ISPAD 2023
ROTTERDAM, THE NETHERLANDS

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Pediatric diabetes in a rapidly changing world

ABSTRACT BOOK

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ORAL SESSION I: DIABETES CARE, EDUCATION AND GENETICS

O-02 | Effect of glycemic control in type 1 diabetes on genome-wide DNA methylation profile

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Introduction: Glycemic control regulation is crucial, since hyperglycemia causes micro- and macrovascular complications. Growing evidence suggests that hyperglycemia influences the development of vascular complications through DNA methylation.
Objectives: Our objective was to elucidate differentially methylated loci in individuals with Type 1 Diabetes (T1D) who exhibit no indications of chronic diabetic complications, and to conduct a comparative analysis between suboptimal and optimal glycemic control management.
Methods: The study included 20 participants with T1D, aged between 13 and 21 years and with T1D for at least 5 years. Participants' DNA was isolated from blood samples and pooled according to their mean values of glycated hemoglobin (HbA1c). Participants were classified into two groups: HbA1c < 7% (10 participants) vs. HbA1c > 8% (10 participants).
DNA methylation was detected on a native DNA using PromethION platform (Oxford Nanopore Technologies). Statistical analysis was done with R packages DSS for differential analysis, annotatr for gene annotation, and clusterProfiler for Kyoto Encyclopedia of Genes and the Genomes (KEGG) signaling pathway enrichment analysis.
Results: A total of 8385 differentially methylated sites including 4575 hypomethylated and 3810 hypermethylated according to group HbA1c>8% were detected in 1802 genes. These genes were enriched for 48 KEGG signaling pathways. The top five pathways were phospholipase D signaling pathway, phosphatidylinositol signaling pathway, retrograde endocannabinoid pathway, Rap1 signaling pathway, and endocytosis.
Conclusions: Our results show that different regulation of glycemic control in blood samples of participants with T1D without signs of chronic diabetic complications altered DNA methylation patterns. Several of statistically significant signaling pathways were already associated with pathology of vascular complications. These changes could contribute to an early identification of risk for development of micro- and macrovascular complications in T1D.

O-03 | Larger decrease in HbA1c from onset of type 1 diabetes in children and adolescents in recent years in Sweden

I. Steineck[1,2], J. Anderzén[3], K. Eeg-Olofsson[4], J. Ekelund[5], S. Gudbjornsdottir[5], L. Hanberger[6], J. Nåtman[5], A. Pundziute-Lycka[7,8], U. Samuelsson[9], S. Särnblad[10,11], K. Åkesson[6,3], R. Hanas[7,12]
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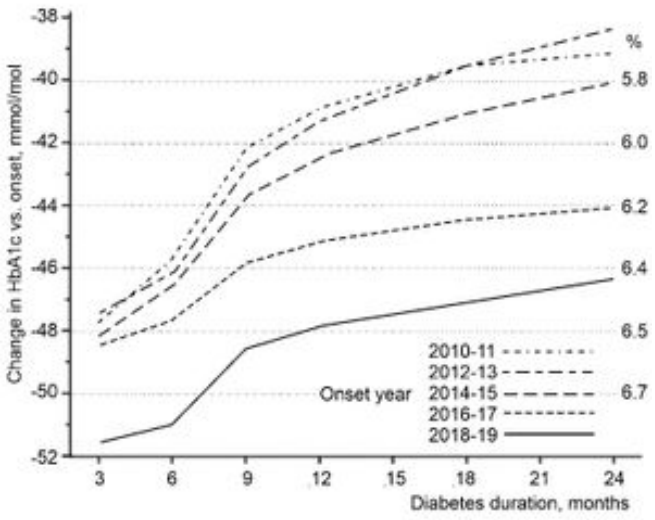
Introduction: HbA1c has decreased considerably in Sweden in recent years. The pediatric HbA1c target was lowered to 48 mmol/mol (6.5%) in 2017.

Objectives: The aim of this study was to investigate changes in HbA1c during the first two years after diagnosis in 2010-2019 in 2-year periods.
Methods: The Swedish National Diabetes Register collects data every ~3 months and has > 95% coverage up to age 18 years. We collected all available HbA1c data and diabetes duration for children and adolescents with diagnosis of type 1 diabetes between 2010 and 2019.
Results: 6,891 patients were followed over two years from onset (48,292 HbA1c values). There was a continuous decrease in mean HbA1c 24 months after onset from 56.0 mmol/mol (7.28%) in 2010/11 to 50.5 mmol/mol (6.77%) in 2018/19. Mean 2-year HbA1c at onset varied between 92.9±25.2 and 96.5±25.4 mmol/mol (10.7±2.3 and 11.0±2.3%). The initial drop in HbA1c from onset until 3 and 6 months has increased each year, especially after 2015. CGM use was high (89.5%) already in 2014 when registering of this variable started. Pump use increased from 38.6% in 2010/11 to 66.5% in 2018/19.



Conclusions: A larger decrease in HbA1c from onset can be interpreted as an intensification of initial diabetes teaching and treatment. Aiming for as low as possible HbA1c 3-4 months after diagnosis may be a modifiable factor that can result in better long-term control. The increased use of diabetes technology and the decreased HbA1c target may both have contributed to the considerable lowering of HbA1c during the study years.

O-04 | Evaluation of the UK's nationally commissioned NHS children and Young people's diabetes digibete platform and app

M. Julian[1], F. Campbell[2], C. Mullier[2], F. Hanson[2], R. Julian[3], J. Hughes[3]
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Introduction: DigiBete: A community-led, clinically approved NHS self-management Platform and App for Children, Young People and their Families (CYPF) with Type 1 Diabetes (T1D).
Objectives: An independent academic team was commissioned to evaluate the utility of DigiBete in respect of the self-management education and improved outcomes for CYPF with T1D, to confirm DigiBete's on-going efficacy and value as a resource for both Healthcare Professionals and CYPF.
Methods: 4 sites took part in the evaluation. A mixed methodology of quantitative and qualitative data were employed.
Quantitative: Two main data sources:
1. CYPF App data captured via the DigiBete database
2. Online surveys with HCPs (N=178 respondents), CYPF (N=1,165 respondents,) evaluating the impact of the platform.
Qualitative: Interviews, n=28 participants from total sample n=14 CYPF and n=14 HCPs.
The CYP at the 4 sites were aged 5 to 17 years. HCPs included Consultants, Diabetes Specialist Nurses, Dietitians and Psychologists.

	Gateshead	*Wigan*	*South Tyneside & Sunderland*	*Southampton*
App Users	188	246	294	411
App User Gender (*only male & female reported)	65% Female 34% Male	50% Female 50% Male	54% Female 46% Male	54% Female 44% Male
Average Diagnosis Length	4.0 years	3.1 years	3.7 years	4.2 Years
Videos Viewed	776	1,468	932	1,679
Number of Quizzes Passed	207	136	293	266
Average Quiz Score	68%	69%	62%	61%
Awards Achieved	35	45	35	67

Table 1. DigiBete app user information.

Results: N=1,139 DigiBete App users found across the sites, indicated a wide reach across the service. App users had been diagnosed between 3.1 and 4.2 years indicating the resource is valuable in maintaining diabetes self-management.- 4,855 Videos viewed across the participating sites, an average of 1,213

videos per site- 84% HCPs reported they agreed that having access to the DigiBete App helped patients to manage their T1D- 95% Respondents agreed that they would recommend DigiBete
- 58% HCPs agreed or strongly agreed that the DigiBete App was saving their service time and money
Conclusions: Healthcare Professionals demonstrated a comprehensive understanding of the benefits of DigiBete enabling their CYPF to embed the App as part of standard care. This has positively influenced the adoption of DigiBete with an average of 226 quizzes being achieved per site, 1 per user. This learning can help develop skills essential for living with T1D. The model is now being extended to Pakistan.

O-05 | IDEAL (ISPAE Diabetes Education and Learning) –a wholly virtual, structured, intensive pediatric diabetes educator (PDE) training program in India for limited resource settings seems to be a successful and cost-effective game changer

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Introduction: A virtual, intensive, 12-week 24 session 48h program imparting basic & advanced T1D care skills – IDEAL - was initiated in India in 2021.
Objectives: To assess short-term outcomes of the IDEAL program
Methods: Demography, test scores, feedback from faculty + PDEs of batches 1-3 (>6 mo post-course) were analyzed.
Results: So far, in 4 batches trained: 107 trainees enrolled: women: 88%; T1Ds: 23%, attendance: 93%; certified 83.2%. Wide geographic & linguistic spread-trainees from non-metros increased to 41% by batch 4 (In ongoing batch 5: Nepal, Mauritius, Dubai also).
Mean scores: pre-test 65.2% (±3.5) improved significantly to 76.2% (±5.3); exit exam 72.7% (±2.8).
(a) WhatsApp group of IDEAL PDEs & faculty has promoted networking, higher visibility, information sharing on facilities, online meetings, trained personnel and quacks.
(b) Directories of IDEAL PDEs and pan-India resource centers compiled on ISPAE website. Could sensitize the National Commission for Protection of Child Rights (Govt of India), which:
(c) issued directive to all School Boards, to permit diabetes self-care during exams and otherwise also; and;
(d) started action against a quack. Batch 1-3 PDEs reported 90-100% greater ability to advise insulin, diet and exercise self-adjustments; motivate for & handle regular intensive SMBG, teach hypo-& hyperglycemia & DKA prevention; handle psychological issues and take on greater responsibilities. 80-90% higher job satisfaction; more able to motivate for and handle CGM, communicate better; handle manipulative behaviors. 60-70% better pan-India networking, taking new initiatives, teaching in outreach programs & meetings. 38% career growth helped.
Eager enquiries are coming from several places. However, language barriers and variable backgrounds of PDEs continue to pose problems. Ongoing reinforcement and deeper penetration into smaller areas needed.
Conclusions: IDEAL PDE program appears to be accessible and effective, already improving ability to provide T1D care in limited resource settings like India.

O-06 | Role of HNFA1 gene variants in pancreatic beta cells function and glycemic control in young individuals with type 1 diabetes

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Introduction: HNF1A transcription factor, implicated in the regulation of pancreatic beta cells, as well as in glucose and lipid metabolism, is responsible for type 3 maturity-onset diabetes of the young (MODY3). HNF1A is also involved in increased susceptibility to polygenic forms of diabetes, such as type 2 diabetes (T2D) and gestational diabetes (GD), while its possible role in type 1 diabetes (T1D) is not known.
Objectives: To investigate in young individuals with T1D subjects the association of common genetic variants in *HNF1A* gene with T1D susceptibility and clinical traits related to beta cell function (IDAA1c), glycemic control (HbA1c), kidney (eGFR, ACR) and metabolic function (lipids, BMI).
Methods: 277 children and adolescents with T1D and 140 healthy controls were recruited. Genotyping was conducted by Illumina Infinium Global Screening Array (GSA v3.0). Genotype calling was performed with the GenomeStudio software (Illumina, Inc.). The following SNPs in *HNF1A* gene were selected: rs1169286, rs1169288, rs7979478, rs2259816. Through linear or logistic regression analysis, we analyzed their association with T1D susceptibility and related-clinical traits (i.e., Insulin-dose adjusted glycated hemoglobin A1c (IDAA1c), glycated hemoglobin (HbA1c), standardized BMI (BMI-SDS), lipids levels, albumin to creatinine ratio (ACR) and estimated glomerular filtration rate (eGFR)).
Results: No association between *HNF1A* SNPs and T1D development emerged. We found that rs1169286 was associated with IDAA1c and HbA1c values (p-value = 0.0027 and p-value = 0.0075, respectively), while rs1169288 was associated with IDAA1c (p-value = 0.0081).
Conclusions: Our findings suggest for the first time that *HNF1A* variants may be a risk factor for beta cell function and glycemic control in T1D subjects.

O-07 | Trend analysis of quality indicators of diabetes therapy in children and adolescents with type 1 diabetes considering possible joinpoints

K. Strehle[1,2], M. Holder[3], C. Boettcher[4], U. Menzel[5], B. Rami-Merhar[6], H. Bartelt[7], A. Galler[8], D. Klose[9], K. Warncke[10], S. Lanzinger[1,2]
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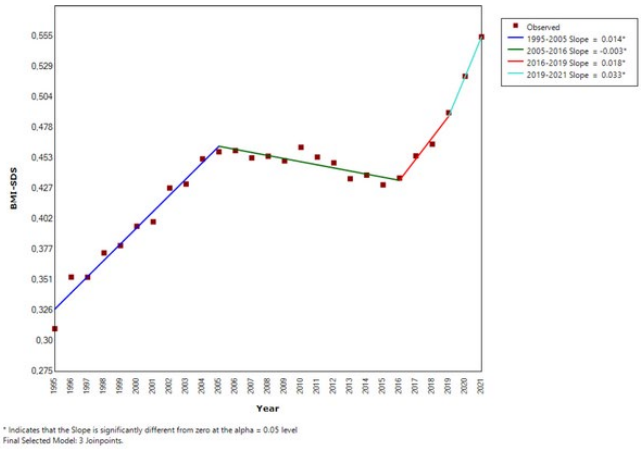
Introduction: Joinpoint regression can be used to study breakpoints in time trends.
Objectives: Our objective was to investigate temporal trends in diabetes treatment and outcomes in children and adolescents with type 1 diabetes (T1D) from 1995 to 2021 using joinpoint regression. Moreover, we aimed to study linear, quadratic or cubic relationships over time.
Methods: Individuals with T1D <21 years of age (diabetes duration ≥3 months) registered in DPV were included. Linear, Poisson and logistic regression were used to study temporal trends of HbA1c, BMI-SDS, insulin pumps (CSII), continuous glucose monitoring systems (CGM), event rates of severe hypoglycaemia and diabetic ketoacidosis (DKA) adjusting for sex,

age, diabetes duration and migratory background. Joinpoint regression was conducted to study breakpoints in temporal trends.

Results: In 96,216 children and adolescents with T1D, a cubic increasing trend in BMI-SDS was observed (1995: 0.3 (SE 0.01), 2021: 0.6 (0.01) with 3 joinpoints showing a steeper increase in 2016-2019 and 2019-2021 (Figure 1). We found a linear decrease in HbA1c (1995: 8.2% (0.03), 2021: 7.6% (0.01)) with 2 joinpoints in 2006 (slope 0.04) and 2009 (slope -0.03). Event rates of hypoglycaemia decreased from 1995 (16.9 events / 100 PY (0.01)) to 2021 (8.0 events / 100 PY (0.004)) with a most pronounced nearly linear decrement in 2011-2014 (slope -2.5). DKA remained stable over time (1995: 1.9 events/ 100 PY (0.003), 2021 (1.8 events / 100 PY) (0.001)). CSII increased consistently from 1995 (0.4% (0.001) to 2021 (60% (0.003), and CGM use was 16.8% (0.002) in 2016 and (81.5% (0.002) in 2021.



Conclusions: Trend analysis of individuals with T1D showed improved metabolic control and an increase in diabetes technology, but also increases in BMI-SDS and stable DKA over time. Joinpoints might reflect approval of innovative treatment devices; however, other factors, such as lifestyle changes, might also play a role in the observed breakpoints.

O-08 | Clinical outcomes in children with type-1-diabetes with early versus late diagnosis: analysis from the DPV registry

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Introduction: Efforts have been made to increase early detection of type 1 diabetes (T1D). Earlier initiation of insulin treatment has been discussed to preserve beta-cell function.

Objectives: To compare clinical parameters of pediatric T1D patients with early, average and late diagnosis and treatment initiation.

Methods: In a population-based analysis, data from 17,924 children and adolescents with newly diagnosed T1D between 2015 and 2020 were retrieved from the DPV registry in March 2023. Data at diabetes onset and during 4 years of follow-up were analyzed. Statistical analyses included locally weighted scatterplot smoothing and regression models

adjusted for sex, age, insulin pump use, immigrant background, and repeated measurements. Laboratory-measured HbA1c values and those estimated from CGM were aggregated into a combined glucose indicator (CGI).

Early diagnosis was defined as HbA1c at first presentation < 1st age-dependent quartile (Q1) and absence of DKA, unconsciousness, and weight loss > 3 kg. Late diagnosis was defined as any of the following: HbA1c > age-dependent Q3, glucose > 600 mg/dl, DKA, unconsciousness, or weight loss > 3 kg. Patients with neither late nor early diagnosis were assigned average diagnosis.

Results: At T1D manifestation, patients with early, average and late diagnosis had a median age of 9.50 [Q1; Q3: 6.01; 12.84], 9.14 [5.79; 12.63], and 10.18 [6.23; 13.23] years, respectively. 60.5%, 54.3%, and 53.5% of them were male, respectively. In patients with early diagnosis, CGI was still lower 4 years after manifestation than in patients with late diagnosis (7.50% [7.42;7.57] (mean [95% confidence interval]) vs. 7.76% [7.71;7.81]). Similarly, BMI-SDS was lower 4 years after manifestation, and the daily insulin dose remained lower until 2 years after diagnosis.

Conclusions: During the first 4 years of follow-up, pediatric T1D patients diagnosed early have better glycemic control than those diagnosed late. Potential long-term benefits of early initiation of insulin treatment need to be evaluated.

O-09 | Ten years with improved care of pediatric diabetes in nordic countries

J. Svensson[1], K. Åkesson[2], S.J. Kummernes[3], T. Skrivarhaug[4], N.H. Birkebæk[5], E. Konradsdottir[6], R. Bjarnason[6], A.K. Tuomaala[7], M.-A. Pulkkinen[7], R. Jussila[7], A.P. Lyckå[8], on behalf of the NordicDiabKids

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Introduction: Benchmarking between registers have been part of Nordic collaboration for decades

Objectives: To report 10 years of HbA1c, BMI and severe hypoglycemia in a Nordic pediatric type 1 diabetes population and describe possible drivers.

Methods: Data were captured from each registry from the years 2012 to 2022 including the age group 0-18 years and descriptive statistics were applied for each country and year separately.

Results: On average 13640 children were followed per year with an average age of 12.5 years and diabetes duration of 4.9 years. Demographics were comparable over the years with no or limited changes in mean age, diabetes duration and gender distribution over these 10 years.

All Nordic countries (Norway (N), Finland (F), Denmark (D), Sweden (S) and Iceland (I)) experienced a parallel decrease in HbA1c of 10 mmol/mol or more (N: 72 to 56.9; F: 68.7 to 59.0; D: 66.7 to 55.7; S: 61.7 to 51.3 and I: 70.7 to 60.3 mmol/mol).

For those with available registration of severe hypoglycemic events there was a decrease (N: 4.8 to 1.6%; D: 3.8 to 0.9% and S: 3.0 to 2.3%) and an increase in BMI (N: 20.5 to 21.2; D: 20.1 to 20.9 kg/m^2) over the past decade.

Different events and changes with a possible impact on the improvement have been introduced such as quality improvement programs, targets and access to new technology (Table 1).

This reduction in HbA1c translates into a decreased risk of late complications such as retinopathy of more than 40% and cardiovascular disease according to https://steno.shinyapps.io/T1RiskEngine/ of more than 12%.

Country	Quality improvement program	Intermittent CGM	Automatic insulin delivery	HbA1c target 58 mmol/mol	HbA1c target 53 mmol/mol	HbA1c target 48 mmol/mol
Norway	2017	2016	2020	2015	2019	2023
Finland	2015	2016	2019	2014	2018	NA
Denmark	2020	2018	2021	2015	2020	NA
Sweden	2010	2014	2020	2012	2013	2017
Iceland	2017	NA	2021	2014	2017	NA

Table 1.

Conclusions: In the last decade the Nordic countries have experienced parallel improvement in the quality indicators HbA1c and severe hypoglycemia, but at the same time a small increase in BMI. There are several possible drivers of these changes including quality improvement programs, new technology and changing targets of which Sweden have been the leading force.

O-10 | Glucose control of migrant children with type 1 diabetes in Lombardy

B. Dionisi[1,2], G. Frontino[1,2], A. Rigamonti[1,2], V. Castorani[1,2], E. Morotti[1,2], F. Sandullo[1,2], F. Scialabba[1,2], R. Foglino[1,2], F. Arrigoni[1,2], C. Morosini[1,2], G. Olivieri[1,2], F. Meschi[1,2], G. Barera[1,3], R. Bonfanti[1,2,3]
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Introduction: Migrant status may obstacle the management of type 1 diabetes (T1D) and the use of diabetes technologies. Patients at our center represent approximately 40% of children with T1D in Lombardy.
Objectives: Our aim was to compare glucose control and treatment choice of migrant children with T1D visited by our center in 2021 and 202 vs all patients followed at our center sec Sweet database.
Methods: Auxological parameters, HbA1c (%), type of glucose monitoring [by blood (BGM), flash (FGM) or continuous (CGM)glucose monitoring], and treatment modality [multiple daily injection (MDI) insulin therapy, sensor augmented pump (SAP), advanced hybrid closed loop (AHCL)] were recorded.
Results: Migrant population: 78 patients (35F, 43M), mean age 13yrs±4, mean BMI-SDS 0.70, mean HbA1c 7.9±1.6. Of these, 63 (81%) use MDI (2 use BGM, 61 use FGM) and 15 (19%) use pumps (2 SAP, 12 AHCL, 1 pump user with BGM). HbA1c is not significantly different between pump and MDI users (7.37±1.18 vs 8.05±1.71). Regarding all the 878 children with T1D followed at our center: mean age 13.1yrs, mean BMI-SDS 0.59, mean Hb1Ac 7.02±1.12. Of these, 49.4% are pump users (mean Hb1Ac 6.7%) and 48.4% MDI users (mean Hb1Ac 7.3%). HbA1c is significantly higher in migrant children vs overall ($p<0.0001$).
There is no significant difference in HbA1c between migrant pump users vs overall. Other parameters are not significantly different.
Worthy of attention is the finding of a higher HbA1c value in pump users migrants compared to the total sample of patients in our center who use insulin pumps.
Conclusions: Migrant T1D children followed at our center are less likely to use technology and consequently have suboptimal glucose control. Although technology has evolved to play an evermore central and less cumbersome role in T1D treatment, its use in ethnic minorities is less than desirable. A more tailored healthcare system must be implemented in order to promote the use of advanced technologies in all children with diabetes regardless of cultural background.

ORAL SESSION II: DIABETES COMPLICATIONS AND ASSOCIATED DISEASES

O-11 | Risk of renal complications and death in Young and middle-aged swedes with familial type 1 diabetes - a nation-wide, prospective study

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Introduction: Type 1 diabetes is a multifactorial disease with a strong genetic component. Around 8 % of children with type 1 diabetes have a parent with the same condition.

Objectives: We wanted to examine the risk of long-term complications in a cohort with childhood-onset type 1 diabetes, comparing individuals with familial (FD) to sporadic (SD) type 1 diabetes.

Methods: From 1977 to 2010, we included 16 572 individuals with type 1 diabetes diagnosed before 15 years of age. Of these, 1 390 (8.4%) had at least one parent with the same disease at the time of diagnosis. FD (cases) and SD (controls) individuals were linked to the National Cause of Death and Patient Registers, from which we obtained information on date of death and renal failure diagnoses.

End of study for registered diagnoses and deaths were 2019 and 2020, respectively.

For a subset (n=9 579), we acquired HbA1c levels in young adulthood from the National Diabetes Register.

Results: Mean age at onset in FD and SD were 8.4 ± 3.93 and 8.7 ± 3.83 years, respectively. At end of study, 55 individuals with FD had died and 159 had received a diagnosis of renal failure (RF), compared to 455 and 1400 in the SD group (Table).

The Cox's proportional hazard ratios for death and RF diagnosis in FD compared to SD were 1.33 (95% CI 1.00, 1.75) and 1.27 (95% CI 1.08, 1.50), respectively. Mean HbA1c at 20-30 years of age in the FD group was significantly higher compared to the SD group (67.85 mmol/mol vs.65.81 mmol/mol, p = 0.004).

	Familial T1D (n=1 390)[1]	Sporadic T1D (n=14 311)[1,2]	P-value[3]
Women	666 (47.9)	6 735 (47.1)	0.56
Men	724 (52.1)	7 576 (52.9)	
Age at T1D onset (years)			
Total	8.4 (3.93)	8.7 (3.83)	<0.001
Women	8.2 (3.79)	8.6 (3.68)	0.01
Men	8.5 (4.06)	8.9 (3.96)	0.03
Renal failure (n)			
Total	159 (11.4)	1 400 (9.8)	0.03
Women	76 (11.4)	680 (10.1)	0.25
Men	83 (11.5)	720 (9.5)	0.07
Age at renal failure diagnosis (years)			
Total	27.9 (7.9)	28.6 (8.0)	0.30
Women	27.5 (7.7)	27.5 (7.7)	0.99
Men	28.3 (8.1)	29.6 (8.2)	0.15
Follow-up time to renal failure, death or end of study (months)			
Total	266.3 (108.1)	275.8 (108.8)	0.001
Women	263.7 (107.1)	275.9 (109.3)	0.08
Men	268.6 (109.0)	275.6 (108.4)	0.01
Deaths (n)			
Total	55 (4.0)	455 (3.2)	0.13
Women	25 (3.8)	156 (2.3)	0.03
Men	30 (4.1)	299 (3.9)	0.77
Age at death (years)			
Total	30.7 (10.8)	31.9 (10.6)	0.44
Women	30.0 (11.1)	31.1 (10.9)	0.66
Men	31.3 (10.8)	32.4 (10.4)	0.61
Follow-up time to death or end of study (months)			
Total	290.6 (112.8)	297.6 (111.5)	0.26
Women	288.2 (110.8)	299.9 (111.5)	0.01
Men	292.7 (114.6)	295.4 (111.6)	0.54

[1]Data are numbers and percentages or means and standard deviations (SD). In total, 16 572 were included. Of these, 871 had missing information on parental T1D. [3]P-values are differences between familial and sporadic groups.

Table. Number of deaths and renal failure diagnoses in individuals with familial and sporadic type 1 diabetes (T1D).

Conclusions: Individuals with FD had higher mean HbA1c at 20-30 years and small but significantly elevated risks of kidney failure and death compared to those with SD. Although the exact mechanisms behind these differences are unclear, we suggest that individuals with familial type 1 diabetes be a prioritized group in health care.

O-12 | The improvement of Neuregulin-4 level and vascular complications after using metformin in adolescents with type 1 diabetes mellitus treated with intensive insulin therapy: a randomized controlled trial

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Introduction: Neuregulin-4 (Nrg4), a recently identified adipokine, has been found in multiple organs, in particular brown adipose tissue. Lower Nrg4 levels have been associated with obesity, insulin resistance, impaired glucose tolerance and type 2 diabetes mellitus (T2DM).

Metformin has shown some potential in preclinical studies to improve diabetic nephropathy, decrease advanced glycation end products, which mediate some diabetic complications, decrease oxidative stress in endothelial cells and tends to reduce cardiovascular morbidity and mortality.

However, no enough data as regards metformin effect on vascular health and microvascular complications in pediatric patients with T1DM.

Objectives: We performed a randomized-controlled trial to assess the effect of oral supplementation with metformin on glycemic control, lipid profile, Nrg4 levels and carotid intima media thickness (CIMT) as a marker for subclinical atherosclerosis in pediatric T1DM patients with micro-vascular complications.

Methods: This study included 100 children and adolescents with T1DM. Enrolled patients aged 12-20 years with disease duration ≥ 5 years and have microvascular complications.

Patients were randomly assigned into two groups; intervention group who received oral metformin tablets 500 mg once daily. The other group did not receive any supplementation and served as a control group. Both groups were followed-up for 6 months with assessment of fasting blood glucose (FBG), HbA1c, Nrg4 levels, lipid profile, c-reactive protein (CRP), urinary albumin creatinine ratio (UACR) and CIMT.

Results: Both groups were well-matched as regards baseline clinical characteristics and laboratory parameters ($p>0.05$). After 6 months, metformin therapy for intervention group resulted in a significant decrease of FBG, HbA1c, total cholesterol, C-reactive protein (CRP), urinary albumin creatinine ratio (UACR) and CIMT while Nrg4 levels were increased compared with baseline levels ($p<0.001$) and compared with control group ($p<0.001$).

Metformin therapy was well-tolerated with minor gastrointestinal disturbances (nausea, heartburn, flatulence and diarrhea). Baseline Nrg4 levels were negatively correlated to FBG, HbA1c, total cholesterol, CRP and CIMT ($p<0.001$ for all).

Conclusions: Metformin therapy improved blood glucose levels, glycemic control, dyslipidemia and elevated Nrg4 levels and hence, decreased inflammation, microvascular complications and subclinical atherosclerosis in pediatric patients with T1DM.

O-13 | Sweat gland nerve fiber density and association to sudomotor function, symptoms, and risk factors in adolescents with type 1 diabetes

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Introduction: Neuropathy is common in adolescents with diabetes; however, research on autonomic neuropathy is sparse and quantification of the sudomotor innervation is never done before in a pediatric population.

Objectives: To quantify sweat gland nerve fiber density (SGNFD) in adolescents with a type 1 diabetes (T1D) duration above five years. In addition, to investigate associations between SGNFD, quantitative sudomotor axon reflex test (QSART), and possible risk factors for abnormal tests indicating sudomotor neuropathy.

Methods: Cross-sectional study where sixty adolescents with T1D and 23 control subjects were included. Clinical data, biochemical data, QSART, and skin biopsies from the distal leg were obtained. Skin tissue was immunostained and imaged by confocal microscopy.

Quantification of the sweat gland volume and three-dimensional reconstruction of the nerve fibers were performed using a design-unbiased technique.

Results: In total, 452 sweat glands (SG) were analyzed with a mean of 5.5 SG per individual. Adolescents with T1D had a significant reduction of maximum and mean values of total nerve fiber length (NFL) and SGNFD compared to controls (NFL $p<0.01$, $p=0.03$; SGNFD $p<0.01$, $p=0.02$, respectively).

Sweat gland volume (SGv) was similar between groups ($p=0.24$). Higher NFL was associated with both higher SGv and SGNFD ($r=0.77$ and $r=0.78$, both p values <0.05) and a trend toward higher NFL leading to higher sweat response was observed ($r=0.24$, $p=0.07$).

No association between SGNFD and QSART was found ($r=0.16$, $p=0.21$). In cases with reduced SGNFD, SGv, and NFL, the sweat response was reduced or absent. Height, systolic blood pressure, total daily insulin dose, and basal/total insulin dose were positively correlated to sweat response, while low-density lipoprotein, and HbA1c (mean last 5 yrs) were negatively correlated to sweat response (all p values <0.05).

Other microvascular complications and high cholesterol levels increased the relative risk for reduced SGNFD.

Conclusions: Adolescents with T1D have significantly reduced NFL and SGNFD, but not SGv compared to control subjects. Evaluating all three parameters; NFL, SGv, and SGNFD were important for understanding the association with sweat responses obtained by QSART.

Three-dimensional reconstruction of sudomotor innervation adds important information about the distribution of structural nerve damage and allowed for distinguishing between structural and functional changes indicating sudomotor autonomic dysfunction.

O-14 | Glycosylated hemoglobin correlates with anti-human transglutaminase antibodies in children and youths with type 1 diabetes and new onset celiac disease

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Introduction: Type 1 diabetes mellitus (T1D) individuals have always been considered an "at risk" population for celiac disease (CD) due to the common immunogenic background.

Objectives: Aim of this study was to evaluate clinical, laboratory and histological characteristics in a large cohort of pediatric patients with T1D at CD diagnosis.

Methods: Retrospective multicenter observational study. Data were collected from 19 pediatric diabetes centres of the Italian Diabetes Study Group of ISPED. Children and adolescents diagnosed with T1D (ages 0-20 years) and CD, from January 2010 to December 2019, were included and compared with patients with T1D only enrolled at Coordinating Centre. Exclusion criteria were non-autoimmune diabetes; age > 20 years; anthropometric and biochemical data not available; diagnosis of CD not made according to ESPGHAN 2012 guidelines.

Clinical, anthropometric and laboratory data were recorded. Continuous data presented as mean + SD, categorical variables as frequencies and percentages. Clinical differences evaluated by independent t-test. The independent relationship between categorical variables analyzed by Pearson's correlation analysis. In this study a $P<0.005$ was considered statistically significant.

A comparison between the ratio of the measured value of anti-TG2 to the upper limit of normal (ULN), rounded to whole numbers, and expressed as fold-anti-TG2, was made.

Results: 461 patients (82.9% male, median age 85.89 + 48.51 months) affected by T1D and CD (T1D-CD) and 141 patients affected only by T1D were enrolled: 33% (154) had a concurrent diagnosis of T1D and CD; 5.6% (26) had a diagnosis of CD before the onset of T1D, 61% (281) had a diagnosis of CD after T1D. A significant difference between cases and controls was observed for both glycosylated hemoglobin (A1c) value and fold-anti-TG2 (p=0,000).

Conclusions: Pediatric individuals with dual autoimmunity (T1D+CD) do not experience typical symptoms of CD and show worse glucometabolic control.

O-15 | Resting metabolic rate in Indian adolescents and youth with type 1 diabetes mellitus: a case controlled study

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Introduction: Energy metabolism in type 1 diabetes (T1D) is known to be different. Resting metabolic rate (RMR) accounts for the largest portion of total energy needs. The objective of our study was to assess resting metabolic rate and its determinants in adolescents and young adults with T1D in comparison with age and gender matched healthy controls.
Objectives: The objective of our study was to assess resting metabolic rate and its determinants in adolescents and young adults with T1D in comparison with age and gender matched healthy controls.
Methods: This cross-sectional study included 97 children and young adults (10-19 years) with type 1 diabetes having disease duration of at least 6 months. For the control population, 95 age and gender matched healthy adolescents were enrolled.
Results: Adolescents with T1D were significantly shorter, had significantly lower calorie intake, higher RMR and volume of oxygen consumed (VO2) as compared to the healthy controls. RMR adjusted for weight showed a significant positive correlation with lean body mass (LBM) percent, energy intake and a negative correlation with disease duration.
Those with T1D duration less than 5 years demonstrated a significantly higher RMR, lower body fat percentage, higher LBM percent, carbohydrate and energy intake/kg body weight and higher calculated insulin sensitivity (IS) as compared to those with greater disease duration.
Muscle mass percentage, higher energy intake were found to be significant positive predictors and advancing age/ diabetes duration, a negative predictor of weight-adjusted RMR ($p<0.05$), while IS and male gender tended towards significant negative association ($p=0.06$).
Conclusions: Indian children with type 1 diabetes had a higher resting metabolic rate as compared to healthy children. Muscle mass, energy intake and diabetes duration were observed to be important predictors of RMR in T1D. Reduction in RMR with advancing age/disease duration may predispose to weight gain and subsequent double diabetes in T1D.

O-16 | Prevalence of LDL-hypercholesterolemia and other cardiovascular risk factors in young people with type 1 diabetes

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Introduction: The main cause of mortality and morbidity in people with Type 1 diabetes (T1D) is cardiovascular disease (CV). Early detection and treatment of cardiovascular risk factors (CVRFs) is of great importance.
Objectives: To analyze the prevalence of LDL-hypercholesterolemia and other CVRFs in youth with T1D
Methods: Prospective study recording clinical and laboratory parameters as well vascular thickness measurement in youth with T1D (age 6-18 years, T1D duration >1 year) attending a diabetes clinic. LDL-hypercholesterolemia, microalbuminuria and arterial hypertension were defined as CVRFs.
Results: 333 youth (48% girls; age: 13.3 years [10.3-15.5], T1D duration: 5.9 years [3.5-9.4], HbA1c: 7.4% [6.8-8.0]; Intima Media Thickness: N=223, 538.0 µm [470.0-618.0], median [IQR]) participated. LDL-hypercholesterolemia was present in 30 participants (9%; 18 girls; age: 14.3 years [11.2-15.7]).
No participant had persistent microalbuminuria, although 59 (18.3%) had elevated albumin excretion in a random urine spaceman.
Arterial hypertension was present in 11 participants (3.3%; 4 girls; age: 14.1 years [11.1-16.1]). LDL-hypercholesterolemia was associated with a family history of premature CV disease ($p<0.001$), higher blood pressure, higher insulin requirement ($p<0.05$), higher HbA1c ($p<0.05$), higher triglyceride ($p<0.001$) and total cholesterol ($p<0.001$), but lower HDL cholesterol ($p<0.05$) levels.
Sex, pubertal status, duration of diabetes, type of therapy and physical activity did not differ between participants with and without LDL- hypercholesterolemia.
Conclusions: LDL-hypocholesterolemia affected 9% of youth with T1D in this cohort and was associated with other CVRFs. A holistic therapeutic concept for these young people is essential.

O-17 | Using administrative health data to describe adherence to clinical practice guidelines and their relationship with DKA after diagnosis

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Introduction: Clinical practice guidelines (CPGs) for type 1 diabetes (T1D) recommend 2-4 hemoglobin A1c (A1C) tests per year, and routine screening tests for co-morbidities and complications.
Objectives: We described adherence to CPGs and their relationship to diabetic ketoacidosis (DKA) after T1D diagnosis.
Methods: In this prospective longitudinal cohort study, we used population-based administrative data. We included patients aged <18 yrs diagnosed with T1D. We defined adherence to CPGs as: ≥2 A1C tests per year, ≥1 thyroid stimulating hormone (TSH) test every two years, ≥1 urine albumin/creatinine (alb:Cr) test per year among patients age ≥12 and ≥5 years post diagnosis, and ≥1 eye exam per year among patients age ≥15 and ≥5 years post diagnosis. The relationship between adherence in the previous patient year and DKA after diagnosis was assessed with generalized estimating equations and adjusted for year of and age at diagnosis, sex, urban/rural residence, and DKA at diagnosis.
Results: 31,184 person-years (4,935 individuals) were included. Adherence to CPGs was 60% for A1C tests in the first year of diagnosis, 87% for TSH tests in the first two years from diagnosis, and 58% and 54% for alb:Cr tests and eye exams five years post-diagnosis, respectively. Ten years post-diagnosis, adherence was 46% for A1C tests, 82% for TSH tests, and 55% for alb:Cr tests and eye exams. About 2% had DKA in the first year of diagnosis increasing to 4% ten years post-diagnosis. Adherence to A1C tests was associated with over 20% reduced odds of DKA (adjusted odds ratio (AOR)=0.77, 95% confidence interval (CI)=0.68-0.87), while adherence to TSH tests was not associated with DKA (AOR=0.92, 95% CI=0.76-1.12) and there was only some evidence of reduced odds of DKA with adherence to alb:Cr tests (AOR=0.84, 95% CI=0.64-1.08) and eye exams (AOR=0.75, 95% CI=0.48-1.18).
Conclusions: Patients with ≥2 A1C tests per year had significant reductions in DKA. A1C testing is a possible area of focus to optimize and sustain patient engagement in their care.

O-18 | Tear proteomics profile in children and adolescents with type 1 diabetes mellitus versus healthy age- and gender- matched controls reveals new differentiating markers

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Introduction: Previous studies have shown differences in serum, plasma, or saliva proteomics profile in patients with type 1 diabetes mellitus (T1DM), compared with healthy controls.
Objectives: The purpose of this prospective study is to identify the tear proteomics profile in children and adolescents with T1DM followed at the Diabetes Center of the First Department of Pediatrics of the National and Kapodistrian University of Athens, at "Aghia Sophia" Children's Hospital versus healthy controls.
Methods: Fifty-six children with T1DM, with a mean age of 11,5 years, without comorbidities and at least one year after T1DM diagnosis, and fifty-six healthy age- and gender- matched children, were enrolled in the study. Tear sampling was performed with Schirmer strips.
Sample preparation was performed using the SP3 protocol and tryptic peptides were analyzed by high performance liquid chromatography coupled with a Q Exactive HF-X mass spectrometer for the identification and quantification of the tear protein content.
The programs Perseus and Metascape were used for statistics and bioinformatics analyses.

Results: 3302 proteins were identified. Children with T1DM showed higher expression of immunoglobulins, lacritin, apolipoprotein A4, agrin and semaphorin 3E, and lower expression of proteins S100A8 and S100A9, compared to controls.
Within the T1DM group, difference in protein expression, such as complement factors and apolipoprotein E, was observed depending on the level of glycemic control. Finally, markers of exosomes were identified in all tear samples.
Conclusions: Tear proteomics profile of children with T1DM reveals increased immune response and inflammation processes, even twelve months following T1DM diagnosis compared with controls. A more exaggerated inflammatory pattern is observed in children with T1DM and bad glycemic control, compared to those with good glycemic control.
Consequently, tear proteomics could provide biomarkers for early detection of long-term complications in patients with T1DM.

O-19 | Diagnosing coeliac disease in type 1 diabetes: are repeat raised antibodies sufficient?

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Introduction: Coeliac disease (CD) is prevalent in 5-10% of children and adolescents with Type 1 diabetes (T1D). CD diagnosis is often made based on serology alone using TTG.
Objectives: We aimed to evaluate the performance of serological diagnosis in children with newly diagnosed T1D.
Methods: In this retrospective cohort study we analyzed data from the John Hunter Children's Hospital Pediatric Endocrine Database (PED) to evaluate the correlation between TTG levels and other clinical and laboratory parameters in children under 17 years who were diagnosed with T1D between 2012-2023. The eligible patients were divided into two groups based on their TTG within 6 months of diagnosis, and their subsequent normalisation or elevation while on a gluten containing diet, as well as their duodenal biopsy outcomes, Chi-square was used to analyze data.
Results: 383 children with newly diagnosed T1D had TTG measured at or within 6 months of diagnosis and were included. 81/383 (21.1%) had an initial elevated TTG. Among this group, 57/81 (70.3%) had repeat TTG still elevated within 6 months, 47/57 (81%) underwent endoscopy, and 39/57 (68.4%) had positive duodenal biopsies confirming CD and 8/57 (14.0%) had a negative biopsy. Of the 10 patients who had repeat elevated TTG but did not undergo biopsy, two were diagnosed on the basis of serology alone and 8 remained on a gluten containing diet (GCD) from which 1 had subsequent normalisation of antibodies, and no subsequent diagnosis of CD. 24/81 (29.6%) of the subjects with elevated TTG at diagnosis of T1D remained on a gluten containing diet and normalised their antibodies subsequently. 33/81 (40.7%) had CD disproven either by negative biopsy or declining antibodies despite continuing on GCD.
Conclusions: Elevated TTG is common in newly diagnosed T1D patients, 40.7% of these patients in our experience do not have coeliac disease. Our data supports repeated serology after 3-6 months and pursuing a biopsy in patients with persisting TTG elevations to avoid over-diagnosis of CD in T1D. patients.

O-20 | Glycemic variability and time in range affect the risk of overweight and high LDL-cholesterol in children and youths with type 1 diabetes

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Introduction: Cardiovascular diseases (CVD) are the leading cause of death in subjects with Type 1 Diabetes (T1D). Reducing cardiovascular risk factors (CVRFs) exposure is critical for CVD prevention.

Long-term glycaemic control, measured by HbA1c, had been recognized as the main factor affecting CVRFs profile. To date, the possible association between short-term glycaemic control and variability measured by continuous glucose monitoring (CGM) metrics and CVRFs has been explored by a limited number of studies.

Objectives: To test the hypothesis that CGM metrics independently contribute to the exposure to three main CVRFs (overweight, LDL cholesterol, blood pressure [BP]) in children and adolescents with T1D.

Methods: Eight hundred and five children and youths (age 2-18 years) with T1D were enrolled. Anthropometric, BP, HbA1c, lipid profile parameters were collected. CGM metrics were calculated from four and two weeks of data. The association between CGM metrics and CVRFs was explored with bivariate correlation analysis. Binary multivariable logistic regression analyses were performed to test independent associations between CVRFs (cut off defined according to the ISPAD guidelines: BMI>85th percentile,LDL-c>100 mg/dL,BP>90thpercentile) and CGM metrics according to gender and adjusting for confounding factors.

Results: In both genders, metrics of hypoglycaemia and glycaemic variability (coefficient of variation [%CV]) positively correlated with BMI. LDL-c positively correlated with mean glucose and metrics of hyperglycaemia. A negative correlation was found between LDL-c and time in range (TIR). No significant correlations were found between CGM metrics and BP. In both genders, TIR<70% was significantly associated with LDL-c>100 mg/dL (OR 3.1 in males, 2.3 in females). In females, CV>36% was significantly associated with overweight (OR 2.1).

Conclusions: CGM metrics were significantly associated to the risk of overweight in females and high LDL-c in both genders.

ORAL SESSION III: OBESITY, TYPE 2 DIABETES, MONOGENIC AND OTHER FORMS OF DIABETES

O-21 | Relationships among biological sex, body composition, and bone mineral density in Young persons with and without diabetes

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Introduction: Bone mineral density (BMD) assesses bone health, and is influenced by factors such as age, sex, and body composition. Diabetes and obesity affect bone metabolism, but their relationship with BMD in young people remains unclear.

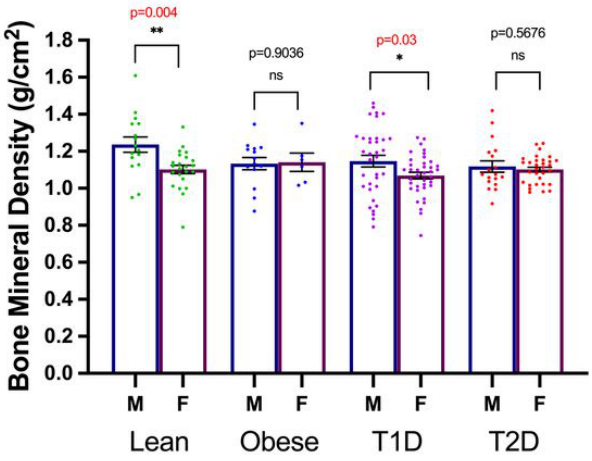
Objectives: This study aimed to investigate sexual dimorphism in BMD in youth with type 1 (T1D) and type 2 diabetes (T2D), and lean and obese controls without diabetes.

We also aimed to evaluate the impact of obesity and diabetes on this dimorphism, and the associations among body mass index (BMI), body fat percentage, and lean mass percentage with BMD.

Methods: A cross-sectional study (n=211) was conducted among youth with T1D (n=87, 19.0±4.6 years, BMI 24.0±4.2 kg/m^2, HbA1c 8.6±1.2, 44% female) and T2D (n=62, 16.1±2.1 years, BMI 37.2±7.7 kg/m^2, HbA1c 6.9±1.6, 50% female), as well as lean controls (n=41, 20.6±5.3 years, BMI 22.7±2.8 kg/m^2, HbA1c 5.2±0.2, 56% female) and obese controls (n=21, 15.4±2.2 years, BMI 37.3±7.4 kg/m^2, HbA1c 5.5±0.3, 29% female). BMD, body fat percentage and lean fat percentage were measured by dual-energy X-ray absorptiometry (DXA), and BMI was calculated from height and weight.

Results: Sexual dimorphism in BMD was observed in T1D (1.15±0.19 vs. 1.07±0.11 g/cm^2; p=0.03) and lean controls (1.24±0.17 vs. 1.10±0.11 g/cm^2; p=0.004), with males having higher mean BMD than females in both groups. However, this dimorphism was lost in individuals with obesity and T2D (*Figure 1*).

Higher BMD associated with higher BMI (r=0.16; p=0.03), higher lean mass (r=0.16; p=0.03) and lower body fat percentage (r=-0.21; p=0.004).



Conclusions: Our study found that the sexual dimorphism observed in BMD for T1D and lean controls was lost in individuals with obesity and/or T2D. Higher BMI and higher lean mass associated with higher BMD, while higher body fat associated with lower BMD.

These findings suggest that the relationship between sex and bone health is complex and may differ according to body composition and diabetes status.

O-22 | Incretins and cardiac autonomic function in youth with obesity across the glycemia spectrum

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Introduction: Incretins, glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP) have been related to vascular function with variable effects depending on obesity status in adults. The relationship of incretins to vascular function in youth is unclear.

Objectives: We hypothesized that endothelial and cardiac autonomic dysfunction (CAD) are related to lower GLP-1 and GIP in response to glucose ingestion in youth with dysglycemia compared with those overweight (OW) or normal weight (NW) and normal glucose tolerance (NGT).

Methods: Adolescents [50 male/52 female; 15.6±1.8 yrs; 24 NW-NGT, 22 OW-NGT, 27 prediabetes and 29 with type 2 diabetes (T2D)] underwent assessment of body composition (DXA scan), 2-hour oral glucose tolerance test (OGTT) with calculation of whole body insulin sensitivity index (WBISI), area under the curve (AUC) of glucose (BG), GLP-1 and GIP. Reactive hyperemia index (RHI), and heart rate variability (HRV), were measured by peripheral arterial tonometry. For HRV, a higher LF/HF (low frequency to high frequency ratio) is indicative of CAD with loss of parasympathetic tone and decreased HRV.

Results: The ratios of AUC-GLP-1 and AUC-GIP to AUC-BG were lower in the groups with dysglycemia compared NGT groups (p=0.016 and 0.001, respectively). GLP-1 and GIP were not related to RHI. Fasting and AUC-GLP-1, but not GIP, negatively related to LF/HF (r=-0.37, p=0.002 and r=-0.43, p<0.001 respectively).

In a linear regression model with LnLF/HF as the dependent variable, AUC-BG (b=0.31, p=0.04) and AUC-GLP-1 (b=-0.44,p=0.002) contributed to the variance in LnLF/HF independent of %body fat, hs-CRP, WBISI, age, sex, race-ethnicity and Tanner stage (R^2= 0.27, p=0.04).

Conclusions: Youth with obesity and dysglycemia have impaired incretin response. Glycemia is negatively, whereas GLP-1 is positively associated with HRV after accounting for adiposity, WBIS and inflammation. GLP-1 may be an important determinant of CA function in youth with obesity across the glycemia spectrum.

O-23 | Discovery of a new treatment for a novel form of rare diabetes caused by an insulin Gene mutation using patients' iPSC-derived β cells

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Introduction: Tailored treatment based on etiology may benefit monogenic diabetes patients. A heterozygous (HET) mutation (c.16C>T, p.Arg6Cys, INSR6C) in the insulin gene has been shown to be diabetogenic and to impair preproinsulin translocation into the endoplasmic reticulum (ER).

Objectives: We discovered a family with homozygous (HOM) and HET INSR6C mutations and examined pathogenic mechanisms and therapeutic options using induced pluripotent stem cell (iPSC) models.

Methods: We reprogrammed HOM- and HET patients' PBMCs into INSR6C iPSCs, CRISPR/Cas9 corrected the INSR6C, differentiated iPSCs into pancreatic β cells, and evaluated the *in vitro* β cells function and GLP-1 analogs (GLP-1a) treatment effect.

Results: A girl developed diabetes at 11 yrs was found to have a HOM INSR6C mutation. (HbA1c 11.9%, C-peptide 3.3 ng/ml, glycemia 286 mg/dL, no ketoacidosis, negative islet autoantibodies). On hybrid closed loop system her HbA1c remained > 8%.

Two HOM uncles had diabetes at 9 and 20 yrs (initially insulin-treated). Her HET father had diabetes at 32 yrs, and her HET mother had impaired glucose tolerance at 41 yrs. HOM INSR6C iPSC β cells showed increased preproinsulin-to-proinsulin ratio (p <0.0001), and lower insulin content and glucose-stimulated insulin secretion (at 16.8 mM, 1.9-fold and 2.5-fold, p <0.05) compared to corrected cells.

HET cells had an intermediate phenotype. GLP-1a exenatide and dulaglutide (50 nM) protected HOM INSR6C β cells from apoptosis induced by thapsigargin, a synthetic ER stressor (1 μM, 48 hours, p < 0.05).

The HET father achieved a HbA1c reduction (10.2% to 6.9%) with a combination of insulin (degludec) and GLP-1a (semaglutide).

Conclusions: We report the first three patients with HOM INSR6C as a cause of diabetes. HOM INSR6C leads to preproinsulin accumulation in β cells and reduces insulin content and secretion. GLP-1a protect HOM INSR6C iPSC β cells from ER stress and improves glucose control in the HET patient. GLP-1a may be considered as a novel treatment option in this young patient.

O-24 | Efficacy and safety of Dapagliflozin (DAPA) or Saxagliptin (SAXA) in youth (Age 10–17 Years) with type 2 diabetes (T2D)

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Introduction: Therapy options are limited for children/adolescents with T2D.

Objectives: T2NOW (NCT03199053) is a 26-week (wk), Phase 3 study with a 26-wk safety extension.

Methods: Patients (Pts) aged 10–17 years with A1C 6.5–10.5% (on metformin, insulin, or both) were randomized 1:1:1 to DAPA 5mg (N=81), SAXA 2.5mg (N=88) or placebo (PBO; N=76). Pts in the DAPA/SAXA arms with A1C ≥7% at Wk 12 were further randomized 1:1 at Wk 14 to continue the dose or up–titrate to DAPA 10mg / SAXA 5mg. Primary endpoint was change in A1C for DAPA or SAXA (all doses) vs PBO at Wk 26.

Results: In the DAPA, SAXA, PBO groups, respectively, mean (SD) age was 14 (2), 15 (2) and 15 (2) yrs, T2D duration 2 (2), 3 (2), and 3 (2) yrs, baseline A1C 8.22% (1.46), 8.02% (1.43), and 7.96% (1.63) and FPG 9.0 (3.6), 9.6 (8.6) and 8.4 (3.2) mmol/L. Overall, 94%, 94% and 90% of pts in each group completed Wk 26. DAPA achieved the primary endpoint. Mean change in A1C was -0.62% for DAPA and 0.41 for PBO; between-arm difference of -1.03% (95%CI -1.57, -0.49; p<0.001). DAPA vs PBO was significant for all secondary endpoints (Table). SAXA did not meet the primary endpoint. Mean change was 0.06 (0.20) for SAXA and 0.50 (0.20) for PBO; between-arm difference of -0.44 (95%CI -0.93, 0.05; p=0.078). Sensitivity analysis showed a benefit vs PBO: difference of -0.89% (95%CI -1.47, -0.31; p=0.003 [per-protocol pts, excludes data after rescue]). SAXA secondary endpoints were not tested (as primary endpoint not met). Adverse events (AEs) and serious AEs occurred in 73 and 9% of DAPA pts, 69 and 8% of SAXA pts, and 71 and 7% of PBO pts. Hypoglycemia occurred in 30, 30 and 29% of pts and diabetic ketoacidosis in 1, 0 and 1 pts, respectively, in each group.

Primary endpoint at Week 26 (DAPA or SAXA)	Treatment regimen	Difference or Odds Ratio versus PBO	95% CI	p-value
Adjusted mean change in A1C	**DAPA all doses combined (5 mg and 10 mg) N=81**	**−1.03%**	**(−1.57, −0.49)**	**<0.001**
Adjusted mean change in A1C	SAXA all doses combined (2.5 mg and 5 mg) N=88	–0.44%	(−0.92, 0.05)	0.078
Secondary endpoints at Week 26 (DAPA only) Adjusted mean change in A1C	DAPA 5 mg pts plus those randomized at Wk 14 to up-titrate to DAPA 10 mg (due to A1C ≥7% at Wk 12)* n=60	–0.86%	(−1.44, −0.27)	0.004
Adjusted mean change in A1C	DAPA pts who receive 5 mg throughout the study n=60	–1.19%	(−1.76, −0.62)	<0.001
Adjusted mean change in FPG	DAPA all doses combined (5 mg and 10 mg) N=81	–1.08 mmol/L	(−2.02, −0.14)	0.024
Adjusted mean change in FPG	DAPA 5 mg pts plus those randomized at Wk 14 to up-titrate to DAPA 10 mg (due to A1C ≥7% at Wk 12)* n=60	–1.04 mmol/L	(−2.07, −0.01)	0.047
Adjusted mean change in FPG	DAPA pts who receive 5 mg throughout the study n=60	–1.12 mmol/L	(−2.11, −0.13)	0.026
Adjusted odds ratio for proportion of pts with baseline A1C ≥7% achieving A1C <7.0% at Wk 26	DAPA all doses combined (5 mg and 10 mg) N=81	3.8†	(1.2, 11.7)	0.019
Adjusted odds ratio for proportion of pts with baseline A1C ≥7% achieving A1C <7.0% at Wk 26	DAPA 5 mg pts plus those randomized at Wk 14 to up-titrate to DAPA 10 mg (due to A1C ≥7% at Wk 12)* n=60	3.5†	(1.0, 11.4)	0.042
Adjusted odds ratio for proportion of pts with baseline A1C ≥7% achieving A1C <7.0% at Wk 26	DAPA pts who receive 5 mg throughout the study n=60	4.4†	(1.4, 13.2)	0.009

*Pts randomized at Wk 14 to continue with DAPA 5 mg were not included in this analysis; †Adjusted odds ratio vs placebo; Data assessed using analysis of covariance (for A1C and FPG analyses) or logistic regression (for proportion of pts); DAPA, dapagliflozin; FPG, fasting plasma glucose; PBO, placebo; pts, patients; SAXA, saxagliptin; Wk, week

Table: Primary and secondary endpoints

Conclusions: DAPA was superior to PBO in reducing A1C and FPG at Wk 26, as add-on therapy in children/adolescents with T2D. SAXA was not superior. Both treatments were well tolerated with no new safety findings.

O-25 | Monogenic diabetes among children and Young adults clinically diagnosed as having type 1 diabetes in Cameroon

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Introduction: Monogenic diabetes is a rare form of diabetes common in children and young adults and can easily be mistaken for type 1 diabetes. Islet autoantibodies and C-peptide testing has been shown to robustly exclude people with type 1 diabetes allowing targeted genetic testing on those who are most likely to have monogenic diabetes.
Objectives: We aimed to establish the prevalence of monogenic diabetes amongst children and young adults with diabetes using a targeted approach based on biomarker screening and genetic testing.
Methods: We studied 259 children and young adults with insulin-treated diabetes diagnosed at an age <30 years attending type 1 diabetes clinics in Yaounde and Bafoussam, Cameroon.
Triple islet autoantibodies (GAD, IA2, ZnT8) were measured in serum using an ELISA technique. Islet autoantibody negative participants were selected for C-peptide analysis. C-peptide was measured in plasma by direct electrochemiluminescence immunoassay technique. C-peptide-positive participants (C-peptide >200 pmol/L) were then selected for genetic testing for all 29 identified causes of monogenic diabetes.
Results: A total of 1.9% of the participants (5 of 259 participants) had monogenic diabetes (1 HNF1A, HNF1B, 1 INSR, 1 Mt: 3243, 1 HNF4A). All participants were started on insulin at the time of diabetes diagnosis. 3 of 5 participants did not have an affected parent with diabetes.
The 2 participants with an affected parent had the Mt: 3243 mutation (Mother) and HNF4A mutation (Mother). The median (IQR) T1DGRS was significantly lower in the participants with monogenic diabetes compared to those with autoimmune type 1 diabetes: 7.94 (7.91 – 10.29) VS 11.61 (9.93 – 12.83), p<0.001.
Conclusions: This first study in sub-Saharan Africa confirms the existence of monogenic diabetes among individuals with young-onset diabetes diagnosed at an age <30 years in Cameroon.
Genetic testing is important to identify those with monogenic diabetes who will benefit from specific treatment among our young diabetic patients.
Keywords: Monogenic diabetes, young-onset diabetes, islet autoantibody, C-peptide, Cameroon.

O-26 | sRAGE: a biomarker of kidney disease in youth-onset type 2 diabetes (T2D)?

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Introduction: The circulating soluble receptor for advanced glycation end-products (sRAGE) has been proposed as a biomarker of diabetes complications in adults.
Objectives: We examined whether sRAGE could serve as a biomarker for vascular function in youth-onset T2D from the TODAY study.
Methods: In TODAY, we measured sRAGE 3 times at: randomization (T1), glycemic failure (HbA1c≥8%) on randomized treatment or midpoint in study (T2), and end of follow-up (T3). Of TODAY subjects, 165 lost glycemic control with HbA1c ≥ 8% (G1) and 135 maintained HbA1c < 8% (G2)].
Controls [n=99, HbA1 5% (4.9,5.2), with similar obesity, sex (60% female), race-ethnicity, median age 24 (21,27) years as the TODAY cohort at T3] had sRAGE measured once.
Multivariable models examined the relationship of sRAGE with nephropathy [urine albumin: creatinine (UACR) ≥30 mg/g, hyperfiltration (eGFR ≥135 ml/min/1.73m^2)] and vascular measures [pulse wave ve-

locity (PWV), augmentation index (AI)], adjusting for treatment, diabetes duration, HbA1c, BMI, age, sex, and race-ethnicity.

Results: At T1, the T2D youth groups had similar age (13.9 yrs), diabetes duration (0.7 yrs), and sex (60% female). sRAGE levels were lower in T2D vs. controls (752.8±308.3 vs. 954.4 ± 356.7 pg/ml, p<0.0001) at T3. By T3 (mean duration 7 yrs), sRAGE levels decreased compared with T1 and T2 in in G1 vs. G2 (p<0.05). sRAGE concentrations were 711.9±294.1 vs. 802.7±318.9 pg/ml, p=0.0032 in G1 vs. G2 at T3, with no significant difference by treatment.

HbA1c was inversely related with sRAGE. Higher sRAGE levels were associated with a lower risk of hyperfiltration (HR=0.93, 95% CI 0.86-0.99, p=0.03) and inversely related to eGFR (p<0.001); no relationships were observed with UACR, PWV, or AI.

Conclusions: sRAGE levels decline overtime in youth with T2D, are inversely related to glycemia, and may serve as a biomarker of kidney function.

O-27 | Associations between diet and oral microbiota diversity in youth with a parental history of obesity: the quality study

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Introduction: Emerging evidence links the oral microbiota to obesity, however associations with diet are unknown.

Objectives: 1) Estimate associations between diet and oral microbiota diversity at ages 8-10 yrs; 2) Examine how associations differ across weight categories.

Methods: Cross-sectional study of 240 children (8-10 yrs) with a history of parental obesity from Québec, Canada (QUALITY study). Energy and macronutrient intakes and foods groups were collected using 3 non-consecutive 24-hour diet recalls.

Total genomic DNA was extracted from supra- and sub-gingival dental plaque samples, and 16S-rRNA based microbial profiling were performed.

Oral microbiota diversity was measured using amplicon sequence variants (ASVs) and Chao1 and Shannon and Simpson reciprocal indices to represent richness and evenness, respectively.

Multivariable linear regressions were adjusted for age, sex, pubertal stage, zBMI, and teeth brushing frequency. Linearity was verified using polynomial terms.

We examined effect modification by weight category (normal vs. overweight/obesity) and sex using interaction terms.

Results: Participants were 9.6 yrs (SD 0.93), 57% were boys, 23% had overweight and 19% had obesity. Evenness was inversely associated with meat servings in a non-linear fashion, with associations attenuating with increasing meat consumption (Table).

Increased intake of sugar-sweetened beverages (SSBs) was positively associated with all indices of diversity among children with overweight/obesity, while associations were not significant among children with normal weight.

	Richness		Evenness	
	ASV β_{ASV} [95% CI]	Chao1 β_{CHAO1} [95% CI]	Shannon $\beta_{SHANNON}$ [95% CI]	Simpson $\beta_{SIMPSON}$ [95% CI]
Fruits and vegetables, servings /1000 kcal	4.7159 [-3.44, 12.87]	5.43 [-3.84, 14.71]	0.033 [-0.019, 0.086]	0.75 [-0.83, 2.32]
Meat, servings /1000 kcal	0.68 [-21.00, 22.37]	0.32 [-24.35, 24.98]	β: -0.51 [-0.98, -0.045] β^2: 0.20 [0.031, 0.37]	β: -19.60 [-33.50, -5.70] β^2: 7.29 [2.27, 12.31]
Dairy, servings /1000 kcal	0.64 [-18.45, 19.74]	0.275 [-21.45, 21.99]	0.045 [-0.077, 0.17]	0.40 [-3.28, 4.08]
Fiber, g/1000 kcal	3.072 [-1.44, 7.59]	3.42 [-1.71, 8.56]	0.026 [-0.0028, 0.055]	0.56 [-0.31, 1.43]
SSBs, 100mL/1000 kcal				
Normal weight	7.90 [-6.07, 21.87]	8.35 [-7.51, 24.20]	-0.02 [-0.11, 0.07]	-1.12 [-3.84, 1.60]
Overweight/ Obesity	31.21 [11.97, 50.45]	37.43 [15.60, 59.27]	0.14 [0.02, 0.27]	4.61 [0.87, 8.35]
Carbohydrates, % of daily energy intake	0.67 [-0.92, 2.26]	0.79 [-1.02, 2.60]	0.0015 [-0.0087, 0.012]	0.12 [-0.18, 0.43]
Saturated fats, % of daily energy intake	-1.95 [-5.62, 1.72]	-2.230 [-6.41, 1.95]	-0.0065 [-0.03, 0.017]	-0.42 [-1.13, 0.28]
Proteins, % of daily energy intake	0.99 [-2.00, 3.99]	1.123 [-2.28, 4.53]	0.0098 [-0.0094, 0.029]	0.032 [-0.55, 0.61]

Table. Multivariable linear regression models of diet and oral microbiota diversity

Conclusions: Associations between diet and bacterial diversity of the oral cavity in childhood suggest differing underlying mechanisms according to food groups and weight categories. It may be that certain food groups are associated with a healthy pattern of bacteria, while others (e.g. SSBs) lead to increased diversity of pathogenic strains.

O-28 | Effects of elexacaftor/tezacaftor/ivacaftor on glucose metabolism in teenagers with cystic fibrosis- where do we stand after one year of therapy?

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Introduction: Cystic fibrosis-related diabetes (CFRD) and glucose tolerance abnormalities are frequent in people with cystic fibrosis (CF). Persons with CF and CFRD have significantly greater mortality and worse lung function than those without diabetes.

The new triple-CFTR modulator therapy Elexacaftor/Tezacaftor/Ivacaftor (ELX/TEZ/IVA) showed excellent clinical and especially pulmonary function results.

However, little is known about other effects on organs also affected by the cystic fibrosis transmembrane conductance regulator (CFTR) loss of function.

Our observational pilot study of 2021 was one of the first to investigate the effect of ELX/TEZ/IVA on glucose homeostasis in teenagers with CF: glucose tolerance improved shortly after initiating ELX/TEZ/IVA.

Objectives: We performed a follow-up after one year of ELX/TEZ/IVA therapy initiation to gain knowledge about long-term outcomes.

Methods: For our single-centre observational follow-up study, we included the same persons with CF as in the initial pilot study: Thirteen adolescents with CF performed a standardized 3-h OGTT oral glucose tolerance test (OGTT) after a median of 16 months of ELX/TEZ/IVA treatment.

Results: After a median (IQR) of 16 (12-19) months of ELX/TEZ/IVA therapy, glucose tolerance among 13 young persons with CF stayed stable compared to when the pilot study ended; OGTT categories and glucose, insulin and c-peptide levels during OGTT did not change.

Fasting glucose levels improved from 5.21 mmol/L (5.12; 5.35) before therapy to 5.02 mmol/L (4.88; 5.39) (p=0.02). HbA1c levels lowered from 5.6 % (5.5; 5.9) shortly after the start of therapy to 5.5 % (5.3; 5.6) (p=0.09).

Conclusions: In this small observational study, glucose metabolism did not deteriorate but improved slightly further under continuous ELX/TEZ/IVA therapy. More extensive studies over a more extended period and in different age groups are required to confirm a continuous beneficial effect of ELX/TEZ/IVA on glucose metabolism.

O-29 | The evolution of glucose tolerance in cystic fibrosis: the central role of beta-cell function

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Introduction: To date, the pathophysiological mechanisms underlying the natural history of glucose intolerance in subjects with Cystic Fibrosis have not been yet longitudinally investigated simultaneously assessing the contribution of all the three direct determinants of glucose regulation, i.e., insulin secretion, sensibility and catabolism.

Objectives: The aim of this study was to investigate the relationship between changes in glucose tolerance status and the direct determinants of glucose regulation in subjects with CF to test the hypothesis that Beta-cell function is the key process governing favorable or detrimental changes of the their glucose tolerance status.

Methods: Beta-cell function (derivative and proportional control reflecting the first and the second phase of insulin secretion, respectively), insulin clearance and insulin sensitivity, measured using a validated mathematical model, were evaluated in 127 CF subjects aged 10-25 years who underwent two OGTT tests over at least 1-year follow up period. Subjects were categorized according to their changes in glucose tolerance status in three groups: regressors, stable and progressors.

Results: Beta-cell function significantly improved in regressors and worsened in progressors, whereas it didn't change in stable. Insulin clearance decreased in both regressors and progressors. Insulin sensitivity decreased in all the three groups. Binary logistic regression analysis showed that Beta -cell function (change in proportional control adjusted for insulin clearance [PC_{adj}]) and baseline glucose tolerance status predicted the regression of glucose tolerance status, independent of other confounding factors.

	Single multivariable regression		
Variables	***OR***	**95% CI**	**p value**
Age	1.026	0.940 – 1.120	0.564
Gender	0.353	0.067 – 1.844	0.217
BMI	1.060	0.796 – 1.411	0.690
CF genotypes	1.310	0.497 – 3.457	0.585
Glucose tolerance status at baseline	0.171	0.068 – 0.433	*< 0.001*
PC_{adj} at baseline	0.999	0.990 – 1.009	0.885
Change in PC_{adj}	0.978	0.963 – 0.994	*0.006*
	R^2 Nagelkerke = 0.70		

Conclusions: Beta-cell function is the key process governing favorable or detrimental changes in glucose tolerance stages over time in CF subjects.

O-59 | Adolescence is a time of accelerated vascular ageing in type 1 diabetes: initial findings from the AdDIT Follow-Up Study

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Introduction: Childhood-onset type 1 diabetes (T1D) is associated with an increased risk of premature cardiovascular mortality.

Objectives: This study aimed to assess the evolution of subclinical vascular damage in young people with T1D as they transitioned through adolescence.

Methods: Repeated vascular phenotyping was performed in early adolescence (age 13), late adolescence (age 17), and young adulthood (age 23) in 288 adolescents with T1D (52% male) recruited to the Adolescent Type 1 Diabetes Intervention Trial Follow-Up Study (AdDIT Follow-Up).

Carotid remodelling was assessed via measures of lumen diameter, intima-media thickness (IMT), and beta stiffness index; aortic stiffness via carotid-femoral pulse wave velocity (PWV); and endothelial function via flow-mediated dilation (FMD).

Repeated measures ANOVA were used to assess vascular changes over time, and unpaired t-tests used to compare vascular phenotypes measured in young adulthood to an age- and sex-matched group without T1D (n = 292; 49% male).

Results: In individuals with T1D, progressive stiffening of both the carotid artery and aorta was observed across the 9-year follow-up (e.g. PWV mean [95%CI] change = 1.1 [0.9, 1.3] m/s). In the transition from late adolescence to young adulthood, IMT also increased (+0.04 [0.03, 0.06] mm) and FMD decreased (-1.0 [-0.8, -1.2] %).

As a result, young adults with T1D had carotid arteries that were narrower, thicker (IMT = +0.3 [0.2, 0.4] mm), and stiffer (beta stiffness index = +0.3 [0.1, 0.5]) than those without T1D. Aortic stiffness was also higher (PWV = +0.8 [0.6, 0.9] m/s) in T1D, while a compromised FMD (-2.8 [-2.0, -3.6]%) indicated the presence of systemic endothelial dysfunction.

Conclusions: Young people with T1D demonstrate accelerated arterial ageing as they transition adolescence. As a result, these individuals enter young adulthood with arteries that are already smaller, thicker, stiffer, and with evidence of profound endothelial dysfunction when compared to young adults without T1D.

ORAL SESSION IV: PSYCHOLOGICAL AND PSYCHOSOCIAL ASPECTS OF DIABETES

O-31 | Internalized weight bias and experiences of weight victimization are understudied in adolescents with disordered eating and type 1 diabetes

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Introduction: People with type 1 diabetes (T1D) have 2-3x increased risk for eating disorders. Weight stigma and internalized weight bias, or judging self-worth based on weight status, are associated with poor mental health outcomes and reduced engagement in health behaviors. No studies have investigated weight bias among adolescents with T1D.

Objectives: This study sought to examine associations between weight stigma and disordered eating in adolescents with T1D. We hypothesized that weight-based victimization and internalized weight bias would be positively associated with disordered eating.

Methods: Adolescents (*N*=135, age=14.78 +/-1.44 years, T1D duration=6.79 +/-3.76 years, 86% White, 27% publicly insured) completed the Diabetes Eating Problems Survey (DEPS-R), Weight-Bias Internalization Scale (WBIS), and questions about weight-based victimization by peers, family, or healthcare professionals. Multiple hierarchical regression and *t* tests were used to examine associations between DEPS-R scores and WBIS scores and weight-based victimization, respectively.

Results: DEPS-R scores ranged 0-51 (*M*=12.51, *SD*=12.37) with 21.5% of scores elevated (i.e., 20). DEPS-R scores were significantly higher for those who had experienced weight-based victimization by family, $t(125)=4.06$, $p<.001$; peers, $t(34)=-3.81$, $p<.001$; or healthcare providers, $t(125)=2.83$, $p=.005$. After controlling for race, sex, BMI *z*-score, A1C, and T1D duration, WBIS scores were significantly associated with DEPS-R scores (b=.70, $p<.001$). Adding WBIS to the model explained 66.2% of the variance in DEPS-R scores ($R^2=.66$, $F(6,119)=38.85$, $p<.001$).

Conclusions: Experiencing weight stigma in different environments, including healthcare settings, and internalized weight bias are strongly associated with disordered eating in adolescents with T1D. In light of increasing overweight/obesity rates and the pervasiveness of weight stigma, it is imperative to better understand how weight bias is related to eating pathology to identify targets for preventing disordered eating.

O-32 | Responses to the strengths and difficulties questionnaire predict 11-year HbA1c trajectories in children and adolescents with type I diabetes: a national population-based study

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Introduction: Routine screening for psychological conditions like depression and anxiety is recommended for adolescents with type 1 diabetes.

Objectives: We aimed to determine whether caregiver responses to the Strengths and Difficulties Questionnaire (SDQ) are predictive of HbA_{1c} trajectory membership in children and adolescents with type 1 diabetes, when adjusting for covariates.

Methods: For a Danish 2009 national cohort of children and adolescents with type 1 diabetes, SDQ data, baseline and registry-based HbA_{1c} data (2009-2020) and registry-based sociodemographic data were merged. Group-based trajectory modeling was used to identify distinct HbA_{1c} trajectories. Multinomial logistic regression was used to test whether caregiver SDQ scores predicted HbA_{1c} trajectory membership when adjusting for sex, age at diabetes diagnosis, diabetes duration, family structure, and caregiver education level.

Results: In total, 835 children and adolescents (52% females) with a mean (SD) age of 12.5 (3.3) years, and a mean diabetes duration of 5.2 (3.1) years were included. Based on 7,247 HbA_{1c} observations in the period of 2009-2020, four HbA_{1c} trajectories were identified: 1) "on target, gradual decrease"(26%), 2) "above target, mild increase then decrease" (41%), 3) "above target, moderate increase then decrease" (24%), and 4) "well above target, large increase then decrease" (9%). Higher SDQ total difficulties scores predicted trajectory 3 and 4 (P = 0.0002 and P < 0.0001, respectively). Regarding the SDQ subscale scores, emotional symptoms predicted trajectories 3 and 4, and conduct problems and hyperactivity/inattention predicted trajectories 2, 3, and 4. Single-parent family and low caregiver education level both predicted trajectories 3 and 4.

Conclusions: Caregiver SDQ responses and sociodemographic information may help to detect children and adolescents with type 1 diabetes who need intensive multidisciplinary medical and psychological interventions.

O-33 | Psychosocial and religious drivers of fasting ramadan in type 1 diabetes (T1D) Children and adolescents: mixed method approach

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Introduction: Fasting Ramadan is a religious obligation for all healthy adult Muslims. The sick and pre-pubertal children are exempt, However, many children with type 1 diabetes (T1D) choose to fast.

Objectives: To determine 1- the psychosocial drivers of fasting Ramadan in individuals <18 years with T1D & their caregivers. 2- the impact of pre-Ramadan education on their intentions to fast.

Methods: Children with T1D & their parents were surveyed shortly after the end of the month of Ramadan using a simple questionnaire. Data from the questionnaire was presented as mean±SD. Then 4 focus groups of 6 persons who fasted to discuss the drivers fasting Ramadan. Data from focus groups was analyzed using thematic analysis.

Results: Forty-seven patients (age 12.7 ± 3.78 y); 23 (48.9%) males; T1D duration 5.25 ± 4.32 years]; HbA1c 7.96% ± 1.34% (before Ramadan) participated in this survey. Fifteen (31.9%) were on CSII & 32 (68.1%) were on MDI; 34% fasted against medical advice. Participants with T1D were able to fast for 23.8±4.89 days during Ramadan. Only 38.6% sought Ramadan-focused education prior to fasting. Hypoglycemia (24.2%), hyperglycemia (68.8%), as well as ketosis (23.4%) were major complications of fasting during Ramadan; 70.2% intend to fast again in following years.

The 4 main drivers that emerged from the thematic analysis of the focus groups: 1- Aspiring to feel normal, 2- Aspiring to share fasting experience with community, 3- Belief that fasting is a religious obligation of Islam and not accepting exemption (both children & parents), 4- Family and peers' pressure to fast & 5-To avoid bullying by community if not fasting.

Conclusions: Psychosocial and religious beliefs in T1D <18-year are the major drivers of the decision to fast Ramadan, and not the medical condition. No significant differences were noted for fasting drivers among T1D. This study highlights the need for including major role of Muslim Clerics in Ramadan focused diabetes education to spread awareness & guide the decisions of fasting in this age group.

O-34 | ConnecT1D: A care model designed to achieve excellent and equitable glycemic and psychosocial outcomes for youth with type 1 diabetes (T1D)

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Introduction: Despite remarkable advancement of diabetes technology, outcomes for youth with T1D remain suboptimal and the impact of diabetes-related morbidity disproportionately affects youth of minority race or ethnicity, and those experiencing poverty.

Objectives: ConnecT1D aims to reorient diabetes care from episodic visits to proactive delivery model that supports families through equitable access to technology, community partnerships, communication between visits, and integration of diabetes device data into the electronic medical record. By fo-

cusing our design to address the needs of medically and socially vulnerable youth with T1D on public insurance (a proxy for socio-economic status), we aim to narrow equity gaps of disproportionate access to advanced diabetes technology and psychosocial supports.

Methods: People with T1D and caregivers, clinicians, quality improvement (QI) specialists, social workers, and diabetes educators participated in a Design Session (n=27 attendees). Four focus areas generated 130 ideas and over 50 candidate interventions to improve HbA1c and related process measures for a cohort of youth with T1D on public insurance (n=293). Over 12 months the team pursued iterative PDSA cycles to test interventions including social determinants of health screening, diabetes community health worker, embedded psychologist, proactive dose adjustments between visits. Data tracked on time series graphs.

Results: At baseline, youth with public insurance had lower rates of diabetes technology access and 1% higher mean HbA1c. After 1 year of ConnecT1D interventions, 95% had consistent clinic visits, 68% had visit with psychology; CGM increased from 56% to 80%, insulin pump increase from 55% to 65%, Mean HbA1c decrease from 9.4% to 8.9% with narrowing of health disparities in all metrics.

Conclusions: Participatory design and QI methodology resulted in improved access to diabetes technology, psychosocial supports, and glycemic outcomes while reducing health disparity gaps for children with T1D on public insurance.

O-35 | Childhood opportunity index and clinical characteristics at diabetes diagnosis in youth: type 1 versus type 2 diabetes

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Introduction: Among youth with type 1 diabetes (T1D), poor glycemic control is associated with neighborhood-level deprivation. Childhood Opportunity Index (COI), a composite measure of education, health, environment, social, economic factors, is associated with obesity in youth without diabetes but has not been assessed among youth with diabetes.

Objectives: To investigate associations between COI and clinical characteristics at diagnosis of T1D and type 2 diabetes (T2D).

Methods: In a retrospective cohort of youth admitted for new-onset T1D or T2D to a large academic pediatric hospital in Pittsburgh, PA, USA, COI was compared by diabetes type (t-test and chi-squared tests). Multivariable linear and logistic regression were used to evaluate associations between COI and clinical characteristics at diagnosis (HbA1c, pH, bicarbonate, DKA (yes/no), BMI Z-score). Obesity was defined as BMI Z-score ≥ 1.64 for age/sex. Analysis was stratified by diabetes type and adjusted for age and sex. Race was not included in models due to strong collinearity with COI.

Results: The cohort included 407 youth with T1D (45% female; 11.6% Black, 85.5% white, 2.9% other) mean (SD) age 9.2y (4.5), and 113 youth with T2D (51% female; 44.6% Black, 50.9% white, 4.5% other) mean (SD) age 14.4y (3.3). As expected, obesity was more common in youth with T2D (86.3% vs 19.6% in T1D, $p<0.001$). Youth with T2D vs T1D had lower COI (2.6 vs 3.3, $p<0.001$). Youth with T1D with low/very-low vs high COI had higher odds of DKA (OR 2.0, $p = 0.01$) and obesity (OR 3.5, $p=0.002$). In youth with T2D, lower COI was associated with higher BMI Z-score (+0.4 and +0.6 for low/very-low and moderate vs high COI, $p=0.03$ and $p=0.006$, respectively).

Conclusions: COI is associated with severity of clinical presentation at diagnosis in youth with T1D but is significantly lower among youth with T2D overall. Analogous to youth without diabetes, lower COI is associated with higher BMI in both youth with T1D and T2D.

O-36 | Metabolism and memory: α-synuclein level in children with obesity and children with type 1 diabetes: relation to glucotoxicity, lipotoxicity, and executive functions

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Introduction: Children with obesity and those with type 1 diabetes (T1D) exhibit subtle neurocognitive deficits, the mechanism of which remains unknown. α-synuclein plays a fundamental role in neurodegeneration. Moreover, its role in glucose and lipids metabolism is emerging.
Objectives: This study aims to assess whether α-synuclein is correlated with the degree of neurodegeneration in children with obesity and those with T1D in comparison to healthy controls and correlate it to various neurocognitive and metabolic parameters.
Methods: Forty children with obesity, 40 children with T1D, and 40 matched-healthy controls were assessed for anthropometric measurements and blood pressure. The cognitive evaluation was performed using Stanford–Binet scale and Barkley Deficits in Executive Functioning (EF) Scale-Children and Adolescents. α-synuclein, fasting lipids and glucose were measured with calculation of the homeostatic model of insulin resistance and estimated-glucose disposal rate.
Results: Children with obesity and those with T1D had significantly higher α-synuclein ($p < 0.001$) and total EF percentile ($p = 0.001$) than controls. α-synuclein was negatively correlated to total IQ ($p < 0.001$ and $p = 0.001$), and positively correlated with total EF percentile ($p = 0.009$ and $p = 0.001$) and EF symptom count percentile ($p = 0.005$ and $p < 0.001$) in children with T1D and obesity, respectively.
Multivariate regression revealed that α-synuclein was independently related to age ($p = 0.028$), diabetes duration ($p = 0.006$), HbA1C% ($p = 0.034$), total IQ ($p = 0.013$) and EF symptom count percentile ($p = 0.003$) among children with T1D, and to diastolic blood-pressure percentile ($p = 0.013$), waist/hip ratio SDS ($p = 0.007$), total EF percentile ($P = 0.033$) and EF symptom count percentile ($p < 0.001$) in children with obesity.
Conclusions: α-synuclein could have a mechanistic role in neurocognitive deficit among children with obesity and T1D.

O-37 | Prevalence of disordered eating behaviors among adolescents with type 1 diabetes: a single centre study

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Introduction: Individuals with T1DM have a 2-3 folds increased risk of disordered eating behaviors (DEBs). Coexisting T1DM and DEBs is associated with impaired metabolic control and consequently an increased morbidity and mortality. Screening for DEBs should begin in pre-adolescence and continue through early adulthood.
Objectives: To assess the prevalence of DEBs among adolescents with T1DM in relation to onset and duration of diabetes, level of glycemic control and diabetes-related complications.
Methods: A descriptive cross-sectional study which included 350 youth with T1DM (195 females and 155 males), with mean age of 13.86±1.95 years, and median diabetes duration of 5 (1-14) years.
Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition for feeding and eating disorders (APA 2013), Arabic translation and Mini International Neuropsychiatric Interview for Children were used to screen for DEBs among the study cohort.
Body composition measurements were obtained by bioimpedance technique using Tanita BC-418MA body composition analyzer.
Results: 22.6% of the study cohort have DEBs (Other specific feeding and eating disorders (OSFED): 68.4%, bing eating: 11.4%, bulimia nervosa and avoidant restrictive: 7.6% and anorexia nervosa: 5.1%). Cases with DE have higher median diabetes duration than cases without DE (6 (3-7) Vs 5 (1-6) years,

P=0.04). There is a significant higher frequency of DKA and hospital admission among cases with DEBs as compared with those without DEBs (84% Vs 74%, *P*=0.049). Diabetic nephropathy is significantly frequent in DEBs group (53% Vs 27%; *P*=0.001).
Waist circumference is significantly higher in females with DE (*P*=0.001). Serum triglycerides are significantly higher in DEBs cohort as compared with non-DEBs cohort (*P*=0.04).
Conclusions: Our results point to the need for early detection of DEBs in adolescents with T1DM in order to refer them as soon as possible to experts in clinical nutrition and mental health disorders for positive outcomes for T1DM.

O-58 | Relationship between time in range, time in tight range and HbA1c in youth and young adults with type 1 diabetes – results from the German/Austrian/Luxembourgian/Swiss DPV registry

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Introduction: In continuous glucose monitoring (CGM) users, time in range (TIR, 70-180 mg/dL) is an established marker to evaluate glycemic control. More recently, and especially with the rising uptake of automated insulin delivery (AID) systems, time in tight range (TTR, 70-140 mg/dL) has been proposed as a new marker.

Objectives: The aim of this study was to examine the relationship between TIR, TTR and HbA1c.
Methods: Data of youth and young adults below the age of 25 years with type 1 diabetes (T1D) for > 3 months, from the German/Austrian/Luxembourgian/Swiss Diabetes Prospective Follow-up registry (DPV) between 2019-2022 were analyzed. The latest available HbA1c and CGM data were identified and descriptive statistics and correlation coefficients were calculated.
Results: CGM data were available in 8071 of the 45 423 people with T1D from 147 centers meeting the inclusion criteria. 1892 (median age 13.9 years [IQR 10.4-16.9], diabetes duration 4.8 years [2.3-8.4]) had CGM data with > 80% completeness over the preceding 12 weeks and were included. Median (IQR) TIR, TTR and HbA1c were 57% (45–67), 35% (27-44) and 7.3% (6.8-8.0) respectively. TIR and TTR correlated strongly, ρ=0.965, p<0.001. TIR and TTR were negatively correlated with HbA1c, ρ=- 0.764, p<0.001 and ρ=- 0.779, p<0.001. The two correlations were not significantly different, p=0.276. Table 1 shows TIR, TTR and HbA1c with correlations in different subgroups.

	All	Gender		Age groups				Regimen		
		female	male	<6 y	6-12 y	12-18 y	18-25 y	MDI	CSII	AID
N	1892	881	1011	111	552	992	237	750	819	323
TIR (%)	57 (45-67)	56 (46-67)	57 (45-67)	60 (50-67)	61 (50-70)	54 (44-65)	55 (44 - 64)	56 (45 - 67)	54 (43 - 63)	65 (57 - 72)
TTR (%)	35 (27-44)	35 (27-44)	36 (27-44)	37 (28-46)	38 (30-46)	33 (25 -42)	35 (26 - 42)	35 (26 - 44)	33 (25 - 40)	42 (35 - 48)
HbA1c (%)	7.3 (6.8-8.0)	7.4 (6.9-8.0)	7.3 (6.7-7.9)	7.4 (6.9-7.9)	7.2 (6.7-7.7)	7.4 (6.8-8.1)	7.3 (6.8 - 8.0)	7.2 (6.7 - 7.9)	7.5 (7.0 - 8.0)	7.2 (6.7 - 7.7)
TIR vs. TTR	0.965	0.964	0.967	0.95	0.965	0.965	0.968	0.969	0.958	0.948
TIR vs. HbA1c	-0.764	-0.764	-0.766	-0.693	-0.759	-0.781	-0.722	-0.822	-0.759	-0.685
TTR vs. HbA1c	-0.779	-0.779	-0.779	0.728	-0.765	-0.791	-0.754	-0.835	-0.772	-0.683

Table 1: TIR, TTR and HbA1c and correlation coefficients in different subgroups. Values are presented as median and IQR (TIR, TTR and HbA1c) and correlation coefficients derived from Spearman rank correlation. All values differed significantly between the groups at a level of p<0.001, except TIR and TTR for gender. Correlation coefficients were significant at a level < 0.001. TIR: time in range, TTR: time in tight range, MDI multiple daily injections, CSII continuous subcutaneous insulin infusion, AID automated insulin delivery, y: years

Conclusions: Based on real world data from a multicenter, multinational registry, TIR and TTR did not differ significantly in youth with T1D. However, TTR may have advantages for education purposes and motivation.
Moreover, TTR can be used as additional target to provide more information specifically for people with very high TIR, a group expected to grow as the use of advanced technologies like AID systems increases.

O-56 | Outcomes on health economics during an 18 months controlled study in children with type 1 diabetes including AID, MDI, and CSII – all used along with the same rtCGM-system

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Introduction: Health economic evaluations are of great importance besides the impact on other metrics.
Objectives: We evaluated the long-term effect on health economics by comparing an AID system with MDI- and CSII-treatment, all supplemented by the same CGM system.
Methods: Inclusion required the use of Dexcom G6 rtCGM for glucose monitoring. The choice of insulin administration was made based on individual preferences.
Three separate groups were created:
Tandem Control IQ (CIQ), MDI, and CSII.
Data on direct and indirect costs were collected using device-specific costs and a unique database including all health-related costs within the region.
Moreover, the indirect costs related to parental absences from work due to a T1D child's sickness were collected from the Swedish Social Insurance Agency.
The health utilities (Quality Adjusted Life Years, QALYs) for each of the health states were derived from the published literature.
A Markov cohort model was used to evaluate the cost-effectiveness of standard treatments (MDI and CSII) and CIQ in the management of T1D.
Results for QALYs for each of the three treatment approaches were calculated besides the incremental cost-effectiveness ratio (ICER) between the standard group (MDI and CSII) and the intervention CIQ group measured as costs per QALYs.
Results: Eighty-four T1D children/adolescents were included (CIQ, n=37; MDI+rtCGM, n=19; CSII+rtCGM, n=28). The analyses show that the use of CIQ is highly cost-effective compared with treatment with MDI or CSII therapy in children and adolescents with T1D.
The use of CIQ was associated with significantly lower ICER than MDI or CSI at the 10-, 20-, and 30-year time horizons.
A key strength of our analysis is that all study participants used the same CGM sensor, which ensured that the differences in outcomes were related solely to the insulin administration method.
Conclusions: We demonstrate that for all time horizons, 10-20-30 years, the use of Tandem CIQ was more effective and less costly compared with MDI or CSII use.

ORAL SESSION V: SCREENING, PREVENTION AND EPIDEMIOLOGY OF DIABETES

O-38 | New-onset type 1 diabetes cases in children pre-post and during COVID-19 pandemic in Latin America: a multicenter study

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Introduction: The COVID-19 pandemic has impacted the rates and severity of new-onset type 1 diabetes (T1DM).

Objectives: To determine the rates and severity of new-onset T1DM among pediatric populations in Latin American centers during the stay-at-home 2020 COVID-19 pandemic and compare them with pre-pandemic (2018 - 2019) and post-pandemic (2021 - 2022).

Methods: A retrospective chart review investigated the rates of new-onset T1DM in children aged 6 months-18 years during the stay-at-home 2020 COVID-19 pandemic, the pre-pandemic (2018 & 2019), and the post-pandemic (2021 & 2022) in 27 centers in Argentina, Chile, and Peru.

The percentage of new-onset T1DM for each year was calculated in relation to the total number of cases over a 5-year period.

Results: Of 2244 (48.1% females) cases, 49.3% had medical insurance. Mean values at new-onset were: age 8.83 ± 3.78 years, glucose 458 ±183 mg/dL, Hb A1c 11.3% ± 2.48, pH 7.21± 0.16, and bicarbonate 13.21±7.69. There were no significant differences in age, BMI, glucose, and HbA1c from 2018 to 2022.

However, pH and bicarbonate were significantly lower in the stay-at-home 2020 pandemic (pH 7.1& bicarbonate 12.3 mEq/L) than in pre-pandemic 2018 (pH 7.2 & bicarbonate 14.3 mEq/L). The rate of new cases of T1DM over a 5-year period was 16.4% (368 patients) in 2018, 18% (403 patients) in 2019, 19.8% (443 patients) in 2020, 24% (539 patients) in 2021, and 21.8% (491 cases) in 2022.

Although 2021 was no longer the stay-at-home period, the frequency of new cases continued to grow, while in 2022, this frequency decreased slightly compared with 2021. Only 3.0% of new-onset T1DM had COVID-19 infection at presentation in 2020, 5.1% in 2021, and 3.7% in 2022.

Conclusions: An increase in new cases of T1DM has been registered in Latin American centers since the pandemic began. The bicarbonate and pH levels of new cases of T1DM were significantly lower during

the stay-at-home 2020 pandemic compared with 2018 pre-pandemic, suggesting an impact of the pandemic on the delay in the diagnosis of the disease.

O-40 | Evidence of atypical non-autoimmune diabetes amongst young people diagnosed with type 1 diabetes in Cameroon and Uganda: results from young-onset diabetes in Sub-Saharan Africa (Yoda) Study

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Introduction: Type 1 diabetes (T1D) has been poorly characterised in Africa and its aetiology is not well understood. Some authors have suggested that the phenotype and aetiology of the condition in Africa is different from the classical presentation elsewhere.
Objectives: We aimed to determine whether clinically diagnosed type 1 diabetes in young people in sub-Saharan Africa is of autoimmune aetiology.
Methods: We assessed islet autoantibodies (GAD, IA-2, ZnT8), type 1 diabetes genetic susceptibility (genetic risk score (T1DGRS) and plasma C-peptide in 644 individuals from Cameroon (258) and Uganda (386) with a clinical diagnosis of type 1 diabetes, insulin treatment and diabetes onset before 30 years.
Results: The median age at diagnosis and diabetes duration was 15 (12, 18) years and 4.5 (1.4, 8.3) years. 71.3% were negative for islet autoantibodies (71.0% in Cameroon and 71.6% in Uganda).
Participants with islet autoantibody-negative diabetes had similar ages of diabetes onset and BMI as islet autoantibody-positive diabetes participants in both cohorts; the median age of diabetes onset was 15 (12, 18) vs 15 (11, 18) years, p=0.40 and median BMI 21.8 (19.7, 24.5) vs 21.6 (18.7, 24.1) kg/m^2, p=0.18.
Participants with islet autoantibody-negative diabetes had substantially lower T1DGRS, and higher C-peptide levels compared to those with islet autoantibody-positive diabetes: T1DGRS 9.17 (7.81, 10.70) vs 11.37 (10.00, 12.55), p<0.001 and C-peptide 121 (18, 351) vs 48 (3-166) pmol/L, p<0.001.
However, severe insulin deficiency (C-peptide <200 pmol/L) occurred in 62.1% (95%CI 57.2-66.8) and 78.3 (95%CI 71.2-84.1) of islet autoantibody-negative diabetes and positive participants respectively.
Conclusions: The majority of individuals diagnosed with type 1 diabetes in this population do not have features suggestive of either autoimmune type 1 diabetes or type 2 diabetes.
Therefore non-autoimmune severely insulin-deficient diabetes accounts for the majority of childhood and young adult diabetes in sub-Saharan Africa.

O-41 | Autoantibody positive versus autoantibody negative type 1 diabetes in children: clinical and biochemical characteristics

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Introduction: 10-20% of newly diagnosed type 1 diabetes mellitus (T1DM) does not show diabetes-associated autoantibody seropositivity, known as autoantibody negative T1DM.
Objectives: To better understand autoantibody negative T1DM we investigated differences in clinical and biochemical characteristics of children with autoantibody positive and autoantibody negative T1DM.
Methods: Monocenter retrospective cross-sectional cohort study conducted at Diaboss, a Dutch pediatric diabetes clinic at the OLVG hospital. Data were collected between July 2012 and September 2022. Patients diagnosed with T1DM under the age of 18 years were included.
Autoantibody positive was defined as testing positive for one or more diabetes-associated autoantibodies (GADA, IA2A, ZnT8, IAA and/or ICA).

Results: 562 patients were recruited. Eight of 562 (1,4%) patients were found to have genetically confirmed monogenic diabetes at a later stage and were excluded. The majority of the cohort was of Caucasian (n=153) or North African (n=149) origin. There was a slight predominance of males (52,9%). Average age at diagnosis was 8,79 years.
No significant differences in demographic and clinical characteristics, diabetes presentation and long-term diabetes control were found between autoantibody positive and autoantibody negative patients. In 15 of 66 patients (23%) with autoantibody negative T1DM monogenic causes were ruled out by genetic testing.
The other 51 patients (77%) were not tested. Autoantibody negative patients with a positive family history for DM were more likely to be tested for monogenic causes (P=0,002).
Conclusions: Pediatric patients with autoantibody positive and negative T1DM are similar in this study. This implies that both groups can be approached in the same way regarding treatment, education and prognosis. Only a small proportion of the autoantibody negative T1DM patients was tested for monogenic causes. Consequently, misdiagnosis may occur. Since these types of diabetes require different treatments, clinicians should be aware of this.

O-42 | Diabetes in children diagnosed under two years of age across two continents

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Introduction: Children diagnosed less than 2 years of age represent a small proportion of diabetes diagnoses worldwide. It is therefore difficult for individual clinicians or diabetes centres to develop expertise in managing this cohort.
In addition, some children diagnosed as infants may have non autoimmune or monogenic forms of diabetes. Determining the diagnosis early is important early, as management differs between different types of diabetes.
An improved understanding of this cohort may be helpful guiding clinicians in management and targeting areas for future research.
Objectives: - To describe demographic, clinical, and management characteristics of children diagnosed under 2 years of age from two large registries across two continents.
- To compare glycaemia, treatment, and diabetes technologies use in those with autoimmune type 1 diabetes (T1D) or other forms of diabetes such as neonatal or monogenic forms.
Methods: The Australasian Diabetes Data Network in Australia and New Zealand (ADDN), and the Prospective Diabetes Follow-up Registry in Germany, Austria, Luxembourg, and Switzerland (DPV) are two large registries collecting data on people with diabetes. Data from both registries were analysed for individuals diagnosed with diabetes under 2 years of age between 2000-2021.

Results: 5,289 children were identified. 92.6% were classified as T1D. Those with T1D had higher HbA1c one year after diagnosis; mean HbA1c was > 7% in those with T1D and <7% in those with other diabetes types. Those with T1D were more likely to present with diabetic ketoacidosis at diagnosis and more commonly used insulin and CGM. Sulphonylurea use in non-autoimmune diabetes was more common in DPV than ADDN.

Demographics	ADDN		DPV	
Number of participants	943		4346	
% Female	436 (46.2%)		1874 (43.1%)	
Age at diagnosis (months, Mean (SD))	16.5 (5.7)		16.0 (5.7)	
Age at last visit (years, Mean (SD))	11.3 (5.9)		10.7 (5.6)	
Year of diagnosis 2000-2010 2011-2021	 492 (52.2%) 451 (47.8%)		 2251 (51.8%) 2095 (48.2%)	
Type of diabetes				
Autoimmune type-1 diabetes[a]	891 (94.5%)		4005 (92.1%)	
Monogenic/Other, onset < 6 mo[b]	23 (2.4%)		207 (4.8%)	
Monogenic/Other, onset ≥ 6 mo	29 (3.1%)		134 (3.1%)	
	Autoimmune	Other	Autoimmune	Other
% DKA at diagnosis	419 (63.7%) n =658	11 (19.6%) n = 34	1119 (46.5%) n =2409	25 (17.6%) n =142
Mean(SD) HbA1c (most recent visit)[c]	8.4 (1.4) n =808	6.3 (1.6) n =44	7.8 (1.3) n =3892	6.9 (1.4) n =310
Management[c]	Autoimmune n =891	Other n =52	Autoimmune n =4005	Other n =341
n (%) CGM without HCL, LGS, or PLGS	381 (42.7%)	13 (25.0%)	1992 (49.7%)	108 (31.7%)
n (%) injection therapy	349 (39.2%)	4 (7.6%)	733 (18.3%)	53 (15.5%)
n (%) Insulin pump without HCL or LGS/PLGS	441 (49.4%)	10 (19.2%)	2224 (55.5%)	94 (27.6%)
n (%) Hybrid Closed Loop or LGS/PLGS	59 (6.6%)	1 (1.9%)	933 (23.3%)	38 (11.1%)
n (%) Sulphonylurea	0 (0.0%)	1 (1.9%)	2 (0.0%)	38 (11.1%)

[a] Includes those diagnosed < 6 months of age with positive diabetes antibodies, [b] Neonatal diabetes defined as potassium channel mutations, UPD6/ methylation disorders, pancreatic agenesis, and other forms of antibody negative diabetes diagnosed less than 6 months of age, [c]data from most recent visit in most recent treatment year, [d] No documented therapy indicates patient did not have treatment with insulin or sulphonylurea documented in the registry databases. HCL: hybrid closed loop, LGS: low glucose suspend, PLGS: predictive low glucose suspend, CGM: continous glucose monitoring.

Conclusions: The majority of children diagnosed with diabetes less than 2 years of age have T1D, with other forms much less common. Mean HbA1c was above target (>7%) for those with T1D, and below target for those with other diabetes types. Use of insulin and CGM was more common in those with T1D.

O-43 | Is there an accelerated increase of pediatric type 1 diabetes incidence since the beginning of the COVID-19 pandemic in Germany? a DPV study evaluating the period from 2011 to 2022

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Introduction: Several reports indicate that the incidence of type 1 diabetes (T1D) increased during the COVID-19 pandemic.

Objectives: To evaluate whether the accelerated increase in T1D incidence persisted beyond the acute COVID-19 crisis for up to 3 years.

Methods: We evaluated data on T1D onset of children and adolescents aged 0.5-<18 years from the German multicenter Diabetes Prospective Follow-up

Registry. Incidence rate ratios (IRRs) for T1D in the total group and stratified by age for 2020 – 2022 were estimated based on the long-term pre-pandemic trend from 2011-2019.

Results: Data on 34,757 newly diagnosed cases (10,830 between 2020 and 2022) with pediatric T1D were analyzed. Median [Q1; Q3] age at onset was 9.7 [5.9; 12.9] years with 55% boys.

Overall, IRR with 95%-confidence interval for T1D was 1.14 [1.08-1.19] in 2020, 1.22 [1.16-1.28] in 2021, and 1.13 [1.08-1.18] in 2022 (all p<0.001).

IRRs were highest in the youngest age group of children <6 years with IRRs steadily increasing during the three pandemic years (2020: 1.18 [1.07-1.30]; 2021: 1.40 [1.28-1.54]; 2022: 1.43 [1.30-1.57], all p<0.001). In the age group of 6-<12 years the highest IRR was estimated for 2021 with 1.26 [1.17-1.36], while identical IRRs in 2020 1.14 [1.06-1.23] and 2022 1.14 [1.06-1.22] were observed (all p<0.001).

In adolescents aged 12-<18 years a significantly increased IRR was observed only in 2020 (1.10 [1.01-1.19], p=0.035), with a stabilization of the observed vs. predicted incidence in 2021 (IRR: 1.04 [0.95-1.13], p=0.412) and a subsequent reduction in 2022 (IRR: 0.91 [0.83-0.99], p=0.025).

Conclusions: The steeper increase in pediatric T1D incidence continued throughout the duration of the pandemic until 2022, with an acceleration in younger children but a slowdown in older children.

Decision-makers should prepare the health care system, both structurally and in terms of human resources, for the expected increase in the number of people with T1D who require chronic care.

O-44 | The INNODIA cohort of first-degree relatives of people with type 1 diabetes: screening and baseline characteristics

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Introduction: The INNODIA consortium has developed a European infrastructure for the recruitment and detailed characterization of a large cohort of people with new onset Type 1 diabetes (T1D) as well as Unaffected Family Members (UFM). Its overall aim is to advance how to predict, stage, evaluate and prevent T1D onset and progression.

Objectives: Here we report screening and baseline characteristics of the UFM cohort.

Methods: The INNODIA UFM cohort consists of first-degree relatives (FDR) (age 1-45 years) of individuals with T1D, recruited from 13 European countries, and followed up to 4 years, with 6-monthly oral glucose tolerance tests (OGTT), anthropometric measurements, HbA1c, and yearly islet autoantibodies (AAb).

Results: 5341 UFM (56% male) were screened between 2016-2021, at a median [IQR] age of 15.0 [9.0-33.0] years; 56% were <18 years. Out of them, 456 (8.5%) were positive for ≥1 AAb; 318 (5.9%) had one, and 138 (2.6%) had multiple AAb. The percentage of participants with multiple AAb decreased with age (Figure 1). The most common AAb was GAD65 (63%) followed by insulin antibodies (49%), ZnT8A (25%), and IA-2A (19%). At the baseline visit, out of the 337 with available OGTT, 48 (14%) had dysglycemia and 10 (3.0%) had a 2-hour glucose ≥11.1 mmol/l. Fasting C-peptide was (median[IQR]) 568 [397-753] pmol/l, with lower levels in participants <10 years (314 [250-376]) pmol/l than in those who were older (10-17 years: 636 [517-804] pmol/l ; >18 years 625 [526-802] pmol/l). Median HbA1c was 34 [31-36] mmol/mol, with no differences across age groups.

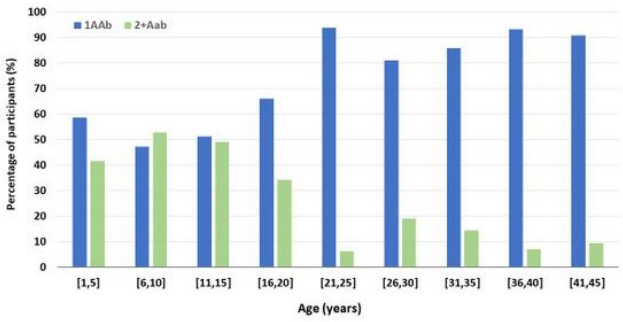

Figure 1. Autoantibodies by age.

Conclusions: The INNODIA UFM cohort shows that around 8.5% of FDR are positive for ≥1 AAb and highlights the presence of undiagnosed dysglycemia and stage 3 diabetes. Age-related differences in C-peptide are already detectable in this at-risk population. Further follow-up data will lead to a better characterization of this cohort and the potential identification of subgroups at different risks of progression.

O-45 | Enhancing type 1 diabetes early detection and advanced diagnostics in Qatar

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Introduction: With Qatar ranking 4th in global T1D incidence, effective early screening, diagnostics, and understanding of the disease are crucial.

Objectives: With two main goals in consideration, the project is created to solve this pressing need: The first step was building the Qatar T1D biorepository, a cutting-edge tool for examining the causes of T1D in Qatari infants. In order to analyze risk and protective HLA alleles linked with T1D development in the Qatari population, the research specifically seeks to fine-map the HLA alleles and haplotypes from 15k whole genomes of Qatar Biobank individuals. Second, establishing a diagnostic framework using a commercial ELISA, ELisaRSR "3-Screen" ICA, for simultaneous and subsequent individual measurements of autoantibodies to GAD65, IA-2, and ZnT8.

Methods: The biorepository gathers diverse biological samples from over 170 families. Concurrently, HLA typing is performed on whole-genome sequencing data, and the ELisaRSR "3-Screen" ICA ELISA is employed on serum samples from T1D patients and their unaffected relatives, with ongoing autoantibody data generation.

Results: The biorepository has enabled the discovery of T1D genetic protective and risk factors, including a high diversity of rare alleles among class II HLA genes. Significant associations were found between clinical phenotypes of T1D and multiple alleles from genes DRB1, DQA1, and DQB1. The ELISA test demonstrated high precision, detecting autoantibodies where external testing failed.

Conclusions: The DANNA project successfully highlighted a genetically distinct landscape of the HLA locus for the consanguineous Qatari population, underscoring the project's potential in revolutionizing T1D management in Qatar by developing a unique prediction model that combines HLA, clinical, and ongoing autoantibody data, specifically designed for the MENA population.

The project now invites collaborations to further explore these promising findings, aiming to enhance preventive and predictive strategies for T1D in the future.

O-46 | Early detection of change in beta cell function using frequently at home measured dried blood spot C-peptide levels in newly diagnosed type 1 diabetes

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Introduction: There is a need for early detection of change in beta cell function in people with newly diagnosed (ND) type 1 diabetes (T1D) to inform clinical trial design. The gold standard mixed-meal tolerance test (MMTT) is an invasive inpatient procedure that cannot be performed frequently enough for this purpose.

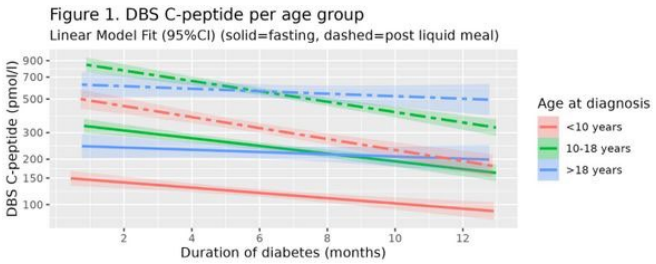
Objectives: To assess whether frequently at home measured dried blood spot (DBS) C-peptide levels are a viable alternative for early detection of change in beta cell function.

Methods: The INNODIA ND cohort consists of people with T1D recruited within 6 weeks from diagnosis. Participants measure finger prick DBS C-peptide monthly fasting and 60 min post liquid meal (Ensure Plus®). Participants had MMTT at 12 months to calculate C-peptide area under curve (AUC). Linear mixed model was used to predict C-peptide AUC at 12 months using DBS C-peptide slope with correction for age.

Results: 292 people with ND T1D (58% male) were included in the analysis, 125 were children (<10 yrs), 124 adolescents (10-18 yrs) & 43 adults (>18 yrs). Median [IQR] number of DBS card pairs was 6.5 [3-10] over 12 months. Children had significantly lower fasting and post liquid meal DBS C-peptide ($p<0.01$) than adolescents and adults (Figure 1).

DBS C-peptide significantly declined over time ($p<0.001$), but slope was not different between age groups. C-peptide AUC at 12 months was significantly lower in children (median [IQR] 193 [154-420] pmol/l/min, $p<0.001$) than adolescents and adults (591 [310-989] & 857 [484-1092] pmol/l/min). Fasting DBS C-peptide only significantly ($p<0.001$) predicted C-peptide AUC at 12 months if using full 12 months of DBS data but not if shorter periods such as the first 6 months are used.

However, post liquid meal DBS C-peptide in the first 6 months after diagnosis significantly predicted C-peptide AUC at 12 months ($p<0.01$).



Conclusions: DBS C-peptide post liquid meal can reliably detect change in beta cell function in the 6 months after diagnosis and is an outcome measure worth considering in clinical trial design.

O-01 | Development and implementation of a "pediatric endocrinology and diabetes education program in francophone africa" (In french: programme de formation en endocrinologie ET diabètologie pédiatrique pour l'afrique francophone [PEDAF])

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Introduction: Non-communicable diseases are recognized as a major cause of morbidity in Low and Middle-Income Countries (LMICs).

More than 100 million speak French in 21 Sub-Saharan African (FSSA) countries. We identified only 19 pediatric endocrinologists in FSSA (37% in Cam-

eroon and Senegal) mostly trained in France or through the successful anglophone "Paediatric Endocrine Training Centers for [West] Africa" (PETC[W]A) offered in Nairobi and Lagos, as well as adult endocrinologists and several general practitioners and pediatricians with an interest in diabetes. 11/21 countries had no pediatric endocrinologist.

Objectives: To build capacity in pediatric endocrinology and diabetes in FSSA.

Methods: African and International partners developed a Master program recognized by the CAMES (www.lecames.org), which offers international and mutual recognition of a medical specialty.

We critically reviewed the PETC[W]A program. Funding was obtained from EKFS and WDF for training of 16 candidates.

Results: We first organized a 2-month, free, introductory, virtual, "prerequisite" program for all health professionals, prior to the Master program. The 1st edition (May-Jun 2022) was attended by 95 physicians and allied health professionals from 17 countries.

We then offered a 2-yr hybrid Master program (50% virtual and 50% in person, to increase flexibility and decrease cost while offering appropriate clinical experience (Figure 1)) with a curriculum focused on LMICs needs.

Two francophone training centres (Dakar, Senegal and Yaounde, Cameroon) were chosen based on safety, political stability and the presence of an academic center with an existing pediatric clinic in endocrinology and diabetes.

Eight pediatricians and adult endocrinologists from 8 countries were selected among 22 applications based on the CV, results of the "prerequisite" test and plans for a pediatric diabetes and endocrinology centre at home after the Master.

The first 6 months (virtual) of the Master program took place in Oct 2022. Topics were jointly presented by African and International colleagues. The IT platform was provided by the "Université Numérique Francophone Mondiale" (www.unfm.org).

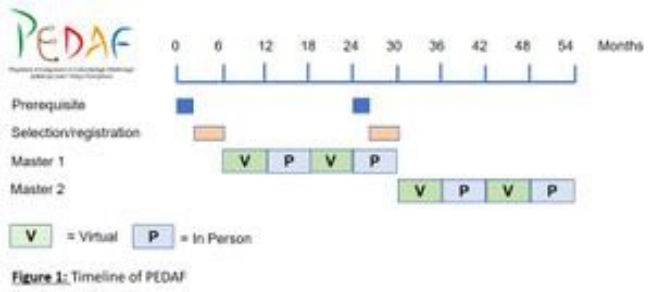

Figure 1: Timeline of PEDAF

Conclusions: Regional conceptualization and international funding and professional collaboration are key to implementing successful post-graduate training programs in pediatric endocrinology. Outcome evaluation will assess the long-term sustainability and effect on regional and national pediatric endocrine capacity.

ORAL SESSION VI: TECHNOLOGY, NUTRITION, EXERCISE AND ADJUNCTIVE THERAPIES

O-47 | Changes in gut bacteriome composition on low-carbohydrate diet in children with type 1 diabetes

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Introduction: Low-carbohydrate diet (LCD) is a controversial but popular dietary choice for many children and adolescents with type 1 diabetes (CwD).
Objectives: In a cross-over trial with LCD (clinicaltrials.gov NCT05078658), we assessed whether even a short period of tightly controlled LCD is able to change the gut bacteriome in CwD.
Methods: Twenty CwD (aged 15.1±3.0 years) were recruited into an intervention trial with a 5-week period of LCD (95±3 g carbs daily) followed by 5 weeks of regular carbohydrate diet (RCD) (193±18 g carbs daily) with the order randomized. The diets did not differ in energy intake (8360 vs. 8392 kJ, P=0.08).
The fecal samples were collected regularly before, after and throughout the interventions (median number of samples collected per subject was 12, IQR 10-15). The fecal bacteriome was assessed using massively parallel sequencing of the variable regions V3-V4 of 16S rDNA.
Mixed effects regression models were built where responses were principal components of the bacteriome community, alpha diversity indices and individual taxa. The predictors were the type of the diet, time since start of the diet and randomized order of the diets.
Results: We observed shifts in the bacteriome community composition on the LCD which were apparent at all taxonomic levels (P for various principal components ranging from $5x10^{-4}$ to 0.015); their magnitude was however moderate.
Of individual taxa, *Bifidobacterium sp.* and its higher taxonomic categories were negatively associated with LCD; the overall effects observed on the community composition were however broader than could be explained by changes in this single taxon. The alpha diversity decreased with time regardless of the intervention sequence, but did not associate with LCD.
Conclusions: Even a short period of LCD is associated with subtle yet significant changes in the stool bacteriome community composition mainly in the *Bifidobacterium sp.* The observed changes may help us understand the possible effects of LCD on T1D.

O-49 | Agreement between the glucose management indicator and point of care hemoglobin A1C

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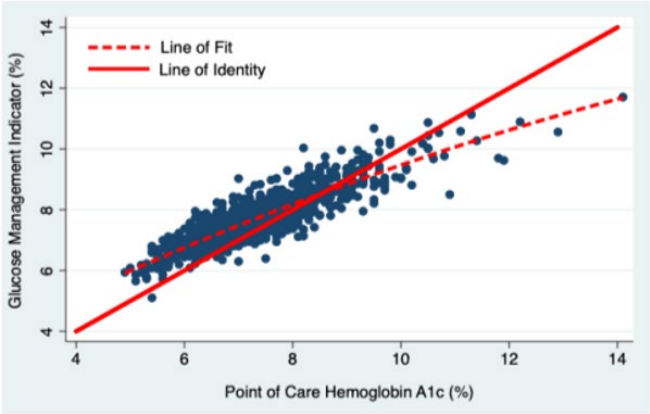
Introduction: Continuous glucose monitors (CGM) are commonly used in pediatric type 1 diabetes (T1D) care, however, point of care (POC) hemoglobin A1c (A1c) values continue to impact care and decision making.
Objectives: To examine the relationship between 90-day GMI values and point-of-care (POC) A1c in youth with T1D followed at 8 outpatient clinics in a large, academic center.
Methods: Youth <22 years with T1D ≥ 3 months using a Dexcom G6 with ≥70% CGM wear time in the 90 days preceding a POC A1c were included. POC A1c was measured using Siemens DCA Vantage analyzer. Youth with anemia and hemoglobinopathies were excluded (n=52).
Following graphical inspection, a linear regression model that included a quadratic term for A1c was used to analyze differences between POC A1c and GMI. Poor agreement was defined as a >0.5% difference between GMI and POC A1c.
Results: We studied 1051 youth (MeanT1D duration 5.8 ± 4.0 yrs, 82.2% NHW, 5.7% NHB) whose glycemic data were: MeanA1c 7.3 ± 1.1%, min-max 4.9-14.1%; MeanGMI 7.7 ± 0.9%, min-max 5.1- 11.7%. The relationship between GMI and POC A1c was not linear and this difference was tempered at higher

POC A1C and magnified at lower POC A1C (Figure 1) (R2=0.78, p<0.0001; A1c β=0.95, p<0.0001; A1c2 β=-0.17, p=0.002). For a GMI of 6%, 9%, and 12%, respectively, the model predicted an A1c of 6.3%, 8.7%, and 11.0%. 30.5% of youth had less than a 0.3% absolute difference between GMI and A1c.

The absolute difference between GMI and A1c was more than 0.5% in 50.0% of youth; GMI exceeded A1c by ≥0.5% in 44.4% while A1c exceed GMI by ≥0.5% in 5.6%.



Conclusions: Agreement between POC A1c and 90-day GMI values was imperfect. On average GMI is higher than A1c, but less so at high A1c and to a greater extent at lower A1c. Clinicians must be aware of these differences when making treatment decisions and counseling youth and families.

O-50 | Low carbohydrate versus mediterranean diet in adolescents with type 1 diabetes: a randomized control trial

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Introduction: Carbohydrates are the main macronutrient that affect postprandial glucose. Individuals with type 1 diabetes are increasingly embracing low-carbohydrate diets for better glycemic targets. Despite the popularity of a low-carbohydrate diet among people with type 1diabetes, there is a lack of evidence regarding its efficacy and safety.

Objectives: To compare glycemic parameters and metabolic health of a low carbohydrate diet (LCD) versus a Mediterranean diet (MED) in adolescents with type 1 diabetes

Methods: In an open-label, randomized, non-inferiority trial, 40 individuals with type 1 diabetes, aged 12-22 years, were randomly assigned to LCD or a MED for 24 weeks. Glycemic outcomes included time in range(TIR) and glycosylated hemoglobin (HbA1c).

Results: Baseline characteristics were similar in the two groups. After 6 months intervention, the median TIR 3.9-10.0 mmol/L(70-180 mg/dl) increased from 47%(35;55) to 58%(51;72) in the LCD group and from 52%(interquartile range 38;60) to 67%(50;73) in the MED group, p=0.86.

There was no difference in %TIR< 3.0 mmol/L (<54 mg/dl). The delta %TIR>13.9 mmol /L (>250 mg/dl) was higher in the LCD (-11.0 (-5.0; -16) than the MED group (-3.1 (0.0; -9.4)) (p=0.008). Delta HbA1c level improved in both groups. The decrease was significantly lower in the LCD than the MED group after six-months, -7.5(-13.9; -1.2), p=0.02. Median daily carbohydrate intake was 60g (45;88) for the LCD group and 128g (interquartile range 104;155) for the MED group. Delta BMI z-score was lower in the LCD group, -0.1(-0.3; -0.1), than in the MED group, 0.0(-0.1; -0.1), p=0.08. Lipid levels did not differ between the groups.

Conclusions: Non-inferiority (13% relative margin) of the LCD versus the MED was demonstrated by the primary endpoint, %TIR3.9-10.0mmol/L(70-180 mg/dl), among adolescents with type 1 diabetes. The risk for hypoglycemia and the presence of cardiovascular risk factors were similar in the two groups.

O-51 | Effect of a hybrid closed loop system on glycaemic and psychosocial outcomes in youth with elevated HbA1c and high diabetes distress: a randomized clinical trial

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Introduction: Although hybrid closed loop (HCL) systems improve glycaemia, its effect on youth with suboptimal diabetes care remains unknown.
Objectives: The aim was to determine the efficacy of HCL on glycaemic and psychosocial outcomes in a high-risk cohort of youth with Type 1 diabetes (T1D) with elevated HbA1c and high diabetes distress.
Methods: In a 6-month multicentre trial in Australia, youth with T1D and mean HbA1c > 8.5% were assigned 1:1, to either insulin pump ± CGM (control) or Medtronic advanced HCL (intervention).
The primary outcome was glycated haemoglobin (HbA1c) and secondary outcomes were CGM metrics (% Time in range TIR 70-180 mg/dl, Time >180 mg/dl, Time < 70 mg/dl) derived from masked CGM and youth-reported problem areas in diabetes (PAID), quality of life, anxiety, depression and fear of hypoglycaemia using validated questionnaires.
Results: Out of 42 participants randomized [mean ±SD age 16.2 ±2.5 years, HbA1c 9.8 ±1.1%, PAID score 43.2 ±18.6], 38 completed the study. HbA1c reduced from 9.5 ±0.9% to 8.9 ±1.1% with HCL and from 10.0 ±1.3% to 9.9 ±1.1% in control group with mean adjusted difference of -0.78 (95% CI -1.46, -0.09, p=0.028). HCL increased TIR (difference 19.10%; 95% CI 11.1, 27.1; $p \leq 0.001$), reduced time > 180 mg/dl (difference -17.7%; 95% CI -26.6, -8.8; $p \leq 0.001$), with no increase in time < 70 mg/dl (difference -0.8%; 95% CI -2.7, 0.6; $p=0.350$).
The figure shows 24-hr sensor glucose profile for TIR. There was no difference in psychosocial outcomes: diabetes distress, quality of life, anxiety, depression and fear of hypoglycaemia between the two groups at the end of the study. There were 3 episodes of ketoacidosis in the control group and one in the HCL group with no severe hypoglycaemia in either of the two groups.

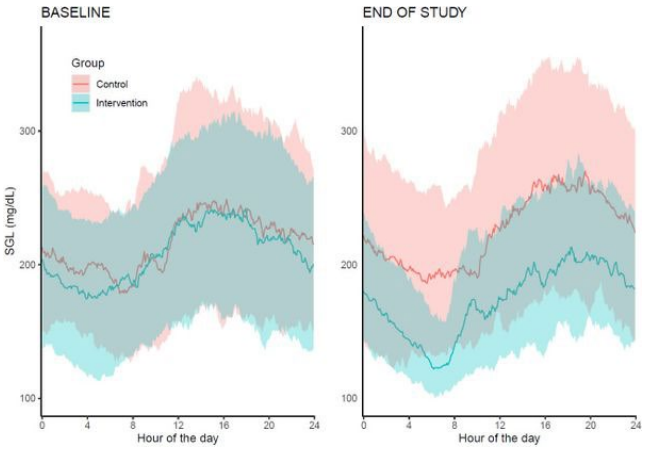

Figure: 24-hour Sensor Glucose Profile at baseline and study end/

Conclusions: Most youth with sub-optimal diabetes control continued to use HCL therapy with improved glycaemic outcomes although there was no change in psychosocial measures.

O-52 | The glycemia risk index predicts type 1 diabetes self-management habits in youth

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Introduction: The Glycemia Risk Index (GRI) is a validated measure of the quality of glycemic control in adults with type 1 diabetes (T1D).
Objectives: We sought to determine whether GRI associated with the 6-Habits score, a validated measure of youths' engagement in diabetes self-management habits (Lee et al., 2021).
We examined this association in the context of an additional (7th) habit designed to assess consumption of a healthy diet.
Methods: We retrospectively examined electronic health records of individuals who received care from a Midwest (USA) tertiary care pediatric diabetes clinic network. GRI was calculated based on continuous glucose monitor data, and habit scores were collected within 3 weeks of a GRI score. A mixed-effects Poisson regression examined how GRI associated

with total habit scores, reflective of the number of T1D self-management habits completed. GRI, hemoglobin A1c (HbA1c), age, race, ethnicity, and insurance type were entered as fixed effects. Individual was included as a random effect to account for multiple observations.

Results: The cohort (N=1500) included youth with T1D ages 1.9-18.0 years, with 48.7% males, 86.7% non-Hispanic White, 70.0% on commercial insurance, and a mean age of 12.7 years (SD=3.7). GRI scores and HbA1c decreased as habit scores increased (Figure 1), suggesting individuals who performed more self-management habits achieved a higher quality of glycemic control.

Age and insurance type were also significantly related to total habit scores. Older individuals had lower habit scores compared to their younger counterparts (t = -7.92, p < .001). Those with commercial insurance had higher habit scores than self-pay, public, or other types of insurance (t = 2.21, p = .03).

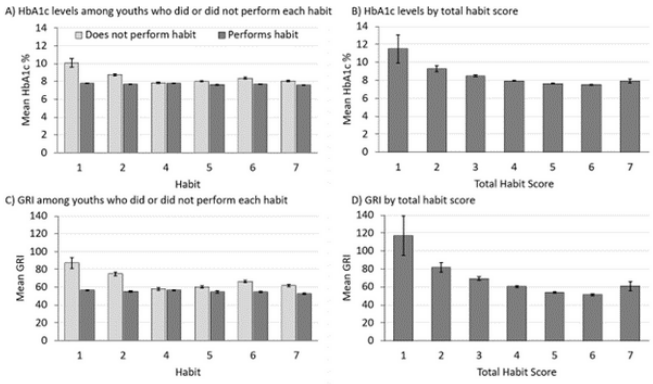

Figure 1. Mean hemoglobin A1c (HbA1c) levels by each habit (A) and by total habit score (B). Mean Glycemic Risk Index (GRI) by each habit (C) and by total habit score (D). Error bars reflect 95% confidence intervals. Habit 1) monitors blood glucose levels; Habit 2) administers boluses; 3) uses an insulin pump; 4) administers boluses before meals; 5) reviews blood glucose data; 6) alters insulin doses between clinic visits; 7) consumes a healthy diet. Note that all individuals included in analyses engaged in habit 3. While the GRI was developed so that the maximum value was 100, we did not cap GRI scores for the analyses.

Conclusions: GRI associated with scores on the 6-Habits scale, providing validation for both measures. GRI may add value beyond HbA1c and sensor time in range as an indicator of the quality of glycemia in youth.

O-53 | Increasing step count during the first year after diagnosis relates to increased time in range among youth with type 1 diabetes: 4T exercise study results

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Introduction: Many youth with type 1 diabetes (T1D) do not meet physical activity (PA) recommendations of at least 60 minutes of moderate-to-vigorous PA per day. The teamwork, targets, technology, and tight control (4T) Exercise Study 1 started youth with T1D on continuous glucose monitoring (CGM) and PA trackers by 1-month post-diagnosis. Structured exercise education was offered over tele-health with the goal of reducing barriers associated with PA by increasing knowledge, education, and confidence around safe exercise with T1D.

Objectives: Our objective was to assess PA behaviors and glycemia in youth with T1D receiving the 4T Exercise intervention during the first 12 months post-diagnosis.

Methods: Youth with T1D started CGM (median [IQR]) 12 [7, 21] days post-diagnosis and a PA tracker 41 [28, 61] days post-diagnosis. Steps, active time, and moderate-to-vigorous PA were retrieved from PA trackers. CGM metrics [% time below range (TBR1; 54-70 mg/dL, TBR2; <54 mg/dL), time in range (TIR; 70-180 mg/dL), and time above range (TAR1; 181-250 mg/dL, TAR2; >250 mg/dL)] were retrieved from Dexcom Clarity.

Data were analyzed using simple mixed linear regression models with random patient effects.

Results: Youth (n=42, age 13 [11, 15] years, 31% female, 57% non-Hispanic White, 19% publicly insured) wore PA trackers 14 [13-15] hours/day. From 1-3 months to 10-12 months post-diagnosis, average (±SD) step count/day (5,531±2,596 vs 6,580±2,619 steps; p<0.0001) and active time/day (2:10±0:56 vs 2:21±0:53 hr:min; p<0.0001) increased, respectively. From 1-3 months to 10-12 months post-diagnosis, TIR

PHYSICAL ACTIVITY AND CGM METRICS	Months 1-3	Months 4-6	Months 7-9	Months 10-12	p-value
Steps/day	5,531 ± 2,596 5,575 [3,401, 7,463]	5,421 ± 2,758 5,728 [3,840, 7,364]	6,361 ± 2,723 6,054 [4,344, 8,131]	6,580 ± 2,619 6,518 [5,373, 7,668]	<0.0001
Active time/day (hour:min)	2:10 ± 0:56 2:11 [1:35, 2:47]	2:03 ± 0:59 2:06 [1:20, 2:37]	2:17 ± 1:00 2:07 [1:36, 2:56]	2:21 ± 0:53 2:21 [2:00, 2:41]	<0.0001
MVPA/day (minutes)	26 ± 21 23 [8, 36]	26 ± 27 18 [7, 33]	28 ± 28 19 [12, 37]	30 ± 32 16 [8, 44]	0.8
% TAR 2 (>250 mg/dL)	6 ± 8 3 [0, 10]	7 ± 7 3 [1, 11]	7 ± 6 6 [2, 9]	7 ± 8 3 [1, 12]	0.2
% TAR 1 (181-250 mg/dL)	17 ± 11 16 [8, 27]	17 ± 12 19 [6, 26]	20 ± 10 20 [13, 29]	18 ± 10 16 [11, 26]	<0.0001
% TIR (70-180 mg/dL)	74 ± 17 77 [59, 88]	72 ± 17 73 [56, 88]	71 ± 14 71 [59, 85]	72 ± 16 79 [53, 85]	<0.0001
% TBR 1 (54-70 mg/dL)	2.6 ± 4.7 1.6 [0.5-2.8]	3.0 ± 6.3 1.5 [0.7-2.8]	1.9 ± 1.4 1.7 [1.0-2.5]	2.0 ± 1.4 0.7 [0.7-3.3]	0.1
% TBR 2 (<54 mg/dL)	0.4 ± 0.9 0.1 [0.0-0.4]	0.5 ± 1.7 0.1 [0.0-0.4]	0.3 ± 0.3 0.2 [0.0-0.3]	0.3 ± 0.3 0.2 [0.0-0.5]	0.9

Table 1. Continuous Glucose Monitoring (CGM) and physical activity metrics from 1-12 months post-diagnosis of type 1 diabetes. Data presented as mean ± SD or median [IQR] per day; MVPA = minutes of moderate-to-vigorous physical activity, TAR2 = time above range 2 (>250 mg/dL), TAR1 = time above range 1 (181-250 mg/dL), TIR = time in range (70-180 mg/dL), TBR1 = time below range 1 (54-70 mg/dL), TBR2 = time below range 2 (<54 mg/dL). P-values correspond to the 3 d.f. tests for differences in means from a simple mixed linear regression model with random patient effect.

decreased (74±17 vs 72±16%; p<0.0001) and TAR1 increased (17±11 vs 18±10%; p<0.0001), with no significant differences in TBR. Moderate (7-10K) and high (>10K) daily steps were associated with increased TIR vs low (<7K) steps (73±15% and 73±15%, vs 71±17%, respectively; p<0.0001).

Conclusions: In summary, the 4T Exercise program with diabetes-related technologies (i.e., CGM and PA trackers) soon after diagnosis is feasible in youth with T1D. The 4T Exercise program appears to be successful in helping newly diagnosed youth maintain or exceed current TIR clinical target guidelines (>70% TIR) while also potentially facilitating more daily PA.

Future work is needed to determine if the 4T Exercise program is superior to standard of care shortly after diagnosis in youth with new onset T1D.

O-54 | Bi-hormonal fully closed loop system for the treatment of type 1 diabetes in adolescents aged 12-18 years

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Introduction: Superior glycemic control has been demonstrated in adults with type 1 diabetes (T1D) with a bi-hormonal fully closed loop system (FCL).

Objectives: To demonstrate performance and safety of the FCL in adolescents (12-18 years) with T1D.

Methods: The FCL was assessed in a randomized cross-over trial at home. Primary endpoint was time in range (TIR: 3.9–10.0 mmol/L). Secondary endpoints included other performance parameters, safety, and person-reported outcomes (adolescents and par-

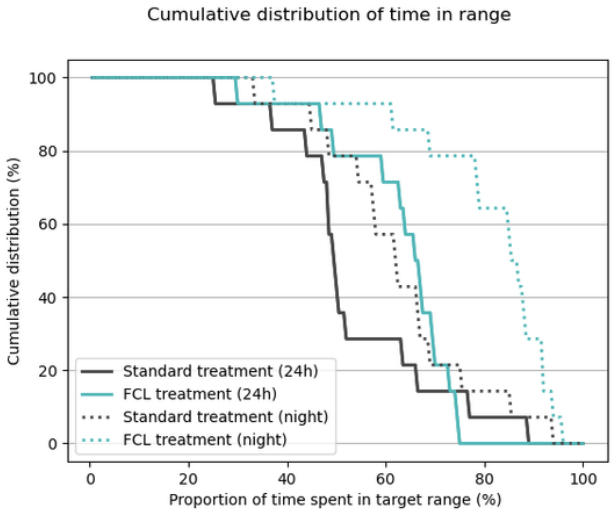
ents). Two weeks of participants' standard treatment were compared with two weeks of FCL treatment using a Wilcoxon signed rank test.

Results: Data from 14 of 20 included adolescents were analyzed (4 failed data collection, 2 withdrew during FCL period (of which 1 included in analysis), and 1 not yet completed). Median TIR was 49.4% [IQR 47.6–60.3] during control treatment and 66.3% [60.3–70.0] during FCL treatment (p=0.104; see figure).

No differences were seen in time below range (1.7% [0.7–3.9] vs 1.9% [1.1–2.7]; p=1.000), time above range (TAR: 47.1% [35.6–51.6] vs 31.7% [27.8–36.2]; p=0.119), mean glucose (10.6 mmol/L [8.9–11.1] vs 9.0 mmol/L [8.5–9.7]; p=0.194), and coefficient of variation (37.2% [34.9–40.6] vs 39.1% [36.8-43.3]; p=0.090).

Significant improvements were seen during the night in TIR (62.0% [55.1–68.3] vs 86.1% [78.5–90.6]; p= 0.005), TAR (37.8% [26.0–43.2] vs 11.8% [6.7–20.3]; p=0.009), and mean glucose (9.6 mmol/L [8.6–10.2] vs 7.5 mmol/L [7.0–8.0]; p=0.013).

Diabetes treatment satisfaction (DTSQ) scores tended to increase for FCL treatment. No serious adverse events were reported.



Conclusions: This study was the first to assess a bi-hormonal FCL in adolescents with T1D. These preliminary data show that, without meal or exercise announcements, the FCL achieved glycemic control comparable to standard treatment, with better nighttime performance. Patient satisfaction was at least comparable to standard treatment. The FCL was safe to use.

O-55 | Performance of a clinic-deployed model to predict diabetic ketoacidosis (DKA) risk in type 1 diabetes (T1D)

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Introduction: DKA is a severe, potentially life-threatening complication of T1D. Predicting DKA risk may allow for preventive interventions.

Objectives: We assessed the performance of a clinic-deployed machine learning model that identifies youth with T1D at risk for DKA-related hospitalization.

Methods: DKA risk predictions using production data for a cohort of 2605 youth with T1D (53% male) aged=13.5±4.3 yr (mean±SD) receiving care from a network of US diabetes centers between 9 Jun 2022 and 6 Mar 2023.

Each week, the deployed model predicted 6-month DKA risk for all youth who had a clinic visit within the prior 90 days. The weekly cohort was rank-ordered by probability of hospitalization.

We considered the top R=100, 50, 25, or 10 highest-risk individuals as potential thresholds for a clinical intervention. We calculated the weekly precision, the fraction of people in the top R who experienced DKA, and recall, the fraction of DKA events successfully placed in the top R, for each threshold.

This approach replicates how a clinic may prioritize people for preventive interventions based on each individual's risk. An updated model including average time between DKA episodes, added on 28 Dec 2022, was also evaluated.

Results: Overall, 74 DKA events occurred within 6 months of a baseline prediction for 5158 clinic visits (1.9%). Using the top 100 as the DKA threshold, 21% of youth in the top 100 experienced DKA (precision) and 57% of all DKA events were in the top 100 (recall), on average.

Of the 41 DKA events which occurred following the deployment of the updated model, 24% of youth in the top 100 experienced DKA (precision) and 79% of all DKA events were in the top 100 (recall), on average.

	All DKA events (N=74)[a]		DKA events (n=41) with updated model[b]	
DKA threshold	Precision	Recall	Precision	Recall
Top 100	0.21	0.57	0.24	0.79
Top 50	0.35	0.47	0.44	0.72
Top 25	0.52	0.36	0.68	0.57
Top 10	0.62	0.18	0.88	0.30

[a]Top 5 most important features, original model: (i) HbA1c value, (ii) cumulative DKA, (iii) time since last DKA, (iv) insurance status, and (v) race.
[b]Top 5 most important features, updated model: (i) average time between DKA, (ii) time since last DKA, (iii) T1D Duration, (iv) cumulative DKA, and (v) HbA1c value.

Conclusions: We previously developed and clinically deployed a model to predict 6-month DKA risk. The model successfully flagged the majority of DKA cases as requiring additional care. Future efforts will assess the efficacy of preventive interventions for reducing DKA-related hospitalization.

O-57 | Residual insulin after anti-viral treatment with pleconaril and ribavirin in new onset type 1 diabetes. A phase 2, randomized, placebo-controlled, double blind, clinical trial

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Introduction: Previous studies have shown a clinically significant association between enterovirus infection and type 1 diabetes and a low-grade enterovirus infection has been demonstrated in the pancreatic islets of patient with newly diagnosed type 1 diabetes.
Objectives: To determine the effect of antiviral treatment with the combination of pleconaril and ribavirin on beta cell function.
Methods: This is a phase-II, placebo-controlled, randomized, double-blind, parallel-group trial. The study was conducted at two centers (Oslo, Norway and Copenhagen, Denmark).
The participants were 96 children and adolescents (6-15 years) with newly diagnosed type 1 diabetes. They were randomly assigned to receive oral antiviral treatment (pleconaril and ribavirin) (n=47, 19 females) or placebo (n=49, 21 females) for 6 months, started less than 3 weeks after diagnosis of type 1 diabetes.
Primary endpoint was endogenous insulin production at 12 months, measured by area under the concentration–time curve (AUC) for C-peptide levels in response to a 2-hour mixed-meal tolerance test at 0, 15, 30, 60 and 90 minutes.
A linear mixed model for repeated measures was used, and the treatment effect was estimated as the average marginal effect at 12 months (AME).
Results: At 12 months, mean 2-hour C-peptide AUC was 41 % higher in the antiviral group than in the placebo group.
This difference is statistically significant (AME 0.057, p=0.04, adjusted for baseline level). 36/42 vs. 30/45 of the subjects, respectively, had maximal C-peptide > 0.2 pmol per milliliter (p=0.04).
There were no significant differences regarding HbA1c, glycated albumin, insulin dosage, severe hypoglycemic events or adverse events at 12 months.
Conclusions: Among children with newly diagnosed type 1 diabetes, a 26-weeks course with two antiviral drugs resulted in better endogenous insulin production and a higher proportion of patients with clinically relevant preserved C-peptide secretion than placebo.

Poster Abstracts

DIABETES AND COVID-19

O-39 | The effect of COVID-19 on type 1 diabetes incidence among children and adolescents: a multi-center prospective observational cohort study

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Introduction: Conflicting results have been reported regarding the impact of COVID-19 infection on the incidence of new-onset type 1 diabetes (T1D) among children.
Objectives: To assess associations between seroprevalences of the distinct anti-SARS-CoV-2 antibodies, and the occurrence of new-onset T1D in children and adolescents.
Methods: This multi-center prospective observational cohort comprised two groups of children who attended medical care between October 2020 and July 2022: children with new-onset T1D and children who performed endocrine tests (control group), in a 1:3 ratio. Anti-SARS-CoV2 antibodies, including anti-S, anti-N, and neutralizing antibodies, were assessed in each group.
Results: The cohort included 51 children with T1D and 182 children in the control group. The median (interquartile range) age was 11.4 (8.2,13.3) years old, and 45% were female. Increases were not observed in the seroprevalence of any of the anti-SARS-CoV2 antibodies among the children with new-onset T1D compared to the control group. Among the T1D group, anti-S seroprevalence was higher among those without diabetes ketoacidosis (DKA) compared to those with DKA upon T1D diagnosis, (72% vs. 42%, p=0.035), but when adjusted to their vaccine status no differences were observed in the anti-S seroprevalence. Additionally, there were no differences in the anti-N antibodies or the neutralizing antibodies between the DKA vs. the non-DKA groups. No associations were observed between any of the anti-SARS-CoV-2 antibodies and any of the glycemic parameters.
Conclusions: This study is the first to assess several distinct anti-SARS-CoV-2 antibodies in new-onset T1D, and our findings do not support an association between SARS-CoV-2 infection and the occurrence of T1D in children and adolescents. Nevertheless, we advise that all children previously infected with SARS-CoV-2 be closely monitored, as autoimmunity may emerge in the future, potentially many years after the initial infection.

P-100 | Immediate impacts of COVID-19 vaccination on glycemic control in patients with type 1 diabetes: a systematic review and Meta-analysis

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Introduction: COVID-19 vaccination is recommended in diabetic patients since diabetes is associated with worse outcomes in COVID-19 infection. The safety profile of different types of COVID-19 vaccines, especially on glycemic control, can be investigated due to the availability of data from continuous and interstitial glucose monitoring devices.
Objectives: This meta-analysis aimed to quantify the immediate impact of COVID-19 vaccination on glycemic control in patients with type 1 diabetes (T1D).
Methods: A systematic search of Pubmed, Embase, and Google Scholar was conducted independently by two reviewers using the same search strategy for

studies published till January 2023 in the English language. Comparative observational studies reporting on the immediate continuous or interstitial glycemic control before and after COVID-19 vaccination in T1D patients were included.

The primary outcome was the time in range (TIR) metric proportion (%) of glucose results falling within the range of 3.9–10 mmol/L.

Other outcomes were time above range (TAR) (>10 mmol/L), time below range (TBR) (<3.9 mmol/L), coefficient of variation (CV), and mean blood glucose levels. The pooled outcomes were compared pre- and post-vaccination using Hedges' g (HG) with a 95% confidence interval (CI).

Results: The COVID-19 vaccination caused a small but statistically insignificant decrease in TIR after both first (HG= 0.21, 95% CI: -0.02-0.44, p=0.07) and second doses (HG= 0.09, 95% CI: -0.04-0.21, p=0.19). Likewise, TAR was not increased after either the first (HG= -0.09, 95% CI: -0.22-0.03, p=0.12) or second vaccine dose (HG= -0.07, 95% CI: -0.21-0.06, p=0.30). TBR and CV were not significantly affected by either of the doses.

The mean blood glucose levels were not significantly altered by either the first (HG= -0.14, 95% CI: -0.39-0.12, p=0.29) or the second dose (HG= -0.05, 95% CI: --0.19-0.10, p=0.51).

Conclusions: The COVID-19 vaccination has minimal effects on the immediate glycemic control of T1D patients, resulting in an excellent safety profile.

P-101 | Effects of COVID-19 pandemic on body mass index and glycaemic control in children with type 1 diabetes mellitus

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Introduction: Coronavirus disease of 2019 (COVID-19), a highly transmittable viral disease, disrupted the lives of people around the world. The management of a chronic disease like Type 1 Diabetes Mellitus patients was challenging during this period due to restricted movements, limited physical activity and closure of schools and playgrounds.

Objectives: The aim of this study was, to assess the impact of COVID-19 period on Body mass index and Glycaemic control of children with Type 1 diabetes.

Methods: Study was conducted in a Paediatric Endocrinology department which provides free consultation,free insulin vials,glucometer and strips. Children under the age of 18 years diagnosed with type 1 diabetes and having a minimum of two prior records of Physical parameters and HbA1c were included in this observational study.

The anthropometric parameters and HbA1c were noted before COVID-19 (March 2020) and after the COVID-19 (August 2022) follow-up visits.

During the lockdown period, the patients were managed by regular tele-consultation with the diabetes care team and also provisions were made for primary caregivers to visit our hospital and obtain free insulin.

Results: Out of the 147 patients, 79 (53.17%) were females and 68 (46.25%) were males.All the patients were on basal-bolus regimen with NPH and Regular insulin.Weight z-score increased from pre-COVID to post-COVID (-0.789±1.57 vs. 0.436±1.49, p <0.0001) with concurrent increase in BMI z-score (-0.01±1.07 vs. 0.76±1.82, p <0.0001).

There was a reduction in physical activity time (from 54.36 ± 10.04 min to post- COVID 33.60 ± 18.38 min p:<0.0001) and increase in screen time (from 106.23 ± 40.87 min to post- COVID 363.87 ± 88.88 min).

However,there was no significant change in glycemic control (10.65±2.22% vs. 10.35±1.94%, p 0.057).

Conclusions: Post COVID-19, there was a significant increase in weight and BMI z-scores, due to reduced physical activity emphasising the importance of healthy lifestyle and physical activity. However, there was no change in the glycaemic control.

P-102 | Psychosocial burden of the COVID-19 pandemic in adolescents with type 1 diabetes in Germany and its association with metabolic control

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Introduction: Adolescents with type 1 diabetes are at increased risk of developing mental health disorders. The impact of the ongoing COVID-19 pandemic is not known.
Objectives: To investigate the psychosocial burden of the COVID-19 pandemic on adolescents with type 1 diabetes and its impact on metabolic control.
Methods: Multicenter observational cohort study based on data from the German Diabetes Prospective Follow-up Registry. Adolescents aged 12-20 years with type 1 diabetes were asked during routine follow-up visits to complete a questionnaire on psychosocial distress and daily use of electronic media during the COVID-19 pandemic from June 2021 to November 2022. Well-being, anxiety and depression symptoms were assessed using WHO-5, GAD-7 and PHQ-9 questionnaires. The impact of mental health symptoms on metabolic control was analyzed by using multivariable linear regression models adjusted for sex, diabetes duration and immigrant background.
Results: 688 adolescents (45.6% females) from 20 diabetes centers participated. Anxiety and/or depression scores were unremarkable in more than 85% of participants. Compared to patients with HbA_{1c} values in the lowest tercile, patients with HbA_{1c} values in the highest tercile had lower mean adjusted WHO-5 scores (52.4 vs 58.4, P=0.006), and higher mean adjusted GAD-7 (5.3 vs 3.9, P=0.001) and PHQ-9 scores (5.4 vs 4.2; P=0.012). HbA_{1c} was significantly positively associated with GAD-7 and PHQ-9 and negatively associated with WHO-5 scores (all P<0.001). Daily electronic media use was positively associated with adjusted mental health problems (all P<0.01).
Conclusions: The psychological burden of the COVID-19 pandemic during the later phase of the pandemic in adolescents with type 1 diabetes was relatively low. However, mental health problems were associated with poorer metabolic control and higher use of electronic media.

P-104 | Handling pediatric diabetes clinics during and two years after COVID-19 pandemic outset: an electronic survey from the ISPAD-JENIOUS group

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Introduction: COVID-19 pandemic led to a major paradigm shift in type 1 diabetes (T1D) care.
Objectives: To understand the long-lasting shift in pediatricT1D clinical care experienced within a 2-year period caused by the pandemic.
Methods: A web-based survey developed by the ISPAD-JENIOUS group gauged major changes in T1D clinical care throughout specific topics: characteristics of diabetes centers; changes in clinical practice and workforce; current situation and perspective in follow-up.

Results: Sixty-two responders from 26 countries completed the survey. During the pandemic, 40% of responders reported that more than 75% of patients relied on telemedicine and 29% reported that 10-25% of patients in their centers preferred to continue remote or virtual communication with 26% reporting that 10-25% of their patients continued to use telemedicine 2 years after the lockdown.

Most (64.5%) reported the establishment of virtual training sessions in their center during the lockdown and 60% continued the virtual training after the lockdown. Regarding pump training for new users, 40% relied on virtual training during the lockdown while 2 years later 50% used hybrid training.

Generally, 45% reported a change in the structure and design of the delivered service and 48% reported improvement in the virtual care.

Most (58%) defined lack of basic requirements for training session as: internet connections, digital literacy as barriers to health care professionals'(HCPs) advancement in telemedicine. 49% and 34% referred to the absence of integrated delivery systems and poor communication with other specialties respectively as challenges when referring patients using telemedicine.

Conclusions: COVID-19 pandemic impacted the structure of T1D clinical care, and telemedicine seemed to have become an important tool in many diabetes clinics.

Although online surveys are important tools in defining the new standards of care for T1D, HCPs are exhausted from online questionnaires and strategies enhancing responses should be considered early.

P-105 | Type 1 and type 2 diabetes mellitus: clinical outcomes due to COVID-19. A systematic review of the literature and meta-analysis of observational studies

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Introduction: Most studies do not differentiate between patients with type 1 and type 2 diabetes in COVID-19.

Objectives: To identify whether there are differences in clinical outcomes between COVID-19 patients with diabetes (type 1 and type 2) and with COVID-19 patients without diabetes.

Methods: MEDLINE, EMBASE, LILACS, OVID, WHO COVID-19 Research Database and Scopus were searched from December 01, 2019, to August 15, 2022. We included observational studies without restriction of geographic region, language, sex, or age, whose outcome was mortality, intensive care unit (ICU) admission, and hospitalization.

Two authors independently performed the selection, data extraction and quality assessment (National Institutes of Health tool). A third reviewer resolved discrepancies. Data were synthesized according to sociodemographic and clinical characteristics of the patients.

Meta-analysis was performed using the random effects method reporting Odds Ratio (OR) with 95% Confidence Intervals (CI).

Results: 94 primary studies were included for this systematic review and 47 for the meta-analysis. When assessing the risk of bias, it was found that 46%, 40% and 14% of the articles presented good, fair, and poor quality, respectively. The OR for mortality, ICU admission and hospitalization for patients with diabetes was 2.62 (95% CI 2.10 to 3.28; I^2 100%),

2.63 (95% CI 1.55 to 4.47; I^2 95%) and 3.70 (95% CI 1.90 to 7.21; I^2 98%) respectively. Patients with type 1 diabetes also had a higher odds of hospitalization (OR 2.43 95% CI 1.98 to 2.98; I^2 0%) and patients with type 2 diabetes higher odds of death (OR 2.54 95% CI 1.84 to 3.51; I^2 93%).

The study population and sample size were identified as potential sources of heterogeneity in the subgroup analysis.

Conclusions: Regardless of the type of diabetes, there is a greater possibility of unfavorable clinical outcomes due to COVID-19. Therefore, clinical, and public health measures should be aimed at guaranteeing comprehensive management and care for patients with diabetes.

P-290 | Survey on acute complications in type 1 diabetes children : follow up study from the year 2017 to the year 2022 at Southern Rajasthan in the India

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Introduction: Diabetic ketoacidosis (DKA) and Severe hypoglycemia are acute and potentially life-threatening complications of type 1 diabetes. Both of these acute complications are preventable but unfortunately they still account for enormous morbidity, hospitalization and mortality among diabetic patients due to unavailability of proper education, specialized care and supplies of medicines and insulin.

Objectives: This is a study of more than 200 Type 1 diabetic children supported by Ramchandani Diabetes care and Research Centre, Kota Rajasthan India to highlight the fact that how unavailability of education, resources and specialized care(during COVID pandemic period)affected these children and resulted in episodes of Severe Hypoglycemia and Diabetic Ketoacidosis.

Methods: The data showing severe hypoglycemia and diabetic ketoacidosis of more than 200 Type 1Diabetic children from the year 2017 to 2022 was studied.

Results: It was observed that the incidence of severe hypoglycemia was 6.8 per hundred patients per year in 2017, 5.1 in 2018, 0.1 in 2019, 11.5 in 2020, 1.0 in 2022 and 3.6 in 2022.In the same way the incidence of Diabetic Ketoacidosis was observed as 11.9 per hundred patients per year in the year 2017, 1.9 in 2018, 0.0 in 2019, 4.2 in 2020 and gradually decreased to 2.0 in 2021 and finally it was 3.0 in the year 2022.

Conclusions: The study suggests that these children went through the episodes of severe hypoglycaemia and diabetic ketoacidosis more, when they couldn't access the education, supplies and facilities provided by the centre due to Covid19 and lockdown. As soon as the lockdown was over and they were able to access the facilities the episodes of hypo and DKA gradually decreased.

P-301 | Mixed methods study to explore the impact of COVID-19 on family quality of life for rural caregivers of children with type 1 diabetes

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Introduction: The psychosocial impact of COVID-19 may increase feelings of caregiver burden and diabetes distress, while potentially limiting access to necessary healthcare services for families who have a child with type 1 diabetes living in rural communities.

Objectives: This mixed method study examined changes in caregivers of children living with T1D perceived changes in quality of life and burden due to COVID-19.

Methods: Utilizing community-engaged research methods, our team compared QOL and caregiver burden data from 2019 (n=209) and to 2022 (n=95)

data. Outcomes were the WHOQOL-BREF, the ZBIS, and a focus group guide. Survey data explored the impact of COVID-19 diabetes distress, while caregiver interviews provided in-depth data on the impact of COVID-19 in rural communities on quality of life, health management routines, and access to T1D healthcare services.

We completed 14 virtual focus groups with a total of 42 caregivers, transcribed interviews verbatim, and utilized a phenomenological analysis to allow for codes and themes to emerge from the data.

Results: Caregivers reported significant improvements in psychological health (p<.001) and social relationships (p<.001), significant increase in burden (p<.001), and no significant changes in physical health and environment from 2019-2022.

Three themes were: intensifying financial toxicity during the pandemic, breaking down of social support systems, and adapting to rapidly changing healthcare delivery.

Conclusions: Overall, caregivers in the US reported improvements in quality of life when comparing before and after the pandemic.

However, caregivers did report increased caregiver burden and qualitative findings indicated worsening financial stress and weakening of social supports due to job losses, stay-at-home orders, and fear of contracting illness and unknown complications due to their child's diabetes diagnosis.

We expect that families had adjusted to changes from the pandemic and resumed typical routines.

P-311 | Analysis of prepandemic and pandemic diagnostics of pediatric type 1 diabetes mellitus in Lithuania

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Introduction: The COVID-19 pandemic had a strong impact on the management of newly and previously diagnosed diabetes.

Objectives: The aim of this study was to evaluate children with newly diagnosed type 1 diabetes mellitus (T1DM) in the Hospital of Lithuanian University of Health Sciences Kauno Klinikos during 2018–2022.

Methods: Data according to following age groups were analysed: 0–4, 5–9, 10–14, 15–18 y.o. The comparison between prepandemic/postpandemic (2018, 2019, 2022) and pandemic (2020, 2021) years was performed. Following data were analysed: means of glycated hemoglobin (HbA1c,%), venous pH at the diagnosis day, duration (days) until T1DM diagnosis. Blood metabolic analytes for excluded and diagnosed diabetic ketoacidosis (DKA) based on confirmed ISPAD biochemical criteria [1]. Statistical analysis was performed with SPSS 29.0. P <0.05 was considered significant.

Results: In total, during the study period, T1DM was diagnosed in 667 children (0–18 y.o.) in Lithuania. There was no statistical difference between new T1DM cases during pre/postpandemic and pandemic timeframe. No differences in HbA1c, venous pH means, or symptoms duration was detected between age groups or timeframes. We did not detect any significant differences between health status based on DKA criteria (mild, moderate, sever) at T1DM diagnosis time between the 1st and 2nd groups (prepandemic and pandemic period): 28.2%, 22.7%, 13.6% *vs.* 21.3%, 21.3%, 18.7%, respectively. We did not observe any significant different correlation between venous pH and duration from 1st symptoms until diagnosis day in between the study periods.

Conclusions: This study showed that the time from 1st symptoms until T1DM diagnosis was not prolonged

at quarantine period, and the severe DKA was not more prevalent in the quarantine period for patients with newly manifested T1DM. It could presume good access to health care through the Emergency department to 3rd level health care specialized service.

P-332 | Antibodies to COVID-19 in newly diagnosed children and adolescents with type 1 diabetes mellitus (T1DM): a casual association?

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Introduction: Environmental factors like viral infections are triggers of autoimmunity. COVID-19 pandemic increased T1DM clinical onset and in pediatric patients severe diabetic ketoacidosis (DKA) was reported. Delayed recognition of symptoms, restriction imposed by the lockdown, reduced availability of health care services have been considered. Moreover, COVID-19 exposure might have contributed to new cases of T1DM by precipitating clinical onset.
Objectives: In our cross sectional retrospective study we evaluated the frequency of COVID-19 in newly diagnosed T1DM children and adolescents and the relationship between COVID-19 immunity and clinical, immunological and metabolic parameters.
Methods: From February 2020 to December 2021, in 49 new cases of T1DM (age 1-20 yrs) we evaluated glucose, ketone bodies, pH, β-cell immunity, RT-PCR of upper respiratory tract specimen. SARS-CoV-2 antibodies were detected by Maglumi SARS-CoV-2-S-RBD IgG using a chemiluminescence immunoassay (CLIA) for quantitative IgG antibodies.
Results: Patients were divided in G1 (n=31, 61.3% males) aged of 8.5±4.9 yrs who had not contracted COVID-19 and G2 (n=18, 50% males) aged of 8.2±5.2 yrs who before T1DM diagnosis had contracted COVID-19. Serological detection of SARS-CoV-2 antibodies was positive in G2 and negative in G1. No differences for gender, age, C peptide and HbA1c, pH (p=0.79) and HCO3- (p=0.29) were found between G1 and G2. The % of patients with newly diagnosed T1DM with severe DKA was higher in G2 but not significantly (22.2% vs. 12.9%, respectively p=0.27). No significant differences were observed regarding β-cell autoantibodies type.
Conclusions: Given the relatively short time elapsed since COVID-19 pandemic, its role as a contributing factor to autoimmune T1DM remains a unanswered question. To date insufficient data are available about the etiopathogenetic role of COVID-19 as trigger of autoimmunity. The high frequency of T1DM during and after pandemic supports COVID-19 infection as a precipitating factor for T1DM clinical onset.

P-380 | SARS-CoV-2 serology and islet autoantibodies in type 1 diabetes mellitus onset – a single center cohort study

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Introduction: Early diagnosis of type 1 diabetes mellitus (T1DM), one of the most frequent chronic illnesses affecting children, is crucial, as it plays a key role in preventing the development of diabetic ketoacidosis - a life-threatening acute complication. It is already known that the etiopathogenetic role of viral infections has long been suggested and now, emerging data are pointing towards a complex bidirectional relationship between diabetes and COVID-19.
Objectives: Our study is based on highlighting some possible correlations between SARS-CoV-2 serology and T1DM onset.
Methods: For this ideea we performed an observational retrospective cohort study that included 158 children diagnosed with T1DM between April 2021–April 2022. We assed the presence or absence of SARS-CoV-2 and T1DM specific antibodies and other laboratory findings.
Results: In the group of patients with positive SARS-

CoV-2 serology, detectable IA-2A antibodies were present in a higher percentage, also a higher mean HbA1c value was found and many children were positive for all three islet autoantibodies determined (GADA, ICA, and IA-2A). We also compared this group of patients to a group of patients diagnosed before the pandemic and we found an increased incidence of both DKA and severe DKA, as well as a higher age at diagnosis and higher levels of HbA1c in the pandemic group, our study group.

Conclusions: This study brings important findings related to type 1 diabetes and COVID 19. Also the results highlight the need for further research to better understand the complex relationship between SARS-CoV-2 infection and T1DM.

P-399 | Trend of glycemic control and hospital visits of type 1 diabetes children and adolescents during pandemic

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Introduction: Pediatric Diabetes is a chronic condition which is diagnosed in children and adolescents and needs follow up every three to four months to maintain good glycemic control. Pandemic has lead to restriction in movements thus affecting the frequency of hospital visits of the children living with diabetes.

Moreover in developing countries this may led to poor accessibility to insulin, poor glycemic control and increase chances of landing to Diabetes Ketoacidosis(DKA). So Patients' data during the year 2020 and 2021AD was analysed. HbA1c%, Frequency of visit, BMI, frequency of DKA and severe hypoglycemia throughout these two years were analysed.

Objectives: To find out the frequency of hospital visits during the strict lockdown year and the year with less restriction to movement.

To see the glycemic control during these two years.

To see the alternative ways of delivering insulin

Methods: Retrospective analysis of two years' Medical record of children with diabetes was done specially focusing on frequency of visits and complications of Diabetes. Methods of insulin delivery was also recorded.

Results: Total 63 children and adolescents were analyzed during the period. Total visits were 164 in 2020 and 217 in 2021AD. Mean HbA1c% was 10.2% (SD:2.11) and 9.3% (SD: 2.19) in 2020 and 2021. Similarly Severe Hypoglycemic events were 31 in 2020 and 42 in 2021. Only 4 children landed up with DKA in 2020 and 2 in 2021. 28% of children have asked some of their relatives and neighbors to collect insulin more than 1 time. For 12%children ambulance drivers were used to carry insulin to their home.

Conclusions: Hospital visits were less during first year of Pandemic but next year the number of visits improved. Though the mean HbA1C% seems higher during start of Pandemic it's not statistically significant. Severe Hypoglycemia and DKA events seems similar. Alternative methods used to deliver insulin might have helped in glycemic control during travel restriction period. This can be planned for future possible pandemics.

TECHNOLOGY IN DIABETES CARE

P-001 | The effects of insulin pump treatment on children's nutritional habits, metabolic control and body composition- one year follow-up real life data

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Introduction: Insulin pump therapy is the most modern diabetes treatment method available. While there are many studies that improve metabolic control and increase the quality of life, some studies express concerns about deterioration of eating habits and weight gain.

Objectives: The aim is to evaluate the metabolic control,nutritional habits,body compositions of children using insulin pump theraphy by 1-year follow-up.

Methods: A total of 30 cases using 3 different types of insulin pumps were included in the study. The cases were evaluated at the start of treatment, at the 6th and 12th months. Biochemical parameters were obtained from the files. Body composition measured with the tanita780ma. The nutritional habits of the cases were evaluated by analyzing their food consumption records.

Results: Cases with type 1 diabetes (18F, 12 M) had a mean age of 12.1±4.4 and a mean HbAc of 7.3±1. During the 1-year follow-up, improvement in metabolic controls was observed, but it was not statistically significant. When body weights and compositions were evaluated, a decrease was found in BMISDS at the end of 1 year.

While body fat decreased significantly at 6 months, it increased significantly at the end of 1 year, although not worse than at baseline (p=0.01).

Food consumption was evaluated according to national standards, no significant deficiency was detected, while total energy intake decreased from 1358±385 kcal/day to 1211±342 kcal/day.

In macronutrients, carbohydrate intakes decreased (44.1-44.8-42.7%), protein intakes remained similar (17%), fat intakes increased (38.3-38-39.8%), fiber intakes decreased and then increased.(13.8-12.2-14.3). The number of main meals did't change, the number of daily snacks first decreased then increased.(2,1-0,8-1,8 times)

Conclusions: Although pump therapy offered a more flexible lifestyle, no significant changes were observed in the children's eating habits. By keeping the nutrition under control, it is possible to achieve a better metabolic control without any deterioration in body composition.

P-003 | Disparities in time in range by area deprivation for youth with early continuous glucose monitoring initiation in the U.S

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Introduction: The 4T Study 1 started all youth with newly diagnosed type 1 diabetes on continuous glucose monitoring (CGM) and remote monitoring (consisting of remote weekly glucose reviews and dose adjustments as clinically indicated).

Equitable access to CGM was prioritized by bridging gaps in sensor access and offering smart devices (iPods) to maintain cloud connectivity for remote monitoring.

Objectives: We aimed to evaluate time-in-range (TIR) trajectories by state-level area deprivation for youth in the 4T Study 1.

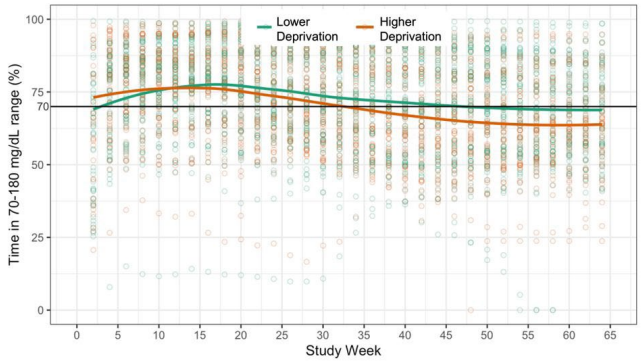
Methods: Home addresses, as documented in the electronic medical record, for youth in the 4T Study 1 (n=133) were used to assign a California state-level deprivation value.

This state-level deprivation index was developed by the U.S. Health and Human Services Administration and was chosen for this analysis as it is a measure of deprivation that incorporates neighborhood factors in the domains of income, education, employment, and housing quality.

Deprivation values were not available for three youth. Youth were stratified into lower and higher deprivation groups by the median deprivation value (≤2 vs >2) in the 4T Study 1 cohort. Descriptive differences in A1c by deprivation were evaluated by locally estimated scatter plot smoothing.

Results: Youth in the 4T Study 1 with deprivation values (n=130, age 11[IQR 7-13] years, CGM start at 10[IQR 6-18] days, A1c at diagnosis 12.1±2.4%, 35% publicly insured, 32% Hispanic) were stratified into lower (n=72) and higher (n=58) deprivation groups. Differences in TIR emerged by deprivation 15 weeks

after diagnosis and TIR was 5.3% lower in higher deprivation groups compared to lower deprivation groups (Figure).



Conclusions: Clinically significant disparities in TIR by deprivation level for youth in 4T Study 1 persist throughout the study period. These data suggest that in addition to equitable CGM access, there is a need to address structural factors that impact area deprivation to bridge disparities in glycemic outcomes.

P-005 | How does initiation of continuous glucose monitoring affect HbA1c and BMIz development in children living with type-1-diabetes? A group-based multitrajectory modeling on 12,353 individuals from the diabetes prospective follow-up registry

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Introduction: Although continous glucose monitoring (CGM) can improve metabolic control, it is questionable whether everybody benefits to the same extent and which individuals improve most. Moreover, continuous correction of blood sugar levels by multiple insulin injections might increase body weight.

Objectives: To evaluate heterogeneity of HbA1c and BMIz development from one year prior up to two years after CGM start in children living with type-1-diabetes (lwT1D).

Methods: 12,353 lwT1D (51.8% boys) aged ≤18 years with a diabetes duration of ≥1 year at CGM start from the prospective diabetes follow-up, DPV, were studied. Group-based multitrajectory modeling to identify subgroups with similar trajectories of both HbA1c and BMIz.

Results: Three distinct subgroups of joint HbA1c and BMIz change were identified (fig. 1). The two largest groups (G2,G3) with moderate change of HbA1c over time, experienced alongside either a clear BMIz gain (G3: dashed line, 44.1% of individuals) or a BMIz reduction (G2: solid line, 47.8%). A small group (G1: dash-dotted line, 8.1%) had a BMIz increase after CGM start along with a clear HbA1c reduction, al-

though HbA1c has been worsened prior CGM. First unadjusted analyses indicate older age, longer diabetes duration, a higher migration background, BMIz, HbA1c, or insulin dose/kg bw and less pump use at CGM start as proxyies for HbA1c improvement along with BMIz worsening (G1 vs. G3). By contrast, younger children, boys, having no migration background, a higher BMIz, a lower insulin dose and more frequent pump use seemed to be more often in G2 with BMIz reduction along with moderate HbA1c change if compared to G3.

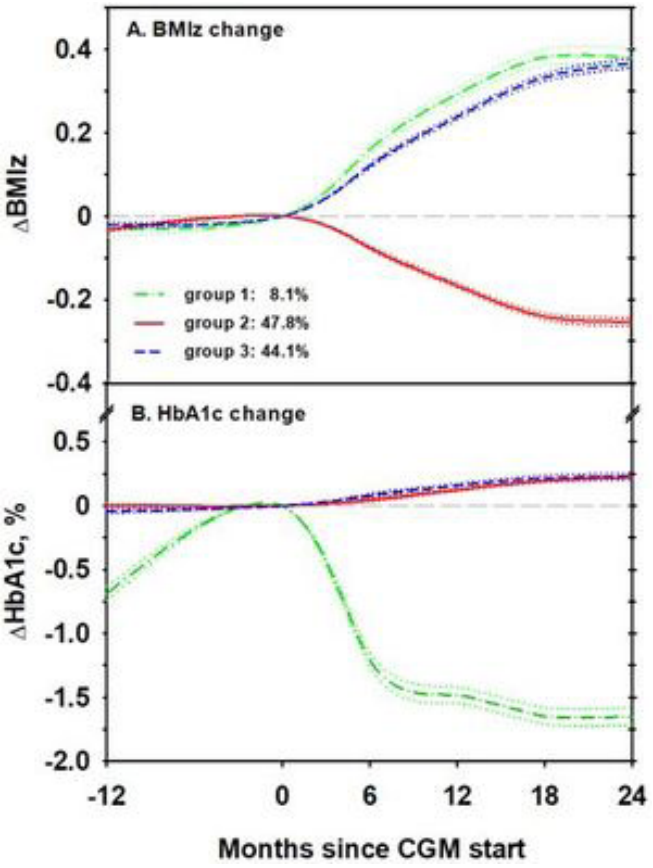

Fig. 1: Joint HbA1c and BMIz curves

Conclusions: Although CGM seems to stabilise or even improve HbA1c in lwT1D, not all individuals benefit with respect to BMIz. Specific focus should be put to high-risk individuals, identified proxies might help to develop individual-adapted treatment strategies (e.g. individualized diabetes training).

P-006 | Continuous glucose monitoring attrition among youth with type 1 diabetes

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Introduction: Continuous glucose monitor (CGM) use improves glycemic control in youth with type 1 diabetes (T1D). Despite high rates of use, many youths discontinue CGM use.

Objectives: To identify the reasons for and timing of CGM discontinuation among youth with T1D.

Methods: A retrospective chart review was conducted utilizing electronic medical record data at a pediatric tertiary care center. Youth [MB1] with T1D who had at least one office visit between November 1, 2021 and November 1, 2022 were included.

The timing of CGM initiation and discontinuation were based on CGM cloud-based software. Reasons for discontinuation were gathered from documentation medical charts. Data were collected and managed using the Research Electronic Data Capture (REDCap) database.

Results: Out of 2,696 total children, 315 children (11.7%) were not using CGM at their last office visit. Youth who were not using CGM had a mean age of 15.1±4.0 years, 59.3% were male, and 29% identified as Non-Hispanic Black. Non-wearers were predominantly privately insured (67%), had a mean hemoglobin A1c (A1c) of 8.8±2.3%, and a mean T1D duration of 6.3±4.5 years. 158 youth previously wore CGM but discontinued[MB1] , and 33% discontinued within the first 45 days.

There were no significant differences in age ($t=1.275$, $p=0.2$), weight ($t=0.139$, $p=0.89$), or body mass index (BMI) ($t=0.076$, $p=0.94$) between those who previously used CGM and those who never used CGM. Differences in duration of T1D ($t=2.906$, $p<0.05$) and last A1c ($t=3.867$, $p<0.001$) were significant between groups.

The most common reasons for CGM attrition were problems with the device sticking to the body (18.4%), dislike of a device on the body (10.8%), challenges related to insurance coverage (9.5%), and system mistrust due to concerns for inaccurate readings (8.2%).

Conclusions: To prevent CGM attrition, intervention and support should happen soon after initiation. Initial educational programs on CGM should address most common reasons for discontinuation and ensure pathways to obtaining supplies.

P-007 | Differences in glycemic control based upon continuous glucose monitor (CGM) smartphone versus dedicated receiver use

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Introduction: Youth using CGM can view data on a dedicated receiver or a smartphone. It is unknown whether the device used to view CGM data impacts glycemic control.
Objectives: To assess differences in glycemic control based on CGM receiver versus smartphone use.
Methods: Youth <22 years of age with type 1 diabetes (T1D) managed with insulin for at least 6-months who were using a Dexcom G6 CGM were included. CGM data was evaluated over a 90 day period (09/01/2022 to 11/29/2022) and the hemoglobin A1c (A1c) value closest to this time period was used. T-tests, Kolmogorov-Smirnov tests, and a multiple linear regression model were to assess for differences in A1c depending on the type of device used to view CGM data.
Results: Among 1,322 youth with T1D (M_{age} 14.42 ± 4.2 yrs , $M_{T1D\ Duration}$ 6.1 ± 4.2 yrs, 74.7% Non-Hispanic White, 71.0% privately insured, 71.0% insulin pump use), only 2.2% of youth used a dedicated receiver to view CGM data.
Dedicated receiver users had higher A1c values (7.7% (IQR 6.7-8.9) vs 7.2% (IQR 6.5-8.2), p=0.04) and less CGM active time (35% IQR(14.9-39.2) vs 94.2% IQR(79.5-97.7), p<0.0001).
CGM active time was >70% among 10.3% of youth using a receiver versus 81.4% using a smartphone (p<0.0001). In a regression model, after controlling for insulin regimen and T1D duration, A1c was no different among smartphone and dedicated receiver users (R^2=0.09, p<0.00001; β=0.30, p=0.37). After adjusting for CGM active time (R^2=0.24, p<0.00001) A1c was lower among dedicated receiver users (β=-0.89, p=0.009).
Conclusions: CGM active time is lower among youth with T1D viewing data with a dedicated receiver than those using a smartphone. Although A1c values are higher among receiver users, after controlling for CGM active time, glycemic control is superior among receiver users.
Strategies to improve CGM active time may be a more cost-effective approach to improve glycemic control rather than efforts to support smartphone use for all individuals with T1D.

P-008 | The relationship between HbA1c and time in range in a pediatric population

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Introduction: As life expectancy of patients with type 1 diabetes improves, the prevention of long-term microvascular complications becomes more relevant. These complications can be delayed by intensive treatment with better glycemic control. HbA1c is used as a parameter for assessing this control, but has some limitations as it only reflects the average blood glucose control over the preceding 2-3 months.
Recently, the proportion of time in range (TIR), measured by continuous glucose monitoring (CGM) is often proposed as an alternative to the use of HbA1c. Studies in adults reveal a strong correlation between HbA1c and TIR but this has been insufficiently investigated in a pediatric population.
Objectives: This retrospective monocentric pediatric study aims to determine the correlation between HbA1c and TIR during the 2, 4 and 12 weeks (TIR_{2w}, TIR_{4w} and TIR_{12w}) prior to consultation.
Methods: 168 children and adolescents (0-18 years old) with T1DM are included in this retrospective study at the University Hospitals Leuven. CGM data, HbA1c and multiple demographic variables are collected from the patient files.

pearson correlation coefficient (R)	HbA1c	TIR_{2w}	TIR_{4w}	TIR_{12w}	TAR_{2w}	TAR_{4w}	TAR_{12w}
HbA1c	1.000	-0.571	-0.603	-0.624	0.643	0.698	0.710
TIR_{2w}	-0.571	1.000	0.933	0.839	-0.902	-0.843	-0.771
TIR_{4w}	-0.603	0.933	1.000	0.925	-0.822	-0.904	-0.853
TIR_{12w}	-0.624	0.839	0.925	1.000	-0.727	-0.830	-0.920
TAR_{2w}	0.643	-0.902	-0.822	-0.727	1.000	0.918	0.816
TAR_{4w}	0.698	-0.843	-0.904	-0.830	0.918	1.000	0.921
TAR_{12w}	0.710	-0.771	-0.853	-0.920	0.816	0.921	1.000

Results: A strong negative linear correlation is found between HbA1c and TIR_{2w} (R = -0.571), TIR_{4w} (R = -0.603) and TIR_{12w} (R = -0.624).
Secondary outcomes reveal even stronger correlations between HbA1c and time above range (TAR) during the preceding 2, 4 and 12 weeks (TAR_{2w}, TAR_{4w} and TAR_{12w}). A very strong correlation is found between TIR_{2w} and TIR_{12w} (R = 0.839). Similar results are found between TAR_{2w} and TAR_{12w} (R = 0.816).
Conclusions: This study reveals a strong correlation between HbA1c and TIR during the preceding 2, 4 and 12 weeks in a pediatric population, making TIR a potential alternative or complementary metric to HbA1c. TIR_{2w} was strongly correlated to TIR_{12w} and thus seems a viable alternative to TIR_{12w}. Furthermore, TAR also appears promising in assessing glycemic control.

P-009 | The relationship between HbA1c and glucose management indicator and time in range in youth with type 1 diabetes

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Introduction: As continuous glucose monitoring (CGM) becomes increasingly utilized, glucose management indicator (GMI) and time-in-range (TIR) could replace hemoglobin A1c (HbA1c). Studies in adults report a significant discordance between HbA1c and GMI, but data in youth with type 1 diabetes (T1D) are limited.
Objectives: To study the concordance between HbA1c and GMI in children and adolescents with T1D.
Methods: Real-life CGM data during 2, 4, 8, and 12 weeks preceding HbA1c measurement were retrospectively collected from 133 youth with T1D. The agreement between GMI and HbA1c was analyzed with Bland-Altman plots. Linear regression was used to explore associations.
Results: Only data from 117 youth (48.7% male) with CGM use ≥70% were analyzed: their mean (SD) age was 11.9(3.4)yr, T1D duration 5.1(3.7)yr, HbA1c 57.2(11.7) mmol/mol, GMI 59.0(9.3)mmol/mol.39 youths used flash (FGM) and 78 real-time (rtCGM) glucose monitoring. There were no significant differences in sex distribution (male 53 vs 41%) and BMI SDS between the two groups.
However, rtCGM users were younger (5.9±3.0 vs 8.4±3.5yr, p<0.001), had higher CGM usage (94.5±6.3 vs 88.3±9.0%, p<0.001), and better HbA1c (54.7±10.8 vs 62.1±12.1mmol/mol, p=0.002).
Average CGM metrics were similar irrespective of data collection duration (i.e., 2 vs 12 weeks). HbA1c was significantly associated with TIR (r= −0.86, p<0.001) and GMI (r: 0.91, p<0.001).
Bland-Altman plots showed a mean (SD) difference of 1.8 (5.1)mmol/mol between HbA1c and GMI, which was higher for rtCGM than FGM (Figure 1).
BMI SDS was inversely associated with the GMI–HbA1c difference [B coefficient (SE): −1.19 (0.44), p=0.008], whereas sex, age, and T1D duration were not.

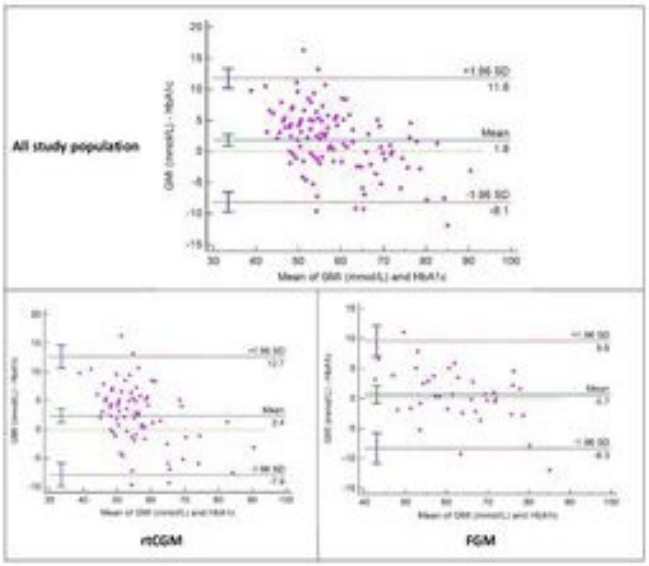

Figure 1. Bland- Altman Plots for HbA1c and GMI comparison

Conclusions: GMI and TIR were strongly associated with HbA1c. However, there was a significant difference between GMI and HbA1c, which should be considered in clinical practice. Factors affecting this difference should be further explored.

P-010 | Discordance between hemoglobin A1C and glucose management indicator (GMI) in children and youth with type 1 diabetes

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Introduction: Since the advent of continuous glucose monitors (CGMs), the glucose management indicator (GMI) is increasingly used in clinical practice to estimate hemoglobin A1c (A1C). However, the formula for GMI is derived predominantly from White adults.
Objectives: We sought to assess the discordance between GMI and A1C in a multi-ethnic population of children and adolescents with type 1 diabetes (T1D).
Methods: Cross-sectional retrospective study including youth 2-18yo with T1D at two major paediatric diabetes centres in Canada. Data were harmonized across centres. CGM metrics including GMI were recorded in the 14 days prior to A1C measurement. A1C-GMI discordance was calculated for each patient by subtracting GMI from A1C. Low discordance was defined as <0.5% and high discordance as ≥0.5%.
Low and high discordance groups were compared with regards to sex, age, BMI, ethnicity, A1C, and time in range (TIR). Multivariate linear regression was performed to determine predictors of discordance.
Results: 171 patients were included (mean age 12 ± 3.9 years, 43% female, 65% White). Mean A1C was 7.7% ± 1.3%. A1C-GMI discordance was <0.1%, ≥0.5%, and ≥1.0% in 8.2%, 46% and 17.5% of patients, respectively. Mean discordance was -0.1% for White individuals and +0.2% for non-White individuals. Mean TIR was higher in the low vs. high discordance group (55% vs 49%, p=0.03), while all other characteristics were similar between groups. In multivariate regression, higher A1C was significantly associated with higher discordance (p<0.001).
Conclusions: In this paediatric cohort, A1C-GMI discordance was greater compared to adults. A1C tends to be higher than GMI in non-White individuals. Lower TIR and higher A1C were associated with greater discordance, suggesting that A1C does not reflect glycemic control as well at higher extremes of glycemia. GMI formulas may need to be more population adapted. More research is needed in minority groups, such as those of non-White ethnicity.

P-082 | A sub-analysis comparing CSII use with MDI on habitual sleep timing and duration in a 6-month RCT using isCGM in young people (13-20 years) with type 1 diabetes

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Introduction: Habitual sleep patterns in young people with type 1 diabetes (T1D) can be highly variable.
Objectives: To investigate the impact of 6-months use of intermittently scanned CGM (isCGM) compared to Self-Monitoring Blood Glucose (SMBG) on habitual sleep timing and duration in young people with T1D and HbA1c ≥75 mmol/mol.
In this sub-analysis, we hypothesised participants using continuous subcutaneous insulin infusion (CSII) would experience less variable sleep patterns and increased sleep duration than those using multiple daily injections (MDI).
Methods: Sixty-four participants with T1D aged 13-20 years (mean 16.6±2.1), 48% female, diabetes duration 7.5±3.8 years, 41% Māori/Pasifika, mean HbA1c 96.0±18.0 mmol/mol [10.9±3.8%] were recruited to a 6-month RCT; 33 were allocated to the isCGM intervention and 31 to the SMBG control group.
Participants completed the Pittsburgh Sleep Quality Index (PSQI) questionnaire at baseline and 6 months to subjectively measure sleep and wake timing and total hours of sleep each night. Regression analyses were used to model between-group comparisons, adjusted for baseline measures.
Results: At 6 months mean sleep onset in the CSII (n=9, mean age 16.4±2.8 years, 44% female, 22% Māori/Pasifika, mean HbA1c 88.6±12.5 mmol/mol [10.3±3.3%]) and MDI (n=55) groups was 22:17±1.11 and 23:13±1:34 (hh:mm) respectively (MD -44mins [-93, 5] p=0.077). Mean wake time occurred at 08:30±1:26 and 08:02±1:38 (hh:mm) in the CSII and MDI groups respectively (MD 38mins [-29, 105] p=0.263). CSII users reported more time in bed (MD 86mins [30,

142] p=0.003); however mean sleep duration was not substantially different between the groups (MD -14mins (-75, 47) p=0.646).

Conclusions: Participants in this study had above-target HbA1c, indicating insulin treatment modalities were not being utilised to their full potential. Findings from this sub-analysis did not allow us to conclude that CSII offered benefits over MDI on subjectively measured sleep and wake timing or sleep duration following 6 months use of isCGM.

P-083 | Using CGM to identify onset of stage 3 type 1 diabetes

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Introduction: Continuous Glucose Monitoring (CGM) has been shown to identify children at high risk of progressing to stage 3 type 1 diabetes (T1D).

Objectives: To examine the evolution of CGM measures during progression from stage 2 to stage 3 T1D.

Methods: Participants (N=31) were community-screened, confirmed islet autoantibody positive. All had dysglycemia by one or more measures upon study entry: A1c, OGTT, CGM (by average sensor glucose or %time above 140 mg/dL [TAR140]) and/or home glucose testing. Participants were randomized 2:1 into 6 months unblinded CGM-guided structured education vs HGT monitoring with blinded CGM. Baseline characteristics were compared between those who progressed to stage 3 T1D vs nonprogressors utilizing t-test or chi-square for continuous or categorical variables, respectively.

Results: Time from baseline to stage 3 T1D was 6.3 months for the 11(35%) who progressed. The mean follow up of those who remained at Stage 2 was 12.9 months. All participants who progressed met ADA stage 3 diagnostic criteria; however, none had A1c ≥6.5%. Progressors were more likely than non-progressors to have a first-degree relative with T1D (73% vs 20%, p=0.004), and progressors had significantly higher 2h OGTT glucose and TAR140 at baseline visit (see Table). In contrast, other glycemic measures, including A1c, were not significantly different between progressors and nonprogressors at baseline. Progressors showed significant change from baseline to time of diagnosis for TAR140 (19±11% vs 32±16%, p=0.039), but not A1c or average sensor glucose. A greater percentage of progressors had been randomized to unblinded CGM, but this did not reach significance (82% vs 50%, p=0.13).

Continuous data presented as mean ± SD Categorical data presented as % (N)	Nonprogressors at Baseline (n=20)	Progressors at Baseline (n=11)	p-value (progressors vs nonprogressors)	Progressors at Stage 3 (n=11) *p<0.05 vs baseline
Age (years)	12.9 ± 3.7	10.1 ± 4.7	0.076	
Male	30% (6)	64% (7)	0.069	
First-degree relative	20% (4)	73% (8)	0.004	
Fasting glucose (mg/dL) [mmol/L]	83 ± 7 [4.6 ± 0.4]	86 ± 12 [4.8 ± 0.7]	0.43	
Peak OGTT gluc (mg/dL) [mmol/L]	166 ± 35 [9.2 ± 1.9]	196 ± 62 [10.9 ± 3.5]	0.13	
2 hour OGTT gluc (mg/dL) [mmol/L] abnormal: ≥140 mg/dL (7.8 mmol/L)	116 ± 26 [6.4 ± 1.4] abnormal: 25% (5)	169 ± 66 [9.4 ± 3.7] abnormal: 73% (8)	0.004 0.021	
A1c (%) [mmol/mol] abnormal: ≥5.7%	5.4 ± 0.4 [35 ± 4] abnormal: 25% (5)	5.4 ± 0.4 [36 ± 4] abnormal: 36% (4)	0.73 0.50	5.6 ± 0.3
TAR140 (CGM %time >140 mg/dL [7.8 mmol/L]) abnormal: ≥10%	10 ± 7 abnormal: 35% (7)	19 ± 11 abnormal: 82% (9)	0.013 0.023	32 ± 16*
Average Sensor Glucose (mg/dL) [mmol/L]	113 ± 10 [6.2 ± 0.5]	120 ± 11 [6.7 ± 0.6]	0.066	133 ± 20 [7.4 ± 1.1]

Conclusions: CGM facilitates early recognition of stage 3 T1D before elevation in HbA1c and metabolic decompensation. TAR140 appears to differentiate progressors similar to 2h OGTT glucose measures. CGM may provide a useful tool for identification and monitoring of high-risk individuals.

P-084 | Optimizing postprandial glycemic excursions following high glycemic index meals in children and adolescents with type 1 diabetes on insulin pump therapy

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Introduction: Optimizing postprandial glycemic (PPG) excursions is a core therapeutic target in the management of type 1 diabetes (T1D).
Objectives: Thus, the aim of the current study was to assess the efficacy of different insulin delivery regimens on optimizing PPG following consumption of meals with high glycemic index carbohydrates (H-GI(CHO).
Methods: A randomized cross-over study recruiting 24 participants (11.7 ± 2.2 years) with T1D; all were on continuous subcutaneous insulin infusion (CSII) for at least 1 year with a mean HbA1c of 7.2 ± 0.9 % (55.2 ± 1.3 mmol/mol).
Participants received the same test meal (CHO (59 g, GI=81±6), Protein(6 g), fat(0.5 g)) and were randomized to receive 4 different boluses over 4 consecutive days.
The first bolus was a standard bolus (100%) delivered 10-15 minutes upfront. The second was a standard bolus (100%) delivered 25-30 minutes upfront.
The other two boluses were given as super boluses; where prandial insulin dose was increased by 50% (150%) and 40% (140%) respectively and a temporary basal of 10 % was set for 2 hours, both boluses were delivered 10-15 minutes upfront.
Results: The standard bolus delivered 10-15 minutes upfront resulted in an early PPG at 60 and 120 min. with mean excursions of 65.7 ± 12.1 and 81.0 ± 26.7 mg/dl respectively.
The early PPG (60,120 min.) was successfully controlled by the 3 other tested boluses with a mean glucose excursion less than 30mg/dl (P <0.01).
The bolus delivered 25-30 minutes upfront and the super bolus (140%) resulted in significantly lower PPG compared with standard bolus delivered 10-15 minutes upfront (P < 0.01) with no risk of hypoglycemia.
Four participants (16.7%) experienced hypoglycemia following the super bolus (150%).
Conclusions: Following the consumption of a H-GI CHO, a standard bolus delivered 25-30 minutes upfront and a super bolus, extra 40 % of insulin added to prandial insulin with a temporary basal of 10 % for 2 hours, were superior in controlling early post prandial glycemic response with no risk of hypoglycemia.

P-085 | Diabetes technology and insulin adverse events in inpatient diabetes care: real life experience in a large pediatric tertiary care center

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Introduction: Diabetes management has significantly evolved with the advent of continuous glucose monitoring (CGM) and continuous subcutaneous insulin infusion (CSII) technologies. These devices can improve glycemic control and quality of life and reduce hypoglycemia risk. Despite limited regulatory approval for inpatient diabetes technology use, individuals with diabetes prefer to continue their home devices during inpatient hospitalizations.
Objectives: We report our efforts and experience in building a safe mechanism for continued diabetes technology use in a large tertiary care pediatric center.
Methods: Institutional policies were revised to allow appropriate supervised inpatient use of home CGM and CSII in 2021. We created patient consent forms, electronic medical record order sets, nursing documentation flow sheets, education modules and communication platforms to utilize technology safely. Inpatient CSII and CGM use, and insulin adverse drug event (ADE) data was collected and analyzed by our Insulin ADE quality improvement team.
Results: Between July-2021 and February-2023, diabetes inpatient service cared for 589 unique hospitalizations. Inpatient CGM orders were utilized in 120 and CSII orders in 86 hospitalizations. Orders for CGM and CSII were captured in 64 hospitalizations, with 35 for closed loop CSII.
Overall, insulin ADEs did not increase between 2019/2020 (6.499 and 6.108 ADE/1000 insulin doses, respectively) and 2021/2022 (7.532 and 5.439 ADEs/1000 insulin doses, respectively). The rate of encounters with reported hypoglycemia or severe hyperglycemia did not differ with technology use (table).

Diabetes hospitalizations in 2021 and 2022	Total Hospital Days	Encounters with severe hypoglycemia	Encounters with severe hyperglycemia
CGM with or without pump (N 121)	1286	38.8%	54.5%
Pump only (N 24)	372	50%	54.1%
No technology (N 444)	5852	41.7%	50%

Conclusions: Our real-life experience demonstrated that diabetes technology use in hospitalized pediatric patients may be done safely. We did not see an increase in insulin ADEs, nor in severe hyperglycemia or hypoglycemia. With the rapid evolution and adoption of diabetes technologies, it is crucial for inpatient technology use to be evaluated for optimal patient safety and experience.

P-086 | A comparison of second generation isCGM to selfmonitoring of blood glucose in children with type 1 diabetes and suboptimal glycaemic control: a 12week randomised controlled trial

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Introduction: This study compared second-generation intermittently scanned glucose monitoring (isCGM) system (Abbott Diabetes Care, Witney, U.K.) to self-monitoring of blood glucose in children (4-13 years inclusive) with type 1 diabetes and sub-optimal glycaemic control (HbA1c 58–110 mmol/mol).

Objectives: The primary outcome was the difference in glycaemic control (HbA1c) between groups at 12 weeks.

Methods: This open-label randomised controlled trial enrolled children from 5 New Zealand centres. Following 2 weeks of blinded sensor wear, children were randomised 1:1 to control or intervention arms.

The intervention was second generation isCGM, the control group was self-monitored blood glucose. Pre-specified secondary outcomes included change in glucose monitoring frequency, standard glucose metrics and psychosocial outcomes. Trial registration February 2020 (ACTRN12620000190909p).

Results: At baseline there were 100 participants, 25% Māori, 22% Pasifika, 53% NZ European, mean age (SD) 10.9 (2.3) years, 41% males, duration diabetes 4.2 (2.9) years, mean Hba1c 75.1 (13.6) mmol/mol with 83% on injections and 16% insulin pump; no difference in any baseline measure between groups.

51 participants were randomised to control and 49 to intervention. 91 participants completed the trial: there was no difference in Hba1c between groups at 12 weeks:74.7 (12.8) vs. 76.1 (14.8) mmol/l; p = 0.3), delta difference 0.23 (0.21, 0.67 CI); p = 0.3). There was both an increase in testing frequency with isCGM (delta +4.89 (2.97, 6.81; p <0.001) and a reduction in % time below target (<4mmol/l) difference -6.4 (-10.6, -4.2; p <0.001).

Conclusions: This is the first trial of second-generation isCGM in children to date, and showed no overall improvement in Hba1c, but a reduction in time in hypoglycaemia in children with sub-optimal control aged 4-13 years was seen.

Wider access to isCGM alone may not improve diabetes control but may provide clinically important reductions in hypoglycaemia risk.

P-087 | Impact of diabetes and device satisfaction in children with type 1 diabetes using non-automated and automated insulin delivery systems. Real-world data from a multicenter study in Italy

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Introduction: New technological devices are increasingly used in the management of children with type 1 diabetes (T1D). The use of advanced technology has a considerable impact on the lives of people with diabetes.

The Diabetes Impact and Device Satisfaction (DIDS) is a simple but effective tool for identifying the satisfaction of the device used and the impact of diabetes in affected people. It has recently been validated in the Italian pediatric population.

Objectives: The aim of this multicentre, cross-sectional Italian study was to evaluate health-related quality of life and metabolic control in children using automated insulin delivery (AID) and non-AID systems in daily life.

Methods: Children diagnosed with T1D for more than six months, younger than 18 years, using non-AID (MDI + SMBG, MDI + CGM and SAP) and AID (PLGM, HCL, AHCL) systems were recruited consecutively during the visits at 17 centres for paediatric diabetes nationwide between 2021 and 2022. Clinical data, CGM metrics, and DIDS scores were obtained. Continuous variables were summarized using quartiles and comparisons between groups were evaluated using the Wilcoxon rank-sum test.

Results: Overall, 1013 subjects for this analysis, 48% girls, 32% treated with AID system.All CGM-based metrics were associated with better glycaemic control when using AID compared with non-AID systems, except for TBR (BG<54 mg/dL) which was extremely low in both groups. Quality of life was significantly better in AID-treated adolescents, with significantly higher treatment satisfaction and significantly lower diabetes burden than in non-AID-treated adolescents.

Variables	non-AID systems (n=692)	AID systems (321)	p
Age at diagnosis (years)	8 (5 - 11)	6 (3 - 10)	p<0.001
HbA1c (%)	7.2 (6.7 – 8.0)	6.7 (6.4 - 7.2)	p<0.001
TIR (70-180 mg/dl)	57 (46 - 70)	72 (63 - 78)	p<0.001
TBR (BG< 54 mg/dl)	0 (0 - 1)	0.1 (0 - 1)	0.391
TBR (BG< 70 mg/dl)	3 (1 - 6)	2 (1 - 3)	p<0.001
TAR (BG> 180 mg/dl)	28 (21 - 38)	20 (15 - 27)	p<0.001
TAR (BG> 250 mg/dl)	7 (2 - 17)	5 (2 - 9)	p<0.001
CV (%)	37 (33 - 42)	35 (31 - 38)	p<0.001
Device Satisfaction (score)	8.3 (7.4 – 9.0)	8.9 (8.3 - 9.4)	p<0.001
Diabetes Impact (score)	4.0 (2.8 - 5.8)	3.5 (2.3 – 5.3)	0.001

Conclusions: Use of AID systems on a large, unselected population of children with T1D has been associated with achievement of CGM-based goals in over 50% of children with T1D. Additionally, AID systems showed better results with the DIDS scale on treatment satisfaction and the impact of diabetes.

P-157 | Cross-sectional analysis of glycaemic outcomes in youth with type 1 diabetes on continuous glucose monitoring in a state-wide diabetes service

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Introduction: Universal funding of continuous glucose monitoring (CGM) in Australia provides an opportunity to analyse real-world glycaemic outcomes.
Objectives: The aim of this study was to evaluate glycaemic outcomes from CGM data in a population-based cohort of youth with type 1 diabetes (T1D).
Methods: A cross-sectional analysis of CGM metrics in youth on CGM was carried out at Perth Children's Hospital between August and September 2022; which was approximately 6 months after initial commercial availability of advanced hybrid closed loop (HCL) systems. Patient data was included where wear time was >70% for at least 14 days. Those on flash or intermittently scanned glucose monitoring were excluded. Metrics analysed were Time in Range (TIR 3.9-10.0 mmol/L), Time in Tight Range (TITR 3.9 to 7.8 mmol/L), Time Below Range (TBR <3.9, <3.0 mmol/L), Time Above Range (TAR >10.0 mmol/L) and Glucose Management Indicator (GMI).
Results: 726 youth (52% male, mean±SD age of 12.0 ± 3.8 years and mean±SD diabetes duration of 4.3 ± 3.3 years) met criteria for analysis. Overall mean±SD TIR was 58.7 ± 17.3%, TITR was 37.7± 26.9%, and TAR was 38.8 ± 18.4%. Median(IQR) TBR < 3.9 mmol/L was 1.69 (2.6) % and TBR < 3.0 mmol/L was 0.2 (0.7) %.
Mean±SD GMI was 7.5 ± 3.3%.
Table 1 provides CGM metrics based on age, diabetes duration and insulin regimen. Both age and diabetes duration were associated with TIR and TITR ($p < 0.05$).
Insulin regimen was available in 604 youth and was associated with glycaemic control ($p < 0.05$); with HCL users spending 67% time in range compared to 57 % and 58% in children on multiple daily injections(MDI) and sensor augmented pump(SAP). Of HCL users, 44.2% met the 70% TIR benchmark and most met benchmarks for TBR < 3.9 mmol/L (86%) and TBR < 3.0 mmol/L (85%). Those not on HCL met the TIR benchmark infrequently with 23% of SAP users and 27% on MDI achieving TIR > 70%.

Demographics		Sample size (n)	% TIR (Mean ±SD)	% TITR (Mean ± SD)	% TBR <3.9 mmol/L (Median (IQR))	% TBR <3.0 mmol/L (Median (IQR))	GMI (Mean ±SD)
Age	< 5 years	38	55.9 ± 17.8	36.4 ± 16.8	2.7(1.5)	0.4(1.1)	7.5 ± 4.2
	5 - 11.9 years	298	61.3 ± 16.2	40.7 ± 14.5	2.2(2.8)	0.3(0.6)	7.3 ± 4.2
	> 12 years	390	56.8 ± 17.9	36.2 ± 15.1	1.2(2.4)	0.2(0.6)	7.6 ± 4.1
Duration of diabetes	<1 year	88	66.3 ± 17.6	44.3 ± 17.9	1.4(1.8)	0.1(0.4)	7.2 ± 4.0
	1-4.9 years	389	58.2 ± 16.6	37.6 ± 14.4	1.8(2.7)	0.3(0.7)	7.5 ± 4.1
	>5 years	249	56.6 ± 17.7	36.5 ± 14.8	1.7(2.7)	0.3(0.7)	7.6 ± 4.3
Insulin regimen*	HCL	163	66.7 ± 12.4	44.9 ± 11.8	1.6(2.2)	0.2 (0.5)	7.2 ± 3.9
	Sensor augmented pump	219	58.3 ± 16.8	37.4 ± 14.6	1.9(2.7)	0.3(0.7)	7.5 ± 4.3
	Multiple daily injection regimen	222	56.8 ± 18.7	36.3 ± 16.1	1.7(2.8)	0.3(0.7)	7.5 ± 4.2

*Table 1: Cross sectional CGM metrics based on clinical variables. *Insulin regimen, n= 604*

Conclusions: In this state-wide cohort, glycaemic outcomes as measured by CGM are suboptimal with mean TIR below the consensus goal. Increased use of HCL and efforts to maintain improved TIR after the newly diagnosed period may improve outcomes.

P-158 | Youth from all socioeconomic backgrounds demonstrate glycaemic benefit from diabetes technology: a cross-sectional analysis

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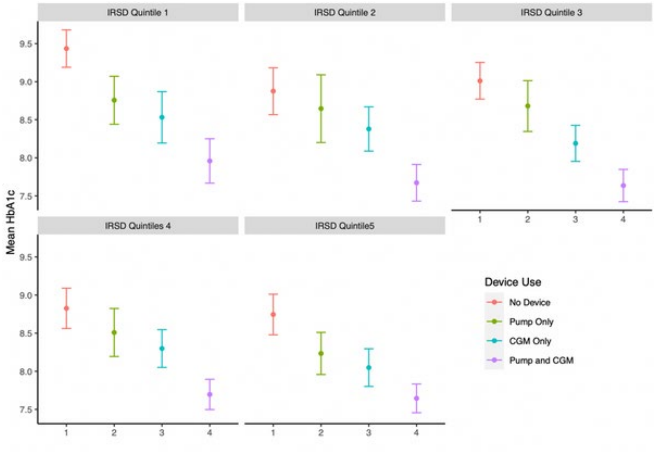
Introduction: Continuous glucose monitoring (CGM) and insulin pumps improve glycaemic outcomes in type 1 diabetes (T1D), but the impact of technology across socioeconomic groups remains unexplored.
Objectives: This analysis investigated whether technology use was associated with improved glycaemic outcomes across the socioeconomic spectrum.
Methods: Cross-sectional HbA1c data from youth with T1D (<18 years, duration >6 months) in the Australian national registry (ADDN) on 30th June 2022 was analysed. The most recent residential postcode was used to assign socioeconomic status (SES) based on The Index of Relative Socio-economic Disadvantage (IRSD), an area-based measure of SES delineated from census data. Linear regression models with adjustment for age, diabetes duration and location within Australia were conducted to determine associations between IRSD quintile, HbA1c, and treatment regimen.
Results: Of the 2821 youth with T1D, mean (SD) age was 12.4 (3.6) years, mean T1D duration was 5.1 (3.6) years, 50.4% were female and mean HbA1c was 8.1 (1.6) %/65 (17.5) mmol/mol. IRSD quintile was independently associated with HbA1c (p<0.001). CGM (n=649), pump (n=449) and use of both devices (n=1025), were associated with lower mean HbA1c across all IRSD quintiles (p<0.001). Associations remained following adjustment.
Unadjusted mean HbA1c (with 95% confidence interval) for each treatment category by IRSD quintile are presented in the figure. There was no significant interaction between IRSD quintile and technology use on HbA1c (p=0.624). Compared to insulin injections only, HbA1c was 0.45% lower ([0.66, 0.25] 95% CI) for those utilising pump, 0.70% lower ([0.87, 0.53]) for those utilising CGM and 1.24% lower ([1.41, 1.08]) for those utilising both devices.



Conclusions: HbA1c was lower across each SES quintile with technology use. Youth with T1D from all socioeconomic backgrounds benefit from diabetes technologies, highlighting the need to address barriers to accessing technology.

P-159 | Successful integration of Insulin Pump therapy in the home land of Snowdonia, North Wales, UK- Our experiences with advanced diabetes technology

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Introduction: Advances in diabetes technology has changed the outlook of diabetes management. It offers greater flexibility for users and easier access of diabetes information by health care professionals for timely interventions. The National Paediatric Diabetes Audit (NPDA) outcomes from England&Wales highlights inequalities in accessing technology due to geography or ethnicity.
There is an urgency to eliminate these barriers to improve outcomes for children and young people (CYP) with T1D.

Objectives: To understand and analyse the practices of our local paediatric diabetes services in supporting CYP living in mountainous and rural North Wales from accessing advanced diabetes technologies.
Methods: A retrospective analysis was carried out on all CYP with diabetes managed at Bangor hospital, North Wales during 2022-23. The primary focus was on the outcomes of insulin pump users. Data was collected from online database.
We studied the demographic data (age, duration of F/U, BMI SDS) and analysed HbA1c and glycaemic parameters (TIR, TBR, TAR) from the latest clinic appointment. A subgroup analysis was carried out on HCL users. We compared mean and range.
Results: Total of 97 patients of which 95 were T1D. CGM was used by 83/95 (87%) **[Dexcom- 80, Libre-3].** 50/95 **[53%]** CYP were using MDI. Rest of the 45/95 **[47%]** were on insulin pump of which 17 were on HCL (4 unlicensed).
Our mean HbA1c for entire cohort was 61 mmol/mol.

	All pump patients	HCL users (LOOP)	Non HCL users
Age at diagnosis	6.1 (1-13.6)	5.5 (1.5 - 13.6)	6.4 (1 -11.8)
Age at last follow up	11.7 (2-18.3)	11.5 (2.6 - 15.8)	11.8 (2- 18.3)
Duration of Diabetes	5.6 (1-12.6)	6 (1.1 - 12.6)	5.4 (1 – 12.4)
Total (M) [% of total]	45 (M-21)	17 (M-8) [38%]	28 (M-13) [62%]
BMI SDS	0.00 (-1.44 to +2.22)	0.09 (-1.11 to + 1.82)	0.00 (-1.33 to +2.49)
HbA1c (mmol/mol)	52 (31 -78)	52.1 (39 - 71)	51.9 (31 – 78)
Time in range, TIR (4-10 mmol/l)	59 (28 – 85)	64 (43 – 78)	56 (28 - 85)
Time below Range, TBR (<4 mmol/l)	3.5 (0 – 10)	2.3 (0 - 6)	4.2 (0 – 10)
Time Above Range, TAR (>10mmol/l)	37 (11 – 72)	34 (19- 51)	39 (11- 72)

Outcomes:
1. Both HCL & non-loop users achieved similar HbA1c.
2. HCL users achieved improved glycaemic targets compared to non-loop users but it did not translate to a better HbA1c.
3. Differences in technology did not affect BMI SDS adversely.

Limitations:
1. Small numbers in HCL group and cross sectional study.

Conclusions:
1. Better outcomes are achievable with advanced diabetes technology in a rural population.
2. Effective access of patient data using remote technology helps in timely interventions.
3. Reported improved quality of life for CYP and families.

P-160 | The impact of public policy on equitable access to technology for children and youth living with type 1 diabetes

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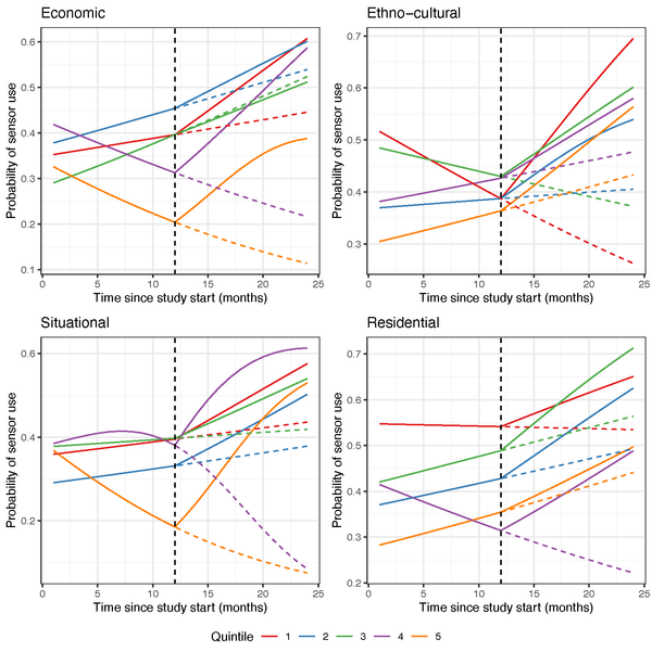
Introduction: In June 2021, the Canadian province of British Columbia's (BC) public health insurance expanded coverage to include a continuous glucose monitor (CGM) for people living with type 1 diabetes (T1D).
Objectives: We assessed uptake of CGM technology across levels of social deprivation both prior to and following this policy change.
Methods: This retrospective cohort study used data from a clinical registry that contains demographic and clinical data for T1D patients seen at diabetes clinic in a tertiary level children's hospital. Eligible patients were: 0-18 yrs, had T1D, and had at least one observation from June 2020 to June 2022.
We used the Canadian Index of Multiple Deprivation to define degree of social deprivation (1=least deprived, 5=most deprived) on dimensions of residential instability (RI), economic dependency (ED), ethnocultural composition (EC) and situational vulnerability (SV).
For each dimension, we used generalized additive models with random effects for repeat measures to contrast observed and (based on pre-policy trends) expected CGM use before and after the policy change within levels of deprivation.
Results: Figure 1 shows pre- and post- trends in CGM use by quintile for each area of deprivation. 477 patients were included with 433 and 437 providing data before and after the policy change, respectively. The most common quintiles for RI, ED, EC and SV were 2, 1, 5 and 1, respectively. Those in the least deprived quintiles had higher rates of sensor use both before and after the policy change. For both ED

and SV, sensor use was declining in the year prior to the policy change in the most deprived quintiles but increased sharply after coverage. For Residential Instability and Ethnocultural Composition, a clear trend did not emerge.



Conclusions: Public coverage of CGM was correlated with increased uptake amongst the most economically vulnerable individuals confirming that government policy has had a positive impact on access to diabetes technology.

P-161 | Effect on metabolic control, structure of CNS studied by MRI and neuropsycologic tests in a cohort of very young diabetic children treated by MDI or CSII from onset of type 1 diabetes: a follow up of 10 years

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Introduction: The metabolic control and particulary the exposition to hyperglicamia may show important consequences on the development of CNS particularly in young children from onset of type 1 diabetes

Objectives: This study aimed to evaluate the impact of technology-intensive therapy, compared to conventional treatment, on metabolic control, alterations in brain morphology, and neuropsychological domains in very young children with T1D.

Methods: Metabolic analysis with a 10-year follow-up, neuropsychological and neuroradiological analyses were conducted on a pediatric cohort of 24 individuals, including 16 diagnosed with T1D before the age of 6 (8 treated with CSII and rtCGM and 8 treated with MDI and isCGM or rtCGM) and 8 healthy age-matched controls. The neuroradiological analysis included an MRI of the CNS with DTI acquisition. A two-tailed T-test was used in *Randomise* to test the differences in FA, corrected for multiple comparisons. Neuropsychological analysis included the WISC-IV scale, the NEPSY-II battery, and the PedsQL questionnaire.

Results: The implementation of intensive technological treatment in diabetic children, compared to conventional therapy, resulted in significantly lower Hba1c values ($p<0.05$), with a 30% reduction in exposure to hyperglycemia without an increase in acute complications.

Neuroradiological examination showed a significant increase in white matter FA in diabetic patients treated with CSII compared to patients on MDI therapy, observed mainly bilaterally in the thalamic radiation posterior, optic radiation, right superior longitudinal fasciculus, and left external capsule.

The neuropsychological evaluation found that the patients treated with CSII had qualitatively higher scores than the MDI group, (p0,05 Utest)

Conclusions: This study provides evidence that intensive technological treatment can improve metabolic control and preserve white matter integrity in children with diabetes in a particularly delicate stage of their CNS development.

P-162 | The influence of treatment on glycemic control and discordance between laboratory glycated hemoglobin and glucose management indicator in children and adolescents with type 1 diabetes

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Introduction: The use of continuous glucose monitor (CGM) and insulin pump (CSII) increased during the last years in children and adolescents with type 1 diabetes (T1D). The glucose management indicator (GMI) is a useful metric for the clinical management of patients.

Objectives: To evaluate glycemic control, A1c-GMI discordance and its potential predictor factors in young people with T1D according to different CGM and insulin treatment.

Methods: Data on age, T1D time disease, BMI z-score, and laboratory A1c were recorded during the annual routine outpatients visits in patients using CGM by at least 3 months. Ambulatory glucose profile data were collected (14-days period preceding the visit) and difference between A1c and GMI was calculated.

Results: One hundred and eighty children and adolescents with T1D (56% male; age 14.2 yrs; T1D duration 5.33 yrs) were enrolled and divided in: 95 on rtCGM+MDI (Group A), 47 on rtCGM+CSII (Group B; 21.3% nonautomated CSII), and 38 on isCGM+MDI (Group C).

Groups were comparable for age and BMI z-score, but not for T1D duration (3.4 vs 7.5 vs 6.0 years; χ^2=17, p<0.001). Laboratory A1c (7.3 vs 6.7 vs 8.1%; χ^2=21.8, p<0.0001), GMI (7.7 vs 7.1 vs 7.9%; χ^2=28.7, p<0.0001), and A1c-GMI discordance (-0.60 vs -0.40 vs -0.15%; χ^2=8.4, p=0.015) values were significantly different between groups. GMI was higher than A1c in groups A (p<0.0001) and B (p=0.002). Differences were also found in TIR (χ^2=37.2, p<0.001), CV (χ^2=16.6, p<0.001), and %time CGM active (χ^2=13.6, p=0.001).

Multiple regression analysis found that %time CGM active (β=-0.40; p<0.0001) was a predictor factor of the A1c-GMI discordance in Group A.

Conclusions: Despite the longer T1D duration, patients treated with CSII associated with rtCGM have a better glycemic control than MDI treated ones. In an era where telemedicine has been implemented for the care of patients with T1D, A1c-GMI discordance should be interpreted cautiously in clinical practice, mainly in rtCGM+MDI users where the %time CGM active is a significant predictor factor.

P-163 | Reduction of time spent in hypoglycemia through real-time CGM with predictive alarms in adolescents with type 1 diabetes

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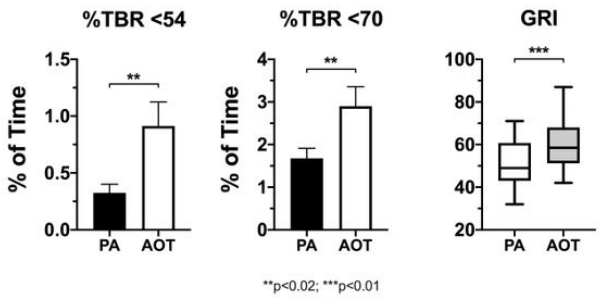
Introduction: Hypoglycemic events are linked to microvascular and macrovascular complications in subjects with Type 1 Diabetes (T1D).

Objectives: The study aimed to evaluate the efficacy of real-time continuous glucose monitoring (RT-CGM) with predictive alarm (PA) technology in reducing the time spent below the range (%TBR <70 mg/dl) in a group of adolescents with Type 1 Diabetes (T1D) treated with multiple daily insulin injections (MDI).

Methods: This is a crossover, monocentric and randomized study. Twenty patients with T1D were enrolled (M 50%, mean age 15.4 ±1.4 years old) all using RT-CGM. RT-CGM was used with Alarm on Threshold (AOT) or Predictive Alarm (PA) for hypoglycemia. Patients were randomized to PA/AOT or AOT/PA groups spending two weeks in every single intervention arm. AOT for hypoglycemia was set at 70 mg/dl and the PA alarm for hypoglycemia was set 20 minutes before the threshold.

The statistical analysis was conducted using a linear mixed-model analysis with %TBR as the dependent variable, the treatment group (PA or AOT) as a factor, and the participant as a random factor.

Results: Patients using PA for hypoglycemia spent less time in severe hypoglycemia (%TBR <54 mg/dl; 0.32±0.3 vs 0.92±0.84; p<0.02) and in hypoglycemia (%TBR <70 mg/dl; 1.67±1.06 vs 2.90±2.05; p<0.02), with better Glycemia Risk Index (GRI, 51.3±11.0 vs 61.6±12.6; p<0.01) (Figure)



Conclusions: The use of RT-CGM with PA technology reduce time spent in hypoglycemia in patients treated with MDI improving their quality of glucose control.

P-251 | Preliminary outcomes of an inpatient pediatric CGM pilot program

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Introduction: Management of diabetes in children, adolescents, and young adults is complex, warranting frequent monitoring and review of health data. Robust literature exists demonstrating clinical value of CGMs in diabetes management; however, access to CGMs may be a barrier to achieving desired clinical outcomes.

Objectives: Review preliminary outcomes of an inpatient CGM pilot program, targeting pediatric participants admitted to a four-week Chronic Illness Management Program at Children's Specialized Hospital, between January-December, 2022.

Methods: Personal CGM devices were procured through the pharmacy department and/or external vendors with grant funding. Appropriate program participants were identified and offered personal CGM devices to be worn during admission.

Education was provided to participants and families regarding personal CGM use, including how to use CGM, how to interpret and share data, and how to obtain CGM for home use after discharge. Data from patients utilizing a CGM device during 2022 admissions is actively being analyzed.

Results: Out of 24 program participants in 2022 with diabetes, 18 (75%) used CGMs during admission. The 6 (25%) participants not using CGMs were not appropriate or were not interested in using a CGM. More than half (56%) of participants using CGMs gained access to the device through the pilot program; the other users had obtained devices through insurance prior to admission. Notably, participants who used CGM demonstrated a greater reduction in A1C from admission to discharge (-2.26% change), versus patients who did not use CGM (-0.15% change).

These results are statistically significant at a .01 level, as evidenced by an independent samples t-test.

Conclusions: Initial analysis highlights outcomes such as access to CGM, impact on diabetes management, and successes and challenges of program implementation.

Ongoing analysis aims to explore improving access to life-changing diabetes technologies on a larger scale and leveraging outcomes to support continued programming.

P-265 | Evaluating the effectiveness of tandem t:slim X2 insulin pump (Hybrid closed loop) In managing type1 diabetes in CYP: an audit

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Introduction: The technologies have advanced dramatically in recent years to integrate with continuous glucose monitors (CGM) and incorporate control algorithms. This enables insulin delivery in response to continuous glucose information to improve overall glycemic control. T-slim pump is one of the HCL insulin pump available in the market since 2020.

The pump's precise dosing system (Basal IQ and Control IQ) allows for more accurate delivery of insulin, reducing the risk of hyperglycaemia and hypoglycaemia. Intensive glycemic control reduces risk of micro vascular complications and reduces cardiovascular complications.

Objectives: To evaluate the effectiveness of hybrid closed loop system in managing type 1 Diabetes in children and young people.

Methods: Retrospective Audit of 26 patients with Type1 Diabetes who were commenced on T-Slim pump between July 2020 to July 2022 in a single Diabetes Unit. Records were difficult to find in 2 patients and 2 patients decided not to continue the use of the pump after trial period. We collected data on (Average age, ethnicity, Pre and post pump -HbA1c and Time in Range and at 3 and 6 months, Number of hospital admission pre and post T slim pump). P value was calculated by using paired t test.

Results:
Median age: 7.3yrs .
Median HbA1c (Pre pump): 62mmol (7.8%)
Median Time in Range (Pre pump): 55%.
Median HbA1c at 3 months: 55mmol (7.2%)
Median Time in range at 3 months: 65.6%.
Median HbA1c at 6 months: 55mmol (7.2%)
Median Time in range at 6 months: 66.2%.
There was a significant improvement in Hba1c with p=0.0020 and 0.0017 respectively at 3 and 6 months post starting the pump.
There was a significant improvement in time in range at 3 and 6 months with p value 0.0015 and 0.00024 respectively.4.1% hospital related admission due to pump failure.

Conclusions: T slim pump supports CYP with type1 diabetes to gain better glycemic control by significantly improved median HbA1c by 7mmol at 3 months. It also helped improve time in range to 66.2% at 6 months.

P-272 | Glycemic outcomes and satisfaction with the use of patch pump in India

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Introduction: Patch pump is currently not available in India. However, the T1D community is eagerly waiting for this user-friendly option.
A patch pump with automated insulin delivery (AID) system for managing type 1 diabetes includes a pump, a real-time continuous glucose monitor, and a proprietary mobile application. Customizable glucose targets between 110-150 mg/dL are available.

Objectives: In this study, we report on the glycemic outcomes and user experiences of this system as used by three patients with T1D living in India who obtained the system from the US.
Methods: We analyzed data from the proprietary app and CGM app in three users with T1D (all females; age: 7.0±3.6 years; duration of diabetes: 4.6±3.2 years). Changes in time in range (TIR; 70-180 mg/dL), time below range (TBR<70 mg/dL), and time above range (TAR>180 mg/dL) were calculated before and after 6 months of AID system use. User experience was collected using structured and semi-structured surveys. Qualitative data from the surveys were analyzed to identify themes related to user experience.
Results: Compared to baseline, %TAR and TBR decreased by 6.3% and 4.3% (P<0.001) respectively. Mean %T1R increased from 79.6±5.6% to 88.0±6.1% (P < 0.001). The mean total daily insulin dose decreased by 9 units/day (p<0.001). HbA1c decreased significantly from 8.2±0.3% at baseline to 6.4±0.3% (p<0.001) when on AID. The AID system was well-received and users appreciated the lack of calibration with the CGM, the flexibility provided by the absence of tubing and ease of changing the infusion set (less than 5 minutes). The users reported bare minimum manual interventions and negligible hypoglycemic episodes. However, one of the users experienced issues with the pump peeling off. One previously on tethered pump reported significant improvements in QOL after switching to patch pump.
Conclusions: The use of patch AID system improved glycemic outcomes and was associated with higher satisfactions among T1D. We hope to gain access of this technology in managing T1D in India.

P-275 | Partnering with families of color and healthcare providers to co-develop strategies to promote equitable use of advanced diabetes technology

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Introduction: Racial and ethnic inequities in use of continuous glucose monitoring systems and insulin pumps contribute to disparities in glycemic levels. In a previous study, we identified six barriers to families of color using diabetes technology across socioecological levels (e.g., families' perceptions of technology, provider prescribing practices, complex insurance process).
Objectives: This study describes the process of partnering with youth of color with type 1 diabetes (T1D), their caregivers, and healthcare providers to co-develop strategies to promote equitable use of diabetes technology.
Methods: We convened families of color (3 teens, 4 caregivers) and healthcare providers (1 nurse practitioner, 1 physician) to co-develop strategies to address identified barriers. Then, through semi-structured interviews with Hispanic and non-Hispanic/Black youth with T1D (n=14), their caregivers (n=17), and healthcare providers (n=14) we elicited perspectives on preferred strategies.
We classified strategies as preferred, neutral, or non-preferred based upon responses and examined the narrative content of excerpts to better understand why youth and caregivers did or did not like specific strategies.
Results: We co-developed two to five strategies for each of the six barriers. The most preferred strategies across barriers were (1) meeting with peers who use diabetes technology, (2) facilitating patient-provider communication around diabetes technology, (3) proactive outreach from the diabetes care team, and (4) patient navigators to help with insurance approval. Educational and informational materials were the least-preferred strategies.
Conclusions: Engaging families and healthcare providers yielded feasible strategies to promote equitable use of advanced diabetes technologies. Other initiatives to promote health equity among youth with T1D can apply this process. Additional research is needed to test the acceptability, feasibility, and preliminary efficacy of these strategies.

P-276 | Poorly adherent adolescent to a highly motivated pump user and successfully overcoming the challenges of a teenager using tubeless insulin pump- a case report

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Introduction: Type 1 Diabetes is challenging for adolescents due to physical, emotional and life style changes. Search for autonomy during puberty leads to poor adherence to diabetes management. It results in complications and reduced life expectancy. Tubeless insulin pumps offer greater flexibility, and more importantly discretion, which improves self-esteem and confidence.
Objectives: To share the inspiring experience of an adolescent who had been struggling with poor glycaemia control for a decade. He was able to achieve a remarkable turnaround by achieving much improved glycaemic control with tubeless pump.
Methods: A 17-year-old male diagnosed with T1D at 8 years of age and had been on MDI for 10 years. Despite CGM use for 6 years, poor glycaemia persisted. Due to poor adherence and engagement, in the past he was deemed not safe for insulin pump switch over. There were no diabetes related admissions. His Coeliac, Thyroid functions, Lipids, Urine ACR, retinopathy & foot screening were normal
Results: Since switching over to insulin pump
- **Patient's Perspective (consented)**
  - it improved my fitness, I have better stamina as a body builder. I feel better than ever before
  - I sleep better as I needed to go often to loo in the night and woke up with headaches
  - **Would you recommend pump?** 100% since it is simple, easy to handle, less of a worry and keeps my sugars in range
- Glycemic control improved significantly
- positive impact on self-esteem, energy levels & sleep quality

- highly motivated, eager to help others facing challenges

MDI in comparison to Pump therapy in 3 months in brackets:

Mean BG (mmols/l) 13.1 (9.7)
Time in range % (4-10) 29 (45)
Time below range % (<4) 6 (8)
Time above range % (>10) 65 (47)
HbA1c (mmol/mol) 54 (47)
TDD insulin(units) 95 (81)
BMI SDS 0.52 (1.17)

Conclusions: Our patient experience demonstrates that tubeless insulin pump can help poorly compliant adolescent to achieve significant and rapid improvement safely. It also improves the quality of life and patient satisfaction.

Advanced Hybrid Control Loop (AHCL) systems represent the pinnacle of modern insulin pump technology and likely to solidify better glycemic control.

P-280 | Clinical insights from continuous glucose monitor use in patients living with type 1 diabetes in rural Malawi

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Introduction: People living with type 1 diabetes (PLWT1D) in low-resource settings face numerous barriers achieving glycemic targets.

Use of continuous glucose monitoring (CGM) is increasing but uptake remains low in sub-Saharan Africa. In 2022, a randomized control trial evaluating feasibility of CGM was conducted in Neno, Malawi.

Objectives: The objective of this study was to evaluate three-month trends from participants who had been randomized to the CGM arm for clinically significant blood glucose trends.

Methods: This is a sub-study of a 2:1 parallel arm open randomized control study to assess the feasibility and impact of CGM. Ambulatory glucose profiles (AGP) from 29 participants in the CGM arm were reviewed by clinicians. Patient reports with AGP patterns exemplifying observed trends were identified and described in detail.

Results: Overall, the use of CGM was associated with improved diabetes management and outcomes. Time in range and insulin doses increased from baseline to endline.

Prevalence of hyperglycemia was highest overnight (12AM to 6AM) through the duration of the study. Case studies of patients who demonstrated positive impact of CGM are reported.

Conclusions: CGM provided compelling insights into blood glucose trends with significant clinical implications, specifically TIR below recommended target and a few episodes of severe overnight hypoglycemia.

This study offers a clear view of the extreme variability in blood glucose in patients living with TID in rural SSA, highlighting the need for improved access to blood glucose monitoring in this setting. CGM is a tool that can capture previously undetected patterns, enhance patient education, and the ability to guide and individualize treatment decisions for patients and clinicians.

P-303 | Glycemic outcome associated with insulin pump in children and adolescents with type 1 diabetes in Latvia

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Introduction: Since 2018, in Latvia, children and adolescents with T1D have the opportunity to start insulin pump therapy with financial support from the state.

Objectives: There has been no collection of data on the frequency of insulin pump therapy and glycemic outcomes in patients with T1D associated with insulin pump treatment in Latvia.

Methods: The study included patients with T1D in Latvia aged <18 years and who have had a documented use of a pump for at least 1 year from 2010 to March 2022. A total of 187 patients were included, they were divided into three age subgroups - when insulin therapy was started - 0-6 y, 7-12 y, 13-17 y.

A retrospective analysis of glycemic outcomes (HbA1c) before and 1 year after initiation of insulin pump therapy was performed. Data was statistically analysed by Microsoft Excel 2010, IBM SPSS.

Results: From 2010 to 2017, insulin pump therapy was started in 46 patients (24.5%), but from 2018 to March 2022 for 141 patients (75.4%).

Age when insulin pump therapy was started – 0-6 years 41.7% (n-78), 7-12 years 44.4% (n-83), 13 years-17 years 13.9% (n-26).

Mean HbA1c before starting insulin pump therapy was 7.9% (min 5.64, max 12.54%) and 7.7% one year later. (min 5.4, max 12.09%). The mean difference in HbA1c after one year was -0.26%, with results ranging from -5.67% to +2.94%.

49.2% (n-92) of patients achieved HbA1c <7.5% after 1 year of treatment with an insulin pump, but <7.0% in 28.9% (n-54) of patients.

Conclusions: The frequency of using an insulin pump for pediatric patients with T1D has increased significantly since 2018. Most patients in the study have improved glycemic outcomes after one year of using an insulin pump, but results vary.

P-317 | The efficacy of insulin pump therapy in Libyan children with type 1 diabetes mellitus

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Introduction: Continuous subcutaneous insulin infusion (CSII) therapy has been shown advantage ability to mimic physiological insulin release. CSII represents a treatment option that can aid in achieving important goals to reduce one of the most frequent complication associated with treatment; reduces glycosylated hemoglobin A1c with a concomitant decrease in the rate of severe hypoglycemic events and increasing quality of life.

Objectives: To report the effect of CSII on glycemic control, hypoglycemia and diabetic ketosis rates in Libyan children with T1D.

Methods: This study performed including patients treated and followed by the department of endocrinology, Tripoli University Hospital. Fifty-seven T1D patients used Continuous subcutaneous insulin infusion (CSII) therapy enrolled in this study.

The main indication for CSII therapy was the reports of hypoglycemic episodes and inappropriate metabolic control. The following parameters were analyzed: HbA1c, the number of severe hypoglycemic and diabetic ketoacidosis episodes (DKA).

Results: 57 patients treated with insulin pumps with mean age was 11.46 years ± 3.39 SD. Mean duration of diabetes was 1.26 year ± 0.94 SD. The baseline mean HbA1c was 8.58 ± 1.73% during multiple daily injection (MDI) at pre-pump and 7.76 ± 1.33% after initiation of CSII (p = 0.001), with higher proportion of patients post-pump treated had good metabolic control with HbA1c compared to pre-pump infusion; 23 patients (40.4%) and 16 patients (28.1%), respectively.

The incidence of ketoacidosis was improved comparing with MDI pre-pump, fifty-eight episodes of DKA occurred in 35 patients (60.7%) before the initiation of insulin pump therapy and only 10 episodes DKA in 7 patients (12.3%) after use of insulin pump (p = 0.001). The incidence of severe hypoglycemia was 29 episodes during pre-pump period, which reduced to 3 episodes during CSII (P < 0.001).

Variable		HbA1c (%) before pump therapy		HbA1c (%) after pump therapy		p-value
N		%	N	%	N	
HbA1c (%) Mean ± SD		8.58 ± 1.73		7.76 ± 1.33		
Glycaemic control HbA1c (%)	< 7.5%	16	28.1%	23	40.4%	0.001
	7.5 -8.4%	12	21.1%	18	31.6%	
	8.5 -9.9	15	26.3%	12	21.1%	
	>10%	14	24.6%	4	7.0%	

Conclusions: This study supports CSII is effective alternative in managing T1DM. In addition, therapy with Insulin Pump in diabetic patients is very efficient and safe in achieving therapeutic goal of diabetes with decrease (HbA1c) and significantly reduced rates of DKA and hypoglycemia

P-318 | Increased utilization of insulin pumps and improving health equity among youth with type 1 diabetes: a quality improvement initiative

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Introduction: Insulin pump use among youth with type 1 diabetes (T1D) has been shown to improve glycemic control and decrease acute complications. Furthermore, health inequities of insulin pump use among minority youth with T1D exist.

Objectives: This project aims to increase insulin pump utilization and reduce health inequities among youth with T1D at a large tertiary care hospital through innovative quality improvement and equity initiatives.

Methods: Baseline data was collected to identify pump utilization among youth in the outpatient T1D clinic. Pump utilization disparity data was also measured among racial/ethnic groups. Interventions include improving provider and patient awareness of pump use in the clinic setting and family focus groups.

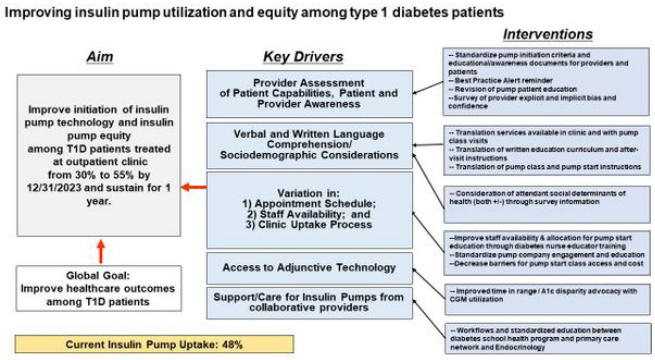
Other interventions include addressing social determinants of health through surveys and reducing cost barriers, providing translation services for pump initiation and education, and creating innovative clinic and patient workflows to enhance pump initiation.

This project also merges collaborative partnerships with multidisciplinary providers such as the school based diabetes program and primary care network.

Results: Baseline insulin pump use was seen in 30% of the patient population, and pump use was 28% and 26% lower in Blacks and Hispanic youth as compared to Non-Hispanic Whites.

Through these interventions, insulin pump utilization has increased by 26% among total youth with T1D over 18 months.

Conclusions: We observed low rates of insulin pump use in the T1D population, and significant disparities in insulin pump use among minority with T1D. Addressing social determinants of health, addressing patient and provider awareness and barriers, and enhancing collaborative partnerships can lead to increased insulin pump utilization and improved diabetes care access among a large, racial/ethnic diverse population with T1D.



P-319 | Discordance between laboratory glycated hemoglobin and glucose management indicator in children and adolescents with type 1 diabetes

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Introduction: CGM use is increasing in subjects with T1D and GMI is a useful metric for the clinical management of patients.

Objectives: To evaluate the discordance between A1c and GMI in young people with T1D and to identify potential factors affecting the discrepancy.

Methods: Data on age, T1D duration, BMI z-score, laboratory A1c, and AGP were recorded during annual routine outpatients visits in patients using CGM by at least 3 months. The difference between A1c and GMI was calculated for the 14-, 30-, 60-, and 90-days periods preceding the visit.

Results: One hundred and eighty children and adolescents with T1D (56% male; median age 14.2 years; T1D duration 5.33 years) were enrolled. The frequency of rtCGM users was 78.9%. A1c-GMI discordance we found in all analyzed periods was non significantly different.

Considering data from the 14-day period, median GMI was higher than A1c (7.6 vs 7.2%; $p<0.0001$). Frequencies of discordance ≥0.5 and ≥1.0 were 35 and 26.1%, respectively; discordance ≤0.1 was found in 14.4% of patients. We found that median A1c values were better in rtCGM users than in isCGM ones (7.1

vs 8.1%; p<0.0001). However, median GMI was higher than A1c in rtCGM users (7.4 vs 7.1%; p<0.0001), but not in isCGM (7.9 vs. 8.1%, p=NS). Median A1c-GMI discordance values were different between groups (-0.50 vs -0.15%, respectively; p=0.003).
Considering the whole study population, multiple regression analysis demonstrated that mean glucose values by AGP 14-days (β=-0.76; p<0.0001) and rtCGM (β=-0.22; p<0.001) were predictor factors of the A1c-GMI discordance.
Conclusions: No difference in the A1c-GMI discordance was found between analyzed periods, supporting the recommendation for diabetes clinicians to review 14 days of data for adequate decision-making.
In our real-world setting we found a 0.36% A1c-GMI discordance and the rtCGM seems to be a predictor factor. This discrepancy should be interpreted cautiously in clinical practice, in an era where telemedicine has been implemented for the care of patients with T1D.

P-335 | Increasing insulin pump therapy in patients with recently diagnosed T1D without increasing rates of diabetic ketoacidosis (DKA): a quality improvement (QI) initiative

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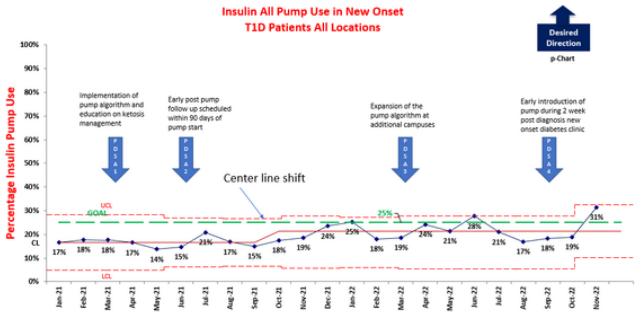
Introduction: Insulin pump therapy is recommended for all youth with T1D as it enhances quality of life and improves glycemic control. Structured education and support play a pivotal role in both optimizing diabetes management with pump therapy and decreasing risk of DKA.
Objectives: We led a QI initiative with the aim of increasing insulin pump use in youth age <18 years with recently diagnosed T1D (duration <1 year) from baseline of 17% to 25% from January 2021 to November 2022 at our tertiary care hospital. As a balancing measure, we evaluated DKA rates in the same cohort to non-pump users.
Methods: A series of Plan-Do-Study-Act cycles were implemented including:
- Pump initiation algorithm, including minimal safe start criteria, and education on ketosis management with pump action plan (1)
- Clinic follow up scheduled within 90 days of pump start (2)
- Expansion of the pump algorithm at additional clinic locations (3)
- Early introduction of pump during 2 week post diagnosis new onset diabetes clinic (4)

Results: P-Chart (Figure 1) shows an increase in percentage of patients with recently diagnosed T1D on pumps from 17% to 31% between January 2021 through November 2022. During this time, we noted a total of 32 DKA encounters amongst patients with recently diagnosed T1D and none were related to pumps.



Conclusions: Our improvement efforts led to increased pump usage in our cohort without increasing DKA events. It is unclear if partial remission phase of diabetes contributed to lack of DKA encounters. A multidisciplinary approach with education on managing pumps should be implemented to prevent shortcomings such as DKA. In the future, we plan to evaluate the rates of the pre and post pump DKA events within same subjects and hospitalizations at subsequent follow up visits.

P-337 | Demographic and clinical predictors of glycemic control trajectories in adolescents with type 1 diabetes: a 9-year longitudinal analysis

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Introduction: Adolescence is a challenging time for achieving optimal glycemic control.
Objectives: This study identified glycemic control trajectories and examined demographic and clinical factors that predict the probability of following particular trajectories during adolescence.
Methods: Latent class analysis was used to identify glycemic control trajectories in a cohort of 170 adolescents with type 1 diabetes who were followed for nine years beginning at a mean age of 10.4 years in two phases at pediatric diabetes clinics of three university-affiliated medical centers.
Blood samples were obtained at six-month intervals and analyzed for HbA1c in a central laboratory.
Demographic and clinical variables were obtained by chart review.
The study sample was 50% female, 22% had single parents, and 12% were non-White.
Results: Three distinct types of glycemic control trajectories were identified using HbA1c (Low-Risk M = 7.5, SD = .25, n = 57; Medium-Risk M = 8.87, SD = .44, n = 87; and High-Risk M = 10.79, SD = .79; n = 26). Logistic regression analyses were conducted to predict these trajectories by demographic and clinical factors including age, age at diagnosis, biological sex, ethnicity, race, single-parent, family income, study site, and insulin pump use.
Results showed that the probability of being in the Low-Risk class was decreased by older age at diagnosis (B = -.33, p = .02) and increased by pump use (B = 2.44, p = .01) and being female (B = -1.33, p = .04).
The probability of being in the Medium-Risk class decreased by pump use (B = 2.44, p = .01) and being White (B = -1.51, p = .04).
Similarly, the probability of being in the High-Risk class decreased by pump use (B = -1.37, p = .04) and being White (B = 1.51, p = .04).
Conclusions: Insulin pump use decreases risk for suboptimal glycemic control trajectories. Further, older age at diagnosis, being a boy, and belonging to a non-White race are demographic factors that increase risk for suboptimal glycemic control trajectories during adolescence.

P-342 | Changes in glucose variability and diabetes control in children and young adults with type 1 diabetes on routine continuous glucose monitoring and continuous subcutaneous insulin therapy following a switch to hybrid closed-loop therapy (MiniMed 780G) - retrospective study

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Introduction: Given increasing popularity and access to hybrid closed-loop therapies for children with type 1 diabetes (T1D), long-term real-life data on the therapy effectiveness become available.
Objectives: To investigate changes in glucose variability (GV) indices measured by continuous glucose monitoring (CGM) and diabetes control in young people (5-25 y.o.) with T1D before and for 9 months after switching to hybrid closed-loop (HCL) MiniMed 780G therapy.
Methods: This single-center retrospective study included children and young adults (age 5-25y.o.) with T1D who started MiniMed780G therapy between January 2021-April 2022 and previously used continuous subcutaneous infusion and continuous glucose monitoring ≥3 months.
The patients were followed for up to 9 months using data from routine outpatient visits (timepoints: before/at switch and 3, 6 and 9 months after switch).
Data from CGM were collected using manufacturer`s software from 2 weeks within 1 month before each visit with most complete data – and processed further using Glyculator 3.0.
Results: Final analysis included 46 patients [23 (50%) boys, median age 11 (25-75%: 7.9-13.3) y.o.; diabetes duration 3.7 (1.4-5.1); pre-transition HbA1c 6.6% (6.4-7.5)].
We noted significant improvements in mean glucose (pre-switch: 151 (131-164), 3m: 139 (126-148), 6m: 141 (132-150), 9m: 140 (132-151) – p=0.0112), coefficient of variation (pre-switch: 37 (31-42), 3m: 35 (31-38),

6m: 34 (31-38), 9m: 35 (31-38) – p=0.0038), as well as times in hypoglyceaemia (<54 - pre-switch: 1 (0-2), 3m: 1 (0-1), 6m: 0 (0-1), 9m: 1 (0-1) – p=0.038), hyperglycaemia (>180 - pre-switch: 27 (16-35), 3m: 20 (14-25), 6m: 21 (16-26), 9m: 18 (14-25) – p=0.0111) and in target (70-180 - pre-switch: 70 (60-78), 3m: 79 (74-83), 6m: 78 (72-81), 9m: 77 (71-82) – p<0.0001). Daily dose of insulin showed a tendency for increase by the end of follow-up.

Conclusions: A prolonged 9-month long observation in a routine care setting demonstrates that switch from sensor-augmented pump therapy to HCL offers sustained benefits in glucose variability in control for young people with T1D.

P-349 | The comparison between glycosylated hemoglobin A1c levels and glucose management index obtained from three different continuous glucose monitoring systems

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Introduction: Currently the glucose management index (GMI) values from the continuous glucose monitoring (CGM) reports are becoming a cornerstone of monitoring the diabetes therapy.
According to the literature calculation of GMI was based on CGM readings (median 48 days) with Dexcom G 4 and 5.

Objectives: The aim of the study was the comparison of GMI values retrieved from 3 CGM systems to the glycosylated hemoglobin A1c (HbA1c) values.

Methods: The study included 50 GMI values retrieved from 90 days of CGM reports from the past 90 days. The CGM systems were: Medtronic GuardianTM Link 4, FreeStyle Libre 1, Dexcom G6.
The GMI values were then compared with the HbA1c values which were obtained from the certified laboratory.

Results: The GMI values from Medtronic GuardianTM Link 4 and FreeStyle Libre 1 are lower than those obtained from HbA1c, 0.202% and 0.046% respectively. The GMI value from Dexcom G6 is on average 0.042% higher than the HbA1C from the laboratory.

	b	p	a	p
Medtronic Guardian™ Link 4	0.375 95%CI: (0.30-0.50)	<0,001	4.006 95%CI: (3.20-5.52)	0.474
FreeStyle Libre	0.619 95%CI: ()	<0,001	2.555 95%CI: (1.13-3.54)	0.735
Dexcom G6	0.7778 95%CI: (0,6-1)	0.093	1.544 95%CI: (0.05-2.76)	1

Table. The results of Passing-Bablock regression for Carelink, Libra and Dexcom.

Conclusions: GMI from Dexcom G6 has the highest compatibility with the laboratory acquired HbA1c.

P-352 | Continuous glucose monitoring in a newborn at risk for hypoglycemia

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Introduction: In some categories of newborns, early detection of hypoglycemia is essential. Neonatal hypoglycemia is associated with brain damage, seizures, visual pathway problems and suboptimal neurodevelopment.
Continuous glucose monitoring (CGM) devices are currently used off-label in newborn at-risk, reducing the use of capillary blood glucose measurements and their possible complications.
FreeStyle Libre 3, is already widely used in childhood diabetes, with benefits in terms of glycemic control, but its accuracy in this age group has not been confirmed yet.

Objectives: We describe the case of a newborn at risk of hypoglycemia in which was placed the FreeStyle Libre 3 and was possible the comparison between continuous glucose monitoring and the conventional capillary monitoring via POCT (Point Of Care Testing) StatStripXpress.

Methods: The newborn was delivered by caesarian section at 38+2 GW and was adeguate for gestational age sec Ines Charts. He underwent glycemic monitoring due to the risk of hypoglycemia (mother with pregestational type 1 diabetes).
Free Style Libre 3 was inserted at the 6th hour of life and maintained for 4 days during the stay in the hospital. We compared the readings of CGMS with capillary blood glucose values.
Results: A total of 9 blood glucose values were compared to readings from the CGMS. DTX-Libre3: 64-90: 26. 77-86: 9. 76-78: 1. 61-58: 3. 66-59: 7. 41-40: 1. 37-40: 3. 93-79: 14. 71-63: 8 The mean difference is 8mg/dL.
Conclusions: RT-CGMS is safe and reliable. Compared to the capillary measurement of blood sugar, it allows the early detection of hypoglycaemic episodes and their prevention, forthermore reducing exposure to pain. FreestyleLibre 3 is preferable to instruments already on the market in terms of size, number of measurements, warm-up and sensor duration. Our case report suggests that FreeStyleLibre 3 is a valuable aid in the management of newborn at risk for hypoglycemia and calls for larger population studies to encourage its use in clinical practice.

P-373 | Time from type 1 diabetes (T1D) diagnosis to clinic-connected CGM data is improving

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Introduction: Achieving target glycemic outcomes among youth in the US remains an ongoing challenge, despite the increasing uptake of advanced diabetes technologies. These devices, specifically CGM, are the standard of care for BG monitoring in youth with T1D. Connecting these data directly to clinics through cloud-based portals creates the opportunity for remote monitoring and earlier intervention in response to abnormal glucose patterns.
Objectives: This study aimed to identify if the time from T1D diagnosis to cloud-connected CGM data shortened over time.
Methods: All youth, less than 18 years old, newly diagnosed with T1D at a Midwestern USA Pediatric Diabetes Center between 1/2/2017 and 6/29/2023 were included. We measured the number of elapsed days between the T1D Dx date and the first date of recorded CGM data shared with clinic through Dexcom Clarity and/or Glooko. Observation periods were defined as pre-COVID (1/2/17 to 3/16/20), COVID (3/17/20 to 8/31/22), and post-COVID (9/1/22 to 6/29/23).
Results: For all age groups, the time to first streamed CGM data was shortened over the observation period. CGM adoption rates remained stable at ~84% throughout. Average time from T1D Dx to first CGM data among all study participants was 359 days pre-COVID, 79 days during COVID, and 16 days post-COVID. This trend occurred in all age groups (306 to 50 to 8 days in 0-6 year-olds; 561 to 165 to 19 days in 6-12 year-olds; and 711 to 173 to 27 days in 13-18 year-olds, respectively).
Conclusions: Time from diagnosis to CGM-streaming data shortened during the observation period. Readily available glucose data may allow for earlier and more frequent/effective remote patient monitoring interventions.

P-377 | Performance analysis of the MiniMedTM 780G advanced hybrid closed-loop system (AhCL) in children and adolescents with type 1 diabetes (T1D) before, during, and after ramadan: Qatar experience

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Introduction: Management of Ramadan fasting poses a multifaceted challenge for individuals with T1D. It requires special care, attention, and careful consideration. To date, there is a lack of evaluation regarding the impact of minimid 780G AHCL system among children and adolescents withT1D who are planning to fast Ramadan in the state of Qatar.
Objectives: To assess the effectiveness and safety of the MiniMed 780G AHCL system in children and adolescents with T1D before, during, and after Ramadan in Qatar.

Methods: A total of 16 participants with average diabetes duration of 7 years±4.16, mean age 13±2.6, BMI 23%±6.21, and HbA1C 7%±0.7, with no diabetes complications. Using the Minimed 780G (AHCL), evaluations were conducted at Sidra Medicine OPC over three months (March23-May23,2023). into Time 0 (T0- 4 weeks prior Ramadan), Time 1 (T1- during Ramadan), and Time 2 (T2- one-month post Ramadan). Pre-Ramadan education covered fasting eligibility, AHCL adjustment, nutrition education, and hypoglycemia management was performed. Individuals were contacted on weekly basis during Ramadan to ensure safe fasting. CGM and Insulin data from Carelink from T0, T1 and T2 was collected and analyzed.

Results: Findings showed successful fasting for 22.4±0.21 days with no severe hypoglycemia, DKA, or hospitalization. No significant differences in AHCL system performance were observed between pre-, during, and post-Ramadan (Table1).

Parameters	Before	During Ramadan	P value Before vs, during	After	P value During vs. after	P value Before vs. after
Time in AHCL, %	96±12.31	98±4.13	0.22	99±1.34	0.09	0.17
Sensor wear (%)	95±6.78	96±3.48	0.12	95±2.46	0.08	0.50
TIR; 70-180 mg/dl)	70±10.61	70.44 ±8.22	0.43	70±6.71	0.34	0.48
TAT >180 mg/ dL (%)	28±11.22	28.13 ±8.53	0.48	28±9.25	0.44	0.49
TBR, <70 mg/dl)	2±2.14	1.19±1.37	0.03	2±3.68	0.06	0.37
Total daily insulin dose, U/d	64.01±37.44	60±34.260	0.12	65.9±38.17	0.02	0.29
Autocorrection bolus	13±7.824	12±7.26	0.13	14±9.29	0.01	0.09
Carbohydrates, g/d	175±59.71	179±56.51	0.35	177±62.62	0.42	0.43
Active insulin time	2±1.097	2.2±1.11	0.08	2±1.10	0.17	0.17

Table 1. Statistics during Ramadan vs. 1 month before and after.

Conclusions: The results indicate that the utilization of the AHCL system successfully guarantees the safety of fasting during Ramadan for children and adolescents with T1D. Through minimizing the need for human intervention and maintaining optimal glycemic control target, the system demonstrates its effectiveness. In conclusion, the MiniMed 780G (AHCL) system provides a safe and efficient option to adapt to changes that occur during fasting Ramadan among patients with T1D.

P-404 | Glycemic control under an insulin pump therapy in children and adolescents with type 1 diabetes: a prospective study

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Introduction: Insulin pump therapy is recommended more and more in type 1 diabetic patients (T1DM) in order to achieve and maintain optimal glycaemic control.

Objectives: The aim of this study is to determine the impact of insulin pump therapy on glycemic control and hypoglycemic events among children and adolescents with T1DM.

Methods: This is a prospective and descriptive study including 18 T1DM children and adolescents' patients treated by insulin pump, followed up in the Department of Endocrinology-Diabetology and Nutrition of Mohammed-VI University Hospital Center-Oujda, in the eastern of Morocco between 2017 and until March 2023. All patients received a clinical evaluation, analysis of the glycemic cycle and a dosage of HbA1c at the time of the start of insulin pump and during the evolution. Statistical analysis was performed by SPSS version-21.

Results: Eighteen patients were enrolled in this study. The mean age was 11 ± 4,5 years old, divided into 10 girls and 8 boys, with a sex ratio (M/F): 0,8. The duration of diabetes was less than 3 years for 61% of patients, with a mean duration of 4,2 years. No statural or ponderal abnormalities were noted. The mean HbA1c has decreased between M0, M3, from, 8,1 ± 1,4 % to 7,3 ± 1,2 then decreased at M6 by 0,1% and at M12 it was unchanged. The frequency of hypoglycemia decreased from 6,5 ± 4,3 episodes/week to 3,2 episodes/week at 3 months, and to 0,5 ± 0,2 episodes/week at 2 year. No severe hypoglycemia was noted during this period.

Conclusions: Insulin pump therapy appears to be reliable and effective when used appropriately, combined with appropriate therapeutic education and glycaemic monitoring to maintain long-term glycaemic control in children and adolescents with T1DM.

P-407 | Comparison of hypoglycemic average between continuous glucose monitoring and capillary glucose in children with type 1 diabetes

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Introduction: Type1 diabetes mellitus in children has become a public health issue.Continuous glucose monitoring is a minimally invasive method, using Flash technology to measure blood glucose levels in the interstitial fluid, enabling the insulin dose to be adjusted, reducing the number of injections and improving quality of life.

Objectives: Our aim is to evaluate average hypoglycemic episodes in type1 diabetics by comparing continuous glucose monitoring (CGM) and capillary glucose (CG).

Methods: Retrospective descriptive study of 22 patients under 18years of age with type1 diabetes,followed up in Endocrinology-Diabetology-Nutrition consultation at the MohammedVI University Hospital Oujda Morocco over a period of 06 months.

Study endpoints included the difference between capillary glucose and continuous glucose monitoring to assess mean hypoglycemia,and the number of nocturnal events.

Results: The mean age was 10 ± 8years with a male predominance (59.5%), 73% of whom were on basal bolus insulin therapy,and 27% on insulin pump therapy with a duration of diabetes of 08 ± 06 years. There was a discrepancy between interstitial glucose levels and capillary glucose levels: Mean daily blood glucose was higher by CG (199 ± 47.3 vs 184.1 ± 56.9mg/dl) with an estimated mean difference of 15mg/dl.

Among these patients with hypoglycemia, the mean number of blood glucose episodes was lower by CG than by CGM,but limited by the number of scans (46%of patients had fewer than 8scans per day). We calculated nocturnal hypoglycemia occurring from 00:00 to 06:00, the proportion of patients with hypoglycemia <70mg/dL (26% vs 44%) and <50mg/dL (2% vs 11%) respectively.

Conclusions: Continuous glucose monitoring has led to lower average daily blood glucose levels and better detection and prevention of hypoglycemic events,particularly nocturnal and/or asymptomatic hypoglycemia .It offers the advantage of measuring interstitial glucose every 5 to15 minutes,providing a complete 24 hour glucose profile. This new technique facilitates our patients self-monitoring and thus self-management.

P-011 | The real-world impact and safety of initiation of the Medtronic minimed TM 780G in children with type 1 diabetes aged 2-6 years

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Introduction: The advanced hybrid closed-loop (aHCL) system Medtronic MiniMed™ 780G is used off-label in children with type 1 diabetes (T1D) under 7 years of age, as limited data are available on the use of aHCL systems in young children.

Objectives: To evaluate the real-world impact on glycemic control, parent-reported outcomes and safety 3 months after initiation of the MiniMed™ 780G aHCL in children with T1D aged 2-6 years.

Methods: Children aged 2-6 years who used the MiniMed™ 780G in Manual Mode for at least 4 weeks and whose parents agreed to enable Auto Mode were recruited at 16 diabetes clinics in Belgium. Data were prospectively collected from before to 3

months after start of Auto Mode. Parent-reported outcomes were evaluated through questionnaires (HAPPI-D and Hypoglycemia Fear Survey – Parent version). Data are reported as mean ± SD, median (IQR) or least-squares mean [95% CI].

Results: Of the 54 children included, 22 (41%) already had completed the 3-month visit. The majority of included children were girls (65%) with an age of 5 (3-6) years and T1D duration of 23.8 ± 13.1 months. Time in range (TIR; 70-180 mg/dL) increased from start to 3 months (60.2% [55.7-64.8] to 65.7% [60.9-70.6], p<0.001).

Children with a TIR <70% at start improved after 3 months (56.5% [52.8-60.2] to 64.5% [61.1-67.9], p<0.001) but no improvement was seen in children with a TIR ≥70% at start (74.3% [70.6-77.9] to 73.3% [67.9-78.6], p=0.626). Other glycemic outcomes and insulin delivery characteristics are shown in Table 1.

Quality of life (QoL) of parents and children remained stable. Four people reported 5 severe hypoglycemic events 4 months before start compared to 0 events after 3 months. No hospitalizations for ketoacidosis were reported 4 months before start compared to 1 hospitalization after 3 months.

	Start (n=54)		3 months (n=22)		p-value
HbA1c (%)	7.4	(7.0-7.7)	7.1	(6.7-7.4)	0.024
Time >180 mg/dL (%)	34.4	(29.0-39.8)	28.8	(23.1-34.5)	0.001
Time >250 mg/dL (%)	11.3	(7.1-15.5)	10.3	(6.0-14.6)	0.229
Time <70 mg/dL (%)	5.8	(5.0-6.7)	6.0	(4.9-7.2)	0.758
Time <54 mg/dL (%)	1.2	(0.6-1.8)	0.9	(0.2-1.5)	0.134
Mean glucose sensor (mg/dL)	160.8	(150.8-170.9)	152.9	(142.4-163.4)	0.003
Coefficient of variation (%)	41.0	(39.4-42.6)	43.1	(41.1-45.2)	0.009
Basal daily insulin dose (units)	4.5	(3.5-5.5)	5.5	(4.4-6.6)	<0.001
Bolus daily insulin dose (units)	9.8	(8.8-10.7)	9.8	(8.5-11.0)	0.973

Data represent least-squares mean (95% CI).

Table 1. Overview of glycemic outcomes and insulin delivery characteristics at start and after 3 months

Conclusions: Three-month use of the MiniMed™ 780G aHCL in children with T1D aged 2-6 years in a real-world setting is safe and associated with better glycemic control, without impact on QoL.

P-012 | Improving equity in the use of diabetes technology: perspectives from experiences of historically marginalized youth with suboptimally controlled type 1 diabetes and their parents

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Introduction: Vast socioeconomic inequities exist in access to diabetes technology in the United States. Non-Hispanic black (NHB) youth with type 1 diabetes (T1D), public healthcare insurance, and suboptimal glycemic control are least likely to access these technologies.

Objectives: We aimed to understand barriers to T1D technology access and to seek ideas to promote equitable access among NHB youth participating in a pilot study of Tandem t:slim X2 insulin pump with Control-IQ technology (CIQ) use.

Methods: Fifteen publicly insured, insulin pump naïve NHB youth aged 6-21 years with T1D and baseline hemoglobin A1c (HbA1c) ≥ 10% and their parents participated in a non-randomized 6-month mixed methods pilot study assessing the impact of CIQ use.

Forty-five to 60-minute semi-structured interviews were conducted upon completion of the study with parents and youth >9 years. Interviews were recorded and transcribed.

Semantic content analysis and consensus coding involving two team members was used to generate themes.

Two interview questions were posed: (Q1) 'What barriers have you experienced to diabetes technology access?' and (Q2) 'What should be done to help others access this technology?'.

Results: Twelve youth ($Mean_{age}$ 15.3±3.1 years, $Mean_{T1D\text{-}duration}$ 5.9±3.5 years, $Mean_{A1c}$ 11.9±1.4%) and 12 parents were interviewed. Three themes resulted from Q1 and five themes resulted from Q2 (See Table 1, following page).

Q1: What barriers have you experienced to diabetes technology access?

Theme: Lack of education about and support for diabetes technology use disempowered families

Definition: The healthcare team was perceived as inflexible, unwilling to offer families choice in their approach to diabetes care, and unable to envision the potential for technology to improve glycemic control and quality of life, which left families feeling shamed, dismissed, and abandoned.

Exemplar Quote: "It was no choice. It was like, 'This is it,' because he had went into DKA I believe twice, and after that the doctor was like, 'No, we want to just do the two shots,' and I just felt like that was worse. That's when I said, 'There has to be something else. If I'm doing all that I can do with trying to do the best we can, there has to be something else.' There has to be. Like you're just telling us no, we just have to do that, and then there were times when he asked about the pump in the past and wanted the pump, and they just acted like it was just impossible for him to get a pump, and now that we've been on a pump, I said, 'We could have been doing this a long time ago'... The only thing I knew is that there was a pump that, you know, people use, but I just didn't know anybody else that had a pump, and so when my son would go to the camp, he would come back like, 'Mom, I want a pump. Everybody at the camp has a pump,' and I'm like, 'Everybody at the camp has a pump?' He's like, 'Yeah, everybody.' I'm like, 'Well, that's weird that they haven't offered that to you at all,' and then we would come back and like I would ask about it. It was just like, 'No, he's not ready for a pump. He needs to get his A1c down, and he needs to do better with the shots, and then we'll move him on.'" (Parent of participant 7, age 19, T1D for 5 years)

Theme: Perceived challenges of adopting diabetes technology use outweighed the unknown potential benefits

Definition: The emotional burdens of living with T1D, misconceptions and lack of knowledge about diabetes technology, and fear of committing to something new left families feeling uninterested in, uninformed about, intimated by, and resistant to considering hybrid closed loop (HCL).

Exemplar Quote: "Well, one of the reasons was because at first, I was just really scared of people seeing it...and I just thought I was just going to have a big pump, and now everybody's just going to see it and know about my diabetes, but it was just like man, I didn't really want to do it because like I don't want diabetes. I don't really like my diabetes." (Participant 15, age 13, T1D for 8 years)

Theme: Systemic racism and factors intrinsic to the American healthcare system limited access

Definition: Barriers in accessing diabetes technology are mediated by long-standing inequities in education, access to healthcare, employment, and household income that present challenges in navigating a healthcare system not designed to address individual patient needs.

Exemplar Quote: "Yeah, because I'd say maybe where people live [makes it hard to get a pump], they don't have like a close hospital or something like that, or like people might miss their chance, like they were in DKA and it never got suggested, and maybe like people are mean. They don't feel like doing it because of race or something, yeah. That's what I felt like... I just thought everybody was against me for diabetes." (Participant 15, age 13, T1D for 8 years)

Q2: What should be done to help others access this technology?

Theme: Everyone should be educated about the benefits of diabetes technology, ideally with input from a healthcare team member with diabetes

Definition: Education about diabetes technology should be universally offered as part of diabetes care with consideration of the practical aspects of diabetes technology use that improve quality of life in addition to glycemic control; representation from clinicians with diabetes provides a valuable perspective that facilitates this practice.

Exemplar Quote: "I feel like I am more comfortable talking to you about [my child's] diabetes because you have diabetes, but it is like you deal with it 24/7 and [our clinician] is great, but it does not change the fact that you do have like with children with diabetes, but you don't actually take these issues home so I feel like hearing it from families with diabetes and their providers that have diabetes has a different comfort level because you actually understand degrees and experience working how it feels to take it home. Like once we leave Children's they don't have to deal with what comes with [my child] overnight or during the day so I feel like hearing it from families with children with diabetes is easier." (Parent of participant 6, age 8, T1D for 6 years)

Theme: Clinicians must work to overcome implicit bias and support technology uptake among those to whom it has not been historically offered

Definition: The medical team should examine their preconceived ideas that only youth with optimal glycemic control and diabetes management practices will benefit from and succeed with technology so that they can work to get HCL to historically minoritized youth and those with the poorest control who are least likely to be offered technology but stand to benefit most.

Exemplar Quote: "You know, of course you can promote it to the good people, but going to people like me first, basically, you know, that's not really doing that good and explaining it to them how y'all explained it to me in a simple way so everybody can understand it, and you don't have to worry about them not knowing what to do because once they see it, like how you explained it to me, they'll see it's so simple, you literally just type in what you're about to eat." (Participant 7, age 19, T1D for 5 years)

Theme: Family and community awareness and acceptance of HCL must be improved

Definition: Demystifying type 1 diabetes and diabetes technology through education and exposure in minoritized communities will build trust and support access.

Exemplar Quote: "Very important. I think it would be very important, especially meeting with other people of color. Like don't get me wrong. It doesn't matter if it's just another mom. Well, it doesn't matter what color she is, but the way she would navigate would be kind of different from the way I would navigate. Sometimes it seems like we're from two different worlds, so when you do have another person of color that is a single mom or going through the same thing, it kind of like gives a little more support.... But at the same time, you can also get that from other moms, too, so just having like a – and then there's like a difference between a mom in a two-parent household versus a single mom, so even just a single-mom meeting would be awesome." (Parent of participant 9, age 12, T1D for 1 year)

Theme: Clinicians must provide anticipatory guidance unique to individual needs

Definition: Additional support in preparing for technology use, including setting realistic expectations, and helping with organization surrounding devices, will promote interest in technology and empower those living with T1D and their parents to succeed with HCL.

Exemplar Quote: "I feel like everything is trial and error, it is a learning experience and it's like technology at the end of the day is still technology it is going to have its malfunctions, it's weird reboots, it's going to do it's a weird thing from time to time, it is definitely just kind of have to go with the flow and just, I would deftly just say don't try to go around things or stretch things out if you just know this is what it's supposed to be done like you know you should keep it charged, do that and you know you need to change your site, change your site don't try to prolong things, wait to the last minute, just to keep everything how it is supposed to be." (Participant 8, age 18, T1D for 13 years)

Theme: Resources are needed to overcome barriers imposed by social determinants of health

Definition: Comprehensive services to address day-to-day life challenges that exist outside of diabetes management would make the additional tasks of navigating diabetes technology feel more attainable.

Exemplar Quote: "Sometimes it might not be that they don't know, but, you know, some people deal with so many other different things that sometimes [diabetes technology] might not be a thought." (Parent of participant 14, age 13, T1D for 3 years)

Table 1: Themes, definitions, and exemplar quotes

Conclusions: Historically minoritized youth and their parents experienced barriers to technology access including their healthcare team, their own misconceptions, and societal constraints. They suggest that access can be made broader and more equitable by improving awareness of technology and its benefits, examining bias in the healthcare team, and working to address social determinants of health specific to this population.

P-013 | Performance of the MiniMed 780G system in young users with low total daily insulin dose – a real world analysis

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Introduction: The MiniMed (MM) 780G Advance Hybrid Closed Loop (AHCL) system is currently approved for people with type 1 diabetes (PwT1D), aged between 7-80 years, and with a minimum total daily insulin dose (TDD) of 8U at initiation. Per discretion, however, a health care provider can decide to prescribe the system outside of the approved intended use (off-label).
Even though the manufacturer explicitly does not promote off-label use, real-world data hereof are needed for informed decision making.
Objectives: Here, we report on the performance of the MM780G system in young PwT1D that require less than 8U of insulin per day.
Methods: 'CareLink Personal' (CP) data from Aug2020-Dec2022 were extracted from MM780G system users in Europe, Middle East, and Africa. Users were included if they had ≥10 days of sensor glucose (SG) data after AHCL initiation, as well as a mean TDD of 5-8U (5 is the minimal algorithm input), and self-reported to be ≤15 years (≤15 is the youngest age group in CP). All data were used, regardless of whether the system was in AHCL or in open loop. Continuous glucose monitoring (CGM) based metrics were aggregated for the full day, the daytime (06.01am-11.59pm) and the nighttime.
Results: The 100 users on average had a TDD of 6.8±0.8U and spent 77.5±31.5% of the time in AHCL. CGM based metrics are shown in the figure. On average, the mean SG was 149.8±18.4 mg/dL, the standard deviation of SG was 55.8±12.6 mg/dL, the glucose management index was 6.9±0.4%, the time between 70-180 mg/dL was 71.1±12.4% and the time below 54 mg/dL was 0.5±0.7%. Even though glucose control was good during each time window, it was best during the night.
Conclusions: This analysis of young MM780G system users with low TDD need showed an average glucose control that exceeds international targets. Nevertheless, the manufacturer emphasizes that the system must be used for its intended purpose and does not promote usage beyond.

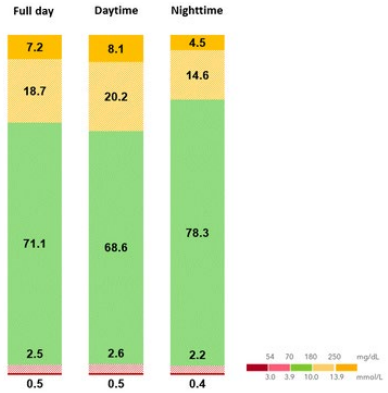

Figure. CGM based metrics per full day, and broken down per daytime and night-time window.

P-014 | The use of optimal system settings in real-world pediatric MiniMed 780G system users has a large impact on increasing the time in tight glucose range

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Introduction: The percentage of time spent in tight range (TITR, 70-140mg/dL) increasingly receives attention.
Objectives: We report TITR in real-world pediatric MiniMed (MM) 780G Advanced Hybrid Closed Loop (AHCL) system users. We also report on (modifiable) factors that improve TITR and compare these with factors that improve time in range (TIR, 70-180 mg/dL).
Methods: 'CareLink' data from Aug20-Dec2022 were extracted from MM780G system users, aged ≤15 years, and living in EMEA.
Univariate and multivariable models were used to identify factors associated with increased TITR and TIR (post-AHCL initiation).
For modifiable factors, we then compared their relative impact to the increased TITR versus TIR. Only users with ≥10 days of sensor glucose data before and after AHCL initiation were included in models, to correct for baseline glycemic control.
Results: 14,577 users had their data extracted, 3,800 were modelled. Factors associated with high TITR were pre-AHCL TITR and percentage of time in automation.
Factors inversely associated were percentages of daily insulin provided by automation, and numbers of daily calibrations, AHCL exits and alarms. Modifi-

able factors that predicted high TITR were 'optimal settings' use (*i.e.,* active insulin time (AIT) of 2hrs, glucose target (GT) of 100mg/dL), number of manual daily boluses and 2-3 distinct carb ratios per day (all: p<0.01).

These modifiable factors also predicted a high TIR, however, the relative impact of 'optimal settings' was 61% larger in TITR versus TIR. The figure, focusing on 14,577 users, shows times in ranges for all users and for those after optimizing modifiable factors.

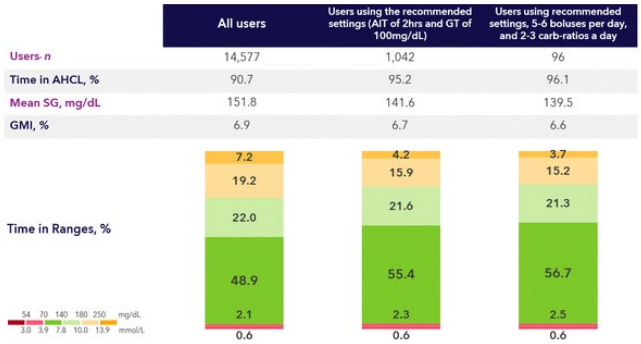

Figure: Time in ranges for all users aged ≤15 years and for those after optimizing the modifiable factors.
Results are displayed as mean; AIT, active insulin time; GT, glucose target; AHCL, advance hybrid closed loop; SG sensor glucose; GMI, glucose management indicator.

Conclusions: Modifiable factors such as GT, AIT, and the number of manual boluses and distinct carb ratios were associated with better glycemic control in pediatric MM780G users. Their impact on the increase of time in TITR is bigger than their impact on the increase of TIR.

P-015 | Diabetic ketoacidosis at onset of type 1 diabetes and glycemic control with closed-loop insulin delivery

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Introduction: Type 1 diabetes presents with diabetic ketoacidosis (DKA) in 25-50% of children and young people. Large observational studies have found DKA at diagnosis is associated with higher glycated haemoglobin (HbA1c) levels over time.

Objectives: We evaluated whether hybrid closed loop (HCL) therapy from onset of T1D could mitigate against the adverse glycaemic effect of DKA at diagnosis.

Methods: In this post-hoc analysis, data were analysed from 51 children and young people (aged 10 to 16 years) randomised to use the Cambridge HCL system for 24 months from diagnosis of T1D as part of the CLOuD trial (NCT02871089).

Participants were grouped based on the presence (n=17) or absence (n=34) of DKA at diagnosis, defined as per ISPAD guidelines.

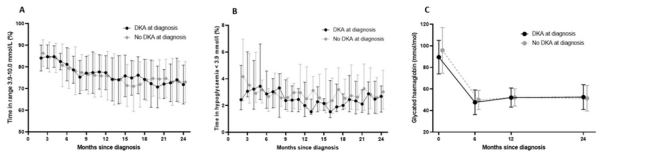
Sensor glucose metrics (time in range 3.9-10.0mmol/L, time below range <3.9mmol/L) and total daily insulin dose were calculated for each participant for each month from diagnosis.

Unpaired t-tests were used to compare glycaemic and insulin related metrics between groups at 6, 12, and 24 months.

Results: At baseline, participants' age was (mean±SD) 12±2 years, 49% (25) were female and 33% (17) presented in DKA. Participants with and without DKA at diagnosis had similar time in target glucose range (3.9-10.0mmol/L), time below range (<3.9 mmol/L) and HbA1c at 6, 12, and 24 months (Figure1 A, B, C).

While insulin requirements at 6 months were higher in those with DKA at diagnosis compared to those without DKA (median [IQR] 42.8 [24.1-57.6] units/day vs. 22.9 [19.0-37.4] units/day, p=0.05), this was not statistically significant after adjusting for body weight (0.74±0.26 units/kg/day vs. 0.58±0.19 units/kg/day, p=0.18). The AUC of C-peptide level after mixed-meal tolerance test was similar between groups at all time points.

Figure 1: Glycaemic control in children and young people with newly diagnosed type 1 diabetes by the presence or absence of diabetic ketoacidosis (DKA) at diagnosis



Panel A shows the percentage time in range 3.9-10.0 mmol/L (mean ± SD) of sensor glucose levels from 2 to 24 months after the diagnosis of type 1 diabetes. Panel B shows the percentage time in hypoglycaemia <3.9mmol/L (median, interquartile range) from 2 to 24 months after diagnosis. Panel C shows the glycated haemoglobin (HbA1c) level (mean ± SD) at baseline and at 6, 12, and 24 months after diagnosis.

Conclusions: In children and young people, HCL therapy from onset of T1D could mitigate against the adverse impact of DKA at diagnosis on long term glycaemic control.

P-016 | Continuing improvement of HbA1c in a Dutch pediatric and adolescent diabetes clinic since the introduction of the hybrid closed loop

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Introduction: Since the reimbursement of glucose sensors for pediatric type 1 diabetes patients in April 2018 in The Netherlands, we saw a clear improvement in our Hba1c outcome. Targets were more easily reached but still less than 20% of our patients reached the target of a Hba1c <7,0% (53).

At the end of 2020 the first hybrid closed loop insuline pumps (HCL) were introduced in The Netherlands, fully reimbursed by the insurance for pediatric patients. In our pediatric and adolescent clinic, an outpatient clinic of a regional hospital .(MeanderMC , Amersfoort) we treat patents from 0-21 Years old. About 20 percent of our patients is 18 Years to 21 Years old.

All our patients are allowed to start a HCL system despite underlying diseases, psychiatric problems or poor adherence to insulin therapy in contrast to study settings in which mostly motivated and patients without comorbidity are included.

Objectives: To demonstrate the effect on Hba1c outcome of HCL systems in a real life setting, a Dutch pediatric and adolescent outpatient clinic of a regional hospital (MeanderMC Amersfoort) treating patients from 0 -21 Years old.

Methods: In The Netherlands we have to report yearly our Hba1c results for quality purposes. The last Hba1c of the year per patient is collected and the percentage of children and adolescents with a hba1c <7,5% (58) and >10% (86) is reported.

We have collected the results from 2018 to 2022 and added the mean hba1c and hba1c <7 (53) to these results.

Results: After introducing glucosesensors we saw an improvement in our outcome; hba1c <7% (53)and <7,5% (58) improved , the mean Hba1c did not improve. Since 2021, the year we started HCL systems, the percentage of patients that reaches a Hba1c <7.0%(53) continues to improve. Half of our patients used a HCL system in 2022; In 2022 the mean Hba1c improved to 7,5% (58) and the percentage Hba1c <7.0%(53) improved further to 31,4%, we registered less children with Hba1c >10%.

Outcome	2018*	2019	2020**	2021	2022***
Hba1c<7% (53)	12,9%	19%	21,5%	23,8%	31,4%
Hba1c<7.5% (58)	38,2%	33,8%	40%	39,4%	52,6%
Hba1c>10% (86)	6,3%	6,4%	7,0%	7,5%	4,4%
Mean Hba1c	7,9%	8,0%	8,0%	7,9%	7.5%
No Patients	317	346	372	386	388

**April 2018 reimbursement of glucose sensor*
*** October 2020 introduction of HCL systems*
**** 200 patients on HCL systems*

Conclusions: Hybrid closed loop systems in a real life setting improves Hba1c outcome in a pediatric and adolescent outpatient clinic in the Netherlands.

P-017 | Lived experiences with closed-loop in youth with type 1 diabetes and their families: so much to learn about their psychosocial needs!

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Introduction: Closed loop (CL) automated insulin delivery systems have led to substantial improvements in glycaemic outcomes in people with type 1 diabetes (T1D).
Objectives: However, we investigated what psychosocial needs of families should be considered in parallel throughout childhood and adolescence when implementing a CL and the first year of follow-up.
Methods: We conducted an inductive exploratory study, based on in-depth individual interviews with 35 participants (young people with T1D aged 7-18 years, their parents and the diabetes care team), on their inner experience of CLs over the last 12 months in 4 different centres in France, in order to understand the psychosocial needs of families of children and adolescents using CLs.
Results: Our results show that CL modifies the life with diabetes and specific psychosocial needs appear for the child, the adolescent, the parents and the family dynamics.
Five psychosocial needs emerged from the perceptions and experiences of the participants over a period ranging from the preparation and installation of the CL to the first year of life with the CL:
1. To feel safe,
2. To feel supported,
3. To live a life less burdened by diabetes,
4. To gain autonomy, and;
5. To find one's place in the family organisation with diabetes.

There is therefore a requirement for diabetes teams to take into account and support these different needs during CL treatment, even if the CL itself appears in the families' experience to be a key player in meeting these needs because of the learning and processes underlying its daily use.
Conclusions: These initial results give us a better understanding of how to support the specific psychosocial needs of young people treated with CL, but also offer us avenues for our support to the families of young people with type 1 diabetes, regardless of their treatment.

P-018 | Advanced hybrid closed loop pump in 2–6-year-old children: one-year experience

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Introduction: The good glycemic control in young children is challenging to achieve and the treatment is very burdensome to families.
Objectives: The safety and impact of the advanced hybrid closed-loop (AHCL) system on glycemic outcomes in 2–6-year-old children with type 1 diabetes and on the diabetes distress of caregivers.
Methods: A non-randomized, prospective, single-arm clinical trial (n=35) conducted between 2021-2022. The inclusion criteria were:
1. Type 1 diabetes diagnosis > 6 months,
2. Total daily dose of insulin ≥ 8 units/day,
3. HbA1c < 10% (85 mmol/mol), and;
4. Capability to use insulin pump and continuous glucose monitoring (CGM). AHCL was used for 12 months. Parental diabetes distress was evaluated with a PAID-PR (Problem Areas In Diabetes – Parent, revised) survey. The changes in the main outcome measures between 0, 6, and 12 months were analyzed with paired-samples t-test.

Results: During the first six months of follow-up, HbA1c, mean sensor glucose value (SG), time in range (TIR), and time above range (TAR) improved significantly (Figure 1) The improvements lasted for up to 12 months in CGM parameters, but HbA1c in-

creased slightly. The results are similar to those earlier published from the first 3 months of follow-up (1). The parental diabetes distress decreased significantly between 0 and 12 months, (0 mo: mean 37.5, 12mo: mean 25.9, p<0.001) (0 months data published earlier (1)).

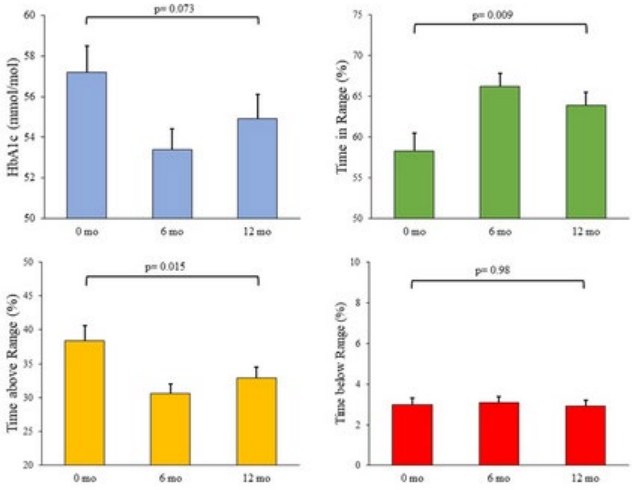

Figure 1. HbA1c, TIR, TAR and TBR at 0, 6 and 12 months. 0 months data published earlier (1)

Conclusions: Treatment with aHCL improved the glycemic control measured by CGM parameters of the young children and alleviated parental diabetes distress. The effect lasted up to one year, though HbA1c slightly deteriorated during the last months. These finding are reassuring and support the long-lasting positive influence of aHCL treatment on glycemic control in young children and reduced distress of their caregivers.

Ref: Pulkkinen MA et al. *Diab Technol Ther 2023*; *25*: 100-107.

P-019 | Optimizing glycemic outcomes in children with the MiniMedTM 780G system

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Introduction: When using the MiniMedTM 780G system, glycemic outcomes are best when a recommended glucose target (GT) of 100 mg/dL (5.5 mmol/L) and active insulin time (AIT) of 2hrs are used by children <15 years of age (Arrieta et al. *Diabetes Obes Metab.* 2022;24:1370-1379).

Objectives: The present study assessed pivotal trial and real-world system data from several regions, and the impact of using the recommended settings on glycemic outcomes.

Methods: CGM metrics including mean sensor glucose (SG), glucose management indicator [GMI] and TIR from pivotal trial participants (N=149) and real-world MiniMedTM 780G system users (N=15730: Europe, Middle East and Africa [EMEA], N=14577; Latin America [LATAM], N=472; and Australia and New Zealand [ANZ], N=681) were assessed when overall settings (any GT with any AIT) were used versus when recommended settings were used.

For pivotal trial data, time (3-6 months) when participants were using the 100 mg/dL GT and 2hr AIT was aggregated.

For real-world users, system data were uploaded to CareLinkTM Personal software from AUG 2020 to DEC 2022 and individuals used the 100mg/dL GT+2hrs AIT for ≥95 % of the time. CGM metrics underwent descriptive analyses.

Results: With overall settings, most study participants and real-world users had a GMI of <7.0%, TIR of >70% and TBR<70 mg/dL (<3.9mmol/L) of <4% (See table on following page).

When recommended settings were used, GMI was reduced, TIR increased by 3% in the pivotal trial and by ~3-6% in real-world users.

Time above range (TAR>180 mg/dL [>10 mmol/L] and TAR>250mg/dL [>16.7 mmol/L]) was reduced, while TBR remained <4.0%.

	Pivotal Trial	Real-world (All regions)		Real-world EMEA		Real-world LATAM		Real-world ANZ	
	Overall (N=149)	Recommended settings (N=37)	Overall (N=15730)	Recommended settings (N=1120)	Overall (N=14577)	Recommended settings (N=1042)	Overall (N=472)	Recommended settings (N=48)	Overall (N=681)	Recommended settings (N=30)
Mean SG, mg/dL	153 ± 11	149 ± 14	151 ± 16	142 ± 12	151 ± 16	141 ± 12	148 ± 15	139 ± 13	154 ± 18	143 ± 11
GMI, %	7.0 ± 0.3	6.9 ± 0.3	6.9 ± 0.4	6.7 ± 0.3	6.9 ± 0.4	6.7 ± 0.3	6.8 ± 0.3	6.6 ± 0.3	7.0 ± 0.4	6.7 ± 0.3
Time at SG ranges, %										
TBR <54 mg/dL	0.6 ± 0.5	0.5 ± 0.6	0.6 ± 0.6	0.6 ± 0.6	0.6 ± 0.6	0.6 ± 0.6	0.7 ± 0.7	0.7 ± 0.8	0.6 ± 0.8	0.7 ± 0.7
TBR <70 mg/dL	2.6 ± 1.5	2.4 ± 1.7	2.7 ± 2.0	2.9 ± 2.0	2.7 ± 1.9	2.9 ± 2.0	2.9 ± 2.0	3.1 ± 2.1	2.6 ± 2.1	2.7 ± 1.8
TIR 70-180 mg/dL	70.3 ± 6.8	73.3 ± 8.1	70.9 ± 9.3	77.0 ± 7.5	70.9 ± 9.3	77.0 ± 7.5	73.4 ± 9.1	78.5 ± 8.3	69.6 ± 9.9	76.3 ± 6.1
TAR >180 mg/dL	27.1 ± 6.9	24.4 ± 8.4	26.3 ± 9.7	20.1 ± 7.7	26.4 ± 9.6	20.1 ± 7.7	23.7 ± 9.3	18.5 ± 8.5	27.8 ± 10.5	21.0 ± 6.8
TAR >250 mg/dL	7.4 ± 4.0	6.3 ± 4.9	7.1 ± 5.5	4.2 ± 3.3	7.2 ± 5.5	4.2 ± 3.3	5.6 ± 4.6	3.6 ± 2.9	8.0 ± 6.3	4.5 ± 2.4

Table. Comparison of CGM metrics during overall and recommended settings of MiniMedTM AHCL (pivotal trial) and MiniMedTM 780G (real-world) systems used by youths <15 years of age.
Data are shown as mean±SD
Overall settings: 100 mg/dL (5.5 mmol/L) to 120 mg/dL (6.7 mmol/L) glucose target with active insulin time of 2hrs to 8hrs
Recommended settings: (100 mg/dL glucose target with 2hrs active insulin time)
EMEA (Europe, the Middle East and Africa); LATAM (Latin America), ANZ (Australia and New Zealand)

Conclusions: The best glycemic outcomes in children with T1D using the MiniMedTM 780G system are observed with the use of a 100 mg/dL (5.5 mmol/L) glucose target and 2hr active insulin time without compromising time spent below range.

P-020 | Impact of advanced hybrid closed-loop systems on glycemic risk index, insulin dose adjusted A1C and time in range in pediatric patients with type 1 diabetes transitioning from mdi therapy: A real-world observational study

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Introduction: Hybrid closed loop systems (AHCL) have been shown to improve A1c levels and time in range and decrease hypoglycemia in pediatric patients with type 1 diabetes (T1D). However, limited published data exist on its impact on glycemic risk index (GRI), insulin dose adjusted A1c (IDAA1c) and time in tight range (TIT).

Objectives: We aimed to evaluate the impact of transitioning from MDI therapy to AHCL on GRI, IDAA1c and TIT in a pediatric population with T1D in clinical practice.

Methods: A real-world observational study was conducted in pediatric patients with T1D previously treated with MDI and intermittent scanning glucose monitoring (isCGM). Clinical and glucometric data were collected at baseline and 1 week and 3 months after AHCL initiation. GRI was calculated using the formula: (3.0 × TBR < 54 mg/dL) + (2.4 × TBR 54-70 mg/dL) + (1.6 × TAR >250 mg/dL) + (0.8 × TAR 180-250 mg/dL) and IDAA1c using the formula: (total daily insulin dose per kilogram x 4) + A1c. TIT was defined as time between 70 and 140 mg/dL.

Results: A total of 40 patients (55% males) with a mean age of 11.5±3.4 years and a mean duration of T1D of 3.7±0.5 were included. Mean GRI decreased significantly from 41.8±21.1 to 22.9±10.7 (CI 95:19.4-26.3; p<0.0001) at 1 week and to 15.2±15.4 (CI 95: 10.2-20.1; p<0.0001) after 3 months. IDAA1c improved significantly from 10.7±1.6 (CI 95: 10.2-11.2) to 9.7±1.1 (CI 95:9.4-10.1; p<0.0001) at 3 months. The proportion of patients meeting TIR > 70% increased from 22.5% at baseline to 97.4% at 1 week and 96.0 % at 3 months.

TIT > 50% was achieved by 92.3% of patients at 1 week and 84.6% at 3 months. No severe hypoglycemic events or ketoacidosis episodes were reported.

n = 40	Baseline	1 week - Mean difference from baseline	3 months - Mean difference from baseline
A1c (%)	7.2 ±0.8 (CI 95: 7.0-7.5)	-	-0.7 (CI 95: -0.5 a -1.0) p < 0.0001
Average Sensor Glucose (mg/dL)	162±29 (CI 95: 153-172)	-29.5 (CI 95: -20 to -38) p < 0.0001	-23.5 (CI 95: -13.1 to -33.9) p < 0.0001
TIR (70-180 mg/dL) (%)	60.7±17.5 (CI 95: 55.1-66.3)	+20.6 (CI 95: 15.5 to 28.8) p < 0.0001	+18.5 (CI 95: 12.4-24.7) p < 0.0001
TAR > 180 mg/dL (%)	35.2±18 (CI 95: 29.5-41)	-20.5 (CI 95: -15.1 to -26.0) p < 0.0001	-17.8 (CI 95: -11.7.1 to -23.9) p < 0.0001
TAR > 250 mg/dL (%)	10.8±9.6 (CI 95: 7.3-14.4)	-9.2 (CI 95: -5.7 to -12.6) p < 0.0001	-6.4 (CI 95: -2.3 to -10.5) p < 0.005
TBR < 70 mg/dL (%)	3.6±3.9 (CI 95: 2.4-4.9)	+0.14 (CI 95: -1.16 to 1.4) p = 0.83 NS	-0.27 (CI 95: -1.9 to 1.4) p = 0.74 NS
TBR < 54 mg/dL (%)	0.3±0.7 (CI 95: 0.1-0.5)	+0.02 (CI 95: -0.22 to 0.26) p = 0.88 NS	+0.17 (CI 95: -0.24 to 0.57) p = 0.40 NS
Coefficient of variation (%)	35.8±5.6 (CI 95: 33.3-38.2)	-4.0 (CI 95: -1.7 to -6.2) p < 0.002	-2.4 (CI 95: -5.7 to -0.8) p = 0.13 NS

Conclusions: Transitioning pediatric patients with T1D from MDI to AHCL systems contributes to improving GRI and IDAA1c and substantially increasing TIR and TIT. These findings support the use of AHCL systems as a safe and effective option to achieve glycemic targets in pediatric T1D patients.

P-090 | Experiences with an AID system in preschool-aged children with type 1 diabetes - data from standard care

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Introduction: Achieving therapy goals (HbA1c <7.0%, time in range, TIR >70%, time below range, TBR <4%) in young children with diabetes is an immense challenge in daily life even with sensor-augmented pump therapy. Since May 2022, the first CE marked automated insulin delivery (AID) system is available per prescription in Germany. It is approved from 1 year of age and a total daily insulin dose of at least 5 units.
Objectives: To asses the efficacy and feasibility of an AID system in preschoolers as soon as possible after diabetes onset.
Methods: We retrospectively analyzed data from children with type 1 diabetes who were < 6 years old, had diabetes duration < 1 year, and had an outpatient clinic visit in the 1st quarter of 2022 or 2023. At diabetes onset, all children < 6 years of age received sensor-augmented pump therapy with predictive low glucose management (PLGM) and since May 2022 the Ypsopump with CamAPS FX (AID) in our center. We compared the treatment data of those with PLGM and AID treatment, respectively.
Results: 23 children (47.8% girls) used the AID and 17 children (35.2% girls) the PLGM system. AID therapy started 76±53 days and PLGM 86±37 days after diabetes onset. Compared to PLGM cohort, the AID group had higher TIR and higher TBR with similar insulin requirements (Table 1) and tended to have lower mean glucose and HbA1c values. Acute complications as severe hypoglycemia or DKA did not occur in either group.

	AID	PLGM	P-values
Age	3.9±1.2	3.5±1.7	n.s.
Diabetes Duration [days]	179±92	156±65	n.s.
TDD Insulin [U/kg BW/d]	0.55±0.2	0.53±0.1	n.s.
HbA1c [%]	6.9±0.8	7.2±1.0	n.s.
Mean [mg/dl]	152±22.2	170.5±33.3	n.s.
SD [mg/dl]	56±16	59±17	n.s.
CV	36.2±5.9	34.2±7.0	n.s.
TIR [%]	72.0±10.8	59.0±20.4	0.022
TBR <70 [%]	3.3±2.3	1.3±0.8	0.004

Table 1.

Conclusions: The first experience with an AID system in standard care in very young children with diabetes have been positive. Compared to sensor augmented pump therapy, the use of an AID system helped the families to achieve treatment goals. Our findings of significantly higher TBR values in the AID group highlight the importance of careful monitoring of initial AID settings in this vulnerable population.

P-092 | Improved usability in caregivers of children using the Omnipod® 5 automated insulin delivery system compared to prior therapy

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Introduction: Caregivers of children with type 1 diabetes (T1D) face many challenges in managing their child's therapy. New technologies should be designed with a user-centered approach to be easy to use so as to reduce the burden on caregivers.
Objectives: We assessed the perceived usability of the Omnipod 5 Automated Insulin Delivery System by caregivers of children (ages 2-<12 years) during a 3-month outpatient study of the system compared to prior therapy.
Methods: Caregivers of children aged 2-<12 years (N=157) with T1D completed the System Usability Scale (SUS) at study start, in reference to their prior therapy method, and at study end, in reference to the AID system. Results were stratified based on the prior therapy method: multiple daily injections (MDI), tubed insulin pump, or tubeless insulin pump.
Results: Perceived usability with the AID system was significantly improved with the study system compared to each prior therapy method at baseline (Table, all p<0.05).
Prior MDI and prior tubed pump users had larger improvements than the group of prior tubeless pump users (p<0.0001 and p=0.0023, respectively), likely due to tubeless pump users already having significantly higher perceived usability than the other two groups at baseline (p<0.0001).
There was no difference in the magnitude of improvement seen by the groups of prior MDI and prior tubed pump users (p=0.4970).

Table. System Usability Scale results (mean±SD) from caregivers of children (ages 2-<12 years) with T1D using the Omnipod 5 System for 3 months compared to their prior therapy

Measure	Scale (Optimal Score)	Value Reported	Prior MDI Users (N=18)	Prior Tubed Pump Users (N=20)	Prior Tubeless Pump Users (N=119)
System Usability Scale (SUS)	0 to 100 (100)	Baseline	67.6 ± 16.0	66.0 ± 16.2	81.5 ± 13.2
		End of Study	92.5 ± 5.9	86.9 ± 12.8	90.4 ± 11.4
		Change	**24.9 ± 15.5***	**20.9 ± 19.8***	**9.0 ± 15.1***

* Significant change with p-value <0.05 assessed by paired t-test or Wilcoxon signed rank test

Conclusions: The Omnipod 5 AID System was perceived to have higher usability than prior therapy method for caregivers of children with T1D. In particular, the AID system was found to have the greatest increase in perceived usability among those on MDI or a tubed pump therapy at baseline, with a similar improvement observed when transitioning from either method. This indicates the potential for the AID system to be adopted by those without prior pump experience.

P-093 | Real-world glycemic outcomes with the Omnipod® 5 automated insulin delivery (AID) System in under-resourced groups: results from the United States medicaid population

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Introduction: Medicaid is the United States public insurance program that covers healthcare costs for those with low income, disabilities, and other qualifying statuses. A high proportion of Medicaid beneficiaries are children, adolescents, and young adults who may face significant barriers to access diabetes technology, further exacerbated by disparities that already exist based on race, ethnicity, and socioeconomic status.
Objectives: To evaluate the glycemic benefit of AID in under-resourced children, adolescents, and young adults, we analyzed real-world outcomes for Omnipod 5 AID System users who were covered by Medicaid.
Methods: Continuous glucose monitoring (CGM) and insulin data from Omnipod 5 users aged <26 years covered by Medicaid in the US with ≥90 days of data available in the cloud-based data management system were included. Data from 1,237 users with sufficient CGM data (≥75% of days with ≥220 readings) were available at the time of analysis, with >225,000

person-days of data total. Results were analyzed overall and for those primarily using the lowest target setting (average target over time of 110-115mg/dL [6.1-6.4mmol/L]).

Results: Users were aged median [IQR] 11 [8, 15] years with median 176 days of system use. Time spent in Automated Mode was median 90.8%. The 110, 120, 130, 140, and 150mg/dL targets were used for 39.7%, 34.2%, 11.1%, 4.5%, and 9.8% of time, respectively. Median time in target range (70-180mg/dL; 3.9-10.0mmol/L) was 56.7% overall and 61.1% with the lowest target (Table).

Time <70mg/dL (<3.9mmol/L) was low: median 1.1% overall and 1.2% with the lowest target. Median GMI was 7.6% overall and 7.4% with the lowest target.

		All Targets	Lowest Target‡
N†		1,237	427
Age (y)		12.1 ± 5.5, 11 [8, 15]	13.4 ± 5.1, 12 [10, 17]
GMI (%)		7.7 ± 0.7, 7.6 [7.2, 8.1]	7.5 ± 0.7, 7.4 [7.0, 7.8]
Time in range (%)			
mg/dL	mmol/L		
<54	<3.0	0.3 ± 0.4, 0.2 [0.1, 0.4]	0.4 ± 0.4, 0.2 [0.1, 0.4]
<70	<3.9	1.4 ± 1.3, 1.1 [0.5, 1.9]	1.6 ± 1.5, 1.2 [0.6, 2.1]
70-180	3.9-10.0	56.3 ± 14.4, 56.7 [47.3, 65.7]	60.8 ± 14.7, 61.1 [52.9, 72.1]
>180	>10.0	42.3 ± 14.9, 41.9 [32.5, 51.7]	37.6 ± 15.2, 37.3 [26.1, 46.2]
Insulin Use (U/d)		39.7 ± 21.8, 36.4 [21.4, 54.2]	46.0 ± 22.7, 43.0 [29.6, 60.6]

Data are mean ±S.D., median [interquartile range]
†Users with ≥75% of days with ≥220 readings
‡Users with ≥75% of days with ≥220 readings and mean target over time of 110-115mg/dL (6.1-6.4mmol/L)

Table. Real-world glycemic outcomes for Medicaid-covered users aged <26y on the Omnipod 5 AID System.

Conclusions: These results demonstrate that under-resourced children, adolescents, and young adults are using the Omnipod 5 AID System safely and effectively in the real world, supporting policy changes that could enable greater access to this technology among this population.

P-094 | Real-world glycemic outcomes of >5,000 children and adolescents with type 1 diabetes using the Omnipod® 5 automated insulin delivery system (AID) with cloud-based data management

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Introduction: The Omnipod 5 AID System is a novel tubeless hybrid closed-loop system that allows for personalized therapy through customizable glucose targets from 110-150mg/dL in 10mg/dL increments (6.1-8.3mmol/L in 0.55mmol/L increments).

The system enables automatic upload of data for all users initiating the system, facilitating unprecedented access to evaluate real-world outcomes.

Objectives: To assess the real-world glycemic benefit of AID in children and adolescents, we analyzed real-world outcomes for Omnipod 5 AID System users aged <18y.

Methods: Continuous glucose monitoring (CGM) and insulin data from Omnipod 5 users with type 1 diabetes (T1D) aged <18y in the US with ≥90 days of data available in the cloud-based data management system were included.

Data from 5,050 users with sufficient CGM data (≥75% of days with ≥220 readings) and primarily using the lowest target setting (mean target over time 110-115mg/dL [6.1-6.4mmol/L]), aged <6y (n=224), 6 to 12y (n=2,781), and 13 to 17y (n=2,045) were available at the time of analysis, with >850,000 person-days of data total.

Results: Users were aged mean±SD 11.4±3.4y with median 184 days of system use. Outcomes are shown in the Table for each age group.

Median time in target range (70-180mg/dL; 3.9-10.0 mmol/L) was 74.3%, 69.2%, and 65.6% for each age group, respectively. Time <70mg/dL (<3.9mmol/L) in each age group was low: median 3.0%, 1.7%, and 1.2%, respectively.

Conclusions: These results are the first to demonstrate that in over 5,000 children and adolescents using the Omnipod 5 System in a real-world setting, highly favorable glycemic outcomes are achievable and are similar to those first reported in pivotal trials.

Age Group		<6 years	6 to 12 years	13 to 17 years
Sufficient CGM Data + Lowest Target† (N=5,050)				
N (%)		224 (4.4%)	2,781 (55.1%)	2,045 (40.5%)
Age (y)		4.2 ± 1.0, 5 [4, 5]	9.6 ± 1.8, 10 [8, 11]	14.7 ± 1.4, 15 [14, 16]
GMI (%)		6.8 ± 0.5 6.7 [6.5, 7.1]	7.1 ± 0.5 7.1 [6.7, 7.4]	7.3 ± 0.6 7.3 [6.9, 7.6]
Time in range (%)				
mg/dL	mmol/L			
<54	<3.0	0.7 ± 0.7, 0.5 [0.3, 0.9]	0.4 ± 0.5, 0.3 [0.1, 0.6]	0.4 ± 0.6, 0.2 [0.1, 0.5]
<70	<3.9	3.6 ± 2.4, 3.0 [2.0, 4.8]	2.2 ± 1.8, 1.7 [0.9, 3.0]	1.7 ± 1.6, 1.2 [0.7, 2.2]
70-180	3.9-10.0	73.3 ± 11.1, 74.3 [67.0, 82.0]	68.6 ± 11.8, 69.2 [61.1, 76.8]	65.2 ± 13.6, 65.6 [56.6, 74.2]
>180	>10.0	23.0 ± 11.8, 21.8 [14.1, 30.0]	29.2 ± 12.4, 28.9 [20.4, 37.2]	33.1 ± 14.1, 32.8 [23.5, 42.1]
Insulin Use (U/d)		15.1 ± 7.3, 14.3 [11.7, 17.2]	33.9 ± 17.4, 29.4 [21.2, 42.3]	54.2 ± 18.4, 52.4 [42.2, 64.2]
Users meeting consensus guidance†, N (%)		150 (67.0%)	1,316 (47.3%)	743 (36.3%)
Users meeting consensus guidance‡, N (%)		85 (37.9%)	1,062 (38.2%)	661 (32.3%)

Data are mean ±S.D., median [interquartile range]
†Users with ≥75% of days with ≥220 readings and mean target over time of 110-115mg/dL (6.1-6.4mmol/L)
‡Users with ≥70% time in target range (70-180mg/dL; 3.9-10.0mmol/L)
§Users with ≥70% time in target range (70-180mg/dL; 3.9-10.0mmol/L) and ≤4% time below 70mg/dL (3.9mmol/L)

Table. Real-world glycemic outcomes across pediatric age groups with the Omnipod 5 AID System.

P-095 | Hybrid closed loop (HCL) Insulin delivery system is equally safe in unlicensed user group and improves overall glycaemic control in preschool children along with very high level of parental satisfaction

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Introduction: The Hybrid closed loop (HCL) has revolutionised management of T1D. Some advanced HCL insulin pumps have restrictions on its wider clinical use. Variable practices exists among clinicians managing children with T1D.

Objectives: We share our experiences on the use of **Tandem Control-IQ HCL** in unlicensed user group **(i.e. <6 years of age *, <10 units of Insulin/day and Wt <25 kgs)**. We also share parent's perspectives on glycaemic control and Quality Of Life (**QOL**) [consent taken]

Methods: **Case series:**

4 cases on the use of **Tandem T-Slim Control-IQ** in unlicensed user group. All of them use Dexcom G6 for CGM. Cases 1-3 were on Tandem Basal-IQ and Case-4 was on MDI before commencement of Control-IQ.

Case- Age at Diagnosis (months), Age at start of Control-IQ.
[Weight in Kgs, TDD at start of Control-IQ]
Case-1
Diagnosed at 18 months, Basal-IQ at 22 months, Control-IQ at 30 months.
[Wt- 12.8, TDD-9 units]
Case-2
Diagnosed at 18 months, Basal-IQ at 21 months, Control-IQ at 27 months.
[Wt-15.4, TDD-9 units]
Case-3
Diagnosed at 11 months, Basal-IQ at 13 months, Control-IQ at 23 months.
[Wt-13.4, TDD-8 units]. *Awaiting for F/U appointment.*
Case-4
Diagnosed at 38 months & managed with MDI regime. Control-IQ at 43 months.
[Wt- 19, TDD-12 units]

All four children did not meet the clinical criteria for use of Control-IQ HCL.

Results: Table-1 compares glycaemic control at the start of Control-IQ and latest follow up point.

	Case 1 (M)		Case 2 (M)		Case 3 (M) *		Case 4 (F)	
Treatment before Control-IQ	Tandem-Basal IQ		Tandem-Basal IQ		Tandem-Basal IQ		MDI	
	At start of Control-IQ	Latest F/U	At start of Control-IQ	Latest F/U	At start of Control-IQ	Latest F/U	At start of Control-IQ	Latest F/U
TIR % (4-10 mmol/l)	52	69	68	73	37	68	71	65
TBR % (≤ 3.9 mmol/l)	3	5	6	6	2	4	0	2
TAR % (≥10.1 mmol/l)	45	26	26	21	61	28	29	33
HbA1c (mmol/mol)	50	52	42	39	71	-	56	59
BMI (Kg/M^2)	17.4	17.4	20.1	19.6	17.6	-	19.3	19.1
Severe Hypoglycaemia (reported)	None	None	None	None	None	-	None	None
Parents experiences & Would they recommend Control-IQ? Quotes- from parents	Positive & Yes 'Highs (>14), were hardly happening any more'		Positive & Yes 'We have trust & confidence with Control-IQ'		Positive & Yes 'Really positive & lot easier'		Positive & Yes 'Pump without Control-IQ nonsensical'	

Table-1.

Outcomes:
- Clinically significant improvement in glycaemic control
- Parents reported high level of satisfaction & reduced hypoglycemia fear
- Improved quality of sleep
- Overall improved the QOL not only for the child but for the entire family

Limitations:
- Small numbers and shorter follow up period

Conclusions:
1. Use of diabetes technology in unlicenced group is equally safe without compromising the car
2. Open discussions and collaborative working with parents are crucial while opting for nonconventional management strategies

P-096 | Self-management behaviors and changes in body mass index among children and adolescents using the advanced hybrid closed loop system: 12 months prospective study

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Introduction: Data assessing self-management behaviors (SMB) including carbohydrate (CHO) intake and meal announcement as well as changes in body weight among young people living with type 1 diabetes (T1D) using advanced hybrid closed loop (AHCL) is limited.

Objectives: Thus, the aim of this study was to access SMB and changes in body mass index (BMI) among children and adolescents with T1D using the Medtronic Minimed ™ 780G system.

Methods: A prospective study including 50 participants with T1D (age: 10.04 ± 3.33 years) successfully initiating the AHCL system and regularly followed up for 12 months. BMI Z-score was assessed regularly during the study period.

Data regarding insulin delivery, meal announcement, average daily intake of CHO and CGM metrics were recruited from CareLink™ Software.

Results: After completing 1 year on AHCL,BMI Z-score of the participants were comparable throughout the study period with mean baseline Z-score of 0.59 ± 0.15 compared to 0.6 ± 0.14 at the end of the study (P>0.05). The percent of basal insulin decreased by 15.8% when shifting to AHCL. Regarding SMB, participants announced an average of 3.5± 1.1 meals /day, the frequency of meal announcement positively correlated with time spent in range (TIR; 70-180 mg/dL) (r= 0.6, P<0.01).

The average baseline total daily announced CHO was 187.94 ± 35.11 grams/day (40-50% of estimated daily caloric requirements). The total daily announced CHO was comparable throughout the study period (P >0.05).

These findings were coupled with improvement in glycemic outcomes as evidenced by a significant decrease in HbA1c from 8.76 ± 0.75 % (72.2 mmol/mol) to 6.9 ± 0.3 % (51.9 mmol/mol) (P <0.01). TIR substantially increased reaching 81.1 ± 4.75 % 1 year after initiating AHCL (p<0.01) with 1.6± 0.7 % of the time spent below 70 mg/dL.

Conclusions: The AHCL system attained the recommended glycemic outcomes together with providing more flexibility in daily consumptions. The improved glycemic targets were not associated with increasing CHO intake or BMI among children and adolescents with T1D. SMB is an important prerequisite for achieving glycemic targets.

P-097 | Improvement in real-world glycaemic outcomes in Australian youth with type 1 diabetes on closed loop therapy

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Introduction: In the pre-closed loop era, less than a third of youth achieved the recommended targets of glycaemic outcomes. Closed loop systems (CLS) have evolved with refinements in algorithm; enhancements to the MiniMed™ Medtronic 780G compared to the previous 670G/770G CLS include a choice of glucose targets, automated correction boluses, and an improved user interface.

Objectives: The aim was to compare the real-world glycaemic outcomes and goals achieved by Australian youth with Type 1 diabetes with the 780G CLS to the 670G/770G CLS.

Methods: A retrospective analysis of Carelink™ real-world data collected between March 2019 and Jan 2023 from Australian youth ≤ 15 years of age was conducted. 670/770G and 780G users on Guardian Sensor 3 with at least 10 continuous days of sensor glucose data following Closed Loop (CL) start were included. Analyses included % time in CL, insulin delivery, CGM metrics and proportion of users achieving recommended glucose management indicator (GMI < 7.0%) and time in range (TIR 70-180 mg/dl > 70%) goals.

	670G/770G n=986	780G n=591	P values# between 670G/770G and 780G
System performance			
Sensor wear (%)	68.8 ± 26.5	82.8 ±17.5	<0.001*
Time in closed loop (%)	60.5 ± 28.6	85.5 ±19.1	<0.001*
Exits from closed loop/week, n	4.6 ± 2.4	1.8 ± 1.5	<0.001*
System-initiated exits from closed loop/ week, n	4.2 ± 2.4	1.3 ± 1.4	<0.001*
User-initiated exits from closed loop/week, n	0.4 ± 0.6	0.4 ± 0.7	0.0447*
Insulin delivery##			
System-initiated, % TDD	46.0 ± 8.9	56.0 ±10.7	<0.001*
User-initiated, % TDD	54.0 ± 8.9	44.0 ± 10.7	<0.001*
User-initiated boluses per day, n	6.4 ± 2.1	5.6 ± 2.2	<0.001*
Proportion of users meeting recommended targets (%)			
Users with GMI < 7% or 53 mmol/mol	27.1	53.8	<0.001**
Users with Time in range >70%	25.6	53.3	<0.001**
Users with Time below range (<70 mg/dl) < 4%	81.4	82.4	1.000**
Users with GMI <7%, Time in range >70% and Time below range (<70 mg/dl) < 4%	15.6	37.4	<0.001**
CGM metrics*			
GMI %	7.3 ± 2.6	7.0 ± 2.6	<0.001
GMI mmol/mol	56.1± 5.1	53.2 ± 4.9	
Coefficient of variation %	37.7 ± 4.1	37.5 ± 4.4	0.5107
Mean Glucose mg/dl	166 ± 19.6	154.9 ± 18.6	<0.001
% Time in range 70 to 180 mg/dl	62.9 ± 10.7	69.2 ±10.1	<0.001
% Time < 54 mg/dl	0.7 ± 0.8	0.6 ± 0.8	0.0604*
% Time <70 mg/dl	2.6 ± 2.0	2.6 ± 2.1	0.8167*
% Time >180 mg/dl	34.5 ± 11.3	28.2 ±10.8	<0.001
% Time >250 mg/dl	11.6 ± 7.7	8.2 ± 6.5	<0.001*

Values in Mean ± SD

P values# 191 users of both devices, values with *from Wilcoxon signed rank test; values with **from McNemar's test; p values without * or ** from paired t test.

780G n=984 and p values n=190.

Results: The table above summarises the results. 780G (n=591) users achieved a TIR of 69.2% ± 10.1 %, GMI of 7.0 ± 2.6% (53.2 ± 4.9 mmol/mol) with 86% time in CL while 670/770G (n=986) users achieved TIR of 62.9% ± 10.7%, GMI of 7.3 ± 2.6 % (56.1 ± 5.1 mmol/mol) with 61% time in CL with system-initiated insulin delivery higher (56%) with 780G than 670/770G (46%). There was reduction in time spent > 180 mg/dl (780G vs 670/770G; 28.2% vs 34.5%) with no increase in hypoglycaemia with 780G. GMI and TIR targets were met in 54% and 53% of youth on 780G compared to 26% and 27% on 670/770G.

Conclusions: Compared with the first-in-market 670G/770G systems, more than half of youth on 780G met the recommended glycaemic targets with improved time in range and reduction in hyperglycaemia with no increase in hypoglycaemia.

P-098 | Real-world performance of two automatic insulin delivery systems in a Danish, pediatric cohort over a 12-month follow-up period: a retrospective study

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Introduction: Automatic insulin delivery (AID) systems improve glycemic control in in-patient trials and short-running real-world studies.

Objectives: To investigate whether initial improvements in glycemic outcomes with AID systems (Tandem Control IQ or Medtronic Minimed 780G) persist during one year of real-world observation.

Methods: A retrospective, observational study including children aged 0-18 years old from Steno Diabetes Center Copenhagen, Denmark, switching to an AID system irrespective of previous treatment modality during a two-year period. Glycemic measures and HbA1c were collected before (T_{pre}) as well as three (T_3), six (T_6), and twelve (T_{12}) months after AID initiation.

Data were analyzed using linear mixed modelling with participants as random effect intercept and time, AID-type, and their interaction term as fixed effects.

Results: A total of 194 individuals switched during the inclusion period of which 153 (83 females (42,8%), median age 11.3 [IQR 7.9-14.4] years, median diabetes duration 4.9 [IQR 1.7-7.2] years) had sufficient

data at minimum one timepoint for analyses, defined as a minimum of 14 days of continuous glucose measuring with >= 70% sensor data coverage. HbA1c decreased significantly after three months of AID usage and this change persisted during the entire year of observation (Table 1).
Furthermore, most glycemic metrics improved after 3 months and remained stable, except for time below range (TBR; <3.9 mmol/L), which remained unchanged at all four timepoints (Table 1).
The amount daily carbohydrates logged in the pumps did not change with initiation of AID treatment or throughout the observation period, but the total amount of daily insulin administered significantly increased following the switch to AID treatment (Table 1).

Variable Mean (95% CI)	T_{pre} (n = 94)	T_3 (n = 126)	T_6 (n = 117)	T_{12} (n = 70)	$P_{overall}$ (month)
HbA1c (mmol/mol)	58.6 (57.0-60.3)	53.1 (50.9-55.2)	54.1 (51.9-56.4)	53.4 (51.6-55.2)	<0.0001
Time in range (3.9-10.0 mmol/L) (%)	62.1 (60.1-64.1)	71.3 (69.4-71.7)	69.5 (67.5-71.4)	69.5 (67.4-71.7)	<0.0001
Time below range (<3.9 mmol/L) (%)	1.9 (1.6-2.3)	1.6 (1.3-1.9)	1.7 (1.4-2.0)	1.6 (1.4-2.1)	0.18
Time above range (>10.0 mmol/L) (%)	35.1 (33.0-37.2)	26.2 (24.2-28.3)	27.8 (25.8-29.9)	27.9 (25.6-30.2)	<0.0001
Time in right range (3.9-7.8 mmol/L) (%)	39.8 (37.8-41.8)	49.6 (47.6-51.5)	47.8 (45.8-49.8)	47.5 (45.4-49.7)	<0.0001
Glycemic risk index	44.6 (42.0-47.2)	32.9 (30.4-35.4)	36.0 (33.4-38.5)	35.1 (32.3-37.9)	<0.0001
Daily carbohydrates (grams)	202.0 (184.2-219.9)	186.4 (172.2-200.5)	185.7 (171.1-2002)	195.1 (178.4-211.7)	0.22
Total daily insulin (IE)	35.9 (31.4-40.3)	36.9 (32.8-41.0)	38.4 (34.2-42.6)	41.5 (37.2-45.8)	<0.0001

Conclusions: In a Danish pediatric cohort, treatment with AID resulted in improved glycemic outcomes after three months of use, and this improvement persisted for a minimum of 12 months in a real-word setting.

P-099 | Use of advanced hybrid closed loop (AHCL) in automode reduces need of caretaker-initiated insulin boluses in preschool (2 – 6 y old) children during the night hours

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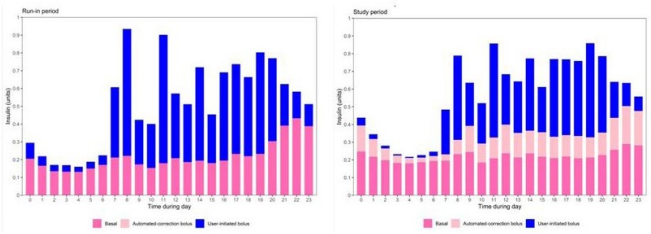
Introduction: Treatment of type 1 diabetes in young children is challenging since they experience marked day-to-day and within-day and especially within-night variability in glucose levels. Characteristically, young children have an increase in insulin need during the late evening hours, and reduced need of insulin during early morning hours, making insulin adjustment even more challenging.
Objectives: To analyze the change in the need of user-initiated boluses during the night time in preschool children (2 - 6 year old) with type 1 diabetes treated with advanced Hybrid closed loop (AHCL) pump when using manual mode versus automode.
Methods: A non-randomized, prospective, single-arm clinical trial (n=35) to analyze safety and effectiveness of AHCL pump conducted between 2020-2022. Data of the mean insulin (iu) / hour was analyzed from 31 patients during the run-in period (manual mode, 12 days) and during the use of automated mode (340 days) to analyze the change in the need of manual correction boluses during the sleep time when using manual mode versus when using the automode.
Results: In preschool children with type 1 diabetes insulin need (iu / hour) increases after falling a-sleep and drops after the midnight (Figure).



Basal insulin between 21 pm and 06 am was on average 0.208 (0.1) iu / hour during the run-in phase (manual mode) and did not significantly change during the automode phase (0.224 (0.06) iu / hour, p=0.194).
However, need for caregivers' interruption to correct rising glucose during night was significantly reduced in automode. Mean amount of user-initiated bolus-insulin between 21 pm and 06 am during the

manual mode was 0.087 (0.05) iu / hour and was reduced significantly to 0.057 (0.049) iu / hour during the automode, p=0.007.

Conclusions: Need of manual insulin correction boluses during the nighttime is significantly reduced with use of automode of the ACHL pump in preschool children giving caregivers possibility for less interruption in their sleep.

P-164 | Real life comparison of two advanced hybrid closed-loop systems among children and adolescents: the open-source automated insulin delivery and MiniMedTM 780G

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Introduction: In recent years, several advanced hybrid closed-loop (AHCL) systems have been developed to combine glucose sensing and automated insulin delivery for individuals with type 1 diabetes. These systems utilize an algorithm to automatically adjust some aspects of insulin dosing based on continuous glucose sensor data, insulin pump data, and other relevant information such as carbohydrate intake and glucose targets.

Objectives: To compare glycemic parameters of youth with type 1 diabetes treated by 2 different AHCL systems: an open-source automated insulin delivery system (OS-AID) or the MiniMedTM 780G system.

Methods: This observational study utilized diabetes-related data from five medical centers. The primary outcome measures were the mean time spent in selected glycemic ranges for each system.

Results: At baseline the OS-AID group (n=29) were younger than the 780G group (n=20) (11.1±3.7 vs. 13.7±3.8 years, respectively, p=0.02), had lower HbA1c levels (6.7±0.6% vs. 7.6±1.0%, p=0.001), and spent longer time in range (TIR_{70-180}) 69.7±12.9% vs. 60.5±17.2%, p=0.05). There were comparatively more significant improvements in mean glucose, HbA1c, and TIR_{70-180} levels in the OS-AID group, with less time above range and increased weight gain at 11.1±34 months. The 780G group showed significant improvement only in TIR_{70-180}.

At final follow-up, the OS-AID group had a significantly lower mean HbA1c level (6.4±0.6% vs. 7.3±0.9%, p=0.001), and a lower glucose management indicator, however, time spent in the hypoglycemic ranges ($TBRI_{54-70}$ 5.0±3.0 vs. 2.5±2.2, p=0.002 and $TBRII_{<54}$ 1.5±1.3 vs 0.5±0.9, p=0.016) was longer than the 780G group.

Conclusions: Both AHCL systems similarly improved TIR. The OS-AID youth had better glycemic control but spent a longer time in the hypoglycemic range.

P-165 | One year follow up comparison of two advanced hybrid closed loop systems in adolescent patients with type 1 diabetes

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Introduction: Tandem Control-IQ and MiniMed 780G are currently the two advanced hybrid closed loop (AHCL) systems most commonly used in pediatric patients with type 1 diabetes (T1D) in the Czech Republic. Adolescents and young adults are the group with the highest HbA1C values, often unable to reach recommended glycemic targets.

Objectives: The aim of this study was to retrospectively compare data from continuous glucose monitoring in adolescent patients one year after initiation of AHCL (Tandem Control-IQ and MiniMed 780G) therapy.

Methods: Thirty-four adolescent (15 Tandem system, 19 MiniMed 780G system, M: F 16: 18, mean age 15 years, diabetes duration > 1 year) with T1D, previously treated with Predictive Low Glucose Suspend

(PLGS) systems or Multiple Daily Injections (MDI) and then upgraded to AHCL have been enrolled. Glycemic control (GMI and time in ranges, mean glucose value, standard deviation, coefficient of variation) and AHCL characteristic (total insulin dose, basal/bolus ratio, total carbohydrates) were analyzed at baseline and at 3, 6 and 12 months after initiation of the AHCL system.

Results: For both AHCL systems, there was a significant increase in time in range (TIR) after 3 months of treatment from 65.1 to 80.1% ($p < 0.0004$) and from 74.8 to 79.6% ($p < 0.021$). The MiniMed 780 group achieved significant increase in TIR over the year as well as a reduction in total time below range (TBR). For the Tandem Control-IQ group, there was a significant reduction in TBR during the whole year. Severe hypoglycaemia and diabetic ketoacidosis were not observed.

Conclusions: Tandem Control-IQ and MiniMed 780 G systems lead to improved glycemic control in adolescent patients with T1D especially during the first 3 months after initiation of AHCL therapy. The comparison between the two evaluated systems in our study did not show significant diferences in all monitor parameters after 12 months from the start of the therapy.

P-166 | Reduced hypoglycaemia rates with the use of automated hybrid closed loop (AHCL) pump technology in a camp setting

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Introduction: Use of technology is increasing in camps. This requires appropriately trained staff, as per ADA guidelines, and may reduce risks for hypoglycaemia. Our 2022 camp included significant numbers of children using AHCL therapy allowing us to assess the impact of this technology at managing glycaemic control with consecutive days of exercise.

Objectives: To compare hypoglycaemia rates in children and adolescents using AHCL or standard pump therapy at camp.

Methods: Retrospective analysis of real world data: rates of hypoglycaemia for children and youth with T1DM using AHCL pumps compared with non-HCL pumps, and change in use of pumps and AHCL in the last 10 years. Hypoglycaemia was defined as glucose < 3.9mmol/L, confirmed with finger-stick. 49 children and adolescents with type 1 diabetes attended diabetes camp in Wellington, New Zealand: 30 children (8 – 13 years) and 19 adolescents (13 – 18 years). 38 of the 49 'campers' used insulin pumps, including 28 using AHCL; 1 Medtronic 780G with Smartguard (SG) and 27 Tandem with Control IQ (CIQ).
Non-HCL pumpers used either finger pricking, Libre, Dexcom, or Basal IQ (BIQ). Rates of technology were compared over the past 10 years.

Results: Pump use at camp has increased from 20% - 84% of children, and 24% - 73% of adolescents since 2012. AHCL was first used in 2022. 70 episodes of hypoglycaemia across the 5 days of camp for 28 of the 38 in participants using CSII: 37 out of 70 (0.74 episodes/person/day) in those not using without AHCL; 33 out of 70 (0.24 episodes/person/day) in those using AHCL, a significant reduction. This compares with previously published rate of 0.9 episodes/person/day (McTavish, L., & Wiltshire, E. (2011).

Conclusions: Technology use at camp has increased dramatically over 10 years, with AHCL most common at our most recent camp in 2022. This retrospective study of real-world data shows that this technology is safe in a camp setting, and can improve rates of hypoglycaemia.

P-167 | Simplified meal announcement with a three personalized presets of carbohydrates as alternative method to meal announcement with precise carbohydrate counting in adolescents with type 1 diabetes using the MiniMed 780G system

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Introduction: Only one third of people with diabetes feel they can estimate carbohydrates well and nearly half of them consider carbohydrate counting to be on the most burdensome aspect of their diabetes management. We search for new strategies to make meal management easier and to alleviate the burden of precise carb counting.

Objectives: To evaluate the system use and utilization to glycemic outcomes in adolescents with Type 1 Diabetes (T1D) using meal announcement with precise carbohydrate counting and presets of three carbohydrate amounts.

Methods: 34 participants (12-18 years) with T1D that initiated MiniMed 780G system were randomly assigned to the Fix group (simplified meal announcement by preset of 3 personalized fixed carbohydrate amounts) or the Flex group (precise carbohydrate counting). Glycemic outcomes (HbA1c, Time in Ranges), bolus distribution, system settings and utilization were analyzed after 12 weeks.
Results: TIR was 73.5±6.7% in the Fix and 80.3±7.4% in the Flex group (p=0.043), while HbA1c of 6.8±0.3% and 6.6±0.5 %, did not differ (p=0.168), respectively at the end of the study. Manual bolus amount was lower in the Fix group when compared to the Flex group (20.8±9.1 u/d vs 30.8±9.4 u/d, p=0.003) and the amount of insulin delivered by auto-correction was almost twice as high in the Fix group compared to the Flex group (17.9±8.6u/d vs 8.9±3.5 u/d, p=0.003).
No differences in sensor wear, automated mode, glucose target and active insulin time were found between the groups.

	Fix Group			Flex Group			Group Difference
	Baseline	*Study*	*P*	*Baseline*	*Study*	*P*	*P*
HbA1c, %	8.0±2.1	6.8±0.3	0.026	7.9±1.5	6.6±0.5	0.001	0.168
HbA1c, mmol/mol	64±26.2	51±3.3	0.026	63±18.6	49±5.5	0.001	0.168
Sensor glucose, mg/dL	174±26	147±23	0.002	168±29	145±18	0.005	0.804
CV, %	35.6±8.1	34.1±5.0	0.520	30.1±4.4	30.8±4.2	0.634	0.045
Time in Ranges							
<54 mg/dL	0.2±0.4	0.1±0.3	1.000	0.8±1.4	0.5±0.3	0.275	0.167
54-70 mg/dL	1.4±0.5	1.5±1.5	0.605	2.0±1.5	2.7±1.7	0.718	0.283
70-180 mg/dL	47.5±18.3	73.5±6.7	0.001	49.1±16.8	80.3±7.4	0.001	0.043
180-250 mg/dL	22.6±8.1	19.0±5.2	0.122	26.8±8.2	13.5±5.9	0.001	0.114
>250 mg/dL	28.3±15.9	5.7±3.6	0.001	21.3±11.8	3.0±2.4	0.001	0.012
TDD, u/kg/d	1.0±0.6	1.1±0.4	0.517	1.0±0.6	1.1±0.5	0.601	0.984
Bolus insulin, % of TDD	56	41	/	56	51	/	/
Auto correction, % of TDD	/	27	/	/	15	/	/
Basal insulin, % of TDD	44	31	/	44	34	/	/
Weight, kg	52.2±12.7	53.5±11.2	0.753	51.3±10.7	52.4±9.6	0.754	0.765
Meals, n per day	4.2±2.1	3.7±0.9	0.404	4.7±2.1	5.1±1.1	0.492	0.003
Carbs, gr per day	172±54	165±66	0.753	171±64	178±65	0.748	0.566
ICR, gr	11.2±1.2	5.8±1.6	0.001	11.5±2.2	6.0±1.3	0.001	0.619
System use and settings							
Sensor wear, %	/	94.2±8.2	/	/	94.8±9.9	/	0.695
AHCL usage, %	/	90.2±6.4	/	/	91.6±7.4	/	0.666
AHCL exits*	/	0.7±0.6	/	/	0.6±0.8	/	0.207
SMBG, n per day	/	0.7±0.4	/	/	0.5±0.3	/	0.338
Set change, n of days**	/	2.9±1.2	/	/	2.7±1.6	/	0.805
Res change, n of days**	/	2.5±0.9	/	/	2.3±1.1	/	0.451

Values are shown as mean±SD, unless otherwise specified; M, months; CV, Coefficient of Variation; Carbs, carbohydrates; ICR, Insulin to carb ratio; AHCL, Advanced Hybrid Closed Loop System; SMBG, Self-Monitoring Blood Glucose; Res, reservoir; *AHCL exits per patient per week; **6/15 from Fix Group and 8/17 use Extended Wear Infusion Set (7 days)

Table 1. Glycemic control, Carbohydrate announcement, insulin and system settings.

Conclusions: Adolescents on the MiniMed 780G system using simplified meal announcement can reach international targets of glycemic control. This method can be used as alternative approach in those adolescents challenged with precise carbohydrate counting with a minimal sacrifice of glycemic control compared to precise carbohydrate counting, which remain important for MiniMed 780G users.

P-168 | The use of AID systems improves glycemic control in adolescents with type 1 diabetes and attention deficit hyperactivity disorder – a single center case series

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Introduction: Children and adolescents with type 1 diabetes (T1D) and attention deficit hyperactivity disorder (ADHD) are known to have poorer glycemic control than children with T1D without ADHD.
Currently available automated insulin delivery (AID) systems have the potential to support adolescents with T1D and psychiatric comorbidities such as ADHD.
Objectives: The aim of this case series was to describe glycemic control before and after start of AID in youth with ADHD.
Methods: Children and adolescents with T1D and ADHD followed up at the UKBB who changed their insulin therapy to an automated insulin delivery (AID) system were identified. Demographics and glycemic parameters (mean HbA1c, mean percentage time spent between 3.9 and 10mmol/L (TIR) and mean percentage time spent < 3.9mmol/L (TBR)) one year before and one year after AID start were obtained from medical records and compared using a Wilcoxon rank sum test.
Results: Five adolescents (3 male and 2 female) with T1D and ADHD started on an AID system between February 2019 and February 2022. Median (range) diabetes duration was 1.1 years (0.8-14.4 years), median age at AID start 13.6 years (11.0-16.6). Median (range) TIR increased from 45.5% (33.8-59,6) to 71% (45.3-76.7), p=0.043, while TBR did not significantly change 2.8% (1.3-11.3) vs 2.3% (1.5-5.3), p= 0.225. All adolescents except one showed a trend towards lower HbA1c values, median HbA1c was 7.9% (6.9-8.9) before vs. 7.5% (6.5-9.4) after AID start, p=0.5. No episodes of diabetic ketoacidosis (DKA) or severe hypoglycemia (SH) occurred during the two-year follow-up period.
Conclusions: This case series illustrates that AID can facilitate diabetes management in adolescents with T1D and ADHD. It points towards improved glycemic control and less time in hypoglycemia without an

event of DKA or SH. These observational findings warrant verification in a larger cohort with longer follow-up and comparison between children and adolescents with T1D and ADHD with and without AID.

P-169 | Benefits of a second-generation AID systems over the first-generation in real-world settings: a one-year comparative study

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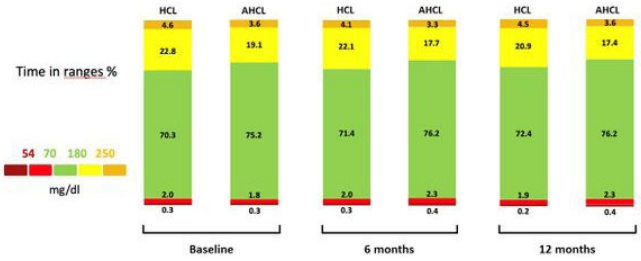
Introduction: Recently, a second-generation automated insulin delivery (AID) system has been developed that adds to the first-generation several enhancements, such as automatic correction boluses and individualized different target set points.
Objectives: The aim of this monocentric observational study was to assess the real-world performance of first- and second-generation AID systems in a cohort of children and adolescents with type 1 diabetes over a one-year follow-up.
Methods: Demographic, anamnestic, and clinical data of the study cohort were collected at the start of automatic mode. Data on continuous glucose monitoring metrics, system settings, insulin requirements, and anthropometric parameters at three different time points (baseline, 6 months, 12 months) were retrospectively gathered and statistically analyzed.
Results: Fifty-four individuals (55.6% of females) aged 7-18 years switching to AID therapy were included in the analysis.
Two weeks after starting automatic mode, subjects using advanced hybrid closed-loop (AHCL) showed a better response than hybrid closed-loop (HCL) users in terms of time in range (p = 0.016), time above range 180-250 mg/dl (p = 0.022), sensor mean glucose (p = 0.047), and glycemia risk index (p = 0.012). After 12 months, AHCL group maintained better mean sensor glucose (p = 0.021) and glucose management indicator (p = 0.027).
Noteworthy, both HCL and AHCL users achieved the recommended clinical targets over the entire study period (Figure 1).
The second-generation AID system registered longer time spent with automatic mode activated and fewer shifts to manual mode at every time point (p < 0.001).



Conclusions: Both systems showed sustained and successful glycemic outcomes in the first year of use. However, AHCL users achieved tighter glycemic targets, without an increase of hypoglycemia risk. Improved usability of the device may also have contributed to optimal glycemic outcomes by ensuring better continuity of the automatic mode activation.

P-170 | Rapid improvement of glycemic control in children and adolescents with type 1 diabetes mellitus, after transitioning from multiple dose injections to advanced hybrid closed loop

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Introduction: Recent studies have shown that Advanced Hybrid Closed Loop (AHCL) insulin delivery system offers better glycemic control to children with Type 1 Diabetes Mellitus (T1DM). AHCL system is the only one offered to date in Greece and has just recently being reimbursed.
Objectives: In this retrospective study we compared Continuous Glucose Monitoring (CGM) metrics (Time in range- TIR, Time below range- TBR, Glucose Management Indicator- GMI and mean glucose) of children with T1DM (diagnosed over 1 year before), followed at our Diabetes Center, ranged 3 months before (when on MDI and Flash Glucose Monitoring-FGM) and 3 months after transitioning to AHCL "auto-mode" function.
Methods: 12 children with T1DM (mean age 13.59 years, mean diabetes duration 3.65 years), previously treated with MDI, using FGM for at least 6 months, without diabetes complications, were enrolled in our study. There was an open-loop phase between MDI

and AHCL phase (mean duration 33.92 days). Reliable FGM and CGM data (sensor use >70%) were reported as well as episodes of severe hypoglycemia (SH) and diabetic ketoacidosis (DKA).

Results: There was a statistically significant decrease in GMI (7.47% in MDI/FGM vs 6.78% in AHCL phase, p< 0.002) and mean glucose (174,92mg/dl to 144,75mg/dl respectively, p< 0.001), and a statistically significant increase in TIR (55.03% to 75.42% respectively, p< 0,001). TBR decreased from 4% to 2.42% respectively (p< 0.05). One adolescent had an episode of SH in MDI as well as in AHCL phase (in manual mode due to CGM failure) and the same adolescent experienced 1 mild DKA episode in open-loop phase (due to catheter failure).

Conclusions: Preliminary data after AHCL reimbursement in Greece, show in our Center, that children with T1DM achieved rapid improvement in their glycemic control three months after initiating the AHCL system, compared to previous treatment with MDI. This finding encourages health care professionals to transition pump- naive children with T1DM to this new therapeutic modality.

P-171 | Sleep quality of parents of children with type 1 diabetes in the era of advanced hybrid closed loop systems for insulin delivery

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Introduction: Overnight control has always been challenging for parents of children with type 1 diabetes (T1D). The fear of hypoglycaemia and the need of correcting hyperglycaemic peaks can affect the quality of sleep (QoS). Some studies on Advanced hybrid closed loop (AHCL) technology showed effectiveness in improving QoS in parents and caregivers. However, the number of participants involved was often low or QoS was compared before and after the AHCL use

Objectives: This is a large crosssectional study on the QoS of a cohort of parents of children with T1D, comparing the type of insulin delivery.

Methods: Parents were asked to fullfill a questionnaire for the Pittsburgh Sleep Quality Index (PSQI). Data about metabolic control (HbA1c and CGM metrics) and insulin treatment were collected.

Results: 128 families reply to the questionnaire. As a whole group, mean age of children was 12.7±3.3, mean age at T1D onset 6.1±3.8, mean PSQI 6.3±4.2 and mean HbA1c 6.96±0.9. 48% of parents reported trouble sleeping because of diabetes management related issues. 24.6% reported a fairly/very bad sleep quality and 26.6% revealed problems to keep up enough enthusiasm to get things done.

Subdividing for insulin delivery treatment: Group 1 (Patch pump+ CGM), Group 2 (MDI+CGM), Group 3 (AHCL).

	Group 1 (n.23)	Group 2 (n.41)	Group 3 (n.64)	p value
PQSI	6.6±4.9	6.0±4.7	5.8±3.6	ns
trouble sleeping because of diabetes management related issues	52.1%	68.4%°	39.0%°	p°=0.001
fairly/very bad sleep quality	34.7%*	21.9%	15%*	p*=0.001

Subdividing for HbA1c, Group A (HbA1c ≤7%, n.72 pts) vs Group B (HbA1c >7%, n. 56): mean TIR 70% vs 48% (p<0.001), TAR 26% vs 55% (p<0.001), TBR 3% vs 1.3% (ns), CV 34% vs 36% (ns), PSQI 5.39±3.9 vs 7.24±4.4 (p=0.006).

Among Group A, 20% belonged to group 1, 28% to group 2 and 52% to group 3 (p=0.0001).

Conclusions: Although advances in technology, parents of children with diabetes often have poor QoS. However, parents of children on AHCL insulin delivery have less problems in sleeping related to diabetes management issues and a better perception of their quality of sleep. In fact, good metabolic control is strongly associated with better PSQI and with the use of AHCL devices.

P-172 | Outcomes on glycaemic metrics and sleep during an 18 months controlled study in children with type 1 diabetes including an Automated Insulin Delivery system, MDI, and CSII – all used along with Dexcom CGM

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Introduction: Long-term results using AID systems is rare.
Objectives: We evaluated the long-term effect on glycemic metrics and sleep by comparing an AID system with MDI- and CSII treatment when all these insulin administration alternatives were supplemented by the same CGM system.
Methods: An observational study was conducted. Inclusion required the use of Dexcom G6 rtCGM for glucose monitoring. The choice of insulin administration was made based on individual preferences.
Three separate groups were created: Tandem Control IQ (CIQ), MDI, and CSII. Glycaemic metrics were collected and comparisons were made at the start, 6, 12 and 18 months.
Parent sleep quality and quantity during the previous week were assessed using a 10-point Likert scale questionnaire.
The number of hours they and their child experienced during the previous week was calculated and self-reported by the parents.
Results: Eighty-four T1D children/adolescents were included (CIQ, n=37; MDI+rtCGM, n=19; CSII+rtCGM, n=28). CIQ users achieved significantly greater %TIR and %TIT throughout the observation period. In parents, a better quality of sleep was noted with the use of CIQ compared with MDI+rtCGM users, mean difference -2.97, p=0.000, and CSII+rtCGM users, mean difference -2.39, p=0.03.
A larger quantity of sleep hours per day was also noted in parents with the use of CIQ compared with MDI+rtCGM users, mean difference -2.69 hrs/day, p=0.000, and CSII+rtCGM users, mean difference -2.39 hrs/day, p=0.001.
Parents of CIQ users also reported that their child experienced more sleep hours per day (8.9±1.1 hrs/day) compared with MDI+rtCGM users (7.3±1.2 hrs/day, mean difference -1.64 hrs/day, p=0.003, but not significantly more hours than CSII+rtCGM users (7.9±1.7 hrs/day, mean difference -1.02, p=0.076.

Glycaemic metrics	Time (months)	Tandem Control IQ	CSII + rtCGM	MDI + rtCGM
TIR >70%	3 - 18	81.7%	44.0%	30.1%
TIT >50%	3 - 18	78.0%	45.9%	26.8%

Odds ratio reaching TIR>70%;

- 1.9 times higher probability to reach TIR>70% when Tandem Control IQ is compared with CSII and rtCGM
- 2.7 times higher probability to reach TIR>70% when Tandem Control IQ is compared with MDI and rtCGM

Odds ratio reaching TIT>50%;

- 1.7 times higher probability to reach TIR>70% when Tandem Control IQ is compared with CSII and rtCGM
- 2.9 times higher probability to reach TIR>70% when Tandem Control IQ is compared with MDI and rtCGM

Figure. Proportion of individuals reaching clinical targets at 3-18 months.

Conclusions: We demonstrate significant benefits in glucose control in T1D children and improved sleep for both parents and T1D children/adolescents with the use of Tandem Control IQ.

P-255 | Safety and performance of the MiniMedTM 780G advanced hybrid closed-loop system in children, adolescents and adults with type 1 diabetes in Egypt

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Introduction: Advanced Hybrid Closed Loop (AHCL) systems includes an algorithm that provides both automated basal rate and correction boluses to keep glycemic values in a target range.
Objectives: To evaluate the real-world performance of the MiniMed™ 780G system among different age groups of Egyptian patients with type 1 diabetes mellitus (T1DM).
Methods: Data uploaded by T1DM patients living in Egypt were aggregated and analyzed. The mean glucose management indicator (GMI), percentage of time spent within glycemic ranges; TIR, time below range (TBR) and time above range (TAR), system use and insulin consumed in users after initial Auto Mode start were determined.
Results: One-hundred seven 780G™ AHCL system users were enrolled; 62 (58%) were males. Their median age was 16 years (range 3-71 years). Six months after initiating Auto Mode, patients spent a mean of 85.31% of the time in Auto Mode (SmartGuard) and achieved a mean GMI of 6.95 ± 0.58%, TIR 81.54 ± 8.43%, TBR <70 mg/dL 2.19 ± 1.11% and TAR 180–250 mg/dL 13.17 ± 6.15%.

When compared with pre-Auto Mode initiation, GMI was reduced and TIR increased ($p<0.05$ for both). After initiating AHCL, TIR was greater in adults and children compared with adolescents (83.86 ± 9.24% and 82.29 ± 7.22% versus 78.4 ± 7.34%, respectively; $p< 0.05$). The total daily dose of insulin was increased in all age groups primarily due to increased system-initiated insulin delivery including basal and auto correction boluses.

Conclusions: Most MiniMed™ 780G system users across different age groups achieved international consensus-recommended glycemic control while minimizing hypoglycemia, in a real-world environment with no serious adverse effects even in a challenging age group as children and adolescents.

P-271 | Improved HbA1c in a northern english town using hybrid closed loop system

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Introduction: Wigan is an ex coal mining town in Northern England that has gone through de-industrialisation. Public health profiles are poor. The diabetes unit had been flagged by the National Paediatric Diabetes Audit (NPDA) as being a negative outlier for mean HBA1C.

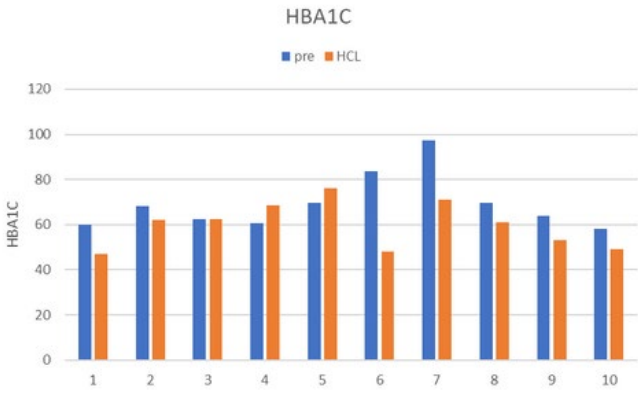
The unit engaged in a quality improvement project to help improve outcomes, As part of this project we sought to develop the use of hybrid closed loop (HCL) systems amongst our patients with the aim of reducing HBA1C

Objectives: Our objectives were to demonstrate a reduction in HBA1C in a safe manner without significant side effects.

Methods: The staff offered a hybrid closed loop(HCL) system to patients(Medtronic 780). All patients were trained to carbohydrate count and were educated about the use of a closed loop system. HBA1C for up to 12 months before and after changing to hybrid closed loop was recorded. Diabetes related admissions and significant hypoglycaemia were also documented.

Results: 13 patients aged 9 to 17 were changed to hybrid closed loop systems (7 male and 6 female) from August 2021 to date. 7 patients were already on pumps and 6 were using multiple injections. One patient was commenced on HCL straight after diagnosis, and two patients were only very recently commenced on HCL. That left 10 patients; 8 showed an improvement in their HBA1c. The average HBA1C prior to HCL was 69.4 mmol and after HCL 59.8 mmol. None of the 13 patients has had a significant hypoglycaemic episode or a diabetes related admission. No patient asked to discontinue their HCL.

The overall clinic mean case adjusted HBA1C has improved to 66.2 mmol and we are no longer an NPDA outlier.



Conclusions: Our results indicate that HCL is safe and well tolerated in a district setting. There is significant improvement in HBA1C.

We note that most of the patients were adolescent and our personal experience is that several of these teenagers were quite disaffected with diabetes - yet they have done (surprisingly?)well with HCL.

P-296 | A clinical evaluation of insulin pump systems including a hybrid closed loop (HCL) system in children and young people (CYP) of different age groups with type 1 diabetes (T1D) in the Noah's ark Children's Hospital for Wales

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Introduction: As per the current National Paediatric Diabetes Audit report, there is an increase in use of diabetes technologies associated with lower HbA1c. Use of closed loop systems are associated with the best HbA1c outcomes.

National recommendation is that CYP should be offered a choice of diabetes technology that is appropriate for their individual needs and made aware of

differences in outcome with different modalities of insulin delivery and blood glucose monitoring.
Our CYP are on various pump and CGM systems, including the MiniMed 640 system in children between 1-7 years of age and the HCL MiniMed 780G in CYP >7 years of age.
Objectives: To evaluate the effectiveness of both the MiniMed systems on HbA1c, sensor derived glucose time-in range (TIR), hypoglycaemia, skin reactions, Quality of Life (QoL) in CYP in our service.
Methods: We did retrospective analysis of our database, carelink download and the HbA1c pre and post pump introduction of CYP on the MiniMed systems. We conducted a survey asking questions on QoL using the Likert scale, sensor use, time in hypoglycaemia, fear of hypoglycaemia and frequency of skin reactions.
Results: We have 18 children on the MiniMed 640G, 1-7years of age and 19 CYP on the 780G, 7-17 years of age. In most CYP, HbA1c decreased following either system use, with the greatest reduction seen in CYP who were in smart guard mode greater than 50% of the time. All CYP/carers on the 780G agree/strongly agree that using the HCL system reduced their fear of severe hypoglycaemia, compared to 93% of carers of those on 640G. 77% of children on 640G experienced adverse skin reactions compared to 54% on the 780G.
Conclusions: The hybrid closed loop systems have potential to improve outcomes and quality of life in CYP with T1D as evidenced within our patient cohort. Further analysis of TIR, comparison of other HCL pump systems, education on improved sensor use and skin integrity management is planned within our service.

P-312 | Improved glycemic control in children and adolescents with type 1 diabetes mellitus treated with advanced hybrid closed loop pump therapy

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Introduction: To date, several advanced hybrid closed loop (AHCL) systems are available in the treatment of patients with type 1 diabetes mellitus (DM1)
Objectives: The aim of our study was to examine whether AHCL pump therapy leads to better glycemic control in children and adolescents with DM1 in routine clinical practice during 12 months of follow up.
Methods: This retrospective cohort study includes all children and adolescents who started AHCL treatment between 2020 and 2022 at a single-center pediatric outpatient clinic. Data on patient characteristics and glycemic control at start and during 12 months of follow up was collected from the medical files. Primary outcome was glycemic control measured by HbA1c, time in range (TIR), time below range (TBR) and time above range (TAR).
Results: A total of 122 children, median age 14 years (range 3-21 years), 50% boys, were eligible for analysis. Median duration of DM1 before start AHCL therapy was 5.2 years. Before the start of AHCL, 46% of patients were treated with multiple daily insulin injections (MDII). After 3 months of AHCL therapy, median HbA1c had dropped from 65 mmol/mol at start to 55 mmol/mol. This improvement remained preserved during follow up (median follow up time 12 months). Comparable results were found for improvement in glucose management indicator (GMI) 62 to 54%, TIR 47 to 69% and TAR 51 to 29%. TBR did not change with AHCL therapy (median 1%). After 3 months of AHCL treatment, 40% of patients reached the target criteria of HbA1c <53 mmol/mol compared to 11% of patients at start of AHCL treatment.
Conclusions: In routine clinical practice, AHCL therapy improves glycemic control in children and adolescents with type 1 DM importantly. This effect remains preserved during follow up of 12 months.

P-320 | Is hybrid closed loop (HCL) Insulin delivery system the holy grail of future diabetes management in children and young people (CYP) With T1D?

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Introduction: Hybrid closed loop (HCL) insulin delivery system helps in the management of diabetes with greater flexibility. It is particularly helpful in preschool children with erratic and unpredictable eating behaviour. The fear of hypoglycaemia continues to impact on the quality of life of parents and also

young people with T1D. HCL improves overall glycaemic control and reduces the incidence of long term diabetes related complications.

Objectives: To assess the impact of HCL insulin delivery system on overall glycaemic control in CYP with T1D.

Methods: A retrospective analysis of all current HCL users in a district general hospital was carried out (2020-2023). All the data were collected form Twinkle online diabetes data base.

We collected data on the type of HCL, BMI SDS, HbA1c, Glycaemic control (TIR, TBR, TAR) at the time of starting HCL. These parameters were compared to latest follow up time point. Follow up period on HCL was calculated.

Paired T test was used to calculate the statistical differences between these two time points.

Results: A total of 45/95 (47%, M=21) were on pump therapy among which 17/45 (38%, M-8) were using HCL. Of this 13/17 (M-6) were using licensed HCL and 4/17 (M-2) were using DIY HCL. All HCL users were using Dexcom G6 for CGM.

The mean follow up period was **1.6 years (Range 0.1-3.2)**

	At start of HCL	Latest F/U point
Age in years	9.9 (2.1-14.2)	11.5 (2.6-15.8)
BMI SDS	-0.01 (-1.19 to +1.97)	0.09 (-1.11 to +1.82)
HbA1c in mmol/mol	54 (42-72)	52.1 (39-61)
Time in range (4-10mmol/l)	64 (40-78)	64 (49-78)
Time below Range (<4 mmol/l)	2.8 (0-9)	2.3 (0-6)
Time above range (>10mmol/l)	33 (19-58)	34 (19-51)

The Paired T-test results were not statistically significant.

Table. Results shows mean (range).

Outcomes

1. The mean HbA1c showed 2 mmol/mol improvement at last F/U point (not statistically significant).
2. HCL use has helped in maintaining the BMI SDS.
3. Parents reported better Quality of life for their children and less fear of hypoglycaemia.

Limitation:

Follow up period and small numbers

Conclusions:

1. HCL certainly simplifies diabetes management and offers greater flexibility with insulin administration.
2. Sustainable glycaemic improvements were evident in our cohort.
3. HCL is undoubtedly the Holy Grail for management of T1D at present until we have a major breakthrough. Liberal funding options are crucial for long term HCL therapy.

P-347 | What is the percentage of children and adolescents with diabetes able to reach the TTIR range using an AHCL (780G)?

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Introduction: The TTIR (time between 70 and 140 mg/dl) represent the new frontier in the treatment of type 1 diabetes in children and adolescents. TTIR is important for two main reasons: TTIR in normal humans in >95% and the TIR (70-140) could be not enough in the prevention of future cardiovascular events.

Objectives: The study have the aim to verify how is the percentage of children wearing a medtronic 780G in the real world able to reach the TTIR.

Methods: we evaluate the downloads in the Carelink databases of 44 patients followed in our Centre at San Raffaele Hospital in Milan and we measured the percentage of these childrens in TTIR

Results: The percentage of our patients in 780G in TTIR is 60%.

Conclusions: Today with an AHCL (780G) is possible to reach the TTIR (70-140 mg/dl) in more than half of patients. It is important for the future of our children with diabetes be able to reach this target in a higher percentage of patients and the doctor schould not benot satisfied reaching a good TIR, and continue to working to reach a better result. This is dome by continuing to work on details, in particularly on time of bolus, bolus omitted, carbohydrate to insulin ratio and non hypercorrection of low glucose value.

P-354 | The individualization of treatment with CamAPS Fx in patient with Asperger's syndrome – case report

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Introduction: The coexistence of type 1 diabetes (T1D) and Asperger's syndrome remains a challenge in the treatment of diabetes

Objectives: CamAPS FX use in T1D boy and Asperger's syndrome

Methods: Due to prandial and correction boluses omissions switching to HCL was proposed

Results: 16 years old boy with Asperger's syndrome diagnosed with T1D on October 20, 2021, was treated with CSII and Dexcom G6. Despite repeated diabetes and dietary education, due to Asperger's syndrome and lack of cooperation the prandial boluses and correction boluses were not given. Therefore, the diabetes was uncontrolled: Mean Sensor Glucose 226 mg/dL, GMI 8.7%, CV 24.3%, TIR 20%, HbA1c 8.1%. Alternative HCL (hybrid close loop) therapy (CamAPS Fx) was introduced.

The patient was instructed to turn on Boost when eating. 3 weeks after switching to the HCL, the control of diabetes improved: Mean Sensor Glucose 153 mg/dl, GMI 7%, CV 28.75%, TIR 74%. The prandial boluses were still overlooked, but the Boost function was used

Conclusions: The HCL system significantly improved the glycemic control in youth with type 1 diabetes and Asperger's syndrome despite prandial boluses omission.

P-355 | The use of advanced hybrid closed-loop during strumectomy in T1D patients - 2 case reports

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Introduction: Due to a dynamic development of technology there is a growing population of patients using AHCL, which automatically adjusts delivery of insulin. That being said, meeting such patients in perioperative period is becoming more likely.

Objectives: The aim of this study was to present two T1D cases undergoing strumectomy using AHCL during perioperative period according to a procedure designed in cooperation by diabetology, anesthesiology and operating teams.

Methods: 2 patients: a 12- and 33-years old females using AHCL were admitted to the hospital to undergo an elective strumectomy due to a diagnosis of Graves' disease and papillary thyroid cancer. Two weeks prior to the surgeries good glucose metrics were observed in both patients. In agreement with anesthesiology and operating teams it has been decided to continue AHCL during surgery. We activated a temporary target of 150 mg/dL at 3:00 a.m the night before surgery and patients received intravenous hydration during perioperative period.

Results: Using an AHCL system enabled the safe and correct performance of strumectomy on patients with T1D, while maintaining stable and proper glycemic control. We observed some CGM sensor disruption in one case, probably caused by placing it too close to an operation field.

Conclusions: We believe that there is a need for unified, precise guidelines concerning the use of AHCL during a perioperative period.

P-375 | Youth in the United States using an advanced hybrid closed loop (AHCL) achieve better glycemic outcomes than historical T1Dx registry participants

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Introduction: Children and adolescents with type 1 diabetes, on average, do not meet glycemic targets in the United States. The last comprehensive evaluation of average A1c across the T1D Exchange Clinic Registry was from a 2018 cohort, with reported data showing the median A1c ranging from 8.1% at 5 years old to 9.3% in late adolescents.

Objectives: Our objective was to compare the average Glucose Management Indicator (GMI, a CGM-derived glucose metric approximating A1c) of children and youth with type 1 diabetes using the t:slim X2 insulin pump with Control-IQ technology, an advanced hybrid closed loop (AHCL) for 2 years with the averages published by the T1D Exchange Registry.

Methods: We retrospectively analyzed data from youth using the AHCL for >24 months in the Tandem customer database in April 2023. The GMI was calculated at 24 months of AHCL use for every by year of age for the last quarter of use and compared with HbA1c data from the T1Dx registry.

Results: Data from 2015 children ages 6-12 years (52% female) and 3,396 adolescents ages 13-17 (48% female) were analyzed.

Time in automation was >90% at all time points for all ages. In all age groups, GMI improved significantly from baseline to 24 months of AHCL use (7.8% to 7.55% in children, and 7.8% to 7.46% in adolescents, p<0.001). Across every year of age, GMI levels were markedly lower than the HbA1c medians reported by the T1D Exchange Registry.

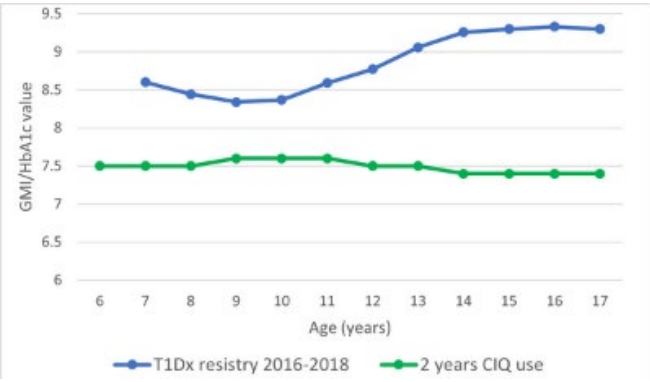

Figure.

Conclusions: Control-IQ use in children and adolescents results in lower GMI than the nationally published averages of A1c from the T1D Exchange Registry.

P-376 | Real-world reduction in adverse events in youth with one year use of advanced hybrid closed loop

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Introduction: Severe hypoglycemia (SH) and diabetic ketoacidosis (DKA) remain significant risks with intensive insulin therapy. While these adverse events (AE) rates are generally very low in advanced hybrid closed-loop (AHCL) clinical studies, prospectively collected real-world use AE rates are lacking, particularly in the pediatric population.

Objectives: To prospectively investigate rates of SH and DKA in pediatric users of the t:slim X2 insulin pump with Control-IQ technology, an AHCL system.

Methods: The Control-IQ Observational (CLIO) study was a single-arm, prospective, longitudinal, post-market surveillance study of pediatric individuals with type 1 diabetes age 6 and above who began use of the AHCL in the real-world outpatient setting and were then followed for 12 months. AE rates were reported monthly and were compared to historical data. Patient reported outcomes (PRO) were assessed quarterly. All study visits were virtual.

Results: 931 youth participants had adequate data for analysis, with 919 participants completing through 12 months. SH rates were significantly lower than historic rates for children (9.31 vs 19.31 events/100 patient years, d=0.29, p<0.01). DKA rates were also significantly lower at 1.93 vs 12.81 events/100 patient years, d=0.79, p<0.01. The reduction in AEs occurred independent of baseline hemoglobin A1c or prior insulin delivery method.

Time below 70 mg/dl was 1.0% (0.5-1.9) in ages 14-17 years and 1.1% (0.6-2.2) in youth ages 6-13. Reduction in diabetes burden was consistently reported via PROs.

Conclusions: SH and DKA rates were lower for pediatric users of AHCL compared to historical data for youth and adolescents over 12 months of use. Real-world use of this AHCL system proved safe and effective in this virtual study design.

P-384 | Glycemic outcomes of MiniMedTM 780G advanced hybrid closed-loop technology use in children from India

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Introduction: Type 1 diabetes mellitus (T1DM) is the most common form of diabetes in children and adolescents in most countries. India has the highest population of children with T1D in the world (Magliano DJ et al. IDF Diabetes Atlas [Internet] 10th edition. Brussels, Belgium. *International Diabetes Federation*; 2021). Developing countries such as India face a multitude of challenges that include unequal access to appropriate healthcare (e.g., T1DM educators and dieticians) and specialist referral systems; a large burden of patients; and variable levels of diabetes education among patients and their families.

Objectives: The objective of this study was to assess the impact of the MiniMed™ 780G system on achieving recommended glycemic outcomes (de Bock M et al. *Pediatr Diabetes.* 2022;23[8]:1270-1276) in children 15 years of age or younger.

Methods: Data of assented children (N=160, aged ≤15 years) with T1DM, from India, who used the MiniMed™ 780G system and uploaded data from January 2022 to May 2023, were aggregated and retrospectively analyzed. For users with ≥10 days of sensor glucose (SG) data after initiating the system, mean SG, glucose variability, glucose management indicator (GMI) and the percentage of time spent within (TIR), below (TBR) and above (TAR) target glycemic ranges were determined. The percentages of users with GMI <7% and TIR >70% were also evaluated.

Results: The percentage of time in AHCL control and aggregated CGM-derived glycemic data for the 24-hour day, daytime and nighttime periods are shown (Table).

Conclusions: Real-world MiniMedTM 780G system use by children with T1DM, from India, allowed a mean TIR of 71%, in accordance with international consensus goals, and more than half to achieve a GMI of <7.0% and TIR of >70%.

Table 1. Overall outcomes of MiniMed™ 780G system users ≤15 years of age with T1D, from India.

Users, n	160
24-hour day	
AHCL control, %	88.8 ± 17.6
Mean SG, mg/dL (mmol/L)	151.0 ± 17.7 (8.4 ± 1.0)
SD of SG, mg/dL (mmol/L)	54.2 ± 10.7 (3.0 ± 0.6)
CV of SG, %	35.7 ± 5.0
GMI, %	6.9 ± 0.4
Users with GMI <7%, %	57.5
Users with TIR >70%, %	53.1
Percentage of time at SG ranges	
<54 mg/dL (3.0 mmol/L)	0.6 ± 0.7
<70 mg/dL (3.9 mmol/L)	2.7 ± 2.2
70-180 mg/dL (3.9-10 mmol/L)	71.0 ± 11.2
>180 mg/dL (10.0 mmol/L)	26.4 ± 11.6
>250 mg/dL (13.9 mmol/L)	6.3 ± 5.2
Day time (6AM-12AM) percentage of time at SG ranges	
<54 mg/dL (3.0 mmol/L)	0.7 ± 0.8
<70 mg/dL (3.9 mmol/L)	2.7 ± 2.3
70-180 mg/dL (3.9-10 mmol/L)	68.2 ± 11.9
>180 mg/dL (10.0 mmol/L)	29.2 ± 12.5
>250 mg/dL (13.9 mmol/L)	7.2 ± 5.8
Night time (12AM-6AM) percentage of time at SG ranges	
<54 mg/dL (3.0 mmol/L)	0.6 ± 0.6
<70 mg/dL (3.9 mmol/L)	2.6 ± 2.4
70-180 mg/dL (3.9-10 mmol/L)	79.2 ± 11.9
>180 mg/dL (10.0 mmol/L)	18.2 ± 12.1
>250 mg/dL (13.9 mmol/L)	3.7 ± 4.5

Data are shown as mean or mean±SD.
SG, sensor glucose; SD, standard deviation; CV, coefficient of variation of SG; GMI, glucose management indicator.

P-002 | Utility of artificial intelligence in assessing bone age and bone health in indian children and youth with type 1 diabetes mellitus

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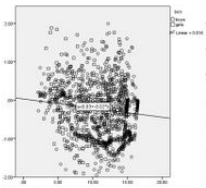
Introduction: Artificial intelligence is playing an increasing role in assessment of paediatric musculoskeletal system and for bone age (BA) assessment. BoneXpert (BX) is one such automated method for BA which also performs digital radiogrammetry and computes the metacarpal index (MCI) and bone health index (BHI). Its utility in subjects with type-1 diabetes (T1D) has not been widely reported.

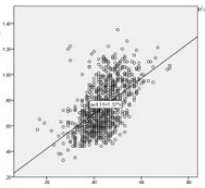
Objectives: To study the utility of BX in the assessment of BA in Indian children and youth (CY) with T1D and to assess association of MCI and BHI (measured by BX) and bone health in Indian CY with T1D.

Methods: The MCI, BHI and BA were assessed retrospectively in 1272 subjects with T1D using digitalised left-hand x-rays. The demographic, anthropometric, clinical, dietary, biochemistry, dual x-ray absorptiometry (DXA) data and peripheral quantitative computed tomography (pQCT) at tibia and radius data that were performed using standard protocols were extracted from hospital records.

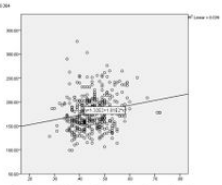
Results: The root mean square error of BX with respect to reference and true bone age by Tanner Whitehouse-3 (TW-3) method were estimated to be 0.72 years and 0.67 years respectively in Indian CY with T1D as shown in figure. The BX provided MCI results were in concordance with the DXA derived bone mineral density and pQCT derived cortical density measurements; MCI correlated with trabecular density at the tibia as shown in figure. More than half the subjects with T1D had significantly decreased MCI. Height, tanner stage, vitamin D concentrations showed positive correlation while HbA1c and disease duration had negative correlation with MCI.



Bland Altman plot of manual reference rating and BoneXpert by TW3 method



Scatter plot showing correlation between Metacarpal index (MCI, derived by BoneXpert) and Bone density at lumbar spine by DXA (L1-L4 BMD)



Scatter plot showing correlation between MCI and trabecular density at tibia (4%) on pQCT

Conclusions: Artificial intelligence tools like BX may be used for accurate assessment of BA and for screening for bone strength in Indian CY with T1D which may be helpful in reducing fracture risk and improving bone health.

P-021 | Missed correction opportunities identified in pediatric users of a smart insulin pen (SIP) plus continuous glucose monitoring: impact on glycemia and potential for actionable reminders

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Introduction: An important feature of the InPen SIP is its ability to track active insulin, enabling opportunities to safely calculate correction doses any time after a bolus. Analysis of sensor data indicates that less than half of sensor alerts are actionable (a correction dose can be safely delivered). Alerts without an associated action may drive alert fatigue and insulin stacking risk.

Objectives: Identify missed correction opportunities and investigate the relationship of their duration to glycemia in pediatric SIP+CGM users.

Methods: A retrospective cohort analysis was performed using deidentified sensor glucose (SG) data from N=1,090 individuals aged 0-17 years, during the latest 14 days of use in the 60th-90th day period after starting InPen, January 2020-December 2021.

The average amount of time with missed correction opportunities was calculated. Missed correction opportunities were defined as elevated SG values that also required a correction dose of insulin to return glucose to target (adjusted for active insulin); and was calculated using personalized therapy settings (180 mg/dL-Glucose Target)/Insulin Sensitivity Factor; minimum of 0.5 units. *Pearson's r* was used to evaluate the correlation between missed correction opportunities and time spent in different ranges.

Results: Users in the analysis averaged 6.0±4.2 hours of missed correction opportunities per day. The duration of the missed correction opportunities per day showed strong correlation with TIR (r=0.82, p<0.0001) and TAR (r=0.84, p<0.0001) but not with TBR (r=0.23, p<0.0001).

Conclusions: Missed, safe correction dose opportunities occur in children with T1D and their duration is associated with poorer glycemia. Having access to this information may lead to robust, data-informed conversations between HCP's and patients on how to improve glycemia.

Future research is needed to provide real-time decision support so that users understand when and how much to correct an elevated SG based on active insulin data while limiting non-actionable SG alerts.

P-022 | Low socioeconomic backgrounds are associated with reduced engagement with remote patient monitoring via patient portals in youth with type 1 diabetes and their families

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Introduction: Asynchronous remote patient monitoring (RPM) support for youth with type 1 diabetes (T1D) wearing continuous glucose monitors (CGMs) allows for increased contact between the healthcare team and the youth or their parents to support technology use and frequent insulin dose adjustments. Stanford has two clinical studies evaluating the use of CGM and RPM with a patient portal to support youth with T1D.

The 4T Study supports youth during the first year of T1D diagnosis, whereas the CGM Time in Range Program (TIPS) supports youth with established T1D and public insurance. Prior studies suggest patient portals are not an effective modality for communication with youth and families from lower socioeconomic status (SES).

Objectives: We hypothesized that engagement with a patient portal for RPM would be negatively associated with ethnic minority backgrounds and public insurance (a marker of low SES in the US).

Methods: Patient demographics and message read receipts from the patient portal were obtained from the medical records. Messages unrelated to RPM were excluded. Timely review of provider messages was defined as reading the message within 7 days.

Results: Participants in TIPS had lower read rates compared to participants in the 4T Study (58.5% vs 81.3%). Read rates were lower in non-English speakers compared to English speakers (75.1% vs 82.0% in 4T Study and 54.4% vs 60.0% in TIPS). Within the 4T study, read rates were lower with public insurance status compared with private insurance status (78.9% vs 82.2%). In both groups, read rates declined similarly over time (Table).

Conclusions: Many families do not engage with patient portal RPM. Engagement was negatively associated with ethnic minority backgrounds and longer duration of T1D diagnosis, but only weakly negatively associated with public insurance status. We need to explore alternative communication methods that are suitable to families of lower SES to promote equity in diabetes care.

Patient Characteristics	4T Study	CGM TIPS
All	81.3% (n=3,483)	58.5% (n=673)
Primary Language		
English	82.0% (n=3,085)	60.0% (n=491)
Non-English	75.1% (n=398)	54.4% (n=182)
Insurance status		
Public insurance	78.9% (n=976)	57.8% (n=638)
Private insurance	82.2% (n=2,507)	Not applicable
Month of Study Enrollment		
1st month	92.1% (n=240)	63.2% (n=57)
12th month	77.2% (n=114)	46.9% (n=32)

Table. Proportions of RPM messages read within 7 days across study populations and patient subsets.

Differences in proportions between study populations are statistically significant ($p<0.001$) for each row.

P-023 | 4T Study: CDCES experience

K. Rochford[1], F. Bishop[2], A. Chmielewski[3], B. Conrad[3], E. Fox[4], C. Guestrin[5], D. Maahs[2], J. Leverenz[3], K. Opsahl-Ong[5], P. Prahalad[2], P. Sagan[3], D. Scheinker[2], D. Zeherveia[2], C. Carter[6]
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Introduction: The 4T study initiates CGM in youth with T1D within a month of diagnosis. Enrolled youth receive remote patient monitoring (RPM) and, as needed, recommended adjustments from CDCESs who use the TIDE (Timely Interventions for Diabetes Excellence) dashboard to monitor CGM data. On average, 90 patients are reviewed each week, 28% of whom are on a weekly review cadence and 72% of whom are on a monthly cadence, by a team of 6 CDCES.

Objectives: Our objectives were to evaluate the CDCES experience and workflow using TIDE and to identify opportunities to support CDCES efficiency as well as the impact of their patient education and adjustment recommendations.

Methods: Using a human-centered design process the CDCES workflow was mapped to develop new visualization concepts for TIDE. The first phase included observation sessions and a CDCES team workshop. Opportunities to improve efficiency were identified, prototyped, and iteratively tested.
Results: Four phases in the workflow were identified: Triage, Assessment, Investigation, and Intervention (Figure 1). The Investigation phase was prioritized for support because of the CDCES time and effort required. Three types of visualizations were identified to support this phase: time in range (TIR) over time, Continuous Glucose Monitor (CGM) alarms timeseries, and patient engagement with CDCES RPM messages sent thru the patient portal. Across all three types, CDCES reviewers indicated that visualizations using standard patterns, like color and form, such as the standardized AGP (Ambulatory Glucose Profile) report, were the easiest to understand and interpret.

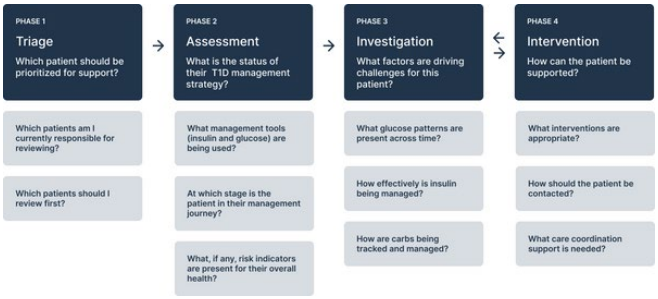

Figure 1. Phases of the 4T CDCES patient review workflow.

Conclusions: Visualizations of TIR, CGM alarms, and message engagement may be valuable to regular reviews of patient glucose management by clinicians. New TIDE dashboard visualizations should adopt common data standards and patterns consistent across similar tools.

P-024 | Utilising application-based registries to explore the characteristics of children and adolescents with type 1 diabetes mellitus in Indonesia

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Introduction: In 2017, around 70% of children & adolescents with type 1 diabetes mellitus (T1DM) were diagnosed with diabetic ketoacidosis initially in Indonesia. Changing Diabetes in Children (CDiC) Indonesia, a public-private partnership, was established to improve healthcare access for young people with T1DM, with developing T1DM patient registry as one of its primary initiatives.
Objectives: To describe sociodemographic and metabolic characteristics of children and adolescents with T1DM in Indonesia, using data from internet-based and novel application-based patient registries.
Methods: A descriptive study was done using CDiC Indonesia patient registries until 2 May 2023: (1) internet-based CDiC registry filled by patients or caregivers from 24 March 2022, and (2) novel application-based patient registry (PrimaKu Diabetes Diary), which patients and doctors have filled since 12 November 2022. Categorical variables were shown in frequencies and percentages. Continuous variables distribution was assessed and described using medians and interquartile ranges (IQR).
Results: 839 patient data were analysed from CDiC registry, and 310 (36.95%) were registered in PrimaKu. Based on CDiC and PrimaKu registries, over half were female, around 20% from West Java province, aged 12 (8;15) years and 11 (7;14) years. Based on PrimaKu, mostly covered by national health insurance (N=262;84.52%), with parental education mainly high-school graduates. HbA1c at enrolment in CDiC and PrimaKu were 8.5%(7.3%;11%) and 8.45%(7.5%;10.3%). Blood glucose data were recorded from 278 patients in PrimaKu, and around a fifth of those patients had over 70% normal FPG (N=48,17.27%), 2hPP (N=48,17.27%), and RBG (N=60,21.58%) measurement since they registered. Most patients use basal-bolus insulin therapy.

Conclusions: Internet-based and application-based patient registries enhance the understanding of the characteristics of young individuals with T1DM in Indonesia, supporting the development of targeted strategies to reduce T1DM mortality and morbidity.

P-025 | Evaluating the feasibility and usability of the onboarding process for TrustSphere's clinical pilot study with caregivers of children living with type 1 diabetes

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Introduction: TrustSphere is a novel digital health platform enabling patients with Type 1 diabetes (T1D) to view their diabetes data, access recommendations and resources from their healthcare team, and consent to sharing their data for research.

To optimize trust, TrustSphere offers a digital 'front door' that includes identity verification, consent and age-appropriate assent to use data for clinical care, and secure linking of diabetes devices.

Objectives: We evaluated the feasibility and usability of this digital front door to onboard caregivers of children living with T1D onto TrustSphere.

Methods: Participants in TrustSphere's clinical pilot study at BC Children's Hospital Diabetes Clinic (Vancouver, BC) were observed virtually using screen-sharing technology during platform onboarding. Surveys were emailed to participants immediately after onboarding and process data was evaluated for feasibility.

Results: Caregivers (17/19) completed a post-onboarding survey; 76% agreed that the application was easy to use for account setup, identity verification and device connection. 71% would use it frequently, 76% felt confident using the application, and 59% agreed it could potentially help them manage their child's T1D. Various security features in place for identity verification were appreciated (88%). 65% agreed the consent/assent for the data linking process was informative and 82% felt the language was easy to understand. Caregivers understood the rationale for consent (94%) and 76% agreed it was helpful to be guided through an explanation of consent/assent and where their child's data would be stored. Some caregivers expressed that the security and consent process was time-consuming and sometimes redundant. Process issues occurred with mismatched account information.

Conclusions: Caregivers found onboarding easy and liked accessing information about their child's T1D care in one place. Though most caregivers understood the complexity of the consent process, some found it cumbersome. Process improvements could also be made.

P-027 | Pilot evaluation of the user experience and usefulness of TrustSphere, a novel digital health platform for pediatric type 1 diabetes

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Introduction: Digital solutions have potential in improving childhood type 1 diabetes (T1D) care .

Objectives: We gathered patient/family ('patients') and healthcare provider (HCP) perceptions of usability of TrustSphere, a novel digital health platform for pediatric T1D.

Methods: TrustSphere is a digital platform combining the ability for patients to connect diabetes devices and access a trusted shared collaborative care dashboard where relevant data (glucose and insulin) can be viewed, and forms and other tasks can be completed. It enables a patient-centred mechanism to donate data to a research registry (MyData4Research – MD4R). Patients and HCP were recruited from BC Children's Hospital (Vancouver, Canada)

and used the platform before and during clinic visits. Patients completed post-clinic (17/19) and end-of-phase surveys (15/19); HCPs completed 41 surveys. The surveys were designed to assess the usage, usability, and usefulness of the platform and were deployed electronically. Data were analyzed using descriptive statistics.

Results: Most patients (87%) agreed/strongly agreed that logging in and viewing clinical information in the dashboard was easy. Most patients (88%) used the platform to prepare for clinic visits by completing forms (71%), reviewing glucose summary data (47%), and reviewing tasks (47%).

Patients reported that clinic visits were slightly (24%), somewhat (29%), much (18%) or very much (6%) more personalized. Some patients (59%) felt the platform was helpful for clinic visits, and 73% would recommend the platform to other families. For MD4R, 87% of patients reviewed the consent/assent process, and 85% agreed/strongly agreed that it was informative and easy to complete. HCP reported that the platform improved clinic visit preparation (90%) and patient interactions (88%). Most HCP (90%) were satisfied with the TrustSphere platform.

Conclusions: The TrustSphere platform is useful to patients and HCP for clinic visits and shows the potential to improve diabetes self-management habits and clinical outcomes.

P-028 | Employing an expert user group to support the research and co-design of a chatbot to support young people (YP) with type 1 diabetes mellitus (T1DM) transitioning to adult services

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Introduction: YP with T1DM transfer from paediatric to adult healthcare services aged 16-19 years but are often poorly equipped to self-manage. Negative transition experiences result in disengagement and deteriorating physical and mental health. Digital interventions can provide YP with needed holistic support.

Objectives: Exploring the involvement of an Expert User Group (EUG) in co-designing the first NHS-approved developmentally appropriate chatbot for YP with T1DM funded by the National Institute for Health Research extending DigiBete's self-management support

Methods: Qualitative focus groups and individual interviews in two paediatric and two young adult diabetes clinics in the UK NHS with YP aged 11-25 years (n=36), including those digitally or socially excluded. An EUG (N=8 aged 14- 25) advised on the project. Data were analysed using Framework Analysis and deductive coding based on the COM-B model and associated behaviour change wheel.

The EUG met frequently with the Patient and Public Involvement lead, both in person and virtually to offer their views on the study, chatbot design and analysis issues.

Results: Adopting behaviours to support self-management of diabetes can be difficult for YP. The EUG supported study design including the language used and how information would be presented

about the study to YP to support recruitment. The research analysis highlighted the contexts in which YP self-manage their T1DM and their related experiences and needs. The EUG offered extended reflections on key themes of the research and views on chatbot content and functionality.

Conclusions: EUG involvement provides an important insight into study development and delivery. A collaborative, longitudinal relationship was established with the EUG to support in-depth feedback on sensitive areas and complemented the research programme. The success of this co-design model has led to co-authorship of conference presentations and other planned dissemination activities between the research and chatbot development teams and the EUG

P-029 | The glycemia risk index correlates with hemoglobin A1C in youth with type 1 diabetes and is elevated in individuals who experienced diabetic ketoacidosis

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Introduction: The Glycemia Risk Index (GRI), which condenses the Ambulatory Glucose Profile into a single metric, was developed to describe the quality of glycemic control in adults with Type 1 diabetes (T1D). Whether GRI describes glycemia quality in youth with T1D remains unknown.

Objectives: We examined the relationship between GRI and hemoglobin A1c (HbA1c) in youth with T1D and compared GRI in youth who did and did not experience diabetic ketoacidosis (DKA) over 12 months.

Methods: In a retrospective design, we selected individuals who received care from a Midwest (USA) tertiary care pediatric diabetes clinic network, had >50% continuous glucose monitor (CGM) wear time, and T1D diagnosis occurred >1 year prior to sampling. We correlated a single GRI value calculated from 1 week of CGM data with HbA1c measurements collected at baseline (within 3 weeks of GRI calculation), 3, 6, 9, and 12 months later. Two sample t-tests were used to compare GRI and HbA1c values between individuals who did and did not experience a DKA event during the 12-month window.

Results: The cohort (N=764) included youth with T1D aged 2.5-21.1 years, with 49.4% males, 84.6% non-Hispanic White, 71.0% on commercial insurance, and a mean age of 13.1 years (SD=3.8). GRI positively correlated with HbA1c at baseline (r=0.7), 3 (r=0.6), 6 (r=0.6), 9 (r=0.6), and 12 (r=0.5) months. Individuals who experienced a DKA event had significantly higher GRI scores and HbA1c values at baseline, 3, 6, 9, and 12 months compared to individuals who did not experience DKA. The high component of the GRI score differed between groups but the low component did not.

	No DKA (n=1093)	DKA (n=35)	t	p
	Mean (SD)	Mean (SD)		
GRI	66.9 (30.6)	87.7 (36.8)	3.92	<.001
GRI High Component	60.7 (32.4)	78.8 (40.7)	2.60	.01
GRI Low Component	6.2 (8.8)	8.9 (13.1)	1.20	.24
HbA1c at Baseline (%)	8.4 (1.7)	10.4 (2.1)	5.73	<.001
HbA1c at 3 Months (%)	8.3 (1.6)	9.8 (1.8)	4.07	<.001
HbA1c at 6 Months (%)	8.6 (1.8)	10.4 (2.3)	3.94	<.001
HbA1c at 9 Months (%)				
8.5 (1.7)				
10.1 (2.2)			5.09	<.001
HbA1c at 12 Months (%)	8.5 (1.9)	10.4 (2.8)	3.89	<.001

Conclusions: GRI positively correlated with HbA1c over 12 months. GRI and HbA1c values were higher in youth who experienced DKA compared to those who did not. GRI may serve as an easily obtainable indicator of risk for DKA in youth with T1D.

P-030 | Assessment of the glycemia risk index as metric for evaluating quality of glycemia in youths with type 1 diabetes

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Introduction: The Glycemia Risk Index (GRI), a composite metric that condenses an individual's quality of glycemia into a single number, has been validated in adults with Type 1 diabetes (T1D). The GRI is calculated using weighted metrics from the Ambulatory Glucose Profile (AGP): (1) % time spent in low- and very low-glucose hypoglycemia and (2) % time spent in high- and very high-glucose hyperglycemia.

Objectives: In a cohort of youths with T1D, we evaluated:

1. Proportions of youth in GRI Grid-defined glycemia risk zones/quintiles, and;
2. Correlations between the GRI and youths' AGP metrics.

Methods: We retrospectively analyzed continuous glucose monitor (CGM) data from youth receiving care at a network of pediatric diabetes clinics in the Midwest USA.

Our cohort included 1,873 youths with T1D (49.8% female; median (IQR) age, 13.3 (5.4) years; 73.8% insulin pump users). We assessed youths' GRI scores (median [IQR], 56.4 [38.1]) on a two-dimensional GRI Grid.

The Grid depicts individuals' quality of glycemia and stratifies individuals into ranked glycemia risk zones/quintiles (labeled A-E) reflecting optimal (zone A) to least-optimal (zone E) overall quality of glycemia. We also evaluated correlations between the GRI and various AGP metrics.

Results: Proportions of youths in glycemia risk zones A-E, respectively, were 4.6%, 19.5%, 27.4%, 21.5%, and 26.9% (Figure 1).

The GRI correlated negatively with % time in target glucose range (70-180 mg/dL; r= -0.97); it correlated positively with % time in high- (181-250 mg/dL; r= 0.94) and very high- (>250 mg/dL; r= 0.96) glucose hyperglycemia.

The GRI was not highly correlated with % time in low- (54-69 mg/dL; r= -0.05) or very low- (<54 mg/dL; r= 0.10) glucose hypoglycemia.

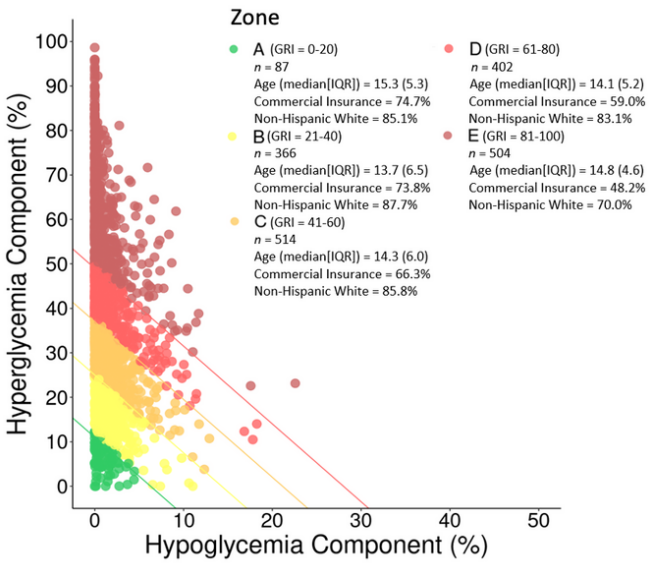

Figure 1. The Glycemia Risk Index (GRI) Grid graphically depicts individuals' quality of glycemia (i.e., % time spent above and below target glucose range [70-180 mg/dL]). The Grid stratifies individuals into ranked glycemia risk zones/quintiles (separated by diagonal lines and labeled A-E, above) reflecting optimal quality of glycemia (zone A; 0-20th percentile) to least-optimal overall quality of glycemia (zone E; 81-100th percentile). Each point represents the hypoglycemia component versus the hyperglycemia component for an individual at the time of their most recent encounter.

Conclusions: In youth with T1D, the GRI is more impacted by time spent in hyperglycemia versus hypoglycemia. GRI score distributions in this population suggest opportunities for using CGM-derived composite metrics to improve youths' quality of glycemic control.

P-246 | Pilot study of monthly video visits increases technology adoption by youth from underserved communities

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Introduction: We have previously shown that asynchronous remote patient monitoring (RPM) is associated with improved clinical outcomes in youth with public insurance who engage with portal messaging.

Objectives: In this pilot study, the objective was to determine the feasibility of short, monthly video visits instead of asynchronous RPM in youth with type 1 diabetes on public insurance.

Methods: Youth with public insurance were approached during in-person clinic visits to participate in this study. Following informed consent, those who

were not already using continuous glucose monitoring (CGM) were started on CGM. Youth then had 10 monthly telehealth visits with a physician for dose adjustments and education followed by an in-person clinic visit.

Results: A total of 8 youth enrolled in the study (mean age 15.7 ± 2.6 years, mean diabetes duration 8.0 ± 3.8 years, 37.5% male, 100% on public insurance, 100% minoritized groups, 75% English speaking, 5 previously on CGM, 1 was using a hybrid closed loop system [HCLS] and 1 was using an insulin pump, mean distance to clinic 55.0 ± 31.7 miles, baseline mean HbA1c 10.1 ± 2.2%).

Four patients completed all visits, 1 patient completed 7 visits prior to requesting in person visits, 1 completed 5 visits prior to being lost to follow up, and 2 were withdrawn from the study due to family emergencies.

Of the 5 patients who completed at least half of the visits, 3 had an improvement in HbA1c, one had an increase in HbA1c, and one was unchanged. The mean HbA1c at 12 months was 9.0 ± 2.9%.

By the end of the study period, all 5 who attended at least half of the visits were using or had a prescription for a HCLS.

Conclusions: Frequent video visits between diabetes providers and underserved youth is feasible; however, maintaining continued engagement with this population can be challenging and deserves continued study. Increased touchpoints between the care team and youth can increase adoption of diabetes technology and may improve clinical outcomes.

P-264 | Access to laptop and impact on glycaemic control in CYM with type 1 diabetes: - interim results of a pilot study

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Introduction: There has been major technological advances in the care of CYP with Type 1 diabetes. Use of insulin pumps & CGM has been associated with improvement in glycemic & quality of life.

There are re web-based platforms that collect data directly from devises aid both families & healthcare professionals to make therapy decisions.These platforms allow for remote monitoring & also promote self-care. A previous audit identified that a number of our families were digitally poor and did not have access to a laptop and so could not easily access these data sharing platforms. As part of a quality improvement project to reduce inequality to access of diabetes related technology, we secured a grant from NHS England to purchase laptops for our digitally poor patients as a pilot

Objectives: To study the impact of access to a short structured education and a home laptop has on glycaemic control.

Methods: CYP and their parents who had indicated in an earlier survey that they did not have laptop were given one if they attended a 2-hour training session. Demographics and other data were collected from the electronic medical record. The CYP were followed up every 3 months.HbA1c & Time in range (TIR) was obtained at baseline, and at 3 months. A change in HBA1c of 0.5% was defined as clinically significant. The paired student t-test. This QI was registered with Audit Department.

Results: Of the 22 patients , 68.1% were male.Mean age at baseline was 10.25 (SD 3.39) (4-16) years. Complete paired data was available for 19 patients. The mean (±SD) % of TIR increased from 47.7±16% at baseline to 56.4± 20.6% during the 13-week follow up period. (Mean adjusted difference, 8.7 percentage points 95% confidence interval, 1.05-18.5; p=0.07. There was also no significant difference in mean HBA1c achieved. (7.9% (SD 1.29) VS 7.9 (SD 1.33) P=1). 68.1% of CYP improved their TIR by more than 5%.

Conclusions: our preliminary data suggests that this intervention is not helpful to all and perhaps understanding motivations may help select those that will benefit

P-283 | Point-of-care testing for HbA1c analysis in a pediatric diabetes outpatient clinic at a tertiary university hospital: a determinative factor for decision making

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Introduction: HbA1c is a critical analyte for monitoring glycemic control in patients with diabetes mellitus (DM). Point-of-Care testing(POCT) has been increasingly used as a technology that facilitates patients evaluation and therapeutic adjustment.
Objectives: Evaluate how the presence of the HbA1c POCT performed during medical outpatient clinic appointments can benefit pediatric patients with DM.
Methods: This retrospective study was conducted at a pediatric diabetes outpatient clinic at Santa Casa de São Paulo, a tertiary university hospital. We used DCA-Vantage® (Siemens) to analyse samples of patients with DM on their appointment in our outpatient clinic from March 2022 to September 2022. The methodology is based on latex agglutination inhibition immunoassay.
Results: We had 171 samples from 161 patients that underwent POCT (10 patients collected POCT in 2 different appointments). 58% were female a, with a mean age of 12.5 years old (2 to 26 y). The diagnosis was Type1 DM in 89.5% of the patients. From the 171 patients, 67 (39.1%) did not have HbA1C results performed within 3 months before the appointment in which the POCT was done. From this 67 patients without HbA1c results, 49 (75%) also did not have HbA1C measured in the following assessment within 3 months after the POCT was done.
Conclusions: This study demonstrated that POCT enables decision-making during appointments without waiting weeks or months for the laboratory result. It can contribute to improving the glycemic control of patients. Taking into account the socio-economic difficulties faced by the patients in the study, it facilitates the assessment of HbA1c, avoiding visits to the lab for sample collection and being less invasive than venous sampling (specially with this young population). This lead to a more significant number of patients with available values at the time of consultation, helping in the decision of changes in diabetes management.

P-328 | Lessons for translation of technologies for diabetes for low- and middle-income countries: adaptation of mHealth solution for carbohydrate counting to Peru

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Introduction: Carbohydrate counting (CC) is crucial for people living with type 1 diabetes (PLW1D). Training in CC is limited and to address this an app (WebDia) was developed in Switzerland. WebDia displays foods and beverages with their respective carbohydrate levels ([carbs]) allowing PLW1D to know the content of foods and define their insulin dose.
Objectives: Adapt WebDia to Peru in order to facilitate CC; Train healthcare workers, PLW1D and carers to use WebDia.
Methods: A dietitian prepared a database of Peruvian foods with their composition and carb content. This was reviewed by a nurse from Switzerland and in Peru by a pediatric endocrinologist and two researchers.
A validation with a small group of PLW1D and carers was also done. In three Peruvian regions, a 2-day workshop to experience living as a PLW1D and learn how to do CC for healthcare workers was implemented. After that a 1-day workshop was held for healthcare workers, PLW1D and their carers.
The knowledge of healthcare workers was evaluated pre and post-training, and participant satisfaction was assessed.
Results: The app was adapted by organizing foods into three groups: processed, ultra-processed food and beverages; cooked dishes and desserts; and fruits. The dietician used different sources to identi-

fy carbs for each group. Validation with PLW1D and carers led to improvements, with adjustments for missing food items and unclear information such as carbs from protein sources.
During the training, 24 healthcare workers, 28 carers and 19 PLW1D participated. After the training, healthcare workers improved their knowledge of type 1 diabetes and most agreed that WebDia is helpful. PLW1D and carers appreciated the existence of WebDia as it helped them improve their CC skills.
Conclusions: Key lessons from this study are the need for collaboration; multi-disciplinary teams; and active involvement of PLW1D.
Adapting mHealth solutions to new contexts is important, and sharing experiences that documents these processes can help standardize this.

P-344 | Developing an integrated technology model for decentralized management of type 1 diabetes (T1D) at primary health care levels in Rwanda

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Introduction: Diabetes affects over 10.5% of the global population, more than half a billion people in 2021, and is expected to increase by 25% in 2030 and 51% in 2045. Gaps in diabetes prevention and control have been identified, particularly for T1D. An integrated technology approach, such as a text messaging program using WELTEL, Automated Insulin Delivery with ZIPLINE can improve management by facilitating data interoperability. Decentralized healthcare at the primary level can also lead to more efficient management.
Objectives: The study's goal is to create an integrated technology model for type 1 diabetes management in Rwanda's primary healthcare system. The study's specific objectives are to identify factors affecting patient satisfaction, evaluate the healthcare system's readiness for decentralized management, analyze financial patterns, develop an evidence-based model, assess the feasibility and cost-effectiveness of the model, and identify barriers and facilitators to decentralization.
Methods: This study aims to create and evaluate an integrated technology model for managing type 1 diabetes at primary healthcare levels in Rwanda. A mixed-methods approach will be used, including observational and descriptive design with pre-post study through action research.
Non-probability purposive sampling will be used to select participants from three districts, including patients with T1D, their families, healthcare providers, community health workers, and policymakers.
Data will be collected using questionnaires and interview guides and analyzed using descriptive and inferential statistics. Ethical principles will be followed.
Results: An integrated technology model can help decentralize T1D management to primary healthcare levels in Rwanda and provide valuable insights for scaling up in other developing countries.
Conclusions: The integrated technology model developed in this study is intended to provide cost-effective interventions for the management of T1D patients and inform policy-makers and strategic planning processes.

P-364 | Clinic partnership project, GIZ and Heinrich-Heine University Duesseldorf: mHealth usability, effectiveness, and satisfaction survey among children, adolescents, and care providers in rural and remote municipalities of Bosnia-Herzegovina

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Introduction: Children with Type 1 Diabetes Mellitus (T1DM) from rural and remote areas in Middle Bosnia lack diabetes care as the main pediatric clinic is only located in the capital Sarajevo. mHealth was chosen to facilitate digital diabetes care and to connect patients from remote areas with the main pediatric diabetology clinic.

Objectives: To assess the usability, effectiveness, and satisfaction of the Diabetes: M app intervention among parents, children/adolescents, and healthcare providers (HCPs) from rural and remote areas.
Methods: In a cross-sectional study conducted from February to March 2022, the Diabetes: M app's usability and effectiveness were assessed among T1DM patients/parents, and HCPs. Self-administered online questionnaires were used to evaluate the app after a 3-month period. Descriptive analysis was performed presenting categorical variables as frequencies and percentages and continuous variables as mean, range and standard deviation.
Results: 50 children/parents and adolescents with T1DM and nine healthcare providers (HCPs) participated in the survey. T1DM patients had a mean age of 14 ± 4.5 years, with 52% female. The HCPs, all female, had a mean age of 43.4 ± 7.8 years and a mean professional experience of 17.8 ± 8.8 years. Overall, the Diabetes: M app was reported as usable and satisfactory by T1DM patients/parents (rating of 5.7/7.0) and HCPs (rating of 5.2/7.0) regarding ease of use.
The app functions, considered extremely or very useful by T1D patients/parents were: online monitoring and follow-up by HCPs (67.5%), charts and graphs (64.4%), and bolus calculator (64.1%). For HCPs, the top three functions were the food database (100%), reminders (100%), and bolus calculator (100%).
Conclusions: Survey results strongly support using the mHealth app in T1DM to address diabetes care shortages, improve management, and enhance HCPs and patients' communication. mHealth tool was able to connect remote patients and local HCPs with the main diabetology clinic, potentially preventing serious complications.

P-409 | Digital, user-controlled, outpatient follow-up of children and adolescents with type-1 diabetes in Innland Hospital Trust, Norway

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Introduction: Traditional pediatric outpatient follow-up of type-1 diabetes (T1D) includes 3-4 annual consultations. In light of the increasing use of advanced technology in diabetes care, we initiated an innovation project aiming to establish digital, user-controlled follow-up (DUFU) of children and adolescents with T1D.

Objectives: 1. Implement DUFU as an integrated part of our diabetes care
2. Develop digital questionnaires for use in patient-reported evaluation of diabetes control
3. Assess how DUFU is experienced as an alternative and/or supplement to traditional physical out-patient control for T1D
4. Optimize the format of DUFU according to the needs of patients, their parents and health personel based on their experiences
Methods: 25 children and adolescents with T1D using closed-loop automated insulin pumps were included (5 families as a user group). All families participated in 3 rounds of video consultations preceded by answering digital questionnaires on self-reported diabetes control.
Following each video consultation all families and diabetes nurses and doctors answered a short digital evaluation questionnaire. Separate focus group interviews for the diabetes health care team and for 5 user group families were conducted after each round of video consultation.
Quantitative data from the questionnaires were presented by histograms and pie charts and analysed by Wilcoxon signrank test for changes over time. Focus group interviews were recorded and transcribed followed by qualitative content analysis.
Results: Results of both qualitative and quantitative analyses showed a high degree of satisfaction with use of video consultation including communication, equality to physical consultation and low frequency of adverse experiences. No changes over time during the project were found except for increase in experience in use of video consultation.
Conclusions: Use of DUFU is experienced as an acceptable, time-sparing alternative to physical out-patient control for patients, their parents and their health care providers.

P-411 | «ANA WA SOUKARI» mobile application: a novel approach of self-management in type 1 diabetes

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Introduction: The management of type 1 diabetes (T1D) especially during childhood and adolescence is a real challenge, not only for health professionals but also for the patients themselves. Thus, free access to mobile technology has changed the vision of the basic therapeutic education process and enhanced diabetes self-management.

Therefore, our medical team developed «Ana wa Soukari» as a newly designed Moroccan smartphone application for therapeutic education and insulin doses management for type 1 diabetes.

Objectives: Describe the effectiveness of the «ANA WA SOUKARI» application in management and glycaemic control of (T1D) in children and adolescents.

Methods: "Ana wa soukari" is a smartphone application designed and developed by a team led by the medical staff of our Endocrinology Diabetology department of university hospital center Oujda –Morocco.

Our medical team had elaborate the medical content of therapeutic education that suits T1DM patients of all ages, particularly children and adolescents.

The work was supported by the valuable help of both the communication and computer technology departments. The application can be used on all Android devices including tablets

Results: We included in the study a number of 52 cases of children and adolescents, aged between 3 years and 18 years with a mean age of 11,5 ±4,4 years, sex ratio H/F was 1.8.Mean HbA1c levels in Group A and Group B dropped from 8,5% ±2,3 and 8,2% ±2 respectively at baseline to 7,6% ± 1,6 and 8% ± 1,9 at three months follow-up.

Change in hypoglycaemic episodes was – 1,9 ± 2,1 for Group A and – 0,73±0,7 for Group B. DTSQs was performed in both groups at the endpoint. Scores were higher in group (A) than in group (B) with a mean score of 31,9 ± 3,4 and 27,4 ± 3 respectively.

Conclusions: Our study sheds light on the impact of this revolutionary technological approach and its applications in enhancing basic education and facilitating diabetes self-management, which can be considered as an adjuvant intervention to standard diabetes care.

DIABETES CARE

P-031 | Retrospective audit of the east of england, children and Young people diabetes network, out of hours consortium provision

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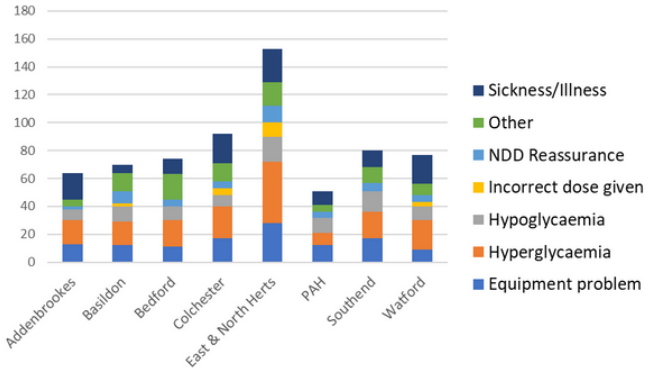
Introduction: In 2011 the East of England Children and Young Peoples Diabetes Network (EECYPN) sought to find a solution to the provision of out of hours advice regionally and co-ordinated the development of the Out of Hours (OoH) Consortium Pilot.
Following the success of the pilot, the Out of Hours Consortium was adopted in late in 2011 as a network initiative.
Initially with five member units, the service has grown to its current seven units, who cover the out of hours service in rotation on a week-by-week basis over the course of the year.
Objectives: The audit aims to review the timing, nature and outcome of the calls received to the Out of Hours service over a 12-month period.
Methods: Each call to the Out of Hour's consortium is documented on the 'Out of Hours Contact Form'.
All call details were logged on the data capture sheet and returned to the author for collation and analysis.
Results:
1. A total, in excess of 661 calls were made to the Out of Hours service between 1st April 2021 and 31st March 2022.
2. The months of February, July, September had the the least number of calls.
3. There is an unequal distribution of calls throughout the week
4. Most calls are received between the hours of 17:00 -24:00 (63.4%) .
5. The average length of each call was 10 minutes.
6. Most of the contact with the OOH service was from the mums of our children and young people (77%),
7. The was a symmetrical distribution of calls when age was analysed.
8. There were a variety of reasons why patients and families called the Out of Hours Service. These are in the chart below.
9. An overwhelming 86% of calls were managed at home and avoided possible hospital attendance
10. 11% of callers were advised to attend their local A&E department.



Conclusions: The audit has demonstrated that the EECYPDN Out of Hours Consortium is well utilised by CYP and their families across the region. Calls to the service are largely appropriate and 86% of the problems were resolved by the clinical on-call team

P-032 | Disparities in access to care between youth with type 1 and 2 diabetes in the United States (US)

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Introduction: Youth with type 2 diabetes (T2D) are at higher risk for complications than peers with type 1 diabetes (T1D). Few studies have evaluated differences in access to care.
Objectives: We compared visits for T1D and T2D youth using a national, claims dataset and explored the relationship between provider visits with ISPAD recommended multidisciplinary care and acute care.
Methods: Using Optum's de-identified Clinformatics® Data Mart Database, we included youth <19 years. Diagnosis was determined by validated algorithm and prescription claims.
The primary outcome was diabetes provider visits in 2019; secondary outcomes were claims with a diabetes care and education specialist (DCES), dietitian, or behavior health (BH) provider and acute care (emergency visits, admissions). Covariates included US region, household income, device use, and comorbidities.
Results: We included 4300 T1D youth (age 13.4±3.8 yrs, 53% male) and 405 T2D youth (15.7±2.2 yrs, 34% male). T1D subjects had more visits with a diabetes

provider, 4.0±1.8 vs 1.9±1.7 (p<0.001). 56% of T2D subjects had 0-1 visits (7% of T1D subjects, p<0.001). T2D youth were less likely to have a DCES visit (OR 0.18, 95% CI 0.09-0.35) but more likely to see a BH provider (OR 1.95, 1.46-2.60).

In all subjects, after adjusting for covariates, each additional provider visit increased the odds of claims with a DCES (OR 1.48, 1.37-1.61), dietitian (OR 1.25, 1.15-1.34), and BH provider (OR 1.23, 1.17-1.30).

Similar proportions of T1D and T2D subjects required an emergency visit (6.7 vs 8.4%, p=0.44) or admission (6.5 vs 6.4%, p=0.94). Increasing provider visits (≥5) raised the odds of admission (OR 1.14, 1.04-1.25), though no association was seen with emergency claims (p=0.42).

Conclusions: T2D youth were far less likely to have provider visits despite insurance coverage, indicating other barriers to care.

Missing provider visits limits access to multidisciplinary care. Increasing visits raised the odds of admission, identifying a sub-group with higher underlying health needs.

P-033 | A scoping review exploring the role of the dietitian in the identification and management of eating disorders and disordered eating behaviours in adolescents and adults with type 1 diabetes mellitus

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Introduction: Eating disorder diagnoses and disordered eating behaviours are more prevalent in people living with Type 1 Diabetes Mellitus, in particular in adolescents. The role of the dietitian in this setting is not clearly outlined in the literature.

Objectives: This scoping review aims to outline the available information for the role of the dietitian in identifying and managing eating disorders in adolescents and adults with co-occurring Type 1 Diabetes Mellitus in a clinical setting.

Methods: The Johanna Briggs Institute was utilised to guide this scoping review and to develop a search strategy for relevant databases. Relevant organisations and societies websites and professional magazines were reviewed as part of the grey literature search.

Results: 38 peer reviewed journal articles, 5 professional articles, 5 book chapters and 11 clinical guidelines were included in this scoping review. Information on the role of the dietitian was identified in six focus areas: (1) prevention, (2) identification and screening, (3) inpatient dietetic management, (4) outpatient/community dietetic management, (5) knowledge, attitude and practices and (6) member of multidisciplinary team.

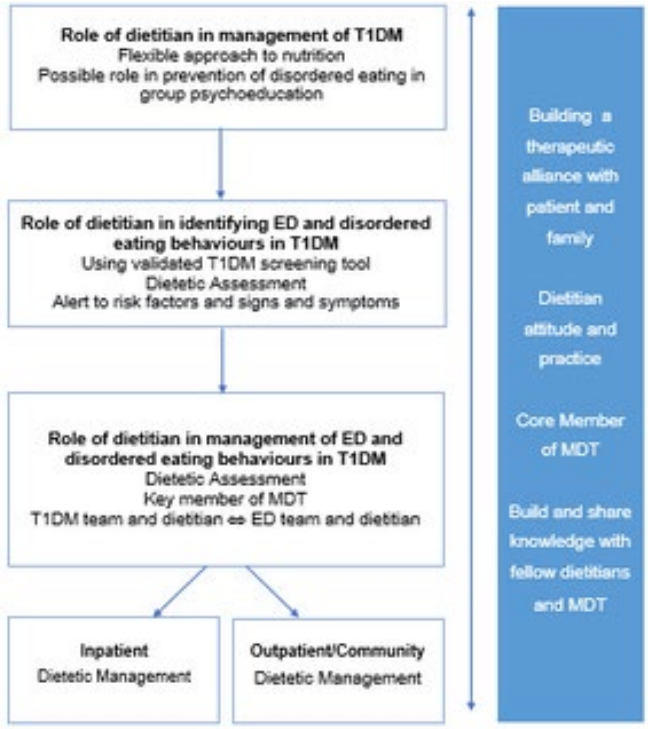

Figure 1. Flowchart outlining the six focus areas identified in the scoping review for role of the dietitian.

ED = eating disorder, MDT = multidisciplinary team, T1DM = type 1 diabetes mellitus

Conclusions: This scoping review mapped the available information in the current literature on the role of the dietitian in the identification and management of eating disorders and disordered eating behaviours in adolescents and adults with a dual diagnosis of Type 1 Diabetes Mellitus. The reviewed literature suggests there is a strong reliance on expert opinion and practice to inform the role of the dietitian. Further research is required in order to ensure more robust evidence-based practice in this area.

P-034 | Vector of measures: data visualization for understanding past, present, and probable outcome improvement in the reduction of hemoglobin A1C in type 1 diabetes population at a large pediatric diabetes center

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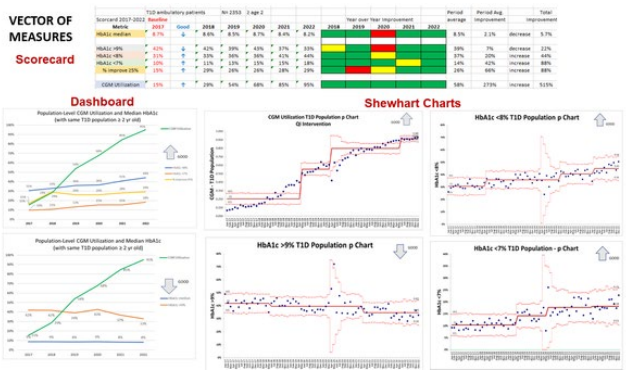
Introduction: Our diabetes team previously developed the *Type 1 Diabetes Composite Score* to complement hemoglobin A1c (HbA1c) reduction, and the *Type 1 Diabetes Care Index* to characterize our diabetes clinic's ability to meet best practice guidelines as per ADA/ISPAD for the best patient outcomes.
Objectives: Building upon these indices, we visualized data using a Vector of Measures display to better understand the magnitude and direction of HbA1c values in support of quality improvement (QI) intervention decision making.
Methods: For improvement planning, we developed a scaled overview of HbA1c and continuous glucose monitoring (CGM) measures, charting past (scorecard); present (dashboard); and probable (Shewhart charts) improvement impacts. The Vector of Measures displayed T1D population's uptake of CGM technology and the decline in HbA1C values.



Results: From 2017-2022 we observed strong correlation of increasing CGM utilization from 15% to 95% with decreasing HbA1c values. The median HbA1c decreased from 8.7% to 8.2%, a 5.7% improvement. The average HbA1c in high-risk T1D population (defined as patients with HbA1c of >9.0%) decreased from 42% to 33%, a 22% improvement. Additionally, the average HbA1c in T1D population with HbA1c of less than 8.0%, increased from 31% to 44%, a 44% improvement and in those with HbA1c of less than 7.0%, the average HbA1c increased from 10% to 18%, an 88% improvement.
Conclusions: In this approach to data visualization, we demonstrate the ability of Vector of Measures to display the direction and magnitude of change. This approach may be utilized on multiple different platforms to support quality improvement decision-making for more timely and most effective interventions in other chronic medical conditions.

P-035 | Large discrepancy between HbA1c and time in tight range in a swedish pediatric population

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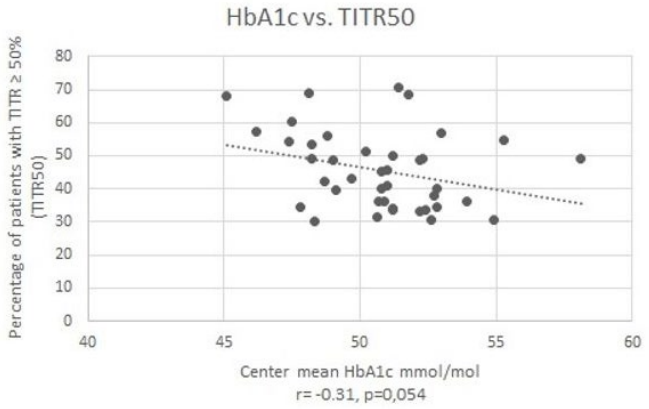
Introduction: HbA1c has since long been the gold standard to evaluate the level of metabolic control. Increasing emphasis has now been placed on CGM (continuous glucose monitoring), especially Time in Range (TIR) over the past 2 weeks. In Sweden, we have in pediatrics used the more physiologic Time In Tight Range (TITR, 3.9-7.8 mmol/l, 70-140 mg/dl). TIR 70% equals ~ TITR 50%.

Objectives: The aim was to investigate how HbA1c relates to TITR in Swedish pediatric clinics.
Methods: The Swedish National Diabetes Register collects data every ~3 months and has > 95% coverage up to age 18 years. We used online data (https://www.ndr.nu/#/knappen), extracting the latest available aggregated center HbA1c and center percentage of patients with TITR ≥ 50% (TITR50), based on ≥70% of time per patient on CGM during the past 2 weeks.
Results: The national mean HbA1c was in April 2023 51.0 mmol/mol (95% CI 50.8, 51.2) (6.8%, 95% CI 6.8, 6.8) and the mean TITR50 44.8% (95% CI 43.7-45.9, range 30.1-70.8%). For a given center HbA1c of approximately 50 mmol/mol (6.7%), center TITR50 varied between 30 and 70% and for a given TITR50 of 50%, HbA1c varied between 48 and 58 mmol/mol (6.5-7.5%).



Conclusions: There is a much wider range of center TITR50 compared to center HbA1c. Although both are taken at the same time, HbA1c reflects the metabolic control over 2-3 months while TITR only mirrors 2 weeks. On the individual level, situations like infections may affect TITR more than HbA1c, but apparently there are also other factors influencing the relationship on a group level.
Possible explanations include a variable amount of time below < 4 mmol/l (70 mg/dl), which we could not account for. Also, if the clinic emphasizes the importance of TITR over HbA1c, a bias may be introduced in that the
family tries hard to get extra good readings during the 2 weeks preceding the visit. We conclude that TITR and HbA1c differ, and thus are equally important to register at clinic visits.

P-036 | Assessment of delivery of ambulatory care for children and adolescents with diabetes mellitus in Austria - a nationwide survey according to ISPAD/SWEET recommendations

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Introduction: In order to provide optimal care for children and adolescents with diabetes mellitus a multidisciplinary team is essential.
A team of doctors (preferably specialized in pediatric diabetology), nurses/diabetes educators, dieticians, psychologists and social workers are needed to educate the person with diabetes (PwD) and their caregivers at diabetes onset, as well as throughout diabetes routine care to achieve the best possible outcome and care despite the chronic disease.
The ISPAD/SWEET recommendations for the multidisciplinary specialized pediatric diabetes team members per 100 patients are: for optimal care: nurse (diabetes educator) 1.0 full-time equivalent (FTE), doctor 1.0 FTE, dietician 0.5 FTE, social worker 0.3 FTE and psychologist 0,3 FTE (*Pediatric Diabetes* 2012: **13** (Suppl. 16): 15–19).
Objectives: To assess the current structure of diabetes teams and numbers of PwD in routine care in Austria.
Methods: An online questionnaire was sent to all centers, who care for children and adolescents with diabetes mellitus < 19 years of age. The questionnaire was filled out by all these centers (100%) between May 1st and August 31st, 2022.
Results: At time of the assessment 34 centers in Austria took care of 3550 children and adolescents with diabetes mellitus < 19 years of age.
Center size: 10 small centers with <50, 14 medium centers with 50-99 and 10 large centers with ³ 100 PwD; (median center size 70, IQR 45-130, range 16-400 PwD).
Conclusions: The survey results revealed, that not one single center in Austria meets the SWEET recommendations for optimal care.
The overall situation discovered, that more resources for staff are needed to provide adequate care for these children and adolescents with diabetes melli-

tus. Austria, as one of the top 20 wealthiest nations, should be able to provide adequate personnel resources for the care of young PwD.

ISPAD/SWEET recommendations for optimal care	FTE per 100 PwD	current situation in Austria per 100 PwD
Nurse/Diabetes Educator	1	0,38
Doctor	1	0,54
Psychologist	0,3	0,11
Dietician	0,5	0,17
Social Worker	0,2	0,04

Table 1. Comparison of ISPAD/SWEET recommendations (FTE per 100 PwD) versus the current situation in Austria.

P-037 | Demographic and clinical factors related to participating in a case management program for youth with diabetes

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Introduction: Case management involves coordinating quality services to help youth with type 1 (T1D) or type 2 diabetes (T2D) achieve optimal glycemic levels and may help reduce health disparities. Data on case management program participation are lacking.

Objectives: The objective of this retrospective cohort study was to examine demographic and clinical traits of youth who enroll in, and complete, a diabetes case management program.

Methods: Youth with T1D or T2D (n=424) referred to a case management program at a children's hospital in the United States and their program status (not enrolled, enrolled but not completed, completed) were extracted from an internal registry.

Families in this program meet multiple times a month with a case manager and work on goals (e.g., blood glucose monitoring, transportation barriers). Youth race, ethnicity, age, diagnosis, diagnosis duration at time of referral, and primary insurance were extracted from electronic health records. We used youths' zip codes to capture community-level social determinants of health (SDOH). Pearson Chi-Square was used to examine differences in demographic and clinical variables by program status.

Results: Of the youth referred to the case management program, 319 (75.2%) enrolled; of those who enrolled, 127 (39.8%) completed the program. Those referred within the first year of diagnosis (X^2[1, *N*=424]=19.76), from a younger age group (X^2[2, *N*=424]=7.13), and who had private insurance (X^2[1, *N*=424]=4.06) (*p*'s<.05) were more likely to enroll. Youth with T1D (X^2[1, *N*=319]=4.51), living in a community with fewer negative SDOH (X^2[4, *N*=319]=19.84), who had private insurance (X^2[1, *N*=319]=7.71) were more likely to complete the program (*p*'s<.05).

Conclusions: Despite a high enrollment rate, youth at risk for suboptimal glycemic levels were less likely to enroll in, or complete, the case management program. Thus, this program may inadvertently perpetuate, or worsen, health disparities. Initiatives to promote equitable participation in case management programs are needed.

P-108 | Enhancing transfer experiences of dutch young adults with diabetes mellitus type 1: still a way to go

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Introduction: The need to improve transitional diabetes care is widely acknowledged. Despite several efforts, many young people still experience large care gaps when transitioning from pediatric to adult settings, causing discomfort, confusion and significant rates of loss to follow-up.

Objectives: This study, part of a national quality improvement initiative to advance transitional care in 12 hospitals (15 diabetes teams), aimed to gain insight into the benefits of transitional care investments with regard to transfer experiences of young adults with diabetes mellitus type 1 (DM1).

Methods: Two groups of diabetes teams were created through cluster analysis: paying more (HI-ATT) versus less attention (LO-ATT) to transitional care. Retrospective controlled evaluation included the Transfer Experiences Scale (OYOF-TES) with 5-point Likert subscales on young adults' transfer experiences in terms of reception in adult care, alli-

ance between pediatric and adult care, preparation for transfer, readiness to transfer, and youth involvement. Trust in care providers and satisfaction with transitional care (score 1-10) was also studied.

Results: A total of 169 young adults (45.3%) with DM1 responded. They felt most positive about their readiness to transfer (4.04±.65) and the reception in adult care (3.94±.80). Young adults were less positive about their involvement in decisions (3.29±.98), alliance between pediatric and adult care (3.15±.88), and preparation for the transfer (2.97±.92). The only difference between the LO-ATT and HI-ATT teams was that young adults in the HI-ATT teams felt better prepared for transfer (p<.05).

Overall satisfaction with transition was scored with a mean of 7.01 (±1.53). The young adults, on average, showed significantly more trust in their pediatric care providers than in their adult care providers (8.24±1.73 versus 7.54±1.77, p=.001).

Conclusions: Current investments in Dutch diabetes care do not seem enough to enhance young adults' transition experiences; there is room for improvement in all teams.

P-109 | Impact of social work presence in clinic in response to a positive PHQ9 score

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Introduction: Routine depression screenings are recommended for youth with type 1 diabetes (T1D) and type 2 diabetes (T2D).

Objectives: We investigated the value of social workers (SW) embedded within the depression screening process at a pediatric diabetes clinic to increase detection of true mental health concerns and subsequent disposition planning.

Methods: Youth 12-21 years of age with a diagnosis of T1D or T2D who were electronically administered the Patient Health Questionnaire – Modified for Teens (PHQ9) at a tertiary pediatric diabetes clinic in 2022 were included in the chart review. Based on our protocol, a positive PHQ9 is defined as total score ≥ 11, and/or suicidal ideation (SI) in the past 2-4 weeks, or lifetime suicide attempt (SA) history.

Results: Of the 209 youths screened, 37 (17.7%) were positive. As compared to those without positive screens, youth who screened positive had a higher mean hemoglobin A1c (1.5 ± 0.4%, p<0.01) but did not differ in terms of age, race/ethnicity, insurance type, duration of diabetes, or insulin regimen. 13.5% (n=5) of those with positive screens had a scheduled behavioral health visit on the same day and did not merit SW assessment.

Of those requiring SW assessment, 72% had T1D, 28% had T2D, average age was 16.0 ± 2.4 years, duration of diabetes was 5.4 ± 3.9 years, and average A1c 8.5 ± 2.4 %. 59.4% of youth screened positively due to SI in the past 2-4 weeks, while 40.6% screened positive for total PHQ9 score or a lifetime SA. 25% completed a Columbia-Suicide Severity Rating Scale, 18.8% completed a safety plan, 6.2% were referred to outpatient psychology, and 3.1% were referred for emergent psychiatric evaluation.

Conclusions: SW presence in a clinic where depression screenings are completed allows for an assessment of psychosocial need, patient safety, and disposition planning.

Due to the accessibility of this assessment, youths are directed to the appropriate resource or level of care needed as determined by the SW and decreases emergent psychiatric evaluations.

P-110 | Children with new onset type 1 diabetes and excessive body mass experience greater loss of c-peptide level compared to normal weight diabetic peers – single centre, two years observation study

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Introduction: The prevalence of obesity in pediatric population increases without sparing children with T1D. Pancreatic β-cells of some individuals with long-standing T1D are still able to secrete small amounts of insulin. The research is ongoing to find factors associated with the possibility to preserve endogenous insulin secretion in individuals with long-standing T1D.

Objectives: The objective of this study was to determine the influence of excessive body mass index on C-peptide secretion in children newly diagnosed

with T1D in two years observation. We also aimed to assess the possible relationship between cytokines secreted from adipose tissue and β-cell function status.

Methods: The study group consisted of 153 pediatric patients with newly diagnosed type 1 diabetes, which was divided into two groups according to BMI-SDS ≥1 or <1. Participants were followed up for the next two years and assessed for changes in body weight, HbA1c, and daily insulin requirement (DIR). C-peptide was assessed at baseline and after two years. We also evaluated the patients' levels of inflammatory cytokine: IL-1β, IL-10, IL-12p70, IL-17, TNF-alpha and IFN-gamma at the disease onset.

Results: Subjects with BMI-SDS≥1 presented significantly higher serum C-peptide level and lower DIR at diagnosis than children with lower body weight. The two-year follow-up showed that C-peptide level in patients with higher weight dropped more rapidly. Although at diagnosis there were similar values of HbA1c between groups and significantly lower DIR in BMI-SDS ≥1 group, we observed that HbA1c and DIR increased after two years in the group with excessive body weight. The levels of some cytokines were significantly higher in BMI-SDS≥1 group.

Conclusions: Higher BMI is not correlated with a greater probability of extended partial remission period. The efforts should be paid to decrease and maintain body mass in overweight and obese children diagnosed with type 1 diabetes as one of the main parts of diabetes care to achieve better disease outcomes in long run.

P-111 | Effect on Hb1C and TITR when comparing pen and pump treatment

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Introduction: Previous studies have not been able to prove any benefits in HA1c in children aged 0-17 years comparing pen treatment vs. insulin pumps. The annual 2022 report Swedish National Diabetes Register (NDR) reports the same conclusion. From a clinical view, this does not add up as we almost always experience improvement after switching from pen to pump treatment. In Sweden, we have agreed in pediatrics to use Time In Tight Range (TITR, 3.9-7.8 mmol/l, 70-140 mg/dl). TIR 70% equals ~ TITR 50%. The pediatric HbA1c target is 48 mmol/mol (6.5%) since 2017.

Objectives: The aim of this study was to compare pump and pen users in relation to diabetes duration.

Methods: NDR collects pediatric data every ~3 months and has > 95% coverage up to age 18 years. We used online data (https://www.ndr.nu/#/knappen), extracting the latest available aggregated data on percentage of HbA1c ≤48 mmol/mol and percentage of patients with TITR ≥ 50% (TITR50), based on ≥70% of time per patient on CGM during the past 2 weeks. Data on the treatment of choice (pump or insulin pen) was analyzed in relation to diabetes duration.

Results: NDR was accessed May 8th, 2023. 82.0% used insulin pumps and 18.0% used injections with insulin pens.

For children with type 1 diabetes age 0-17 using insulin pumps, 45,4% have HbA1C ≤48 mmol/mol and TITR50 46,2% compared to 42,3% (HbA1c) and 44,7% (TITR50) for those with pen treatment. With duration <2 years and insulin pump, the numbers are 55,5% (HbA1c) and 57,7 (TITR50) vs pen 53,5% (HbA1c) f56,8% (TITR50). With duration >2 years, 41,9% of pump users had HbA1c ≤48 and 42,2% (TITR50) and pen users 32,1% (HbA1c), 27,6% (TITR50). When comparing the 19 clinics in Sweden with ≥ 20 patients using pens and pumps respectively, 39.1% of those using pumps had HbA1c ≤48 compared to 28.9% for pen users (p< 0.001).

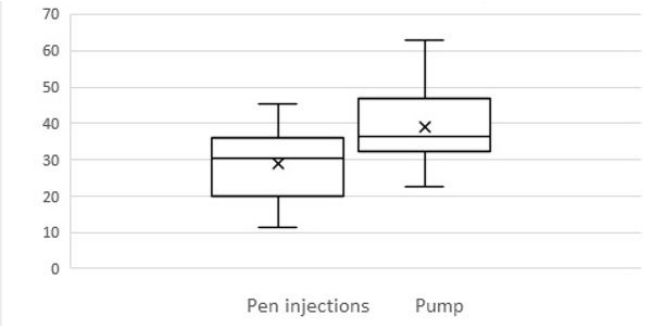

Figure. Percentage of patients with HbA1c ≤ 48 mmol/mol (6.5%) (patients with > 2 years diabetes duration, p <0.001)

Conclusions: Among the group with longer duration and less likely to be in the "honeymoon phase", insulin pump users may benefit from lower HbA1c and increased TITR compared to pen treatment. This is only valid on the group level and needs to be further studied on the individual level.

P-112 | Is there an association between HbA1c ≤48 mmol/mol (6.5%) and overweight/obesity?

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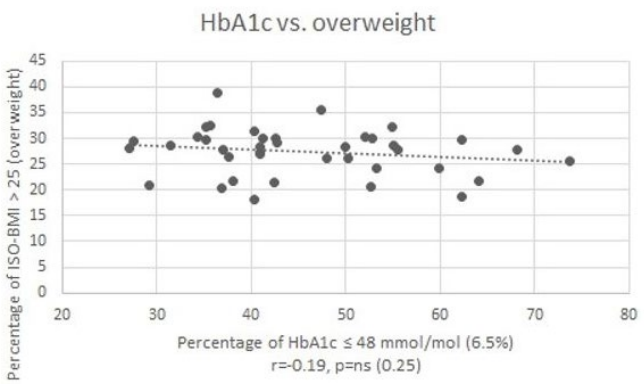
Introduction: Overweight and obesity are increasing problem in young people in the general population in many countries, including Sweden. There is an ongoing discussion in Sweden and internationally whether a decrease in HbA1c will lead to an increase in overweight/obesity.
The HbA1c target was changed in Sweden to ≤48 mmol/mol (6.5%) in 2017. This level represents a mean glucose level of 7.8 mmol/ml (140 mg/dl).
Objectives: The aim of this study was to see if there is an association between Hba1c ≤48 mmol/mol (6.5%) and overweight or obesity on a center level.
Methods: The Swedish National Diabetes Register collects pediatric data every ~3 months and has > 95% coverage up to age 18 years.
We used online data (https://www.ndr.nu/#/knappen), extracting the latest available HbA1c and weight as BMI-SDS.
Results: The national mean HbA1c was in April 2023 51.0 mmol/mol (95% CI 50.8, 51.2) (6.8%, 95% CI 6.8, 6.8). Average percentage overweight (ISO-BMI > 25) per center was 26.6% (range 18.0-38.7%, 95% CI 25.2-27.2), and for obesity (ISO-BMI>30) the corresponding figure was 6.0% (range 1-11.9, 95% CI 5,5-6,5).
The correlation between center percentage of patients with HbA1c ≤48 mmol/mol (6.5%) and center percentage of patients with ISO-BMI > 25 was not significant (Fig).



Conclusions: There was no significant correlation between HbA1c and overweight or overweight (data not shown) on a center level, indicating that diabetes is not a risk factor for an increased rate of obesity when HbA1c is at the level of ≤48 mmol/mol (6.5%).
Modern hybrid closed loop pumps that decrease insulin at impending hypoglycemia will lower the need for extra carbohydrates, which may contribute to this finding.
Physical activity is an essential part of a successful treatment to achieve an HbA1c within target and will also mitigate weight increase.

P-113 | Islet amyloid polypeptide level at the diabetes diagnosis – does it matter in the long run? Clinical follow-up during nine years of diabetes duration in Swedish children

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Introduction: Islet amyloid polypeptide (IAPP) is a beta cell hormone secreted together with insulin. IAPP may misfold and form IAPP-amyloid which is present in islets of most patients with type 2 diabetes and in other conditions associated with beta cell stress.
Objectives: To study the significance of IAPP level at diagnosis for the clinical course of Type 1 diabetes.

Methods: Plasma IAPP level in children (age <18 years) with newly diagnosed type 1 diabetes (n=224) were analysed. Clinical follow-up data (HbA1c, BMI-SDS, insulin dose units/kg, age, sex) were obtained from the Swedish National Diabetes Register 2005–2014. Diabetes duration was categorized into three 3-year periods. ANOVA was used for comparison of means according to the IAPP-level and diabetes duration. Multivariate linear regression analysis was performed using data as continuous variables.

Results: High IAPP defined as level above 100 pmol/L was found in 11% of patients (25/224). Mean HbA1c and insulin dose increased with diabetes duration and was higher in the High-IAPP group. Mean BMI-SDS increased with diabetes duration in the Low-IAPP but decreased in the High-IAPP group (see Table).

In multivariate analyses mean HbA1c was associated with diabetes duration (p<0,001), IAPP level (<0,001) and insulin dose (<0,001), but BMI-SDS was no longer significant after adjustment and there was no difference between females and males.

	High IAPP (n=25)			Low IAPP (n=199)			
Duration (years)	0-2	3-5	6-9	0-2	3-5	6-9	ANOVA p-value
HbA1c mmol/moL (DCCT %)	58,0 (7,5)	65,2 (8,1)	69,0 (8,5)	56,8 (7,3)	63,3 (7,9)	63,0 (7,9)	<0,001
Insulin (units/kg)	0,89	1,0	1,01	0,78	0,91	0,93	<0,001
BMI-SDS	0,31	0,29	0,01	0,51	0,71	0,83	<0,001

Conclusions: High IAPP at diagnosis was associated with differences in the clinical course of Type 1 diabetes during the nine years follow-up. Higher HbA1c despite higher insulin dose may indicate that the patients with high IAPP at diagnosis were more insulin resistant. BMI-SDS decreased over time in the group with high IAPP but the effect disapeared after adjustment. These findings need to be confirmed in larger studies with longer follow-up.

P-114 | The insulin huddle: a patient safety tool

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Introduction: The huddle is a brief, structured discussion used to manage quality and safety in complex systems. It has been used successfully in aviation and nuclear power and more recently has been applied to medicine. Three years ago, we developed and implemented an Insulin Huddle within our weekly diabetes team meetings, reviewing issues that have arisen over the previous week with regard to inpatients on insulin and proactively flagging future concerns.

Objectives: To assess the huddle as a safety tool in a paediatric diabetes service.

Methods: We reviewed all huddle data recorded over 13 quarters, from January 2020 to March 2023. These were analysed across five thematic groups: inpatients, prescribing errors, administration errors, gaps in staff knowledge, and future concerns. Comments on these themes were noted.

Results: Huddles were completed in 142 of 169 weeks (84%). During that time, there were 408 diabetes inpatients. Prescribing errors were noted in 32 weeks (22.5%), administration errors in 30 weeks (21.1%), gaps in staff knowledge in 46 weeks (32.4%), and future concerns in 85 weeks (60%). The most common prescribing errors identified related to the insulin kardex (9/24, 37.5%).

Other common prescribing errors included an incorrect dose (4/24, 16.7%) or no dose documented (4/24, 16.7%). By far the most common administration error was missed insulin doses (17/35, 48.6%), followed by late administration (5/35, 14.3%) and missed meals (3/35, 8.6%). Gaps in staff knowledge included the insulin kardex (6/30, 20%), food and diabetes (5/30, 16.7%) and general discomfort with patients with diabetes (4/30, 13.3%).

Conclusions: The safety huddle has proven beneficial in other areas of medicine and is well suited to use in paediatric diabetes. Implementation of the Insulin Huddle in our tertiary paediatric centre has helped to raise awareness of important patient safety issues. Patterns of safety concerns, errors, or gaps in staff knowledge can provide guidance for future education or quality improvement.

P-115 | Post-diagnosis pathway of diabetic children and youth followed in the changing diabetes in children (CDiC) program in Guinea

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Introduction: Type 1 Diabetes is increasing worldwide and access to care remains challenging in developing countries. To address the challenges of access to diabetes care in children, the Changing Diabetes in Children program was implemented in Guinea in 2009.

Objectives: To describe the post-diagnosis course of diabetes and identify the challenges faced by children and youth enrolled in the Changing Diabetes in Children (CDiC) program in Guinea.

Methods: We conducted a cross-sectional study in 9 diabetes clinics of Guinea over a 6-month period (January to June 2022), including 583 children and youth with diabetes followed-up through the CDiC Guinea program. We collected information on socio-demographic variables, diabetes control parameters, schooling, healthcare facility utilization (Diabetes clinics and other care sites), and use of traditional healing.

Results: The mean age was 18.46 ± 4.59 years with a slight female predominance (51.3%). Most patients (75%) had an HbA1c ≥ 8%. A total of 60.2% of children and youth had visited other sites not dedicated to diabetes management. Also, 55.4% had taken a decoction in an effort to "cure" their diabetes.

Of the children and youth with diabetes who had moved, 59.5% had done so because of their diabetes. The frequency of schooling was 72%. A negative impact of diabetes on schooling was reported by 62.6% of diabetic children and adolescents.

Among the children attending school, 66.5% reported a delay in their schooling attributed to diabetes.

Conclusions: This study showed that despite the existence of a program dedicated to the management of childhood diabetes in the country, many challenges remain.

The use of other clinics not prepared for diabetes management could be related to the long distance which is not appropriate for day-to-day needs of children and youth with diabetes. Another major concern is the delay in schooling.

A holistic approach seems necessary to maximize the success of the CDiC program to the benefit of children with diabetes in Guinea.

P-116 | Health care utilization and pre-diagnosis routes for diabetes mellitus among children and adolescents in the city of Conakry, Guinea

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Introduction: In Africa, timely diagnosis of childhood diabetes is hampered by poorly performing care pathways. This results in misdiagnosis and often fatal complications.

Objectives: to describe pre-diagnosis pathways and health facilities utilization among children and adolescents diagnosed with diabetes in Conakry, Guinea.

Methods: Two hundred and twenty-five children aged 14.03±4.06 years, followed in Conakry, and their families were interviewed.

The following information was collected: time between the onset of symptoms and the diagnosis of diabetes, number of health care visits before diagnosis, reasons for the choice of facilities consulted, possible reasons for the delay of diagnosis and management of diabetes.

Results: The mean time to care seeking was 2.51±4.08 [0.28-48] weeks. This delay was longer when the first recourse was the traditional healer or self-medication at home compared to conventional health facility (3.79±7.35 [0.71-48] versus 2.20±2.66 [0.28-24] weeks).

The mean number of visits before diagnosis was 1.96 [1-4]. The most frequent first referral was to a private clinic (48.0%); 24 subjects (10.7%) were referred to a traditional healer.

Determinants of the choice of first referral facility were proximity (44%), recommendation of the facility (27.1%), good reputation (19.6%), judgment of relatives (8%), and affordability of care services (1.3%).

Conclusions: Care utilization was delayed for most children and adolescents with diabetes. Subsequent care pathways were complex and characterized by poor diagnostic performance.

Difficulties in the diagnosis of childhood diabetes in Africa are related to poorly performing care pathways. Diabetes needs to be further integrated into priority health programs.

P-237 | Diabetes wheel of life: allowing CYP with diabetes to choose how they want to improve their diabetes management

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Introduction: The Ealing Paediatric Diabetes team utilises a trust pathway for children and young people (CYP) with type 1 diabetes (T1D) that present and HbA1c of >69 mmol/mol involving frequent contacts from different members of the team and intensive education.

It has been proposed to include in the current high HBA1c pathway, structured self-led goal setting techniques and a diabetes related wheel of behaviour change created by the team.

Objectives: To demonstrate how the Diabetes Wheel of life has been developed and how it is going to be utilised as part of current trust high HbA1c pathways.

Methods: The diabetes adjusted wheel of life has been created utilising diabetes management behaviours based on the American Association of Diabetes Educators. CYP evaluate themselves on each behaviour as a Likert scale from 0 (Not doing it, not feeling) to 5 (doing it, feeling it).

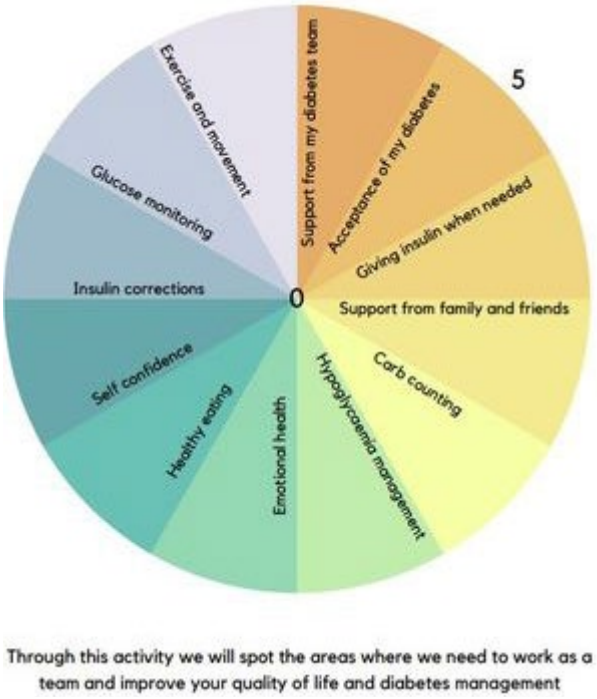
This forms a shape that at the end of the intervention is expected to look in a more circular way with the behaviours being improved through SMART goal settings.

As part of the initial session of the pathway the diabetes specialist nurse, dietitian and psychologist guiding the session explain each area of the wheel. CYP read out loud what is expected from them to do regarding those areas.

After completing the "Diabetes Wheel of Life" the CYP chooses 1 goal, and the healthcare professional another one based on the areas of the circle that the CYP felt less satisfied.

The wheel is to be completed during the first clinic of the current high HbA1c pathway and after 3 and 6 months.

Results:



Conclusions: Measuring the impact on glycaemic management of goal setting and the diabetes wheel of life can be of guidance on how to improve the approach of current high HbA1c pathways. Research will be done on the impact of the present tool in HbA1c, TIR and quality of life. Goal setting is recognised as an evidence base strategy of diabetes self-management education promoting new behaviours and positive outcomes.

P-244 | Inpatient pediatric diabetic ketoacidosis: management errors and outcomes

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Introduction: Diabetic ketoacidosis (DKA) is a life-threatening state of hypoinsulinemia leading to metabolic acidosis. Best practice guidelines for treatment of DKA have been published by ISPAD, however there is little exploration into their adherence.

Objectives: The purpose of this study is to assess the frequency and severity of DKA presentation to a Children's Hospital in the US, as well as to evaluate inpatient DKA management with respect to ISPAD guidelines.

Methods: This is a retrospective chart review of diabetes patients (≤18 years) admitted to our center between 2020 to 2022. HbA1c, pH, and bicarbonate were analyzed to assess for severity of DKA, determine the time to resolution, endpoints at discharge, and recurrence of acidosis. For the purpose of this study, DKA diagnosis, severity, and resolution guidelines are as published by ISPAD.

Results: We identified 305 admissions with mean patient age of 11 years and HbA1c of 11.6%, where 64% of encounters presented in DKA. Of these, 38%, 20%, and 42% presented in mild, moderate, and severe DKA, respectively.

The median pH at presentation was 7.24 and those with fair/good control (HbA1c <8.5%) had a significantly higher median pH of 7.32 than the median pH of 7.23 in those with poor control (HbA1c >8.5%).

Notably, 37% of admissions did not have repeat pH despite initial pH below 7.3, with 30% of those at pH below 7.1.

The median time to subcutaneous (SQ) insulin for all encounters in DKA was 17 hours, where time until transition to SQ insulin increases with DKA severity.

Notably, transition to SQ insulin occurred prior to bicarbonate greater than 18mmol/L in 60% of encounters.

Conclusions: Based on this study, 64% of pediatric diabetes patients presented in DKA, with the majority of these patients having poor glycemic control. The guidelines for pediatric management of DKA were not met, as demonstrated by lack of pH retesting in over 80% of the cohort, though the follow-up rate was improved in those with severe DKA. Additionally, transition to subcutaneous insulin prior to DKA resolution occurred in 60% of the encounters.

P-259 | Applying motivation theory to diabetes management for improved individualised care

L. Tribe[1]

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Introduction: The dynamic between health care professionals (HCP) and people with diabetes (PWD) needs a well defined framework for success which motivation models can provide.

Objectives: Through an empirically proven motivational model, better diabetes management can be achieved, reducing the risk of burnout and improving long-term outcomes.

Methods: In 2004, Professor H.M. Kehr released his paper on "The 3C-model", it provides a guide for aligning workplace outcomes to individual motivations and skills.

Tackling issues commonplace in diabetes management such as motivation, burnout, and capability, it is believed the model can be applied to the dynamic between the HCP and PWD to optimise diabetes management.

The model considers the motivation and skills of the individual, and the desired outcomes of both the PWD and the HCP. The model incorporates psychological concepts such as volition (willpower) and gives guidance for motivational interventions with a goal of approaching a "Csikszentmihályi flow state" aligning the individual to the outcome with minimal exerted effort.

Results: The application of this model involves:

- A model-driven, structured discussion between the HCP and PWD on their motivation, skills, and desired outcomes regarding diabetes management in the context of:

1. Head: What are we trying to achieve?
2. Heart: Are there fears and doubts?
3. Hands: Does the PWD have the skills required?

- With an understanding of the desired outcome, tools for diabetes management can be considered and the model suggests appropriate interventions if needed e.g.

1. Head: Reconsider goals or look for different incentives
2. Heart: Consider other tools/provide support
3. Hands: Apply training/coaching

- Periodic follow-up ensures continued alignment and the opportunity to intervene

Conclusions: The result is a framework for discussion between the HCP and PWD, allowing an understanding of the individual's goals and circumstances with intervention tools to ensure continued diabetes management success, minimising stress and the risk of burnout.

P-343 | Using the behaviour change model and positive deviance in DM camps creates better compliance and control of type 1 diabetes in Myanmar

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Introduction: CDIC in Myanmar is key in supporting T1 Diabetes Children. Diabetes Camps are the tripartite platform for endocrinologists, patients, and CDIC staff to share better DM care and exchange of good practices to adhere to the treatment.

Objectives: T1 DM Camps are organized

1. To educate, lead behavior changes, and update regime on T1 children by endocrinologists and CDIC staff.
2. To exchange knowledge and practices of patients, CDIC staff, parents, and caretakers on T1 DM treatment practices, diet, mental motivation, physical activities, injection method, and dos and don'ts for better treatment compliance.
3. To monitor the status of T1 DM control and further treatment.

Methods: Treatment regimens and care models were updated during the camps. CDIC staff discussed the transtheoretical (TT) model to maintain healthy practices (not eating sweets fruits, carbohydrates, and fat) which makes better education and a healthy lifestyle fulfilling the ambition of T1 children.

The life course was mentioned as their goal and the importance of maintaining healthy practices and regular treatment. TT model makes them decide of giving up bad habits, good adherence to insulin treatment, and good habits of self-care (e.g., eating low carb diet, and more vegetables).

Positive deviance also plays a key role, in the participants. Better-controlled role models are selected and let them discuss their best practices.

Patients also exchange their experiences of warning signs of hyper/hypoglycemia by eating/drinking different types of food, storage techniques of insulin in a natural way to maintain a cold chain amidst a severe shortage of electricity and best injection method of insulin.

Results: Mentally motivated adhering to a better lifestyle, regular adherence to insulin, less injection-related side effect, better compliance on treatment reducing HBA1C.

Conclusions: Diabetes camps are the key platform that allows sharing of positive deviance and enables behavior change.

P-366 | Improving glycemic control in Norwegian pediatric diabetes care - data from the Norwegian childhood diabetes registry (NCDR)

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Introduction: Many children and adolescents with type 1 diabetes do not meet ISPAD's glycemic target.

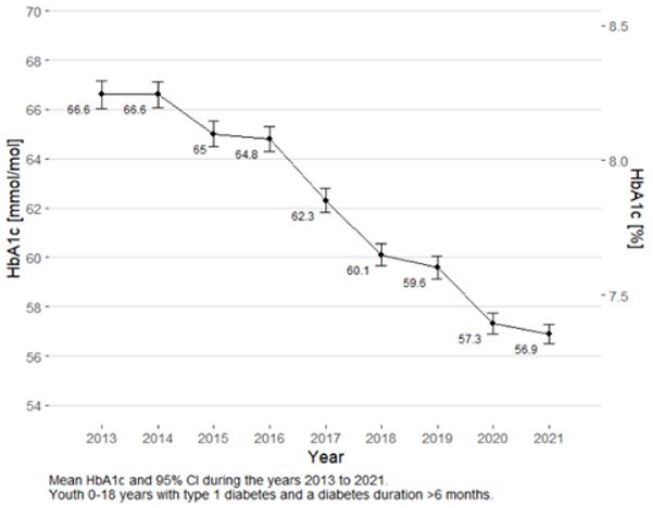
Objectives: To evaluate: (1) to what extent HbA1c and the use of diabetes technology have changed at national level and (2) how glycemic control was influenced by using diabetes technology, carbohydrate counting or the participation in a quality improvement collaborative.

Methods: We included all youth with type 1 diabetes who participated in the annual registrations in the NCDR from 2013 to 2021. The outcome measure was HbA1c. Predictor variables in an adjusted linear mixed-effects model were: (1) the use of diabetes technology, (2) the consequent use of carb counting for meal bolusing, and (3) whether the patient's diabetes team has participated in a quality improvement collaborative.

Results: From 2013 to 2021, data from 5,873 youth with type 1 diabetes were registered, resulting in 24,222 yearly follow-up visits. The number of youths registered per year increased from 2,461 in 2013 to 3,054 in 2021. There was decrease of mean HbA1c in our study population from 66.6 mmol/mol (2013) to 56.9 mmol/mol (2021). The percentage of youth reaching ISPAD's HbA1c target of <58 mmol/mol and

<53 mmol/mol increased from 29% and 13% in 2013, to 60% and 36% in 2021, respectively. Insulin pump use increased from 65% (2013) to 87% (2021). CGM use increassed from 34% (first registered in 2016) to 96% (2021).

The percentage of youth and families using carbohydrate counting increased from 78% to 90%. The use of CGM, carbohydrate counting and participating in a quality improvement collaborative were associated with lower HbA1c.



Conclusions: Over a period of 9 years, glycemic control in Norwegian youth with type 1 diabetes, reflected by mean HbA1c and HbA1c in target, has improved. The use of CGM, carbohydrate counting and participating in a quality improvement project were associated with better metabolic control.

P-372 | Improved outcomes among children with new-onset type 1 diabetes via the 4T program

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Introduction: Most US children with type 1 diabetes (T1D) do not meet glycemic targets.

Objectives: We evaluated data from three clinics with robust quality improvement programs who participate in T1DX Quality Improvement Collaborative. One clinic had a systematic program (4T: Teamwork, Targets, Technology, Tight Control) focused on improving CGM access, communication of aggressive targets for glycemic control, weekly identification of patients at risk based on CGM metrics, and remote communication with at-risk individuals.

Methods: We included all patients with available data, aged 6 months to 21 years newly diagnosed with T1D between 1 June 2014 and 28 December 2016 (Historical) and 13 June 2020 and 5 March 2022 (Present). We determined the proportion of patients who achieved HbA1c < 7% at 12 months (±45 days) in the historical and present cohorts in each clinic.

Results: At diagnosis of T1D, for Stanford (1), the Barbara Davis Center (2), and Children's Mercy (3), respectively, mean age was 10.2 (IQR 6.6-12.8), 10.1 (6.7-13.1), and 12.1 (8.4-15.5) years; male sex was 52, 56, and 55%; HbA1c was 11.3 (SD 2.5), 12.9 (2.5), and 11.3% (2.9); and 29.8, 31.4, and 26.3% had public insurance.

At 12 months technology use increased from 37.5 to 100% (CGM) and 32.7 to 49.6% (pump) (1); 35.5 to 81.1% and 36 to 45.6% (2); 18.6 to 83.4% and 41.7 to 48% (3). The proportions of patients achieving HbA1c < 7% at 12 months are shown by clinic and time period in Figure.

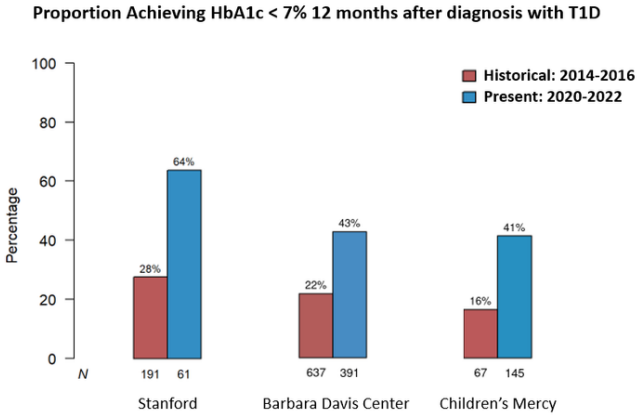

Figure 1. Proportion achieving HbA1c <7% 12 months (+/- 45 days) after diagnosis with T1D. Sample sizes (N) are displayed below each bar graph. Stanford implemented the 4T program in 2018.

Conclusions: The proportion of patients achieving HbA1c < 7% improved at all clinics. Incomplete HbA1c data limit conclusions. The 4T program appears to augment other improvement efforts and requires multi-center study for translatability. Whether improved glycemic control in the first 12 months post-diagnosis translates to sustained benefits requires longitudinal study.

P-374 | Digital transformation of pediatric diabetes care through a value-based health care model (CloudCare®)

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Introduction: CloudCare® is an integrated patient management solution developed by Diabeter that embeds brand agnostic data from diabetes devices to provide person-centered diabetes care based on a continuous triage guided by an algorithm and a decision support system both for patients and HCP.
As a result, patients may benefit of having an individualized approach to the traditional 3-4 visits a year care-model, by skipping some visits when possible or having access to the diabetes team as soon as needed.
This approach may reduce the burden both for patients and HCP and simultaneously could be to improve diabetes outcomes and at same time to reduce economic costs.
Objectives: To describe clinical outcomes in a cohort of children and adolescents with T1D at a large diabetes clinic following the implementation of a VBHC model through the use of CloudCare®
Methods: Observational study with prospective data from patients followed-up at a large diabetes clinic in Spain collected before and 14 months (September 2021-November 2022) after the implementation of a VBHC model based on CloudCare®.
Participants signed informed consent to analyze their clinical and sensor data as part of their standard care.
Results: Data from 546 subjects were analyzed (mean age 12.25y; mean diabetes duration 4.8y; 72% MDI+CGM; 15% SAP; 13% AID).
Mean triaged patients: 156+/-56/day. % of subjects achieving HbA1c<7% increased (22% vs 38%; p<0.01); mean HbA1c decreased (7.65 vs 7.54%; p<0.01); mean TIR increased (53% vs 61.5%; p<0.05); SH and DKA rate decreased (1.4 vs 0.3 and 0.8 vs 0.4 ep/patient-year, respectively);
On-site visits decreased by 33%; hospitalization at onset decreased by 2.7 days; ER visits due to diabetes decreased by 59%. The algorithm suggested ad-hoc virtual appointments for 9.3+/-3.2 participants/day.
Conclusions: The use of CloudCare in a large pediatric diabetes clinic was associated to improved glycemic outcomes and resulted in an optimization of efforts by patients and HCP to achieve those outcomes.

P-389 | FAITH: A comprehensive care model for dual diabetes management

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Introduction: Dual diabetes, the coexistence of type 1 diabetes and type 2 diabetes, poses unique challenges and complexities in diabetes management. While the traditional management strategies for type 1 and type 2 diabetes have been extensively studied and implemented, there is a growing recognition of the need for specialized care models that focus on dual diabetes. In response to this need, the FAITH (Food and water, Activity and sleep, Insulin dosing, Time in range, Happiness) model of diabetes management has been developed by me.
Objectives: This study aims to evaluate the effectiveness and outcomes of the FAITH model of diabetes management, developed based on my personal experience, expertise, and insights, in the comprehensive care of patients with dual diabetes, assessing its impact on glycemic control, quality of life, and reduction of diabetes-related complications.
Methods: A comprehensive research approach was employed to investigate and validate the FAITH model.
The existing literature, including clinical trials, observational studies, and expert consensus guidelines, was reviewed to gather evidence supporting the effectiveness of the individual components of the FAITH model.
Results: Studies demonstrate that optimizing and integrating strategies for food and water management, promoting physical activity and healthy sleep patterns, precise insulin dosing, monitoring time in range, and addressing psychosocial well-being are associated with improved outcomes in individuals with dual diabetes.

Conclusions: The research strongly supports the adoption of the FAITH model, as a comprehensive care approach for individuals with dual diabetes. By incorporating evidence-based strategies for food and water management, optimizing activity and sleep patterns, precise insulin dosing, monitoring time in range, and promoting happiness and psychosocial well-being, the FAITH model effectively addresses the multifaceted needs, with the potential to improve glycemic control, reduce complications, and enhance quality of life.

P-400 | Evaluation of the effect of adding long subcutaneous insulin to the standard treatment of diabetic ketoacidosis in children

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Introduction: Type 1 diabetes (T1DM) is one of the most common chronic diseases in childhood and approximately 80,000 new cases occur annually in children and adolescents under 15 years of age in the world. The frequency of diabetic ketoacidosis **(**DKA) at the onset of T1DM has been reported from 12.8% to 80% worldwide.
The hospitalization rate of diabetic patients with DKA continues to increase despite the many advances in insulin production and diabetes control in recent decades.
Objectives: The efficacy and safety of adding two different types of subcutaneous long-acting insulin to the standard treatment of diabetic ketoacidosis (DKA) in children were investigated.
Methods: In the pediatric intensive care unit (PICU) and under close monitoring, the effect of adding insulin detemir and glargine in the early hours to the standard treatment of DKA was compared with the control group in terms of reducing the recovery time of ketoacidosis and possible side effects.
Results: The results of the analysis showed that there was a significant difference in the average time of the acute phase between the groups, and the post hoc test showed that the acute phase time was significantly shorter in the Levemir arm compared to the standard arm (p = 0.008), but there was no difference in the increase in the incidence of common complications due to the nature of the disease and the treatment process with the new method.
Conclusions: It seems that adding some types of long-term subcutaneous insulin to the standard treatment of DKA in children shortens the resolution time of the acute phase of ketoacidosis without imposing complications and as a result, occupies less beds in the pediatric intensive care unit.

P-039 | Differences in managing type 1 diabetes among children in Danish schools

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Introduction: Managing type 1 diabetes is complicated for most children and their families - and will often require support from an adult during the school day. This situation is challenging for the primary school personnel as well as for the child and the parents.
Objectives: To examine differences between schools in daily management and support of diabetes among children in Danish primary schools.
Methods: The Kids with Diabetes in School (KIDS) project is a multicenter project including all Steno Diabetes Centers in Denmark and the Danish Diabetes Association. All primary schools in Denmark were invited to participate in the study (n=2129, response rate 43.3%) by responding to a questionnaire. Data from 524 schools with children with diabetes is included.
Results: We found several differences in diabetes management between schools according to self-reported wealth and school size. A larger proportion of schools with low wealth did not have guidelines for diabetes management compared to schools with high wealth (78% vs. 70%). The same applied to large

vs. small schools (81% vs. 71%). Further, a larger proportion of schools with low wealth vs. high wealth (19% vs. 10%) as well as small vs. large schools (25% vs. 15%) had not received education in diabetes management. Similar associations were found in relation to experiences by the school personnel of having sufficient time to familiarize with diabetes in general, having sufficient time to familiarize with supporting a specific student with diabetes, and to support students with diabetes during school hours.

Conclusions: Differences in managing diabetes among schools can lead to unequal opportunities for children with diabetes and larger workloads on parents in terms of managing and supporting their children during school hours. There is a need for improvement in supporting schools in order for them to relieve stress among children with diabetes, their parents, and the school personnel.

P-040 | Diabetes and school health (DASH) Program: an innovative school-based care coordination program to optimize care and reduce inequities for youth with type 1 diabetes

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Introduction: The Nationwide Children's Hospital (NCH) Diabetes and School Health (DASH) program is a novel health equity strategy and school-based program.

Objectives: The inter-disciplinary approach provides on-site type 1 diabetes (T1D) education to students/staff, addresses medical/psychosocial concerns, coordinates scheduled delivery of medications/supplies, and facilitates communication among families, school staff and diabetes team.

Methods: The pilot year enrolled 56 students, in over 35 schools in central Ohio. All 56 students were identified as high risk based on their low Diabetes Composite Score, a novel risk assessment tool developed by NCH (score <10, indicating increased risk). Data was obtained for students, caregivers, and staff, including A1C, acute care utilization, educational mastery, psychosocial, and health equity measures.

Results: Close to 300 school based T1D visits took place during the pilot year. 65% of the T1D DASH population was identified as an ethnic minority. Median Diabetes Composite Score increased by 2 points indicating decreased risk of complications. Median number of follow up diabetes clinic visits increased by 4.5 over the pilot year. Median A1c improved from 12.4 to 11.9%. Regular continuous glucose monitor use increased from 16% to 55% of the DASH population. Skill improvements were noted with school caregivers and students for blood glucose meter monitoring/patterns, managing the continuous glucose monitor, confidence with T1D care, and decreased caregiver worry about T1D complications, per the Diabetes School Caregiver Management Perception (DSCMP), Problem Areas in Diabetes (PAID), and Self Efficacy in Diabetes (SEDE) surveys.

Conclusions: DASH is a novel school-based program that provides care coordination, support, education, and oversight to students at high risk of T1D complications. The program has been effective improving diabetes clinic attendance, increasing school staff and caregiver comfort with diabetes technology and care, and decreasing risk of complications.

P-256 | Health-related quality of life in elementary school students with type 1 diabetes and their families

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Introduction: It is very difficult to achieve a good quality of life (QoL) in children who are primary school students and concurrently on the way to reach puberty and autonomy in the management of their disease.

Objectives: This study aims to evaluate patients` self-reported and parent-proxy reported QoL and their correlation with different factors, in elementary school students with T1D.

Methods: This cross-sectional study included patients younger than 15, diagnosed with T1D in the period January 1992-April 2021 in Montenegro. A total of 87 patients and the same number of their caregivers completed questionnaires (Peds-QL Diabetes Module 3.2, Peds-QL Family Impact, general data).

Results: The majority of patients were boys (62.1%), inhabiting urban regions of the country (73.6%), with

a median of age 12.4 years. The median disease duration was 4 years and the majority of patients were on multiple injections insulin therapy (92%). The longer duration of the disease correlated with higher HbA1c (p=0.037) and lower parental Total Score on the PedsQl Diabetes Module (p=0.011). A significant difference between patients` and their caregiver`s QoL perception was not observed. At least one parent was unemployed in 37.9% of patients. Almost every third mother was unemployed and it led to lower HbA1c levels (p=0.047). PedsQl 3.2 Diabetes Module Total score, Treatment I and Management Summary Score were significantly higher in children of unemployed mothers.

Conclusions: This study highlights that with a longer duration of the disease elementary school children with T1D digress from optimal metabolic control and at the same time their parents/caregivers` QoL slumps. Parental unemployment positively impacted the QoL of students with T1D, but the unemployment rate is high, especially among mothers. We suggest more attention for both, children with T1D and their caregivers, in healthcare planning as the time from diagnose cognition passes.

P-299 | Diabetes in school: developing recommendations for how to coordinate communicative support for families with a child with T1D in school (the KIDS study)

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Introduction: The KIDS study has previously explored the support provided for children with T1D and their families in Danish schools, via: 1) an interview study with municipal employees about the organization of- and experience with supporting families, 2) a survey examining the organization of diabetes management in primary schools, 3) a survey among parents focusing on worries during school hours.

Objectives: Based on the findings from these studies, the objective of the present study was to explore possible solutions to identified problem areas and define recommendations for practice.

Methods: Participatory workshops were organized in each of the five regions in Denmark to facilitate reflective dialogue. Relevant stakeholders were invited to take part in the workshop: 1. Municipal employees, 2. School employees (teachers, social workers and managers), 3. Diabetes healthcare professionals from the pediatric clinic and 4. Young people with T1D and their parents. In the workshops the participants were systematically encouraged to: 1) Discuss support for children – based on their own experiences and 2) Propose concrete solutions to problems discussed in the exercises. The workshops were audio recorded, transcribed, and thematically analysed.

Results: Six themes were identified: 1) Professional training in diabetes care is needed for inclusion of children with T1D in the school setting, 2) Responsive dialogue, joint decision making and realistic expectations are essential components, 3) A designated person responsible for co-ordinating the child's care at school is beneficial, 4) National alignment is needed, 5) There is a need for specialised municipal diabetes teams, and 6) Special attention is needed at defining points during the school years.

Conclusions: The overall recommendation is that an action plan is agreed upon within the first two weeks after diagnosis. The plan should preferably be agreed upon on a face-to-face network meeting involving the family and relevant stakeholders from municipality, school and hospital.

P-044 | Out-of-pocket expenses and rationing of insulin and diabetes supplies: findings from the 2022 T1International cross-sectional web-based survey

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Introduction: Previously, the study team found people with type 1 diabetes (T1D) reported significant out-of-pocket expenses (OoPEs) and rationing of insulin and diabetes supplies, made worse by COVID-19.
Objectives: Continue investigating self-reported OoPEs and underuse of insulin and diabetes supplies for people with T1D.
Methods: An online cross-sectional survey was promoted by T1International's global network of patient advocates from May through September 2022. Participants provided monthly OoPEs for insulin and diabetes supplies, rationing frequency of insulin and glucose testing supplies, impacts of the COVID-19 pandemic, and open-ended comments.
Results: Analysis focused on 731 responses across seven countries: the United States (US), India, the United Kingdom (UK), Sweden, Canada, Panama, and Germany. Highest median monthly OoPEs (250.3 USD) were reported by participants with partial health care coverage, followed by no health care coverage (201.8 USD), and 0 USD (median) by those with full health care coverage.
Median monthly OoPEs were highest in Panama (340 USD), followed by the US (269 USD), Canada (192.1 USD), and India (175.5 USD), and were very low in Germany (5.5 USD), the UK (0 USD), and Sweden (0 USD). Insulin rationing was reported only by participants in the US (22.9%), Panama (18.2%), India (14.8%), and Canada (14.6%).
Rationing of glucose testing supplies varied widely, from 48.4% of participants in India to just 6.1% in Sweden, and was reported in all countries. COVID-19 affected access and/or affordability of insulin and diabetes supplies for more than half of participants.
Qualitative analysis of open-ended responses identified themes that enrich quantitative results, including limits to life choices due to OoPEs.
Conclusions: More than 1 in 6 rationed insulin and nearly 1 in 3 rationed glucose testing supplies, even among participants from mostly high-income countries. Our results show a stark divide in OoPEs depending on level of health care coverage, and OoPEs correlate with rationing frequency.

P-046 | Expansion of public insurance coverage of continuous glucose monitor reduces health disparity in children with type 1 diabetes

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Introduction: Continuous glucose monitor (CGM) is accepted as the standard of care in people with type 1 diabetes (PWT1D). CGM utilization is lower in patients with public insurance and minorized ethnicities. In 2022, California Medicaid (public insurance) expanded CGM coverage to all PWT1D without requiring a minimum number of glucose tests per day. It is unknown if this policy change is sufficient to increase CGM usage.
Objectives: We hypothesize that Medicaid expansion narrowed but did not eliminate the disparity in CGM usage.
Methods: Data was extracted from electronic medical record of a large urban children's hospital in 2021 and 2022. CGM usage was determined based on clinician documentation or the presence of CGM downloads.
We limited the data query to PWT1D who were seen at least once in the diabetes clinic each year. Chi-square and student T-tests were used to determine statistical significance ($P<0.05$).
Results: We included 1471 and 1355 PWT1D in 2021 and 2022, respectively. Medicaid insured 66.8% and 62.2% of the patients in 2021 and 2022, respectively. CGM usage increased 1.4-fold in the entire patient population (2021: 52.2%, 2022: 71.1%).
Between 2021 and 2022, CGM usage increased 1.6-fold (39% to 63%) and 1.1-fold (77% to 85%) for those with Medicaid and private insurances, respectively. CGM usage increased in all race/ethnicities, with

the largest increase seen in patients who identify as Black and Latino (2021 vs 2022: White 69% vs 83%, Latino 38% vs 60%, Black 15% to 50%, P£ 0.0001 for all comparisons). CGM usage increased 1.3-fold (58% to 74%) in English speakers and 2.1-fold (29% to 59%) in non-English speakers.

Conclusions: Our results demonstrate that Medicaid expansion of CGM coverage increases its utilization for pediatric PWT1D. Despite increased CGM usage in marginalized community, disparity persists among patients with public insurance, minority races/ethnicities, and non-English language. Future studies are needed to identify barriers that preclude equity in technology uptake.

P-047 | Does size matter? Hospital volume in pediatric diabetes care and costs

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Introduction: Pediatric diabetes care has become increasingly specialized as a result of multidisciplinary care and technological developments. Guidelines recommend sufficient experience of treatment teams, as centre size is known to influence treatment outcomes.

Objectives: This study evaluates the association between hospital volume, resource use and hospital expenditure of Dutch children with diabetes mellitus.

Methods: Observational retrospective cohort study with hospital claims data of 5,082 children <18 years old treated across 44 Dutch hospitals between 2019–2020.

Hospitals were categorized into three size categories; small (≥20–100 patients), medium (≥100–200 patients) large (≥200 patients). All-cause hospitalizations, consultations, technology use, and hospital expenditure were analysed per volume category and adjusted for age, sex, and socio-economic status (SES).

Results: Hospitalization rates were lowest in large hospitals, and patients were hospitalized significantly less often compared to small hospitals (adjusted OR 0.49; [95% CI 0.40–0.59]; p<0.001). The median number of outpatient pediatrician visits in a year was 7 in large hospitals and 6 in small hospitals. Patients in large hospitals more often had ≥7 yearly consultations (adjusted OR 1.63; [95% CI 1.41–1.89]; p<0.001).

Real-time continuous glucose monitoring use was highest in medium-sized hospitals (adjusted OR 1.30; [95% CI 1.12–1.53]; p<0.001), whereas no difference in pump usage was observed.

Mean diabetes care expenditure per patient was highest in medium size centres (€5,642, interquartile range €1,947–6,944); the significant mean difference in diabetes care costs was attenuated after adjustment for age, sex, and SES.

Conclusions: Characteristics of care provision vary by hospital size. A dissemblance in diabetes populations may explain differences in diabetes care expenditure due to hospital volumes.

Further research is needed to study the impact of volume-related differences in resource use on clinical outcomes.

P-049 | Type 1 diabetes in Guinea - changing diabetes in children

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Introduction: Type 1 diabetes (T1D) in Africa is characterized by misdiagnosis and lack of access to life-saving insulin therapy for those diagnosed. In this context, the Changing Diabetes in Children (CDiC) program has been implemented in several countries, including Guinea since 2009.

Objectives: To assess the burden of T1D and provide an overview of accessibility and affordability of care for people living with T1D in Guinea since the start of the CDiC partnership in 2009.

Methods: We assessed the burden of T1D with data collected from a national registry implemented in 2009. We additionally conducted 2 cross-sectional surveys in November 2021 to assess the accessibility and affordability of diabetes care for T1D. The first survey was conducted on 13 public and 30 private pharmacies throughout Guinea to understand availability and cost of care and medical supplies. The second survey was conducted by direct interviews on 90 youths rolled-out from the CDiC program at age 25, to assess "the real-life" affordability of diabetes care for T1D in Guinea.

Results: As of April 30, 2023, a total of 1,243 children have been diagnosed and treated with comprehensive type 1 diabetes through the CDiC partnership since 2009. On average, children enrolled in CDiC visit a clinic monthly, HbA1c average improved from 10,6% in 2010 to 8.3% in 2014 and mortality dropped from 25% (2010) to 3.8 % (2017). An estimated yearly cost of **$** 1525 was found for T1D supplies per individual. Among patients rolled-out from the program, the prevalence of poor glycemic control increased from 65 % to 78 % with access to insulin as the main difficulty (58%).

Conclusions: The CDiC partnership allowed a better access to T1D care in Guinea by providing medical supplies such as insulin, glucometers, strips and HbA1c testing. Our survey throughout pharmacies in Guinea shows that CDiC saves families - with 1 child with T1D - an estimated yearly cost of **$** 1525. However, there is still challenges remaining, particularly for the quality of care.

P-297 | Exploring the challenges of access to care and regular clinic follow-up for type 1 diabetes patients during crisis: a case report from Myanmar

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Introduction: Type 1 diabetes is a chronic condition that requires lifelong management and regular monitoring to prevent serious complications. However, in Myanmar, access to care and regular clinic follow-up is often limited, and patients may face numerous challenges, especially during times of crisis.

The ongoing political crisis in Myanmar has resulted in a significant disruption of the healthcare system, making it difficult for type 1 diabetes patients to access care and adhere to regular clinic follow-up.

Objectives: This case report is to explore the challenges faced by type 1 diabetes patients in accessing care and adhering to regular clinic follow-up during the ongoing political crisis in Myanmar.

Methods: The study employed convenience sampling to select 22 participants who enrolled under Changing Diabetes in Children program in Myanmar.

Data were collected using an unstructured questionnaire and physical examination, while qualitative data were analyzed through content analysis. In-depth interviews were conducted to gather data.

Results: Most of the patients who were found had stopped following up due to difficulties related to the coup, including transportation problems and financial difficulties. Some patients were managing their diabetes through self-treatment with insulin pens purchased from private pharmacy, while others had reverted to less expensive but less effective insulin.

Conclusions: The ongoing political crisis in Myanmar has exacerbated the challenges faced by type 1 diabetes patients in accessing care and regular clinic follow-up.

This report provides insights into the challenges faced by type 1 diabetes patients in accessing care during times of crisis in Myanmar. The results suggest that policymakers and healthcare providers need to

improve access to care model and regular clinic follow-up for type 1 diabetes patients in Myanmar, particularly during times of crisis, to prevent long-term complications and improve health outcomes.

P-359 | Results from a multi-stakeholder meeting on medical devices in paediatric type I diabetes

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Introduction: Automated insulin delivery systems (AIDs) are recommended for all pediatrics by ISPAD guidelines.
Objectives: To discuss all challenges involved with providing children (including the very young) and adolescents with diabetes (CwD) with the latest appropriate technology, such as AIDs, to manage their blood glucose and help improve their quality of life and suggest ways in which access to new types of devices available to adults can be improved for children with T1D.
Methods: In connection to the Advanced Technologies & Treatment for Diabetes congress in 2023 the "connect 4 children" network organized a multi stakeholder meeting to discuss barriers in providing medical devices to pediatrics with type 1 diabetes with a focus on pre-schoolers. After announcement, stakeholders were asked to apply to this meeting. A coordinating program committee planned the meeting and a balanced selection of participants from relevant interest groups attended, including academics, clinicians, industry, regulators, patient advocates.
Results: 125 participants took part in the hybrid in-person/virtual 1-day meeting, in person and by web portal (interest groups:50 academia/research,21 advocates for CwD,26 industry,28 regulatory). Three plenary sessions with 16 presenters and 3 panel discussion with 19 participants were held.
Conclusions: The most advanced appropriate technology is often unavailable to children with T1D in Europe.
Main issues highlighted were:

- Lack of long-term evidence of benefits/clinical effectiveness and safety of AIDs in very young children
- Regulatory approval processes are very lengthy and expensive for sponsors in EU
- Market access is variable across countries, and even within countries, depending on the proximity of patient to specialist centres (or their ability to travel)
- Reimbursement depends on where the patient lives

Results of this meeting will be published and reported to the EU Commission in order to accelerate access to technology and improve therapy for CwD regardless of their age and place of living.

P-394 | Reducing inequalities in access to diabetes technology – a data-driven regional improvement project in the UK

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Introduction: The National Institute for Clinical Excellence (NICE) updated United Kingdom (UK) guidance for children and young people (CYP) with type 1 dia-

betes (T1D) in 2022. It is now recommended that continuous glucose monitoring (CGM) for CYP should be available for all CYP with T1D. Despite this, National Paediatric Diabetes Audit (NPDA) data shows that only 29% of CYP with T1D use CGM, lowest use is in those of non-white ethnicity & from areas of highest deprivation.

Objectives: Development of novel project to reduce inequalities in CGM use across the SE Region where 4848 CYP with T1D are looked after by 23 PDUs in 6 ICBs.

Methods: NPDA data from the SE region was analysed.

SE CYP Diabetes Clinical Leads interviewed clinicians, managers & commissioners from Integrated Care Boards (ICBs) and Paediatric Diabetes Units (PDUs) with lowest CGM use.

PDUs were asked to complete a survey about their access/use of CGM

Results: The SE has less deprivation & non-white representation than other areas of the UK. CGM use does not follow deprivation/ethnicity. In areas of low CGM use, it is low across all patient groups. Although the SE has a higher CGM use than UK average (33% vs. 29%), this is not consistent across the region with one ICB showing just 15% CGM use. Significant variation in CGM use exists between PDUs.

Barriers to CGM use were identified in 3 main themes:

Staffing – time, skills

Funding (+/- ICB-implemented criteria) of CGM

Specialist team beliefs & practices selecting CYP for CGM

Project development created new regional expert roles (Table 1).

Role	Description
Diabetes Technology Officer (Nurse/ Dietitian)	To work with PDUs to deliver training for healthcare staff and/or support them accessing training elsewhere, to explore current practices of CGM use and if needed to develop them to expand patient numbers using CGM, to develop local CGM pathways and patient education programmes that could optimise current staff availability.
Diabetes Technology Project Manager	Innovation of the CYP Diabetes technology project -to include: supporting project officers to identify current practices in CGM use across PDUs in the SE Region; to establish a centralised reliable mechanism to monitor CGM use across the SE Region in real-time; the development of SE Regional Guidelines for the appropriate use of technology based on NICE Guidelines and accuracy data; to liaise with National Diabetes Programme to align SE processes for CGM funding with nationally developing processes.
Administrator	To support the work of the team and ensure timely data collection to support monitoring of project outcomes

Table 1: CYP Diabetes Technology Project Team.

The project design impacts most CYP possible. Aims are to: explore current practices in CGM use; support PDUs in overcoming local barriers; establish a standardised model of care.

Conclusions: Using data as an indicator, specific barriers to CGM use were identified . A novel team has been designed to drive reduction of inequalities in CGM access for CYP with T1D in the SE Region

P-041 | Effect of postmeal fast-acting insulin aspart on the frequency of hypoglycemia among preschool children with type 1 diabetes: a randomized control trial

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Introduction: A few studies have shown that Fast-acting insulin Aspart (Fiasp®) is better than rapid-acting insulin analogs due to its accelerated pharmacological properties. With its glucose-lowering effect and earlier offset, Fiasp® offers faster onset and earlier peak than Aspart. There are no studies among children with Type 1 diabetes (T1D) below 6 years assessing the efficacy of postmeal injection of Fiasp®.

Objectives: To study the effect of postmeal Fiasp® on the frequency of hypoglycemia compared to premeal Fiasp® among preschool children with T1D.

Methods: A single-center, randomized, open-label, cross-over trial was conducted over one-and-a-half-year on 65 preschool children (6 months to 6 years) with T1D for at least 6 months. Children were randomized to receive their meal bolus postmeal or premeal for the first 3 months, followed by cross-over at 3 months. The two groups were compared at the end of 6 months for the change in frequency of hypoglycemia and hyperglycemia, HbA1c, glycemic variability, and parental satisfaction. Ten children in the study (5 each in the premeal and postmeal groups) underwent pharmacokinetic studies. The trial was approved by the Institutional Ethics Committee and registered with the Controlled Trial Registry of India vide no CTRI/2020/10/028750.

Results: There were no significant differences in the frequency of clinical (p = 0.921), severe (p = 0.167), or serious (p = 0.753) hypoglycemia in the two groups in

the per-protocol analysis. Further, the two groups did not differ in secondary outcome parameters (including insulin doses, HbA1c, frequency of hyperglycemia, glycemic variability, and parental satisfaction). The pharmacokinetic parameters were also similar in the two groups.

Conclusions: To conclude**,** the premeal or postmeal injection of Fiasp® does not affect the frequency of hypoglycemia or other glycemic control parameters among preschool children with T1D. Further, there is no significant difference in the pharmacokinetics of postmeal and premeal Fiasp®.

P-042 | Techniques of insulin omission for weight loss in adolescents with type 1 diabetes according to advances in glucose monitoring devices

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Introduction: Insulin-omission (IO) is an eating disorder in which individuals with diabetes deliberately skip or reduce insulin doses in order to lose weight or prevent weight gain. Adolescents with IO often hide their behavior from family members and healthcare providers, making diagnosis challenging.

Objectives: We aim to describe the techniques adolescents use to conceal insulin restriction according to major advanced in the development of glucose monitoring technologies from the 1980s to 2020s.

Methods: We conducted a literature review using the following keywords: type 1 diabetes, children, adolescents, insulin omission, insulin restriction, misreporting, factitious, diabulimia, and weight loss

Results: In order to conceal their IO behavior, adolescents falsified written glucose level records. With the introduction of glucometers with memory, to hide IO and the elevated glucose levels, adolescents measured the blood glucose of their friends, pets, or calibration fluid, or inserted wrong dates in the glucometers, so it could not be possible to retrieve the data.

With the introduction of continuous glucose monitoring (CGM) systems in the mid-2000s, adolescents inserted decreased amounts of carbohydrates. In 2020, with the increased use of advanced hybrid closed-loop (AHCL) Systems, which have automatic insulin delivery adjustment features, making it even harder for adolescents to conceal their IO behavior by disconnecting the pump to administer a bolus and then reconnecting or deliberately miscalibrating the sensors.

Years	Insulin administration	Glucometer	Methods
1969	Insulin syringes	1st portable glucometer Ames Reflectance Meter	• Falsified data in written logbook/ spreadsheet • Phantom readings • Manipulating glucose test strips • Diluting sample with saliva • Diluting sample with water • Underloading the test strip • Testing friends, siblings, pets, and calibration fluid. • Changing dates in the glucometer • Taking out the battery so data were deleted • Having a few glucometers • Inserting fewer carbohydrates • Changing dates in the glucometer
1983	1st commercial insulin pump was introduced by Medtronic (MiniMed 502)		
1985	The first insulin pen, the NovoPen,		
1996		1st glucose meter that could download test results to a computer using an infrared (IR) cable (Accu-Chek Advantage). It could store up to 100 test results and display them in charts on the computer screen.	
1999		1st CGM system was approved by the FDA in 1999. (Medtronic MiniMed) A sensor inserted under the skin measures glucose levels every 5 minutes	
2006	1st sensor-augmented pump	1st Dexcom	
2018		1st Libre	Avoiding swiping the device
2020	Advanced hybrid closed loop	Data Sharing	Disconnecting the pump False calibrations

Conclusions: The drive to lose weight is so strong, adolescents with type 1 diabetes find ways to bypass insulin administration. It is crucial to recognize the warning signs and techniques of IO, and promptly offer help and treatment in a timely manner.

Thus, healthcare providers must remain vigilant and adopt a multidisciplinary approach to address the complex medical and psychological needs of adolescents with T1D and IO.

P-043 | Where are the dads? a mixed-methods review on the underrepresentation of fathers as caregivers to children with type 1 diabetes

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Introduction: Mothers are often the primary caregiver to children with type 1 diabetes (CWT1D). This larger burden of care often leads to stress, burnout, and negatively affects their child's clinical outcomes. Research shows both familial and clinical benefits when fathers have a larger role in caring for their child with a chronic illness, however, little is understood about fathers' experiences as they are seldom specified in studies on parents to CWT1D.
Objectives: To explore the extent to which fathers are included in studies on parents to CWT1D and to synthesize the existing quali- and quantitative data on fathers as caregivers.
Methods: Qualitative and mixed-methods primary research studies in English and Danish where mothers, fathers, or parents to CWT1D are study participants. Searched databases are: MEDLINE, EMBASE, PsycINFO, SAGE, CINAHL, Anthropology Plus, Anthro Source. Publications are appraised using the MMAT checklist. Quali- and quantitative data are integrated with a graphical synthesis; a narrative approach is used to synthesize qualitative paternal experiences.
Results: Preliminary results identified 233 studies where parent gender was noted: 36 focused on mothers, 5 on fathers, 149 on both parents. An average of 77.4% of participants in parent studies were mothers. Few included socio-cultural explanations for whether or not fathers participated or noted their omission as a limitation.
Conclusions: Preliminary findings highlight the significant lack of inclusion of fathers in studies about CWT1D and their caregivers and may illustrate that the burden of care still lies heavily on mothers. Studies recognizing the benefits of fathers as caregivers seldom address the socio-cultural barriers they may encounter. Future qualitative studies on fathers' experiences from a socio-cultural perspective could provide insight on how to increase the scope of their role as caregivers, thus balancing the burden of care in families, preventing mothers from suffering burnout, and improving their child's clinical outcomes.

P-045 | Decreasing insulin-related adverse drug events (ADEs): a ten-year improvement journey towards reducing ades and optimizing patient safety

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Introduction: Insulin is a high risk medication, and errors in dose administration can cause significant harm. Safe and accurate inpatient ordering and administration of insulin is complex, and Insulin-related Adverse Drug Events (IADEs) can be related to multiple systemic factors.
Ongoing rapid advances in diabetes treatment technologies, sophistication of electronic health record (EHR) systems, and limitations in staff experience are all thought to be major contributors to IADEs.
Objectives: Our aim was to establish a comprehensive system to track and evaluate IADEs and to develop robust strategies to decrease the number and severity of these events. We describe our efforts and interventions over the last ten years (2012-2022).
Methods: Comprehensive, system-wide, interdisciplinary approaches were used to detect, address and reduce IADEs in a large tertiary children's hospital.
An Insulin ADE team was formed to analyze reported events and implement system changes in several key drivers. IADEs were catalogued based on severity, location/unit, and specific historical details of the event.

Interventions ranged from user-level EHR and communication-based to broader systems-level changes in EHR-based insulin dosing and inpatient team staffing. Major interventions are listed in Figure 1.

Results: We tracked IADEs monthly from 2012 to present and noted a decrease in rate of IADEs overall from 1.116 (2012) to 0.476 [per 1000 insulin doses] (in 2022) (Figure 1).

With a few exceptions likely related to challenges over the years of the COVID pandemic, we noted a general downtrend in IADEs over time, despite >10,000 administered insulin doses per year.

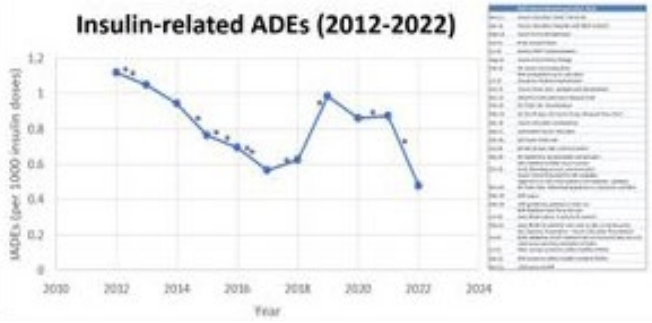

Figure 1.

Conclusions: Decreasing IADEs is a complex but imperative mission for health care institutions. Our journey demonstrates the challenges associated with the drive to achieve near zero harm from ADEs in the setting of the ever-evolving and technically advanced world of diabetes care.

P-048 | How aware are diabetes-care providers of skin reactions in youth with type 1 diabetes using technological devices?

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Introduction: Advances in diabetes-technological devices led to optimizing diabetes care; however, long-lasting skin exposure to devices may be accompanied by increased cutaneous reactions.

Objectives: This study aimed to evaluate diabetologists' and other healthcare professionals (HCPs) confidence and knowledge of dermatological complications caused by technological devices for managing diabetes in children and adolescents.

Methods: A web-based survey was disseminated to diabetes team members by the JENIOUS ISPAD group. The survey included questions on the baseline profile of diabetes providers, and various aspects of their knowledge, awareness, and practical approach to skin reactions, especially contact dermatitis.

A post hoc analysis was applied to investigate differences in the level of awareness on this topic in relation to the professional role of respondents and their experience in diabetes technology.

Results: One hundred-twenty-five response from 39 different countries were collected. Most diabetes-care providers (68.8%) reported paying attention to the appearance of skin adverse events.

Although contact dermatitis was the most frequently reported cutaneous complication, its most common provocative causes are not yet fully known by diabetes-care providers.

All the preventive measures were not clear and, mainly, homogenously put into clinical practice. Almost half of the respondents (42.4%) had discussed the presence of harmful allergens contained in adhesives with device manufacturers. A larger number of diabetes-care providers (49.6%) were uncertain about the effects of skin reactions on glycemic control.

Physicians were more familiar with screening and diagnosing skin reactions than other HCPs (p=0.032 and p<0.001, respectively).

	All responders (n=125)	Diabetes devices use ≤75% (n=74)	Diabetes devices use >75% (n=51)	p-value	Physicians (n=103)	Other HCPs (n=22)	p-value
Screening				0.027*			0.032*
Not familiar	16 (12.8%)	13 (17.6%)	3 (5.9%)		9 (8.7%)	7 (31.8%)	
Slightly familiar	21 (16.8%)	11 (14.9%)	10 (19.6%)		18 (17.5%)	3 (13.6%)	
Moderately familiar	40 (32%)	28 (37.8%)	12 (23.5%)		34 (33%)	6 (27.3%)	
Very familiar	48 (38.4)	22 (29.7%)	26 (51%)		42 (40.8%)	6 (27.3%)	
Diagnosis							
Not familiar	7 (5.6%)	4 (5.4%)	3 (5.9%)	0.167	3 (2.9%)	4 (18.2%)	<0.001*
Slightly familiar	24 (19.2%)	19 (25.7%)	5 (9.8%)		20 (19.4%)	4 (18.2%)	
Moderately familiar	50 (40%)	28 (37.8%)	22 (43.1%)		38 (36.9%)	12 (54.5%)	
Very familiar	44 (35.2%)	23 (31.1%)	21 (41.2%)		42 (40.8%)	2 (9.1%)	

Conclusions: Although diabetes-care providers are quite aware of the chance to develop skin reactions in people with diabetes using technological devices, there are still some unmet needs.
Large follow-up studies and further dissemination tools are awaited to address the gaps revealed by our survey.

P-258 | Parental perception and satisfaction of T1DM management among children and adolescents

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Introduction: The family is considered a significant resource to help children with self-management. Despite a lot of research studies show the importance of family support for diabetic management in children with T1D. There have been significantly less studies that assess the level of parental knowledge and their perception of the disease.

Objectives: To evaluate parental knowledge, behavior, and perception of diabetes management in children and adolescents with T1DM.
Methods: A qualitative study with one-to-one, semi-structured interviews for 20–45 minutes was conducted via phone by well-trained personnel. Appendix A included demographic questions about participants. Appendix B included 11-items questionnaire. Two researchers separately examined the data. Using the NVivo® programme, the researcher thematically examined the data. The major themes and underlying sub-themes were determined.
Results: Theme 1: Role of Parents in T1DM.
Some parents are entirely in charge of the management. One mother reported that she resigned from her job to be able to provide better care for her child with diabetes.
Theme 2: Parent's Knowledge of T1DM.
The common theme was the poor diabetes education at diagnosis and follow up visits. Some parents had to look up the information from different resources including websites, social media ..etc. Other parents reported having challenges with the carb counting
Theme 3: Parent's Perception of T1DM.
Parents perceive diabetes as a disease that very difficult to deal with.
Theme 4: Barriers to T1DM.
lack of good communication and guidance on how to deal with the disease.

Demographic categories		Frequency	Percentage (%)
Gender	Female	10	53
	Male	9	47
Age	0 - 4 years	1	5
	5 - 9 years	8	42
	10 - 14 years	7	37
	15 - 19 years	3	16
Duration of Illness	0 - 1 year	8	42
	2 - 3 years	7	37
	Above 4 years	4	21
Insulin delivery	MDI	16	84
	pump	3	16
Insulin Dose Measurement	Fixed doses	6	32
	Carb Counting	13	68
HgA1c	< /= 7.5	4	21
	>7.5	15	79

Table 1. Demographic characteristics of the participants (N=19).

Conclusions: The top three sub-themes that were raised by parents: uncontrolled DM, lack of adequate supply, and poor education.
So, It is crucial that Ministry of Health engages policymakers and health insurance providers in enhancing insurance coverage of diabetes management and make it more thorough including providing more formal diabetes education classes with specialized diabetes educator.

P-315 | Transient neonatal diabetes mellitus caused by KCNJ11 mutation; when to restart therapy?

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Introduction: Neonatal Diabetes Mellitus (NDM) is a form of monogenetic diabetes and mostly diagnosed under age of 6 months. Mutations in KCNJ11 gene are a relatively common cause of NDM. KCNJ11 encodes the Kir6.2 subunit of the potassium channel; this channel regulates glucose-dependent insulin release from the pancreatic beta-cells into the blood.
Transient NDM (TNDM) typically remits in the first year of life and relapses in puberty. Of clinical importance, infants with KCNJ11 mutations are sensitive to sulphonylurea therapy.
Results: Case**:** A term born baby girl presented at the age of 6 weeks with diabetic keto-acidosis. She was started on insulin s.c. and, after a KCNJ11 mutation was identified (R50Q), switched to oral glibenclamide at the age of 3 months (0,025 mg/kg twice daily). At the age of 6 months, diabetes remitted and medication could be stopped.
Follow-up consisted of periodic- and sick day glucose measurements and yearly one week continuous glucose monitoring (CGM).
Aged 15, CGM time-in-range (TIR, glucose 3,8-7,8 mmol/L) had decreased from 88 to 71%. She reported no complaints. She recently restarted glibenclamide, whereafter TIR improved to 83%.
Conclusions: Treatment of TNDM aims to diminish hyperglycemia (which our patient thus far has not had) and to prevent long-term complications of nefropathy, retinopathy and neuropathy. Patients with TNDM tend to develop less complications compared to patients with permanent NDM. The slowly progressive decrease of TIR raised the question when to restart treatment. We are not aware of a consensus statement on this topic and applied shared decision making with the patient and her parents. Does the re-initiated treatment stand as an example of adequate prevention of long term complications, or is it a form of premature medicalization?

P-401 | The effect of health literacy of caregiver parents of children and adolescents with type 1 diabetes on glycemic control

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Introduction: Some studies conducted on adults with diabetes have suggested that health literacy is an important parameter in the follow-up of diabetes. However, few studies have examined the literacy level of parents of children with type 1 diabetes and its effect on diabetes control.
Objectives: This study aimed to evaluate the level of health literacy of caregiver parents of children and adolescents with type 1 diabetes and the relationship between health literacy and glycemic control.
Methods: Sociodemographic data form and Turkey Health Literacy Scale (TSOY-32) were filled in online by the caregiver parents of diabetics aged 1-18 years, who have been followed up with the diagnosis of T1DM in our outpatient clinics for at least 1 year. Formula and index calculations of the TSOY scale (insufficient health literacy 0-25; Problematic/ Limited health literacy >25-33; Adequate health literacy >33-42; Excellent health literacy >42-50) were arranged in four groups. The metabolic control status of the patients and their scale scores were compared.
Results: One hundred thirty parents with a mean age of 39.1±6.4 years participated in the study. The mean age of diabetics was 11.6±4.1 years and the mean diabetes age was 4.8±3.8 years. The mean TSOY-32 index score was 34.5 (16-50). 10% (n=13) of the participants were inadequate, 31.5% (n=41) limited-problematic, 36.9% (n=48) adequate, 21.5% (n=28) had excellent health literacy.
No correlation was found between the index score and age of the parents, educational status, and hba1c. However, there was a negative correlation between the index score and severe hypoglycemia

and the number of hospital admissions due to hypoglycemia (r=-0.285 and -0.245; p= 0.01 and 0.06, respectively).

Conclusions: Contrary to the literature, no relationship was found between glycemic control and health literacy levels in our study. This may be due to the fact that the scale used in our study is different from the scales used in studies suggesting a relationship between health literacy and glycemic control

DIABETES THERAPY AND PREVENTION

P-243 | Efficacy and safety of idegaspart to optimise glycaemic control in type 1 diabetes patients: case series

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Introduction: Insulin degludec/insulin aspart (IDegAsp) is a new combination, formulated with ultra-long-acting insulin degludec and rapid-acting insulin aspart, with peculiar pharmacological features, clinical efficacy, safety, and tolerability.

Objectives: To evaluate the efficacy and safety of the IDegAspart in patients with type 1 diabetes.

Methods: 16 patients' data were collected in 24 months duration from the case record section retrospectively. Patient demographic details along with baseline glycemic parameters and medications were studied. Inclusion: Type 1 diabetes, Age: more than 16 years, Duration: more than 1 year with the disease

The study was carried out retrospectively at Arogyam Health Care Centre-a tertiary diabetic clinic in Ahmedabad, India. These patients were prescribed with IDegAsp once along with bolus insulin, to achieve the targeted blood glucose range. Before that, most of the patients were on a premix insulin regimen and some of them were on basal-bolus treatment. Patients were advised SMBG, diet control & moderate exercise. The dose was titrated whenever required telephonically if FBG was above 130 mg/dl & PPG was above 180mg/dl. These patients were studied for 2 years and follow-up was scheduled every 3 months.

Results: The mean HbA1C at baseline was 10.19%, FPG 192.68 mg/dl and PPG 274.68 mg/dl. After follow-up at 6-7 months, the mean decrease in HbA1C was 1.67%, FPG 40.37mg/dl and PPG 80.12 mg/dl. The change in body weight was a marginal and numerically lower rate of hypoglycaemia.

Conclusions: IDegAsp provides similar, non-inferior glycemic control to a standard basal–bolus regimen in patients with type 1 diabetes mellitus, with additional benefits of significantly lower episodes of hypoglycemia (particularly nocturnal) and fewer daily insulin injections.

O-30 | Virtual reality's impact on children with type 1 diabetes: a randomized cross-over trial on anxiety, pain, adherence, and glycemic control

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Introduction: For children with type 1 diabetes (T1D), pain and needle phobia can cause postponing of changes in insulin pump infusion sets and continuous glucose monitors, and thus worsen glycemic control.
Objectives: We aimed to assess the effectiveness of virtual reality (VR) technology, in reducing pain and anxiety, and improving regimen adherence and glycemic control among children with type 1 diabetes (T1D).
Methods: Children with T1D, managed with continuous glucose monitoring and insulin pumps, were recruited for a randomized cross-over trial. Children were randomized to one of two interventions for diabetes management: group 1 used VR glasses first and group 2 listened to vocal-guided affective imagery first (audio). After 1 month, the interventions were crossed over.
The outcome measures included pain and anxiety assessment, regimen adherence, glycemic control, and patient-reported outcome measures (PROMs) of VR satisfaction and effectiveness.
Results: Forty children, mean age 11.4 ± 1.8 years, participated. During the VR part, the monthly mean pain score compared to the baseline improved in both groups by 30% (p=0.03). A 14% reduction in the state anxiety score was observed from baseline to 1 month in both groups (p=0.009). Glycemic control measures including time in range, time above range, and glucose management indicator improved in both groups during the VR part (p<0.004 for all measures), compared to the audio part.
After one month, the patient-reported outcome measure (PROM) of satisfaction and effectiveness was 6-fold higher after 1 month in group 1 compared to group 2 (p=0.002). Regimen adherence improved for both groups.
Conclusions: VR was shown to be effective in reducing pain and anxiety, improving regimen adherence, PROM, and glycemic control among children with T1D. We suggest incorporating VR technology in pediatric diabetes clinics to facilitate and improve coping and management of diabetes.

O-48 | Effect of probiotic on glycemic control in children with type 1 diabetes : randomized controlled trial

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Introduction: Studies in animal models and humans with type 1 diabetes mellitus (T1DM) have shown that probiotic supplementation leads to decreased proinflammatory cytokines (responsible for damaging β-cells of the pancreas), improved gut barrier function, and induction of immune tolerance.
Objectives: To study the effect of supplementation of probiotics in children with T1DM on glycemic control, insulin total daily dose (TDD) and lipid profile.
Methods: A single-centered, double-blinded, and randomized controlled trial was conducted in children (2–12 years) with T1DM (mean diabetes duration: 4.91 ± 2.11 years). Ninety children (45 in each group) were randomized and allocated to control or intervention groups.
The intervention group received oral probiotics containing lactobacillus acidophilus La-14 (10^8 CFU) 0.5 mg once daily for 3 months.
Both groups were followed-up for 6 months with assessment of HbA1c, mean blood glucose (MBG), insulin TDD, and lipid profile.
Results: Both groups were well-matched regarding baseline clinical characteristics and laboratory parameters ($p > 0.05$). At 3 months following the intervention, there was a significant decline in MBG (170 vs. 187 mg/dl; p=0.05), and insulin TDD (1.1 vs. 1.4 U/kg/day; p= 0.04).
However, there was no significant change in HbA1c % (9.8 vs. 10.2 %; p = 0.2). At 6 months following the intervention, we found a significant decrease in MBG (145 vs. 192 mg/dl; p=0.003), HbA1c % (8 vs. 10.5 %; p=0.002) and a significant decline in insulin TDD (0.9 vs. 1.3 U/kg/day; p= 0.006) in the interven-

tion group when compared with the control group. Serum triglycerides, total cholesterol, and LDL were significantly decreased in the probiotics group than control group (121 vs. 188, 213 vs 318, 113 vs. 149 mg/dl; *p*=0.001, respectively). Serum HDL was significantly increased in the probiotics group (76 vs. 43 mg/dl; *p*=0.001).

Conclusions: Probiotics supplementation improved blood glucose levels, glycemic control, and lipid profile. Thus, probiotics could be an effective adjuvant therapy in children with T1DM. However, more studies with an extended intervention period are warranted to assess probiotics' sustained effect over time.

P-081 | Effect of metformin adjunct therapy on cardiometabolic parameters in indian adolescents with type 1 diabetes: a randomized controlled trial

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Introduction: Various studies have reported development of insulin resistance(IR) in type-1 Diabetes(T1D). IR accelerates microvascular complications in T1D. Indians are inherently at risk due to higher tendency of IR development compared to Caucasians.

Objectives: To study effect of adding Metformin to insulin therapy in Indian adolescents with poorly-controlled T1D on glycemic control, insulin sensitivity(IS), cardiometabolic parameters, body composition.

Methods: Randomized controlled trial (9 months).

Inclusion: Age:10-19 yrs, T1D duration>1yr, HbA1c>8%

Exclusion: Complications, Metformin intolerance. Participants were age, sex, duration, BMI, HbA1c-matched & randomized to Metformin/Placebo (n=41 each) groups.

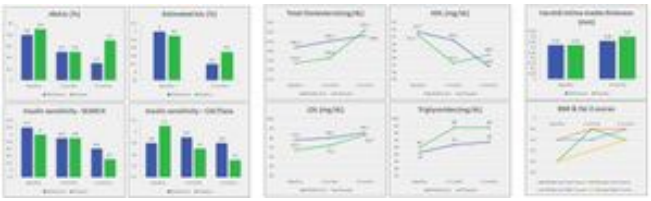
Results: Baseline- Age:14.7±3y (40 females); diabetes duration:5.3±2.2 & 5.1±2.2 y; HbA1c:9.8 & 9.9% (Metformin v/s placebo respectively).

Endline- **Glycemic control**: HbA1c remained unchanged (9.9, 9.7%) on placebo, but decreased significantly (9.8, 9.3%) on Metformin. HbA1c improvement correlated negatively with baseline IS (EGDR:r= -0.3;SEARCH:r = -0.24, *p*<0.05) implying better HbA1c-lowering in those with lower initial IS.

Insulin sensitivity: CACTIexa & SEARCH scores showed no worsening of IS on Metformin but significant worsening on placebo.

Cardiometabolic factors: Significant increase in LDL (42%), total cholesterol (133.6 to 151.1 mg/dL) on placebo but not Metformin. Beneficial effect of Metformin on HDL lasted only for initial 3 months. Carotid intima-media thickness worsened on placebo but not Metformin(*p*<0.05).

Body composition: Weight, BMI, Fat Z-scores increased significantly on placebo but not Metformin. Adverse events (AE) were minor; AE, compliance and safety parameters were similar between groups.



Conclusions: Metformin as adjunct to insulin in Indian adolescents with poorly-controlled T1D demonstrated beneficial effect on glycemic control, IS, lipid profile, vascular function, weight, body fat, with good safety profile when administered for 9 months.

P-291 | Efficacy of pancreatic enzymes in diabetic children with malabsorption syndrome: a retrospective case series

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Introduction: Chronic gastrointestinal malabsorption can lead to diarrhea, discomfort, weight loss, malnutrition, and risk of hypoglycemia in patients with diabetes. Given the food insecurity and malnutrition faced by many children in LMICs, this can have severe health implications. Classic Type 1 diabetes has not been associated with malabsorption other than celiac disease. However, malabsorption has been noted in a number of patients in northern Haiti with type 1 diabetes.

Objectives: To describe the response of diabetic patients with symptoms of gastrointestinal malabsorption to empiric pancreatic enzyme treatment.

Methods: A retrospective chart review was completed in a pediatric/young adult Type 1 diabetes program in Milot, Haiti looking for cases of chronic malabsorption. Four patients, ages 9-23 years old

with Type 1 diabetes and clinical malabsorption syndrome treated with pancreatic enzymes were identified (4/87 patients). Collected data included signs and symptoms of malabsorption, duration of diabetes, HbA1c, and response to treatment.

Results: All four patients had postprandial abdominal pain and chronic diarrhea (> 4 weeks). Three had HbA1c data available at time of presentation with malabsorption. After treatment, all patients reported decreased symptoms and increased weight. Three of the four patients had resolution of their symptoms and were able to stop enzymes after 6 months.

PT	Sex	Age Dx T1D (yr)	Age Dx MS (yr)	Wt. enzyme start (kg)	Initial HbA1c (%)	Wt. 3 mo (kg)	Wt. 6 mo (kg)	HbA1c recovery (%)	Wt recovery (kg)
1	F	9	12	18.3	>15	18.9	20.4	11.6	—
2	F	21	21	34.5	12.2	38	40	11	54
3	F	23	24	38.4	>15	39	40.2	11.9	42.5
4	M	15	17	30.5	>15	30	31	12.3	56.9

Table 1.

Conclusions: Empiric treatment of malabsorption with pancreatic enzymes was associated with symptomatic relief, weight gain and improvement in HbA1c in young adults with Type 1 diabetes. Further studies are necessary to understand the prevalence, risk factors, pathophysiology of this intestinal malabsorption syndrome among Type 1 diabetes in children and young adults in Northern Haiti.

P-362 | Effect of statins and ACE inhibitors on the adolescent metabolome in type 1 diabetes: the adolescent type 1 diabetes cardio-renal intervention trial (AdDIT)

S.T Chiesa[1], A. Giton[1], S. Frassineti[1], P. Benitez-Aguirre[2], F.J Cameron[3], M. Craig[4], J.J Couper[5], E.A Davis[6], RN. Dalton[7], D. Daneman[8], K.C Donaghue[2], T.W Jones[6], F.H Mahmud[8], S.M Marshall[9], HA. Neil[10], J.E Deanfield[1], ML. Marcovecchio[11], on behalf of the Adolescent Type 1 Diabetes cardio-renal Intervention Trial (AdDIT) Study Group

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Introduction: Adolescence is a critical period in the early pathogenesis of cardiovascular disease.

Objectives: This study aimed to characterise the emergence of metabolomic risk factors in adolescent T1D and investigate the impact of treatment with statins and ACE inhibitors.

Methods: Metabolomic profiles of 363 adolescents with T1D (duration 6±4 years) recruited to AdDIT and 81 adolescents without T1D were analysed using the Nightingale NMR platform.

Comparisons of 45 metabolites encompassing lipid subfractions, amino acids, ketone bodies, fluid balance, and inflammation were made at age 14±2 years and then re-assessed again in those with T1D after 3.5yrs of intervention or observation.

Results: At baseline, T1D was associated with widespread differences in the metabolome–most notably in HDL-related lipids, amino acids, and ketone bodies. In 3.5-year follow-up of those with T1D, numerous pro-atherogenic metabolites – particularly ApoB-related markers – were observed to increase in line with worsening glyaemic control.

Statin treatment prevented rises in most lipid measures over this period (Figure 1), while ACE inhibitors prevented a modest decrease in HDL levels.

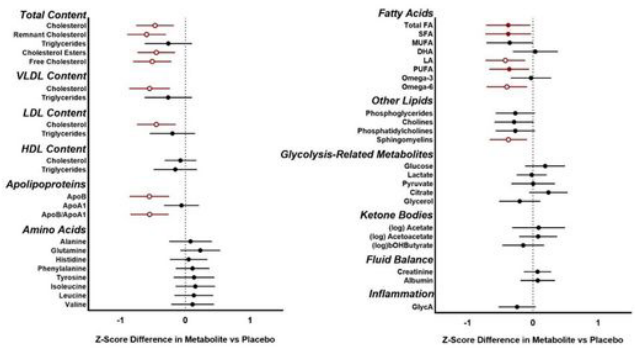

Figure 1. Forest plots show mean z-score difference (+/- 95%CIs) at follow-up in patients taking atorvastatin 10mg (n=74) vs those taking placebo (n=67). Hollow red symbols represent results reaching significance level of p<0.05; after Benjamini-Hochberg corrections for multiple testing.

Conclusions: Widespread differences in the blood metabolome are already apparent in T1D in early adolescence and worsen in line with increasing HbA1c over time. Statins and ACE inhibitors exert widespread and potentially beneficial effects on these changes, although the clinical implications of these remain to be determined.

P-321 | Antidiabetic and renoprotective effects of chromium oxide nanoparticles on oxidative stress and renal function in fat-fed and streptozotocin-treated rats

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Introduction: Globally, diabetes mellitus is affecting major populations worldwide. It is characterized by hyperglycemia resulting from absolute insulin deficiency or insufficient insulin secretion and/or insulin sensitivity.

Objectives: The present study investigated the impact of chromium oxide nanoparticles (Cr2O3NPs) on serum parameters of renal function, on oxidative stress markers (malondialdehyde [MDA] and 8-isoprostane), and on expression level of insulin receptor, glucose transporter 4 (GLUT4), glucokinase genes and heat-shock proteins (HSPs) in rats.

Methods: Male Wistar rats (n=64, 8 weeks old) were divided into four groups. Group 1 received a standard diet (12% of calories as fat). Group 2 received a standard diet, plus Cr2O3NPs; received a single daily oral dose of Cr2O3NPs of 100 mg/kg in suspension. Group 3 received a high-fat diet (40% of calories as fat) for 2 weeks, and was then injected with streptozotocin (STZ) on day 14 (STZ, 40 mg/kg intraperitoneally). Group 4 was treated in the same way as group 3 (HFD/STZ), but was supplemented with Cr2O3NPs 100mg /kg/body weight/day.

Oxidative stress in the kidneys of diabetic rats was evidenced by an elevation in levels of MDA and 8-isoprostane. Protein concentrations of insulin receptor, GLUT4, glucokinase genes and heat-shock (HSP60 and HSP70) in renal tissue were determined by Western blot analyses.

Results: Cr2O3NPs supplementation lowered kidney concentrations of MDA, 8-isoprostane levels, serum urea-N, and creatinine, and reduced the severity of renal damage in the STZ-treated group (i.e., the diabetes-induced group). The expression of insulin receptor, GLUT-4 , glucokinase genes and HSPs was lower in the STZ group that received Cr2O3NPs than in the group that did not.

No significant effect of Cr2O3NPs supplementation was detected in regard to the overall measured parameters in the control group.

Conclusions: This study supported the efficacy of Cr2O3NPs in reducing renal risk factors and impairment because of diabetes and act as potent antidiabetic agent.

O-60 | Teplizumab in children with new onset type 1 diabetes (T1D): outcomes from the Phase 3 PROTECT study

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Introduction: Teplizumab is a humanized monoclonal antibody that binds the T-cell CD3 receptor and inhibits the autoimmune process underlying T1D.

Objectives: The PROTECT study (NCT03875729) was designed to assess β-cell preservation and the safety of teplizumab in newly diagnosed T1D.
Methods: Participants aged 8–17 years within 6 weeks of T1D diagnosis were randomized 2:1 to receive 12 days of IV teplizumab or placebo at baseline and 6 months. C-peptide responses to 4-hour mixed meal tolerance tests were measured.
Primary endpoint was the difference between treatment groups in mean change in C-peptide (area under the curve [AUC]+1) from baseline to Week 78.
Differences in mean continuous glucose monitoring -measured time in range, exogenous insulin use, HbA1c, and hypoglycemia were evaluated at Week 78. Safety endpoints included treatment-emergent adverse events (TEAEs) and serious TEAEs (STEAEs).
Results: Results will be updated in the abstract following a press release.
Conclusions: The PROTECT study provides efficacy and safety data for teplizumab in children with a recent T1D diagnosis.

P-080 | Excellent glycemic control and partial remission one year after diagnosis in participants in the Swedish AIDIT RCT study

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Introduction: The aim of the RCT AIDIT is to preserve β-cell function.
Objectives: To evaluate glycemic outcome and partial remission in participants in the Azithromyzin Insulin Diet Intervention Trial in type 1 diabetes (AIDIT) one year after initiation of study treatment.
Methods: Children aged 6-16 years with T1D diagnosed within 10 days prior were included in this RCT. Both groups received insulin pump treatment (Tandem T:slim Basal IQ) with CGM (Dexcom G6) within one week, aiming at maximizing Time in Tight Range (3.9-7.8 mmol/l, 70-140 mg/dl). The AIDIT protocol of the intervention group consisted of adding to treatment as usual (TAU) 1) 52 weeks treatment, three times weekly, with oral Azithromycin to reduce inflammation, 2) Beta cell rest induced by insulin infusion aiming for glucose level 4.0± 0.5 mmol/L by giving insulin iv for 72 hours at inclusion followed by seven repeated insulin sc pulses of seven hours each during the year and 3) Intensified personalized dietary support. Partial remission was defined as IDAA1c ≤ 9.
Results: Nineteen children, (12 prepubertal, 7 pubertal, 14 boys) completed the first study year. At diabetes diagnosis the mean (SD) HbA1c for the total group was 95 (20) mmol/mol (10.9 %, (1.86)) and two children had mild DKA. Table 1 shows the 1-year results. No significant difference between the groups was shown after 1 year. Partial remission was noticed in 12/19 children. 18/19 children had HbA1c <48 mmol/mol (<6.5%).

One year after inclusion, data from 30 consecutive days with more than 80% data available	Total (N=19)	Intervention N= 10	Control N= 9	p-value (ANOVA)
Mean daily insulin dose (U/kg/day)	0.72 (±0.40)	0.68 (±0.29)	0.77 (±0.50)	0.650
HbA1c (mmol/mol (%))	42.4 ±4.8 (6.05 ±0.45)	42 ±4.4 (6.01 ±0.43)	42.9 ±5.4 6.09 (±0.50)	0.508
Mean sensor glucos mmol/l (mg/dL)	7.57 ±0.85 (136 ±15)	7.34 ±0.72 (132 ±13)	7.82 ±0.95 (141 ±17)	0.226
Glucos variability, Coefficient of variation (%)	34 ±4.8	36 ±3.8	32 ±5.2	0.086
Time in Tight Range 3.9-7.8 mmol/L, 70-140 mg/dL. (%)	57.2 ±11.2	59.5 ±8.3	54.7 ±13.9	0.364
Time in Range 3.9-10 mmol/L, 70-180 mg/dL (%)	79.2 ±8.4	79.1 ±6.8	79.3 ±10.5	0.954
Time in hypoglycaemia level 1, 3.1-3.9 mmol/l, 54-70 mg/dL (%)	3.1 ±2.6	4.2 ±2.7	1.9 ±1.9	0.046
Time in hypoglycaemia level 2, ≤3.0 mmol/l, ≤54 mg/dL (%)	0.58 ±0.90	0.8 ±1.03	0.33 ±0.71	0.272
Insulin-dose-adjusted HbA1c, IDAA1c	8.9 ±1.7	8.7 ±1.4	9.2 ±2.0	0.603

Conclusions: 1) All parts of this pilot study were performable and well tolerated by the participating children and families. 2) Longer time and larger study groups are necessary to show possible improvement in an intervention group when TAU is of high quality.

HbA1c was excellent for both study groups as well as TITR and TIR. As a contemporary comparison, mean HbA1c in ages 7-17 years on national level (NDR/SWEDIABKIDS 2021) 12-24 months after diagnosis was 50.4 mmol/mol with 43.4 % of the children having <48 mmol/mol (<6.5%).

P-088 | Rapid reverting suboptimal glucose control by implementing an advanced hybrid closed-loop system in non-compliant adolescents with type 1 diabetes: 6 month follow-up

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Introduction: AHCL systems represent the next step of automation intended to maximize normoglycemia. Many adolescents with T1D may experience a deterioration in metabolic control due to erratic meal, poor adherence to treatment regimens and endocrine changes.
Objectives: The aim of our study was to evaluate the impact of Tandem Control IQ (CIQ) AHCL in a cohort of diabetic adolescents with suboptimal glucose control.
Methods: We enrolled 20 patients with T1D using MDI and flash glucose monitoring. All patients were upgraded and educated on the use of CIQ. Carbohydrate was not included as patients had previously expressed non- compliance. Glucometrics (TIR,TAR,TBR) were downloaded at baseline, after 2-weeks, 1 month and 6 months of CIQ use.
Results: 20 adolescents with T1D were included (age: 15.7±1.9 years, diabetes duration: 6.2±4.0 years, HbA1c: 10.0%±1.7). TIR increased from 27.1%±13.7 at baseline to 68.6%±14.2 at 2-weeks, to 66.6%±10.7 at 1 month and 60.4%±13.3 at 6 months (P<0.001).
TAR >250 mg/dL decreased from 46.1%±23.8 to 9.9%±9.5 at 2-weeks, to 10.8%±6.1 at 1 month and to 15.5%±10.5 at 6 months (P<0.001). TAR 180-250 mg/dL decreased from 23.0±10.9 to 19.2%±6.1 at 2-weeks, to 20.8%±6.6 at 1 month and 21.7%±5.3 at 6 months. Mean glucose improved from 251mg/dl±68.9 to 162mg/dl±25.0, to 164mg/dl±17.5 and to 175mg/dl±25.5 (P<0.001).
No differences in TBR 54-70 mg/dl or <54 mg/dL were found.
Similar glucose profiles were found between 2-weeks, 1 month and 6 months of use of AHCL. See Figure 1.
Two patients suffered from a single event of mild DKA.

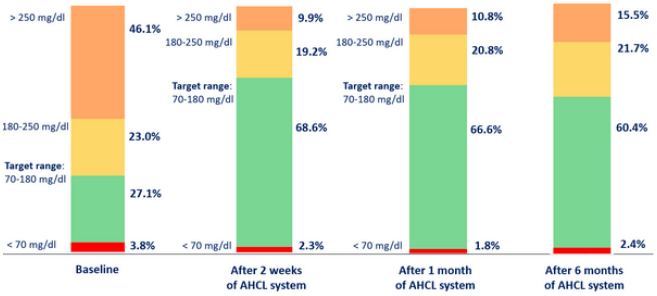

Figure 1.

Conclusions: AHCL systems allow significantly, quickly and safely improve their glucose control. This is a turning point for technology that used to favour mainly those who were already compliant.

P-089 | Safety and glycemic outcomes of advanced closed loop system from onset in very young children (9 months-6 years) With type 1 diabetes: case series

V. Castorani[1], G. Frontino[1], A. Rigamonti[1], E. Morotti[1], F. Sandullo[1], F. Scialabba[1], F. Arrigoni[1], B. Dionisi[1], R. Foglino[1], C. Morosini[1], G. Olivieri[1], G. Barera[1], F. Meschi[1], R. Bonfanti[1]
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Introduction: highly variable insulin sensitivity, low insulin doses, susceptibility to hypoglycemia and inability to effectively communicate hypoglycemic symptoms pose significant challenges for very young children with type 1 diabetes (T1D).
Objectives: Outcomes during hybrid closed cloop system use were evaluated in T1D very young patients.
Methods: Participants (N = 15, mean age: 4.4 ± 2.1 years) used Tandem t:slim X2 Control IQ (CIQ) system from onset of T1D. Safety events, mean A1C, Glucose Management Indicator (GMI), total daily dose of insulin and percentage of time spent in (TIR, 70-180 mg/dl), below (TBR, <70 mg/dl) and above (TAR, >180 mg/dl) range were assessed after 1 month of CIQ use.
Results: 12 male and 3 female (26% are ≤ 2 years old; mean weight: 16.5± 6.5 kg) were enrolled at onset. Diabetic ketoacidosis (DKA) at onset was reported in

41% with mean A1C of 9.7±1.9%. After 1 month of CIQ use, patients reported mean glycemia 143 mg/dl, CV was 37.5±7.4% with total daily dose of insulin 11.2±5.9 U/die (0.7±0.4 U/kg/die, basal (U)/die: 4.2±1.9, bolus (U)/die: 7.0±4.2).
Reported TIR was 75.0±12.1%, TBR (70-54 mg/dl) 3.2±2.3% and TBR (<54 mg/dl) 1.1±1.0%. TAR >250 mg/dl was 6.5±7.4%, TAR 250-180 mg/dl was 14.5±6.1%. GMI mean value after 1 month of CIQ use was 6.7%. No episodes of severe hypoglycemia, DKA and no serious adverse device-related events were described.
Conclusions: Diabetes management in very young children is complicated by higher variability in insulin requirements. CIQ use could safely allow achievement of optimal glycemic control even in children less than 2 years old, despite administration of very low insulin doses.

P-322 | Study of gastric bypass versus gastric restrictive surgery in obese patients with type 2 diabetes

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Introduction: Type 2 diabetes mellitus (T2DM) is a major endocrine disorder that is characterized by progressive β-cell failure and hyperglycemia.
• Hyperglycemia resolves quickly after bariatric surgery, but the underlying mechanism and the most effective type of surgery remains unclear.
• As different types of surgery may present different stimuli to the pancreas and gut, there is a need to identify the effects of these surgeries on endocrine and gastrointestinal function.
Objectives: To evaluate carbohydrate metabolism and beta-cell function in patients with T2DM after two types of bariatric intervention; Roux-en-Y gastric bypass (RYGB) and gastric restrictive (GR) surgery.
Methods: Prospective, nonrandomized, repeated-measures, 4-week, longitudinal clinical trial. In all group, 24 T2DM patients (12 males and 12 females, 53+/-16 years, 46+/-8 kg m, HbA1c 7.2+/-1.3%) undergoing either RYGB (N=12) or GR (N=12) surgery.
We measured glucose, insulin secretion, insulin sensitivity at baseline, and 1 and 4 weeks post-surgery, using hyperglycemic clamps and C-peptide modeling kinetics; glucose, insulin secretion and gut-peptide responses to mixed meal tolerance test (MMTT) at baseline and 4 weeks post-surgery.
Results: At 1 week post-surgery, both groups experienced a similar weight loss and reduction in fasting glucose. However, insulin sensitivity increased only after RYGB. At 4 weeks post-surgery, weight loss remained similar for both groups, but fasting glucose was normalized only after RYGB.
Insulin sensitivity improved after RYGB and did not change with GR, whereas the disposition index remained unchanged after RYGB and increased 38% after GR.
The MMTT elicited a robust increase in insulin secretion, glucagon-like peptide-1 (GLP-1) levels and beta-cell sensitivity to glucose only after RYGB.
Conclusions: RYGB provides a more rapid improvement in glucose regulation compared with GR. This improvement is accompanied by enhanced insulin sensitivity and beta-cell responsiveness to glucose, in part because of an incretin effect.

P-368 | Global attitudes towards screening of type 1 diabetes among members of pediatric diabetes care teams – preliminary results from the JENIOUS T1Dscreen survey

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Introduction: Screening for type 1 diabetes (T1D) is significant as treatment opportunities emerge. Healthcare professionals' attitudes should be assessed.

Objectives: We assessed attitudes towards pediatric T1D autoantibody screening among healthcare providers (HCP) specializing in pediatric diabetes care to provide insights for better implementation of future screening programs.
Methods: A total of 252 HCPs from 67 countries across 5 continents completed an online structured survey disseminated via e-mail and social media from ISPAD, INNODIA and JDRF.
The questions considered T1D screening in two groups - the at-risk pediatric population (children with a first-degree relative with T1D) and the general pediatric population.
The majority of respondents were pediatric diabetologists (55.4%) who worked at university hospitals (62.9%) and cared for more than 300 children with T1D (54.7%).
Results: A majority (81.7%) supported offering screening to at-risk individuals, with only 3.6% opposed. Thirty percent favoured general population screening, with 24.3% against. Most (60.8%) suggested the best age to screen was 2 to 5 years of age in both groups.
Half (50.0%) reported screening was available at their clinical site for at-risk populations and 21.3% for the general population. A majority declared willingness to screen for T1D in both the at-risk (95.2%) and general population (66.3%).
Noted benefits in both groups were a decrease in diabetic ketoacidosis (88.4%) and better awareness of T1D (89.4%). The biggest perceived drawbacks were psychological burden for the screened subjects (85.0%) and their relatives (85.4%) and financial burden for the healthcare system (83.6%).
Conclusions: Most respondents support screening in the at-risk and general population and would be willing to screen in their clinical practice. Screening benefits were known, while perceived drawbacks require further study, as does the case for population screening.

DIABETES EDUCATION

P-050 | School based training and education programme with psychological and peer support (STEPPS) in primary schools

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Introduction: Education is a key factor within diabetes and has been proven to lead to better outcomes. 'Goals of diabetes' is a structured learning programme for children and young(CYP) people with type 1 diabetes, which aims to facilitate patient centered learning and encourage children to gradually take charge of their diabetes over time.
We delivered a pilot initiative of a School based Training and Education programme with Psychological and Peer support (STEPPS) based on 'Goals of Diabetes.
Objectives: The aim of this study was to assess the impact of STEPPS on knowledge, self management and quality of life in primary school children and their carers.
Methods: We delivered STEPPS education to 12 children in primary school. STEPPS consisted of two sessions and were delivered by a diabetes specialist nurse or diabetes educator over the course of 6 months.
Following completion of the programme , we undertook a survey based on a ten point Likert questionnaire, which was completed by children and by their carers in order to assess the impact of STEPPS.
Results: There were 12 children (7 boys, 5 girls) age 6-11 included in the study. The mean age of the group was 9.8 years.
91.6% (11/12) of children stated that they preferred diabetes education to be delivered at school rather than at home or in a clinic. Also, the majority showed a preference for diabetes education in groups (5/12, 41%) rather than individually (3/12, 25%), while some children did not have a preference (4/12, 33%).
After STEPPS, children felt more confident to ask for help when things were difficult (mean 9.4) and found it easier to approach and talk to their diabetes team

(mean 9.4). STEPPS also increased their knowledge and understanding of their diabetes, and children felt that their teachers understood their diabetes better (mean 9.25).
Questionnaires completed by carers showed that they found that STEPPS helped their children feel more comfortable discussing their diabetes (mean 8.0) and that they have become more independent dealing with the self-management of their diabetes (mean 7.9).
Conclusions: STEPPS provided an alternative learning environment, creating an environment where children could share and relate their experiences of living well with T1DM amongst peers and facilitated by a psychologist. The programme has been extended to children aged 13-18 years old to deliver age-appropriate education with psychological and peer support.

P-051 | Flexible insulin dosing pilot program: online group based education

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Introduction: Flexible insulin dosing allows a more flexible approach to diabetes management,allowing insulin dosing to be more closely matched to carbohydrate intake. There was an increasing demand from children,adolescents and their families with Type 1 Diabetes at Monash Children's Hospital for access to education on flexible insulin dosing.
Due to large patient numbers and limited clinician resources an online group based education format was recommended.
Objectives: To develop an online group based flexible insulin dosing program and to determine if this method of online group education would result in positive patient satisfaction and quality of life outcomes.
Methods: A 2 hour online group based flexible insulin dosing program was developed and implemented in 2022 for existing patients on multiple daily insulin injections with T1DM. An online group format was developed to assist with offering the program to an increased number of patients. Education was provided via Microsoft teams with the Dietitian and Diabetes Nurse educator.
Families and patients were educated on flexible insulin dosing using a automated insulin bolus calculator application.
Results: 187 patients were offered an appointment with 119 patients attending the program.Over 26 online groups were run over the past year from March 2022-March 2023. Satisfaction survey results indicated high overall patient satisfaction. 93% of respondents felt the online education was a worthwhile experience. Families reported significant improvement's in meal time flexibility, improved food relationships and greater empowerment with overall diabetes management.
Conclusions: An online group based education program for introducing flexible insulin dosing to families on MDI therapy is an effective method of educating large numbers of patients when resources are limited within a Diabetes Service.
Qualitative feedback from families indicated that the group based online sessions resulted in positive outcomes in their diabetes management, greater empowerment and flexibility with meals.

P-052 | Outcome of the survey conducted among the diabetes healthcare Team highlighting the importance of implementing the oral health module to diabetes education

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Introduction: People with diabetes have an increased risk of periodontal diseases and dental caries which contribute to substantial oral functional disability. According to IDF oral health education should be implemented to diabetes education curriculum.
Objectives: The purpose of this survey was to determine practice behaviours and opinions of the Diabetes Healthcare Team (DHT) about their role in supporting oral health care and their level of confidence in delivering oral health education to children and adolescent with diabetes.
Methods: A 10 item questionnaire was distributed across DHT who treat, provide education service and counselling patients with diabetes. 9 of 10 questions were closed-ended and 1 of 10 question was an open question. A total of 83 participated in the survey.

Results: The majority of the respondents (92%) agreed that Oral Health Module should be implemented as a part of diabetes education and 90% indicated that DHT should play a significant role in providing oral health education.

However, when asked if they are confident in providing an oral health advice to their patients only 16% felt confident while 69% said they do not have enough knowledge to educate patients about oral health management and they never received formal oral health education. Only 8% said that they always advise patients and their families on best practices regarding oral health management.

The majority of diabetes healthcare professionals (93%) expressed their interest in improving their knowledge and participate in any future courses about oral health management.

Conclusions: These findings indicate that DHT is aware of an important role of oral health education and they strongly agree that oral health topics should be added as a mandatory module in diabetes education.

Increasing diabetes education curriculum with an integrated knowledge of elementary oral health education and training would play an extremely important role when it comes to preventing diabetes related oral health complications as well as diabetes management.

P-053 | Role of DEAR-MOMS (mothers of diabetic Type-1 children who were trained as diabetes Educators) to educate newly diagnosed Type-1 children and their parents

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Introduction: Our centre presently provides free supplies like glucometer, stripes, lancets, insulin, syringes, insulin pens etc. getting via LFAC and give free education and consultation to these children and their parents. With increasing number of type 1 diabetes children in our center, we were facing many challenges. We got an idea that if mother of diabetic children can educate the type-1 children and their families then, it will be the most effective plan.

Objectives: We started to train Mothers of Type 1 diabetic Children as a diabetic educator and gave a title Diabetic EducAtoR Moms (DEAR-MOMS) in Kota at Ramchandani diabetes care and research centre and observed how these DEAR-MOMS act as a bridge between doctor and diabetes type-1 children, especially newly diagnosed.

Methods: So first we selected 10 active mothers of our type-1 children and gave a title DEAR- MOMS to them and started to train them. A six months program was designed for them.

The selection criteria were education and speaking and counseling skills of mothers. We also provided them some education material, basic tool kit, some books, insulin techniques kit etc.

We held also practical training for them under the supervision of experienced and certified diabetic educators. 10 diabetes mothers were trained in the first batch.

Results: After one year we analyzed the impact of DEAR-MOMS on diabetes children and their parents. Surprisingly we found very positive outcomes.

1. Individualized education motivated the children in better self-care.
2. There was a strong bonding between DEAR-MOMS and other type-1 children moms because of experiencing the same problem of type 1.
3. They handled several myths and social issues effectively.
4. Positive psychological impact was also seen.

Conclusions: DEAR-MOMS can act as a bridge between healthcare providers and type-1 children and their families. It is a very gold idea to train DEAR-MOMS worldwide to give better community care.

P-055 | Peer and game-based learning techniques to improve diabetes education for paediatric, adolescent patients & caregivers

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Introduction: Diabetes education for youth can fall short in encouraging patients to apply to everyday management. While caregivers lack resources for their psychological wellbeing. In Northern Ireland, DiAthlete held 4 events to take a peer approach to diabetes education, for age groups under 7s, 7-12 year olds, 13-15 y/o, 16-20 y/o + for caregivers

Objectives: Using game-based learning techniques & sociable approaches to improve communication of diabetes

Methods: U7s & 7-12 y/o taught terms with movements: squats to represent hypoglycaemia etc. 7-12 y/o & 13-15 y/o sports games as an analogy for diabetes: e.g Insulin, dribbling a Glucose ball by Blood cones, aiming to store in Cell baskets. 16+s used a gym & workshop sessions to discuss topics.

Caregivers had formal lectures with icebreakers - 'hot potato' technique (passing a ball) to share experiences

Results: U7s enjoyed learning through movement, understanding terms. Older U7s showed independent knowledge of diabetes. 7-12 y/o positive to movements & gave accurate answers to questions such as "what is insulin?"

Enjoyed game-based techniques. 13-15 y/o: noted differences between 13 y/o & 15 y/o. Unwilling in icebreakers - more embarrassed.

Responded well to game-based techniques with activity emphasised over diabetes talk. Exampled independent capabilities in managing diabetes; shared frustrations in relationships with parents & school environments. 16+s didn't enjoy practical sessions.

Responded well to informal conversation. Exampled good, independent diabetes knowledge. Peer environment = comfort to discuss topics. Caregivers showed need for psychological help. Many parents hadn't shared feelings together. Tears & emotions in sessions. Responded positive to adults with diabetes & peer caregivers sharing experiences

Conclusions: Diabetes events in clinic external setting highly recommended. Game-based techniques productive in helping children learn. 16+s respond best to sociable conversation. A need for caregivers to receive psychological support / peer opportunities.

P-056 | Recognizing issues with reproductive counseling: findings from a tertiary care academic center

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Introduction: Guidelines from the American College of Obstetricians and Gynecologists emphasizes the importance of pre-pregnancy counseling at each encounter with a nonpregnant individual as it is an opportunity to discuss improving health to optimize reproductive outcomes. In people with Type 1 diabetes (T1D), preconception counseling is even more important due to the impact of dysglycemia on fetal development; thus, clinical practice guidelines from ISPAD recommend discussions should begin in early puberty.

Objectives: We sought to assess current rates of reproductive counseling by providers at Yale Pediatric Diabetes Clinic who see adolescents and young adults with T1D.

Methods: An anonymous survey was distributed via REDCap to all providers at the clinic. The survey asked respondents whether they provide reproductive counseling. If they do provide counseling, the age counseling is initiated, provider comfort level, and whether any resources are used to counsel were assessed.

Results: Out of 20 providers working in the clinic, 16 (80%) completed the survey. Only half of the pediatric providers (n=8) endorse providing reproductive

counseling. Additionally, only 2 providers counsel males. The mean age when counseling is initiated is 15.25 years. Of the eight providers currently counseling, five endorsed feeling either "uncomfortable" or "very uncomfortable" addressing reproductive counseling, citing "my own knowledge" (n=5), "concern of how counseling will be perceived" (n=5), and "inability to speak with patients without their parents present" (n=3) as reasons. None of the providers utilize pre-existing resources.

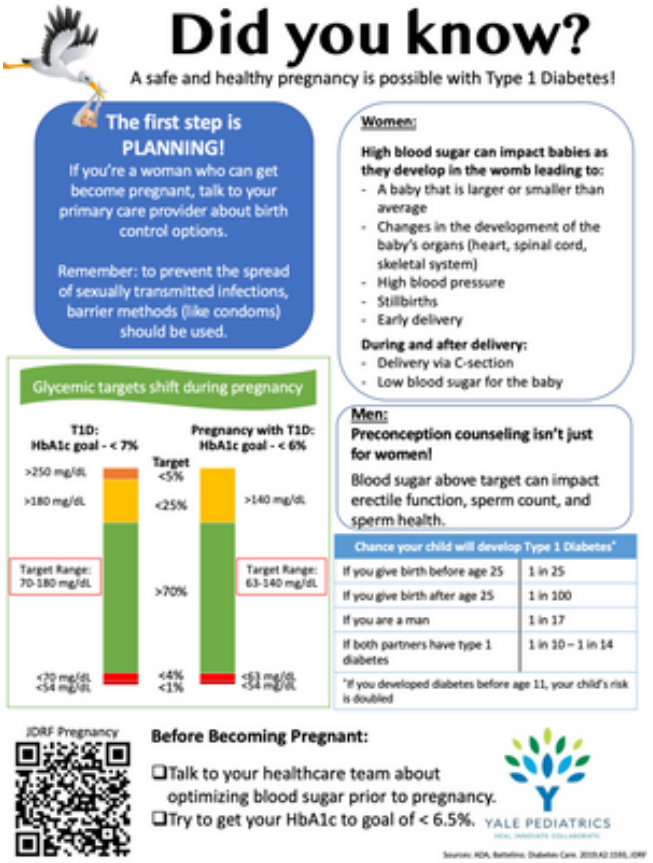

Figure 1.

Conclusions: Guidelines were reviewed, and a reproductive handout (Figure 1) was created to be used for both males and females with T1D seen in clinic. The handout is currently being utilized and follow-up is ongoing to assess if by leveraging this tool a change in clinical practice will occur.

P-127 | Knowledge, self-efficacy, and barriers to community-based diabetes care: a biphasic mixed method study among female community health volunteers

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Introduction: Community-based approaches are important to augment diabetes care. Community health workers like Female Community Health Volunteers (FCHVs) have the potential to enhance diabetes care in a constrained resource setting like Nepal.
Objectives: We assessed FCHV's knowledge, self-efficacy, and barriers to diabetes care before and after training.
Methods: Guided by the Health Belief Model, we conducted a biphasic, Qual + quan, concurrent embedded mixed-methods study among 28 FCHVs from four wards comprising 31,840 population in a rural mid-Western region in Nepal. Between January 5-8, 2021 in phase 1, we conducted 4 Focus Group Discussions (FGDs) and pre-training surveys of FCHVs (1 day in each ward) covering diabetes knowledge, self-efficacy, and barriers to diabetes care. We delivered diabetes-focused didactics, hands-on training, and role-play demonstrations. In phase 2 after 10 months, we repeated FGDs prior to a refresher training followed by a post-training survey.
We used deductive methods for thematic saturation and descriptive statistics for quantitative data. We converged the data during analysis.
Results: FCHV's mean age was 48 ± 6.79 years, 1/3rd had secondary education, and 3/4th were working as FCHVs for >10 years. Six themes emerged under three domains (Table).
After the training, most FCHVs' knowledge improved, perceived barriers diminished, seemed confident in their skills, and garnered the community's trust while providing diabetes counseling.

Table: Results from Bi-phasic Mixed Methods Analyses

Domains	Themes		Example quotes from FGD of FCHVs	Survey results (%)
Knowledge	Diabetes knowledge	Question	Please describe what you know about diabetes.	Diabetes occurs either from lack of insulin or when our body doesn't respond well to insulin. Correct response:
		Phase 1	*I do not have that much knowledge but having sugary products is not the only cause of the disease.*	39%
		Phase 2	*Diabetes means frequent urination, and excessive thirst; so, one should pay attention on diet and do not eat too much sugary products.*	89%
Self-efficacy	Diet and Lifestyle Counseling	Question	Please describe your confidence and skills in counseling people to change lifestyle to reduce diabetes risk.	Diabetes type 2 (the type where body doesn't respond well to insulin) occurs from unhealthy diet, inadequate exercise and obesity. It can be cured. Correct response:
		Phase 1	*The only thing I know is that one should not eat sugary items. I haven't given advice and counseling before.*	50%
		Phase 2	*We are confident to give advice and suggestions. We can suggest eating less rice, potatoes, and sweets.*	92%
	FCHVs confidence	Question	Please describe your confidence and skills in counseling people to change lifestyle to reduce diabetes risk.	What is your skill level in counseling people to modify their lifestyle to manage diabetes? Response (don't have any skill or only know very little):
		Phase 1	*We have not provided suggestions and advice to our community people.*	35%
		Phase 2	*I was unaware earlier, but after getting training, I can counsel easily. Diabetes is a disease that should be tested, and we should control our diet.*	4%
Barriers	Training and Education	Question	What does it take for you to confidently counsel people to change lifestyle to reduce diabetes risk? Please describe what barriers you have.	Do FCHV have a role in diabetes management? Response Yes:
		Phase 1	*We do not have much knowledge regarding this. We need training to counsel our community people.*	75%
		Phase 2	*After the training, we do not have any difficulty in counseling.*	100%
	Community trust and receptiveness	Question	What does it take for you to confidently counsel people to change lifestyle to reduce diabetes risk? Please describe what barriers you have.	What are the factors that hinder FCHV from effectively engaging in activities related to diabetes prevention and control within their community? A. Training and orientation: B. Multiple engagement of FCHVs in different health programs: C. Incentives and motivation: D. Community belief and attitude towards FCHV's skills:
		Phase 1	*Because we are not expert, community people do not listen to us.*	A:69% B:34% C:28% D:31%
		Phase 2	*Some community people said that they had medical checkup after our counseling. A few of them said they were fine, while others said their sugar level was high and the doctor recommended controlling their diet. People said that our counseling was good.*	A:43% B:39% C:61% D:43%
	Future Recommendations	Phase 2	*There is a need of ongoing training. Only one training is not sufficient and we cannot remember things from one training for years. We need training at 6 months interval because we have lots of work, we have to be involved in lots of activities.*	

Conclusions: FCHVs can play a significant role in diabetes care as a bridge between communities and health systems in constrained resource settings like rural Nepal. Regular training, education, and incentives are important for a sustainable program.

P-128 | The type of patient training does not impact outcomes in the first 90 days of automated insulin delivery (AID) use

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Introduction: People with type 1 diabetes (T1D) starting the Omnipod 5 (OP5) AID system could choose to complete individualized education with their diabetes team or to self-start with support from online, industry-provided education

Objectives: To compare the first 90-days of glycemic control and AID interaction by onboarding training type among youth with T1D initiating OP5.

Methods: This retrospective chart review included people with T1D aged <22 years who initiated OP5 before 11/1/22. Data collection included CGM data from the 14 days pre-OP5 initiation (baseline) and CGM and pump data from the first 90 days of OP5 use. T-tests, Kolmogorov-Smirnov tests, and multilevel mixed-effects regression were used to assess changes from baseline to 90 days by onboarding training type.

Results: Among 297 youth initiating OP5 (M_{age} 12.3 ± 3.9, $M_{T1D\ Duration}$ 4.8 ± 3.6, 44.8% female, 84.8% prior OP users), 42.1% trained with a diabetes educator and 57.9% self-started. Self-starters had longer T1D duration (5.0 (IQR 2.6-7.9) vs 2.4 (IQR 1.3-5.5) yrs, p<0.0001) and were more likely to have previously used OP (66.7% vs 6.7%, p<0.001).

Self-starters had worse baseline glycemic control with a higher coefficient of variation (20.7 ± 14.3 vs 19.8 ± 17.9, p=0.004) and more time above range (>180 mg/dL) (46 (IQR 34-58) vs 38 (IQR 25-57.5), p=0.02).

After 90 days of OP5 use, CGM metrics, time in automated mode, and boluses per day did not differ between the groups. In a longitudinal model, after adjusting for baseline average glucose, 90-day average glucose was 14 mg/dL lower (p<0.001) and positively associated with baseline average glucose (β=0.81, p<0.001) but did not differ between the two types of education (β=0.15, p=0.87).

Conclusions: After 90 days of OP5 use glycemic control improved, but neither glycemia control nor AID interaction differed between youth who self-started and those who trained with a diabetes educator. For youth previously using an OP system, online education offered by industry provides adequate training.

P-129 | Reducing disparities and health inequalities highlighted in the national paediatric diabetes audit (1) in disadvantaged communities, by improving digital access and engagement through the development of tailored, cultural resources to address inequalities and digital literacy

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Introduction: DigiBete, is a community-led yet clinically approved digital self-management Platform and App for children, young people and their families (CYPF) living with diabetes, funded by NHS England and Wales.

The DigiBete App serves 23,500 users, 75% of the population of CYP living with type 1 diabetes in England and Wales and 166,000 other users on their open access website.

Objectives: DigiBete recognised the need to create culturally appropriate films and resources for type 1 diabetes to address:

- CYP from disadvantaged, lower socioeconomic backgrounds and with disabilities
- Families from minority ethnic communities, and english as an additional language

Methods: DigiBete prioritised the creation of materials that are accessible to people with cultural dietary requirements, learning disabilities, cognitive, hearing and visual impairment, through specific language voiceovers, British Sign Language (BSL), auto translation and audio functions whilst harnessing plain language and limited text in resources. Cultural and religious practices have been incorporated into DigiBete resources, films and web content designed to meet the needs of diverse communities.

Results: Essential DigiBete films were produced in 10 languages including BSL, Urdu, Polish, Somali, Tamil, Chinese, French and Arabic. The Cultural pages have been viewed 2,896 times, films have been viewed over 2184 times, the highest being for the BSL translations. We are now working with National Young People's Diabetes Network's Access to Diabetes Technology Group to create further training and easy to read technology resources in multiple formats including graphic PDF, plain English and video.

Conclusions: The development of culturally tailored resources has made DigiBete more inclusive meeting all the needs of CYP across communities and has supported uptake. Digital diabetes resources can be an effective and wide-reaching component of a population-based approach to reach out to a wider community. The resources will now be evaluated and monitored for impact.

P-130 | The impact of educational intervention targeting healthcare providers on the quality of care delivered to children and adolescents with type 1 diabetes: a single center study from Egypt

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Introduction: Focused education of healthcare professionals (HCPs) would result in measurable changes in quality of care delivered to people living with type 1 diabetes (PWD) consequently impacting patient-reported outcomes (PROs).

Objectives: Thus, the aim of the current study was to assess the impact of educational intervention targeting HCPs on glycemic control, adherence to treatment and quality of life (QOL) among PWD.

Methods: The educational intervention targeted Junior HCPs from a tertiary diabetes center. The program included a 3 days of basic diabetes training followed by 5 different workshops addressing nutritional management of diabetes, psychiatric management, updates in diabetes technology, communication skills and the last workshop focused on basics of research methodology. The content of the educational material was developed in accordance with ISPAD guidelines.

The PROs were assessed in 100 patients with T1D (8.6±4 years) randomly assigned. The PROs were assessed before delivering the education and after completing the educational program.

The glycemic control was assessed using HbA1c, adherence to treatment was assessed using the Arabic validated version of 4-item Morisky Medication Adherence Scale and QOL was assessed using Arabic validated version of the Pediatric Quality of life Inventory 3.0 Diabetes (Peds QL 3.0, DM Module).

Results: Following the educational intervention, all participants showed a significant reduction in HbA1c with mean HbA1c decreasing from 8.3 ± 1.1% to 7.3 ± 0.6 % ($P<0.01$). Baseline data showed that 49 % of participants were non-adherent to insulin therapy, after the educational intervention 60 % become adherent to their treatment ($p<0.01$). Peds QL (parent proxy) showed a significant increment from 65.4± 9.3 to 75.3±5.6 ($P<0.01$). Similarly, the child proxy showed a significant improvement after the educational program ($P<0.01$).

Conclusions: Implementing educational programs targeting HCPs have significant impact on patients' adherence to treatment, glycemic control and QOL.

P-131 | The role of diabetes care and education specialists in expanding the 4T program and increasing technology use in youth with T1D

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Introduction: . Youth with T1D start on a continuous glucose monitor (CGM) within the first month of diagnosis. The CDCES team provides families with weekly CGM remote patient monitoring (RPM). Messages containing education and insulin dose changes are sent via patient portal.
Prior to the 4T program, pump and CGM were initiated when families expressed interest or if the provider discussed it.
Objectives: Our objective is to describe the role, strengths, and skills of Certified Diabetes Care and Education Specialists (CDCES) in ensuring sustainability of the 4T program (Teamwork, Targets, Technology, and Tight control) and increasing the use of diabetes technology in the Stanford Children's Diabetes program.
Methods: The CDCES team developed a workflow to offer CGM in the first month following diagnosis, a 1-week follow-up, a provider follow-up, and pre-pump class to introduce insulin pump/automated insulin delivery in the first 3 months following diagnosis. The CDCES team provides all education in the family's preferred language to deliver equitable access to diabetes technology. To assess CDCES satisfaction with the 4T program, a 6-question survey was sent via RedCap.
Results: CGM initiation within 30 days of diagnosis increased from 2% historically to 98% in the 4T program. Days to pump initiation from TID diagnosis decreased from 272 in the historical cohort to 144 in 4T. Survey completion was 100% and all CDCES reported that CGM start, and follow-up visits did not burden their workload and that the RPM added value to patients.
In addition, 100% of CDCES reported that the RPM empowered the CDCES team to work at the top of their licensing and certification levels. RPM was reported to add to the CDCES workload (33%) and 100% of CDCES find the patient outcomes and patient satisfaction from the 4T program rewarding.
Conclusions: Incorporating CDCES perspectives into program development can lead to successful programs and increased use of the strengths and skills of the CDCES leading to increased job satisfaction.

P-132 | Motivation of young people to participate in a diabetes camp and its effects at three months follow-up

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Introduction: Complementary to long-term outpatient care, diabetes camps offer the opportunity to exchange experiences with others affected.
Objectives: In an online questionnaire 239 participants of a diabetes camp 2022 were asked in advance about their motivation to participate. Three months later their satisfaction with the camp and its effects were assessed.
Methods: Sociodemographic and clinical-diabetological data as well as interest in twelve main topics (e.g. nutrition, new technologies, social law) were recorded. Motivation to participate was asked by means of seven items. At follow-up, satisfaction with the camp's workshops and activities and experienced diabetes-specific effects were examined.
Results: Overall, 178 young people answered the questionnaire (75% response rate, 70% female, age 21.6±3.5 yrs, diabetes duration 10.8±5.9 yrs, 74% CSII, 89% CGM, 34% AID system, mean HbA1c 7.6±1.5%), at follow-up 90 young people. Ranking of topics (MW±SD; scale 1-5 min-max): new technology (4.4±0.8), new therapies (4.3±0.7), AID systems (4.2±1.0), sports (3.9±1.0), celebrations (3.5±1.2), legal aspects (3.4±1.0).
Most important motives for participation (MW±SD; scale 1-5): Sharing experiences with others (4.5±0.6), party (4.3±0.7), current therapies (4.0±0.7), sports (3.5±1.1), personal concerns (3.3±1.0), support with mental burden (3.2±1.2).
At follow-up, overall satisfaction (MW±SD; scale 1-5; min-max) was high (4.6±0.6), sharing experiences (4.6±0.7), sport (4.6±0.6), information (4.4±0.6), personal counselling (3.9±0.9). Positive consequences were reported by 73% for therapy motivation, 64% for self-management, 58% for self-confidence and

61% for emotional well-being. Qualitative data emphasise the interest in mutual understanding and up-to-date information.

Conclusions: Young people expect diabetes camps to provide up-to-date information about therapies/technologies and to exchange experiences with people of the same age. Participants were highly satisfied and report improved motivation and psychological well-being.

P-133 | Numeracy skills and glycemic control in a multicenter, cross-sectional study of children with type 1 diabetes (T1D)

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Introduction: Numeracy skills are requested in many aspects of T1D management.

Objectives: To study the role of numeracy skills in glycemic control in children with T1D.

Methods: The Mathematical Wordless test (MWT), the Diabetes Numeracy Test (DNT5), the WHO5 psychological well-being and the Family Responsibility test (FRT) were collected from 304 children with T1D (53.9 % boys, 56.1% CSII), 12-18 years old (15±1.7), with a diabetes duration of 6.6±3.8 years from 7 centers from the Hvidoere Study Group and their caregivers. After data curation and univariate comparative analyses, a multivariate HbA1C prediction model was built based on 14 descriptors from 178 patients. The genetic algorithm and Bayesian Information Criterion were used to optimize the model and identify best predictors.

Results: Mean HbA1c was 62.1±14.3 mmol/l (7.8±3.4%) and was lower in children on CSII, families with shared responsibility for T1D management, higher paternal education, age-appropriate class attendance and higher with more DKA hospitalizations ($p<0.05$, medium and small effect). HbA1c showed a positive correlation with diabetes duration and negative with parental DNT5, WHO5 (parental and child's) and MWT ($p<0.05$, small effects) but none with child's DNT5. Children on pump scored better in MWT ($p=0.03$). A correlation was found between cDNT5 and MWT ($r=0.31$, $p<0.01$).

There were significant center differences in HbA1c and all tests, except parental WHO5 ($p<.05$). The multivariate analysis revealed that best predictors for HbA1c, adjusted for center's differences, were diabetes duration, child's WHO5, and modality of treatment (CSII vs MDI) (F stat=7.6, $p<0.01$).

Conclusions: Children's numeracy skills did not significantly affect glycemic control, whereas CSII and the overall quality of life were important predictors of HbA1c. Despite efforts to harmonize diabetes management and education, significant differences between centers regarding the attainment of optimal glycemic control, practical skills and well-being of children with T1D still exist.

P-239 | A family with three real sisters diagnosed with T1DM. All at the age of 12 years: the unique experience

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Introduction: Type1 DM is a chronic condition and it's management affects the whole family and siblings, bringing emotional, psychological and financial challenges for the child and their families.

Objectives: To document the live experience of a family in which three sisters have been diagnosed with type 1 dm at the age of 12 years. In particular to diabetes, how this family adopted and managed diabetes with facing all the challenges.

Understanding these challenges and providing adequate support may reduce their diabetes distress and empower them with overall quality of life, well-being and glycaemic control.

Methods: Their first daughter was diagnosed with Diabetes after a noticeable weight loss at the age of 12 years and at attaining Menarche . Their second daughter suddenly got comatose after having fever , vomiting and respiratory distress and was diagnosed with DKA. Then they noticed that their third daughter was also losing weight at the age of 12 years and Menarche and measured blood glucose levels at home which was high.

Results: The primary theme that emerged were: Concerns managing three sisters of t1dm particularly relating to fear around financial support and complications of DM. Parents benefited from renewed education about management and financial help via Glucometer, Strips, Lancets, Insulin, Syringes and arranging Refrigerator to keep Insulin.

Conclusions: Findings demonstrate the unique challenges family face when three sisters diagnosed t1dm. Lack of awareness, unavailability of blood glucose testing, delay in diagnose, poor health support system and non-affordability of lifelong treatment are the main challenges. The support from DOST Diabetic Child Care Society has played important role in the management of Type1 diabetes in these families. This can also explain how previous knowledge and experience with Diabetes influenced their child's management and support, the family needed.

P-245 | The "diabetes besties" – animated video patient education for children living with type 1 diabetes

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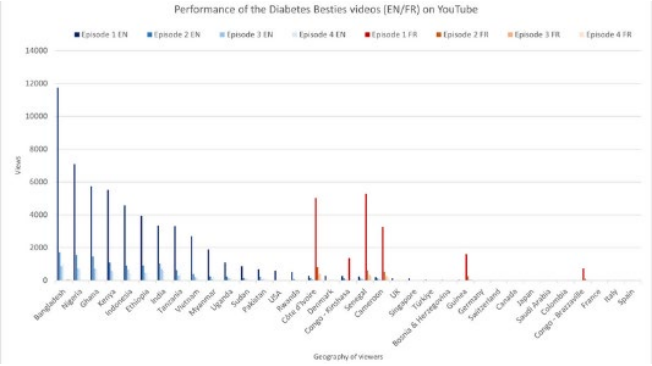
Introduction: Recognizing the lack of child friendly video patient education material, CDiC has developed the cartoon series *Diabetes Besties* which provides children with easy-accessible peer-to-peer education that de-stigmatizes T1D.

The characters and the scenery are designed to be culturally neutral, creating an inclusive space to which children in low-resource settings can relate.

Objectives: To support children with T1D– as well as their caregivers and HCPs in low-resource settings – in understanding and self-managing T1D with medically approved information.

Methods: 4 videos available on Novo Nordisk and ISPAD channels explain why insulin is required, how to inject it, how much insulin is needed and how to manage low blood sugar. In November 2022, a campaign introduced the series in English and French in the respective CDiC countries on Meta and YouTube (targeting children and caregivers) and LinkedIn (promoting to HCPs).

Results: The overall campaign reached approx. 17 million viewers in total. 123.063 views were registered on YouTube, with traffic generated mainly via the Chrome app and Facebook used on mobile devices. LinkedIn generated only a negligible number of viewers. The average viewer was male and between 25-34 years old. YouTube does not register viewers below 18, however, children may have used a shared device. In the past 90 days, 655 viewers returned to watch the first episode. Based on total views, the graph below displays where the videos were mainly accessed from.



Conclusions: While the campaign is considered successful, the analysis indicates a persisting need for further adaptation of de-stigmatizing video patient education. CDiC aims to holistically integrate the cartoon into clinical settings by developing assets targeting HCPs specifically.
Additional translations/subtitles will ensure availability beyond current CDiC countries. Viewers from high-income settings were recorded, hence the potential for integration in those contexts will be explored.

P-247 | A mixed methods study of knowledge, skills and behaviours surrounding new diabetes technologies in accident and emergency department

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Introduction: The attendances in the Accident and Emergency (A&E) department of patients with Type 1 Diabetes Mellitus (T1DM) who are using insulin pumps and Continuous Glucose Monitoring systems (CGM) are increasing as these new diabetes technologies are becoming an integral part of T1DM management.
In addition, hybrid closed-loop (HCL) systems which integrate CGM and insulin pumps to automate insulin delivery are also being increasingly used.
Objectives: The aim of this study was to assess A&E doctors' knowledge, skills, perceptions and behaviours around new diabetes technologies in a single center study.
Methods: A mixed methods study was undertaken. 28 doctors completed a validated quantitative survey using a 5-point Likert scale and semi structured interviews were conducted with 16 doctors working in the A & E department.
Results:
In the quantitative survey, doctors appear to have a limited understanding of insulin pumps, CGMs and HCL (mean score 2.6 and 1.9 respectively) and only 14.2% (4/28) of doctors felt that they would manage appropriately a patient on insulin pump or CGM presenting in A&E department (mean score 2.3 and 2.1 respectively). It was noted that understanding of the new technologies were considered to be very important (mean 4.2 for pumps and 4.1 for CGMs) but the education received around them has been minimal (mean 1.9 for pumps and 2.1 for CGMs).
In the qualitative arm of the study, 94% (15/16) of doctors rated their confidence as extremely low. Other common emotions around the new technologies were fear and anxiety. All doctors (16/16) stated that further training around the new diabetes technologies would be important to improve their confidence on how to clinically manage common patient presentations.
Conclusions:
The implementation of formal education around new diabetes technologies for A&E staff is important and could improve the level of care provided to patients with T1DM presenting to A&E.

P-279 | Pilot prospective cohort study evaluating implementation of diabetes self-management education in Maryland county, Liberia from 2021-2022

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Introduction: Achieving glycemic targets for people living with insulin-dependent diabetes (PLWIDD) is challenging, especially in settings with limited resources. PLWIDD in Africa, particularly the rural poor, experience high rates of morbidity and mortality. Lack of structured diabetes education is a key barrier to improving outcomes. Diabetes Self-Management Education (DSME) is an evidence-based intervention to educate and support PLWIDD with self-management through a behavior change model with emphasis on goal setting, motivational interviewing, and shared decision-making.
Objectives: The purpose of this study was to assess feasibility, acceptability and clinical impact of implementing structured DSME delivery in clinics caring for PLWIDD in Liberia.
Methods: The study was a mixed-methods, prospective cohort study. Twenty-six PLWIDD and six providers were enrolled. In phase one a patient advisory board was established and providers were trained in DSME. In phase two, DSME was integrated into standard clinical care. Change in patient knowledge, self-management behaviors, psychosocial wellbeing, and HbA1c were evaluated.
Results: Patient knowledge increased by 33.77%; 95% CI 17.30, 50.24; p< 0.005, from baseline to 12 months. Mean SMBG frequency increased by 3.2 checks per week from baseline to month 12. Mean number of missed insulin doses per week decreased by 3.1 from baseline to month 12. 34.8% of baseline PHQ-9 scores were positive for depression, while 56.0% of baseline PAID-5 scores were positive for diabetes distress. There was a mean difference of -0.9625% in HbA1c from baseline to 12 months, though not statistically significant.
Conclusions: DSME is a valuable and feasible tool to improve knowledge, behaviors, and clinical outcomes of PLWIDD in rural Liberia. Diabetes distress levels were high, and may be missed by typical depression screening[GF1]. DSME along with efforts to address health systems barriers to diabetes care has the potential of increasing quality of diabetes care in low-resource settings.

P-302 | Exploring the reasons for treatment failure in T1D: results from a community-based survey

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Introduction: Kesavadev Trust Type 1 diabetes project (KT1DP) Sweet Stars initiative is involved in delivering education to T1D and the community.
Objectives: We herewith report the experiences gathered from an education camp attended by 300 participants, including T1D and their caregivers getting treated from various diabetes centres/physicians across Kerala..
Methods: 75 T1D (Age: 14±5.27 years; 56% female; year of diagnosis: 8±4.6 years) participated in the cross-sectional survey. The survey gathered data various aspects of diabetes management; descriptive statistics were used for data analysis.
Results: The average A1c of the participants was 9.3±2.77% and 37% reported never having been instructed on diabetes care. When asked how they learn best, 45% reported video, 37% verbal discussion, 27% written materials, 10% hands-on training, and 8% audio. 45% reported consulting the doctor every month, while the rest reported less frequent visits, ranging from every 2 to 6 months. 18% reported having consulted a dietitian at least once during their hospital visit. 33% reported being hospitalized within the last 12 months, with DKA being the most common reason (50%) followed by hypoglycemia (18%). Other reasons for hospitalization included fe-

ver, cold, and suicide attempts. Participants reported testing blood glucose levels 1-7 times a day, with 38.5% reporting testing four times a day and 34.28% reporting testing twice a day. 70% showed improper site rotation technique and common injection site issues included lumping (46.43%), bleeding (17.86%), and pain (14.29%). 89% of the participants were on a fixed dose of insulin and carb counting skills were utilized only by 6%.
None recounted receiving a flu shot.
Furthermore, a notable lack of awareness among parents about the various aspects of diabetes management was identified.
Conclusions: The study highlights the importance of dedicated type 1 clinics and structured periodic education sessions by multidisciplinary diabetes team to improve health outcomes and ensure continuing care.

P-333 | Epidemiological and clinical profile of diabetic orphans followed at the diabetes unit of the regional hospital of Labé in Guinea

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Introduction: Childhood diabetes is a public health problem requiring multidisciplinary support and coordination. In Guinea, statistics show an increase in the number of cases with the improvement of the care offered. At Labé Hospital, the number of cases followed in the diabetes unit has increased from 28 in 2013 to 87 patients in 2022.
Objectives: To determine the prevalence of orphans among diabetic children and adolescents followed at the regional hospital of Labé and to describe the epidemiological and clinical profile.
Methods: Descriptive and cross-sectional study with prospective data collection over 2 months from July to August 2022. It focused on diabetic children followed at the diabetes unit of the hospital of Labé in Guinea.
Results: The prevalence of orphans among the children and adolescents followed in Labé was 17% (15/87). The average age was 14.27 ± 4.3 years, and females were predominant in 60% of cases.
The children were fatherless in 47% (7/15), motherless in 33% (5/15), and fatherless and motherless in 20% (3/15) of cases.
The children were enrolled in school in 76% of the cases, of which 54% were in elementary school and 46% in secondary school.
The average duration of diabetes was 8 ± 2.7 years, the average glycated hemoglobin was 10.2%, in 67% of the cases the patients had an HBA1c higher than 10%.
Ketoacidosis and severe hypoglycemia were the most common acute complications in the previous 12 months in 32% of cases each.
The 3-injection insulin regimen was the most used (93% of cases), self-monitoring of blood glucose was performed in 47% of patients.
Conclusions: This study finds a significant frequency of orphans in the cohort of diabetic children followed in Labé. Social and family isolation has an impact on long-term metabolic balance and favors the early onset of degenerative complications.
Diabetic children remain insufficiently controlled despite the implementation of programs to improve management.

P-338 | SEREN Active: adapting an education module for children and young people (CYP) with type 1 diabetes mellitus (T1D) to promote and manage physical activity

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Introduction: Physical activity is an important part of childhood development, health and wellbeing and is especially important for CYP with T1D. It improves insulin sensitivity, reduces obesity and cardiovascular risk and promotes wellbeing[1] and therefore should become an integral part of diabetes self-management education [2,3]
Objectives: To adapt an existing structured education module for CYP aged 7-11 with T1D for use in children 11-16.

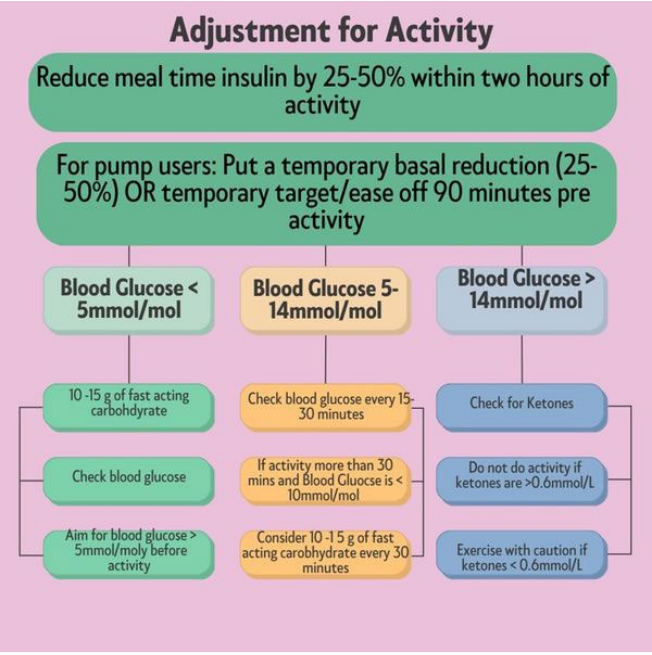
Methods: SEREN Active key stage 2 is an established education module (est. 2019) delivered to children aged 7 to 11 with T1D and is QISMET accredited. It has been delivered to 50 children with T1D in Wales. A review group (2 dietitians, 1 PDSN, 1 paediatrician) was established to adapt and update these resources for KS3/4 (CYP aged 11 to 16).

A pilot of adapted content was run with 5 CYP. The feedback, updates on emerging pump therapy[4] and guidelines[2] were pooled to adapt the original resources and develop a new session for this age group.

Once established it is expected that the key stage 3/4 module would include a quality assurance component in line with other SEREN modules.

Results: SEREN Active key stage 3/4 module has been developed for CYP aged 11-16 and is designed to be delivered in a gym or sports venue. This module encourages CYP with T1D to meet activity levels, understand physiological adaptations to activity and adjustments to insulin dose and carbohydrate intake.

The pilot feedback demonstrates that the adapted modules could be successfully implemented in this age group.



Conclusions: SEREN Active KS3 is a structured education module available for CYP with T1D to self-manage their activity and diabetes. The module incorporates feedback from professionals and CYP alongside latest ISPAD guidelines, emerging glucose monitoring and automated insulin delivery (AID) technology and terminology.

It is expected that this will be used by all paediatric diabetes teams across Wales to improve the outcomes and experience of CYP with T1D.

P-339 | Characteristics and knowledge of children with type 1 diabetes mellitus and their caregivers attending ramadan preparation education session

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Introduction: Ramadan fasting is compulsory for Muslims after puberty, but it poses a high risk to those with type 1 diabetes mellitus (T1DM) due to potential acute complications. Indonesia, with an estimated 1,249 children with T1DM and 70% diagnosed with diabetic ketoacidosis at the time of diagnosis, has the largest Muslim population worldwide. Therefore, education on fasting preparation is key to prevent complications of T1DM during Ramadan.

Objectives: To describe the characteristics and knowledge of children and adolescents with T1DM and their caregivers who attended a Ramadan preparation education session

Methods: A descriptive study was conducted during a one-day Ramadan preparation education session for children and adolescents with T1DM and their caregivers in Jakarta, 16 March 2023. The session, facilitated by pediatric endocrinologists and dietitians, included seminars and workshops.

Participants completed a 20-question T1DM knowledge questionnaire developed by pediatric endocrinologists and adapted from validated KAT-1 instrument.

Results: Data from 41 children who attended the education session were analysed. Over half were female (N=24, 58.54%), with mean(SD) age of 11.51 (4.12) years, age at T1DM diagnosis 7.54 (3.75) years, T1DM duration 3.76 (2.52) years.

Median (IQR) HbA1c of children was 8.9 (7.6;10.1)%, and most had normal nutritional status [mean (SD) BMI: 17.72(3.36) kg/m2].

All children use basal-bolus insulin therapy. 18 (44%) caregivers completed T1DM knowledge questionnaires, with a median(IQR) score of 75% (65%;80%),

12 (56%) of them scored at least 75%, less than half of caregivers could correctly answer questions regarding effect of activity on blood glucose (BG) level.

Conclusions: On average, children who attended the education session before Ramadan did not meet their glycemic targets, emphasising the importance of the session for fasting preparation. The limited knowledge of caregivers regarding the effect of activities on BG suggests the need to evaluate the delivery of the education session

P-358 | Type 1 diabetes transitional care module pilot of the Deapp structured education program

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[3]*Demontfort University, The Innovation Centre, Leicester, United Kingdom*

Introduction: Getting transition right from paediatric to adult care is vital in the life course of a person with type 1 diabetes. Quality care pathways ensure continuity of care, engagement reducing risk to the patient. There is no one consistent structured program in the UK at present.

Objectives: To develop a transitional care module using the DEAPP (diabetes education application) program.Triangulating:3 core principles: watching bitesized videos via the APP, trained diabetes educators and bespoke learning resources testing knowledge acquisition.

Methods: A literature search of best practice to develop a curriculum by health professionals HCP's then tested via focus groups of HCPs, parents & patients to formulate lesson plans /resources covering transition.We used an iterative process to develop a series of short animated videos hosted on the DEAPP app with supporting physical learning resources and a core curriculum for diabetes educators.

Results: 3 core phases of transition were identified:

1. Pre-transition (13-16yrs)
2. Transition (16-17yrs)
3. Support into the young adult clinic

5 core themes were identified:

- The transition process from paediatric to adult care
- Adult activities :starting employment, driving & independent travel
- Risk-taking: drinking, drugs, smoking, attending parties or festivals, misc tattoos, body piercing.
- Relationships, Sexual health & Pregnancy
- Leaving Home starting University

The Iterative process required co-production involving clinicians, media / graphic design, linguists, animators, webdesigners, patients/ families & led to the production of 11 animated videos typically 2 -2 ½ min covering the module alongside a curriculum or diabetes educators. Delivered via the DEAPP app allowing diabetes educators sign off a patient's attainment of competency.

Conclusions: We show the transition module can be delivered via the existing Deapp technology and quality assured training program. This represents a valuable educational resource to aid the patients in the process of transition.

P-378 | Challenging of pregnancy in an adolescent diagnosed with type 1 diabetes mellitus

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Introduction: Pregnancy is usually regarded as a diabetogenic state in which postprandial glucose levels are increased and insulin sensitivity is low. Pregnancy complications that can occur at a patient with type 1 diabetes are the following: hypoglycemia, diabetic ketoacidosis, retinopathy, nephropathy, preeclampsia, premature birth, congenital malformations, abortion spontaneous

Objectives: Blood glucose control during pregnancy is one of the main risk factors for complications occur both on the mother and on the fetus.

Methods: We present the case of a 13-year-old teenage girl, married for ethnic reasons at that age 12 years old, mother of a 7-month-old infant, out of school, known to have hypothyroidism congenital in substitution treatment since birth, diagnosed with type 1 diabetes insulin dependent at the age of 13 years and 10 months.

Results: The patient presented a poor metabolic control and compliance with the treatment was totally inadequate, presenting HbA1C values >9%. At the age of 14 years and 3 months, without prior planning, she became pregnant.

During pregnancy, the patient presents multiple hospitalizations in the Obstetrics and Gynecology Clinic for pain pelvic-abdominal and imminent abortion,

maintaining an unsatisfactory metabolic control. The patient maintains the same behavior in terms of food and treatment. complexity consanguinity is added to the case, the parents are second degree cousins.

Conclusions: Adolescents with type 1 diabetes should be closely monitored. A success management in pregnancy in patients with type 1 diabetes begins before conception with the implementation of preconception counseling that emphasizes the need for glycemic control strictly before and throughout pregnancy.

P-383 | Expansion of the autoimmunity screening for kids (ASK) study throughout the United States

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Introduction: Early detection of islet autoantibodies (IA) and follow up of children at-risk for T1D prevents >90% of diabetic ketoacidosis (DKA) at onset and allows for treatment or enrollment into prevention trials that may delay or prevent clinical T1D.

Objectives: The ASK study aims to make screening accessible throughout the US by translating lessons learned from screening general population youth ages 1 to <18 years (n=32,366) for T1D.

In tandem, the ASK the Experts program aims to support health care providers throughout the US with metabolic monitoring of individuals who screen islet autoantibody positive (IA+) for T1D using knowledge gained from following IA+ children in ASK (n=331).

Methods: Between 2019 and 2023, we collaborated with three diverse sites to expand screening (ASK) and monitoring (ASK the Experts): a rural primary care office (Durango, CO), a regional not-for profit healthcare system (Reno, NV), and a state-wide academic health system (Arkansas Childrens Hospital). Since 2022, ASK the Experts has provided education, IA confirmation and metabolic monitoring support to patients and providers who have contacted the program by website, e-mail or phone.

Results: All ASK expansion sites utilized an e-consent process. Implementation of screening required a variety of methods including electronic medical record integration, home capillary kits, partnership with local laboratories and onsite venipuncture screening. ASK the Experts confirmed positive IA status in 43 individuals throughout the US who did not live in CO. Monitoring these patients for changes in metabolic status requires utilization of telehealth to train and work in tandem with patients' local providers.

Conclusions: Expansion of ASK in the US has increased access to screening individuals for T1D. ASK the Experts ensures at-risk children are monitored effectively to reduce DKA risk. Successful implementation of screening and monitoring at a national level requires flexibility and adaptability based on the unique needs of each healthcare setting.

P-403 | Impact of structured dietary and diabetes education program on glycemic control in individuals with type 1 diabetes: a retrospective analysis

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Introduction: As per the International Diabetes Federation Diabetes Atlas 2022 report, India has the highest prevalence of type 1 diabetes mellitus (T1D) in individuals under 20 years of age. Dietary guidance and diabetes education play a key role in improving glycemic control.

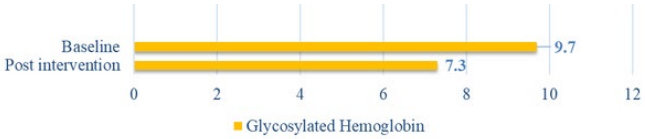
Objectives: The aim of our study was to retrospectively analyze the impact of "Structured Dietary and Diabetes Education Program" on glycemic control in individuals with T1D consulting a health clinic in the city of Mumbai, India.

Methods: The Structured Dietary and Diabetes Education Program comprised of anthropometric assessment, a detailed guide on carbohydrate counting and in-depth diabetes education to the family by a team of dietitian and certified diabetes educator. The three months program was divided into two phases:

Phase I included dietary assessment and diabetes education, using tools such as carbohydrate counting book and Nutrient Calculator app, followed by two weeks of daily rigorous follow-up on WhatsApp for real-time management of blood glucose levels.

Phase II included fortnightly follow-up calls focusing on advanced carbohydrate counting, protein and fat counting, effect of exercise, intercurrent illnesses and other factors. Anthropometric measures and markers of glycemic control were compared at baseline and post-intervention at three months.

Results: At baseline, the average fasting, post-prandial and HbA1c levels were 206 ± 54 mg/dl, 253 ± 52 mg/dl and 9.7 ± 2.2% respectively. At three months follow up, the average fasting, post-prandial and HbA1c levels were 132 ± 24 mg/dl, 167 ± 29 mg/dl and 7.3 ± 0.9% respectively.
The mean reduction in fasting, post-prandial, and HbA1c levels were 74 ± 52 mg/dl, 85 ± 49 mg/dl, and 2.3 ± 2.2 % respectively ($p < 0.05$).



Conclusions: Structured Dietary and Diabetes Education Program with real time intervention in the initial phase was found to be an effective strategy to achieve optimal glycemic control in individuals with T1D.

P-412 | Shorter follow-up between diagnosis of type 1 diabetes (T1D) to next encounter associates with improved glycemic outcomes

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[1]Children's Mercy - Kansas City, Kansas City, United States, [2]University of Missouri - Kansas City, School of Medicine, Kansas City, United States, [3]Stanford University, Palo Alto, United States, [4]Nemours Children's Health, Jacksonville, United States

Introduction: T1D diagnoses require intensive education at new-onset to allow for safe care at home. Educational content can be overwhelming for patient/families, and should be delivered in small, digestible sections. Earlier support and education from the diabetes-care team is essential to improved outcomes in glycemia.
Objectives: To assess if shorter time between initial T1D diagnosis is associated with improved glycemic outcomes, as measured by A1c, at 1 year post diagnosis.
Methods: Youth, < 18 years old, newly diagnosed with T1D during the COVID-19 (3/17/2020 – 9/30/22), at a Pediatric Diabetes Center in Midwest USA engaged in the T1DX-QI Consortium were included. To reduce cognitive burden on new-onset patients/families, we deliver new-onset education in two separate sessions, delivered in the ambulatory or telehealth setting, approximately 3 weeks apart. Patients were categorized by CGM use, and elapsed days between T1D diagnosis and next educational session after new-onset.
Results: With active QI initiatives aimed to improve clinical access throughout the study, the percentage of patients with > 28 days from initial diagnosis to first follow-up shortened over the observational period. A1c at diagnosis was 11%, and 11.2% in the < 28 days and > 28 day cohorts, respectively.
A1c at 1 year, was lower, 7.4% vs 7.8%, in those who had a shorter time to first follow-up. CGM use, and shorter duration between diagnosis and first follow-up/second educational class, are associated with lower A1c. Lowest A1c was noted in the CGM-using group with < 2 week between encounters.

Timeline/CGM Use	At Diagnosis		At 1 year post Dx	
	Avg A1c	n	Avg A1c	n
2nd encounter less than 28 days	11.0%	62	7.4%	46
--Using CGM at 1 year post dx	10.9%	54	7.3%	44
--Not using CGM at 1 year post dx	11.5%	8	9.3%	2
2nd encounter more than 28 days	11.2%	366	7.8%	319
--Using CGM at 1 year post dx	11.1%	332	7.7%	292
--Not using CGM at 1 year post dx	11.7%	34	8.7%	27

Conclusions: Education in the new onset period is critical to successful T1D management. Earlier follow-up after T1D diagnosis is associated with lower A1c. Time from T1D diagnosis to next diabetes-related clinical encounter may have long-term impact on glycemic outcomes. Clinical teams may consider earlier scheduled follow-up after diagnosis and refine educational materials to deliver content over this shorter timeframe.

DIABETES COMPLICATIONS

P-060 | Pediatric diabetic ketoacidosis fluid composition and rate in care of type 1 diabetic patients

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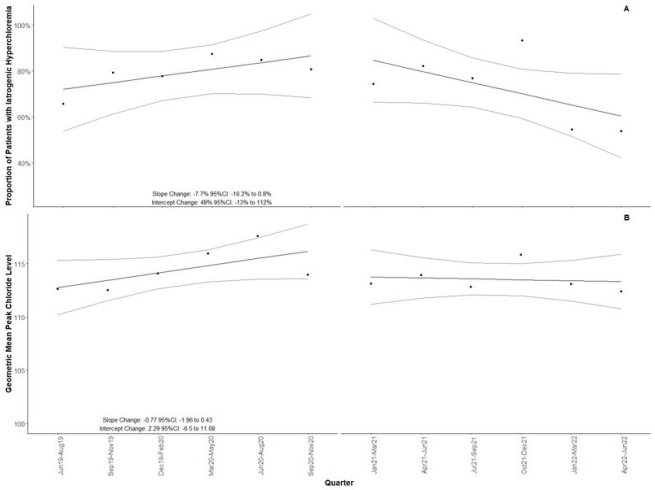
Introduction: Fluid resuscitation for diabetic ketoacidosis (DKA) has been a controversial topic, specifically fluid composition and administration rate.
Objectives: Complications of DKA include hyperchloremia and acute kidney injury (AKI).
The objective of this study was to evaluate the association of decreasing sodium chloride (NaCl) composition in IV fluids on hyperchloremia and AKI.
Methods: In December 2020, our institution changed the base NaCl composition of standard DKA fluids from 0.9% to 0.675% with a recommended increase in resuscitation rates by 33%. A retrospective chart review analyzed patients >30kg admitted for DKA from January 2019-June 2022.
The primary outcome was the rate (CI >110) and severity (peak serum CI) of hyperchloremia. Secondary outcomes included rate of AKI, hospital length of stay (LOS) in hours, and duration of IV insulin drip in minutes.
Outcomes were compared in the 18 months before (baseline) and after (intervention) the change using chi-squared tests (categorical) and Wilcoxson rank-sum tests (continuous).
To account for existing time trends, primary outcomes were also analyzed using interrupted time series (ITS) models with quarterly intervals using R version 4.2.2.
Results: There were 345 patients, 183 within baseline (0.9% NaCl), 162 within intervention (0.675% NaCl). No differences in pH, bicarbonate, or GCS scores were noted between periods.
No difference in crude rates of hyperchloremia between periods were observed (79% vs. 75%, p=0.52). ITS demonstrated a non-significant reversal of the baseline upward trend in rates and severity of hyperchloremia (Figure 1).
Rates of AKI (16% vs. 11%, p=0.34), hospital LOS (51 vs. 55, p=0.35), and insulin drip duration (825 vs. 852, p=0.67) were similar between periods.



Conclusions: Decreasing NaCl concentrations from 0.9% to 0.675% was not associated with a significant reduction in hyperchloremia or AKI. The study is further limited by sample size and single institutional data.

P-064 | A comprehensive observational study on diabetes ketoacidosis in a tertiary care centre – can free supply of insulin reduce the numbers

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Introduction: Diabetic ketoacidosis (DKA) is an endocrine emergency with high morbidity and mortality in Type 1 Diabetes. Lack of awareness of the disease, low socioeconomic status, lack of free insulin supply are the main reasons for DKA and its poor outcome.
Objectives: To determine the Demographic, clinical characteristics, risk factors and outcomes of DKA
Methods: This study was conducted in a tertiary care centre from South India between Feb 2021 to July 2022. All kids with DKA were included, demographic details, history and examination findings were noted. Investigations were done at the time of admission and repeated whenever required.
The duration of ICU Stay, insulin infusion, hospital stay, time for resolution of acidosis and outcome were noted.
Results: There were 48 children and DKA was more common in females (66.7%) and adolescents (47.9%) and also in newlsy diagnosed. The majority of them were from poor socio-economic background. In 14 previously diagnosed patients, the mean duration was 3.8±0.2 years, with an average HbA1c of 11.8±0.6%.

Among them 11 were buying insulin. 52.1% had ph < 7.1, 62.5% had bicarbonate of 6.3±0.1mEq/L and corrected sodium of 123±0.1mEq/L. 64.6% required a insulin infusion dose of 0.1U/kg/hr for a duration of 30.2±0.6 hours, 4.2% required inotropes for 48 hours and 8.3% required. Mechanical ventilation for duration of 11.08±0.6 days. Average time for DKA resolution was 22.1±0.2 hours, with an ICU stay for 3.3±0.1 days and hospital stay for 6.9±0.8 days. Mortaliy rate was 8.3%.

Conclusions: DKA was more prevalent in adolescent females of poor socioeconomic background and in newly diagnosed. Severe acidosis and hyponatremia at presentation were the major risk factors for the mortality in our study.

Incidence of DKA was less in these children previously diagnosed and who were receiving free supply of insulin This is saving the life of many children from developing country. Efforts must be made from the government for sustained free insulin supply to all the sweet kids.

P-068 | Prevalence of hypokalemia & its management in children with diabetic keto-acidosis at a tertiary care center in South India

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Introduction: Hypokalemia is a known complication as insulin administration with acidosis correction drives potassium back into cells, thereby decreasing serum potassium levels, during diabetic keto-acidosis treatment.

Objectives: To determine the prevalence of hypokalemia in children admitted with diabetic ketoacidosis over a period of one year.

Methods: A retrospective chart review performed of all patients ≤18 years of age admitted with Type 1 Diabetes with Diabetic keto-acidosis (DKA) (n=17) at Aster Hospitals, Bengaluru from 1st May 2022- 30th April 2023. Demographics characteristics , biochemical alterations, treatment & complications during management of diabetic keto-acidosis were noted. ISPAD guidelines were followed for management of DKA.

Results: 17 DKA admissions were identified , amongst whom majority(64.7%)were previously undiagnosed with Type 1 diabetes. There was a female preponderance (52%) with median(IQR) age of presentation being 9 (7-12)years. The frequency of complications was as represented in Figure 1.

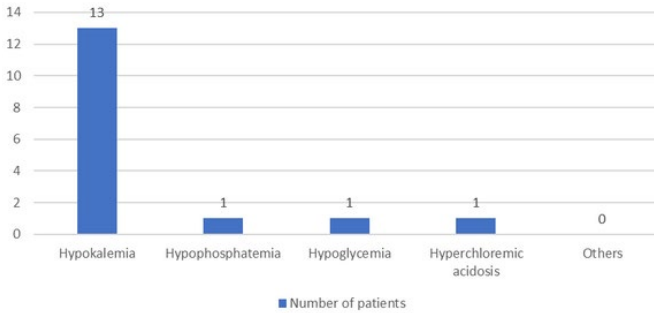

Figure 1. Bar chart showing complications during management of diabetic keto-acidosis (n=17).

It was noted that 13/17 children (76.4%) developed hypokalemia during treatment, out of which 3 had hypokalemia at admission itself. The median (IQR) value of serum potassium was 4.6meq/l (3.3-5.3) at admission which subsequently dropped to median (IQR) value of 3meq/l(2.8-3.17) during the course of treatment .Hypokalemia persisted even after correction of acidosis in 46% cases.

All patients with hypokalemia were given additional potassium supplementation along with potassium replacement of 40mmol/l in intravenous fluids.

Conclusions: This study concludes that hypokalemia was the most common complication observed during management of diabetic ketoacidosis.

It highlights that despite adherence to ISPAD guidelines for potassium replacement, majority of children experienced hypokalemia, which persisted even after resolution of acidosis.

This shows gaps in current guidelines regarding supplemental potassium therapy & management of persistent hypokalemia .

P-138 | Frequency of hypoglycemic coma in children with type 1 diabetes – three datasets of single centre observation over 25 years

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Introduction: Hypoglycemic coma (HC) is a significant clinical outcome of type 1 diabetes (T1D) management and survey of HCs occurrence is a crucial element of glycemic control evaluation. HCs are described as events associated with seizure or loss of consciousness requiring parenteral therapy and are a subgroup of severe hypoglycemia (i.e. of events associated with severe cognitive impairment requiring assistance by another person to administer oral or parenteral therapy).
Objectives: The aim of this study was to asses the present frequency of HC and to compare it to two historical analyses performed in the same centre with the same methodology.
Methods: This questionnaire based study was conducted April 2021-December 2021. Parents of patients aged 2-18.5 years answered questions regarding the occurrence of HC in their children over the previous 36 months. To compare the incidence currently and in the past, the confidence intervals for the Poisson distribution of the incidence rate of HC per 100 patients per year were compared.
Results: We included 303 patients (157 males) - median (Me [Q25-Q75]) age 12.8 years [9.8-15.2], T1D duration 4.7 years [2.3-7.0], 36-months average HbA1c 7.3% [6.7-8.1]; 289 (95%) were treated with insulin pumps, 255 (84%) used continuous glucose monitoring. Over the analysed period 20 HC were reported (in 17 patients). The current incidence (2018-2021) was 2.61 episodes per 100 patients per year (2.2% of patients per year). Historical analyses revealed the following HC incidence: 1996-1999 - 14.2 per 100 patients per year, 2011-2014 - 6.4 per 100 patients per year. Multiple comparisons showed that the incidence of HC in the three periods were significantly different from each other: 2018-2021 (95% CV 0.016 to 0.04) vs 2011-2014 (95% CV 0.046 to 0.088), $p = 0.0007$; 2018-2021 vs 1996-1999 (95% CV 0.113 to 0.177), $p < 0.0001$; 2011-2014 vs 1996-1999 $p < 0.0001$.
Conclusions: Hypoglycemic coma incidence significantly decreased over the last 25 years which may be due to broader use diabetes technologies.

P-139 | A retrospective study on diabetic ketoacidosis in children with newly diagnosed type 1 diabetes mellitus at kantha bopha children's hospital phnom penh during 5 years from 1st January 2014 to 31st december 2018

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Introduction: Diabetic ketoacidosis (DKA) is a potentially severe and common condition in emergency rooms and pediatric intensive care units. It is one of the major complications in patients with type 1 diabetes mellitus (T1DM).
Objectives: The study was taken place to describe the prevalence, clinical characteristics at presentation, laboratory profiles, severity and outcome of treatment as well as mortality rate of DKA with newly diagnosed T1DM in children in Cambodia.
Methods: It was a retrospective and descriptive study in 68 children presented as DKA with newly diagnosed T1DM treated at Kantha Bopha Children's Hospital in Phnom Penh, Cambodia, from 1st January 2014 to 31st December 2018.
Results: Of 138 children presenting with new onset T1DM over the 5-year period, 68 cases had DKA of any severity (49.28 %) with the sex ratio (M:F) of 1:1.52 and the mean age of 7.8 years old. Mostly, patients were from rural area (69.12 %).
Dyspnea was complaint frequently (39.71 %). Among all chief complaints, there were 10.29 % of altered level of consciousness and 5.88 % of coma.
The mean duration of the symptoms was 8.44 days, and of hospitalization was 24.56 days. Mean level of laboratory results were serum glucose (33.51 mmol/L), HbA1C (12.93 %), pH (7.10), and HCO3 (7.45 mmol/L).
The severity was divided into three categories like mild, moderate and severe (22.06%, 32.35 %, and 45.59 % respectively).
During treatment, the mean time of DKA resolution was 21.09 hours and complications were hypokalemia (29.41 %), and hypoglycemia (22.06 %). There were no reported cases of cerebral edema as well as mortality.

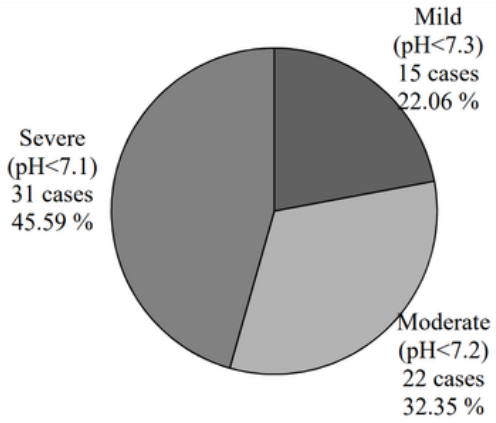

Figure. Severity of acidosis.

Conclusions: DKA at the time of T1DM diagnosis is accounted for almost half of all presented children and often severe.
Children at admission mostly were from rural region and girls have high risk of DKA as well as those with the age of 10-15 years old. They had hypokalemia (29.41 %) and hypoglycemia (22.06 %) during the treatment, but no cases of cerebral edema or mortality.

P-142 | Refining prediction of risk for diabetic ketoacidosis: The RI-DKA v.1.2

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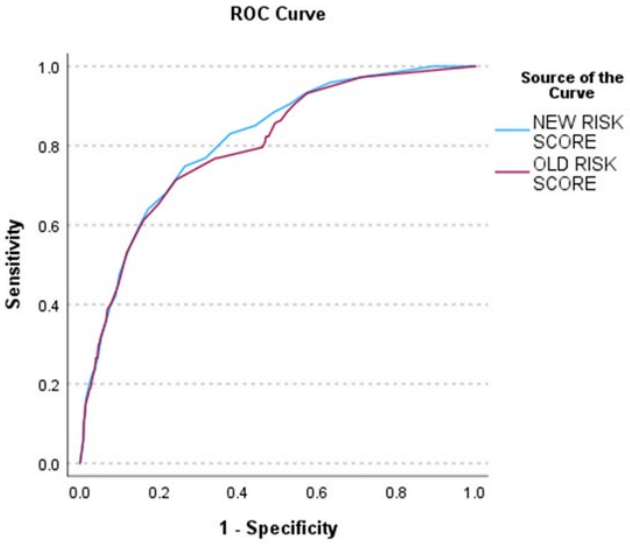
Introduction: The Risk Index for Diabetic Ketoacidosis (RI-DKA) is an automated, electronic medical record-based risk prediction algorithm designed to identify patients with established type 1 diabetes at increased risk for DKA.
The current version of the index successfully categorizes patients as low, medium, and high risk, but was found to miss a subset of patients who went on to experience subsequent DKA.
Objectives: The goal of the present work was to optimize the predictive performance of the RI-DKA in a new cohort of children with type 1 diabetes, to better identify patients in need of preventive care.
Methods: Regression coefficients from the original validation data set were used to re-weight the predictors in the model (presence of DKA in the prior two years, most recent hemoglobin A1c [HbA1c], and insurance status [public versus private]). The revised scoring system was applied to retrospective data from 1827 children (age 0-18) with type 1 diabetes of >6 months duration seen at our institution between September 2019-September 2021, and tested using multivariable logistic regression. Positive likelihood ratios were then determined for each score and used to revise the risk categories.
Results: Reweighting the risk factors resulted in an increased effect of HbA1c on risk categorization, shifting 7% of patients (n=128) from medium to low risk, and 5% (n=91) from medium to high risk. Model performance improved from an AUC of 0.797 to 0.810 (p. = 0.021). Exploratory analyses indicated that adding a fourth (very high) risk category might further improve predictive performance.



Conclusions: Refining the risk prediction algorithm resulted in significantly improved model performance, largely by better accounting for the contribution of HbA1c to DKA risk. While the difference in performance was small, it was clinically significant, as the difference translated into 91 additional patients being identified as high risk and in need of preventive intervention.

P-234 | Diabetic ketoacidosis in a child with severe acute malnutrition in Ghana

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Introduction: Acute severe malnutrition (SAM) among children is common in Ghana because of poverty and general food insecurity. Children with SAM, as a result of reductive adaptation rather develops hypoglycaemia. Diabetes, and hence DKA, in patients with SAM has not been described before in Ghana.
Objectives: To present a 6-year-old boy with severe acute malnutrition with diabetic ketoacidosis (DKA).
Methods: Case description of diabetic keoacidosis in a 6-year-old boy with sever acute malnutrition.
Results: He was successfully managed. He is doing well and keeping to appointments.
Conclusions: It is important to do blood glucose in all children with acute diseases on admission including children with severe acute malnutrition.

P-236 | Incidence of diabetic ketoacidosis in past 2 years among children and teens with type 1 diabetes

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Introduction: Diabetic ketoacidosis is the common presentation of people with type 1 diabetes that arises due to insufficiency of insulin in the body.
Objectives:
1. To calculate the incidence rate of diabetic ketoacidosis among children and teens with type 1 diabetes
2. To rule out the reason for the occurrence of DKA

Methods: Data was extracted retrospectively from the electronic database for the years 2022 and 2021. Inclusion criteria: Patients admitted to the hospital for treatment of diabetic ketoacidosis with symptoms like abdominal pain, and vomiting with or without nausea. Exclusion: newly detected with diabetes & presented with DKA.
All patients admitted for the treatment were further given a structured questionnaire to rule out the reason for the occurrence of DKA.
A physical examination was performed to check lipohypertrophy and insulin pens were checked for air bubbles and other technical issues.
Baseline charactetics:
Median Age (years) 15
Males (2022) 19 Females (2022) 16
Males (2021) 6 Females (2021) 6
No of patient visited the clinic: 102 (2022) 61 (2021)
Median weight (kgs) (2022,2021) 44, 48.2
Median height (cms) (2022,2021) 154, 150
Results: Key findings :
- The prevalence is high among adolescents, and no gender disparities were seen.
- It commonly occurs during the initial years of diagnosis.
- Insulin omission either inadvertently or deliberately is the most common cause of DKA after improper insulin techniques.
- In 2021 due to the COVID pandemic, the follow-up visits at the clinic were affected. This might have affected the incidence rate.

No of DKA incidence	35	12
Incidence rate (per 1000 population)	30.1	10.3
Median DOD (years)	3	7.5
Median HbA1c (%)	10.75	10
Acetone 10 (mild)	12	0
Acetone 11 to 50 (moderate)	15	6
Acetone >50 (severe)	9	6
Liphypertrophy (%), Missed insulin(%)	48.5,51.4	0,99.9

Conclusions: Conclusion: DKA remains the significant complication of T1D in children and teens at diagnosis and during the course of their life. This calls for educational and psychological interventions. It is important to ensure proper insulin injections are taken by a responsible adult in the family.

P-266 | A comprehensive observational study on diabetes ketoacidosis in a tertiary care centre

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Introduction: Diabetic ketoacidosis (DKA) is an endocrine emergency with high morbidity and mortality in Type 1 Diabetes. Lack of awareness of the disease, low socioeconomic status, lack of free insulin supply are the main reasons for DKA and its poor outcome.
Objectives: To determine the Demographic, clinical characteristics, risk factors and outcomes of DKA.
Methods: This was a prospective observational study conducted in the Paediatric intensive care unit associated with a Paediatric Endocrinology department in a tertiary care centre between Feb 2021 to July 2022.
All children who were admitted to the intensive care unit with DKA were included, demographic details, history and examination findings were noted in a structured proforma. All the investigations were done at the time of admission and repeated whenever required.
The duration of ICU Stay, insulin infusion, hospital stay, time for resolution of acidosis and outcome were noted down.
Results: There were 48 children and DKA was more common in females (66.7%) and adolescents (47.9%). The majority of them were from poor socio-economic background. DKA was more common in newly diagnosed type 1 diabetes, there were 14 diagnosed patients, the mean duration of diabetes was 3.8±0.2 years, with an average HbA1c of 11.8±0.6%,on NPH and regular insulin.
Nausea and vomiting was the most common symptom.52.1% had ph < 7.1, 62.5% had bicarbonate of 6.3±0.1mEq/L and corrected sodium of 123±0.1mEq/L. 64.6% required a insulin infusion dose of 0.1U/kg/hr for a duration of 30.2±0.6 hours,4.2% required inotropes for 48 hours and 8.3% required Mechanical ventilation for duration of 11.08±0.6 days.
Average time for DKA resolution was 22.1±0.2 hours, with an ICU stay for 3.3±0.1 days and hospital stay for 6.9±0.8 days. Mortaliy rate was 8.3%
Conclusions: In our study DKA was more prevalent in adolescent females of poor socioeconomic background.It was more common in newly diagnosed. Severe acidosis and hyponatremia at presentation were the major risk factors for the mortality in our study.

P-298 | Be aware of early onset diabetes accompanied by hyperglycemic hyperosmolar state (HHS) In children and adolescents with progeria-like syndromes

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Introduction: HHS is a very rare complication of type 2 diabetes in children and adolescents and is characterized by extremely high blood glucose levels, a profound hyperosmolality and a distinct dehydration. HHS is more common in older people with type 2 diabetes and is extremely uncommon at onset. There is a so-called relative insulin deficiency - the remaining endogenous insulin slows down lipolysis so that the children do not develop significant metabolic acidosis.
Objectives: Progeria-like syndromes are extremely rare genetic diseases of various etiologies that are characterized by premature aging. Little is known yet about metabolic complications, specifically type 2 diabetes.
Methods: We report on two boys with Cockayne and NAA10-related syndrome who presented with acute diabetes mellitus and severe HHS at the age of 7 and 15 years. Both of them had extremely high blood glucose levels at manifestation (925/1000 mg/dl = 51,4/55,5 mmol/l), no or only mild ketoazidosis (pH 7,4/7,2), slightly elevated HbA1c (7,3/7,2% = 56/55 mmol/mol) and very high initial serum osmolality (345 mosm/kg). Both of them required intensive medical therapy with precise rehydration and very careful BG management because of a high insulin sensitivity.
Results: Due to the accelerated aging process in progeria-like syndromes, diseases that normally occur later in life can appear much earlier. The underlying pathophysiological mechanisms are still unclear. It is discussed whether mechanisms that lead to premature aging also promote lipodystrophic syndromes, which in turn are frequently associated with metabolic complications.
Conclusions: In children with progeria-like syndromes early and regular screening for diabetes mellitus is mandatory to avoid life threatening hyperglycemic hyperosmolar state at onset of diabetes.

P-306 | Penile gangrene: an unusual complication due to diabetic ketoacidosis

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Introduction: Penile gangrene is an uncommon urological finding due to its sufficient blood supply. It may be due to infectious, traumatic, or vascular causes. In patients with diabetes mellitus (DM), penile gangrene can result from progressive vaso-occlusive changes with subsequent vascular atherosclerosis. Most of the reported cases are adults with type 2 DM and end-stage renal disease. Penile calciphylaxis due to vascular calcification is a well-established cause in those patients. Management of penile gangrene is difficult and unclear, as there are limited number of cases reported.
Objectives: To our knowledge, only one 10-year-old boy with poorly-controlled type 1 diabetes (T1DM) and Fournier gangrene had been reported.
Methods: We herein report a boy newly-diagnosed with T1DM, presenting with DKA and penile gangrene post-circumcision at Alexandria University Children's Hospital (AUCH).
Results: A 3 9/12-year-old boy with no past medical history had circumcision. Following the procedure, he became feverish, and had penile edema. He was discharged home on antibiotics for 3 days with no improvement, so he was referred to AUCH. On examination, he was feverish, dehydrated, and shocked. His penis was edematous, inflammed, with black discoloration and gangrene at the tip of glans penis. His random blood sugar was >500 mg/dl, so we were notified. He had history of polyuria and polydipsia since 1 week, but the parents did not seek any medical advice. He had extensive candidal diaper rash. Serum Creatinine was 0.76 mg/dl, BUN 6 mg/dl, and calcium profile was normal. He had metabolic acidosis (pH 7.1, HCO3 3.9), and he was polyuric, so he was diagnosed with DKA. His C-peptide was 0.32 ng/ml, & HbA1c 10.7%. He received shock therapy, followed by insulin infusion, intravenous fluids, antibiotics, and surgical debridement was done.
Conclusions: This is the first case describing a boy presenting with DKA & penile gangrene simultaneously. More education is required for earlier detection of DM and preventing complications.

P-307 | A rare but dreadful complication of diabetes mellitus

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Introduction: Mucormycosis represents one of the most common invasive fungal infection in children, and recent studies have suggested a rising incidence. It is an acute opportunistic infection caused by a saprophytic fungus that belongs to the class of phycomycetes.
In most, predominantly aggressive and potentially fatal forms are Rhizopus, (predominant pathogen 90% cases of rhinocerebral mucormycosis).
Mortality associated with invasive mucormycosis is high (> 30–50%), with 90% mortality associated with disseminated disease.
Objectives: To report one of the most fatal acute complication of diabetes mellitus and its overall management in a young girl from a developing country.
Methods: all clinical information history, examination, pictures, radiological and lab reports were kept confidential and taken after the informed consent of the guardian and the patient herself.

Results: A young girl of 9 years known case of T1DM presented in ED WITH fever for 15 days, uncontrolled sugar for 10 days and swelling of the left eye for the last four days, purulent nasal discharge was also noticed by her along with uncontrolled sugars at home, no significant history of other illnesses and surgeries in past.

Previously had been admitted as a case of diabetic ketoacidosis and been managed as such. Birth history was not significant and vaccinations done at proper time. consanguineous parents belong to low socioeconomic class with no family history of diabetes .Her Height was143 cm (+1.18 Z score) and Weight 30 kg (-0.08 Z score.

Nose showed a large necrotic lesion involving both nostrils and nasal septum.There was a marked swelling over left eyelid with purulent discharge and ptosis. Other systemic examination was normal.

Conclusions: Child was treated with medical treatment with amphotericin B and surgical debridement in early phase of the disease. Diagnosis requires a high index of suspicion, evaluation with histopathology, culture, and definitely, molecular identification

P-345 | Cerebral small vessel disease in type 1 diabetes during diabetic ketoacidosis

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Introduction: Untreated cerebral hypoperfusion in DKA may lead to cerebral injury, arterial ischemic stroke, cerebral venous thrombosis, and hemorrhagic stroke.

Objectives: This study assessed the cerebral perfusion status among children and adolescents with DKA during DKA.

Methods: Forty children and adolescents with T1DM presenting with DKA were assessed for severity of DKA, diabetes-duration, insulin therapy, glycated-hemoglobin (HbA1c), and brain magnetic resonance imaging (MRI) during and 2 weeks after the resolution of the DKA.

Results: The mean age of the children and adolescents with T1DM presenting with DKA was 11.40 ± 2.82 years; their median diabetes-duration was 3 years; their mean HbA1c was 13.54 ± 2%.

There was significant decrease in apparent diffusion coefficient (ADC) during DKA than after the resolution of DKA (P<0.001). In children and adolescents with ischemic MRI changes during DKA, there was significant increase in severity of DKA (P=0.003), HbA1c (P=0.016). HbA1c was negatively correlated to ADC.

Conclusions: A significant cerebral hypoperfusion occurs during the DKA which is correlated with the DKA severity.

P-393 | Factors associated with diabetic ketoacidosis after type 1 diabetes diagnosis in pediatric patients in western Canada

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Introduction: Diabetic ketoacidosis (DKA) is a preventable acute complication in type 1 diabetes (T1D).

Objectives: To determine what factors are associated with DKA admission in pediatric patients following diagnosis of T1D.

Methods: All patients with preexisting T1D who were admitted with DKA to a tertiary care centre in western Canada between April 2002 to March 2019 were identified. DKA episodes were included if they occurred >14 days after T1D diagnosis. Admission and T1D management information, patient demographics, medical comorbidities, and details about psychosocial concerns were collected retrospectively from patient medical records. Data were summarized using descriptive statistics.

Results: 144 patients had a total of 175 DKA admissions. Median length of stay was 1 (IQR 1–2) day. Fifty-three percent of patients were female and 37% had DKA at time of T1D diagnosis. Median age at admission was 13 (IQR 11–15) years, median hemoglobin A1C preceding admission was 9.6 (IQR 8.6–10.8) percent, and median number of missed appointments in the two years preceding admission was 1 (IQR 0–2). Seventeen percent of patients were using insulin pumps at time of admission and median insulin dose was 1.26 (IQR 0.93–1.67) units/kilogram.

Admissions were associated with psychiatric and neurodevelopmental comorbidities: 12% ADHD, 3% autism, 8% depression, 5% anxiety, and 2% eating disorders.

Admissions were also associated with psychosocial concerns: 11% marijuana use, 17% alcohol use, 5% smoking, 21% family conflict, and 19% child protective services involvement.

Conclusions: Pediatric patients in western Canada admitted with DKA following T1D diagnosis are older and have inadequate glycemic control.

Interestingly, they are engaging with the healthcare system, with few missed appointments. This suggests that there is an opportunity to intervene. This study also identified what factors might be used to identify local high-risk patients to target preventative interventions.

P-061 | The relationship between the severity of diabetic ketoacidosis at diagnosis and the development of thyroid autoimmunity in children with type 1 diabetes mellitus

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Introduction: Type 1 diabetes mellitus (T1D) is a chronic disease associated with the development of autoimmunity. The most common autoimmune disease among children with T1D is Hashimoto's thyroiditis, with a prevalence ranging from 15% to 30%.
Objectives: In this study, the relationship between the severity of acidosis at diagnosis and the risk of developing thyroid autoimmunity was investigated in children with type 1 diabetes.
Methods: 102 children (53 boys, 49 girls) who were followed up with the diagnosis of T1D and admitted to Adana City Training and Research Hospital Pediatric Endocrinology Clinic between January 2011 and December 2021 were included in this retrospective cross-sectional study.
In addition to thyroid autoantibody positivity, thyroid ultrasound imaging (USG), biochemical analysis and demographic data were obtained from the files.
Results: The mean age of the children included in the study was 12.45±3.70 years, the mean age at diagnosis was 9.46±4.40 years, and the mean diabetes duration was 2.98±2.59 years. The incidence of thyroid autoimmunity and Hashimoto's thyroiditis proven by USG was 9.8%.
Severe ketoacidosis (pH<7.10) was present in 23.5% of the children at the time of diagnosis. While the rate of thyroid autoimmunity was 20.8% in the group with severe acidosis at the time of diagnosis of diabetes, this rate was 6.4% in the group without severe acidosis, and this difference was statistically significant (p:0.038).
The relationship between severe ketoacidosis at the time of diagnosis and the development of thyroid autoimmunity was found to be significant. (odds ratio [OR], 3.84; 95% confidence interval [CI], 1.008-14.650; p: 0.049).
This association persisted after adjusting for gender, age at diagnosis of diabetes, and duration of diabetes (OR: 6.43; 95% confidence interval [CI], 1.215-34.075; p: 0.029).
Conclusions: The relationship between the severity of ketoacidosis at the time of diagnosis and the development of thyroid autoimmunity was found to be significant in children with T1D.
The severity of ketoacidosis can be considered as a predictive factor for the development of multiple autoimmunity, especially Hashimoto's thyroiditis, and this association may be due to the effect of acidosis on the immune system.
There is a requirement for prospective studies with more patient participation, including other autoimmune diseases associated with T1D.

P-062 | Effect of low and high glycemic index meal on postprandial glomerular hyperfiltration in adolescent type 1 diabetes

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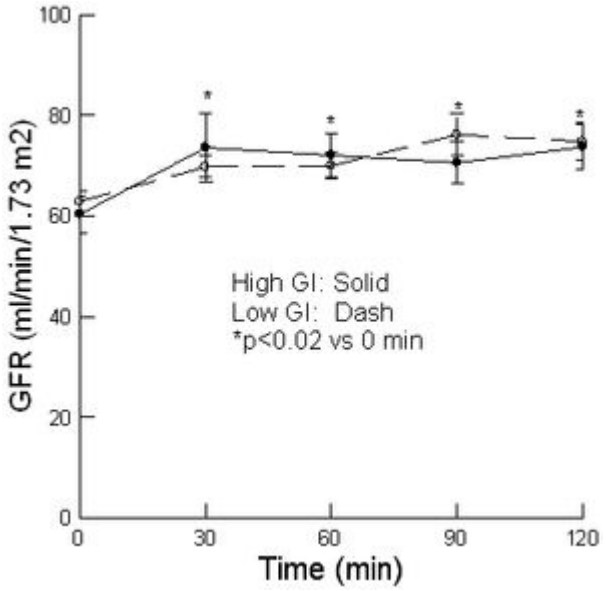
Introduction: Post-prandial glomerular hyperfiltration may play a role in the development of future diabetic neuropathy in adolescents with type 1 diabetes (T1D). Low glycemic index meals are associated with less post-prandial hyperglycemia.
Objectives: The goal of this study was to determine if low GI meals are associated with lower postprandial glomerular hyperfiltration in adolescent T1D.
Methods: 12 adolescents with type 1 diabetes were fed low and high GI breakfasts with identical carbohydrate amounts on 2 separate days in random order and effective glomerular filtration rate (GFR) was calculated from cystatin C measurements at baseline, and 30 min intervals through 120 min (GFR $=70.69 \times (cysC)^{-0.931}$. Subjects were given their usual premeal rapid acting insulin without correction for plasma glucose. If the fasting glucose was < 3.9 or >11.1 mmol/L the study was rescheduled.
Results: Baseline glucose was not different between the two sessions. Post-prandial glucose increase was significantly greater with the high GI meal

(p<0.001). GFR increased 30 min (p=0.013) after each meal and remained elevated for the rest of the study. Responses did not differ between high and low GI index meals.



Conclusions: Glomerular filtration rate increases post-prandially in adolescents with type 1 diabetes. This increase does not differ between high and low GI meals in spite of the larger glucose increase with the high GI meal.

P-063 | Nerve & muscle function assessment & Estimation of subclinical neuropathy prevalence in indian adolescents with type-1 diabetes: a case control study

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Introduction: Clinical screening for diabetic neuropathy diagnoses only the tip of the iceberg, not considering subclinical neuropathy whose progression can be halted if detected early.

Objectives: Comparing nerve,muscle function in Type1 Diabetes(T1D) vs controls; assessing prevalence,determinants of subclinical neuropathy in Indian adolescents with T1D.

Methods: Case-Control study. Inclusion: T1D>2 yr (n=120). Controls (n=40): Age, sex-matched, healthy persons. Exclusion: Illness affecting nerve function.

Results: Age: 15±3yr; diabetes duration: 7±3.5yr; HbA1c:10.2±2%. None had clinical neuropathy.

Nerve conduction study (NCS) - latency significantly prolonged; action potential duration, conduction velocity (NCV) lower in motor nerves; sensory nerve action potential (SNAP) duration lower in T1D (p<0.05).

Jumping mechanography - Esslinger Fitness Index (EFI) SDS, max.power/weight (Pmax-rel) lower (p<0.05)–impaired muscle function in T1D.

T1D subclinical neuropathy prevalence - demyelinating motor neuropathy: upper limbs (UL)-9.2%; lower limbs (LL)-22%. Demyelinating sensory neuropathy: UL-55%; LL-6.4%. Axonal motor neuropathy: UL-23%; LL-12.8%. Axonal sensory neuropathy: UL-13.8%; LL-8.3%. Highest proportion of abnormal motor NCV: peroneal nerve-5.5%; sensory NCV: median nerve-36%, compound muscle action potential (CMAP), SNAP amplitudes: median nerve-12.8%, 9.2%; motor, sensory latencies: tibial-8.3%, sural-4.6%.

Correlation: EFI SDS positively with motor NCV (r=0.4); HbA1c negatively with motor NCV (r=-0.3), SNAP amplitude(r=-0.3); muscle density positively with SNAP amplitude (r=0.4) (p<0.05).

Regression: High HbA1c–associated with neuropathy. EFI SDS, Pmax-rel affected by HbA1c, longstanding diabetes, albuminuria, dyslipidemia (p<0.05).

Conclusions: Muscle function, NCS-adversely affected in T1D. High subclinical neuropathy prevalence in adolescents with T1D; poor glycemic control being causative. Muscle function-affected by glycemic control, duration, albuminuria, dyslipidemia, but not neuropathy, suggesting primary muscle involvement in T1D & not secondary to subclinical neuropathy.

P-065 | Macrovascular changes in children with well-regulated type 1 diabetes and associations to glycemic control

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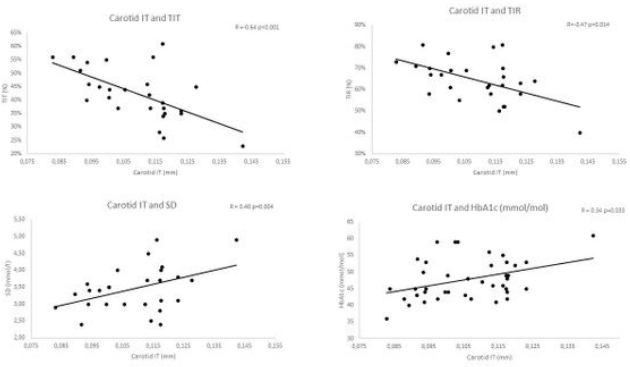
Introduction: Cardiovascular complication development starts early in T1D.
Objectives: By using novel, highly sensitive methods, determinants for early cardiovascular changes in children with T1D were explored.
Methods: We included 50 children (6-15, 99yr) with T1D duration of ≥5 years (HbA1c 46.5 (36.0, 61.0) mmol/mol) and 41 healthy controls.
Morphological, functional and biochemical cardiovascular assessments were performed, including ultra-high frequency ultrasound separately visualizing the layers of the arterial wall, aortic pulse wave velocity, office- and ambulatory blood pressure, longitudinal HbA1c and CGM metrics.
Results: An 11% increased radial intima thickness (IT), 10% increased dorsal pedal (DP) IT, 16% increased DP media thickness (MT), and 14 % increased DP intima- medica thickness (IMT) (p=0.002 and p=0.003-0.008, respectively) was seen in the children with T1D, compared to healthy controls.
Boys with T1D showed a 16% increase in both DP IT and DP IMT (p=0.008 and p=0.042, respectively), and girls with T1D showed a borderline significant 12% increased DP IMT 12% (p=0.07) compared to healthy controls.
Children with T1D showed associations between carotid IT and HbA1c, time in range (TIR), time in target (TIT) and glucose variability (SD) (HbA1c: r = 0.34, p=0.033, TIR: r= -0.47 p= 0.014, TIT: r= -0.64 p<0.001 and SD: r=0.40 p=0.004, respectively), and between carotid intima/diameter ratio, HbA1c and TIT (HbA1c: r= 0.37 p=0.019, TIT: r= -0.49 p=0.009, respectively).
We also found correlations between blood pressure and several gluco-metrics (r=0.36-0.52 p=0.002-0.045, and r=-0.53--0.42, p=0.002-0.017, respectively).
Conclusions: Children with well-regulated T1D show signs of early morphological changes in both intima and media in the examined peripheral arteries. Associations between carotid IT and several of the clinically used gluco-metrics supports the theory of vascular glucotoxicity in T1D, further emphasizing that striving for normoglycemia is essential.



P-066 | Association of chemokine network profile with albumin excretion in children with type 1 diabetes

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Introduction: There is growing evidence that low-grade inflammation may mediate endothelial damage, the first step in developing diabetic complications.
Objectives: Aim was to investigate associations of albumin excretion with inflammatory markers and chemokine networks in Type 1 diabetic children (T1DC).
Methods: 29 healthy controls (HC), (14 M, age 15.46+/-1.51 years) and 31 T1DC (19 M, age 15,55+/-1,61 years), mean disease duration of 10 years, were included. Albumin excretion was reported as the mean of al-

bumin to creatinine ratio (ACR) from two first-morning urine samples. Expression of CCR2, CCR4, CXCR3, and CXCR4 receptors on peripheral blood mononuclear cells was determined using flow cytometry. Chemokines CCL2, CCL5, and CXCL10 were analyzed by BioLegend LEGENDplexTM and CXCL12 by ELISA.

Results: There was no difference in ACR in HC and T1DC (0.2 mg/mmol (IQR 0.0 – 0.4) v.s. 0.2 mg/mmol (IQR 0.0-0.4), *p*=0.71). T1DC had a higher CRP level (0.5 mg/L (IQR 0.1 - 1.0) v.s. 0.1 mg/L (IQR 0.1 – 0.5) in HC, *p*=0.01).

In HC, ACR positively correlated with CXCL10 and inversely with CCL5, but in T1DC positive correlation with CXCL12 was found.

In HC, we found positive correlations of ACR with all CCR2-expressing subsets, while T1DC showed inverse correlations of ACR with CCR2-expressing monocytes and B-cells and with CXCR4-expressing T-cells.

Conclusions: We found higher CRP levels in T1DC and different associations of ACR with chemokines and chemokine receptors in each group. In T1DC there was a positive association of ACR with CXCL12, a chemokine involved in angiogenesis, while associations of ACR with chemokine receptors, namely CCR2 were opposite when compared to HC.

Results suggest a higher inflammatory state and altered regulation of the chemokine network in T1D patients and the potential role of the CCR2 receptor as well as the CXCR4/CCL12 complex in evolving albuminuria.

P-067 | Screening for diabetic neuropathy among children, adolescents and young adults with T1DM in a referral hospital, Yaounde, Cameroon

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Introduction: Diabetic neuropathy (DN) is a microvascular complication of type 1 Diabetes mellitus (T1DM), often coupled with significant disability, poor health-related quality of life, posing a huge economic burden.

Objectives: We aimed to identify factors affecting DN in children, adolescents and young adults.

Methods: We carried out a cross-sectional study of 66 participants with T1DM followed up at the National Obesity Centre of the Yaoundé Central Hospital, Cameroon. Neuropathy was screened using two validated screening tests: Douleur Neuropathique (DN4) and The Michigan Neuropathy Screening Instrument (MNSI).

Results: Mean age of participants was 20.3 ± 5.2 years and duration of T1DM was 5.7 ± 4.9 years. Ninety three percent were not compliant to treatment with a mean HbA1c of 8.2 ± 1.8. A total of 39.4% participants had neuropathy on both the DN4 and the MNSI, meanwhile, 16.7% (11 out of 66) had abnormal scores on the MNSI physical examination (CI=95%).

A duration of T1DM between 5-6 years was significantly associated with the presence of neuropathies (p value = 0.005).

Conclusions: Screening for DN in children, adolescents and young adults should be done within the first 5 years of diagnosis of T1DM, and emphasis should be made on compliance.

Key Words: Type 1 diabetes mellitus, Diabetic neuropathy, HbA1c level

P-137 | Prevalence of sleep disorders in children and adolescents with type 1 diabetes and its relation to glycemic control: a single center study

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Introduction: Poor sleep quality has been linked to insulin resistance and impaired glucose metabolism, but little is known about sleep and type 1 diabetes (T1D). People with T1D experience higher rates of sleep disturbances than people without diabetes, and these disturbances have negative implications on glycemic control, as well as psychosocial and cognitive outcomes.

Objectives: To study the prevalence of sleep disorders and sleep characteristics in children and adolescents with T1D and the possible association between sleep disturbances and HbA1c.

Methods: A case control questionnaire study that was conducted on 189 cases and 106 age and sex matched controls. The sleep was evaluated by using Sleep Disturbance Scale for Children (SDSC) in children 6–12 years old and Adolescent Sleep-Wake Scale (ASWS), total nocturnal sleep duration, sleep disordered breathing, daytime sleepiness scores in adolescents 12–18 years old.

Results: The study showed higher prevalence of sleep disorders in T1D group in comparison to controls (57.1% vs 11.3%; p <0.001). T1D group showed a statistically higher prevalence of daytime sleepiness versus control group (18.5 % vs. 8%, p=0.04).

Multivariate analysis showed that younger age and higher HbA1c are significant independent predictors of sleep disorders in T1D cohort (OR= 3.5 (1.01-12.4); p=0.048, 1.7 (1.4-2.1); p <0.001, respectively).

There was a significant negative correlation between duration of sleep and HbA1c (r= -0.54; P <0.001). Median HbA1c % was higher in T1D with sleep disorders as compared to T1D subjects without sleep disorders (10.2% (8.9% – 11.5%) vs. 7.6% (6.9% – 9.2%), P= 0.001). 3.7% of T1D cohort with good glycemic control (HbA1c ≤7%) had sleep disturbance, while 96.3% of T1D cohort with average glycemic control (HbA1c >7%) had sleep disturbance, (p value < 0.001).

Conclusions: Young people living with T1D have a higher prevalence of sleep disorders as compared with healthy controls. Glycemic control is significantly affected by the presence of sleep disorders and vice versa.

P-140 | Assessment of the oxidative and antioxidative status in children with type 1 diabetes

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Introduction: Hyperglycemia is associated with increased production of free radicals and increased oxidative stress. Scientific evidence indicates that oxidative stress is the common denominator for the major pathways involved in the development and progression of the micro- and macrovascular complications of diabetes.

Objectives: The aim of the study was to assess the oxidative/antioxidative status in children with type 1 diabetes (T1D).

Methods: 90 children (47 boys), with T1D (for 6.23 ± 3.97 years), aged 13.07±3.12 years were enrolled in this study. The serum total oxidative status/capacity (TOS/TOC) and total antioxidative status/capacity (TAS/TAC) was assessed using the fotometric immunodiagnostic sets for PerOx (TOS/TOC) and ImAnOx (TAS/TAC) (both Bensheim, Germany).

TOS/TOC and TAS/TAC associations with HbA1c and continuous glucose metrics from the past 14 days were analyzed.

Results: The TOS/TOC in children with T1D was 938.99±563.46 µmol/l indicating a high level of oxidative stress in 91% of the studied individuals.

Interestingly, intensified oxidative stress developed despite patients exhibiting a high antioxidative potential, as indicated by their serum levels of TAS/TAC.

Moreover, there was a week negative correlation between TOS/TOC and the duration of T1D (r=-0.25, p<0.05). The tendency towards a positive association of TOS/TOC with BMI centile and total daily in-

sulin dose (TDI) did not reach statistical significance (r=0.065 and r=0.053, p<0.1 for both). Neither TOS/TOC nor TAS/TAC were related to the average sensor glycemia (Avg SG), coefficient of variation (CV), glucose management index (GMI) or glycosylated hemoglobin A1c (HbA1c).

Age [years]	13.07 ± 3.12
Male [n,%]	47, 52 %
Duration of T1D [years]	6.23 ±3.97
Avg SG [mg/dl]	151.85±28.01
CV [%]	35.63±9.44
GMI [%]	6.95±0.66
HbA1c [%]	7.56±1.28
TDI [u/kg]	0.62±0.28
TAS/TAC (µmol/l)	321.04±42.61
TOS/TOC (µmol/l)	938.99±563.46

Conclusions: In children with T1D we observed higher than reference total oxidative stress that decreased with disease duration. However, we did not found any significant associations between the increased oxidative stress and glycemic metrics in the studied population.

P-141 | Bone health and the gut microbiome in youth with type 1 diabetes (T1D)

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Introduction: People with T1D have increased bone fracture risk compared to those without T1D. Microbiome differences exist between persons with and without T1D. Relationships between bone health and gut microbiome in T1D are largely unexplored.
Objectives: We hypothesized that youth at risk of, or with, T1D would have lower measures of bone health (HRpQCT and DXA) than healthy controls (HCs) along with microbiome and glycemic differences.
Methods: Youth with preclinical (PC), new onset (NO), and long standing (LS) T1D and HCs had assessments of bone health, serum, stool microbiome, and glycemic measures (Hba1c, CGM).
A permutation test with pseudo-F ratios was used to test β-diversity and a one-way ANOVA and Pearson's Chi-squared to test differences among groups.
Results: Mean age±SD and sex was: PC 12.2±0.1yrs, 100%M, n=2; NO 14.5±1.6, 57.1%M, n=7; LS 14.2±2.2, 17%M, n=6; and HC13.7±1.1, 86%M, n=7.
There were no differences between groups in HRpQCT or DXA. More youth reported fractures in the NO (3,43%) and LS (4,67%) compared to none in the PC or HC groups (p=0.046 between LS and HC). NO (27.8ng/mL±7.5) and LS (24.3±5.6) had lower 25-OH vitamin D levels than the HC (38.4±7.5) and PC groups (40.30±3.7) (p=0.0043 between groups).
HbA1C (p=0.01), CGM Time> 250 (p=0.0012), >180 (0=0.0039), and TIR 70-180 (p = 0.00019) were also different between groups, with highest HbA1C and hyperglycemic metrics in the LS group (mean Hba1c 5.1% in PC, 6.9% NO and 9.2% LS).
Bacterial community analysis using 16S rRNA showed no differences in within sample (α) diversity; there were differences in between sample (β) diversity by group (p=0.042).
There was a higher relative abundance of Prevotella in HC and PC, and higher Bacteroides in NO and LS groups (Figure).

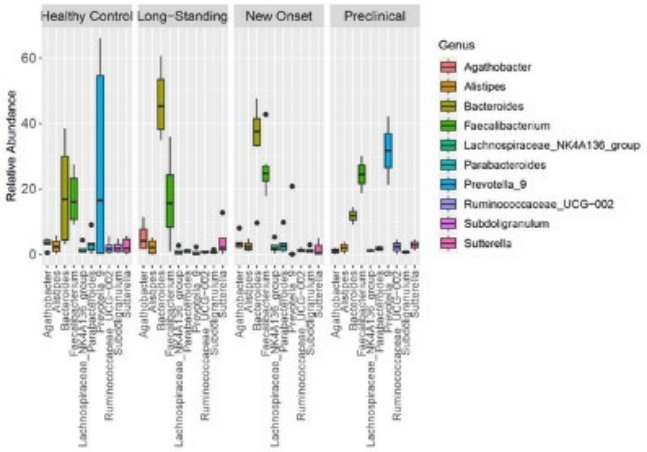

Figure. Top 10 Genius Relative Abundances between the 4 groups. The healthy control and preclinical groups had a higher relative abundance of Prevotella and the new onset and long standing groups had a higher relative abundance of Bacteroides.

Conclusions: Results show modest differences in microbiome studies and no differences in bone measures. Further work is needed in understanding determinants of bone health in T1D, and microbiome relationships for potential interventions.

P-143 | Autonomic regulation of the heart in children with well-regulated type 1 diabetes

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Introduction: Children with T1D have an increased risk of autonomic neuropathy and subclinical signs of autonomic dysfunction may be detected already in childhood. Measurement of cardiac spontaneous baroreflex sensitivity (BRS) is a highly sensitive method which enables detection of subclinical signs of autonomic dysfunction even in children.
Objectives: Using measurements of cardiac BRS, we aimed to examine the autonomic regulation of the heart in children with T1D, the development of autonomic dysfunction in T1D and its associated factors.
Methods: Fifty children (6-15.99yo) with a T1D-duration of ≥ 5 years and 41matched healthy controls were included. We measured cardiac BRS at baseline and in 25 of the children with T1D at 2-year follow-up. Biochemistry, longitudinal HbA1c, gluco-metrics and blood pressure z-score were also analyzed.
Results: The children with T1D showed a median HbA1c of 46.5 (36.0 - 61.0) mmol/mol and a median time in range (TIR) of 63% (40 - 81). The children with T1D had an 18% higher DBP z-score, as compared to healthy controls. We found no difference in autonomic function at rest measured as BRS, QT-variability Index (QTVI) or heart rate variability (HRV) between children with T1D and healthy controls, nor did we see any differences when analysing the female and male groups separately. The autonomic function did not change over time in the T1D group. Associations between longitudinal HbA1c and QTVI as well as T1D-duration and QTVI were seen (r=-0.376 p=0.017 and r=-0.447 p=0.004, respectively).
Conclusions: No signs of autonomic dysfunction were found in these children with well-regulated T1D when using highly sensitive methods for examination. This is a promising finding, indicating that appropriate glycemic control is beneficial for preventing autonomic dysfunction.

	T1D n=44	Healthy controls n=37	p-value
Age (years)	12.04 ± 2.34	11.34 ± 2.46	0.192
T1D duration (years)	7.22 (5.25, 11.46)		--
Height (cm)	156.5 ± 15.0	152.3 ± 16.3	0.228
BMI z-score (SD)	0.35 ± 0.77	0.29 ± 0.89	0.731
Office SBP z-score	0.50 ± 0.23	0.45± 0.23	0.378
Office DBP z-score	0.59 ± 0.17	0.50 ± 0.18	0.019
HbA1c (IFCC) (mmol/mol)	46.5 (36.0, 61.0)	31.0 (27.0, 35.0)	<0.001
HbA1c (DCCT) (%) 5.0 (4.6, 5.4)	6.4 (5.5, 7.8)	5.0 (4.6, 5.4)	<0.001
Time in range (%) (3.9-10.0)	63.0 (40.0, 81.0)		--
Time in target (%) (3.9-7.8)	41.0 (23.0, 61.0)		--
BRS-slope (ms/mmHg)	19.12 ± 7.77	19.50 ± 7.09	0.831
QT variability index	-1.46 ± 0.24	-1.48 ± 0.26	0.312
Heart rate variability (ms)	81.20 ± 32.92	91.77 ± 35.82	0.185

P-144 | A retrospective audit of the management of children and young people with type 2 diabetes informing the development of a dedicated service

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Introduction: Type 2 diabetes mellitus (T2DM) duration positively correlates with complication risk. Thus, early diagnosis, structured education, risk factor modification and complication screening are vital for children and young people (CYP) with T2DM.
Objectives: This audit reviews current practice to inform the development of a dedicated service for CYP with T2DM.
Methods: Retrospective data was collected from 15 CYP with T2DM managed in the Cardiff and Vale University Health Board (CAVUHB) from 2020-2023. Data included patient demographics, BMI, HbA1c, medications and screening for non-alcoholic fatty liver disease (NAFLD), hypertension (HTN), microalbuminuria, diabetic retinopathy (DR) and sleep apnoea.
Results: The mean age at diagnosis was 13 years and the average HbA1c was 64.6mmol/mol (lower than UK average HbA1c 70mmol/mol). Recent mean HbA1c decreased to 50.77 mmol/mol (median duration since diagnosis 3.5 years). 67% of patients were female and 60% of patients had a first degree relative with T2DM.
All were 'overweight' or 'obese' with average BMI SDS 2.89. 44% of CYP gained weight in the 12 months post diagnosis but recent BMI SDS reduced to 2.62.

Although CYP had annual HTN screening, this was not done at every review. At diagnosis, 27% were screened for NAFLD, 93% for microalbuminuria, 27% were reviewed annually for DR and 57% were verbally screened for sleep apnoea.

Conclusions: Risk factors for T2DM include female sex, family history and ethnicity. Complication screening rates at CAVUHB are higher than UK averages (National Paediatric Audit) but will be improved further by a recently developed screening checklist. A pathway for CYP with T2DM in Wales is being developed through the CYP Wales Diabetes Network including a structured education programme. CYP newly diagnosed in CAVUHB receive a leaflet designed for CYP with T2DM, and are invited to group education sessions. Gathering feedback from families and CYP will further inform the evolution of this dedicated service.

P-145 | Factors affecting impaired hypoglycemia awareness in children and adolescents with type 1 diabetes

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Introduction: Hypoglycemia is more frequent among the young explaining the higher frequency of impaired awareness of hypoglycemia (IAH) among children and adolescents.

Objectives: The aim of the current study was to assess the frequency of IAH among an Egyptian cohort of children and adolescents with type 1 diabetes and identify the possible associations with impaired awareness of hypoglycemia.

Methods: A cross-sectional study recruiting 100 patients with type 1 diabetes for at least 6 months duration and aged less than 18 years old recruited from the Pediatric and Adolescent Diabetes Unit (PADU). Patients with other form of diabetes, cardiac disease, thyroid disease, anemia , other chronic disease , patients with intellectual disabilities or patients taking any medications were excluded from the study. The Gold and Clarke questionnaires were used to assess hypoglycemia awareness among the studied cohort.

Results: Among the studied cohort, 42% showed IAH using the Clarke's and Gold's Questionnaires. There was significant increase in Total daily dose of insulin in patients with impaired awareness (P =0.012). There was significant increase in hypoglycemia manifestations in the aware group (p=0.0001), significant increase in SMBG in the aware group (p= 0.0001)which mean that increasing SMBG frequency was associated with increased awareness.
There was significant increase in AST, S.creatinine, LDL cholesterol, total cholesterol and random blood glucose in patients with impaired awareness (P= 0.0001. 0.014, 0.003, 0.001 and 0.005 respectively).
No significant difference between both groups according to Hemoglobin A1c, ALT, HDL cholesterol, Triglycerides, micro-albuminuria and fasting blood glucose.

Conclusions: Impaired awareness of hypoglycemia is reported in 42% of studied participants. Further study of frequency of autonomic neuropathy in this group is warranted.

P-146 | Altered body composition and bone mineral density in young individuals with long-duration (10 years) type 1 diabetes

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Introduction: Type 1 diabetes (T1D) is associated with multiple complications including increased fracture risk.

Objectives: To investigate if adolescents with long-duration T1D have altered body composition and bone mineral density compared to healthy controls.

Methods: Fifty Swedish adolescents with T1D duration of at least 8 years aged 15.0-17.9 years and 50 controls on group level matched by age, sex and geographical area were included. Body composition and bone density was assessed by dual-energy X-ray absorptiometry. Clinical follow-up data were retrieved from the National Diabetes Registry. Subjects with obesity, hypothyroidism and celiac disease were excluded.

Results: Age, weight, height and BMI did not differ between the cases and controls. Mean T1D duration was 10.6 ±2.1years. Mean HbA1c since T1D diagnosis was 56,5±6,3 mmol/mol (7,4%). Mean HbA1c at the age 0-8; 9-13,9 and 14-17,9 years was 57,7±7,9 (7,5%); 55,7±6,9 (7,3%) and 58,8±9,0 mmol/mol (7,5%), respectively.

Adolescents with T1D had increased fat mass compared to healthy controls 18,7± 9,6 kg versus 14,9± 6,7 kg (p=0,03), but their lean mass did not differ 43,6±11,6 kg versus 44,8±8,1 kg (p=0,52).

Total body less head (TBLH) areal bone mineral density (aBMD), TBLH bone mineral content (BMC) and Z-score tended to be lower in cases compared to the controls. Lumbar spine (L1-L4) BMD, BMC, aBMD and Z-score did not differ between the cases and controls.

However, left femur aBMD was lower in cases compared to the controls 1,04±0,15 (g/cm^2) versus 1,13±0,15 (g/cm^2) (p=0,014), as well as total left femur Z-score 0,0±1,14 versus 0,6±0,97 (p=0,008).

Conclusions: Adolescents with long-duration T1D have altered body composition despite normal BMI. Bone mineralization is decreased in the femur but not in lumbar spine although metabolic control during the childhood and pubertal growth period was relatively good.

Bone health is therefore important to monitor already during the adolescence to prevent the development of osteoporosis and bone fractures.

P-248 | Fast recovery of glycogenic hepatopathy in a patient with poorly regulated type 1 diabetes

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Introduction: Glycogenic hepatopathy is a rare condition and may occur in poorly controlled diabetes. It is part of Mauriac syndrome which is characterized by hepatomegaly, growth failure and delayed puberty.

Objectives: The objective is to describe the follow-up of an adolescent patient with glycogenic hepatopathy

Methods: Laboratory investigations, ultrasound of the liver and genetic analysis were performed.

Results: A 16 year old boy was admitted to the hospital because of hepatomegaly since about 6 months and poorly controlled diabetes. He was known with type 1 diabetes since 14 years.

The first 10 years he was treated with continuous insulin infusion via a pump. He switched to 3-4 times daily insulin injections because of several episodes of diabetic ketoacidosis. He had a Freestyle Libre sensor. He displayed late puberty and poor growth.

Target height was -0.6 SD. His height was 152 cm (-3.6 SD), BMI 16.5 kg/m2 (-1.8SD). Liver was palpable around 8 cm below the costal margin. Tanner stage was P3G3A1, testes volume 8 ml. HbA1c was 13.7% (126 mmol/mol), AST 457 U//l, ALT 280 U/l, gamma GT 377 U/l, all elevated.

Additional workup for infectious, autoimmune and metabolic causes of hepatitis was negative.

Ultrasound showed an enlarged liver of 24 cm length, without focal lesions, with a normal spleen. During admission the glucose regulation improved. After 3 weeks liver enzymes had normalized and on physical examination the liver had clearly decreased in size to 3-4 cm under the ribs and to 1-2 cm after about 12 weeks.

After 2 months his HbA1c had decreased to 7.6 % (59 mmol/mol), BMI had increased to 0 SD. The eye specialist did not observe retinopathy. Genetic analyses showed no mutations in genes related to metabolic diseases.

Conclusions: Glycogenic hepatopathy resolved with improvement of glucose regulation in several weeks in an adolescent patient with poorly controlled type 1 diabetes.

P-250 | Preliminary results of medium and long-term screening for microangiopathy in T1D followed in a pediatric setting

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Introduction: T1D beginning at a younger age in children is susceptible to chronic complications in pediatric settings. In this work, we undertake the systematic screening of microangiopathy in T1D followed over the long term in older adolescents and young adults.

Objectives: The aim of this work is the systematic screening of micro-angiopathy in T1D followed over the long term in older adolescents and young adults.

Methods: Single-center study in the oldest T1D patients followed by the same pediatric team, meeting a minimum age of 10 years and a seniority of 5 years. The same examiners perform ophthalmological and neurological examinations. The search for micro-albuminuria is done on morning urination. Glycemic balance is assessed by the average HbA1c of the last 28 months

Results: Ninety-six DT1, including 61 girls, were selected. Age at inclusion 21.69±3.88 years, onset of diabetes 8.08±3.88 years, duration of T1D 13.58±4.22 years. Of average family socio-economic level, they are single 88 times, students 48 times, employees 35 times and the rest unemployed. Their glycemic balance is 7.89 ± 1.51%, median 7.60. Associated pathologies: 3 hypothyroidisms, 2 celiac diseases and lymph node tuberculosis. Chronic complications screened: 8 nephropathies including 7 at stage 3 and only one proliferative retinopathy.

The presence of nephropathy is strongly correlated with the age of onset 4.65±1.73 vs 8.37±3.90 years in its absence and with the duration of diabetes 16.07±3.90 years vs 13.35±3.90 years, respectively ($p<0.001$).

No difference is observed on the other variables, in particular the glycemic balance of the last 28 months, the current age and the sex.

Conclusions: The main chronic complication remains nephropathy in relation to the age of onset and the duration of diabetes. These results further encourage delaying the precocity of onset of T1D as much as possible by acting on modifiable factors such as obesity, which is known to be accelerating, and intensifying insulin therapy as closely as possible in the youngest T1D.

P-293 | Mental health disorders as complications of type 1 diabetes

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Introduction: Common mental health conditions such as depression, anxiety, post traumatic stress disorder and eating disorders are frequently reported in research conducted in those living with Type 1 Diabetes (T1D) & Latent Autoimmune Diabetes in Adults (LADA). Rates of these conditions are comparable to, if not greater than, those seen for physical complications such as nephropathy and peripheral neuropathy. Screening for mental health conditions however, is not a part of regular diabetes care in some health systems and directional relationships remain poorly understood.

Objectives: To explore the nature of the relationship between Type 1 Diabetes and common comorbid mental health conditions and suggest a framework to account for the higher risk of the conditions developing in this population.

Methods: Exploratory review of literature on:

1. The physiology impacted by autoimmune diabetes (T1D and LADA);
2. The impacted physiology's relationship, if any, to depression, anxiety, eating disorders and PTSD;
3. The increased risk of depression, anxiety, eating disorders and PTSD from living with chronic illness.

Results: Studies report that rates of depression, anxiety and eating disorders occur at higher rates in youth with T1D when compared to same aged control groups without diabetes. The disruption to the metabolic system in autoimmune diabetes may be causative for the higher risk of depression, anxiety, eating disorders and PTSD. The dysregulation of certain hormones and neurotransmitters which results from T1D and LADA have been indicated in the development of mental health issues commonly seen in this demographic.

Conclusions: Current research suggests that mental health screening can improve parent-child collaboration on diabetes tasks. Healthcare providers should consider a mental health disorder as a valid and common complication of diabetes rather than a co-occurring disease. As such screening for mental health conditions should be implemented with equal importance to screening for other complications.

P-294 | Prevalence of diabetic nephropathy in Indian children with type 1 diabetes

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Introduction: Diabetic nephropathy (DN) is a known complication of type 1 diabetes (T1D) and are at an increased risk of developing end stage renal disease. The present study aimed to determine the prevalence of DN in Indian children and youth with

type 1 diabetes (T1D). It also explores the predictors of DN and insulin sensitivity in them by SEARCH and eGDR.

Objectives: To evaluate the prevalence of DN and explore its predictors.

Methods: 319 children and youth (2.6-21 years) with T1D having disease duration of at least 2 years were included in this cross-sectional study. Demographic data and laboratory findings were obtained using standard questionnaires and protocols.

Diagnosis of diabetic nephropathy was based on albumin: creatinine ratio (ACR) on two occasions within a period of 3 months. Insulin sensitivity was computed based on the anthropometric and laboratory parameters required for eGDR and SEARCH.

Results: 13.4% were found to have DN (7.5% subjects were known cases of diabetic nephropathy on treatment with enalapril). Hypertension was found in 20.8% subjects with DN in contrast to 7.9% without DN (p <0.05). Interestingly, of the 43 children with DN, 11.3% (n=8) were under 10 years age. Patients with DN had a significantly lower insulin sensitivity compared to those without nephropathy (in the table).

Duration of diabetes and insulin sensitivity were the important predictors of DN. Insulin sensitivity as assessed by SEARCH and eGDR showed a negative correlation with ACR.

Parameter	No DN (n=169)	DN (n=28)
Age	13.6 ±4.2	14.9 ± 4.8
Duration of illness*	6.4 ± 3.3	8.2 ± 4.8
Hypertension (%)	7.9%	20.9%
Microalbumin in urine (mg/lt)	7.7 ± 8.9	49.7 ± 156.4
Albumin: creatinine ratio	13.2 ± 16.6	60.6 ± 411.8
LBMZ*	-3 ± 0.6	-3.3 ± 0.8
eGDR*	8.2 ± 1.7	7.2 ± 2.3
SEARCH	9.7 ± 3.6	7.8 ± 3.7
eGFR	73.0 ± 25.2	82.0 ± 26.1

Conclusions: Prevalence of DN in children and youth with T1Dwas found to be high, even in children under the age of 10 years. Early screening and timely intervention are required to retard the disease progression, hypertension and avoid end stage renal disease. Higher insulin resistance predisposes to nephropathy.

P-295 | Diabetic retinopathy in children with type I diabetes mellitus, an experience from low middle income country

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Introduction: Diabetic retinopathy is one of major chronic complication observed in type 1 diabetes mellitus patients. Main causes include younger age at presentation, un controlled diabetes mellitus, in frequent visits, association with other autoimmune conditions.

Objectives: To estimate the frequency of diabetic retinopathy in children with type 1 diabetes mellitus visiting diabetic clinic, National Institute of Child Health, Karachi.

Methods: A retrospective cross sectional study was designed in which 100 children of T1DM were enrolled from Paediatrics endocrinology out-patient department of National Institute of Child Health (NICH) Karachi. Patients between the age of 10-17 years of either gender with duration of T1DM for more than 5 years and no previous known eye or systemic disease other than T1DM were included. The medical records of eye examination of 100 children from January to December 2017 were reviewed and analyzed.

Patients were selected through non probability consecutive sampling technique and SPSS version 16 was used to analyze data.

Results: One hundred patients of T1DM were enrolled, 82 were male and 18 were females. Mean age of the patients were 11.70±2.38 years (10-17 years) and 59% were <15 years. Mean duration diagnosis of T1DM was 7.05±0.7 years. Mild non proliferative Diabetic retinopathy (NPDR) was found in 17% patients and none had proliferative diabetic retinopathy.

Conclusions: Mild Non Proliferative Retinopathy is quite high in our study population which could later on Progresses Proliferative Retinopathy. Screening for all the children should be mandatory for early diagnosis, management and future of eye complications.

The screening for eye complications for all children Type I diabetes mellitus should be initiated annually after 5 years of diagnosis and in the children who are 10 years are older.

Keywords: Type 1 IDDM, Diabetic Retinopathy (DR), Mild non proliferative diabetic retinopathy (NPDR).

P-308 | Serum lipids as biomarkers for diabetic retinopathy progression in type 1 diabetes

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Introduction: Diabetic retinopathy (DR) is the most common ocular complication of diabetes mellitus, which can lead to irreversible vision loss in working-age population.

Objectives: The aim of the study was to analyze the association of DR in patients with type 1 diabetes mellitus (T1DM) and lipid metabolism biomarkers.

Methods: After being matched by age and sex 72 T1DM patients aged 18-55 were included in this study. The enrolled participants were assigned into three groups, based on the results of fundus photographs as following: 1st group - no DR, 2nd group - non-proliferative diabetic retinopathy (NPDR), and 3rd group - proliferative diabetic retinopathy (PDR). Fasting triglycerides (TG), total cholesterol (TC) and lipoprotein (a) (Lp(a)) were measured in all patients.

Results: The data revealed no difference in TG serum levels in patients of the 1st and 2nd groups. The increase of TG serum levels was identified with the progression of the DR in the 3rd group (+121%, p=0.018). TC also rose in patients in the 3rd study group (+19%, p>0.05 compared to the 1st and 2nd study groups). An increase of Lp (a) was highlighted with the evolution of DR: in the 2nd group (+73%, p>0.05) and in the 3rd group (by about 320%, p=0.019) compared to 1st study group.

The correlation analysis revealed a weak positive correlation between the grade of DR and Lp (a) levels (r_s=0.319, p=0.006), and TG (r_s=0.239, p=0.043).

Conclusions: Our study exposed statistically significant modifications of the TG and Lp (a) levels correlated with the DR grade and a non-significant increase in TC level in T1DM persons. These data indicate a likely involvement of lipid metabolism disorders in the progression of DR.

P-331 | Frequency of hepatic abnormalities in children and adolescents with type 1 diabetes in a tertiary care hospital

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Introduction: The prevalence of liver disease in type 1 diabetics has been reported to be between 2% to 26%. Fatty liver and hepatic glycogenesis being the predominant pathologies. Thus type 1 diabetes related hepatopathy is not uncommon and tends to be more prevalent among children with poor glycemic control. The pediatric literature about type 1 diabetes related liver disease is largely limited to small case series or case reports. Moreover, ultrasound criteria used to define echogenicity and size of the liver were ill-defined particularly from our country.

Therefore, this study is designed to generate local data and to estimate the current magnitude of hepatic abnormalities among children with T1DM.

Objectives: To determine the frequency of hepatic abnormalities among children with T1DM.

Methods: 100 patients meeting the inclusion criteria were enrolled in the study. The patients with positive viral marker were excluded from the study. A blood sample of 5cc was collected for alanine aminotransferase (ALT), aspartate aminotransferase (AST) and glycosylated hemoglobin (HBA1c). Liver ultrasound was performed by single senior pediatric radiologist. Presence of hyperechogenecity or hepatomegaly was noted. All these information along with the baseline demographics were collected in the proforma.

Results: Average age of patients was 6.47±2.281 (1-12) years, 60 (60%) were females and 40(40%) were male. There were 24(24%) patients had hepatic abnormalities among children with T1DM and 76(76%) were with normal hepatic profile on liver functional test and on ultrasound.

Only 2(2%) patients had elevated liver enzymes on liver functional test and on ultrasound feature 14(14%) had hyperechogenecity and 11(11%) had hepatomegaly in this study.

Conclusions: Type1 diabetic children are at risk of acquisition of liver disorders. Poor glycemic control is the key factor that predisposes to hepatomegaly, elevated ALT and abnormal ultrasound findings. Proper glycemic control is recommended prior to more invasive diagnostic procedures.

P-346 | Disordered eating behavior in adolescents with type 1 diabetes on continuous subcutaneous insulin infusion; relation to body image, depression, and glycemic control

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Introduction: Disordered eating behavior (DEB) represents significant morbidity among people with type-1 diabetes (T1D). Continuous-subcutaneous insulin infusion (CSII) improves glycemic control and psychological wellbeing in those with T1D. However, its relation to DEB remains obscure.

Objectives: To compare DEB among adolescents with T1D on CSII versus basal-bolus regimen and correlate it with body image, HbA1C, and depression.

Methods: Sixty adolescents with T1D (30 on CSII and 30 on basal-bolus regimen), aged 12–17 years were studied focusing on diabetes duration, insulin therapy, exercise, socioeconomic standard, hypoglycemic attacks/week, and family history of psychiatric illness.

Anthropometric measures, HbA1C, binge eating scale (BES), body image tool, patient health questionnaire-9 (PHQ9), and the Mini-KID depression scale were assessed.

Results: Among the studied adolescents with T1D, six had DEB (10%), 14 had poor body-image perception (23.3%), 42 had moderate body image perception (70%) and 22 had depression (36.7%).

Adolescents with T1D on CSII had significantly lower BES (p = 0.022), Mini-KID depression (p = 0.001), and PHQ9 (p = 0.02) than those on basal-bolus regimen. BES was positively correlated to depression (p < 0.001), HbA1C (p = 0.013) and diabetes-duration (p = 0.009) and negatively correlated to body image (p = 0.003).

Conclusions: DEB is a prevalent comorbidity among adolescents with T1D, with higher frequency in those on basal bolus regimen than CSII.

P-350 | Are we really doing enough to address diabetes associated co-morbidities in children and young people with diabetes? A cross sectional observation study and a wakeup call!

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Introduction: Higher BMI has been known to results in significant abnormal cardiovascular profiles in T1D compared to T2D. Dyslipidaemia is associated with increased cardiovascular morbidity, neuropathy, nephropathy and retinopathy. Studies have demonstrated that Intensive insulin treatment helps in achieving better HbA1c and reduces long term complications in T1D.

Objectives: Our aim was to understand and report the impact of poor glycaemic control on BMI, lipid profile (Total Cholesterol and LDL fraction) and Urine ACR ratio

Methods: Retrospective analysis was carried out on children and young people (CYP) >12 years of age with Diabetes, managed at Bangor Hospital, North Wales, UK during 2022-23. Data was collected from Twinkle diabetes database. Demographic information (Age at last Follow up, duration of diabetes, BMI SDS) were collected along with results of random lipid profile (Total Cholesterol and LDL) and urine ACR ratio.

A **multiple linear regression analysis** was carried out to assess correlations between HbA1c and lipid profiles & BMI. Reported Mean (Range) as appropriate.

Results: There were total of 103 CYP of which 59 were >12 years of age at the start of April 2022. Rest of the 44 CYP were <12 years and all of then have T1D.

Demographics			
> 12 years	59/103 (57%)	T1D-57, T2D-2	M-31, F-28
Age at last Follow in years- 15.9 (13.3 – 18.8)		Duration of Follow up- 7.0 (0.4 – 13.3)	
BMI SDS		0.00 (-1.61 to +2.99)	
Results			
Urine ACR mg/mmol (49/59)	<3 = 45	3-30 = 4	>30 =None
Total Cholesterol mmol/l (52/59)	< 4 = 13	≥ 4 = 39	
LDL cholesterol mmol/l (48/59)	< 2.6 = 31	2.6 - 3.4 = 15	> 3.4 = 2
HbA1c in mmol/mol	63.3 (38 – 102)		

Results of the multiple linear regression indicated that there was a weak collective non-significant effect between the BMI SDS, Total Cholesterol, LDL, and HbA1c, ($F(1, 57) = 3.18$, $p = .080$, $R^2 = 0.05$, $R^2_{adj} = 0.04$).

Outcomes:
1. HbA1c outcomes are considerably worse in this age group compared to the NICE target of 48 mmol/mol.
2. Dyslipidaemia is common in this age group but none on any pharmacological intervention.
3. Microalbuminuria is seen in 9% of random samples.
4. Failure to complete annual review investigations is common in this age group.

Limitations:
1. Cross sectional data and numbers were small.
2. Only 2 CYP with T2D.

Conclusions:
1. Aggressive management of dyslipidemia is required as per international consensus guidelines to improve the long term outcomes for these CYP with diabetes.
2. Exploring different ways of engagement with adolescents is crucial for effective completion of annual review cares.
3. Specialist Dietetic input is paramount for improving glycaemic outcomes and reducing dyslipidemia associated outcomes.

P-351 | Therapy induced diabetic neuropathy - a rare, but painful complication in an adolescent with type 1 diabetes

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Introduction: *Therapy induced neuropathy of diabetes* (TIND) is a rare, painful complication in patients with diabetes mellitus that may develop in response to rapid improvements in glycemic control in patients with long-standing hyperglycemia.
Most reported cases involve adult patients with diabetes, while reports concerning pediatric or adolescent population are rare.

Objectives: The aim of the present work is to raise awareness of the rare, serious complication of TIND.

Methods: Data from the electronic health record and, for the first time in this context data from the continuous glucose monitoring were assessed.

Results: We present the case of a 17-year-old patient who developed severe acute, painful polyneuropathy 7 weeks after diagnosis of T1D (type 1 diabetes) and initiation of intensified subcutaneous insulin therapy in combination with flash glucose monitoring.
Thereby HbA1c decreased from 167 to 84 mmol/mol within 5 weeks. Time in range (3.9-10.0mmol/l) was 88%. Two weeks later, the patient reported burning pain and touch sensitivity in both feet resulting in deterioration of quality of life. The pain persisted with the maximum dose of gabapentin, pregabalin and tramadol. Diagnostic workup ruled out metabolic, autoimmune, infectious, and genetic causes of polyneuropathy. The diagnosis of TIND was established and a less stringent glucose target range was set. After 4 months the pain stopped.

Conclusions: TIND is a rare, but important differential diagnosis in patients with type 1 diabetes and long-standing hyperglycemia who develop painful neuropathy following rapid improvements in glycemic control. Therapeutic strategies include initiation of pain treatment but even more importantly avoidance of excessively stringent glycemic control and hypoglycemia in patients suffering from TIND.

P-365 | Longitudinal HbA1c-trajectory in children and young adults with type 1 diabetes with and without severe microangiopathy. The VISS-study

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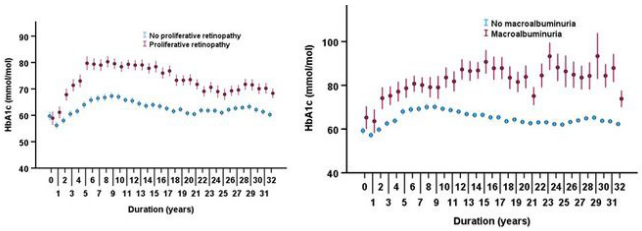
Introduction: In the VISS study we followed patients with type 1 diabetes with HbA1c from diabetes onset and at least 32 years. We showed that long term mean HbA1c from diagnosis is a very strong predictor of severe retinopathy and nephropathy.

Objectives: To study the HbA1c trajectory from the time of diagnosis to see if patients at the greatest risk for deterioration in HbA1c over time can be identified early.

Methods: In a population based observational study 447 patients diagnosed with type 1 diabetes before 35 years of age during1983-1987 in South-East Sweden were followed from diagnosis until 2019. Mean HbA1c was calculated each year for each patient. Severe diabetic microangiopathy was defined as proliferative diabetic retinopathy (PDR) or persistent macroalbuminuria (nephropathy).

Results: The HbA1c trajectories for patients developing PDR and macroalbuminuria follow separate courses early on and stay separated for 32 years during the follow up. Patients without severe complications show an initial dip in HbA1c, probably due to remission after initial treatment, and then HbA1c slowly increases. HbA1c in patients with severe complications directly rises to a higher level within a few years. Mean HbA1c calculated for the period 5-8 years after diabetes onset strongly predicts the development of severe complications.

Females with childhood onset diabetes exhibit a high peak in HbA1c during adolescence associated with higher long term HbA1c and higher prevalence of PDR.



Conclusions: Long term follow up of HbA1c from diabetes onset shows that a steep increase of HbA1c trajectory during the first years is a strong predictor of severe complications. This could allow clinicians to intervene as soon as possible to avoid development of severe long term complications. Females with childhood onset diabetes are a special risk group with a higher prevalence of severe retinopathy.

P-395 | Evaluation of the cochlear and hearing pathway function in children with T1D

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Introduction: Hearing impairment may be one of the potential manifestations of microvascular including neuropathic complications of type 1 diabetes (T1D). Subclinical changes may be developing already in the pediatric age.

Objectives: We present the preliminary results of a study aiming to evaluate the cochlea and hearing pathway function in children with T1D and potential associations between the hearing test outcomes and T1D-related parameters, including glycemic control metrics assessed using continuous glucose monitoring (CGM).

Methods: Until now a total of 36 children with T1D aged between 6-18 years old (mean 13.4+/-3.2; median 14), T1D duration of >36 months (mean 90 +/-41; median 78.5), underwent laryngological examination, after which pure tone audiometry (PTA), distortion product otoacoustic emissions (DPOAE), and auditory brainstem responses (ABR) were performed to evaluate the auditory function. CGM readings at the time of the above measurements were recorded.

Results: PTA values for the majority of frequencies and for PTA4 showed significant positive correlations with time spent above range >180mg/dl (TAR) (r between 0.3 and 0.45, p<0.05). Slightly weaker negative correlations of PTA for higher frequencies were shown for the time in range 70-180mg/dl (TIR) (r=-0.3, p<0.05). DPOAE revealed a significant negative correlation between DPOAE for high frequencies and TAR >180mg/dl (r=-0.31; p=0.015), and a positive association with TIR (r=0.29; p=0.024).

A significant positive correlation was found between ABR for click and TAR>180mg/dl (r between 0.3 and 0.4, p<0.05). DPOAE decrease suggests cochlear dysfunction while ABR results indicate potential neuropathy.

Conclusions: Changes in the cochlear and retrocochlear function were noted in the examined children with T1D. The associations between audiometric

measurement outcomes and CGM readings revealed in the preliminary analysis suggest continuing this project and also include a control group of children without T1D.

CHILDHOOD OBESITY AND TYPE 2 DIABETES

P-054 | A single –center pilot study of 3.0 MG liraglutide in weight management as an adjunct therapy in obese adolescents with type 1 diabetes

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Introduction: Recent data from multiple international registries showed higher rates of overweight and obesity in adolescents with type 1 diabetes (T1DM) compared with their non-diabetic peers.
Management of weight gain should be emphasized as obesity is a modifiable cardiovascular risk factor.
Objectives: To assess the effectiveness and safety of daily 3 mg subcutaneous (sc) Liraglutide amongst obese adolescents with T1DM.
Methods: The 26-week trial involved 32 T1DM obese adolescents (12 to 17 years) and a poor response to lifestyle therapy and exercise. They received liraglutide 3 mg sc daily with their usual insulin dose.
Dose was titrated up on a weekly basis starting from 0.6 mg per day in weekly intervals of 0.6 mg, taking 5 weeks to achieve the maintenance dose of 3.0 mg daily.
Results: Of the 32 patients (females 81.25%), 24(75%) continued therapy for 26 weeks reached daily dose of Liraglutide 3.0 mg.
Reduction in BMI of at least 5% was observed in 15 of 32 participants and a reduction in BMI of at least 10% was observed in 9 participants. BMI SD score at week 26 decreased with an estimated treatment difference from baseline was (−0.26, [CI] −0.34 to −0.08; P=0.002).
There was a significant reduction of HbA1c from 8.4 to 7.6% (P=0.01). Mean fasting glucose concentrations significantly decreased from 146±14 to 115±10mg/dl. Mean post-prandial glucose increment decreased from 196±12 to 152±18mg/dl.
There was a concomitant fall in basal insulin from 33.5±6 to 24.3±8 units (P<0.001 for all) and total bolus insulin from 24.5±4 to 16.5±3 units (P=0.02) with moderate decrease in blood pressure but not significant.
While adverse events were mainly gastrointestinal; no serious adverse events were reported.
Conclusions: Daily Liraglutide as an adjuvant therapy is effective in producing significant body weight reduction in obese adolescents with T1DM with tolerable minimal side effects.

This was associated with improvement of glycemic control despite lower doses of insulin and without increase in hypoglycemic events.

P-057 | Developing a digital self-management platform and app for children and Young people (CYP) With type 2 diabetes to address health inequalities in the UK

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Introduction: DigiBete self-management Platform and App for type 1 diabetes, in 217 centres in NHS England & Wales realised an urgent need to bring parity of care to the Type 2 Diabetes (T2D) CYP population
Objectives: T2D was highlighted as a rapidly emerging problem in the UK's 2019/20 National Paediatric Diabetes Audit
- 810 CYP with T2D received care from a Paediatric Diabetes Unit in England and Wales
- 71.4% lived in the two most deprived quintile areas of the country, and 65.1% from minority ethnic backgrounds
- CYP diagnosis rose from 1.5% in 2019/20 to 3% in 2020/21
Methods: Co-designed over 9 months, the project was facilitated by 3 main groups:
- A multi-cultural user group to reflect the diverse cohort of young people living with T2D, with a multi-disciplinary clinical approval team at Leeds Children's Hospital
- A clinical oversight group, established to ensure the resources produced were representative and culturally appropriate
- The National CYP T2D Specialist Interest Group, as stakeholders on the project
CYP reported 'there are no resources, only for older people', also lack of cultural food representation. Mental health stigma was evident 'people just didn't understand diabetes'. CYP stated that content needed to be short like TikTok videos, some had learning difficulties and language barriers.
Results: 30 new T2D self-management resources were co-produced then reviewed by the 3 main groups. User testing was undertaken across 6 sites with n=41 CYP completing the testing survey.
- 93% found the Platform and App helpful to their self-management
- 95% would use the resources to train other family members or carers
- 87% would recommend the Platform and App to a friend
Conclusions: Successful development was achieved however challenges arose due to:
- Lack of standardised approaches. ISPAD standards and ACDC guidelines embedded
- Small patient numbers in clinics overcome by testing in 2 further clinics
- Resources now rolling out across the UK with further evaluation planned
View the Platform: youngtype2.org

P-058 | Demographic and glycaemic parameters in youth with type 2 diabetes diagnosed < 10 years of age in Bangladesh

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Introduction: The incidence of youth-onset T2D has increased dramatically and is a growing public health concern worldwide. Although the diagnosis of T2 D is rare < 10 years of age but still it should be considered among high-risk population.
Objectives: The objective was to determine the clinical, demographic characteristics and glycaemic control of children with T2DM diagnosed before 10 years of age.
Methods: Retrospective electronic medical record review of children diagnosed with T2DM at BADAS PAediatric Diabetes care and Research Center in BIRDEM Hospital over 12 years was conducted. Patient baseline characteristics with follow up were analyzed.
Results: Our cohort of 55 youth <10 years of age with T2DM were diagnosed between the ages 5 to 9.9 years with the median age 9.0[8.1-9.4] years, 80.0%

were female. Most patients were from urban or semi urban area, seventeen (29.1%) were from rural area. All patients had family history of DM, H/O GDM was present in 25(45.5%) patients.

Forty three (78.2%) patients had acanthosis nigricans. Median BMI was 23.9[21.0- 26.6]. median systolic was 100[90 -110] and diastolic blood pressure was 60[60-70} mm of Hg.

Within our cohort, non-alcoholic fatty liver disease was reported in 17 (30.9%) with mild to moderate fatty change in liver, 3(5.4%) had hypertension and 18 (32.7%) patients had dyslipidaemia.

More than 80.0% required insulin with metformin or insulin alone for management of their hyperglycaemia at the time of diagnosis. Median random C peptide was 1.9[1.4 – 3.0] ng/ml. Median fasting blood glucose was 14.3[7.6-17.1] mmol/ and median haemoglobin A1C at diagnosis was 11.5[9.0-13.1].

Improvement was seen after 6 months with median HbA1c 7.7[7.0-9.3], 22.2% patients achieved optimal glycemic control (HbA1C ≤6.5%).

Conclusions: The screening of children who are at high risk of Type 2 diabetes is essential as our data showed a substantial number of children diagnosed with T2 DM < 10 years of age in Bangladesh.

P-059 | Gut-microbiota in children and adolescents with obesity: inferred functional analysis and machine-learning algorithms to classify microorganisms

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Introduction: Causative factors for increasing pediatric obesity are sedentarity, overfeeding, environmental and epigenetic factors. Recently, gut microbiota imbalance deserves attention.

Objectives: To evaluate gut microbiota assessment.

Methods: We evaluated 55 patients with obesity (BMI-SDS 3.2+/-0.7, mean age 13.1±2.9, yrs, 36% female) 25 normal weight healthy donors (NWHD) age and gender matched (BMI-SDS -0.3+/-1.1). DNA extraction from fecal samples was used for the 16S amplification reaction performed with Ion 16S™ Metagenomics Kit (Thermo-Fisher Scientific).

This method allows the PCR-amplification of 7 out of 9 informative 16S polymorphic regions.

Results: Although the Firmicutes/Bacteroidetes-ratio was associated with obesity, we found Bacteroidetes genus significantly higher in obesity. Different taxa

(Streptococcus, Sutterella, Prevotella), and some descendant species (Streptococcus thermophilus, Sutterella wadsworthensis, and Prevotella copri) were associated. Acidaminococcaceae and Desulfovibrionaceae were linked with severe obesity, and linked with pro-inflammatory diets. Different pathways of amino acid biosyntheses (tyrosine, phenylalanine, tryptophan, and methionine) were positively

correlated with pediatric obesity, as for polyamine biosynthesis virulence factors and pro-inflammatory lipopolysaccharide biosynthesis pathways.
On the opposite, butanediol biosynthesis was less represented in obesity. Some taxa associated with obesity have been related to diseases involving metabolic pathways related to inflammation (polyamine and lipopolysaccharide biosynthesis), markers of inflammation like CRP, and others associated with dyslipidemia
Conclusions: NWHD had an higher value of F/B ratio than obese patients.The role of Acidaminococcaceae and Desulfovibrionaceae were associated with higher BMI-SDS. About the inferred metabolic pathways associated with obesity, it is interesting to point out the abundance of aromatic amino acids, polyamine biosynthesis virulence factors and pro-inflammatory lipopolysaccharide

P-134 | Persistence of metabolic healthy phenotype in metabolically healthy obese indian children and adolescents

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Introduction: Most children and adolescents with obesity have metabolic complications; however, a substantial proportion of these remain metabolically healthy. A paucity of data about the course of children and adolescents with metabolically healthy obesity is unclear due to limited information.
Objectives: To determine the course and its predictors of metabolically healthy obesity in obese Indian children and adolescents.
Methods: Sixty-eight obese children and adolescents with metabolically healthy obesity (40 boys; age mean 12.2 ± 2.8 years) were followed for 2.1 ± 1.4 years till 13.9 ± 3.2 years. Metabolic profiles (oral glucose tolerance test, lipid profile, ALT, blood pressure) were measured at six and twelve months and then annually.
Results: BMI SDS remained stable over follow-up (2.4 ± 0.8 to 2.3 ± 0.5, p =0.23), with only six subjects becoming normal or overweight. Seventeen subjects (25%) developed metabolic complications during the study period (hypertension in three, fatty liver in four, pre-diabetes in four, and dyslipidemia in six). Baseline body fat (40.9 ± 17.6% as against 45.3 ± 13.4%, p =0.71), BMI SDS (2.4 ± 0.8 as against 2.3± 0.5, p =0.819), and rise in BMI SDS (0.14 ± 0.46 as against -0.02 ± 0.3, p =0.17) did not predict progression of metabolic complication.
Conclusions: Obese children and adolescents with metabolically healthy obesity remain healthy on follow-up despite persistent obesity. The lack of predictive value of BMI SDS, change in BMI SDS, and age for metabolic complications suggests the role of genetic and epigenetic factors in determining these complications.

P-135 | A mobile application-based tool "Obesity Interpreter" - a cost-effective point-of-care guidance for the evaluation of children and adolescents with obesity

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Introduction: The assessment of childhood obesity involves the rational use of diagnostic tests in physiological causes while not missing pathologies. We have developed an obesity interpreter, a mobile application that provides individualized guidance regarding the workup of children and adolescents.
Objectives: To develop and validate a mobile application to evaluate children and adolescents with obesity.
Methods: The application was developed (n=460) and validated (n=460) on obese children and adolescents (aged 2-18 years) presenting to our Pediatric Endocrinology clinic. Clinical parameters (age, height SDS, BMI SDS, development, facies, vision, and pubertal development) of physiological and pathological causes of obesity were compared to identify predictors of etiology.
The significant parameters in the development arm were incorporated into the mobile application platform and guided the likely diagnosis and assessment algorithmically. The application guidance was validated against expert opinion
Results: Predictors for the pathological cause of obesity (other than hypothyroidism) included early age of presentation, lower height SDS, dysmorphic

features, developmental delay, and vision defect. Height SDS was, however, not discriminatory between hypothyroidism and exogenous obesity. Date of birth, height, weight, age, development, and vision was thus used in the application algorithm.
The diagnostic guidance provided by the application was concordant with the clinical diagnosis of the 459 obese children and adolescents in the validation arm (418 nutritional, Thirty-three endocrine, ten genetic, and syndromic etiology).
Conclusions: Our mobile application obesity interpreter provides a validated point of care, simplistic, and evidence-based evaluation of childhood and adolescent obesity.

P-136 | Multimodal telehealth education for parents of preschoolers with obesity: improving health-related quality of life, BMI SDS, and lifestyle behaviors

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Introduction: Childhood obesity is a global problem that increases the risk of developing chronic diseases, such as type 2 diabetes. Parental education is a promising approach to address this issue.
Objectives: To evaluate the effectiveness of a multimodal telehealth education program for parents of preschoolers with obesity.
Methods: A total of 100 preschool children with obesity (mean age, 5.7 years; mean BMI, 2.05 SDS) were enrolled in an evening school model. The program consisted of multimodal content, including sports therapy, nutritional education, psychological advice, and medical treatment.
Participants were trained and interviewed before and after the program regarding family dietary behaviors, daily activity and physical activity, medical knowledge of health consequences of obesity, and their health-related quality of life (HrQoL).
Recruitment was through the School Entrance Examination of the Hannover Region, Germany. Validated questionnaires were used for assessing HrQoL (KINDL-R), eating habits (K-FFL & F-FEV), and daily movement (K-B questionnaire).
Results: During the 8-week program, 99.4% of participants attended at least one evening school session, and 79.2% completed the course.
Significant improvements were observed in scores for HrQoL (15.3 vs 20.4) and knowledge of health consequences ($p < 0.001$), as well as in family dietary behaviors and physical activity ($p < 0.01$). 82.4% of participants found the gain in knowledge to be very positive, and 84.7% now exercise regularly (at least twice a week) with their children without media. The BMI SDS improved by Δ 0.2 over the 8-week program, although final results were self-reported.
Conclusions: The multimodal telehealth education program for parents of preschoolers with obesity was effective in improving health-related behaviors and well-being.
This study provides evidence for the potential of telehealth interventions in addressing childhood obesity and highlights the importance of accessible and effective educational programs for children and their families.

P-229 | Predictive factors of insulin resistance in children and adolescents with obesity

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Introduction: Insulin resistance is defined by impairment of the ability of plasma insulin to adequately cause peripheral glucose disposal, suppress hepatic glucose, and inhibit lipoprotein production.
Objectives: The purpose for which this research work was carried out was the follow-up, evaluation and to establish the prevalence of insulin resistance in children and adolescents with obesity by highlighting the association of the various components of individual clinical and paraclinical characteristics that may represent risk factors
Methods: The study is clinical, descriptive, retrospective, randomized and includes 63 patients with obesity, aged between 5 and 18 years, admitted to the Pediatric Department of the Emergency Clinical Hospital in Constanța, between January 1, 2021 nd December 31 2022
Results: Male gender may be a risk factor for insulin resistance, with more than half of patients being boys (65%). The pubertal period (36 patients) represents a risk factor for obesity and implicitly insulin resistance, requiring increased attention to food and

physical behaviors during this period. Acanthosis nigricans is present in 58% of patients, suggesting a strong predictive factor of insulin resistance.
Abdominal circumference above the 90th percentile is also associated with an increased prevalence of developing insulin resistance being correlated with visceral fat (65%).
All patients present pathological values of the HOMA-2 index, resulting in an increased sensitivity of the prediction of insulinresistance in children with obesity following its calculation.
The main therapeutic approach is to change the diet and implement a physical exercise program, to slow down the progression towards metabolic syndrome, cardiovascular complications or diabetes.
Following early intervention, 86% of cases show a favorable evolution.
Conclusions: Obesity represents an increasingly frequent problem in medical practice, having an upward trend in the last two decades, being a determined factor in the physiopathology of insulinresistance.
Heredocollateral history of obesity, dyslipidemia, and diabetes are a predictive factor for the subsequent development of metabolic syndrome.

P-281 | Obesity class and abdominal fat distribution as predictors of glucose intolerance in obese adolescents

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Introduction: Obesity is closely associated with glucose intolerance (GI). This represents a growing challenge, especially in light of continuously increasing proportion of severely obese adolescents.
Objectives: The aim of this cross-sectional study was to investigate abdominal fat distribution in groups of adolescents with various obesity classes and to explore the association of GI with obesity class and abdominal fat distribution.
Methods: According to body mass index (BMI), 90 adolescents, 10-18 years of age (mean age 14.7± 1.9 years), were divided in groups with class 1 (BMI ≥ 95th percentile to < 120% of 95th percentile for age and sex), class 2 (BMI ≥ 120% to < 140% of 95th percentile or ≥ 35 kg/m2) and class 3 obesity (BMI ≥ 140% of 95th percentile or ≥ 40 kg/m2). Abdominal visceral (VFA) and subcutaneous fat areas (SFA) were measured on T2-weighted MRI semi-automatically, at the level of the 2nd lumbar vertebra. Oral glucose tolerance test was used to identify adolescents with GI.
Results: Study population included more girls (62.2%). The majority of adolescents were in advanced puberty (75.6% Tanner stages IV and V), and were severely obese (74.4% obesity class II and III). Severe obesity was more prevalent in boys than in girls (91.2% vs 64.3%).
Adolescents with obesity class I and II had lower VFA and SFA than subjects with class III obesity ($p<0.001$). However, there was no statistically significant difference for VFA/SFA among groups with various obesity classes. GI was detected in 20 adolescents (6 impaired fasting glucose - IFG, 11 impaired glucose tolerance - IGT, 2 IFG+IGT, 1 type 2 diabetes mellitus - T2DM).
In groups with obesity class I, II and III, 8/23, 7/38 and 5/29 subjects had GI. When adolescents were divided in groups according to VFA/SFA tertiles, 5/30 subjects in group with low, 5/30 in group with intermediate and 10/30 in group with high VFA/SFA had GI.
Conclusions: In obese adolescents, VFA/SFA did not differ among groups with various obesity classes. High VFA/SFA was the best predictor of GI.

P-288 | Rapid improvement in glycemic control after treatment with a glp-1 receptor agonist in an adolescent female with uncontrolled type 2 diabetes on long-term insulin therapy

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Introduction: Prior to the approval of GLP-1 receptor agonists (GLP1-1 RAs), adolescent patients with uncontrolled type 2 diabetes (T2D) frequently required multiple daily injections of insulin (MDI) without achieving adequate glycemic control.
Objectives: To examine if treatment with a GLP-1 RA improves measures of glycemia in a pediatric patient with uncontrolled T2D on long-term insulin therapy.

Methods: An 18-year-old female presents with uncontrolled T2D requiring MDI therapy since diagnosis at age 9 years. Her hemoglobin A1c (HbA1c) was 11% on MDI therapy with insulin glargine and insulin aspart (1.1-1.4 units/kg/d).
Four months later her HbA1c decreased to 8.7% after adjusting MDI therapy (insulin degludec and insulin aspart, 0.9 unit/kg/d, 59% basal 41% bolus) with the smart insulin InPen and taking metformin (500 mg daily).
Insulin aspart was stopped before transitioning to treatment with a GLP-1 RA.
Insulin degludec was decreased and then stopped two weeks later due to severe hypoglycemia as the dose of the GLP-1 RA was increased (0.6 to 1.2 mg daily). Patient continued treatment with the GLP-1 RA (1.2 mg) and metformin (500 mg) daily.
Results: Data from a continuous glucose monitor and HbA1c levels were examined before and four weeks after starting treatment with a GLP-1 RA. Measures of glycemia significantly improved with a GLP-1 RA even after discontinuing insulin (Table 1).

Before treatment with GLP-1 RA			After treatment with GLP-1 RA		
Average Glucose (mg/dL)	Time in Range TAR/ TIR)/TBR	GMI HbA1c	Average Glucose (mg/dL)	Time in Range TAR/ TIR)/TBR	GMI HbA1c
226+/-45	86%/14%/0%	8.6% 8.7%	126+/-26	3%/96%/2%	6.3% 7.1%

Table 1. Changes in glycemia four weeks after treatment with a GLP-1 RA. TIR (Time In Range), TAR (Time Above Range), TBR (Time Below Range), and GMI (Glucose Management Indicator)

Conclusions: Some pediatric patients with uncontrolled T2D on chronic insulin therapy may achieve significant improvement in glycemic control without insulin after initiating treatment with a GLP-1 RA, indicating recovery of pancreatic beta cell function.

P-341 | A case of evolving type 2 diabetes mellitus in a nine-year-old girl with learning difficulties

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Introduction: The majority of children with diabetes mellitus (DM) are diagnosed with type 1(T1D) or type 2 (T2D), although many do not meet the T1D/T2D diagnostic criteria or have atypical manifestations.
Objectives: We describe a nine-year-old girl with dysmorhic features, learning difficulties and evolving T2D.
Methods: The patient presented in the outpatient clinic at the age of 6y 11 months with reported high fasting glucose measurements.
She had been born by caesarian section at 33^{+2} weeks gestation, IUGR, birth weight 1700gr, with oligohydramnios; was admitted to the Neonatal Intensive Care Unit (NICU) with respiratory distress just after birth.
During her two-month stay in NICU she developed several episodes of sepsis and necrotising enrterocolitis.
On examination dysmorphic features, mild hirsutism, developmental delay, obesity (Body Mass Index 22.7% kg/m^2 ›95^{th} percentile), Tanner stage 1 were noted.
An oral glucose tolerance test (OGTT) was performed along with Anti-GAD, insulin, IA2 and anti-ZnT8A antibodies, fasting lipid profile, thyroid and adrenal function, routine biochemistry bloods, genetic testing for monogenic diabetes.
She was discharged home with dietary advice.
A second OGTT a year later was still abnormal.
She was treated with increasing doses of metformin, with slight biochemical improvement of the insulin rresistance and worsening HbA1c. Atypical diabetes (ADM) was suspected; neurological assessment, a brain MRI and a karyotype were performed.
Results: OGTTs confirmed hyperinsulinaemia. Diabetes antibodies, genetic testing for maturity onset of diabetes of the young (MODY) were negative as the other investigations.

	1st OGTT	2nd OGTT	Fasting bloods
Glucose 0' (60-100 mg/dl) (3.33-5.55 mmol/l)	118 (6.54)	123 (6.82)	122 (6.77)
Glucose 120'	170	207	-
Insulin 0´ (2,6 - 24,9 µIU/ml)	23.7	26.9	23.9
C-peptide 0´ (1,1-4,4 ng/ml)	2.20	2.34	2.85
HbA1c (4-6%) (20-42 mmol/mol)	6.0 (42)	6.2 (44)	6.4 (46)
HOMA-IR (N<2.5)	6.9	8.16	7.2

Table 1. OGTTs

Conclusions: The onset of T2D is usually slow and insidious. The differential diagnosis in our case included ADM, MODY, mitochondrial diabetes, genetic defects of the β cell or insulin action. ADM is uncommon; however, it is essential to reach a definitive diagnosis as this has implication for the whole family and plan for appropriate treatment.

P-360 | A longitudinal study on patterns of oral microbiota diversity and composition from childhood to late adolescence in children with parental obesity from the province of Québec, Canada: the QUALITY cohort

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Introduction: Despite its link to obesity, little is known about oral microbiota composition across childhood.
Objectives: 1) Characterize variations in α-diversity and composition of the oral microbiota of children 8-10 to 15-17 yrs; 2) examine how composition differs across weight categories.
Methods: The QUALITY cohort studied 630 youth with parental obesity, evaluated at 8-10, 10-12 and 15-17 yrs. Total genomic DNA was extracted from dental plaque samples; 16S based microbial profiling determined α-diversity and composition of the oral microbiota for participants who remained in the same weight categories at all 3 visits (n=142).
Differences in mean values of α-diversity (observed ASVs, Chao1, Shannon, Simpson's reciprocal) across ages were tested using ANOVA and Tukey's tests. Identification of differentially abundant taxa was tested using linear discriminant analysis effect size (LEfSe), with LDA scores as the effect size of differences in composition across weight categories.

Results: At baseline, participants were 9.6 yrs (SD 0.93) and 58% were boys. Across all 3 visits, 75%, 8% and 17% belonged to healthy weight (HW), overweight (OW)and obesity (OB) categories, respectively. Overall, α-diversity indices decreased at 15-17yrs, with no differences across other age groups. Bacterial genera abundance changed across weight categories at each age group (Figure).
Children with OW and OB presented more adverse pathogen profiles (e.g., Gemella, Eikenella), and the greatest number of changes in microbial abundance compared with HW children, with changes more salient at 15-17yrs.

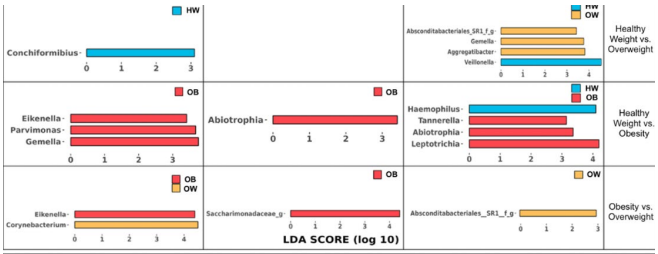

Figure interpretation: As an example, at ages 15-17, children with healthy weight have a higher abundance of *Veillonella* compared to overweight children, and *Haemophilus* compared to children with obesity. Children in the overweight category have more *Gemella and Aggregatibacter* relative to healthy weight children, and more *Absconditabacteriales_SR1_f_g* compared to both other weight categories. Children with obesity have a higher abundance of *Tannerella, Abiotrophia and Leptotrichia* compared to healthy weight.

Conclusions: Oral microbiota α-diversity decreases in adolescence. Pathogenic species differ across ages and weight categories, particularly among children with OW/OB, with more abundant differences and deleterious profiles in late adolescence.

P-396 | Management of severe obesity and type 2 diabetes mellitus in prader-willi syndrome using an off-label combination therapy of semaglutide and methylphenidate

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Introduction: The pharmacotherapy options available for the treatment of hyperphagia and obesity in Prader- Willi Syndrome (PWS) include Phentermine, Topiramate, Exenatide, Liraglutide.In spite of all these therapeutic tools, achieving weight loss in PWS is extremely difficult.
Objectives: To report the treatment of severe obesity and complete resolution of Type 2 diabetes mellitus (T2DM) using combination therapy of Semaglutide and Methylphenidate in a child with PWS.

Methods: 9.5-year-old girl with PWS was referred to our center for the management of severe obesity with multiple co-morbidities. She had been to multiple centers around the world. She was the 3rd child of non-consanguineous parents who was diagnosed with PWS at the age of 2 years.The severe co-morbidities that the child had at the time of consultation at our center were severe obstructive sleep apnea,T2DM since age of 7 requiring basal-bolus insulin and fatty liver. The management of her severe obesity at other centers included low-calorie diets and laparoscopic sleeve gastrectomy done at BMI 80kg/m^2 at the age of 7. There was less than 5kg reduction. At our center she was initiated on Semaglutide 1mg weekly, Methylphenidate 18mg once daily. She was continued on basal- bolus insulin.
Results: By the end of 6 doses of Semaglutide 1mg weekly and Methylphenidate 72mg, there was 6 % reduction in body weight and reduced appetite. The basal and bolus insulin could be stopped within 24 days .She had symptomatic improvement in sleep apnea by week 6.

Week	1	2	3	4	5	6
Weight (kg)	149	148	145	143	142.75	140.8
Weight SDS	4.4	4.39	4.37	4.35	4.34	4.32
BMI (kg/m2)	76.87					72.5
HbA1c (%)	12					8.7
Sleep study	Poor sleep architecture which showed short REM stage of 11.8%. Average SpO2 was 87%.					Average SpO2 was 90%.
Semaglutide - Methylphenidate therapy	1mg, 18mg	1mg, 36mg	1mg, 54mg	1mg, 54mg	1mg, 72mg	1mg, 72mg

Table 1.

Conclusions: This is the first case reporting the use of combination therapy of Semaglutide-Methylphenidate to treat obesity and T2DM in PWS.This combination therapy has resulted in a dramatic,lifesaving reduction in weight and complete resolution of T2DM in our patient. Hence this combination therapy may be useful in other patients with PWS and severe obesity associated with multiple co-morbidities and warrants further clinical trials.

DIABETES IN DEVELOPING COUNTRIES AND MIGRANT POPULATIONS

P-119 | Design and rationale of the human-1 randomized trial comparing human vs. analogue insulins among youth with type 1 diabetes living in low- and middle-income countries

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Introduction: While long-acting insulin analogues are the de-facto standard of care for youth with Type 1 Diabetes (T1D) in high-income countries, short- and intermediate acting human insulins (regular, NPH, premixed 70/30) are predominantly used in low- and middle-income countries.
However, no studies have compared insulin analogues vs. intermediate acting human insulins on risk of serious hypoglycemia, glucose time-in-range, mean A1c, or compared the cost-effectiveness of these treatments among youth living with type 1 diabetes in low-resource settings.
Objectives: The objective of HumAn-1(NCT05614089) is to determine whether insulin glargine reduces the risk of serious hypoglycemia or improves time in range when compared against standard of care human insulin.
Methods: We are in the process of enrolling 400 youth with T1D aged 7 to 25 years from Bangladesh and Tanzania in a 1:1, open-label, randomized trial. Following a run-in period to confirm protocol-eligibility, we randomize patients 1:1 to either continue on their current NPH or premixed 70/30 insulin regimen or switch to glargine insulin (**Figure**). The co-primary outcomes are: percent of time in serious hypoglycemia (<3mmol/l) and time in range (3.9-10 mmol/l), as measured using blinded, professional CGMs. Concurrent ancillary studies on quality of life and cost effectiveness are ongoing.
Results: As of April 27, 2023, 19 participants (mean[SD] age 17[5.8], 79% female, mean[SD] HbA1c 9%[2%]) have been randomized in Bangladesh. Recruitment will soon begin in Tanzania. This study will provide high-quality, trial-derived evidence on the comparative effectiveness and safety of long-acting insulin analogues in lower resourced settings. If glargine is found to be clinically superior, insulin glargine will be provided to all participants.

Figure. HumAn-1 trial design.

Conclusions: If successful, the HumAn-1 trial may lead to improvements in care and clinical outcomes for thousands of children with T1D who live in low-resource settings.

P-121 | Development and validation of an educational booklet for caregivers of children and adolescents with type 1 diabetes

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Introduction: Education of family members is key in the treatment of type 1 diabetes (T1D). However, there is a small number of scientifically validated materials aimed at educating parents and caregivers of children and adolescents with T1D.
Objectives: To develop and validate the content of an educational booklet for Brazilian parents of children and adolescents with T1D.
Methods: Methodological study with two stages: first we conducted a scoping review via PRISMA guidelines to identify published booklets and summarize pertinent content; then, we created and validated the T1D booklet for Brazilian parents. Specialists in health education and diabetes assessed the booklet content, language, and organization. Data were analyzed using descriptive statistics and the Content Validity Ratio (CVR).

Results: We searched PubMed, CINAHL, Web of Science, and LILACS in June 2021, updated in March 2023. Titles and abstracts (N=2,109) were peer-reviewed utilizing Rayyan. Seven publications were included for full-text synthesis.
Most publications were international, authored by health care professionals and content included the seven self-care behaviors in diabetes. The T1D booklet for Brazilian parents was structured with 13 chapters and 22 pages.
Specialists (N=9) were endocrinologists, nurses, and educators, 48.2±8.6 years old, with 24.59± years of experience in T1D care, health, or family education. Twelve chapters received adequate ratings for their content, language, and organization (critical value CVR=.778). The overall CVR value of the booklet was=.885, confirming its content validity.
Conclusions: Our scoping review revealed a few printed materials validated and published in scientific journals. We created and validated a booklet for Brazilian parents with the potential for use in contexts where printed materials are still relevant (e.g. families with low access to technologies).
Future research is needed to validate the Brazilian booklet with stakeholders such as parents/caregivers and diabetes care and education specialists.

P-123 | Decreasing the HbA1c in war refugee children with type 1 diabetes from Ukraine during the first six months of their stay in Czechia

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Introduction: In the wake of the war in Ukraine, Czechia received over 350 000 war refugees of which approximately a third are children, including children with diabetes (CwD).
Objectives: Our aim was to describe the changes in therapy and diabetes control in Ukrainian war refugee CwD during the first six months of their stay in Czechia.
Methods: A total of 124 CwD (62 boys, 62 girls) were enrolled into this longitudinal prospective observational multi-center study since February 2022 through March 2023 in all of the 11 diabetes care centers caring for more than 100 CwD in Czechia. Their average age was 11.8±0,4 and duration of diabetes was 4.5±0.4 years.
During the first visit, the war refugee CwD and their parents/caregivers signed a written consent and completed a survey concerning their diabetes care

prior to their arrival to Czechia. HbA1c, body weight and height and BMI and CGM values were measured and noted during the first visit and then at 3 and 6 months. Non-parametric tests of repeated measurements (ANOVA) were used for statistical analysis.

Results: The mean HbA1c upon arrival was 62.8±2.1 mmol/mol. A vast majority (87.9%) of CwD used multiple-daily injections with only 8.1% using continuous subcutaneous insulin infusion, while in 4.0% CwD the data on therapeutic modality were not obtained. CGM was used in 47.5% of the CwD (43.5% using intermittent scanning, 4.0% using continuous glucose monitoring).

During the 6 months, the HbA1c decreased significantly (60.2; 56.0; 55.8 mmol/mol, p<0.01). The decrease in HbA1c was accompanied by a significant increase in BMI standard deviation score (0.17; 0.25; 0.38 SDS, p<0.01) while the insulin dose remained stable (0.8; 0.78; 0.81 units/kg/day, p=0.80).

The use of CGM technology increased by 46% during the 6 months period. In CwD using CGM before their arrival to Czechia, there was no significant decrease in HbA1c (51.7; 50.0; 50.9 mmol/mol, p=0.6) while in the CwD who initiated CGM upon their arrival to Czechia, HbA1c decreased significantly (69.6; 61.0; 60.1 mmol/mol, p<0.01). Time in range increased significantly in CwD using CGM before their arrival to Czechia (60.5; 63.9; 65.9%, p=0.048).

Conclusions: We have observed a significant decrease in HbA1c of war refugee CwD from Ukraine during the first 6 months after their arrival to Czechia. The steepest decrease was observed in CwD with newly initiated CGM technology underlining its vital role in improving diabetes control in CwD regardless of their background.

P-125 | Determinants of poor glycemic control in children, adolescents and young adults with type 1 diabetes mellitus in Congo

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Introduction: The goal of type 1 diabetes management is to achieve good glycemic control. Most of patients followed up in our settings experienced a poor glycemic control.

Objectives: To analyze the determinants of poor glycemic control in patients with type 1 diabetes in Congo.

Methods: We conducted an analytical, cross-sectional study of 132 children, adolescents, and young adults with type 1 diabetes in Congo.

Informations on socio-demographic characteristics, clinical examination, symptoms of anxiety and depression, the quality of life, and glycemic control were obtained by means of an interview on a survey form. The results were analyzed using SPSS 23 software.

Results: One hundred and thirty-two (132) patients were collected. Among them, 53% were males; 60% had good therapeutic compliance; 72.7% had an HbA1c > 7.5%.

The mean global quality of life was 63.7%; 42.4% had symptoms of anxiety and 48.5% had symptoms of depression. The determinants for poor glycemic control were low socioeconomic status (p=0.000), alcohol consumption (p=0.005), irregularity in attending education sessions (p=0.000), less than two HbA1c tests in the previous year (p=0.001), poor knowledge on diabetes (p=0.000), poor therapeutic compliance (p=0.000), the presence of symptoms of anxiety (p=0.000) and symptoms of depression (p=0.000).

Conclusions: The poor glycemic control of patients with type 1 diabetes in Congo is of multifactorial cause.

Determinants explaining this were: low socioeconomic status, alcohol consumption, irregularity in attending education sessions, less HbA1c tests performed in the previous year, poor knowledge on di-

abetes, poor therapeutic compliance and psychosocial issues. To ensure a better prognosis for these patients, consistent actions to improve these determinants must be implemented.

P-126 | Transition program in the management of type 1 diabetes in Congo from the pediatric age to the adult consultation in Congo: time for advocacy

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Introduction: The transition period in the management of T1DM from paediatric to adult care is a delicate period in patients' life. Poor health outcomes are often noted after transfer to adult care. A well organized and well-planned transition can have a positive and lasting impact on the patient's life.
Objectives: To describe measures taken by health care professionals in the preparation of the transition period, to assess the psychological problems and to compare glycemic control before and after the transition period.
Methods: A descriptive cross-sectional study with prospective data collection on 123 children, adolescents and young adults with type 1 diabetes was carried out. The data was collected using a pre-established survey form. Psychological distress was measured using a patient health questionnaire, the 'problem areas in diabetes' (PAID) for patients aged 19 to 30 years or the 'problem areas in diabetes teenager' (PAID-T) for patients aged 14 to 18 years. The results were analyzed using SPSS 23 software.
Results: Of a total of 123 patients, 17 (13.8%) were followed up in an adult center (Group 1) and 106 (86.2%) in a pediatric center (Group 2). In this latest group, 63 (78.8%) patients were aged 18 years and above. Only 11 (10.4%) patients in group 2 were fully aware of a possible transfer to an adult facility. The mean PAID score in group 1 was 20.5 vs 40.5 in group 2. We noted an HbA1c value ≥ 7.5% in 88.2% patients in group 1 vs 74.5% in group 2.
Conclusions: The transition of patients with type 1 diabetes from pediatric to adult facilities in Congo is disorganized and unprepared. Although the level of diabetes-related distress is low in patients after the transition, but the poor glycemic control already noted in pre-transition persists and even gets worse. In regards of these findings, the implementation of a structured transition program would greatly contribute to improving the management and prognosis of patients in adulthood.

P-193 | Performance of home-collected dried blood spot c-peptide measurement in assessing endogenous insulin secretion in children and adolescents with young-onset diabetes in Sub-Sharan africa

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Introduction: C-peptide measurement during a mixed meal test remains the reference in assessing endogenous insulin secretion in people with diabetes. It is however expensive and cumbersome in practice.
Objectives: We examined the value of home-collected dried blood spot (DBS) C-peptide measurements in assessing endogenous insulin secretion in participants with young-onset insulin-treated diabetes.
Methods: We compared and assessed the diagnostic performances of home fasting and post-meal (post-breakfast, post-lunch, and post-supper) dried blood spot C-peptide measurements with standardised mixed meal test 90-minute blood C-peptide from 37 individuals: median (interquartile range) age 16 (15, 19) years and, diabetes duration 1.2 (0.1, 2.9) years. C-peptide was measured using a single molecule array assay, which has a lower limit of detection (1.50) pmol/L.

Results: The median (interquartile range) fasting, post-breakfast, post-lunch, post-supper, and mixed meal test 90-minute blood C-peptide were 57 (16, 144), 129 (26, 485), 102 (31, 250), 80 (26, 219) and 171 (100, 418) pmol/L respectively. Post home-meal DBS C-peptide levels were strongly correlated with stimulated blood C-peptide at 90-minutes from the mixed meal tolerance test, r=0.90-0.91, with a lower correlation for fasting DBS (r=0.77).

For identifying participants with clinically relevant C-peptide levels (MMTT C-peptide <200pmol/L (near absolute insulin deficiency) and <600pmol/L (insulin requirement and type 1 diabetes) identical post breakfast DBS cut-offs had AUC ROC 0.92(95%CI 0.82-1.00) and 0.98 (95%CI 0.94-1.00), with sensitivity/specificity 85.7% (63.7-97.0) /75.0% (47.6-92.7) and 90.6% (75.0-98.0)/100% (47.8-100.0) respectively.

Conclusions: A single home-collected fasting or post-meal DBS C-peptide level allows accurate assessment of endogenous insulin secretion in people with young-onset insulin-treated diabetes. Therefore, the DBS C-peptide approach can be a useful alternative to venous blood C-peptide measurement in this population.

P-194 | Self-monitoring of blood glucose (SMBG) with individualised insulin dosing leads to improved glycemic control compared to SMBG alone in young people with type 1 diabetes in a low-resource setting

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Introduction: The John Hunter Children's Hospital (JHCH) Australia has achieved an average clinic HbA1c of 7.0% using their Success With Intensive Insulin Management (SWIIM). SWIIM centers around a flexible insulin regime.

The Sher-I-Kashmir Institute of Medical Sciences (SKIMS) in Srinagar, India services 400 children with type 1 diabetes. The average HbA1c is 10.5% and the average life expectancy is 29 years. Access to blood glucose monitoring and diabetes education is limited.

Over the last 18 months, The JHCH has worked with SKIMS clinicians to adapt the SWIIM program (flexible insulin dosing cards, dietetic resources and patient education resources) for the Kashmiri population.

Objectives: To determine if flexible insulin dosing improves diabetes outcomes over glucose monitoring alone in a low-income setting.

Methods: Participants were people aged 0-25yrs with type 1 diabetes using multiple daily injections attending SKIMS.

Participants received blood glucose monitoring strips by the Life For a Child Foundation. Participants were then commenced on flexible insulin dosing cards in a rolling manner.

Results: 59 participants were commenced on BGL monitoring and flexible insulin dosing. Over the study period, the average HbA1c decreased from 10.5% ±2.3 (92 mmol/mol ±25) to 8.7% ±1.9 (72 mmol/mol ±21). 40 participants were commenced on BGL monitoring only and their average HbA1c decreased from 10.4% ±1.8 (90 mmol/mol ±19) to 9.6% ±2.18 (82 mmol/mol ±24).

After 3 to 6 months, this group was commenced on flexible insulin dosing and the HbA1c decreased to 9.0% ± 1.4 (75 mmol/mol ±15). 11 participants were commenced on BGL monitoring and flexible insulin dosing simultaneously and the HbA1c decreased from 10.9% ±3.1 (95 mmol/mol ±33) to 8.3% ±2.5 (67 mmol/mol ±27)

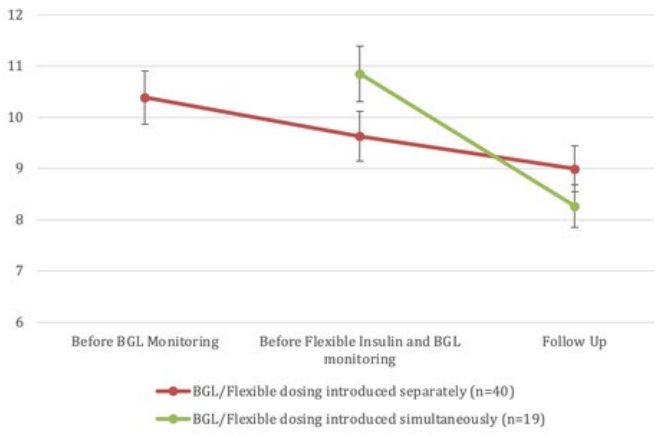

Figure. Average HbA1c following the introduction of BGL monitoring and flexible insulin dosing.

Conclusions: BGL monitoring alone decreased the HbA1c and the addition of flexible insulin dosing led to a further reduction. We conclude that flexible insulin dosing is feasible in a resource-limited setting.

P-195 | Evaluation of quality of life in children and adolescents with type 1 diabetes in Dakar (Senegal)

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Introduction: Improving access to insulin, insulin therapy protocols and patient education have contributed to reducing morbidity and mortality linked to diabetes.
The goal of treatment is to prolong life expectancy and preserve quality of life (QOL).
Objectives: To assess the overall QOL of children and adolescents with T1D in Dakar and to analyze the factors associated with this QOL.
Methods: This was a multicentric cross-sectional study over a six months period (January-June 2022). It concerned children with T1D, aged 5 to 18 and followed at the Changing Diabetes in Children (CDIC) clinics in Dakar.
Data were collected using a pre-established questionary and QOL was assessed by the pediatric QOL score (PedsQL 3.2). We received authorization n°75852 from MAPI Research trust to use PedsQL 3.2. Analyses were performed using the software package SPSS 16.0.
Quantitative variables are described as mean ± standard deviation (SD) and qualitative variables, as percentages.
Results: We included 83 children with a male predominance (58%). Mean age was 12.83 ± 3.6 years and mean HbA1c 10.15±2.54%. Only 10.84% of children had optimal HBA1c ≤ 7.5%. Mean insulin was 0.86 ± 0.27 IU/kg/d and 79.53% of children self-injected insulin.
The mean QOL score was 57.8 ±15.2/100. Worry dimension, evaluated at 20.9, represented a problem for the majority of children, while the dimensions relating to diabetes (73.6) and its treatment (76) were more satisfactory. QOL was correlated with low insulin dose (p=0.0084), absence of snacks (p=0.02), child autonomy (p=0.002), diabetes duration (p=0.004) (Table) However, QOL was not associated with glycemic control.

Characteristics	Score > 57.8/100	Score < 57.8/100	p-value
Age [mean± SD (years)]	15.57±3.2	9.84±4.6	0.02*
Sex - Male [n (%)]	25 (52.08)	23 (47.92)	0.28
Diabetes duration [mean ± SD (years)]	8.4±4.1	3±1.92	0.004*
Insulin dose [mean ± SD (UI/kg/d)]	0.8 ± 20	0.54 ±0.18	0,0084*
Snacks [n (%)]	23 (35.38)	42 (64.62)	0.02*
Self-injection insulin [n (%)]	54 (81.82)	12 (18.18)	0.002*
Normal school attendance [n (%)]	36 (52.95	32 (47.05)	0.24
Parents' irregular income [n (%)]	12 (42.86)	16 (57.14)	0.09
Regular physical activity [n (%)]	46 (63.01)	27 (36.99)	0.02*

Table: Factors associated with QOL score

Conclusions: The QOL of children and adolescents with type 1 diabetes in Dakar is satisfactory despite poor glycemic control. Its measurement during follow-up visits, in addition to glycemic control, may be particularly useful in individual care and the implementation of appropriate interventions.

P-196 | Post ramadan reduction of HbA1c was observed in young people with diabetes who fasted during 2022 ramadan in Bangladesh

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Introduction: Although some experts would consider fasting during Ramadan a high risk for metabolic deterioration, recent studies have demonstrated that individuals with type 1 diabetes (T1D) can fast during Ramadan provided they comply with the Ramadan focused management plan and are under close professional supervision.

Objectives: The study was conducted to assess the safety, changes in hemoglobinA1c, insulin dose, episodes of hypoglycemia in young people with diabetes who did fasting during Ramadan.

Methods: Two hundred forty-three patients with T1D and other types who insisted on fasting were enrolled one month prior to Ramadan 2022. Patients with their caregivers were given a guideline on Ramadan fasting by Diabetes team which included insulin dose, HMBG and dietary adjustments.

We compared the basal characteristics and other parameters eg. HbA1C, fasting days, number of hypoglycaemia, and insulin dose (before and after Ramadan in children and adolescents (< 18 years)with young adults (> 18 years) with diabetes.

Results: Median age was 19[16-23] years, 141 (58.0%). were female; Pre Ramadan median HbA1c was 8.3[7.4-9.5], 158(65.0%) were type 1 diabetes, 65(26.7%) Type 2 and 20 (8.2%) were other types. Among the study participants 108 (44.4%) were < 18 years with pre Ramadan median HbA1c, 8.7 [7.6-10.2] and 135 (55.6%) were young adults > 18 years with median HbA1c, 8.1[7.3-9.0]] (p=.001).

A significantly higher number of participants 102(64.2%) were in older age who fasted for more than 15 days (p=.0001) and breaking the fast was more in young age group (p=0.003). A considerable proportion (47.7%in young vs 52.3% in older group) of patients developed mild hypoglyacemia.

There was reduction of Post Ramadan insulin total daily dose (p =0.143) and significant reduction of median HbA1c, 8.6[7.4-9.5] in young vs 8.0[7.2-9.0] in older group after Ramadan (P = 0.016).

Conclusions: Our data supports Ramadan focused diabetes education with proper care, young people with diabetes can fast safely during Ramadan.

Moreover, in our cohort, there were less episodes of mild hypoglycaemia during fasting time with improved glycemic control after Ramadan.

P-197 | Prevalence and healthcare cost of type 1 diabetes mellitus among Vietnamese children and adolescents: a population-based study using the National Health Insurance Database

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Introduction: Previous researches have found large variations in reported prevalence around the world of type 1 diabetes. However, there is a lack of published studies on the subject in Vietnam.

Objectives: To estimate the prevalence and economic burden of type 1 diabetes mellitus among the Vietnamese population aged below 20 years.

Methods: We used the National Health Insurance Agency database, which covers data on the use of public healthcare services by 92% of the Vietnamese population to extract data from the targeted population. It included patients aged below 20 years in 2022 who were diagnosed with T1D by a defined ICD-10 code (E10).

The prevalence of diabetes was estimated for the total population (aged below 20 years) and by subgroups classified by age (0-4, 5-9, and 10-19) and sex. Healthcare costs accounted for direct medical costs, using payer perspective. The total direct cost per person-year was investigated.

Results: Among 8,393 all-aged patients diagnosed with T1D, 946 (11.3%) were children and adolescents.

The prevalence of T1D among children and adolescents was 3.12 per 100000. Between subgroups by age, the prevalence per 100000 among the population aged 10-19 years was the highest (5.05), followed by the ones aged 5-9 years (2.13) and 0-4 years (0.39).

The prevalence in females (3.62) was higher than that in males (2.66). The total direct costs per person-year were estimated at 500 USD. It was higher than the corresponding cost for T2D in our previous study.

Conclusions: This is the first research investigating the prevalence of children and adolescents T1D in Vietnam. Although the prevalence was modest, higher prevalence among older ages might implicit the latency in diagnosis, which results in poor man-

agement of disease progression. Similarly, a higher healthcare cost for T1D patients compared to T2D patients should be noticed. In fact, management of these T1D patients might be more costly in terms of the indirect costs related to the burdens on their parents, which were underestimated in this study.

P-198 | Living with type 1 diabetes in Bangladesh: a qualitative study of the experiences of young people, caregivers and providers

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Introduction: The challenges of insulin delivery are more pronounced in lower resource settings, impacting on the experiences of children & young adults with Type I Diabetes (T1D).
Objectives: This exploratory qualitative study, supporting the Hum-An1 human/analogue insulin trial, explores patient, caregiver and provider experience of T1D in Bangladesh; this includes impact on daily life, quality of life (QoL) and treatment satisfaction.
Methods: We conducted semi-structured interviews with 10 patients (aged 12-25), 5 caregivers and 5 providers at a diabetes tertiary referral centre in Dhaka. Participants were recruited via purposive sampling to ensure age, gender, socioeconomic group & provider cadre diversity.
Most (17/20) were conducted in person at the clinic; 3 provider interviews were conducted remotely. Data were analysed thematically, combining deductive & inductive approaches.
Results: Six key themes emerged. Diagnoses' highlighted help-seeking behaviour; delayed diagnosis due to limited knowledge of T1D, especially in rural areas; and families' initial distress and fear for the future, including marriageability. 'Insulin and Hypoglycaemia' highlighted coping strategies to manage poor access to a healthy diet, monitoring tools & insulin storage. 'QoL' revealed the role of the multidisciplinary team (MDT) in facilitating diagnosis acceptance.
'Effect on family' debated the negative influence on family finances & caregiver distress. 'Family and community support' showed faith & peer support were vital for acceptance.
'Stigma/discrimination' was shown by concealing the diagnosis, isolation & skipping insulin doses due to embarrassment.
Conclusions: We provide evidence on the challenges of living with T1D in low resource settings, the emotional & economic impact on families & the role of the MDT in improving quality of life.
Future policy & programming should consider MDT care, addressing social stigma and enhancing patient-community knowledge, while reflecting the Bangladesh cultural & religious context.

P-199 | Risk of type 1 diabetes in relatives of people with type 1 diabetes: an Indian study

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Introduction: The risk of Type 1 Diabetes (T1D) in First Degree Relatives (FDR) and Second-Degree Relatives (SDR) is not documented enough in literature. The Colorado study and a Finish study report differences in risk rates and gender predilection in FDR. Here we evaluate our data to estimate the risk in Indian population
Objectives: Our study aims to assess the risk rates and gender predilection in FDR and SDR in people with Type1diabetes enrolled in UDAAN, a Type1diabetes support group in Aurangabad, India.
Methods: The data, maintained of 945 children between Nov 2007 to Jan 2022 was examined. 1700 siblings and 1890 parents of the index cases were interviewed for T1D.
The age of onset of diabetes, duration to onset in the FDR and SDR and correlation with gender was noted.
Results: Of the 945 index cases, 23 (2.4%) had FDR with T1D. Of these 18 (1.9%) had 1 sibling as FDR. One (0.1%) had 2 siblings as FDR. Four (0.4%) had a parent as FDR. Ten (1%) had 1 SDR.
Average age of index case at onset of diabetes was 7.9 years. The average age of FDR at onset was 9.4 years. Average time to onset in sibling was 3.7 years.
Out of the 23 cases with FDR, parents accounted for 17.4 % while siblings were 82.6 %. No significant gender difference was seen.

Conclusions: The number of affected siblings in present study is lower than that reported from other parts of world. The age of onset appears to be lower and without gender bias. The risk should be studied across larger T1D population in India.
These risks need to be explained to the health care providers, educators and parents for early identification and treatment.

P-200 | Latent tuberculosis in children and youth with type 1 diabetes mellitus in Dar Es Salaam, Tanzania

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Introduction: Both tuberculosis (TB) and diabetes mellitus (DM) are increasing worldwide, with the asymptomatic presentation when they co-exist, leading to interference in glycemia control, ant tuberculous therapy failure, relapse, and death.
Different studies (Mixed adult and youth) have shown how frequent TB is in patients with DM, and most of the time, they are asymptomatic. Data for latent tuberculosis in children and youth with type 1 Diabetes in Africa is limited.
Objectives: prevalence of latent tuberculosis in youth and children with type 1 Diabetes in Dar es Salaam -Tanzania.
Methods: Our cross-sectional study recruited Children and youth with T1DM by stage of puberty, glycaemic control, and age at diagnosis from January to December 2021 in -Dar es Salaam. Participants were screened for the presence of latent Tuberculosis using the QuantiFERON test. A positive test was considered to have latent TB.
Results: Of the 281 participants, the mean age was 19 (±6) years, 51.2% were female, and (80.8%) had either a primary or secondary level of education at baseline.
Overall, the prevalence of latent TB was 14.9%, more slightly in females (52.4%) than in males, but was insignificant. The proportion of latent TB was significantly higher in uncontrolled HbA1c levels (76.2%) than those with controlled HbA1c (23.8%) [p=0.046].
Duration of diabetes and age at diagnosis did not affect the occurrence of latent Tuberculosis [p >0.05]. Meanwhile, in the regression model, participants with latent TB were more likely to have uncontrolled HbA1c. [p=0.045]
Conclusions: Despite the methodological limitations, this survey highlights the high prevalence of latent TB among children and youth with diabetes shouting for better control. These results clearly show the need to screen for Tuberculosis in children and youth with diabetes and if possible start them on Isoniazid prophylaxis as per protocol to prevent the development of active tuberculosis, especially in this TB endemic areas like Tanzania.

P-202 | Disturbed eating behaviour in indian adolescents with type 1 diabetes mellitus

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Introduction: Prevalence of DEB in adolescents with T1D is much higher as compared to general population. Till date all studies done on DEB have been conducted in developed nations and their results cannot be presumed to be similar in Indian population due to huge differences in our eating practices and behaviour. Thus, we conducted this research.
Objectives: To study the prevalence of Disturbed Eating Behaviour (DEB) in adolescents with Type 1 Diabetes by using Diabetes Eating Problem Survey-Revised (DEPS-R) and Modified SCOFF (mSCOFF) questionnaire and to determine effect on glycemic control.
Methods: We recruited 10-19 years old adolescents with T1D who were on regular Insulin therapy for ≥1year duration. Diabulimia was also included in DEB.

Demographic and clinical details were recorded.
Sample size: We completed the survey of 100 patients. DEB was assessed using both DEPS-R and mSCOFF. The questionnaires were translated into Hindi and the reverse translation to English was also done. The revised DEPS has 16 items and mSCOFF is a five-item questionnaire that can be quickly administered during routine clinic visit.
Results: Participants were evaluated for DEB using both DEPS-R and mSCOFF. DEB screen was considered positive if ≥2 score in mSCOFF and ≥20 score in DEPS-R. Table 1 shows results of DEB in the study. 45% of the participants had DEB.
Out of these 45 patients with DEB; 55.6% were females and 44.4% were males. DEB was found to significantly affect glycemic control as out of 45 participants with DEB 40(88.9%) had poor glycemic control. Interestingly, 31.0% of our patients had marked responses which were suggestive of diabulimia.

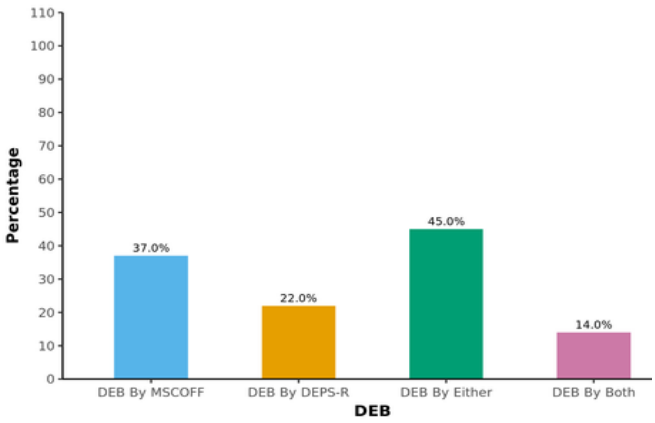

Table 1: DEB in Study Participants

Conclusions: Disturbed Eating Behaviour is highly prevalent in Indian adolescents with T1D. We recommend early screening of all T1D adolescents for DEB for early detection and treatment as it is associated with poor glycemic control.

P-226 | Effects of numeracy and literacy on glycemic control and self-perceived efficacy in youth with type 1 diabetes in Haiti

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Introduction: Effects of literacy and numeracy on glycemic control and self-perceived efficacy in youth with type 1 diabetes (T1D) in low-resource settings are understudied.
Objectives: We evaluated literacy and numeracy in Haitian youth with T1D and their caregivers, and their association with hemoglobin A1C (A1C) and self-perceived efficacy.
Methods: Cross-sectional cohort study at a pediatric diabetes clinic in Haiti from 06-12/2017. We included patients with a diagnosis of T1D at ages 0-25 years and at least one parent of Haitian ancestry, and one caregiver per youth. We collected clinical data, A1C, and administered a population-adjusted numeracy questionnaire and the Perceived Diabetes Self-Management Scale (PDSMS). We used uni- and multivariate models to assess predictors of A1C and PDSMS scores.
Results: We included 85 patients (60% female), median age at diagnosis 14.3y (11, 16.5), median diabetes duration 3.1y (1.2, 4.6) and 73 parents. Mean A1C was 11.3% (± 2.7), less than 10% of patients had A1C <7%. 76 patients (90.5%) self-reported being able to read, 78 (91.8%) to write and 84 (98.8%) to count.
Mothers' and fathers' median education years were 7.0 (2, 16) and 11 (6, 16), respectively. 54 parents (74.0%) self-reported being able to read and write.
Normalized to 100%, median patient numeracy score was 75.0% (56.3, 87.5) and the mean PDSMS score was 65.9% (± 11.8).
In univariate models, lower A1C was predicted by younger age (p=0.013), but not by gender, diabetes duration, numeracy score, parental education or PDSMS score. Higher PDSMS scores were predicted by higher numeracy scores (p=0.003), marginally by male sex (p=0.057), but not by age, diabetes duration, or parental education.
In a multivariate model adjusted for age, sex and diabetes duration, higher numeracy remained a significant predictor of PDSMS scores (p=0.006).

Conclusions: In youth with T1D in Haiti who have ubiquitously poor glycemic control and suboptimal family literacy and numeracy, numeracy is a predictor of self-perceived efficacy of T1D.

P-231 | Comprehensive approach towards paediatric diabetes management: NGO initiatives in developing country

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Introduction:
In developing nations diagnosis of diabetes brings mental-trauma/depression in family. Focused treatment for pediatric age-group is unavailable in developing-countries. 26% of diagnosed diabetics are children's. Adequately trained physicians/Nurses in issues of pediatric-diabetes provide continuity of care, relief from depression and smooth transition from diagnosis to treatment.
Qualitative collaborative relationship between these makes diabetics life bearable. Our NGO-project highlights significance of relationship between nurses and diabetic-children in community clinic setup of rural India.
For Diabetes, its assumed that depression is inevitable sequel to diagnosis. Retrospective analysis of past studies shows—counselling improves QOL & attitude towards diabetes-treatment.
Objectives: To describe/evaluate care issues in diabetic-children's. Observe/modify nature of relationship between nurse and child. To evolve comprehensive treatment plan for patients and families.
Methods: A retrospective analysis of data base from 7 rural health-clinics. Specialized therapy/support to pediatric-age-group not available at any centre. Total 117 children's [4-13 years] diagnosed with diabetes. 23 had additional endocrine/metabolic problems. Nursing/medical care plan analyzed. No specialized trained personal in rural/tribal India.
Opinion/needs from patients families collected on feedback questionnaire. Then we trained 10 nurses & 2 physicians for handling pediatric cases [4 weeks training].
Results: Out of 117, 41 discontinued Rx due to improper counseling/guidance. 3 died. Patient/family's feedback highlights: Better access to newer drugs-delivery-systems, psychosocial support, follow-up-plan. Nurses/physician be sensitized in pediatric care-issues.
Main issues of concern were:
1. Illness and coping with their feelings.
2. Initial impact of diagnosis and a search for solution? Expectations for future life & its quality?
3. Concerns of cost of RX.
4. Availability of proper follow-up centers in rural areas of developing nations.
Conclusions: Multifaceted Relationship between physician/nurse and Diabetics childrens is crucial. This relationship provides better continuity of treatment. We show concerns/difficulties while working in Asian set-up to international experts/seniors at ISPAD-congress.

P-232 | Bridging gaps in paediatric diabetics care: patient advocacy project

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Introduction:
Diabetes in children's brings mental-trauma/depression in family. Focused treatment for pediatric age-group is unavailable in developing-countries. 26% of diagnosed diabetics are children's. Adequately trained physicians/Nurses in issues of pediatric-diabetes provide continuity of care, relief from depression and smooth transition from diagnosis to treatment.
Qualitative collaborative relationship between these makes diabetics life bearable. Our NGO-project highlights significance of relationship between nurses and diabetic-children in community clinic setup of rural India.
Objectives: This is a patient advocacy project. here we have tried to analyze and address of pediatric patents.
In Diabetes, its assumed that depression is inevitable sequel to diagnosis. Retrospective analysis of past studies shows—counselling improves QOL & attitude towards diabetes-treatment.
So aim was to describe care issues in diabetic-children's. Observe/modify nature of relationship between patient advocate with medic and child. To evolve comprehensive treatment plan for patients and families.
Methods:
A retrospective analysis of data base from 7 rural health-clinics. Specialized therapy/support to pediatric-age-group not available at any centre. Total 123 children's [4-13 years] diagnosed with diabetes.

23 had additional endocrine/metabolic problems. Nursing/medical care plan analyzed. No specialized trained personal in rural/tribal India.
Opinion/needs from patients families collected on feedback questionnaire. Then we trained 7 nurses & 2 patient advocates for handling pediatric cases [4 weeks training].
Results: 41 discontinued Rx due to improper counseling/guidance. 3 died. Patient/family's feedback highlights: Better access to newer drugs-delivery-systems, psychosocial support, follow-up-plan.
Nurses/physician be sensitized in pediatric care-issues.
Main issues of concern were:
1. illness and coping with their feelings.
2. Initial impact of diagnosis and a search for solution? Expectations for future life & its quality?
3. Concerns of cost of RX
4. Availability of proper follow-up centers in rural areas of developing nations
Conclusions: Multifaceted Relationship between caregiver and Diabetic-child is crucial. Patient advocates can play pivotal role here. This relationship provides better continuity of treatment.
We show concerns/difficulties while working in Asian set-up to international experts/seniors at ISPAD-congress.
due to resource limitation we couldn't so long term statistical analysis,

P-233 | Designing diabetes- advocacy project : NGO initiatives in resource-poor nations

S Pal[1], B Gupta[2], T Roy[1]
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Introduction: Diabetes- support services facilities available only in few city hospitals. Especially diabetics in rural India lack comprehensive diabetes care plan. NGO's play key role in psychosocial-support/ Counseling/rehabilitation in remote towns of india.
Objectives: Our advocacy Project aimed to formulate policy for trained personals to give better & cost-effective Diabetes care.
Methods: We mobilized training resources from local primary Health-centers. Training in Counseling & diabetes care imparted to nurses. Team consisted 2 social worker, 4 nurse & one physician. Local traditional faith-healers & community leaders involved for more effective diabetes awareness/education programs. Aim was to provide physical-comfort to patient, improve relationship with diabetics family members, gradually we prepared patient/family for long term diabetes care needed by patients. Discomfort/anxiety decreases overall treatment efficacy. 51 Patients enrolled during community out-reach-programs. Data collected on feedback-questionnaire.
Most difficult tasks is discussing cost of long term therapy & non availability of newer insulin preparations in rural/tribal areas.
Results: Diabetes Counseling/ support services must be made more accessible in rural-areas. Our NGO's approach is also very cost-effective. Due to non-availability of trained-personal in rural areas this approach crucial in resource poor nations. We noted 86% responded favorably to counseling/ nursing care programs, 79% showed willingness to motivate fellow patients to facilitate supportive-care-program of NGO-volunteers.
Conclusions: 17 patients themselves became regular active facilitators in our NGO's Diabetes-care workshops. Our Holistic approach helped overcome hopelessness/fear depression. Supportive care emerged very serious issue affecting QOL in diabetics. NGO's need to Improve access to drugs by collaboration with national diabetes societies..

P-235 | Clinical profile and outcome of type 1diabetics mellitus in BPKIHS up to 16 years old children

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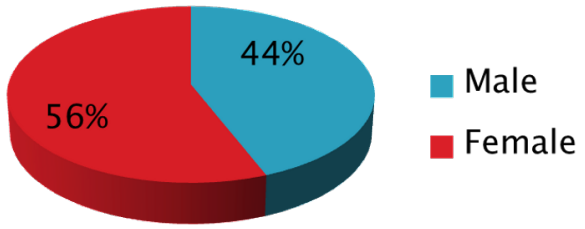
Introduction: Treatment and management of Type 1 DM among children remains a significant challenges in pediatrics age group requiring prompt management. However till date there are no published data on pediatrics population in Type 1 DM in the eastern region of Nepal. This opens the door to conduct this study at BPKIHS to explore the treatment and management outcome of the Type 1 DM in pediatrics population at our prestigious site. Thus, owing to above reports observations early treatment and management were the crucial factors in improving outcome of type 1 DM in pediatric population.

Objectives: General Objectives
Clinical profile and outcome of type 1diabetics mellitus in BPKIHS up to16 years old children.
Specific Objectives:
To study the demographic variable such as age, sex, occupation, family income of T1DM.To assess the knowledge of children and home care management in diabetes mellitus and to evaluate the risk factors associated with Type I Diabetes Mellitus.
Methods: Population/ participants:
50 Children were included in this study
Type of study design:
Observational and asked questionnaire based Study.
Results: A total of 50 cases were included, the mean and SD age of all the patients was 10±3.8 (range 1.5-16) years.



The male and female data, (44%) was found to be male and female was (56%).
Knowledge about Type I Diabetes Mellitus (T1DM)
it was found that 30% has Knowledge about T1DM=30%, while 70% has got No Knowledge about T1DM
Knowledge about Treatment of T1DM
it was observed
Knowledge about Treatment of T1DM= (33) 54%
No Knowledge about TreatmentT1DM= (27) 46%
Management Practicing about Type I Diabetes Mellitus (T1DM)
It was seen
Management Practicing about Type T1DM=39 (78%)
No Management Practicing about Type T1DM=11 (22%)
Complication
Complication associated with T1DM=3 (6%)
No Complication associated with T1DM=47 (94%)
Income Status
sub categorized
<10000=13 (26%)
10000-20000=16 (32%)
20000-40000=11(22%)
>40000=10(20%)
Conclusions: There was no significant difference between the male and female population. The Knowledge about T1DM it was found that majority of the patients (70%) do not have Knowledge about T1DM. Around half of the patients had knowledge about Treatment of T1DM.Management Practicing about Type T1DM was observed in around 78% i.e. 39 out of 50 cases.
Complication associated with T1DM was observed in just 3 cases out of 50 i.e. 6%.The family income status was categorized into 4 sub group and it was found that maximum income level was in the group of 10000-20000=16 (32%).

P-240 | Reduction of diabetes-related hypoglycemia in children and adolescents with type 1 diabetes in Ghana

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[1]Cincinnati Children's Hospital Medical Center, Endocrinology, Cincinnati, United States, [2]University of Cincinnati, College of Medicine, Cincinnati, United States, [3]Sonia Nabeta Foundation, New York, United States, [4]Sanford World Clinic, Accra, Ghana, [5]Cincinnati Children's Hospital Medical Center, Biostatistics and Epidemiology, Cincinnati, United States

Introduction: People living with Type 1 Diabetes (T1D) in low income countries experience high morbidity, including severe hypoglycemia. The use of mixed insulins, inability to access supplies, and social factors contribute to hypoglycemia and may limit ability to achieve HbA1c targets. The Sonia Nabeta Foundation (SNF) focuses on sustainable medical care for children and young adults with T1D living in sub-Saharan Africa.
In partnership with Sanford World Clinic, SNF established a T1D clinic in Ghana, West Africa that uses a comprehensive approach, including education, access to analog insulins and supplies, access to a dietician, psychologist and pediatric endocrinologist, and peer to peer support.
Objectives: This study's aim was to evaluate the glycemic outcomes of this clinic population, including HbA1c and a novel metric, hypoglycemia per glucometer days, based upon available data.
Methods: HbA1c was obtained using the BioHermes HbA1c EZ 2.0 machine every 3 months in conjunction with glucometer downloads. Glucometer days were defined as the number of days a patient checked at least one blood glucose (BG) in a 24 hour period.

Hypoglycemia was defined as a BG </= 3.9 mmol/L (70 mg/dL); severe hypoglycemia was defined as a BG </= 3.0 mmol/L (54 mg/dL). Demographic data and insulin doses were abstracted from the medical record.

Results: Of the 22 participants (mean age 18.4 years, range 7-25 years, 7 male), 73% presented to clinic using Mixtard (soluble insulin/NPH) at an average insulin dose of 0.81 units/kg/day.

Month of Clinic Participation	Average HbA1c (%)	Rate of Hypoglycemia per Glucometer Days (%)	Rate of Severe Hypoglycemia per Glucometer Days (%)	Glucometer Days (n)
1 (Baseline)	11.6 (n=22)	27.2	13.6	184
2		36.3	16.1	366
3	8.5 (n=19)	34.0	16.1	341
4		35.0	20.4	329
5		37.6	14.4	194
6	7.4 (n=9)	30.1	15.1	186
7		29.9	13.9	144
8		23.1	2.6	78
9	8.3 (n=3)	15.8	0	57

Conclusions: Data at this time showed a decrease in average HbA1c from 11.7% (baseline) to 8.6% over the first 3 months, sustained over time. Total and severe hypoglycemia rates also decreased over time. This indicates that a comprehensive T1D clinic in a low income country can improve glycemic outcomes. This baseline data will be used in combination with social determinants of health surveys to further develop the clinical and quality improvement initiatives.

P-267 | Prevalence, annual incidence rate and clinical characteristics of pediatric and adolescent patients with diabetes in Kenyatta national hospital, Nairobi, Kenya. A 14 year retrospective study

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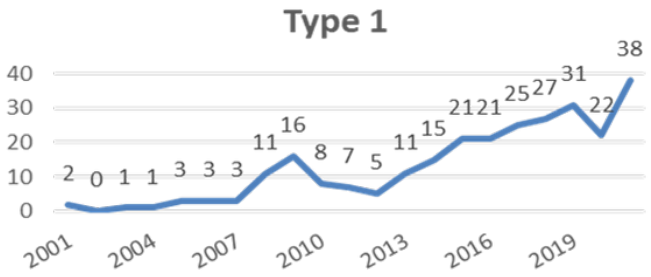
Introduction: There is little data on prevalence and clinical characteristics amongst diabetes in the pediatric and adolescent group in sub-Saharan Africa.

Objectives: To determine the prevalence and annual incidence rate; describe the clinical characteristics in terms of gender, age at diagnosis, presenting complaints, duration from symptom onset to presentation to the endocrine clinic and loss to follow up amongst patients aged 25 years and below with diabetes.

Methods: A hospital-based retrospective, descriptive study was carried out at Kenyatta National Hospital between January 2008 to December 2021 amongst patients aged 25 years and below with diabetes. Statistical Package for Social Science (SPSS) version 23.0 was used for analysis.



Results: The prevalence of type 1 diabetes was found to be 288 with 2 cases of type 2 diabetes and a female preponderance. Most, 36.4%, of cases of type 1 diabetes got diagnosed within the ages of 10 to 18 years while 30% between 19 to 25 years, 12.5% within 6 to 9 years, 15.5% within the first 5 years of life. Diabetic ketoacidosis was the most common initial clinical presentation of type 1 diabetes at 90.2% with 35.7% concomitant weight loss.

Fever formed 16% of the complaints while 2.7% and 2% had polyphagia and secondary enuresis respectively. Few, 2%, had the classical symptoms of diabetes. There was an upward trend in type 1 diabetes with a dip in the year 2020. Patients with type 2 diabetes were diagnosed at the age of 19 and 23 years

respectively. Patients with type 1 diabetes took an average of 2.5 months and a median age of 18 days between symptom onset to clinic review. A third of the cases were lost to follow up.

Conclusions: Recommendations: The increasing cases of type 1 diabetes with delayed diagnosis requires allocation of more resources and increased creation of awareness in the population. Management of various conditions during pandemics to be streamlined. Hospital-based patient tracking system is recommended.

P-273 | An institutional analysis of changing diabetes in children (CDIC)

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Introduction: CDiC is an access-to-medicine program created in 2009 as a charitable partnership led by Novo Nordisk (NN) in collaboration with Roche, WDF, ISPAD, and local implementation partners. In 2020, NN announced the aim of providing 100,000 children access to T1D treatment by 2030.

This paper analyses the opportunities and challenges emanating from operating a charitable initiative within a for-profit multinational corporation.

Objectives: To critically assess the strengths, weaknesses, and long-term sustainability of the CDiC program from an institutional perspective.

Methods: Institutional theory (see, e.g., Scott, 1995; Westney, 1993) focuses, i.a., on how organizations gain legitimacy and handle hybrid tensions within their institutional environments. This understanding of organizational dynamics in addition to MNC integration theory (Meyer & Su, 2015) structure our analysis.

The analysis is based on interviews with NN functional teams, staff, and implementing partners in Tunisia and Bangladesh, as well as on financial and output data from CDiC.

Results: The study identified some tensions inherent to the CDiC program: First, embedding this charitable activity in NN's line organization allows CDiC to scale up rapidly, leveraging affiliate staff's knowledge of diabetes care delivery and insulin portfolios. Yet, the embeddedness also creates communication and program identity challenges.

Second, CDiC encounters a high degree of institutional variability that exacerbates the already complex coordination challenges of adaption to 26 national contexts while securing efficiency, scale, and synergies.

Third, in the absence of market responses, CDiC, like most charitable activities, faces challenges of measuring impact and social return on investment.

Conclusions: CDiC presents a unique organization that has produced noteworthy results. Yet, the institutional analysis demonstrated several tensions and challenges that CDiC faces in its mission towards providing 100.000 children with access to T1D care.

P-287 | Poor vitamin D status in children and adolescents with type 1 diabetes: shall we worry?

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Introduction: India has a high incidence and prevalence of both vitamin D deficiency and Type 1 Diabetes (T1D). However, very few studies have been done in the India to see what happens to vitamin D levels in children and adolescents with T1D.

Objectives: This study was being done to assess the vitamin D status in children and adolescents with T1DM and to compare this with non-diabetic controls. We also aimed to determine the association between Vitamin D levels and glycemic control, frequency of infection episodes and hospitalizations.

Methods: This cross-sectional study was conducted in India from November 2018 – April 2020 after approval from the institutional ethics committee. A total of 42 known cases of T1D aged 2 to 18 years, on treatment for the same for >3 months and 42 age and gender matched unrelated non-diabetic controls were enrolled. Detailed history regarding infections, DKA episodes, hospitalizations and insulin requirements were taken. Vital parameters, anthropometry and findings of clinical examination were recorded. Sample collection of blood and urine was done at recruitment or after prior appointment.

Results: The mean serum vitamin D levels in cases was 19.85 ±11.86 ng/mL and in control 21.76 ± 11.72 ng/mL, the difference was not significant. However, the vitamin D status was significantly poorer in cases

compared to controls. In our study, 59% of the cases were having low vitamin D (including both vitamin D insufficient and vitamin D deficient) as compared to only 52% in controls and this difference was significant (p = 0.034).
There was no significant correlation between vitamin D levels and glycemic control, duration of disease and history of past episodes of hospitalizations and infections in cases.
Conclusions: Children and adolescents with Type 1 Diabetes had significantly poorer vitamin D status compared to controls. Vitamin D deficiency/sufficiency/insufficiency had no correlation with the disease course in terms improved glycemic control, frequency of infections or DKA.

P-289 | Parental distress and quality of life of Indian adolescents with type 1 diabetes

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Introduction: Management of Type 1 Diabetes in children and adolescents can be very stressful for the patients and their families, and this may adversely affect their diabetes management.
Objectives: Management of Type 1 Diabetes in children and adolescents can be very stressful for the patients and their families. We studied the Quality of Life (QOL) of Indian adolescents with Type 1 Diabetes, Parental distress and the factors affecting it.
Methods: 95 parent-children dyad (10-19years) with T1D, who were taking regular Insulin therapy for ≥1year duration completed questionnaire battery that included Hindi and English version of PedsQL Diabetes Module Version 3.0 Child and Parent Report (10-12 years age)/PedsQL Diabetes Module Version 3.0 Teen and Parent Report (13-19 years age) and Problem Areas in Diabetes Survey-Parent Revised version (PAID-PR) survey.
Results: The mean PAID-PR Score was 67.90 ± 16.18 (range:38.75 - 98.5), suggesting that Distress was present in all parents. The mean (SD) of PedsQL Child Score was 59.11 (12.10) and ranged from 24.46 - 79.47. The mean (SD) of PedsQL Parents Score was 55.29 (11.66) and ranged from 22.3 - 83.92. A lesser PedsQL score in both suggesting more problem and poorer QOL.
Age, gender, BMI and other socioeconomic and clinical parameters did not affect the overall quality of life scores (p>0.05). Parental Distress was significantly associated with poor QOL of children as per the PedsQL Parents Score (r = -0.27, p = 0.006) but not with PedsQL Child Score (r = -0.17, p = 0.089). Father's highest educational qualification was not related to the quality of life in children.
However, there was a significant correlation between PedsQL Child Score and highest maternal educational qualification. Mean PedsQL Child Score was highest in children with postgraduate mothers suggesting a better QOL.
Conclusions: Indian parents and their adolescents with T1D have significant distress and poor health related quality of life.

P-309 | SWEET registry : experience of a centre from a low income country

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Introduction: Challenges of diabetes care are numerous especially in low income countries. Data are of a great help in decision making regarding diabetes care. Different registries are proposed to help centres to have a holistic look of their activity. SWEET diabetes registry of ISPAD is most used. The mother and child center of the Chantal Biya Foundation have been included in the latter since a couple of year.
Objectives: The present aim to evaluate effect of being in an international registry
Methods: This is a pre/post observational study of effects of being in SWEET registry. We evaluate institutional, patient care organization, health staff satisfaction, patients/parents satisfaction, health/metabolic impact. Benefits and difficulties are also evaluated
Results: At the institutional level, the entry in SWEET registry leads to modification of the status of the diabetes unit with posting of one non-permanent to permanent staff totally dedicated to diabetes care, attribution of a new space for patient education.
Concerning patients care organization, diabetes consultation was separated to general endocrine consultation, with planification of consultations.

At the level of patient, from data, team were able to identify those without control of basic lab exam, catch up of those loosed of follow up. Health staff and patients has a positive impression on the new unit functioning. Difficulties experienced are related to data entry in DPV software, entry of data in multiple computers, inadequation between high income standards of care and local availabilities

Conclusions: Entry in SWEET registry has a positive impact in the functioning of the diabetes unit of the mother and child centre however, difficulties remains, related to appropriate use of the DPV software. Training of health staff and adaptation to local possibilities are recommended

P-340 | Efffect of gestational diabetes mellitus on neonatal outcomes: prospective observational study

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Introduction: Gestational diabetes mellitus (GDM) represents one of the most common complications during pregnancy, being associated with numerous maternal and neonatal complications.

Objectives: To compare clinical and metabolic derangements in newborns of GDM mothers with non-GDM Mothers.

Methods: Observational prospective study from Nov-2020 - April-2022 in a tertiary care centre in New Delhi with 100 newborns of GDM mothers as cases and 100 newborns of non-GDM mothers as controls. GDM was diagnosed based on IADPSG criteria. Neonatal clinical characterstics including gestational age, birth weight, need of resuscitation, asphyxia, respiratory distress and metabolic complications were compared between the cases and controls.

Results: Mean age of GDM mothers were 26.84 years, with mean HBA1c = 5.36 (±0.61), 79% belonged to upper-middle and 21% to lower-middle class. 54% were diagnosed with GDM in 2nd trimester and managed with medical nutrition therapy (MNT-82%), metformin (15%), and insulin (3%). Hypothyroidism was more common with GDM mothers (31% vs 12%, χ2=10.695, **p=0.002**) comapared to non GDM mothers.

There was no significant difference in the birth weight (2.89 kg vs 2.80kg, p=0.269) need for resuscitation (13% vs 7%) asphyxia (6% vs 5%) and respiratory distress (14%vs9%) in both goups.

Significant number of newborns of GDM mothers vs newborn of non GDM mothers were associated with complications like polycythaemia (27% vs 4%, χ2=20.195**, p=.000**), hypoglycaemia (7% vs 1%, χ2=4.688, **p=.030**) and Large for gestational age (LGA 11% vs 4%,χ2=6.224, **p=.045**).

Newborns of GDM mothers also had longer duration of hospital stay (60% vs 43%, χ2 =5.785, **p=0.016**) with common indications like hypoglycaemia (7%), hypocalcaemia (8%), respiratory distress (14%), and Neonatal hyperbilirubinemia (NNH=30%).

Conclusions: GDM is associated with LGA, NNH, polycythemia, hypoglycemia, hypocalcemia, and increased duration of hospital stays in newborns. Mean hours of life for hypoglycemia to develop was 10.75±6.59 hrs, so one should be more watchful during this period.

P-348 | Scaling DigiBete: UK's first community led, clinically approved diabetes self-management platform in Pakistan with Meethi Zindagi

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Introduction: DigiBete, a not-for-profit (NPO), community led, clinically approved diabetes education platform supports 75% of Children, Young People and families (CYPF) 0-25, with 220 Diabetes Centers in the UK. Following the success of this model, DigiBete UK has collaborated with Meethi Zindagi, also a community led NPO organisation, to scale their service to support CYPF in Pakistan. This project has been funded by The World Diabetes Federation (WDF).

Objectives: To co-design and develop a new culturally tailored digital diabetes educational resource and platform for CYPF across Pakistan using DigiBete's digital model and proven resources to support families managing diabetes at home and extend clinically approved support 24/7.

Methods: Following DigiBete's model, Meethi Zindagi initiated the co design process by engaging adult and paediatric endocrinologists, as well as

T1D community to co create the new platform. The co design team comprised 29 members, including 15 HCPs - doctors, nutritionists and diabetes educators. Among the HCPs, 3 of them also live with type 1 diabetes (T1D), alongside 17 young people and community members living with T1D.

Results: A new community led, clinically approved, culturally tailored digital diabetes education resource for Pakistan has been developed. Customised and adapted according to the local needs, the platform houses 30 localised resources to support CYPF to self-manage T1D.

Conclusions: This model ensures that the community will benefit from uniformed, clinically approved standardised educational resources, reducing misinformation and improving type 1 diabetes management practices. It will also reduce the burden on HCPs and will facilitate them in providing more individualised care. The new community-centred educational resources will be widely adopted in hospitals, at home, and in community settings following user testing.

P-386 | Tracing lost children with type 1 diabetes (T1D) through engagement with administrators, CSOs, and community resources: a field experience from Myanmar

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Introduction: Type 1 Diabetes (T1D) presents challenges in resource-limited settings as in Myanmar necessitating effective tracing and engagement of children with T1D who had lost follow up during COVID era and political crisis periods. "Changing Diabetes in Children" (CDIC) program in Myanmar made a platform to engage community administrators, charity organizations, CSOs, and the Rural Health Centers for tracing and engaging such T1D children.

Objectives: 1. Examine the application of community-based approaches for tracing and engaging T1D patients in Myanmar.

2. Identify lessons and insights from the experiences of implementing community-based approaches in Myanmar.

Methods: Introducing the CDIC program, conducting the educational sessions about symptoms, complications and the need for timely intervention on T1D to highlight the importance of early detection and management in children, distributing the pamphlets and posters on T1D and engaging the face-to-face discussions to address any queries and reinforce key messages related to T1D.

Results: Among the 346 children who had been CDIC registered, 86 were lost-to-follow-up and 44 T1D children have been successfully contacted and reconnected with the CDIC clinics after 9 to 13 months of operations. There were difficulties to trace due to their migration during the crisis in Myanmar and T1D patients had to rely on the knowledge acquired from educational activities provided at their initial hospital admissions and consultations.

Conclusions: The application of community-based approaches by leveraging community networks and optimizing available resources, have successfully reconnected lost T1D children with healthcare services but also provided valuable insights into their challenges in crisis situations.

These findings highlight the importance of continuous comprehensive education, intervention and support programs in resource-limited settings, offer insights into strategies to enhance their care and well-being, and emphasize the need for ongoing assistance and intervention.

P-391 | Comparative efficacy of a two daily mixed insulin injection versus a multiple daily injection with human insulin in a limited resources setting: partial results from a multicenter open randomized crossover clinical trial

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Introduction: The goal of type 1 diabetes (T1D) management is to re-create blood glucose levels as close to the non-diabetic range as possible. Many patients

in developing countries do not reach the set glycemic targets. There is still no rigorous literature comparing the efficacy of premixed human insulin used in these countries in comparison to multiple daily injection regimen.

Objectives: To compare glycemic control and variability between children and adolescents with T1D treated by a two daily injection of 70/30 insulin formulation to those who have a multi daily injection of NPH+R in a resource limited setting.

Methods: Twenty young patients aged 5–18 years with T1D with at least 1 year history of diabetes and followed in 4 hospitals in Burkina Faso were included in the study on 20th May 2023.

They were randomized to two treatment groups, with one group on the 70/30 insulin formulation (group 70 [G70]) and the other group to multi-daily injection of NPH+R (group NR [GNR]).

At the end of the initial 16-week treatment, all patients will be crossed over to the alternate treatment arm for an additional 16 week.

The participants complete continuous glucose monitoring (CGM) with the Abott FreeStyle Libre system.

Insulin doses are being adjusted weekly by the clinical site according to a prespecified insulin intensification algorithm to achieve target fasting [<110 mg/dl (6.1 mmol/l)], bedtime [<130 mg/dl (7.2 mmol/l)], and premeal [<110 mg/dl (6.1 mmol/l)] glucose levels until HbA1c is below 7.0%.

Outcomes will be analyzed based on the time in range during CGM and glycosylated hemoglobin concentration.

Results: Mean age of patients was 14.5±3.9 years (14.9±3.5 in G70 and 14±4.5 in GNR). First month mean delta HbA1c was -1.9±1.9 % in G70 and -1.5±1.6% in GNR. First month mean time in range was 51.7±14.4% (time below range (TBR) 7.33 ±6.9%) in G70 and 47.8 ± 10.4% (TBR 7.33±3.3%) in GNR, p=0.67.

Conclusions: The continuation of this clinical trial next months will allow a better assessment of these preliminary findings.

DIABETES-ASSOCIATED DISEASES

P-103 | Evaluation of serum fetuin A, its relation to insulin resistance in children and adolescents with type 1 diabetes

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Introduction: It has been reported that high fetuin-A levels are associated with insulin Resistance (IR) and cardiometabolic risk factors in obese children and adolescents.

Objectives: To determine the serum level of fetuin A and its relation to IR in children and adolescents with Type 1 diabetes (T1D).

Methods: This cross-sectional study included 65 (n = 65) children diagnosed with T1D who were following up at Diabetes, Endocrine, and Metabolism Pediatric unit (DEMPU) at Cairo University Children's Hospital from November 2020 to January 2021. Demographic, clinical

data, investigations, and management details were collected from patients' medical records in addition to evaluation of serum level of fetuin-A using Human Fetuin A, FETU-A ELISA Kit.

Data management and statistical analysis were performed using Statistical Package for Social Sciences (SPSS) version 24.

Results: Mean age of the study population was 12.6±2 years. About 53.8% of participants had high serum fetuin-A, with a mean value of 671.4±290.8ug/ml. Sixty-one (93.8%) of participants had dyslipidemia.

The mean estimated glucose disposal rate (eGDR) was 6.9±2.1.

Multivariate linear regression to adjust for possible confounders in correlation between serum fetuin-A and eGDR, wasn't significant as P value=0.354.

There was no statistically significant difference between patients with normal and high serum fetuin-A regarding clinical and laboratory data.

There was statistically significant positive correlation between serum fetuin-A, insulin requirements and LDL with P values = 0.035, 0.026 respectively.

Conclusions: Fetuin-A has an association with LDL-cholesterol which surrogates its role in determination of dyslipidemia which is one of the important criteria of metabolic syndrome in patients with T1D.

Although no significant correlation between Fetuin-A and IR measured by eGDR, there was significant association between Fetuin-A level and insulin requirements in children with T1D.

P-106 | The impact of celiac disease in children with type 1 diabetes -on HbA1c, DKA and BMI

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Introduction: The risk of celiac disease (CD) is substantially elevated in children with type 1 diabetes (T1D). CD has been linked to impaired metabolic control, but results have been inconsistent, and no study has examined whether the timing of CD in relation to T1D diagnosis is important.
Objectives: To examine possible effects of CD, and timing of CD diagnosis, on metabolic control in children with T1D.
Methods: All children, age 0-18 years, diagnosed with T1D between 2005 and 2010 and enrolled in the Better Diabetes Diagnosis study (~90% of all Swedish children diagnosed with T1D during this period) were included.
Participants were screened for CD at T1D diagnosis and annually for five years. Glycemic control (HbA1c), diabetes ketoacidosis (DKA) and growth (BMI-SDS) were assessed at T1D diagnosis, and HbA1c and BMI-SDS annually at follow up.
Results: A total of 3612 children were included. At T1D diagnosis, 61 children had known CD (1.7%), 145 children received a CD diagnosis at T1D diagnosis (4.0%), 187 children developed CD 1-5 years after T1D diagnosis (5.2%) and 3219 children were not diagnosed with CD (89.1%). CD status was not significantly associated with HbA1c, DKA or BMI-SDS at T1D diagnosis. In contrast, children with undiagnosed CD at T1D diagnosis, had a lower BMI-SDS (*M*[*SD*] 0.15 [0.89] to 0.21 [1.09]) than children without a CD diagnosis (*M*[*SD*] 0.34 [0.94] to 0.40 [0.99]); p<.05), at all follow up assessments. Children diagnosed with CD before T1D diagnosis had a significantly lower BMI-SDS the two first years of follow up (*M*[*SD*] 0.10 [0.92] to 0.16 [0.95]; p<.05).
Conclusions: Children with known or unidentified CD at their T1D diagnosis appear to have a lower BMI-SDS the first years after T1D diagnosis.
These children may require additional nutritional guidance.
The presence and timing of a CD diagnosis does not appear to affect glycemic control significantly in children with T1D, not at T1D diagnosis nor over a 5-year period.

P-107 | Autoimmune thyroid disease in children and adolescents with type 1 diabetes

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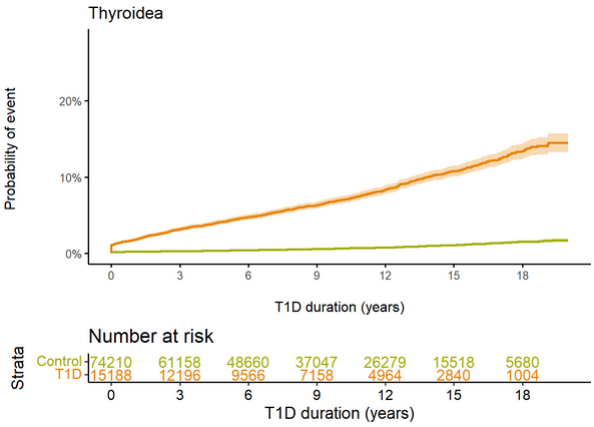
Introduction: There is a known co-morbidity regarding type 1 diabetes (T1D) and other autoimmune diseases (AIDs). This can, at least in part, be explained by a genetic susceptibility to development of these diseases. Autoimmune thyroid disease (ATD) is the most common AID in T1D patients, with a prevalence in children and adolescents of 3-8%.
Objectives: To study the development of ATD in subjects with T1D diagnosed <18 years of age in Sweden and to investigate if ATD affects metabolic control.
Methods: All subjects in the nationwide pediatric part of the Swedish National Diabetes Register, diagnosed and registered from year 2000 to 2019 (n=15,188), with five controls matched according to age, sex, and county of residence (n=74,210) were included in the study. This population was linked with the Swedish National Patient Register in order to acquire ICD codes.
The risk of being diagnosed with ATD was estimated with the Kaplan-Meier method. Smoothed conditional means were used to model the association between diabetes duration and HbA1c.

Results: The prevalence of ATD in T1D patients was 7.1% within 19 years of follow up, with a hazard ratio of 10.61 (9.56-11.79). ATD was more common in females (10.6%) compared to males (4.2%). The excess risk started already from diabetes onset. No difference in HbA1c could be seen when comparing patients with and without ATD.



Conclusions: ATD is more common in older populations, but even in this young population it was diagnosed frequently, strengthening the need to screen every or every second year for the disease, according to ISPAD guidelines.

P-224 | Celiac and autoimmune thyroid disease in patients with anti-GAD positive type 1 diabetes mellitus

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Introduction: Type I diabetes mellitus and autoimmune thyroid disease can occur concomitantly. Patients with Type I diabetes mellitus have high risk of other autoimmune conditions like thyroid disease and celiac disease. It can be part of other endocrinopathy syndromes as well.[1]

Patients with long standing Type I diabetes mellitus have 27-44 % chance of positive antithyroid antibodies and 23-25% chance of developing hypothyroidism .[1]

Anti Gad antibody is most common positive antibody found in >70% of children diagnosed with type I diabetes mellitus although its titre is highest in 1 year of diagnosis and decline after that due to decrease in residual beta cells .[1]

Objectives: To determine the association of anti-thyroid antibodies, thyroid disorders and celiac disease with type-1 diabetes mellitus (T1DM).

Methods: **Cross sectional study at NICH.** A total of 115 children of both gender and aged between 1 to 18 years having known T1DM were analyzed. Children with chronic kidney disease or chronic liver disease were excluded.

Those children were also not included whose parents/caregivers did not wish their children to be part of this research. Blood sample of each child was taken in sterilized container and sent to institutional laboratory for biochemical investigations.

Results: In a total of 115 patients, 67 (58.3%) were female and 48 (41.7%) male. The mean age was 8.87±3.43 (ranging between 1.5 to 17 years). The mean HbA1c was 11.86±7.31%. It was found that anti-GAD IgG was having signification association with celiac disease (p=0.012).

Significant association of Ttg-IgA antibodies with anti-GAD antibodies (spearman's correlation coefficient=0.314, p=0.003). Celiac disease was found to have significant association with TPO antibodies (p=0.001). Thyroid peroxidase antibodies were found to have significant relationship with Anti-GAD antibodies (p=0.012) and celiac disease (p=0.001).

Conclusions: High proportions of children with type-1 diabetes mellitus were found to have thyroid disorder and celiac disease.

P-225 | Thiamine responsive megaloblastic anemia with hypothroidism, a puzzling association, a case report from LMIC

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Introduction: Thiamine responsive megaloblastic anemia (TRMA) is a rare autosomal recessive condition caused by mutations in SLC19A2 gene and is classically characterized by the triad of diabetes mellitus, sensorineural hearing loss and megaloblastic anemia.

It usually presents between infancy and adolescence but the cardinal findings are often not present initially. The anemia, and sometimes the diabetes improves with high doses of thiamine.

Apart from the classical characteristics, less common presentations include optic atrophy, congenital heart defects, short stature and stroke.

Objectives: To confirm Monogenic form of diabetes in a child presenting with early onset diabetes

Methods: After taking parental consent and keeping all confidential , Case report was written.

Results: We present the case of a 5-year-old child with known case of IDDM since 1-year of age presented to us at the age of 14 months with complain of polyuria, fever and vomiting. His HBA1c turned out to be 10.64 confirming his diabetes.

On doing further examination, we learned that the patient has diminished hearing and vision. Thyroid profile showed hypothyroidism. For diminished hearing and vision we send the patient for BERA and retinal examination which showed bilateral sensorineural hearing loss and maculopathy.

Keeping TRMA in view we looked at the patient's complete blood count which revealed megaloblastic anemia. Genetic profile showing homozygous mutation in SLC19A2 gene confirming Thiamine responsive megaloblastic anemia (TRMA).

Conclusions: Thiamine responsive megaloblastic anemia (TRMA) is a rare condition which is confirmed by genetic mutation in our patient. The pediatricians should be vigilant with patients having diabetes to look for other features leading towards disease.

Timely diagnosis along with genetic confirmation will help in treating the patient early as exogenous thiamine have a good response in these patients. Genetic counseling should also be done so that the families get aware of this disease and it's inheritance patterns.

P-242 | Clinical features of patients with high measurable antibody levels on serological tests for celiac disease found in the course of paediatric endocrinology workups in a private sector Singapore setting

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Introduction: The clinical characteristics of patients positive for serological tests of celiac disease in Asians may differ from those in Caucasians and have not been well studied in a Singaporean setting.

Objectives: This case series shows that patients with positive antibody levels on tests for celiac disease who presented for primarily endocrine problems in a multi-racial clinic in Singapore have a different clinical, serological and HLA profile from those previously described in Western literature

Methods: In a series of patients who were seen in a private sector paediatric endocrine clinic in Singapore for problems of growth failure, short stature , pubertal development , diabetes and thyroid disease, a panel of 4 serological tests for celiac disease [tissue transglutaminase (tTg)-IgA, tissue transglutaminase (tTg)-IgG, deamidated gliadin (DGP)-IgA, deamidated gliadin (DGP)-IgG], and a sequence based HLA DQb1 typing were performed as part of routine clinical care if the patient also presented with features suggestive of celiac disease or gluten intolerance.

Results: A group of 220 patients aged below 21 years at first presentation between Jul 2008-Jul 2021 had a serological level above the manufacturer's upper limit of normal for one or more of these 4 tests (tTg-IgA, tTg-igG, DGP-IgA and DGP-IgG).

Of these 220 patients (121 male: 99 female), age range 0.44-2.21 (mean 10.26) years, there were 170 (77.3%) non-Caucasians, while 50 (22.7%) were of Caucasian ethnicity.

Of the non-Caucasians, 99/170 (58.2%) were of Chinese ethnicity, 56/170 (35%) were Non Chinese Asian (12 Malay, 18 South Asian, 26 other Asian), 13/170 (7.6%) were mixed Caucasian- Asian and 2 Middle Eastern.

Of all 220 patients, 149 (67.7%) were positive for one test, 71 (32.3%) were positive for multiple tests, 42 (19.1%) positive for 2 tests, 23 (10.5%) for 3 tests, and 6 (2.7%) were positive for 4 tests.

Group	All with at least 1 of 4 tests positive	TTg IgA Positive	TTg IgG Positive	DGP IgA Positive	DGP IgG Positive
Whole cohort	220 (100%)	58 (26.4%)	122 (55.5%)	121 (55.5%)	26 (11.8%)
Non-Caucasians	170/220 (77.3%)	42/170 (24.7%)	95/170 (55.8%)	90/170 (52.9%)	17/170 (10%)
Caucasians	50/220 (22.7%)	16/50 (32%)	27/50 (54%)	30/50 (60%)	9/50 (18%)
Ethnic Chinese	99/220 (45%)	28/99 (28.3%)	55/99 (55.5%)	60/99 (60.6%)	8/99 (8.1%)
DQ2 & or DQ8 Present (% of whole cohort)	125/220 (56.8%)	36/58 (62%)	63 /122 (51.6%)	75/120 (62%)	14/26 (51.8%)
DQ2 & or DQ8 Present (% of Caucasians)	40/50 (80%)	15/16 (94%)	20/27 (74%)	27/30 (90%)	8 /9 (89%)
DQ2 & or DQ8 present (% of Non Caucasians)	86/170 (50.6%)	21/42 (50%)	43/95 (45.3%)	48/90 (53.3%)	6/17 (35.3%)
DQ2 & or DQ8 Present (% of Ethnic Chinese)	51/99 (51.5%)	14/28 (50%)	22/55 (40%)	34/60 (56.7%)	5/8 (62.5%)

Conclusions: Paediatric endocrine patients with positive serological tests for celiac disease in a multi ethnic Singapore clinic were more likely to be positive to TTg-IgG (56%) and DGP-IgA (56%) than TTg-IgA (26%) or DGP-IgG (12%). Positivity patterns were similar across different ethnic groups.

Positivity to more than one antibody was seen in 32%, positivity to 2 tests in 19% and to 3 or more tests in 13%. Screening for celiac disease using TTg-IgA alone is inadequate in this population. However, HLA DQ2 and DQ8 are seen in only 50.6% of non-Caucasians vs 80% of Caucasian patients.

P-253 | Sinoatrial block in a 7-year-old boy with recurrent hypoglycemia

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Introduction: Hypoglycemia triggers activation of the sympatho-adrenal system and an increase in myocardial workload and oxygen demand. The altered balance between energy supply and demand can lead to proinflammatory and hematological changes that result in myocardial ischemia.

Objectives: A 7-year-old boy with type 1 diabetes mellitus presented with three days of chest pain with episodes of intensification and pallor during physical activity. He had been diagnosed with diabetes when 5.5 years of age and had no comorbidities.

The patient was on MDI treatment with regular insulin corrections at night (at mother's discretion) and was found to have frequent, mild hypoglycaemia during the previous week (2-4 per night). The glucose variability was 63% and the time in hypoglycemia 8%.

Methods: Physical examination revealed cardiac arrhythmia with heart rate 60-64/min, confirmed by ECG: sinus arrhythmia with II gr. sinoatrial (SA) block and right bundle branch block. The biochemical tests showed significantly elevated creatine kinase (3097 U/L) with increased creatine kinase-MB fraction.

The echocardiography exam was normal. A wide panel of virological and microbiological tests was performed, without any evidence of concomitant infection.

Results: During the 4-day hospital stay the insulin doses were adapted and the blood glucose stabilized in the range of 4-11 mmol/l. From the third day the patient no longer experienced pain and pallor, the heart rate normalized and SA block resolved on the ECG. Creatine kinase and CK-MB fraction gradually decreased into the reference range in the next 3 months.

Conclusions: We suspect that prolonged, recurrent hypoglycemia was the cause of silent myocardial damage and transient SA block.

Hypoglycaemia-induced ECG changes have been described in the past and this case supports the concept that children with type 1 diabetes, experiencing hypoglycemia, are at increased risk of silent ischemia and consequent arrhythmias.

P-316 | Correlation of glycemic control with IGF- 1 level among Pakistani children and adolescents with type 1 diabetes mellitus

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Introduction: Growth Hormone is implicated in the counter-regulatory response to hypoglycemia. Studies reported that insulin-like growth factors-1 (IGF1) concentration is influenced by glycemic control.
However, the putative effects of diabetes and metabolic control on circulating levels of IGF-1 remain controversial.
Objectives: To determine the correlation of insulin-like growth factor 1 with HbA1c at pre-pubertal and pubertal stages in type 1 diabetes mellitus.
Methods: This cross sectional study was conducted at National Institute of Child Health, Karachi, Pakistan. All children of Pre and pubertal stages having ages of 2-18 years with either gender presented with type 1 diabetes mellitus and duration of diabetes not more than 6 months were included.
A blood sample was collected from patient after 8 hours fasting and was sent to the NICH laboratory for assessment of IGF-1 and HbA1c. SPSS version 21 was used for data analysis. Pearson's correlation was applied to see the relation between IGF-1 and HbA1c.
Results: Mean age of the patients was 10.86 ±3.69 years. Male frequency was found to be higher 86 (53.4%) than females 75 (46.6%).
Weak negative correlation (r=-0.223, p-value 0.014) was found in between IGF-1 level and HbA1c.
At pre-pubertal stage, correlation was moderate negative (r=-0.313, p-value 0.007) while at pubertal stage, correlation was weak negative (r=-0.051, p-value 0.767).
Conclusions: The correlation of IGF-1 with HbA1C was found moderate negative at pre-pubertal while weak negative at pubertal stages in type 1 diabetes mellitus.

P-324 | Seizure and behavior trouble in a diabetic patient: think hashimoto's encephalopathy

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Introduction: Hashimoto's encephalopathy (HE) is an autoimmune encephalopathy associated with elevated antithyroid antibodies.
Objectives: We want to draw attention to this pathology.
Methods: We report the case of a young diabetic girl with seizure and behaviour trouble.
Results: A 12 year-old-girl with a history of type 1 diabetes mellitus, one hypoglycemic seizure episode and depression, presented a short, generalized *seizure episode*. Glycaemia, head CT scan, lumbar punction, cultures and toxic screening were normal.
The electroencephalography (EEG) showed symmetric slow waves. She was discharged with a diagnosis of viral encephalitis. Two weeks later, she presented again a short, generalized seizure episode.
For the last month, parents had noticed aggressivity. An anti-epileptic treatment was started. The TSH and FT4 were normal but anti-thyroid peroxide antibodies were as high as >1000 UI/mL (normal range <35UI/mL). Autoantibody testing (including NMDA receptor panel and GAD65) was negative. Brain RMI were normal. There was no sign of ovarian teratoma.
The first EEG showed the persistence of symmetric slow waves. High dose intravenous methylprednisolone was given, followed by oral prednisolone tapered over one month. The neurological exam showed bradypsychia that decrease during hospitalization. She didn't develop other seizure and the behavior normalized. The anti-epileptic treatment was stopped. The discharge EEG was normalized, and anti-thyroid peroxide antibodies decreased at 178UI/mL.
After 3 months, she developed again behavior trouble with psychomotor retardation associated with an increase of anti-thyroid peroxide antibodies to 924 UI/mL. Oral prednisolone was given for 6 weeks, and mycophenolate was initiated as a steroid sparing treatment because of unstable diabetes.
Conclusions: HE is a rare but severe desease. The diagnosis is often overlooked at presentation. It's important to be investigated particularly among patient with other autoimmune disorder because of steroid-responsiveness.

P-325 | Vitamin D status in people with type 1 diabetes in a rural support group in Western India

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Introduction: Given the association between vitamin D and T1DM and the possible role that vitamin D deficiency [VDD] might play in its pathogenesis, many observational studies have assessed the 25-hydroxyvitamin D (25-OH D) level in T1DM patients and found a significant higher prevalence of 25-OH D deficiency in T1DM patients.

Objectives: Our study aims to assess the Vitamin D status in people with Type1 diabetes enrolled in UDAAN, a Type1 diabetes support group in Aurangabad. We also analyzed the relation between Vit D levels and sociodemographic factors, gender, age, and glycemic control.

Methods: 359 children of Type 1 diabetes were assessed during the routine screening in the clinic. The demographic and clinical data was collected through the records and a questionnaire.

Chi-square test or Fischer's exact test was used for qualitative data. ANOVA was applied for quantitative variables.

Results: Analysis showed 15.9% had Vitamin D deficiency [VDD], 27.3% had vitD Insufficiency and 56.8% had vitD Sufficiency. 19.4% of the subjects living in urban area while 11.9% in rural area had VDD. This was [P = 0.008]. 29.4% of the subjects from upper class had VDD, 15.4% from middle class had VDD. 14.5% from lower class had VDD. (P=0.005)

A statistically significant difference found between Vitamin D levels and age[P<0.001] and age of onset of Type1diabetes[P=0.014].

There was no statistically significant difference found between Vitamin D levels and BMI, HbA1c, Insulin dose and gender and presence of Hypothyroidism.

Conclusions: The present study revealed a high prevalence of VDD and VitD insufficiency in people with Type1Diabetes. A significant correlation to socioeconomic status, urbanization, age and age of onset of diabetes was observed.

P-334 | Simultaneous presentation of Graves' disease and type 1 diabetes

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Introduction: The association between type 1 diabetes and autoimmune thyroid disease is well documented in the literature. Both can coexist although one endocrinopathy usually precedes the other.

The simultaneous new onset of both diseases is rarely seen. Hyperthyroidism is less common than hypothyroidism in association with type 1 diabetes. Graves' disease, the commonest cause of hyperthyroidism in juvenile age group, is very rare in children younger than 4 years old.

Objectives: To describe simultaneous presentation of Type 1 diabetes (T1D) & Graves' disease (GD) in two pre-school children .

Methods: We describe two cases of children aged 3 years who were diagnosed with type 1 diabetes and Graves' disease at the same time.

Results: Both children presented with a history of complaints of increased thirst, urination, weight loss for two weeks. Both were underweight at presentation and were not in diabetic ketoacidosis. Neither of them had a positive family history of autoimmunity.

Age (years) / Sex	3/F	3/M
Pulse rate (N,70-115/min)	140	130
Blood Pressure(mm Hg)	106/60 (50^{th}-90^{th} centile)	90/60 (50^{th}-90^{th} centile)
Goiter	Absent	Present (Grade 1)
HbA1C (N, <5.7%)	11.7	11.3
Antibodies (IAA,IA2,GAD65,Zn8)	GAD 65 Positive (280IU/ml)	All negative
TSH (N, 0.67-4.16 µIU/ml)	0.003	0.002
Free T4 (N,0.86-1.40 ng/dl)	6.05	2.49
TSH Receptor antibody (N, <1.5IU/l)	16.74	9.82
Technetium scan	Mildly enlarged thyroid gland,	Mildly enlarged thyroid gland
(Normal uptake- 0.5-3.5%)	Increased uptake -5.6%	Increased uptake-4.4%

Table 1: Clinical profile of the children at a glance.

Conclusions: Both the cases had a relatively shorter duration of symptoms before being diagnosed with type 1 diabetes and were not in diabetic keto-acidosis at diagnosis indicating that co-occurrence of Grave's Disease possibly led to an earlier diagnosis of type 1 diabetes. Graves' disease is rare in children under the age of 4 years.
However, both our patients were 3 years old at the time of presentation of Graves' disease suggesting that Graves' disease manifests at a younger age in children with type 1 diabetes. Larger studies are needed to validate these observations.

P-363 | Reduced heart rate variability is associated with arterial stiffness in young adults with type 1 diabetes: the AdDIT follow-up study

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Introduction: Reduced heart rate variability (HRV) and increased arterial stiffness (AS) have previously been identified in adolescents with Type 1 diabetes (T1D).
Objectives: We aimed to test whether these early markers of cardiovascular risk persist into young adulthood and whether these phenotypes are associated.
Methods: HRV and AS were measured in a total of 428 young adults: 172 with T1D, participating in the AdDIT Follow-Up Study (mean±SD age 23±2yrs; diabetes duration 15±3yrs) and 256 without, from the ALSPAC study (mean age 21±1yrs). HRV was assessed using standard deviation of normal NN intervals (SDNN) and root mean square of successive differences between heartbeats (RMSSD), and arterial stiffness using carotid-femoral pulse wave velocity (PWV).
Multiple linear regressions including cohort interaction terms and adjusted for age, sex, BMI, and HR were used to assess whether T1D modified associations between exposures and outcomes.
Results: Young adults with T1D had lower HRV (RMSSD 56±37ms vs 67±44ms and SDNN 65±31ms vs 73±32ms) and higher PWV (6.1±1.0m/s vs 5.4±0.7m/s) than young adults without (all p<0.01). T1D modified the relationship between HRV and PWV (interaction terms p=0.005 (RMSSD) and p=0.043 (SDNN)), with PWV inversely associated with HRV in T1D alone. (Figure 1).
This relationship remained broadly unchanged following further adjustment for Hba1C (β=-0.36 [-0.64, -0.07] p=0.015).

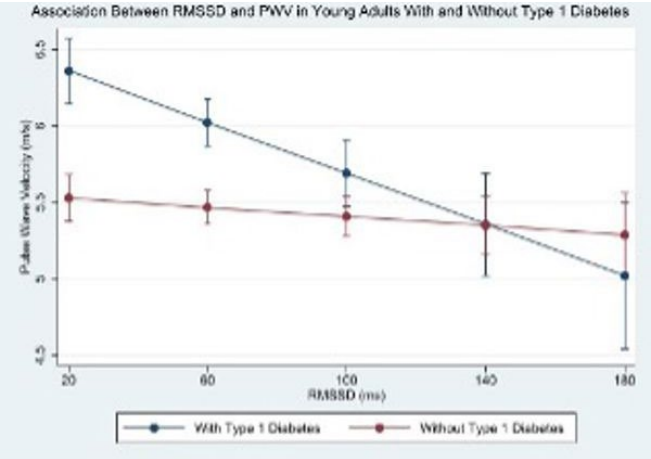

Figure 1.

Conclusions: Early onset autonomic dysfunction persists into young adulthood in T1D and is associated with increased arterial stiffness.

P-367 | Unveiling the potential impact of CFTR modulators in cystic fibrosis-related diabetes

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Introduction: Cystic fibrosis transmembrane conductance regulator (CFTR) modulators have revolutionized the treatment of Cystic Fibrosis (CF) by restoring CFTR protein function, thereby improving respiratory symptoms and quality of life.
However, their effects on CF-related diabetes (CFRD) remain uncertain.
Objectives: To determine the impact of new CFTR modulators on glucose tolerance and their metabolic outcomes in CF pediatric patients.
Methods: A retrospective, single-center, case study was conducted on 8 adolescents diagnosed CF, who underwent oral glucose tolerance tests (OGTT) before and after initiating elexacaftor-tezacaftor-ivacaftor (ETI) or lumacaftor-ivacaftor (LI) therapy.
Clinical data was collected from medical records, and descriptive statistical analysis was performed.
Results: Of the 8 patients (median age: 16.5 years; 7 females), 7 had the DF508 mutation, with 4 in homozygothy. Prior to initiating modulator therapy, an OGTT was performed (mean 7.1 ± 4.9 months; 2-15 months), revealing one case of Abnormal Glucose Tolerance (AGT) but no CFRD diagnoses. None of the patients used Continuous Glucose Monitors.
Half of the patients started ETI therapy, while the other half initiated LI therapy. A follow-up OGTT was conducted (mean 6.6 ± 4.4 months; 1-13 months).
Among those on ETI, three out of the four individuals showed improvements in Body Mass Index (BMI), HbA1c, and glucose levels during the 120-minute OGTT, resulting in the resolution of AGT in one patient.
In contrast, three out of four patients that started LI therapy, three exhibited a decline in OGTT categories, with one patient diagnosed with AGT and another with CFRD. Besides, two showed worsening HbA1c and BMI values.

		OGTT before modulators			OOGT after modulators				BMI			HbA1c		
		Months before starting modulators	Fasting glycemia (mg/dL)	Glycemia at 120 minutes (mg/dL)	Months after starting modulators	Fasting glycemia (mg/dL)	Glycemia at 120 minutes (mg/dL)	Interpretation	Before (Z-score)	After (Z-score)	Interpretation	Before (%)	After (%)	Interpretation
ETI	1	10	89	113	1	125	98	Improvement	-0,41	0,1	Improvement	5,5	5,5	Equal
	2	2	92	82	9	110	74	Improvement	-0,67	1,54	Improvement	5	4,7	Improvement
	3	4	95	110	9	199	92	Resolution of AGT	-0,98	0,06	Improvement	5,6	5	Improvement
	4	15	97	120	9	105	84	Deterioration	0,59	0,41	Deterioration	5,4	4	Improvement
LI	5	3	90	137	13	122	88	Deterioration	-0,51	0,42	Improvement	6	5,9	Improvement
	6	4	116	131	1	138	107	Improvement	-0,26	0,1	Improvement	5,7	5,8	Deterioration
	7	6	117	139	3	130	73	CFRD	-0,73	-1,41	Deterioration	5	5,1	Deterioration

Conclusions: This pilot study suggests that ETI treatment may have positive effects on pancreatic function, potentially delaying or preventing the onset of CFRD. Long term follow up and a larger cohort are required to confirm these findings.

P-371 | Diagnosis and treatment of diabetes mellitus in pediatric patients with pancreatitis followed in a multidisciplinary clinic

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Introduction: Children with recurring acute or chronic pancreatitis are at risk for pancreatitis related diabetes mellitus (DM). Pancreatic endocrine and exocrine concerns are managed by different subspecialists.
Our center has a unique pediatric pancreatitis multidisciplinary clinic (MDC) with pediatric gastroenterology, endocrinology, pain, and nutrition.
We obtain point-of-care (POC) HbA1c during clinic check-in for immediate DM screening.
Objectives: To characterize pediatric patients with pancreatitis and DM followed at our pancreatitis MDC and describe the utility of POC HbA1c testing in our MDC.
Methods: We analyzed a retrospective chart review of pancreatitis MDC patients from 2018-2023 with a diagnosis of pancreatitis and DM (n=27).
Results: Twelve were diagnosed with DM prior to presentation and two presented after total pancreatectomy with islet autotransplantation (TPIAT).
Four patients were diagnosed by POC HbA1c at their first MDC visit, four eventually developed DM, and five later underwent TPIAT resulting in DM. Of the twelve patients with previously diagnosed DM, 42% were Hispanic/Latino, 50% were female.
On presentation to the MDC, patients were 15.4±2.1 years old with BMI 23.2±4.0 kg/m2 and HbA1c 9.6±2.9%.
Four patients developed DM within 1.4±0.6 years of follow up. Of these patients, 100% were Hispanic/Latino, 75% were female. DM was diagnosed

at 14.0±2.2 years old with BMI 33.8±5.0 kg/m2 and HbA1c 9.1±3.4%. Of our 27 patients with DM, four had type 1 DM autoantibodies.
At most recent visit, HbA1c was 8.9±3.2%. DM treatment involved oral agents (15%), insulin (85%) and nutrition counseling for all patients. Total daily dose of insulin was 0.75±0.5 u/kg/day and 48% of patients used continuous glucose monitors.
Conclusions: Instituting POC HbA1c screening in a pancreatitis clinic identifies patients with new onset DM, supporting multidisciplinary care. Despite intensive care, HbA1c for these patients remains above guideline goals. More research is needed in providing DM care for children with pancreatitis.

P-381 | Optimal frequency to screen celiac disease among patients with type 1 diabetic mellitus: a multicenter study

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Introduction: Although celiac disease (CD) is frequent among patients with type 1 diabetes mellitus (T1DM), there is a disagreement on the optimal interval and frequency to perform screening tests for CD among diabetic patients.
Objectives: This study aimed to evaluate the optimal frequency of screen celiac disease among patients with T1DM.
Methods: This retrospective cohort study was conducted in seven referral diabetic centers in different cities of Iran from January 2020 to January 2021. Data belonging to 106 patients who were affected by both T1DM and CD was collected.
The time interval between CD diagnosis and diabetes(IBCD), the age of diabetes onset, and any associated diseases, symptoms, and family history of T1DM and CD were recorded. Data were analyzed by the Mann-Whitney U test and Spearman correlation test vai SPSS-23.
Results: Results show that 45% of the patients with CD were diagnosed during the first year of diabetes onset; furthermore, 18% and 16% of the patients with CD were diagnosed in the second or third year after being diagnosed with diabetes.
In addition, another 18% of patients with CD were diagnosed during the fourth to the eighth year after diabetes onset. Moreover, a negative relationship existed between the age of T1DM diagnosis and IBCD. However, IBCD had no significant association with gender (P=0.78), family history of CD (P=0.72), and family history of diabetes (P=0.25).
Most participants (59.4%) were asymptomatic at CD diagnosis. Abdominal pain was the most common symptom (23.6%), and other symptoms in order of frequency were growth failure (3.8%), flatulence (1.9%), anorexia, and diarrhea (1.9%).
Conclusions: Generally, the existing guidelines recommend screening patients with T1DM for CD at the presentation of T1DM for two to five years.
This can cause overlook a significant number of patients with CD. Patients with T1DM must be screened annually for CD for at least eight years. Patients diagnosed with T1DM at younger ages must be screened longer than those diagnosed at an older age.

P-385 | Cystic fibrosis - related diabetes in pediatrics: insights from a portuguese reference center

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Introduction:
Cystic fibrosis-related diabetes (CFRD), a common comorbidity of cystic fibrosis (CF), affects up to 20% of adolescents. It has a significant impact, including increased respiratory symptoms, impaired growth and nutrition, complications similar to type 1 and type 2 diabetes, and an elevated risk of mortality.
Objectives: To describe and characterize the pediatric population with CF followed at Centro Hospitalar Lisboa Central (CHLC) - CF Reference Center in Portugal, with a specific focus on CFRD screening and diagnosis.
Methods: Retrospective, large single-center study. The objects of this study were the CF patients at CHLC in March 2023. Data was collected from clinical files, and descriptive statistical analysis was conducted.
Results: The cohort comprised 26 pediatric CF patients, accounting for 48% (n=56) of the total CF population. Ages ranged from 2 to 17 years with a median age of 10 years. Most were female (58%), diagnosed at 1.5±3.0 years, with 20 having a positive sweat test. DF508 mutation was present in 69% of the patients, with 56% being homozygous. Most (67%) received CFTR modulator treatment, including 11 on lumacaftor-ivacaftor (LI), 6 on elexacaftor-tezacaftor-ivacaftor (ETI), and 1 on Ivacaftor. Of the 15 patients aged ≥10 years, 14 underwent at least one oral glucose tolerance test (OGTT) at an average age of 12.3 ± 2.2 years. Four patients exhibited abnormal glucose tolerance (AGT), while two were diagnosed with CFRD. Four of these patients used continuous interstitial glucose monitoring (CGM) devices, without requiring pharmacotherapy.
Conclusions: This study highlights that the majority of pediatric CF patients underwent OGTT assessments, as recommended. Nearly half were diagnosed with AGT or CFRD, with a majority utilizing CGM. CGM proves essential in children with CF, enabling early detection of glucose abnormalities and fluctuations, allowing timely intervention before overt diabetes symptoms develop.

P-406 | The relationship between vitamin D status and type 1 diabetes in children and adolescents

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Introduction: The incidence of type 1 diabetes is rising steadily, with a higher prevalence in northern regions, which may be explained by environmental factors, or more specifically by the impact of low sun exposure and hence a defect in cutaneous vitamin D synthesis.
Objectives: This study aims to identify the relationship between 25OHD (25OH-vitamin D) deficiency and type 1 diabetes.
Methods: We enrolled 147 type 1 diabetic patients under 19 years of age, and 147 non-diabetic controls, in a case-control study to compare serum 25OHD levels in the two groups**.** The data collected were analyzed using SPSS 21 software.
Results: In the patient group, the average duration of diabetes was 3.5±3.7years. The mean age of diabetics was 13.6±4.1 years, versus 13.5±3.4 years for controls. Both groups were predominantly male. The average serum 25OHD concentration was higher in the control group at 19.2±6.1ng/ml in versus 15.1±6.4ng/ml in the diabetic group, independently of disease duration. Moreover, 25OHD concentration remained significantly higher in winter or summer in controls than in diabetics patients (19.5±5.9ng/ml Versus 14.6±6.3ng/ml in winter and 19.1±6.5ng/ml Versus 15.5±6.8ng/ml in summer). A significant negative correlation has been demonstrated between Haemoglobin A1c and serum 25 OHD concentration in patients with type 1 diabetes.

Conclusions: The relationship between vitamin D deficiency and type 1 diabetes has been widely documented. This highlights the importance of systematic screening of diabetic patients, and the initiation of appropriate supplementation. At the same time, we are discussing the possibility of establishing recommendations based on supplementation in the early stages of type 1 diabetes as part of prevention.

P-410 | Rare association of diabetes mellitus type 1, polymyositis and coeliac disease in childhood

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Introduction: Type 1 diabetes mellitus (DM) is frequently associated with other autoimmune diseases such as autoimmune thyroiditis, coeliac disease.
Objectives: The association of type 1 DM, coeliac disease and polymyositis is extraordinary rare.
Methods: We present a case of a 7 years old girl with association of type 1 DM, coeliac disease and autoimmune polymyositis. The DM was diagnosed at the age of 2 and coeliac disease at the age of 4. Her DM was sub compensated and she was on gluten free diet.
At admission, she suffering from proximal muscular weakness, and she unable to walk even short distances. Clinical, laboratory examination, hip muscle MRI was done.
In addition, histological examination of a biopsy specimen from the muscle was held. Present physical, laboratory findings confirmed the diagnosis of polymyositis.
Glucocorticoid pulse therapy and intravenous immunoglobulin were started with good response. Insulin dose was increased and the administration scheme was optimized. In our case a female patient developed three autoimmune diseases.
Taken together, it should be noted that a patient can-suffer from autoimmune polyglandularsyndrome.
Results: It is important that for all patients with type 1 DM we have to search the presence of other autoimmune diseases, especially in cases with the onset of adulthood.
Conclusions: Hence, we recommend personalizing approach for each patients with type 1 DM.

LIFESTYLE – NUTRITION AND EXERCISE

P-183 | Accelerometer measured physical activity and sleep in adolescents with type 1 diabetes

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Introduction: Regular physical activity plays an important role in the prevention of cardiovascular disease (CVD) and is particularly important in individuals with type 1 diabetes (T1D) who are at increased risk of CVD.
Objectives: The purpose of this study was to determine levels of moderate-to-vigorous physical activity (MVPA), sedentary behaviour and sleep in adolescents with T1D, and identify their key barriers to physical activity.
Methods: Participants aged 12-18 years with T1D (> 6 months duration) wore an accelerometer on the wrist for 24 hours over 7-days and a continuous glucose monitor (CGM). Data was processed into PA metrics and sleep using a unique machine-learned random forest PA classification algorithm.
Pearson correlations were used to test for associations between MVPA and metabolic measures. Barriers to PA were measured using a validated questionnaire.
Results: Thirty-seven participants (mean age 14.8 years) provided valid accelerometer data. Mean daily MVPA was 44.0 minutes [SD 17.6] with only 16.2% achieving the guideline of 60 minutes per day. Participants had 11 hours [SD 1.2] of sedentary behaviour and 7.6 hours [SD 1.5] of sleep per day.
Mean coefficient of variation (CV) was 39.6% [SD 7.5]. There was no difference in MVPA in overweight or obese vs. healthy weight participants (45.0 minutes [SD 16.6] vs. 43.1 minutes [SD 18.8]). Approximately one in five participants reported at least one diabetes specific barrier to physical activity.

Conclusions: Adolescents with T1D engage in insufficient MVPA and sleep, irrespective of body weight status, suggesting the need for targeted interventions in this at-risk group.

P-185 | Disordered eating behaviors in adolescents with type 1 diabetes can be influenced by their weight at diagnosis and rapid weight gain subsequently

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Introduction: Disordered eating behaviors are more common in adolescents with type 1 diabetes . The combination of type 1 diabetes and disordered eating behaviors is associated with poor glycemic control, increased risk of short- and long-term complications to type 1 diabetes, and increased mortality.
Objectives: To assess the prevalence of disordered eating behaviors and disease-related risk factors for disordered eating behaviors among adolescents with type 1 diabetes, including factors associated with disease onset.
Methods: A retrospective observational study of 291 adolescents aged 15-19 years, with type 1 diabetes, who completed the Diabetes Eating Problem Survey-Revised (DEPS-R) as part of a routine in our diabetes clinic. The prevalence of disordered eating behaviors and risk factors for their development were assessed.
Results: Disordered eating behaviors were found in 84 (28.9%) adolescents. Disordered eating behaviors were positively associated with female sex [β=3.01 (SE=0.97), *P*=0.002], higher BMI-Z- score [β=2.08 (SE=0.49), *P*<0.001], higher HbA1c [β=2.04 (SE=0.34), *P*<0.001], and treatment with multiple daily injections of insulin [β=2.19 (SE=1.02), *P*=0.032]. At type 1 diabetes diagnosis, higher BMI-Z-score [β=1.55 (SE=0.63), *P*=0.015] for those diagnosed before age 13 years and increased weight gain 3 months post-diagnosis [β=0.81 (SE=0.25), *P*=0.002] in females diagnosed at age 13 years or older were found to be risk factors for disordered eating behaviors (Figure 1).

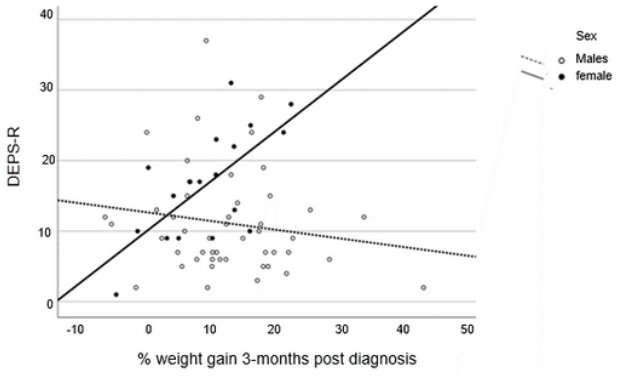

Figure 1. Correlation between % weight gain 3 months post-diagnosis and Diabetes Eating Problem Survey-Revised (DEPS-R) scores in females and males, diagnosed at age 13 years or older.

Conclusions: Disordered eating behaviors are common among adolescents with type 1 diabetes and are associated with various parameters, including BMI at diagnosis and the rate of weight gain 3 months post-diagnosis in females.
Our findings highlight the need for early preventive efforts for disordered eating behaviors and interventions to avoid late diabetes complications.

P-186 | Consequences of confinement in Quebec (Canada) on physical activity in young adolescents with T1DM: impact of COVID-19 on motivations to engage in physical activity

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Introduction: The COVID-19 pandemic forced millions of people, including youth to stay at home for extended periods significantly impacting physical activity (PA). PA can reduce some risk of health problems associated with type 1 diabetes (T1D).

Before the pandemic, only of 20% of Canadian youth aged 5-17 years of age meet this recommendation of 60 min of moderate to vigorous PA (MVPA) per day and adolescent girls with T1D reporting significantly less.

Objectives: The aim was to identify gendered factors that may influence PA in T1D youth before and during the pandemic.

Methods: A cross-sectional study design. Youth (14-17 years) from Quebec, provided informed consent and completed an online survey of sociodemographic, PA and T1D- related variables. Chi-square test was used for categorical variables and one-way analysis of variance for continuous variables. T-tests were used for pre-pandemic and during pandemic responses.

Results: A total of 35 youth completed the survey. Mean age was 15.3±1.5 years with an average T1D duration of 4.5±5.2 years. 52.9% were female, 64.7% used an insulin pump. Significant sex differences were also observed. PA days decreased significantly from 3.6±1.6 to 2.2 ± 1.9 days/week from before to during the pandemic (p=0.048), including a total min/day also decreased from 70.8±35.7 to 53.1±24.4 (p=0.007), a 26% less time in MVPA.

MVPA didn't differ significantly between sexes pre- and during pandemic. Girls reported significantly more worry about exercise-induced hypoglycemia in front of their friends but were more likely to inform a friend about appropriate aid.

Conclusions: Confinement during the COVID-19 pandemic significantly reduced PA frequency, duration and intensity in youth with T1D. Girls also reported significantly more fear of experiencing hypoglycemia in public. Understanding barriers and gender differences of PA in adolescents is crucial to developing strategies to overcome potential barriers in order to restore PA level in this population.

P-187 | Low levels of fat and water-soluble vitamins in children with newly diagnosed type 1 diabetes: a prospective case-control study

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Introduction: Type 1 diabetes (T1D) is a complex disease that probably results from a combination of multiple factors leading to failure of β cell function in the pancreas. The literature regarding the role of fat and water-soluble vitamins in the pediatric population of T1D, especially at the onset of clinical disease is scanty.

Objectives: To measure plasma levels of vitamins in children with newly diagnosed T1D and in age and sex-matched controls.

Methods: Fifty-eight cases were enrolled from Pediatric Diabetes Clinic or Pediatric Endocrinology ward based on eligibility for inclusion criteria. Age and sex-matched controls (n=58) were also enrolled. All the vitamins were quantified by the tandem mass spectrometer, except vitamin D and B_{12} which were measured by chemiluminescence-based immune assay.

Results: T1D cases were recruited at a median duration of 8 days from the diagnosis of diabetes. Among cases, one-third had a family history of T2D. The median, IQR levels of vitamin A (0.29, 0.2-0.6 µmol/l), vitamin E 9.9, 8.0-12.7 µmol/l), riboflavin (18.65, 14.5-24.3 ng/mL), pantothenic acid (16.06, 11.1-27.0 ng/mL), biotin (33.08, 19.2-50.5 ng/mL), folic acid (0.91, 0.6-1.2 ng/mL) were significantly low in children with T1D as compared to the controls (1.45, 1.1 – 1.7), (31.5, 23.3-43.8), (67.01, 57.4-75.5), (56.84, 41.7-74.7), (75.39, 57.5-94.0) and (6.22, 4.3-7.5) respectively.

The mean± SD levels of vitamin D (19.0 ± 16.4ng/mL) and thiamine (12.80 ± 17.3 ng/mL) were also found to be significantly low (p<0.001) in T1D children as compared to their counterparts (27.1 ± 9.5ng/mL) and (45.07 ± 18.7ng/mL). Vitamin B_{12} levels were not significantly different between cases and controls.

Conclusions: The low levels of fat and water-soluble vitamins in children at the onset of T1D might be associated with the development of the disease. The monitoring and supplementation of these vitamins might prove useful in better management of children with T1D.

P-188 | A thematic analysis of barriers and facilitators of physical activity, and strategies for management of blood glucose levels around physical activity for adolescents with type-1 diabetes mellitus

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Introduction: Optimal blood glucose management is pertinent for type-one diabetes mellitus (T1DM). Exercise presents an efficacious, non-pharmacological, and cost-effective adjunctive treatment that contributes supplementary health benefits.
Nevertheless, many adolescents with T1DM are not meeting recommended physical activity levels and are applying inappropriate management strategies around exercise.
Objectives: To investigate in adolescents with T1DM:
1. Physical activity levels;
2. Management strategies utilised around physical activity, and;
3. Barriers and facilitators to physical activity.
Methods: Physical activity levels were assessed using the PAQ-C and PAQ-A. A cut-off score of 2.75 was adopted to classify participants as meeting the recommended ≥60 minutes of moderate-to-vigorous daily physical activity.
Semi-structured interviews with 16 adolescents were conducted, with subsequent NVivo-assisted thematic analysis performed.
Results: Mean PAQ-score was 2.7 (SD 0.77) with 37.5% adhering to recommended physical activity guidelines. Themes related to management strategies were explored, including blood glucose monitoring, insulin-related, exercise-related, and nutrition-related strategies.
Identified barriers included limited T1DM management knowledge, negative social impact, difficulty with technology, poor planning and organisation, individual physiological responses, and the burden of management. The ability to optimally manage, having people around who understand T1DM, and service supports were perceived as facilitators.
Conclusions: This provides clinical insights into the management strategies utilised around physical activity and factors affecting participation that can inform the future promotion of physical activity in this population. 62.5% did not meet recommended physical activity levels.
This was primarily influenced by adolescents' confidence and ability to manage their condition around exercise. In practice, we should use the identified barriers and facilitators to promote physical activity engagement.

P-189 | The MyPlan eating strategy: pilot assessment of acceptability, adherence, and glycemic effects among youth with type 1 diabetes

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Introduction: There is a lack of evidence-based eating strategies to support type 1 diabetes management, especially for youth.
Objectives: From clinical work and formative research, we developed the MyPlan eating strategy (5 eating goals: 3-4 meals, 0-2 snacks; meal/snack carbohydrate target ranges; eating ≤2hrs of waking; eating 2-4hrs apart; no post-dinner snacks) and behavioral intervention. In a 6-month pilot, we evaluated acceptability, adherence, and glycemic effects among youth 12-17 years with T1D >1 year and HbA1c 7.5-11%.
Methods: Parent-youth dyads participated from Cincinnati Children's Hospital and University of North Carolina at Chapel Hill (Dec 2021 – May 2023). Registered dieticians supported adherence via weekly (0-10 weeks) and bi-weekly (12-24 weeks) video-counseling sessions, which were focused on reviewing mobile food logs, developing action plans to meet the 5 MyPlan eating goals, and targeting psychosocial barriers to adherence.
We assessed adherence (24-hour dietary recalls, food logs), acceptability (5-item measure [score: 0-20, acceptable ≤10], qualitative interviews), pre-post change in glucose time in range and HbA1c, and psychosocial outcomes.

Results: Retention (84.6%) and session attendance (mean 15.5±2.5/16 sessions) were high and n=44 completed the study (age 14.7±1.6 years, 59.1% female, 68.2% non-Hispanic White, T1D duration 6.1±3.7 years, HbA1c 8.7±1.2%, 75.0% insulin pump use). At 6 months, the majority of youth (86.4%) and parents (93.2%) found MyPlan acceptable according to the 5-item measure.

Paired t-tests suggest improvement in self-reported ability to avoid hypoglycemia (p=0.04) and hyperglycemia (p <0.01) and a 0.3% decrease in HbA1c (95% CI: -0.62, -0.04; p=0.03; n=41).

Conclusions: Preliminary findings suggest MyPlan may be an acceptable and beneficial diabetes management strategy for subgroups of youth with T1D. Further planned analyses that account for adherence and other clinical, psychosocial, and demographic factors will provide nuanced insights about intervention effects.

P-190 | Is it possible to reduce the morning post-prandial glucose response by changing breakfast, in children with type 1 diabetes? Results from an italian pilot-study

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Introduction: Traditional Italian breakfast is associated with frequent hyperglycemia in post-prandial glucose response (PPGR) in children with T1D.

Objectives: Evaluation of PPGR after a traditional Italian breakfast and a 20g proteins breakfast in children with T1D.

Methods: This study was conducted during an educational camp for children aged 9-14. T1D duration>6 months, CGM usage, and informed consent signature were the inclusion criteria.

Participants enrolled were asked to have two types of breakfast alternatively, ITA and PRO20: the previous was a traditional Italian breakfast (44 g of carbohydrates and 11 g of proteins), the latter contained alternative functional food (12 g of carbohydrates and 26 g of proteins).

Each morning, insulin bolus was administered at 7:45 and breakfast was served at 8:00, under the supervision of the Diabetology team.

Quantitative variables were summarized by mean and standard deviation and comparisons between the two breakfasts were performed by using Student t-test for paired sample or Wilcoxon signed rank test. A generalized linear mixed regression model was fit to the data with the glycemic excursion as dependent variable, patient as random effect, and the interaction between type of breakfast and time, as fixed effect.

Results: Data from 20 children, 11 girls, 75% using insulin pump, diabetes duration 6.5 years (3.2), HbA1c 6.73% (1.01) were analyzed. Children showed comparable baseline glucose with the two types of breakfast.

No significant difference was found in the trend of mean glycemic excursions in the 150 minutes after breakfast (p=0.737), nor a significant variation of glycemic excursions over time (p=0.308).

The statistical significance of the interaction term indicated a different trend over time of the glycemic excursions, with the PRO20 characterized by a lower glycemic excursion in the following 150 minutes compared to the ITA (p<0.001).

Conclusions: Further studies are required to verify if PRO20 could be an alternative breakfast to control the PPGR in children with T1D.

P-191 | Impact of sports behaviour on metabolic control of children and adolescents with type 1 diabetes in two federal states in Austria

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Introduction: To assess the frequency of physical activity on reduction of the HbA1c and/or insulin dose (IU/kg/d).

Objectives: Regular exercise reduces BMI and prevents cardiovascular risk factors. There are only a few studies about the influence of physical activity on metabolic control in persons with type 1 diabetes (T1D). The main question of this study was whether the frequency of physical activity leads to a reduction of the HbA1c and/or a reduction of insulin dose (IU/kg/d) in children and adolescents with T1D.

Methods: In this cross-sectional study the frequency of physical activity of 184 children and adolescents between 6 to 18 years with T1D was assessed us-

ing self-report questionnaires. Data collection took place at the Division of Diabetes at the Department of Paediatrics, Medical University Graz and the Department of Paediatrics, LKH Villach.
The frequency of physical activity was categorized into 4 groups: PA0 (≤ 3-times per week), PA1 (1–2-times per week), PA2 (2–4-times per week), PA3 (> 4-times per week).
Results: The mean HbA1c value (%) in the different groups was PA0: 8.15 ± 1.64; PA1: 7.65 ± 1.08; PA2: 7.85 ± 1.61; PA3: 7.16 ± 0.89. The mean insulin units per kilogram per day were PA0: 0.77 ± 0.23; PA1: 0.82 ± 0.27; PA2: 0.81 ± 0.24; PA3: 0.68 ± 0.25.
The frequency of exercise showed a significant influence on the HbA1c level. In the most active group (PA3) the HbA1c was 0.514 % lower compared to the least active group (PA0) (p = 0.036).
Other significant influences on the HbA1c level were seen with the variables diabetes duration, insulin dose and BMI-SDS.
Conclusions: The results of this questionnaire study show that the frequency of sport among children and adolescents with T1D has an influence on metabolic control, measured as HbA1c value, but not on insulin dose (IU/kg/d).

P-192 | Assessing the acceptability of a virtual food skills program for children with T1D

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Introduction: Food skills programs are not assessed in children with diabetes.
Objectives: To assess the acceptability of summerlunch+ At Home, a virtual food skills program, in children with Type 1 Diabetes.
Methods: Forty-three patients, aged 6-14 years with Type 1 Diabetes participated in an 8-week online program that included weekly live cooking classes, asynchronous learning modules, and quizzes accessed through Google Classroom. Grocery delivery or gift cards were provided to all participants to support equitable access to participation.
Open-ended questions were administered post-intervention, and parent/caregivers interviews were conducted to assess experience with the program. Descriptive results were summarized and thematic analysis performed on all two data sets.
Results: All participants reported having a positive experience and would recommend the program to others. Acceptable elements included the online format, the cooking class demonstrations, and the well-organized content.
Families enjoyed the recipes and expressed an improvement in the families' cooking skills and nutrition knowledge, and (noted) the program as a way to improve family bonding and reduce social isolation.
The gift card or grocery delivery facilitated involvement and was critical to allow low-income and food-insecure families to participate. Barriers to participation include a distracting home environment and not feeling comfortable on camera.
Factors that negatively impacted satisfaction were the large age range of participants and the class timing.
Parents noted a desire for more diabetes education and peer-to-peer interaction in future programs.
Conclusions: The summerlunch+ At Home program is a novel intervention focused on youth with diabetes. The high participation rate with (in-depth) positive feedback from families indicates it was acceptable.
A food skills program may support the development of food skills imperative to diabetes self-management long-term and further research can assess food literacy skills and glycemic management.

P-254 | Immediate skills for counting carbohydrates by a group of children and teens after a nutrition education session

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Introduction: Type 1 diabetes (T1D) is the most common endocrine disease in children and its management is based on insulin therapy and a balanced diet.
Carbohydrate counting is an essential nutritional intervention that emphasizes carbohydrate as the main element affecting the glycemic response.

Objectives: General objective: to train children and adolescents with type 1 diabetes in counting carbs in session
Specific objectives:
- to identify the foods most consumed by children and adolescents T1D;
- to present the food equivalences (carbohydrate content in 100g of food consumed);
- to assess the ability of children and adolescents with T1D to estimate the carbohydrate content of the dish to be eaten
Methods: the basics of carbohydrate counting were given to a group of 20 T1D children and adolescents who had never benefited from this training. It was mainly a question of instilling in them the notion of food equivalence (content of carbohydrates in 100g of food consumed). The evaluation consisted of an on-the-spot estimation by the participants of the carbohydrate content of a presented meal.
Results: 90% of children and adolescents gave the exact carbohydrate content of the proposed meal. As for the remaining 10%, they gave an approximate content which could be explained by their age, not yet mastering the rule of 3; prior to this training.
Conclusions: Learning to count carbohydrates can be done in a nutritional education session provided that the patients have the necessary age/intellectual level.

P-261 | Type 1 diabetes & Physical activity

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Introduction: This pan-India online survey includes data from 131 participants with Type 1 Diabetes, age 12-55, diagnosed from 11 months to 36 years back, using different kinds of insulin and delivery therapies, monitoring blood glucose levels through glucometer or FGM.
Objectives: We aimed to determine the percentage of people living with T1D in India who are engaging in any type of physical activity and how this relates to BMI and HbA1c. The hypothesis was that regular exercise helps keeping BMI and HbA1c in better control.
Methods: The data was collected through an online survey from 131 participants. The presentation of the categorical variables was done in the form of absolute numbers and percentage (%). The quantitative data with non-normal distribution as median with 25th and 75th percentiles (interquartile range). The data normality was checked by using Kolmogorov-Smirnov test. The cases in which the data was not normal, we used non parametric tests.
Results: Close to 30% of respondents reported 1 hour or less of exercise and remaining reported 3 hours per week or more. Close to 40% of respondents report doing resistance training, while the majority exercise aerobically. Fear of hypoglycemia is the most frequent challenge (29%). Exercise for 4 to 8 hours per week showed the best HBA1c management and a high BMI z score.
Conclusions: The results indicates an awareness that physical activity is important for T1D management, to better control glucose levels and general health. However, the majority of respondents only do light aerobic exercise and many expresses fear of hypoglycaemia. This indicates a lack of knowledge about the relationship between exercise and maintaining blood glucose levels. The lower the time spent on exercising the higher the population with poorly controlled HbA1c.
Interestingly we also observe that excessive training may not indicate a better control as the population spending 8 hours or more shows a larger % of people with poorly controlled HbA1c.

P-314 | Lifestyle modification knowledge among parents of children with diabetes in lagos university teaching hospital lagos

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Introduction: Diabetes mellitus (DM) is one of the deadliest diseases in the world, especially in developed nations. In recent years, it has become rampant in the developing nations such as Nigeria. Adoption of healthy lifestyle helps to prevent or manage the disease. However, the knowledge, and practice of healthy lifestyles in many diabetic patients are inadequate.
Objectives: The study aimed at assessing the knowledge of lifestyle modification among parents of diabetic child in Lagos University Teaching Hospital Idiaraba Lagos.
Methods: A descriptive cross-sectional survey design was used, where 100 respondents were conveniently sampled to conduct the study.

Questionnaires were used to collect data, the data was analyzed and presented in frequency and percentages.

Results: The findings showed that the majority of the respondents were females and married, but few were able to further their education to tertiary level. But number of parent (37%) indicated that their children were diagnosed 4-6 years ago, while 15%, 27%, and 21% were diagnosed 1-3 years, 7-9 years and more than 10 years ago respectively.

About two-thirds of the respondents claimed that fatty foods are the main cause of increase blood glucose and majority of them recommended fish, fruits and vegetables helps to control the disease, half of the respondents sees regular exercise very important, whilst brisk walking was specified as best exercise for diabetics.

A majority of the respondents affirmed that the main risk factor of contracting diabetes is obesity and recommends that weight control helps manage diabetes better.

Conclusions: It was concluded that the overall level of awareness among the parents of diabetics is a positive one. It was also recommended that there is need to create awareness to the community through health education about the importance of lifestyle modification, also public and private health sectors need to offer holistic services and training programs for health care.

P-329 | Waist-height ratio (WHtR) for assessment of obesity in children and the risk for biochemical derangement – An observational cross-sectional study

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Introduction: Childhood obesity is a growing epidemic in developing countries like India, predisposing young adults to coronary heart disease, non-alcoholic fatty liver disease (NAFLD), Non-Insulin Dependent Diabetes Mellitus (NIDDM). WC (Waist circumference) and WHtR (Waist height ratio) can assess the central adiposity pointing towards greater cardiovascular risk. WHtR is an age or sex independent tool.

Objectives: To study the predictability of waist-height ratio for assessment of obesity in children and the risk for biochemical derangement and nonalcoholic fatty liver disease– An Observational cross-sectional study.

Methods: 90 children, 5-15 years of age were enrolled as normal, overweight and obese (30 in each group) based on the BMI charts of Indian Academy of Pediatrics 2015.

Their WHtR assessed based on anthropometric examination. Overweight and obese children were investigated for biochemical parameters and ultrasound abdomen done to look for fatty liver changes. Statistical analysis was done by using SPSS version 21.0.

Results: 3 normal, 27 overweight and 30 obese children had WHtR≥ 0.5.

16 overweight, 24 obese children had fatty liver changes. Therefore increasing rate of obesity increases chances of NAFLD.

Study also reported raised liver enzymes (SGOT/SGPT) in these children.

2 overweight and 3 obese children had high total cholesterol, 2 overweight and 9 obese children had high triglycerides.

One (3.33%) overweight group and 4 (13.33%) obese children had prediabetes.

Seven (23.33%) obese and 6 (20%) overweight children had subclinical hypothyroidism.

	Overweight	Obese
Waist-Height Ratio(WHtR) ≥0.5		
Sensitivity/specificity	90%/95%	100%/90%
Positive predictive value/ Negative predictive value	90% / 90%	90.9% / 100%
Fasting blood sugar > 100mg/dl	10/30 (33.33%)	7/30 (23.33%)
HbA1C (5.7-6.5)	5/30 (16.67%)	6/30 (20%)
T4 low (<0.8ng/ml)	1/30 (3.33%)	0 (0%)
TSH (>4.8IU/ml)	7/30 (23.33%)	9/30 (30%)
Triglyceride- High	2/30 (6.67%)	9/30 (30%)
Ultrasound abdomen - Non alcoholic fatty liver disease	16/30 (53%)	24/30 (80%)

Table. Biochemical parameters in overweight and obese chidren.

Conclusions: WHtR ≥ 0.5 showed high sensitivity and specificity to predict overweight and obesity in children.

WHtR may be a better indicator to identify risk such as dyslipidemia, diabetes, subclinical hypothyroidism, increased liver enzymes and NAFLD and it does not depend upon sex, age, and ethnicity of obese children and adolescents.

P-379 | Development of a multi-centre healthy lifestyle campaign through bite size education in the UK

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Introduction: Diabetes Dietitians in two regional UK networks came together to create a campaign that aims to support diabetes teams to give cardioprotective advice. There is a need for dietitians to include more healthy lifestyle advice during their clinical time which is usually focused on carbohydrate counting and exercise management.

Objectives: To present the development of a multi-centre campaign promoting lifestyle changes in children and young people (CYP) with Type 1 Diabetes (T1D) and their families.

Methods: The campaign is based on healthy eating resources from the NHS, partner organisations and charities and it also signposts families to further information via QR codes . A baseline questionnaire was developed to measure change in lifestyle behaviours over time. The resources include information for the MDT as there is a lack of knowledge and confidence among health professions on delivering lifestyle change. This change is more likely if messages are given consistently by professionals.

Results: The baseline questionnaire showed differences in lifestyle habits between centres and regions of the UK showing that health promotion needs population specific focus. The response to the Healthy Lifestyle Campaign resources has been very positive from HCPs and there has been a call for them to become more widely available. They can be adapted to different service needs.

Conclusions: Key learning points to create such resources in the future would be to ensure a version control system, identify key peer reviewers including service users, proof readers and use a recognised readability tool early on. Bite size information can be used effectively for dietitians in their education. Disordered eating and nutrition burn out risks for CYP with T1D should be recognised and the information should be aimed at the whole family. Resources like this can be applied to other areas and have been requested by obesity and health promotion teams. Understanding of population lifestyle habits is crucial for effective use of resources.

GENETICS, IMMUNOLOGY AND THE ENVIRONMENT

P-213 | Association between RS7574865 polymorphism of STAT4 gene and susceptibility of type 1 diabetes: an updated Meta-analysis

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Introduction: Type 1 diabetes (T1D) is a T-cell-mediated autoimmune disease resulting from the selective destruction of pancreatic beta-cells. The signal transducer and activator of transcription 4 (STAT4) gene plays an important role in the incidence of multiple auto-immune diseases, including T1D.

Multiple studies have investigated the association between the STAT4 rs7574865 gene polymorphism and the risk of T1D, but the results have been inconsistent.

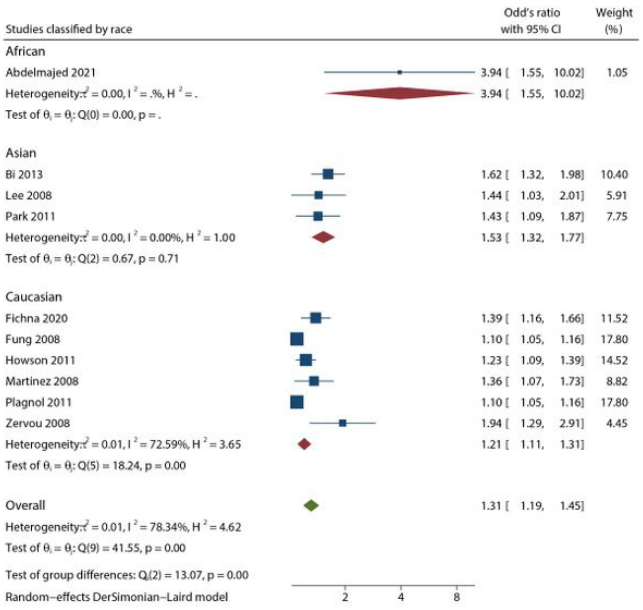
Objectives: This meta-analysis aimed to explore the association between STAT4 gene rs7574865 single nucleotide polymorphism (SNP) and the risk of occurrence of T1D.

Methods: Two authors searched PubMed, Scopus, Google Scholar, and Embase using the same search strategy for studies published from inception to February 2023 in the English language. Observational studies reporting on the association of rs7574865 polymorphism and risk of T1D were included in the meta-analysis.

Studies investigating other SNPs, animal studies, case reports, and reviews were excluded. The association of rs7574865 STAT4 polymorphism and T1D in three genetic models (allelic, recessive, and dominant) were evaluated using pooled odds ratios (ORs) with 95% confidence intervals (CIs).

Results: A total of 10 studies (45,583 participants) were included in the study. A significant association between rs7574865 SNP of STAT4 gene and T1D when assuming allelic model (OR: 1.31; 95% CI: 1.19 to 1.45; p<0.001), recessive model (OR: 1.36; 95% CI: 1.22 to 1.52; p<0.001) and dominant model (OR: 0.56; 95% CI: 0.40 to 0.78; p<0.001) was observed.

In the allelic model, subgroup analysis revealed that the rs7574865 polymorphism of the STAT4 gene is associated with T1D in Caucasians (OR: 1.21; 95% CI: 1.11 to 1.31; p<0.001) but not in the Asian population (OR: 1.53; 95% CI: 1.32 to 1.77; p=0.71) (Figure 1).



Conclusions: rs7574865 SNP of STAT4 gene might be a risk factor for T1D in Caucasians, which can be utilized in the early identification of vulnerable population.

P-214 | Genetic risk score for T1D in children with newly diagnosed diabetes mellitus

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Introduction: Genetic risk score (GRS) for type 1 diabetes (T1D) can be used as an additive marker to already existent differential diagnosis protocols, particularly in clinically uncertain cases.
Objectives: Our aims were to assess the GRS for T1D in newly diagnosed children with DM, and to determine its discriminative power between T1D and controls in Slovak population.
Methods: DNA samples from 812 children with newly diagnosed DM in the years 2008-2023, 179 unrelated patients with monogenic DM and 25 healthy controls were analyzed using Infinium Global Screening Array MD v3 containing ~725,000 SNPs. Genotypes needed for 10SNP GRS were extracted from the data and missing genotypes were determined using KASP assay. Sanger and panel sequencing of genes linked to monogenic DM was performed in patients with the lowest GRS values.
Results: Mean 10SNP GRS-T1D was significantly lower in healthy controls and patients with monogenic diabetes than in newly diagnosed children with DM (9.27±2.2 and 9.55±1.8 vs. 11.92±1.6, p<0.001). ROC analysis showed AUC=0.847, and the optimal cut-off was set to 10.89 (Youden index 0.573).
After follow-up, the type of diabetes in the newly diagnosed children was assessed based on clinical picture and DNA analysis. Ten from 183 patients with GRS under the cut-off were diagnosed with T2D while only 2 from 629 patients with the values over the cut-off. So far, 4 patients with monogenic diabetes of GCK-MODY type have been identified among the patients with the lowest GRS values.
When only clinically diagnosed T1D patients were compared with the whole control group, the ROC curve had AUC=0.881, cut-off 10.92 and Youden index 0.628.
Conclusions: Significant part of patients with GRS under the cut-off was diagnosed with diabetes of other type than T1D. 10SNP T1D-GRS has the capacity to contribute to distinguishing of patients with T1D from patients with other types of diabetes.
Supported by: Ministry of Health 2019/20-LFUK-8 and VEGA 2/0131/21

P-215 | Relationship between MAIT cells and type 1 diabetes development in recently diagnosed children according to age

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Introduction: Mucosal Associated Invariant T (MAIT) cells are innate-like T cells recognizing bacterial metabolites, derived from the synthesis of riboflavin, presented by the non-polymorphic class I like molecule MR1.
Recent results in T1D patients and in NOD mice indicate an abnormal MAIT cell frequency and activation in this pathology.

Objectives: To investigate changes in MAIT cells frequency, phenotype and function in link with the gut microbiota according to T1D age of onset.
Methods: Recent onset (RO) type 1 diabetic patients and control patients, between two and 16 years old were selected for clinical evaluation, blood and stool analysis. For FACS analysis, MAIT cells were identified as CD3+ CD4- CD161highVα7.2+ T cells.
Surface markers were analyzed to determine their activation status(CD25, CD69, CD44), their exhaustion (PD1, KLRG1, TIM3), their migration capacity (CCR6), and their proliferation and survival (Ki67 and BCL2 expression). Cytokine production were also assessed.
Results: We observed a decrease in the frequency of MAIT cells in RO T1D (n=44, 1,01%±1,2SD) compared to control children (n=26,1,83%±2,2SD) (p<0,001). Importantly, we confirmed the correlation between granzyme B (GzB) production by MAIT cells and age at diagnosis, confirming that MAIT cells are more activated in young children who have developed more aggressive disease than adolescents.
We also found an important reduction in MAIT cell, especially in children before seven years of age, with a different profile from children older than 11 years of age.
We could see a difference between the surface markers (CCR6, CD25 and PD1) and also after PMA and ionomicin stimulation (GzB, IL-2 and IL-4) in this young population. Microbiota was analyzed in mice with preliminary results.
Conclusions: MAIT cells are reduced in type 1 diabetic patients, specially at a young age. Indeed, high GzB levels can explain a more aggressive disease in this population.
These differences reinforce a different phenotype between younger and older T1D recent onset children.

P-260 | Genetic diagnosis of neonatal diabetes in a nutrition and diabetes service in a general hospital in Buenos Aires, Argentina in the 2019/2021 coronavirus pandemic

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Introduction: Neonatal diabetes or monogenic diabetes is rare in the pediatric age. Its diagnosis should be suspected in the neonatal period up to 6 months of life (classic neonatal diabetes) and a late form between 9 and 12 months of age (late neonatal diabetes).
We present the case of a patient with a suspected diagnosis **of neonatal diabetes at one year of life**, who had presented hypoglycemia in the first days after birth.
Objectives: Recognize the diagnosis of neonatal diabetes as a difference from diabetes I in the first year of life.
Methods: Clinical case, clinical history data.
Results: Neonatal diabetes, Gen Ins subtype. permanent neonatal diabetes. Parents without genetic alteration, for which corresponds to a de novo mutation. Implication of the result: 50% risk of inheriting this variant and developing diabetes.
Conclusions: Diagnosis of diabetes in the first year of life should include neonatal diabetes in order to provide advice adequate genetic and offer in some cases a different therapeutic alternative to insulin, such as sulfonylureas, in the KCJN11 gen for example.
However, in this patient this therapy was not possible because the treatment in the INS gene mutations must be insulin

P-274 | Diabetes mellitus in a patient with hyperinsulinism hyperammonemia syndrome

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Introduction: Hyperinsulinism/hyperammonaemia (HI/HA) syndrome is the second most common form of congenital hyperinsulinism.
Gain of function mutations in the mitochondrial enzyme glutamate dehydrogenase are responsible for this syndrome.
Children present with fasting and protein sensitive hypoglycaemia combined with elevated ammonia levels and seizures.
The hypoglycaemia of the HI/HA syndrome is well controlled with diazoxide, a KATP channel agonist.
Objectives: We illustrate an unusual case of Type 2 Diabetes Mellitus developing years after the diagnosis of HI/HA syndrome.
Methods:
Case report: A 17-year-old female with a history of congenital hyperinsulinism due to HI/HA syndrome. Patient presented with hypoglycaemia and hyperammonaemia on day 3 of age and was treated with diazoxide until she was 8 years old. She also developed seizures in infancy.
Genetic analysis was positive for a heterozygous missense mutation in GLUD-1 gene.
Patient has learning difficulties associated with behavioural issues. She has excessive weight gain (BMI 32) and ultrasound evidence of non-alcoholic fatty liver disease.
At the age of 16 years, she was diagnosed with diabetes with hyperglycaemia and raised HbA1c. Diabetes antibodies were negative and monogenic diabetes testing excluded any mutation.
She was initially treated with insulin but changed to Metformin.
Results:
Discussion: Our patient presented with typical clinical picture of HI/HA. These children also have neurological abnormalities with ADHD type problems and absence epilepsy; some of her behaviour problems may relate to this and deserve specific help.
Is there a relation between GLUD1 mutation and diabetes?
Her excess weight gain could be related to extra intake to counteract protein induced hypoglycaemia.
Conclusions: It remains unclear if patient's clinical presentation can be solely explained by HI/HA syndrome or coincidently developed T2DM in presence of other risk factors (excessive weight, insulin resistance) hence the need for increased awareness of this possibility.

P-327 | Insulin resistance in rare genetic syndromes

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Introduction: Silver-Russell syndrome (SRS) is a rare, but well-recognized, clinically and genetically entity, caused by genetic alternations, associated with prenatal and postnatal growth retardation, relative macrocephaly and dismorfic features.
Objectives: We report a case of a boy, which was diagnosed with SRS at 2 years, with molecular testing positive: 11p15 LOM
Methods: Analyzing growth chart, we observed a linear, constant increase at percentile 10% up to 7 years when was noticed a jump in his height at percentile 25%.
Results: He was borned small-for-gestational-age (SGA), with relative macrocephaly at birth and postnatal gowth failure.
At 24 months he presents feeding difficulties, low BMI, body asymmetry, failure to thrive, 5th finger clinodactyly, cryptorchidism, inguinal hernia, strabismus, gastro-esophageal reflux and constipation.
At 7 years and half he presented axillary hair, generalized hirsutism, acne face, Tanner stage P4G3, advanced bone age.
After clinical and laboratory investigations was diagnosed with advanced precocious puberty and insulin resistance and we initiating treatment with Metformin 90 mg x 4/ day and a GnRH agonist, to improve final height. At 9 years was performed oral glucose test without a dose of metformine before the test.
After the lab results Metformin was replaced with Extended release metformine 375 mg twice a day.
After 3 months he repeat oral glucose test with his morning dose of Extended release metformin given 10 min before the oral glucose.
Conclusions: Occurrence of visceral adiposity with insulin resistance already in the childhood, may influence the onset of puberty in small-for-gesta-

tional-age (SGA) children. Extended release metformin significantly decreased levels of HbA1c after 3 months.

P-330 | Congenital hyperinsulinism suspected in a 13 years old girl with epilepsy

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Introduction: A 13 years old girl with history of epilepsy was admitted at our department for abdominal pain and respiratory distress. Blood tests revealed a glucose of 49 mg/dl, not improving after intravenous infusion of 10% dextrose. It was associated with raised insulin value (47.6 mcU/ml, normal values 1.9-25) and HbA1c 3.8%.
Objectives: We suspected an insulinoma or congenital hyperinsulinism.
Methods: Continuous glucose monitoring was started. An abdominal MRI excluded an insulinoma. Going back in time, during neonatal period the baby had persistent hypoglycemia, treated with a 12-days intravenous infusion of dextrose, without additional therapies. C-peptide was 4.23 ng/ml. At age of 3, she presented with recurrent tremors and visive hallucinations. Absence seizures were diagnosed at age of 5, and antiepileptics were started. A brain MRI showed some areas of altered signal in the periventricular white matter, as signs of perinatal damage.
Results: Because of persistent hypoglycemia during hospitalization, we firstly increased intravenous glucose rate to 7 mg/kg/min, then therapy with diazoxide was started (3.5 to 5 mg/kg/day). Blood glucose levels improved. Therefore, we suspected a form of misdiagnosed congenital hyperinsulinism.
Sanger sequencing of insulin gene and KCNJ11 gene showed no mutations. The DNA extracted from patient's blood was then analyzed by Next Generation Sequencing for 45 genes involved in pancreatic function. This analysis is still ongoing.
After a 2-weeks therapy with diazoxide, the dose was reduced to almost 4 mg/kg/day, with a good glycemic profile. Additionally, her father now presents with astenia and tremors, and he shows hypoglycemia too at age of 52.
Conclusions: Congenital hyperinsulinism must be always suspected in presence of hypoglycemia and hyperinsulinism. If molecular diagnosis will be confirmed in our patient, we need to understand if neurological symptoms are due to epilepsy, or they are related to symptomatic persistent hypoglycemia.

P-361 | Genetic influences on beta-cell function before type 1 diabetes diagnosis

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Introduction: Autoimmune loss of beta-cell function (measured by C-peptide) is the hallmark of type 1 diabetes (T1D) targeted by interventions that aim to prevent T1D or its progression after onset.
Objectives: We sought to determine whether T1D genetic risk score-2 (T1D-GRS2) and single nucleotide polymorphisms (SNPs) that have been previously associated with C-peptide preservation after T1D diagnosis (e.g., SNPs in *CLEC16A, G6CP2, INS,JAZF1, PTPN22, SLC30A8* and *TCF7L2*) influence C-peptide levels before diagnosis.
Methods: We studied islet autoantibody (Ab)-positive participants in the TrialNet Pathway to Prevention Study who had T1DExomeChip data and assessed the influence of these 12 SNPs and the T1D-GRS2 on area under the curve (AUC) C-peptide levels during oral glucose tolerance tests conducted between 0-9 months prior to the diagnosis of T1D.
Participants (n=702) had a mean age of 13.5±10.3 years, 47% were female, mean BMI was 20.7±6.0 kg/m^2, and mean HbA1c 5.4±0.4%.
The T1D high-risk HLA-DR3-DQ2 haplotype was present in 47% and the high-risk HLA-DR4-DQ8 haplotype was present in 67% of participants.
We performed univariate and multivariate analyses adjusting for BMI, age, sex, number of positive Ab, and the first 3 principal components of ancestry.
Results: A higher T1D-GRS2 was associated with lower C-peptide AUC 0-9 months prior to T1D diagnosis in univariate (β=-0.06, P<0.0001) and multivariate (β=-0.03, p=0.008) analyses.
Participants with the *JAZF1* rs864745 G allele had lower C-peptide AUC 0-9 months prior to T1D diag-

nosis in univariate (β=-0.10, p=0.003) and multivariate (β=-0.05, p=0.047) analysis.

Conclusions: In conclusion, the *JAZF1* rs864745 G allele (which has also been associated with type 2 diabetes risk) and higher T1D-GRS2 predict lower C-peptide AUC prior to the diagnosis of T1D. Studies on their effect on response to trials to prevent or delay T1D onset are warranted.

MONOGENIC AND OTHER FORMS OF DIABETES

P-070 | Precision diabetes: identification and characterization of monogenic diabetes in a tertiary pediatric diabetes center in Israel

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Introduction: Monogenic diabetes encompasses maturity-onset diabetes of the young (MODY), neonatal, and syndromic diabetes.

Objectives: Characterize individuals with monogenic diabetes in a tertiary pediatric diabetes center, and evaluate epidemiological, clinical, and biochemical risk factors.

Methods: Medical records of all children aged 6 months to 18 years who were diagnosed with prediabetes or diabetes, between 2004 and 2022, were analyzed. A DNA sample was collected from children with negative pancreatic autoantibodies, a family history of diabetes, and/or atypical type 1 diabetes presentation.

Exome sequencing using a next-generation sequencing platform and comprehensive analysis of a monogenic diabetes gene panel were applied. The Exeter MODY probability calculator (MPC) score was assessed.

Results: The cohort included 452 individuals, 160 (35.4%) had negative antibodies, and of them, 37 had a high clinical suspicion for MODY. Of the 37 samples sequenced, 27 individuals had a positive genetic result (21 pathogenic/likely pathogenic mutations, 6 variants of unknown significance), yielding a 73% genetic diagnosis rate.

Most cases included mutations in *GCK, HNF1A*, and *WFS*, without any record of *HNF4A*. The median (IQR) age of diagnosis was 13.5 (10-16) years, with 81% female predominance in the positive diagnosis group compared to 30% in the negative group (p=0.006). The median Hba1c level at diagnosis was 1.3-fold higher in the positive group compared to the neg-

ative group (7% (6.2-8.4) vs. 5.5% (5.2-7.7), p=0.017). Five children (19%) in the positive group had a low (<30%) MPC score and 7 (70%) in the negative group had a high (>30%) MPC score. Therapeutic changes due to genetic results were made in 26 (70%).

Conclusions: We describe a unique pattern of monogenic diabetes in a tertiary center in Israel. In cases of low MPC score with a high index of suspicion (atypical presentation, course, or treatment), periodic re-evaluation and genetic testing are warranted for early detection and optimizing precision diabetes.

P-071 | Off-label liraglutide in wolfram syndrome type 1: endocrinological and neurophysiological long-term follow-up in five pediatric patients

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Introduction: Wolfram syndrome type 1 (WS1) is a rare disease with poor prognosis. Insulin dependent diabetes and progressive neurodegeneration its the main features.

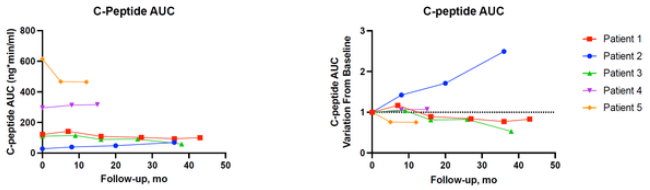
Objectives: Currently, no medication is able to delay or reverse WS1 natural history. Preclinical data suggest that glucagon-like peptide-1 receptor agonist (GLP-1RA), may protect β-cells and neurons. We evaluated Liraglutide (LG) as an off-label treatment in pediatric patients with WS1.

Methods: Five patients (aged 10-14 at baseline) with clinical and genetic diagnosis of WS1, received daily subcutaneous LG for 12-48 months (starting dose: 0.3 mg/die up to maximum of 1.8 mg/die). C-peptide AUC (C-AUC) variation during MMTT was measured to assess the effect on β-cell reserve.

Optical Coherence Tomography (Carl Zeiss Meditec and 3D-Topcon), was used to measure Retinal nerve fiber layer (RNFL) thickness and ganglion cell complex (GCC).

Results: No significant adverse effect was reported. At the latest follow-up, the C-AUC ranged from 77 to 249% of baseline, suggesting no evident beta cell deterioration. Two patients showed a slight reduction in C-AUC from baseline respectively at 43 (101 vs 122 ng∗min/ml) and at 12 months (465 vs 615 ng∗min/ml). In two patients C-AUC increased (70 vs 28 ng∗min/ml at 36 months and 316 vs 296 ng∗min/ml at 15 months).

Only one case showed significant C-AUC reduction after 38 months of treatment (59 vs 111 ng∗min/ml). Despite the bias of using two different OCT devices during the follow-up, no significant deterioration was observed in RNFL or GCC.



Conclusions: With this first preliminary study we evaluate LG treatment in pediatric WS1 patients. Preclinical data shows beneficial effects of GLP-1RA on ER stress and cell degeneration. Since LG is the only GLP-1RA approved for children and is well tolerated, we consider it a valuable option in WS. Multicenter and RCT studies are needed to evaluate LG in routine care.

P-072 | Dapagliflozin as the treatment choice in a young adult with diabetes and heart failure associated with microcephalic osteodysplastic primordial dwarfism-type II

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Introduction: Microcephalic Osteodysplastic Primordial Dwarfism-Type II(MOPDII) is a rare condition with severe growth retardation, microcephaly, skeletal dysplasia, and increased risk for insulin resistance, among others.

Objectives: This report aims to describe the case of a female patient diagnosed with MOPDII, diabetes mellitus and cardiac insufficiency.

Methods: Case report

Results: At 17y(Height=91cm/Weight=16kg), the patient presented acanthosis nigricans, polyuria, polydipsia and weight loss. She was hospitalised with blood glucose levels above 200 mg/dL, and insulin therapy was initiated. At that time, she had an HbA1c of 8.4%, non-reactive anti-GAD Ab and C-peptide of 10.6 ng/mL(RF:1,1-4,4 ng/mL).

During follow-up, she showed progressive improvement in glycemic control; metformin was introduced, insulin was gradually reduced and withdrawn ten months after the diagnosis.

At 17y11mo, she had a myocardial infarction requiring revascularization. During hospitalisation, metformin was suspended, and the glycemic control was adequate. She was put on acetylsalicylic acid, clopidogrel, carvedilol, and enalapril. Her glucose and HbA1c levels remained normal without treatment until 20y, when HbA1c increased to 6.9%, and continuous glucose monitoring data showed hyperglycemia (Figure 1A).

She was also complaining of dyspnea, and her echocardiogram showed ventricular dysfunction with an ejection fraction (EF) of 31%. The option was the introduction of dapagliflozin due to its action in reducing glycemia and improving cardiovascular outcomes in patients with heart failure. She evolved with the improvement of glycemia and reduction of HbA1c (Figure 1B), in addition to improved EF (EF: 31% to 56%) and resolution of symptoms.

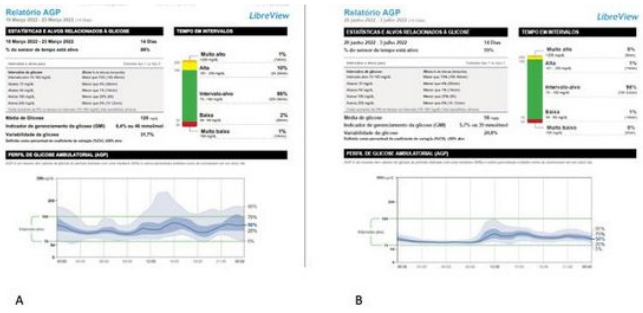

Figure 1. Continuous glucose monitoring reports.
A. Before Dapagliflozin introduction.
B. After 3 months of Dapagliflozin introduction.

Conclusions: Patients with MOPDII are challenging to manage due to their body size and may present with complex combinations, as in this case, with diabetes and cardiac insufficiency. We propose that dapagliflozin could be an efficient and safe treatment option.

P-073 | Incidence of neonatal diabetes mellitus: a reappraisal from Austria/Germany, France and Italy covering 2010-2021

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Introduction: Neonatal diabetes mellitus (NDM) defined as diabetes onsetwithin first 180 days of life is a rare condition. Current estimates of both clinical forms of NDM, i.e. the permanent (PNDM) and transient (TNDM), vary between 1:90,000 live births (Italy) to 1:29,241 (United Arab Emirates).
Objectives: We reassessed the incidence of NDM (PNDM+TNDM) over a period of 12 years.
Methods: For Austria/Germany the DPV database was interrogated, for France data were extractes from the national reference laboratory for NDM in Paris, for Italy we interrogated a database maintained by the Italian Society for Pediatric Endocrinology and Diabetes. Inclusion criterium wa diabetes onset within 6 months of life.
Genetic, immunologic and clinical information was used for classification. only biallelic *GCK* pathogenic variants were considered cause of NDM, while cases bearing heterozygous *GCK* variants were excluded.
Results: Total number of cases of PNDM and TNDM referred for genetic diagnosis during the 12-year period was 155, 88 and 50 and incidence was 1:63,591, 1:102,410 and 1:113,218 for Austria/Germany, France and Italy, respectively.
The most frequent causes of NDM across all clinical presentations were chromosomal aberrations of 6q24 followed by *ABCC8* and *KCNJ11* for Austria/Germany and France. For Italy most frequent cause was *KCNJ11* mutations, followed by 6q24 and *ABCC8*. Cases with biallelic *EIF2AK3* variants associated with the Wolcott-Rallison syndrome were identified in Germany and France, but not in Italy. FOXP3 mutations were the most frequent cause of autoimmune monogenic PNDM in the 3 countries.
Conclusions: NDM incidence in France and Italy for the 2010-2021 period is similar and close to previous estimates. The slightly higher incidence found in Austria/Germany could derive for more widespread ascertainment of cases; however other, still undetermined reasons are also possible.

P-074 | Use of a sodium-glucose cotransporter 2 inhibitor in a patient with rabson-mendenhall syndrome

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Introduction: Rabson-Mendenhall syndrome (RMS) is a rare cause of insulin-resistant diabetes. The treatment of hyperglycemia in patients with RMS due to biallelic mutations of the insulin receptor (INSR) still remains a challenge. High-dose 500 IU/ml insulin has modest effects, and IGF1 is effective only in some cases.
A good effect of leptin has been observed in RMS patients with low leptin levels. However, the most commonly used drug is metformin, but with modest results.

Previously, we used empagliflozin, an SGLT2i drug, in 2 RMS patients and obtained an excellent response in one case and a good response in the second.

Objectives: to assess the effectiveness of empagliflozin in improving the symptoms and outcomes in an 11-year-old boy with RMS associated with INSR variants c.121G>A, p.Arg41Trp, and c.1268+2T>C.

Methods: The patient was on metformin therapy with unsatisfactory glycemic control (HbA1c 8.5%). To optimise therapy, Empagliflozin was added to metformin at a dose of 2.5 mg/d for 2 weeks and then increased to 5 mg/d. The patient has placed a CGM.

Results: After 3 months the time in range (TIR) increased from 47% with metformin monotherapy to 63% and 73% with empagliflozin 2.5 and 5 mg/d, respectively (*Figure 1*). Three months after the addition of empagliflozin was 6.9%. Treatment with empagliflozin is still ongoing with no side effects.

Figure 1-Metabolic monitoring before empagliflozin, after 2-weeks (2.5 mg) and after 3 months (5 mg) of treatment.

Conclusions: Our results support the hypothesis that combined metformin / empagliflozin treatment in RMS patients is effective and safe in the short term.

P-075 | Liraglutide off-label in patient with MODY3

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Introduction: Maturity-onset diabetes of the young (MODY) is a group of inherited disorders of monogenic diabetes which usually present in young adulthood.

The most common subtype is MODY3 characterized by progressive postprandial hyperglycemia due to the degeneration of the beta cell.

Patients are treated with sulphonylurea due to very high sensitivity to these drugs, but they are also prone to develop hypoglycaemia.

Furthmore MODY3 is characterized by a progressive insulin secretory deficit; additional secretagogue or insulin therapy may be required to meet glycemic targets over time.

Objectives: Our aim is to prove the safety and efficacy of glucagon-like peptide 1 analogues (GLP1) in patient with MODY3.

Methods: In November 2022 FreeStyle Libre 2, was placed on a 13-year-old boy with MODY3. In December 2022 subcutaneous therapy with liraglutide at 0.6 mg/day was started, subsequently therapy increased by 0.6 mg weekly until the dose of 1.8 mg/day was reached.

Results: Glycemic data prior to the start of therapy: Time in range (TIR) 81%, Time above range (TAR) 19%, Time below range (TBR) 0%, average glycemia 155 mg/dl.

Glycemic data after one month of therapy: TIR 99%, TAR 1%, TBR 0%, average glycemia 124 mg/dl.

Liraglutide is effective in glycemic control (TIR 81% vs 99%) and safe as no episodes of hypoglycemia occurred.

Moreover, the patient achieved a weight loss with a reduction in BMI from 28.11 Kg/m^2 (1.78 SDS) to 25.53 Kg/m^2 (1.24 SDS).

Conclusions: Sulfonylureas are the first-line therapy in MODY3 which can cause episodes of hypoglycemia due to their glucose-independent mechanism of action and lead to weight gain.

Liraglutide does not show episodes of hypoglycemia because it stimulates insulin secretion in a glucose-dependent manner. Furthmore it reduces cellular stress, promotes cell proliferation so as to improve long-term glycemic control.

Our case report suggests that liraglutide is safe and effective and it would be interesting to evaluate effects over time on a larger population.

P-076 | MODY in the portuguese paediatric population

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Introduction: Despite being uncommon, MODY is presumed to account for 2.5-6% of paediatric cases of diabetes, but initially, it is frequently misdiagnosed as T1D or T2D.

Objectives: The authors aimed to estimate the prevalence of MODY in the Portuguese paediatric population.

Methods: Observational study of subjects with MODY diagnosed under 18 years old, followed in the mainland Portuguese paediatric centers from January 2018 until December 2021. Collected variables: demographics; clinical presentation, diabetes classification and treatment modality at onset; clinical course and progression; gene mutation and time until MODY diagnosis; current treatment. Exclusion criteria: absence of genetic test.

Results: After a national call for cases, 18 out of 25 paediatric centers answered back.

82 cases of MODY were identified: 96% white Portuguese, 39% females, the median age of 9 (2-17) years. 65% had a family history of diabetes and 7% were diagnosed after screening. 6% had hyperinsulinism during infancy.

At onset: median HbA1c was 6.9 (6.5-7.41)%, median C-peptide was 1.47 (1.10-3.24)ng/mL, median BMI-SDS was 0.98 (-0.12-1.4), and median HOMA-IR was 2.03 (1.14-3.27). Pancreatic antibodies were present in 3%.

16 (20%) subjects were misdiagnosed as having T1D (15%) or T2D (5%), with a median delay until rectification of 3 (0.5-4) years. Genetic studies confirmed mutations in GCK (75%), HNF1A (15%), HNF1B (7%), and HNF4A (3%).

Conclusions: We are also underreporting MODY: 1st – unfortunately, we were not able to collect cases from all national centers; 2nd - genetic testing, apart from being expensive, is not performed nationwide, causing delays and even loss of cases; 3rd – as obesity is increasing, it is even more difficult to distinguish it from T2D.

As it is done in other countries, we urgently need to set up a national strategy for genetic screening, defining who should be tested and where.

Straightway we should assemble a network with reference laboratories, and both paediatric and adult centers.

P-077 | A novel mutation in PTF1A in a neonate with monogenic diabetes, first case report from Pakistan

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Introduction: Pancreas trancription factor 1-alpha, encoded by the PTf1A gene, is a basic helix-loop-helix (bHLH) protein necessary for the formation of pancreas and cerebellum.

Homozygous loss of function of mutations in PTF1A have been reported in literature with variable phenotype of pancreatic agenesis, resulting in permanent neonatal diabetes (PNDM). and pancreatic exocrine dysfunction, neurodevelopmental delay, central hypoventilation and cerebellar agenesis.

Several cases have been reported in literature, however this is the first case from Pakistan.

This shows the genetic diversity in largely consanguineous married Pakistani population of neonatal and monogenic diabetes infants and children.

Objectives: To find out the genetic cause of neonatal diabetes of a 24 weeks baby girl .

Methods: This is the case history of baby girl born to consanguineously married parents at 37 weeks of gestation with birth weight of 2.5 kg.

At the age of 4 months she presented in emergency with respiratory distress and was diagnosed as diabetic ketoacidosis.

Her initial HbA1c was 11.6%. There were no other significant findings.

She was put on basal bolus regimen. Mean while her blood sample was sent to Exeter Lab for molecular genetics of neonatal / monogenic diabetes.

She was again admitted at the age of 9 months with severe DKA and sepsis and unfortunately could not survive.

Results: Analysis of all the known neonatal diabetes gene has identified a novel homozygous PTF1A variant, p.Arg187cys, in this patient. This variant has not been reported in the literature. Its clinical significance is currently uncertain.
Conclusions: In Pakistani population the frequency of consanguineous marriage is very high, so the genetic disorders are very common. Permanent Neonatal diabetes (PNDM) and other forms of monogenic diabetes are frequently seen. This is the first case report of a novel PTF1A gene from Pakistan. This also shows that the genetic variability of monogenic diabetes in population of Pakistan.

P-078 | A case of effective management of neonatal diabetes mellitus in infants with AHCL before genetic diagnosis

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Introduction: Neonatal diabetes mellitus (NDM) is a rare condition that presents significant management challenges.The advanced hybrid closed loop (AHCL) is a therapy that combines CGM with CSII, which has been successful in T1DM patients.This case report describes the use of AHCL in a patient with KCNJ11 mutation, who transitioned from insulin to sulfonylurea treatment.
Objectives: To evaluate the efficacy and safety of AHCL therapy in the management of NDM.
Methods: A male infant diagnosed with NDM on day 67 of life,the patient was diagnosed with diabetic ketoacidosis and initiated an intravenous insulin infusion. After clinical stabilization in the PICU, the patient was transferred to our hospital on day 82 of life.We switched treatment from intravenous insulin infusion to AHCL(Tandem T:slim X2 with Control-IQ technology) off-label, even though it's not approved for children under 6 years.
The Sleep Function was activated 24/7, and fixed boluses were administered for formula feeding.This resulted in a gradual stabilization of the blood glucose levels.The patient was discharged on day 91 of life with AHCL,without changing parameters.After a genetic diagnosis of KCNJ11 mutation,the patient's treatment was switched from insulin to glibenclamide. AHCL therapy was discontinued after three days,and it was not necessary to use insulin boluses for the management of meals.
Results: The patient's TIR during the first month of AHCL was 81%,and there were no instances of severe hypoglycemia,ketoacidosis,catheter occlusion,or infections at the CSII insertion site.The metrics of the CGM are presented in Table 1,including those related to glibenclamide (G) monotherapy.

	1-week	2-weeks	1-month	1-month (G)
Time in range 70-180 mg/dl (%)	62	76	81	93
Time in range > 180 mg/dl (%)	37	22	17	6
Time above range > 250 mg/dl (%)	6	7	4	0
Time above range <70 mg/dl (%)	1	2	2	1
Time above range < 54 mg/dl (%)	0.2	0.2	0.2	0
GMI	NA	6.9	6.8	6.4
Estimated mean glycemia (mg/dl)	153	152	144	130
TDD	7.1	7.2	6.9	0

Table 1-Metabolic monitoring after 1-week, after 2-weeks and after 3 months of treatment with AHCL and after 1-month with G.

Conclusions: Insulin administration is critical in the management of NDM), but the use of AHCL may be helpful.This case report demonstrates that AHCL is a promising and safe option for managing NDM in infants.

P-079 | Impaired glucose tolerance (IGT) and indeterminate hyperglycemia (INDET) prevalences in a population of adolescent and young adults with cystic fibrosis with or without exocrine pancreatic insufficiency: a case-control study

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Introduction: Although Cystic Fibrosis Related Diabetes (CFRD) is an adulthood disease, Impaired Glucose Tolerance (IGT) and Indeterminate Hyperglycemia (INDET) may be present from childhood, especially in those with Exocrine Pancreatic Insufficiency (EPI).

Objectives: To assess, in a population with Cystic Fibrosis (CF), the percentage with IGT, CFRD or INDET following Oral Glucose Tolerance Test (OGTT) among patients with or without EPI and analyze for subjects with OGTT alterations the correlations with other variables.

Methods: In this observational, case-control study, a population (10 to 22 years) with CF in follow-up at Regina Margherita Children's Hospital (Turin, Italy) underwent an OGTT with glucose and insulin values measures at 0', 30', 60', 90' and 120' and classified as normal, IGT, INDET, or CFRD.

The groups (EPI, controls) were compared for age, sex, BMI, lung function, comorbidity, antibiotics, CFTR modulator drug (MD), Pancrealipase and OGTT measures, using χ^2 or t-test and linear regression.

Results: We enrolled 76 patients. The prevalence of INDET and IGT were respectively 36.4% and 25% in EPI group, and 9.4% and 6.3% for controls, with an odds ratio for INDET of 5.52 (1.45-21.05) and IGT of 5.0 (1.02-24.4).

No patients presented with CFRD. Those with EPI showed lower BMI and higher antibiotic use in the previous year, despite using newer CFTR MD ($p< 0.05$).

In patients with EPI, glucose was significantly higher at 30'($p=0.011$), 60'($p<0.001$), 90'($p<0.001$), and 120'($p=0.031$), with an impaired insulin response at 0'($p=0.015$) and 30'($p<0.001$).

Multivariate analyses for glucose at 60'($p=0.001$) and 90'($p=0.007$) showed a positive correlation only with EPI.

Conclusions: We observed a higher prevalence of INDET and IGT in adolescents and young adults with CF and EPI, with more INDET than IGT. EPI seems to increase about 5 times the risk of INDET and IGT, while other parameters (such as lung function) seem not correlated to glucose disturbances.

P-216 | Rare cause of marked insulin resistance and hypertriglyceridemia

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Introduction: Insulin resistance with hyperinsulinemia and dyslipidemia are predominantly associated with overweight and type 2 diabetes. Especially in childhood and adolescence and in the absence of obesity, monogenetic causes should also be considered.

Objectives: Case report: 13-year-old-girl, Turkish origin, no consanguineous parents, unremarkable family history, etiologically unclear drawfism, acanthosis nigricans, hyperinsulinemia, hyperandrogenemia, hypertriglyceridemia, hypertransaminasemia and muscle cramps.

Previous therapy: unsuccessful growth hormone therapy, low-dose metformin 500 mg/d.

Methods: Physical examination.

Laboratory assessements.

Ultrasound studies.

Genetic diagnostics.

Results: **Physical findings:** Height 132 cm (< 1st centile), weight 42 kg (3rd-10th centile), BMI 23,8 kg/m^2(75th-90th centile), truncal obesity, triangular face shape, marked acanthosis nuchal and axillary, normal body but thin head hair, brachydactyly, small feet, enlarged liver.

Laboratory studies: HOMA-Index 8.8, 1st OGTT 2h Glucose 194 mg/dl, Insulin > 1000 mU/l, following OGTTs normal, normal daily blood glucose profile, GOT 94 U/l, GPT 23 U/l, triglycerides 417 mg/dl, ldl-cholesterol 135 mg/dl, lipoprotein (a) 98 mg/dl, CK 1284 U/l, testosteron 3,98 nmol/l (0,1-2), androstendion 6,8 nmol/l (0,1-5), leptin 17 ng/ml (6,91 – 21,8), other lipidological, endocrinological (including growth hormone factores) and hepatological diagnostics were unremarkable.

Ultrasound studies: steatosis hepatis, normal ovaries, inconspicuous subcutaneous adipose tissue, inconspicuous echocardography

Molecular genetic: detection of a homocytogenic, autosomal recessive mutation in the *POC1A* (POC1 Centriolar Protein A) gene (c.103+1G>T) and thus the diagnosis of SOFT syndrome (short stature-onychodysplasia-facial-dysmorphism-hypotrichosis syndrome).

Clinical course

	Metformin 500mg/d	No therapy, 5-6 month diet	Metformin 500 mg/d	Metformin 1000 mg/d	Metformin 1000 mg/d + Rosuvastatin 10 mg/d
Triglycerides mg/dl	323	417	538	365	Pending
LDL-C mg/dl	153	163	145	163	Pending
GOT U/l	94	102	72	63	Pending
GPT U/l	23	187	123	101	Pending
HOMA-Index	8.8	20.3	-	6.9	Pending
HbA1c	5.3	5.6	5.2	5.1	Pending

Conclusions: Juvenile insulin resistance and hypertriglyceridemia coupled with steatosis hepatis, short stature, facial dysmorphia, hypotrichosis and muscle cramps should be considered as SOFT syndrome. Prevalence: <1/1,000.000. Therapeutic goal is to minimize cardiovascular risk. The use of metformin, statins and fibrates must be discussed individually.

P-217 | A MODY Calculator for use in the paediatric population from diagnosis

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Introduction: It is important to have a correct diabetes classification at diabetes diagnosis in each individual to obtain the correct treatment from start. Maturity Onset Diabetes of the Young (MODY) is a young-onset, monogenic form of diabetes where the most common forms in childhood do not require insulin treatment. However these cases are often misclassified. Genetic testing is expensive; therefore, approaches are needed to help identify patients who are likely to have MODY.
Objectives: We aimed to develop a MODY probability calculator that can be used in pediatric cases at the time of diagnosis.
Methods: We analysed clinical features and islet autoantibodies data at time of diabetes diagnosis from 3541 paediatric patients from the Swedish 'Better Diabetes Diagnosis' (BDD) population study (n=46 (1.3%) MODY). Firth logistic regression models were developed and model discrimination and calibration were assessed. Model performance was compared with islet autoantibody testing (GAD, IA2, and ZnT8).
Results: HbA1c, affected parent, and absence of polyuria were significant independent predictors of MODY, BMI, sex, and age at diagnosis were not discriminatory. Our model showed excellent discrimination (c-statistic=0.963) and calibrated well, with predicted probabilities lining up well with the observed numbers of MODY (Brier score=0.01).
By using a MODY probability of >1.3% (that is,. above background prevalence) and had similar performance to being negative for all three antibodies (positive predictive value (PPV) = 10% vs. 11%, respectively). Probability >1.3% and negativity for all three antibodies narrows down to 4% of the cohort for genetic testing, which detects 93% of MODY cases (PPV =31%).
Conclusions: We developed a MODY calculator for use in paediatric patients at the time of diabetes diagnosis. This calculator will help to target genetic testing to those most likely to benefit to ensure they receive the correct diagnosis and treatment for their diabetes from the start.

P-218 | Exploring the clinical and genetic spectrum of TRMA/Rogers syndrome: a case series of four pediatric patients in Pakistan

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Introduction: TRMA (thiamine-responsive megaloblastic anemia) or Rogers syndrome is a rare autosomal recessive disorder characterized by the triad of diabetes mellitus, megaloblastic anemia, and sensorineural deafness. We report four cases of TRMA/Rogers Syndrome from Pakistan, highlighting the clinical features and management challenges in a resource-poor setting.
Objectives: To explore genetics and clinical profile of TRMA patients presenting in tertiary care centre Pakistan
Methods: Case series after informed consent
Results: **Case 1**
A 3-year-old female presented with visual problems, and was subsequently diagnosed with diabetes and megaloblastic anemia. Genetic testing revealed a homozygous missense mutation in SLC19A2 confirming the diagnosis of TRMA/Rogers Syndrome. The patient was managed with thiamine supplementation, insulin therapy, and regular follow-up.
Case 2
A 12-year-old female presented with sensorineural deafness, and was later diagnosed with diabetes and megaloblastic anemia. Genetic testing revealed

a homozygous nonsense mutation in SLC19A2 confirming the diagnosis of TRMA/Rogers Syndrome. The patient was managed with thiamine supplementation, insulin therapy, and hearing aids.

Case 3

A 2.5-year-old male presented with sensorineural deafness, and was subsequently diagnosed with diabetes and megaloblastic anemia. Genetic testing revealed a homozygous frameshift mutation in SLC19A2 confirming the diagnosis of TRMA/Rogers Syndrome. The patient was managed with thiamine supplementation, insulin therapy, and regular audiology evaluations.

Case 4

5-year-old child with known case of IDDM since 1-year of age has diminished hearing and vision. Antibody workup was negative and thyroid profile showed hypothyroidism. Furthermore, genetic profile showing homozygous mutation in SLC19A2 gene cofirming (TRMA).

Conclusions: The challenges of managing TRMA Syndrome in a resource-poor setting highlight the need for improved genetic testing and healthcare infrastructure in developing countries

P-220 | Monogenic diabetes gene variants in 323 Greek MODY patients

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Introduction: Maturity Onset Diabetes of the Young (MODY) is a clinically and genetically heterogeneous type of Monogenic Diabetes.

It is a rare disease characterized by early onset hyperglycemia, autosomal dominant inheritance, and defect in β cell insulin secretion, often misclassified as T1DM or T2DM.

Objectives: To present the MODY genetic testing of 323 Greek diabetic patients.

Methods: Genetic analysis was performed in 323 Greek unrelated patients, fulfilling MODY criteria over a period of 4 years. 279/323 patients underwent targeted Next Generation Sequencing (tNGS) with a custom panel for: *GCK, HNF1A, HNF4A, HNF1B, INS, ABCC8, KCNJ11, NEUROD1, CEL, PDX1, APPL1, WFS1, INSR*. Copy Number Variation Analysis (CNVs) was performed by MLPA. 44/323 patients with mild fasting hyperglycemia phenotype, suggestive of GCK-MODY, underwent Sanger Sequencing *GCK* gene.

Results: By tNGs genetic diagnosis was achieved in 30% (83/279) of the patients, while by Sanger sequencing *GCK* MODY diagnosis reached 45.5% (20/44). MLPA analysis revealed 2 heterozygous deletions in *GCK* and *HNF1B* genes.

Overall, the frequency of the different MODY subtypes were: *GCK* (17.6%), *HNF1A* (8.2%) followed by *ABCC8* (4%), *HNF4A* (1.4%) and *HNF1B* (1.4%). Rare MODY subtypes such as *KCNJ11* (1%) and *INS* (1%) were also detected. Five patients, who presented with diabetes without syndromic clinical features were carrying heterozygous variants of unknown signicance in syndromic monogenic diabetes genes *WFS1* and *INSR* .

Conclusions: Genetic diagnosis was achieved in 32% of tested patients. The most frequent MODY subtypes in this study were found to be *GCK, HNF1A* and *ABCC8*, while rarer subtypes and patients with variants in syndromic genes were also detected. Genetic diagnosis is important since different MODY subtypes require different treatment.

Multiple gene screening in MD patients, employing expanded panels of MODY and syndromic diabetes genes, provides early diagnosis of atypical presentations, disease progression prognosis and family genetic counseling.

P-221 | Next generation sequencing and changes in neonatal diabetes landscape in Italy between 2005-2022

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Introduction: Neonatal diabetes mellitus (NDM) defined as diabetes onsetwithin first 180 days of life is a rare condition

Objectives: Evaluate the impact of next generation DNA sequencing (NGS) in diagnostic performance of neonatal diabetes mellitus (NDM, diabetes with onset within the first 6 months of life) which is considered prevalently monogenic

Methods: We compared the period 2005-2013, during which Sanger DNA sequencing was the main diagnostic tool, versus the years 2014-2022, when NGS started to replace Sanger

Results: During 2005-2013, forty-five NDM cases were studied, 26 with permanent NDM (PNDM), 19 with the transient (TNDM) subtype. A final genetic diagnosis was achieved in 19 patients with PNDM (73,1%) (10 KCNJ11, 8 INS, 1 GATA 4) and in 15 patients with TNDM (6 ABCC8, 5 KCNJ11, 4 6q24) (79%). During 2014-2022 we identified 39 NDM cases: 14 PNDM, 25 TNDM.

We found causative genetic variants in 13 PNDM patients (91.6%) (6 KCNJ11, 1 ABCC8, 1 GATA6, 1 RFX6, 1 PDX1, 1 LRBA, 1 FOXP3, 1 IL2RA) and 19 TNDM patients (76%) (7 ABCC8, 7 6q24, 4 KCNJ11, 1 HNF1B). Among TNDM without a final genetic diagnosis, two carry an ABCC8 variant of uncertain significance while in 4 genetic screening was incomplete

Conclusions: As expected, NGS improved the % of final genetic diagnosis of cases with PNDM, identifying variants in rare recessive or X-linked genes such as RFX6, PDX1, LRBA, IL2RA and FOXP3 in the period 2014-2022 (42.8% vs 3.8% of 1st period; p=0.002), and providing a genetic cause for 3 patients with autoimmune PNDM.

In addition during 2014-2022 we observed an apparent increase in TNDM, likely due to fact that screening of blood glucose at birth has become more common and the improved detection of mild, transient cases with no need of treatment which are easily lost at follow-up.

We attribute the lower absolute number of cases in the second period of observation to the dramatic decrease of births in Italy between 2005-2013 (4,882,667; incidence 1:108503 live births) and 2014-2022 (3,952,948; incidence 1:101357 live births)

P-222 | The national experience of neonatal diabetes in Ireland 2006-2023

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Introduction: Neonatal diabetes mellitus (NDM) is a rare form of diabetes usually presenting by 6 months of age. It typically occurs due to a genetic muta-

tion and presents as permanent (PNDM), transient (TNDM), or syndromic neonatal diabetes. Those with a mutation in genes encoding subunits of the K_{ATP} channel may be responsive to treatment with oral sulphonylureas instead of insulin.

Objectives: To review the presentation, genotype, clinical management and outcomes of all patients diagnosed with NDM in Ireland over the past 17 years.

Methods: This was a national retrospective review of NDM cases from 2006 to 2023. Cases were collected through contributions from Paediatric Endocrinologists across Ireland and interrogating our electronic database.

Results: Twenty cases of NDM were identified; 9 PNDM, 7 TNDM and 4 syndromic. Age range of confirmed diagnosis of diabetes was 1 day to 11 months. A genetic mutation was identified in 7 cases of PNDM; *KCNJ11* (n=6), INS gene mutation (n=1), with negative genetics in 2 cases, despite extensive testing.

One of these cases also had Trisomy 21. Five cases of TNDM were due to a 6q24 methylation defect, 1 due to an *ABCC8* gene mutation, and the genetic result in one case is pending.

All 4 of the syndromic cases had Wolcott-Rallison Syndrome, due to *EIF2AK3* gene mutation. In two cases, one with PNDM (*KCNJ11*), the other with TNDM (*ABCC8*) a parent was found to be affected, resulting in the former successfully transitioning off insulin to sulphonylurea.

This case series demonstrates the spectrum of presentation and management of NDM. Treatment with sulphonylurea was more successful when it was started at a younger age. Cases with 6q24 methylation defects presented with a similar phenotype of intrauterine growth restriction, prematurity and TNDM.

Conclusions: Early clinical suspicion and genetic diagnosis is key to management of NDM and informs future risk for the patient and their families. In PNDM, oral sulphonylureas can result in better diabetes control and avoid need for insulin.

P-262 | A case series of monogenic diabetes – highlighting the importance of diagnosis

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Introduction: Monogenic diabetes is uncommon, but accounts for approximately 2.5 to 6.5% of pediatric diabetes and is frequently misdiagnosed as either type 1 diabetes or young-onset type 2 diabetes.

Objectives: To study the etiology, clinical presentation and outcomes of children and adolescents diagnosed with monogenic diabetes.

Methods: A retrospective analysis of data from the year 2011 to 2021 was conducted including all subjects with genetically confirmed monogenic diabetes in the age group of 0-18 years. Initial clinical presentation, associated features, genetic analysis and outcome of these subjects were studied.

Results: 23 subjects diagnosed with monogenic diabetes (confirmed with genetic analysis) were studied, which included neonatal diabetes (14 cases), MODY (3 cases), and various forms of syndromic diabetes (4 with Wolfram syndrome, 1 with H syndrome and 1 with thiamine responsive megaloblastic anemia).

Among the 14 cases of neonatal diabetes, mutations in KCNJ11 gene (7 cases) accounted for 50% of cases, EIF2AK3 gene (3 cases), ABCC8 gene (2 cases), ZFP57 gene (1 case) and NKX2-2 gene (1 case). we could successfully switch over 4 subjects (all with mutations in KCNJ11 gene) from insulin to oral sulfonylureas.

We had 3 cases of MODY (MODY 3, MODY 5 and MODY 13 associated with mutations in HNF1A, HNF1B and KCNJ11 gene respectively) and among them, 2 with mutations in HNF1A and KCNJ11 gene were successfully switched over from insulin to oral sulfonylureas.

Conclusions: Identification of children with monogenic diabetes and making a specific molecular diagnosis helps predict the expected clinical course and guides the most appropriate management. Molecular diagnosis of specific subtypes of MODY and

Neonatal diabetes (with KCNJ11 and ABCC8 mutations) highlights the importance of early genetic diagnosis, as these patients can be switched over to oral sulfonylureas, that are not only more convenient, but also associated with reduced episodes of hypo and hyperglycemias.

P-268 | High prevalence of variants in MODY genes among children with type 1 diabetes mellitus

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Introduction: Maturity-onset diabetes of the young (MODY) includes several types of monogenic diabetes, inherited in an autosomal dominant pattern. The literature examining a possible etiopathogenetic connection between MODY and type 1 diabetes (T1DM) is limited.

Objectives: To outline the prevalence of mutations in 16 MODY genes in a population of pediatric T1DM patients.

Methods: A next generation sequencing (NGS) panel (16 genes: *HNF4A; GCK; HNF1A; PDX1; HNF1B/TCF2; NEUROD1; KLF11; CEL; PAX4; INS; BLK; ABCC8/SUR1; KCNJ11; APPL1; WFS1; INSR*) and evaluation of copy number variations through multiplex ligation dependent probe amplification assay (MLPA) (5 genes: *HNF4A; GCK; HNF1A; HNF1B; ABCC8/SUR*) were performed on all pediatric individuals with T1DM onset from October 2020 to January 2023 (n=32); 2 genetic testing are still ongoing.

Information about sex, age, ketoacidosis, hemoglobin A1c, C-peptide and beta-cell autoantibodies at onset were collected.

Results: We identified variants in 6 T1DM patients (19%): 2 of them were likely pathogenic and 4 were of uncertain significance (according to ACMG criteria); 2 mutations were found in *INSR*, and 1 each for *HNF1A, HNF1B, WFS1* and *CEL* genes. In no cases diabetes was diagnosed in parents.

Patients with variants in MODY genes had no significant differences in clinical or laboratory variables compared to those without variants, except for the positivity rate for ZnT8 antibodies (100% vs. 57%, p=0.04).

	TOTAL	WITH VARIANTS IN MODY GENES	WITHOUT VARIANTS IN MODYGENES	p
n (%)	32 (100%)	6 (19%)	24 (75%)	
Female sex, n (%)	18 (56%)	2 (33%)	14 (58%)	0.27
Age at onset, median (IQR)	9.4 (6.2;12.6)	8.8 (6.2;13.7)	9.3 (5.8;12.6)	0.73
DKA at onset, n (%)	13 (41%)	2 (33%)	10 (41%)	0.70
C-peptide (ng/mL) at onset, median (IQR)	0.34 (0.23;0.75)	0.35 (0.22;0.97)	0.33 (0.23;0.71)	0.75
HbA1c (%) at onset, median (IQR)	11.5 (10.6;13.0)	10.3 (9.0;14.1)	11.6 (10.8;13.0)	0.26
>2 positive autoantibodies, n (%)	7 (22%)	1 (17%)	5 (21%)	0.80
Negative autoantibodies, n (%)	3 (9%)	0 (0%)	3 (13%)	0.36
Anti ZnT8, n (%	21 (68%)	6 (100%)	13 (57%)	0.04

Conclusions: Nearly 20% of T1DM patients had a variant (likely pathogenic or of uncertain significance) in MODY genes. No clinical differences were found between patients with and without variants. Despite the small sample size, our study highlights the possible involvement of variants in MODY genes in the development of T1DM; moreover, the presence of beta-cells autoantibodies should not be considered as a criterion to rule out MODY genetic testing.

P-270 | Identification of pax-4 gene mutations leading to mody-9 in two adolescents at a tertiary care centre in South India

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Introduction: Maturity onset diabetes of the young (MODY) is the most common form of monogenic diabetes contributing to 2.5-6 % of paediatric diabetes. 14 subtypes of MODY have now been identified, and mutations in *HNF1A, HNF4A, GCK* account for about 95% of all MODY cases. But, the incidence of MODY-9 due to *PAX-4* gene mutation accounts for less than 1 % of MODY cases.

Objectives: To report and describe the characteristics of two adolescents who tested positive for *PAX-4* gene mutation which is an extremely rare cause of MODY.

Methods: Genetic analysis was done for the children and adolescents with DM and with a strong family history of DM. Among the various common mutations

accounting for MODY, we identified two adolescents who tested positive for PAX-4 gene mutation leading to MODY-9.

Results:

	Patient A	Patient B
Age at diagnosis	14.6 years	17.2 years
Gender	Male	Female
Clinical presentation	Polyuria, polydipsia x 3 months Weight loss (16 kgs)in 2 months	Excessive hunger and easy fatigability
BMI	37.17 kg/m^2	19.44 kg/m^2
Family history of DM	Both parents – DM Genetic test not done	Father – DM since age 20 – genetic test not done Mother – T2DM
HbA1C at diagnosis	16.2 %	11.8 %
Initial diagnosis	Type 2 DM	Type 2 DM
Gene mutation	PAX-4 (c.680G>A)	PAX-4 (c.992C>T)
Treatment	Initially, lifestyle modification Now, Insulin – basal and bolus	Metformin, Sulfonylureas

Discussion: Paired box gene 4 (*PAX-4*), located on chromosome 7, is a transcription factor that regulates fetal development, cancer growth, commitment of progenitor cells to islet cells, subdues the promoter activity of insulin and is required for the regeneration of β-cells.

Conclusion: Prompt genetic testing in those with a family history of DM and negative insulin antibodies will be pivotal in diagnosing MODY and identifying rare gene mutations such as *PAX-4*.

P-277 | Case report: response to liraglutide in a 16-year-old female with a novel pathogenic variant in the HNF1B gene

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Introduction: Monogenic diabetes accounts for approximately 1-2% of cases of diabetes mellitus. This class of diabetes is often initially misdiagnosed as other etiologies are much more common.

Objectives: We describe a case of monogenic diabetes in a 16-year-old female with MODY5. She is heterozygous for a de novo pathogenic variant, c.926del (p.Phe309SerfsTer18) in HNF1B. This is consistent with a diagnosis of autosomal dominant renal cysts and diabetes syndrome. Mutations in the HNF1B (MODY 5) are associated with pancreatic agenesis, renal abnormalities, genital tract malformations, and liver dysfunction. Historically, people with a mutation in HNF1B can respond to sulfonylurea or repaglinide in addition to insulin.

Methods: The patient was initially treated with metformin for presumed diagnosis of T2D. She also required multiple daily injections of insulin. Once monogenic diabetes was diagnosed, she was started on glipizide, which was gradually increased to 5 mg BID and metformin was discontinued. After 2 years of following this treatment regimen, glycemic control remained suboptimal despite good compliance. Blood sugars were erratic with periods of prolonged hyperglycemia accompanied by frequent hypoglycemia. Average hemoglobin A1C while on this treatment regimen was 8.2%. She has renal impairment and there was slight decline in her eGFR over the past year (eGFR 60'sml/min/1.73m2). Due to poor glycemic response and worsening renal function, glipizide was discontinued, and she was started on liraglutide (0.6 mg daily).

Results: Her response to this medication has been excellent with 95% of blood sugars in target range and no hypoglycemia after 2 months of therapy. She has discontinued lispro insulin and takes one daily injection of glargine (0.48 units/kg/day). Her renal function remains stable to date.

Conclusions: Our case suggests that glucagon-like peptide (GLP-1) receptor agonist therapy may be of value in managing dysglycemia in patients with HNF1B monogenic diabetes (MODY 5).

P-284 | Oculopathy and obesity: a rare case of alstrom syndrome

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Introduction: Alstrom syndrome (AS) is a rare autosomal recessive disease caused by mutation of ALMS1 gene coding for an ubiquitous protein involved in the ciliary function and cell cycle control. We present a clinical case diagnosed at our centre.

Objectives: A 17-year-old boy with global developmental delay, intellectual disability, hyperphagia, obesity (Body Mass Index 30.4 kg/m2), hypertension, reduced testicular volume. At a few months of age, severe visual impairment and onset of nystagmus, altered color perception and photophobia.

Methods: Laboratory investigations, genetic testing and clinical consultations were requested.

Results: He showed hypercholesterolemia, glucose intolerance and severe insulin resistance (maximum value at 2 hours: 1019.8 mUI/ml) at oral glucose tolerance test, and normal testosterone. Abdominal ultrasonography showed hepatic steatosis.

Ophthalmologic consultation showed dystrophy of the central retinal pigment epithelium, and audiology consultation showed bilateral sensorineural hearing loss.

The genetic investigation showed a homozygote variant of ALMS1 gene (Val3906gLYFS*2) VARIANT NM_015120:c11717_11720 of exon 18 causatives of AS.

Conclusions: AS shows a highly variable clinical spectrum with obesity, insulin resistance, visual impairment, sensorineural hearing loss, mental retardation, dilated cardiomyopathy, hepato-renal alterations, and hormonal disorders.

The association of early-onset retinal degeneration, obesity, hyperglycemia, and hearing loss raise the suspicion of AS which clinically overlaps with Bardet-Biedl syndrome (BBS), but is genetically differentiated. In AS progression to blindness is inexorable.

Early diagnosis of AS might improve quality of life with interventions such as lens wear to reduce photophobia, hearing prosthetics, symptomatic therapy in dilated cardiomyopathy when present.

P-286 | Beware of rare forms of diabetes in children

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Introduction: When a person with type 1 diabetes (T1D) is transferred to another diabetes center, this does not lead automatically to a reassessment of the diagnosis. This approach has pitfalls that one should avoid. This case presentation supports a more critical approach.

Objectives: A non obese adolescent with T1D diagnosis, treated with pump and continuous glucose monitoring (CGM) was first seen in our diabetes center one year after diagnosis. The family came on their own initiative. Apparently, she presented with hyperglycemia and a high HbA1c. No information on auto immunity was available.

Family history revealed type 2 diabetes in grand parents.

Methods: During follow up a progressive reduction of insulin was observed with normal HbA1c values, interpreted as prolonged remission. At age 17, she developed abdominal pains, for which further analyses were performed.

Results: Laboratory tests revealed hypomagnesaemia, increased yGt , alkaline phosphatase, C-peptide was 2 ng/dL. Ultrasound demonstrated hypoechogenic liver, hyperechogenicity of portal spaces and non-specific inflammatory signs. Pancreas described as thin and hyperechogenic, kidneys had a normal size, with trophic parenchyma but interspersed with multiple parenchymal cystic images bilaterally. The uterus was bicorn. T1D diagnosis was questioned. Genetic analysis (Sanger and MLPA) confirmed a MODY 5, with heterozygous mutation in chromosome 17q12 resulting in a HNF1B whole gene deletion variant.

Conclusions: MODY 5 is a rare form of monogenic diabetes, characterised by renal cysts, abnormal liver function , hypomagnesia, pancreatic exocrine and endocrine dysfunction (1). Based on pancreas hypoplasia, insulin dependency can occur.

Our patient has been initially misclassified and treated as T1D. Abdominal symptoms led to the correct diagnosis and follow up. Without written documentation on diagnostic criteria, a careful evaluation of the diagnosis is necessary.

(1) Greeley S. et al ISPAD Clinical Practice Consensus Guidelines; 2022; Pediatric Diabetes.

P-304 | Good response to sulphonylurea in a patient with recurrent DM with an ABCC8 variant previously described as non-responsive

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Introduction: Activating mutations in the KATP channel genes (*KCNJ11* and *ABCC8*) are the commonest cause of Permanent Neonatal Diabetes Mellitus (PNDM**).** Approximately 90% of these patients can be switched from insulin to sulphonylureas (SU). The variant R1182W in *ABCC8* has been described as not responsive to SU.

Objectives: We aim to report the case of a patient with the R1182W variant who responded well to SU.

Methods: Case report

Results: RAS, male, 15 years old (y). He was diagnosed with DM at 6 months, with polyuria, polydipsia and DKA, and blood glucose 400 mg/dL. Insulin therapy was started. At 4y, he presented with glycemic control improvement, and insulin therapy was suspended. At 9y10mo, DM has recurred, with blood glucose of 328 mg/dL. Insulin therapy was restarted and one year later, he was referred to our monogenic diabetes clinic. The genetic investigation by NGS revealed a heterozygous variant in *ABCC8* (c.C3544T/p.R1182W-NM_000352.3).

This variant has been previously described as not responsive to SU. At 11.4y, he was using NPH and regular insulin (0.6 IU/kg/day) with high blood glucose levels, HbA1c of 13%, and C-peptide 0.68 ng/mL.

We introduced gliclazide 30mg daily. He improved glycemic control and reduced HbA1c (13.2% to 6.3%). Progressively, the dose of gliclazide was increased, and the total amount of insulin/Kg/day was reduced. At 13.7 years of age, with an amount of gliclazide of 90 mg/day, it was possible to suspend insulin. He slightly worsened HbA1C (7.1 to 7.7%), and we introduced saxagliptin with A1C improvement (Table1).

DATE	18/01/2019	08/08/2019 *	23/12/2019	25/10/2021 **	31/05/2022 ***	02/02/2023
PATIENT AGE (years)	11	11.4	11.8	13.7	14.2	15
GLUCOSE - mg/dL	163	265	108	121	142	115
HbA1C - %	11	13.2	6.3	7.1	7.7	6.6
Estimated average glucose - mg/dL	269	332	134	157	174	143
C PEPTIDE- ng/mL	0.9	0.68	1.68	3.29	3.16	2.66

*Gliclazide introduction
** Insulin suspended
*** Saxagliptin introduction

Table 1. Evolution of laboratory tests of the patient with recurrent DM and a variant in ABCC8 (c.C3544T / p.R1182W- NM_000352.3)

Conclusions: This case emphasizes the necessity to try SU treatment, despite a non-response previously described. It enables suspending insulin use and improving the patient's quality of life. In addition, we saw a good response to the DPP4 inhibitor, which may be an alternative in treating patients with variations in KATP channel genes.

P-305 | Longer-than-expected survival in a patient with Wolcott-Rallison Syndrome: a case report

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Introduction: Wolcott-Rallison syndrome (WRS) is a rare condition and the most typical cause of Permanent Neonatal Diabetes Mellitus (PNDM) in consanguineous families. It presents with PNDM or early-onset DM, spondyloepiphyseal dysplasia, growth retardation, hypothyroidism and recurrent hepatic and renal dysfunction, among other comorbidities. It is caused by biallelic mutations in the *EIF2AK3*. Patients with WRS have a poor prognosis, and most die during the first years of life due to acute fulminant hepatitis or renal failure.

Objectives: We aim to report a 23 year-male patient with genetically confirmed WRS.

Methods: Case report

Results: LP, 23 years old, born from consanguineous parents, had an NDM diagnosis at three months of life, using insulin therapy since then. He has bone dysplasia, short stature (Height=94 cm), hypothyroidism since he was 5 years old, asthma, and immunodeficiency (IgA deficiency and CD4 lymphopenia). The genetic investigation by NGS revealed a homozygous stopgain mutation in *EIF2AK3* (c.C1192T:p.Q398X - NM_004836), classified as pathogenic by ACMG.

He presents a good glycemic control (HbA1c 6.5%). He has transaminases slightly elevated (AST: 47 U/L/TGP: 36U/L) and never had episodes of hepatitis and liver insufficiency. He also has a satisfactory renal function (CrCl=57 mL/min/1.73m^2 – CKD-EPI).

Conclusions: We report a case of SWR with a longer-than-expected survival for patients with this disease. It demonstrates the need to develop longer-term follow-up strategies for these cases.

P-310 | Mutation in the insulin gene, a rare cause of autoantibody-negative type 1 diabetes

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Introduction: Insulin gene mutations have been described as a common cause of permanent neonatal diabetes and can be a rare cause of Maturity-onset Diabetes of the Young 10 (MODY 10), or autoantibody-negative type 1 diabetes.

Objectives: Here we describe an 11 year old girl with autoantibody-negative type 1 diabetes due to a heterozygous insulin gene mutation.

Methods: An 11 year old girl had signs of polyuria and polydipsia since 6 months. She increased in height but not in weight, BMI 13,3 kg/m2 (-2,5SD). At diagnosis glucose concentration was 16.1 mmol/l, blood ketones 0,2 mmol/l, HbA1c 12.5% (113 mmol/mol), c-peptide 0,30 nmol/l, insulin < 2.0 mU/l. All diabetes-associated autoantibodies (anti-GAD65, anti-IA2, anti-ZnT8 and anti-ICA) were negative. She was treated with multiple daily injections (insulin dose 1 U/kg/day) and later on with a hybrid closed loop insulin pump (insulin dose 0,7U/kg/day).

The family history was positive for diabetes. Her father and his mother have been diagnosed with type 2 diabetes and are treated with respectively metformin and insulin.

Results: In our patient next-generation sequencing showed a heterozygous mutation for c.123del p.(Val142Cysfs*89) in exon 2 of the insulin gene. The mutation leads to a frame shift and at protein level to a premature stop codon. In both parents the mutation was not found, therefore our patient had a de novo insulin gene mutation as cause of her autoantibody-negative type 1 diabetes.

Conclusions: It is necessary to perform next-generation sequencing for monogenic diabetes in patients that may have all characteristics of type 1 diabetes, but lack diabetes-associated autoantibodies.

Establishing an insulin gene mutation as cause of autoantibody-negative type 1 diabetes may not change current treatment, but may enable prediction of risk for diabetes in relatives and offspring.

P-326 | The influence of highly effective CFTR modulator therapy (HEMT) in patients with CF and different types of diabetes (CFRD/DT1) on the clinical course of diabetes - the first preliminary Polish experience based on 3 cases

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Introduction: The HEMT in patients with CF (PwCF) was introduced in Poland in 2022. These drugs' positive effect on the CF course is widely recognized, but knowledge about the direct and long-term effects on the treatment of CFRD/DT1 is not complete and clear.

Objectives: We present a 6-month follow-up of the clinical course of diabetes and QoL assessment (WHO survey) in three PwCF and different types of diabetes who were treated with HEMT.

Methods: Cases report

Results:

1. A 15-year-old girl in good condition (stable CF, BMI 18.27) with CFRD diagnosed at 13 yrs, initially was treated with a high-energy diet, stayed in good glycemic control in the first year (HbA1c 6.2%).

Next HbA1c increased to 6.6% and insulin therapy was recommended. When the girl started HEMT, we observed the positive effect of these drugs without insulin on the BG level and BMI:TIR 88%, HbA1c 6.1%, BMI 21 in the 3rd mth, no changes in the 6th.The girl reported improved QoL.

2. A 19-year-old woman in medium condition (stable CF, BMI 16.02) with CFRD diagnosed at 9 yrs was treated with insulin (MDI,TDD 0.4U/kg/day, HbA1c 6.4%). After starting HEMT we observed a significant increase in body weight (BMI 18.02) and no change in HbA1c (6.4%) in 3rd mth. The BMI and HbA1c remained stable in 6th, the women reported improved QoL.
3. A 14-year-old girl with CF and DT1 diagnosed at 6 yrs was treated with an insulin pump and CGM from the DT1 onset. The CF was stable, the effect of diabetes treatment was unsatisfactory (TDDI>1.0 U/kg/day, HbA1c 8.5%, TIR 49%, BMI 23.4). After starting HEMT we observed a significant increase in weight (BMI 26.2 in 3rd mth, next remaining stable), worsening of the BG level (HbA1c 9 and 10.4%, TIR 43 and 35%) and worsening of QoL.

Conclusions: PwCF and diabetes have very individual responses in glycemic control, body weight and QoL after introducing HEMT. While the effect of weight gain remains neutral or even beneficial in CFRD, DT1 require special attention to avoid uncontrolled excessive weight gain and worsening glycemic control.

P-353 | Diabetes mellitus and pre-existed renal and pancreatic abnormalities

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Introduction: MODY5 is a rare subtype of monogenic diabetes mellitus caused by an heterozygous autosomal dominant mutation in the HNF1B gene. The HNF1B takes part in the development of pancreas, liver, kidneys. Abnormal deletions of the HNF1B gene are responsible for urinary system disorders.
MODY5 is a type of Diabetes associated by with urinary tract abnormalities (renal cysts), pancreatic hypoplasia, impairment renal function**,** hyperuricemia, impaired exocrine pancreatic function.

Objectives: To present a rare case of a new onset monogenic diabetes mellitus in a boy and his mother with pre-existed renal and pancreatic abnormalities.

Methods: A 14-year-old boy was admitted to the pediatric department due to abdominal pain and vomiting. Laboratory tests showed Glucose: 630mg/dl,HbA1c:13%, elevated pancreatic enzymes mild DKA (ph7,21HCO3:13), c-peptide:1,12ng/mL. Acute Renal failure. He was an obese boy, BMI:30mg/kg, Tanner stage III.
Medical Past History revealed Polycystic kidneys and renal atrophy, hypopalastic pancreas. Renal abnormalities had been detected by fetal ultrasonography and were confirmed after birth. The child was under the care of a pediatric nephrologist with no suspicion of monogenic diabetes. His mother had diabetes and polycystic kidneys disease .

Results: He had Whole Exome Sequence that showed HNF1B 17:37731774 -289 missense ENST00000617811.5 c.866A>C p. Asn289Thr heterozygous. This mutation is indicative of MODY5 DM. DKA resolved in 5 hours, renal and pancreatic function returned in normal, pancreatis and hyperuricemia. Currently he is on insulin treatment (Basal bolus) and CGM. His mother also had DNA analyses for HNF1B (de novo mutation).

Conclusions: MODY5 is often misdiagnosed as-Type1or Type2 DM. Familial diabetes and Urinary tract abnormalities with liver or pancreatic abnormalities increase the index of suspicion. Pediatrician Nephrologists must be aware of MODY5 when Renal cysts or other renal abnormalities are present. Early diagnosis is essential to avoid diabetes and chronic kidney disease complications.

P-387 | JQ our novel super hero

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Introduction: A 4 months old infant was assessed by our full diabetic team for hyperglycaemia. The baby was born with intrauterine growth retardation at 34 weeks gestation to a healthy mother. The baby's weight was 1050 grams. The antenatal history was only pertinent for IUGR. Due to her low birth weight she was kept in the special care unit. On day 1 of birth her blood glucose was 27.1 mmol/L. Her physical examination was unremarkable.

Objectives: Given the hyperglycaemia event, the NICU team thought of severe stress of the newborn which can be caused by sepsis or hyperglycaemia related to preterm or low birth weight infants.

Methods: This is a case report of an interesting and a novel genetic mutation

Results: The infant was started on insulin subcutaneously as multiple daily injections then shifted to insulin intravenous infusion once the patient suspected to have sepsis. A clinical diagnosis of Neonatal diabetes was established based on the duration insulin requirements. Blood glucose was monitored with flash glucose monitoring system with fluctuation in blood glucose.

Once we received the patient in our care we inserted an Automated insulin delivery system with diluted then undiluted insulin and Blood glucose was in good control. Using whole Exome sequence (WES) clinical relevant mutation in the NEUROD1gene was identified (the p.Ala94Pro variant is NOVEL). This missense variant has not reported previously as a pathogenic variant nor a benign variant to our knowledge.

Conclusions: The clinical phenotype of this infant can be explained by this novel mutation in NEUROD1 gene in which the diagnosis of MODY 6 is possible.

To our knowledge this is missesse mutation that has not been reported previously.

In addition given the challenges of insulin delivery and fluctuation in blood glucose to these infant, we believe that AID system is the best option to control their blood glucose that comes with many challenges.

P-405 | Neonatal diabetes mellitus due to a de novo variant in the INS gene

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Introduction: Neonatal diabetes mellitus (NDM) is a rare condition characterized by the onset of diabetes within the first few months of life. It is distinct from type 1 diabetes, which typically develops in childhood or adolescence. NDM can be caused by various genetic mutations, including those in the INS gene, which encodes for insulin.

Objectives: To report a case of a female baby with neonatal diabetes mellitus (NDM) due to a de novo variant in the INS gene.

Methods: In this case, a female baby was born at 36 weeks with a birth weight of 3 kg. The pregnancy was uneventful, but at the age of 8 months, she presented with diabetic ketoacidosis the patient responded well to insulin therapy. To confirm the genetic aetiology, laboratory tests were conducted.

Results: The haemoglobin A1c (HbA1c) level was significantly elevated at 17.6 (normal range: 4.5-7), indicating poor glycemic control. However, the insulin autoantibody test was negative, ruling out autoimmune diabetes.

Genetic analysis revealed that the patient had a heterozygous pathogenic INS splicing variant. Further genetic testing of the parents showed no mutations, indicating that the variant arose spontaneously (de novo) in the patient.

Conclusions: This case highlights the importance of genetic testing in the diagnosis of NDM. In cases involving INS gene mutations, insulin therapy remains the mainstay of treatment. Early diagnosis and appropriate management are crucial to ensure optimal glycemic control and prevent complications associated with diabetes.

PSYCHOLOGICAL AND PSYCHOSOCIAL ASPECTS OF DIABETES

P-120 | The relationship between neurodiversity in type 1 diabetes and disordered eating: preliminary findings from prevent T1DE study

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Introduction: Children and young people (CYP) living with Type 1 Diabetes (T1D) are at greater risk of developing disordered eating (DE) and eating disorders (ED) (Pursey, Hart et al. 2020). The interactions between neurodiversity, ED and T1D are scarcely reported within the literature. Links between neurodiversity and ED are well established (Nickel et al., 2019).

There may be higher rates of neurodiversity in people with diabetes (Cortese et al., 2022; Butwicka, Frisén et al. 2015) but this is less well established. Neurodiversity in diabetes education and eating disorder risk is not currently considered within clinical guidelines.

Objectives: To explore the relationship between Type 1 Diabetes, Disordered Eating and Neurodiversity in people expressing an interest in the PreventT1DE study

Methods: Participants were recruited from a range of T1D communities in the United Kingdom, using social media (@preventT1DE) and via Diabetes UK patient groups. Participants registered interest for qualitative interviews exploring the development of DE in T1D. Eligibility criteria, demographic information including neurodiversity was collected. Incidence of neurodiversity amongst people with a history of Type 1 Diabetes and Disordered Eating (T1DE) was compared to predicted population and ED incidence. Cardiff Metropolitan University Ethics was granted and approval was received from Diabetes UK research team. This research is funded by RCBC Wales

Results: 27 participants expressed interest. All report a history of DE and T1D. 9 participants reported neurodiversity diagnosis. In addition, 10 others reported that they believe they may have autism or are seeking a diagnosis.

	Participants (History of T1DE)	Population estimate (Doyle, 2020; CDCP, 2022; Thomas, Sanders et al, 2015)	People with an eating disorder (Nickel et al., 2019)
Neurodiversity	19/27: 70% (self reported)	Up to 20%	
Autism	15/27: 55% (self reported)	Up to 2.7%	Up to 27%
ADHD	2/27: 7.4% (self reported)	Up to 7.9%	Up to 18%

Limitations include recruitment via social media and diagnoses were self reported.

Conclusions: There may be relationship between neurodiversity and T1DE development. Further research is needed to understand these links and has considerations for structured education and early intervention/prevention of T1DE.

P-122 | Does parental stress adversely affect metabolic control of children with type 1 diabetes?

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Introduction: Ensuring metabolic control in children with Type 1 diabetes is still one of the most important problems. It is thought that various psychosocial variables, such as stress, have an effect on the metabolic control of children.

Objectives: The aim of the study is to investigate the effect of parental stress on the metabolic control of children with type1 diabetes.

Methods: 81 parents who volunteered to participate in the study from families of children with type 1 diabetes were included. Parents were asked to fill out the Parental Stress Index-Short Form (4th version Abidin et al.), consisting of 36 questions, including those about parental stress, parent-child dysfunctional interaction, and difficult child subscales.

Results: 58%(n=47) of the children participating in the study were girls, and the mean age was 10.6±4.2 years. The mean HbA1c level was 7.6±1.2%. 37% of the patients (n=30) were well-controlled. In the parental stress index(PSI); parental stress, parent-child dysfunctional interaction, and difficult child subscale

scores were found to be median 30(IQR:8), 25(IQR:10), 27(IQR:10), respectively. The total parental stress index score was 81(IQR:25). A positive correlation was found between the PSI and HbA1c levels ($p<0.05$), the factor most affecting the score was the difficult child subscale.

A positive correlation was found between the number of siblings and HbA1c levels. As the education level of the parents increased, the mean HbA1c decreased, and the difference in HbA1c levels was significant at the education level of the father.

On the other hand, HbA1C levels and parental stress scores were found to be significantly lower in pump users compared to pen users.

Conclusions: This study showed that parental stress adversely affected the metabolic control of children with Type 1 diabetes.

Additionally, diabetes technologies have a positive effect on metabolic control and family stress. Providing education and psychosocial support to the family is mandatory for the success of treatment in type 1 diabetes.

P-124 | Feasibility of parent/caregiver diabetes distress screening in type 1 diabetes clinic

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Introduction: Caregiver diabetes distress (DD) consists of sadness, worry, and/or frustration about a child's T1D diagnosis. One-third of caregivers report severe distress up to 1-4 years after T1D diagnosis, which is associated with increased child A1c and family conflict. PAID-PR (Problem Areas in Diabetes Survey – Parent Revised) is used to assess DD primarily in research settings; however, less is known about its clinical utility.

Objectives: We aimed to identify the feasibility of implementing PAID-PR into routine clinical care of T1D in a diverse, large US academic pediatric diabetes center.

Methods: The PAID-PR is an 18-item measure with scores >56/100 indicative of DD. During T1D appointment check-in, PAID-PR was completed by caregivers of all patients. Adult therapy resources were provided to all. Forms were scored after appointments; those with DD (scores >56) were contacted by the co-PI; scores >80 were referred to Diabetes Psychology.

Results: In the initial 3 months, 157 caregivers (at least 50 % of those who attended clinic) completed a PAID-PR. Twenty-percent (N=31) of caregivers experienced DD; 25% of those with DD were referred to Diabetes Psychology; 60% of those referred followed up. There were significant associations between DD and demographic and medical characteristics such that DD was most common in caregivers of male, Black, pre-teens with higher A1c and T1D <4 years (Table 1).

	N =	M_{age} (years)	Sex	Race	$M_{Diabetes\ Duration}$ (years)	M_{A1c} (%)
All screened	157	12.0 ± 4.31	58% male, 42% female	58% Black, 23% Caucasian, 7% Hispanic, 12% Other	4.8 ± 3.78	8.5 ± 2.05
Caregiver DD	31	10.2 + 3.82	64% male, 36% female	53% Black, 16.7% Caucasian, 6.8% Hispanic, 23.5% Other	3.8 ± 3.07	9.0 ± 2.38

Table 1. Characteristics of children with T1D whose caregivers were screened for diabetes distress.

Conclusions: PAID-PR was feasibly incorporated into routine clinical care, although continued efforts to ensure all eligible caregivers receive a PAID-PR are necessary. By identifying caregivers with DD, resources can be provided and caregivers can be connected to behavioral health care if needed.

Limitations can include administration and scoring time constraints. Future directions include expansion of screening to surrounding diabetes clinics and additional languages. We have also begun recruitment for a multidisciplinary pilot intervention aimed to address caregiver DD.

P-147 | Suicidal ideation in adolescents with diabetes

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Introduction: Adolescents with diabetes have increased risk of suicide and depression screening is an important part of their diabetes care. It is unknown whether depression screening identifies all adolescents with diabetes and suicidal ideation.

Objectives: The primary aim of this study was to identify the frequency of adolescents who endorse suicidality in question 9 of the Patient Health Questionnaire (PHQ9) with different degrees of depression scores.
Our second aim was to determine if diabetes distress (Problem Areas in Diabetes-Teen, PAID-T) differs between adolescents with and without suicidal ideation.
Methods: PHQ-9 and PAID T were administered as part of routine clinic visits in adolescents 13-17 years of age. Results are presented as median and 25 and 75%tiles.
Results: Overall 27 of 341 subjects indicated suicidal ideation. Both PHQ-9 [13 (9-18) vs 1 (0-4.5)] and PAID T [88 (62-104) vs 40 (30-59)] scores were significantly higher in patients with suicidal ideation (p<0.001). Frequency of suicidal ideation increased with depression severity (Table; p<0.001).
Adolescents with type 2 diabetes (n=48) had more severe depression than with type 1 diabetes (p<0.001) but suicidal ideation did not differ. There were no sex differences.

	Depression					Total
Suicidal Ideation	None	Mild	Moderate	Moderately Severe	Severe	
No	246	49	14	5	0	314
Yes	2	7	7	10	1	27

Conclusions: Adolescents with diabetes and no demonstrable or minimal depression may still have suicidal ideation. It is, thus, important to screen directly for suicidal ideation in these patients and be immediately ready to interpret results and provide appropriate support. Adolescents with suicidal ideation experience increased diabetes distress. The direction of the association between diabetes distress and suicidal ideation cannot be determined from the single time-point of this study. A bidirectional relationship is possible.

P-148 | Meta-analysis of the effects of psychosocial and educational interventions on depressive symptoms and diabetic control in adolescents with type 1 or type 2 diabetes

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Introduction: Management of depressive symptoms in adolescents with diabetes promotes mental health and may have implications for overall disease management. However, there is little consensus on the most effective interventions for adolescents with diabetes experiencing depressive symptoms.
Objectives: This meta-analysis consolidates research on psychosocial and educational interventions in adolescents with diabetes to determine overall efficacy in treating depressive symptoms, as well as impact on diabetic control.
Methods: A database search identified articles from 1980-2021 related to adolescent diabetes (type 1 or 2), depression/depressive symptoms, and therapeutic/educational interventions. Of the 2,325 articles yielded, 14 met inclusion/exclusion criteria. Effect sizes were extracted and analyzed using Comprehensive Meta-analysis (CMA) statistics software.
Results: Selected studies included 1285 patients, ages 7 years to 20 years, across multiple ethnicities. Studies included psychosocial and/or educational interventions. Outcomes measured included depressive symptoms (13 studies) HbA1C (12 studies) and quality of life (6 studies). The reviewed interventions showed a moderate within groups pooled effect (g=0.799, p<0.001), and no significant between group effects (g=0.038, p=0.846). No moderators were identified.
Conclusions: Results indicate that interventions were effective in improving metabolic control and quality of life while reducing depressive symptoms for adolescents with diabetes. The lack of significant differences between psychosocial and educational interventions may reflect study method heterogeneity, factors besides treatment type that may influence efficacy (eg therapeutic alliance, treatment duration/frequency, care team involvement), or participants' greater biopsychosocial context. These results affirm the value of mental health treatment for adolescents with diabetes, leaving questions on optimal treatment plans for adolescents with diabetes who present with depressive symptoms.

P-149 | Suicidal ideation, suicide attempts and suicide deaths in adolescents and young adults with type 1 diabetes: a systematic review and meta-analysis

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Introduction: Depression and suicidal ideation are more prevalent in adolescents with chronic conditions and may have negative effects on adherence and health outcomes. Adolescents and young adults with Type 1 diabetes (T1D) may be at increased risk of suicide-related behaviours (i.e., suicidal ideation, suicide attempt and suicide death); in turn such behaviours may affect their self-management.
Objectives: The aims of this systematic review were:
1. To determine the prevalence of suicidal ideation, suicide attempts and suicide deaths in adolescents and young adults with T1D ages 10 to 25 years;
2. To compare the prevalence of suicide-related behaviours in youth with T1D versus without T1D;
3. To identify factors associated with suicide-related behaviours.
Methods: A systematic search was conducted on MEDLINE, EMBASE, and PsycINFO for studies published from inception to November 9, 2022. Methodological quality of the included studies was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist. Two independent reviewers conducted all stages of the review, with disagreements resolved through discussion.
Results: 32 studies were included. Using a random effects model with a Freeman-Tukey double arcsine transformation, pooled prevalence of suicidal ideation at any point in patients' lifetime was 15.4% (95% confidence interval [CI] 10.4-21.1%; n=17 studies), which was higher than youth without T1D i.e., 8.7% (95% CI 0.0-41.0%; n=3). Prevalence of lifetime suicide attempts ranged from 0.5 to 11.1% (n=9). The designs of studies reporting suicide deaths in T1D patients did not allow for the calculation of a pooled prevalence. Female sex was associated with increased prevalence of suicidal ideation and suicide attempts in most studies. However, suicide deaths were more frequent in male individuals.
Conclusions: Prevalence of suicidal ideation and suicide attempts is high in youth and young adults with T1D, especially when compared to those without T1D.

P-150 | Improved sleep quality among caregivers of children using the Omnipod® 5 automated insulin delivery system

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Introduction: Sleep quality of caregivers of children with type 1 diabetes (T1D) is often suboptimal due to the fear of hypoglycemia overnight and the need to wake up to treat their child's high or low glucose events. Automated insulin delivery (AID) systems may improve sleep quality by maintaining glucose levels in a safe range overnight without the need for manual intervention.
Objectives: To better understand the effects of AID on sleep quality of caregivers, we evaluated sleep quality and diabetes distress among caregivers of children with T1D aged 2 to <12y before and after 3mo of use with the tubeless Omnipod 5 AID System.
Methods: Caregivers completed validated patient-reported outcome surveys evaluating sleep quality (Pittsburgh Sleep Quality Index, PSQI) and diabetes-related distress (Problem Areas in Diabetes, PAID).
Results were examined for those reporting "very bad" or "fairly bad" sleep quality at baseline (PSQI sleep quality subscale score ≥2). Time below range (TBR <70mg/dL; <3.9mmol/L) overnight (12AM-6AM) was also compared.
Results: Children using AID whose caregivers reported poor sleep quality at baseline (N=38) were aged 6.6±2.5y (mean±SD). Caregivers reported significant improvements across all measures ($p<0.0001$, Table), indicating improved sleep quality and reduced diabetes distress. TBR overnight was low with standard therapy and AID ($p\geq0.05$).
When asked an open-ended question on what they liked most about the system, 53% referred to improved sleep quality or overnight performance of the system in their response.

Measure	Scale†	Baseline	End of Study	Change	Cohen's *d*
Pittsburgh Sleep Quality Index (PSQI) Global Score	0 to 21	10.7 ± 3.6 10.0 [8.0, 14.0]	6.6 ± 2.9 7.0 [3.8, 8.0]	-4.1 ± 3.9* -3.5 [-6.3, -1.0]	1.05
PSQI Sleep Quality Subscale	0 to 3	2.2 ± 0.4 2.0 [2.0, 2.0]	1.0 ± 0.6 1.0 [1.0, 1.0]	-1.2 ± 0.7* -1.0 [-2.0, -1.0]	1.71
Problem Areas in Diabetes (P-PAID-C)	16 to 96	53.6 ± 14.3 51.0 [44.0, 58.3]	41.7 ±8.9 43.0 [36.0, 47.0]	-11.9 ± 15.9* -9.0 [-17.3, -1.5]	0.79
Percentage Time <70mg/dL (<3.9mmol/L) Overnight	-	3.3 ± 4.3 1.8 [0.4, 4.2]	1.8 ± 1.6 1.4 [0.7, 2.7]	-1.4 ± 3.9 -0.1 [-2.6, 0.5]	-

Data are mean ±S.D., median [interquartile range]
†Lower value indicates optimal score

Table. Questionnaire score results from caregivers of children aged 2 to <12y (N=38) reporting poor sleep quality at baseline in the Omnipod 5 Automated Insulin Delivery System pivotal studies.

Conclusions: Use of the Omnipod 5 AID System in children with T1D was associated with improved sleep quality and reduced diabetes distress among caregivers reporting poor sleep quality at baseline. Although TBR overnight was unchanged, the burden of maintaining these levels is shifted from the caregiver to the automated system, allowing caregivers the opportunity for much-needed rest.

P-152 | Early introduction of psychology services at type 1 diabetes diagnosis

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Introduction: Type 1 diabetes (T1D) is a physiologically and psychologically challenging disease. Psychological intervention improves adherence and decreases depression/anxiety associated with management. Currently, limited information is known about the preventive power of psychological interventions.
Objectives: To initiate integration of psychology with patient/family at initial T1D diagnosis and to assess the benefits of this interaction. We hypothesize that having psychology involved at diagnosis will: normalize feelings of distress; introduce coping strategies; proactively identify individual and family needs for psychology intervention; reduce future impact of depression and anxiety on adherence and management; and improve diabetes related quality of life.
Methods: 1st PDSA: Psychology was added as a consult for all youth admitted at new onset T1D during the first two weeks of each month. Psychology staff provided consultation to families and identified premorbid stressors.
Results: 14 youth (6 females) between the ages of 3-18 yrs (M = 11.93) were screened. Three had preexisting mental health diagnoses (2 with anxiety; 1 with depression) and 5 endorsed anxiety related to diagnosis (4 injection/needle related; 1 future impact). Three were seen multiple times for support during injections and reported satisfaction with being seen by a known provider.
Conclusions: Psychology successfully identified 3/14 youth with prior mental health concerns and 5/14 experiencing greater than expected anxiety at diagnosis (57%). In the next PDSA cycle, identified youth will be targeted for consultation at first endocrinology outpatient visit to follow-up, determine further needs, and streamline treatment. We anticipate that this will lower impact of these concerns on future management. Next steps include expanding consults to all patients admitted for new onset and diabetes-related quality of life.

P-153 | Developing a novel intervention for addressing unhealthy risk-taking behaviors among adolescents with T1D

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Introduction: In adolescence, type 1 diabetes (T1D) management goals often conflict with social/emotional goals (e.g., taking insulin in front of new friends vs. trying to "fit-in" with peers). Building emotion regulation (ER) skills could help adolescents manage distress in such situations and reduce risk-taking behaviors (e.g., skipping a bolus).
Objectives: Thus, we aimed to engage adolescents with T1D to assess their interest in such an intervention and co-adapt an existing manualized ER intervention for youth with T1D.
Methods: We recruited 26 adolescents with T1D (ages 12-16 years; 46% female and 8% non-binary; 42% White, 23% Black/African American, 19% Latino, and 15% More than one races/ethnicities) to provide feedback on and suggestions for the proposed content for an adapted ER intervention. Over 12 weeks,

23 of the adolescents participated in an online private forum. Each week we posted a new thread to prompt feedback on a certain aspect of the intervention.
Participants commented on the original post and each other's responses. Another 3 adolescents provided feedback via online meetings.
Results: Co-adapted content included education about and discussion of managing T1D in potentially emotional situations (e.g., feeling nervous to tell a new coach you have T1D) and creating scripted role plays for such situations. Participation rates for each thread on the forum ranged from 65% to 91%.
When asked about their opinion of the intervention, 15 adolescents expressed positive feedback, and none responded negatively. Participants responded that they "enjoyed" the T1D-specific role plays and described the situations as "relatable". Several adolescents also expressed an appreciation for the opportunity to talk about the emotional aspects of managing T1D.
Conclusions: A private, online forum provided a successful environment for engaging adolescents with T1D in adapting an ER intervention so that it is relevant to youth with T1D.

P-154 | Assessment of quality of life in type 1 diabetes mellitus children

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Introduction: Type 1 diabetes is an autoimmune disorder affecting millions of children
worldwide. Once diagnosed, patients require lifelong insulin treatment and can
experience numerous disease-associated complications. It is known that children
with diabetes appear to have a greater incidence of depression, anxiety, psychological
distress, and eating disorders compared to their peers without disease
Objectives: To study the quality of life and factors affecting it in developing country.
Methods: Those who were diagnosed with type 1 diabetes for more than 1 year and aged more than 8 years were given Quality of life Instrument for Indian Diabetes Patients (QOLID) questionnaire in their own language and asked to provide details accordingly. Scoring was given according to the answers given by them. All reports were compiled and assesed. The score of 8 was taken as cut off, those with scores <8 were considered to have impaired Quality of life (QoL) and those having the score >8 better QoL.
Results: Total of 96 children with type 1 DM were included in the study, mean QOLID score of all children was 8.1±0.96 among which 37.5% of children had score below 8.
Most affected among various parameters of QOLID was general health (mean 7.11) and least affected was physical endurance (mean 8.8). Mean HbA1c was 9.97±0.2%. Most of them (39.5%) belonged middle class according modified kuppuswamy socio economical classification. Age at the diagnosis (p value 0.212),gender (p 0.868), occupation of parents (p 0.652) were not statistically correlating with total QOLID scores, however socio economic status (p value of 0.02) and HbA1c values (p 0.001, r -0.80) had a significant negative correlation with QOLID scores as depicted in the figure.

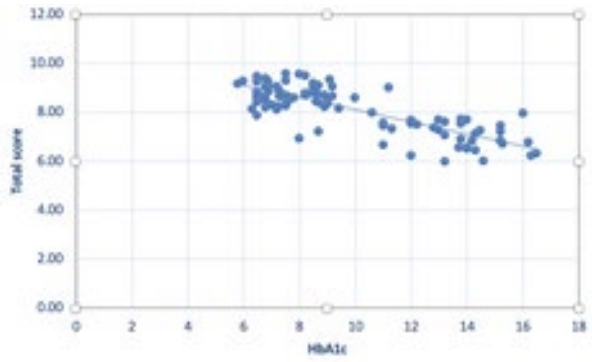

Figure 1. Correlation of HbA1c and total score.
In the present study QOLID total score was found to be seen correlating with HbA1c and was significant (p value of <0.001)

Conclusions: In our study 37.5 % of children with Type 1 Diabetes mellitus had impaired QoL.Socio-economical status and HbA1c were most essential determinants, Assessment of QoL should be done periodically so that if any significant impairment is identified, early interventions could be initiated to improve the overall outcome of the disease.

P-155 | Associations between illness identity and glycaemic outcomes in adolescents and emerging adults with type 1 diabetes

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Introduction: Suboptimal glycemic control is a major issue in adolescents and emerging adults (young people) with type 1 diabetes. At a time when identity formation is most pertinent, young people with diabetes must integrate diabetes into their identity. The way in which diabetes is integrated into identity, i.e., their 'illness identity', may influence glycemic outcomes.

Objectives: The study investigated 1) associations between illness identity and haemoglobin A1c (HbA_{1c}), and 2) associations between socio-demographic and diabetes-specific variables and illness identity in adolescents and emerging adults (young people) with type 1 diabetes.

Methods: A survey study was conducted with 1148 young people (15-25 years of age) with type 1 diabetes. Four illness identity dimensions (rejection, acceptance, engulfment, and enrichment) were assessed using the Danish Illness Identity Questionnaire. Associations were analysed using multivariate linear regression or generalized additive modelling adjusted for relevant covariates.

Results: Acceptance and enrichment were associated with lower HbA_{1c} outcomes. Engulfment was associated with higher HbA_{1c} outcomes. Rejection scores ≥10 was associated with higher HbA_{1c} outcomes. Being female was associated with higher scores on rejection and engulfment, and with lower scores on acceptance. Age was associated with lower scores on rejection. Diabetes duration was associated with higher levels of acceptance, and lower levels of engulfment. Being treated with an insulin pump was associated with lower scores on rejection and higher scores on acceptance.

Conclusions: Study findings provide evidence for an association between illness identity and HbA_{1c} outcomes in young people with type 1 diabetes, suggesting that illness identity characterized by rejection or engulfment can lead to poor glycaemic outcomes, while acceptance and enrichment contribute to better glycaemic outcomes, or vice versa.

P-156 | Minimal clinically important difference scores of the parent and child versions of the problem areas in diabetes-child in school-age families

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Introduction: Diabetes distress (DD) is a multi-symptom emotional condition that relates to living with, or caring for someone living with, type 1 diabetes (T1D).

Objectives: We sought to calculate minimally important differences (MCID) in DD using the Parent Problem Areas in Diabetes-Child (PPAID-C) and Problem Areas in Diabetes-Child (PAID-C) in a sample of 8- to 12-year-olds with T1D and their parents and to identify predictors of DD change over 6 months.

Methods: We recruited 157 parent-child dyads to participate in a US multi-center, longitudinal study of DD. Parents and children completed the PPAID-C and PAID-C, respectively, at baseline and 6-months. We also measured parent and child resilience (Brief Resilience Scale [BRS] or Diabetes Strength and Resilience [DSTAR]), T1D duration, HbA1c, and family socio-economic status (SES) at baseline. We calculated MCIDs for the PPAID-C and PAID-C using one standard error of measurement and identified predictors of DD change at 6 months using ANOVA.

Results: Children were 49% boys and 77% Non-Hispanic White (age [mean±SD]=10.2±1.5 years, T1D duration=3.8±2.4 years, HbA1c=7.96±1.62% [63±6 mmol/mol]). Parents were 89% mothers and 78% married. For parents: 46% reported a MCID decrease (DD improved), 31% reported no DD change, and 23% reported a MCID increase (DD worsened) at 6 months. Baseline predictors of a MCID change (±1 MCID) in PPAID-C scores were family SES, parent BRS scores, HbA1c, and child PAID-C scores. For children: 34% reported a MCID decrease, 33% reported no change, and 33% reported a MCID increase. Baseline predictors of MCID change (±1 MCID) in PAID-C scores were HbA1c and parent PPAID-C scores.

Conclusions: At 6 months, 69% of parents and 67% of children reported a clinically meaningful change in DD levels (±1 MCID), indicating variability in DD levels among children and parents. We also identified behavioral and clinical factors that might predict DD changes (±1 MCID) in families of school-age children with T1D and inform the development of new DD interventions.

P-203 | A pilot study of a virtually-delivered dissonance-based eating disorder prevention program for young females with type 1 diabetes: within-subject changes over 6 month follow-up

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Introduction: There is a lack of interventions to improve body image and prevent eating disorders among young females with type 1 diabetes, an ultra-high risk group. Therefore, we developed a virtual diabetes-specific version of the eating disorder (ED) prevention program the Body Project (Diabetes Body Project), which demonstrated feasibility and preliminary within-subject improvements in outcomes for young females with type 1 diabetes (T1D) from pretest (baseline) to posttest, with medium to large effect sizes. Outcomes have not yet been assessed at over longer-term follow-up.
Objectives: The aim of the current study was to investigate within-subject changes in outcomes from pretest over 6-month follow-up.
Methods: Young females with T1D aged 16-35 years were invited to complete Diabetes Body Project groups in an uncontrolled trial. A total of 35 participants were allocated to five Diabetes Body Project groups (six meetings over six weeks). Primary measures included ED risk factors and symptoms, and secondary outcomes included T1D-specific constructs previously found to be associated with ED pathology (diabetes distress and illness perceptions).
Results: Meaningful within-subjects reductions, with medium to large effect sizes, occurred for the primary (i.e. ED pathology, body dissatisfaction, thin-ideal internalization, and appearance ideals and pressures) and secondary (i.e. glycemic control as measured by HbA1c, diabetes illness perceptions and diabetes distress) outcomes (within-condition Cohen's d ranged from .34 to 1.70) over 6-month follow-up.
Conclusions: The virtual Diabetes Body Project is a promising intervention, worthy of more rigorous evaluation. A randomized controlled trial is warranted to determine its efficacy compared to a control condition.

P-204 | Improving care and outcomes for teenagers and young adults with diabetes - a new blended training programme for healthcare professionals

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Introduction: Transition from paediatric to adult services is challenging for young people with diabetes. The UK's National Diabetes Transition Audit (NDTA, January 2019), points to the deterioration in the completion of annual healthcare checks, achievement of treatment targets and higher levels of diabetic ketoacidosis (DKA) in young people (YP).
Those transitioning to adult services are more likely to fail in completing their annual health checks and miss treatment targets.
Objectives: The programme aimed to train diabetes healthcare professionals to improve outcomes by forming joint paediatric and adult teams, benchmarking their transition service and developing a transition service plan.
Methods: Eight teams comprising 110 healthcare professionals participated in a four-module online course, two facilitated learning events and three coaching calls between April and November 2022.

Results: 110 healthcare professionals enrolled, with 58 (52.7%) completing at least one module of e-learning, with a similar average attendance at live events. From the 18 participants who completed the whole course, 15 agree that it informed their approach to transition with "early planned introduction, stepwise progression through a process of preparation for, and then transition to, adult services, leading to better outcomes including HbA1c, and diabetes related comorbidity and complications".
From the improvement plans underway in each team, seven include patient- led approach, five implement a structured transition pathway and five have resulted in recruiting new staff or restructuring job plans.
All teams are collecting and reviewing team selected metrics (diabetic ketoacidosis (DKA) admissions, HbA1c, attendance rates, patient satisfaction).
Conclusions: Early evidence suggests that the programme has been successful in encouraging the formation of cross-service transition teams, identifying service gaps and addressing them through comprehensive and systematic interventions, in line with the best practice guidelines.

P-205 | Latent growth curves of family conflict and glycemic control during adolescence

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Introduction: Diabetes family conflict is a significant factor in management of type 1 diabetes in adolescents.
Objectives: This study examined the relationship between latent growth curves of family conflict and glycemic control in youth with type 1 diabetes (T1D) during adolescence.
We predicted that variation in family conflict over time would be associated with variation in glycemic control over time.
Methods: A cohort of 170 adolescents with T1D were followed over nine years (starting at a mean age of 10.4 years) in two phases at three university-affiliated pediatric diabetes clinics.
Blood samples were obtained at six-month intervals and analyzed for HbA1c in a central laboratory. The Diabetes Family Conflict Scale was completed four times at yearly intervals by adolescents in the second phase when they were on average 16-19 years of age.
Results: Bivariate correlations between HbA1c and diabetes family conflict (r's =.18-.48, p's<.05) were observed in cross-sectional and longitudinal analyses.
Five latent variable growth curve models were tested: the first four models included latent growth curves for glycemic control and a latent variable for family conflict at each time point; the final model included latent growth curves for both glycemic control and family conflict.
The first four models showed acceptable fit with indices CFI & TLI ranging from .93-.95, and RSMEA=.07; however, the intercept of the latent growth curve of HbA1c was only related with latent family conflict at year 8 and the slope was only related at year 9.
The final model also showed good fit indices and results indicated relationships of the HbA1c intercept with both the intercept and slope of family conflict (B=1.68, & -.37; p<.05), whereas the slope of HbA1c had a marginally significant relationship with the slope of family conflict (B=.03, p=.08).
Conclusions: Variation in family conflict is associated with variation in HbA1c for all trajectory groups, indicating the important role of this factor in management of T1D throughout adolescence.

P-206 | Exploring motivation behind engagement in mealtime bolus behavior in adolescents with type 1 diabetes (T1D): a behavioral economics approach

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Introduction: This study involves a pilot behavioral economic intervention designed to promote engagement with mealtime bolusing among adolescents with Type 1 Diabetes (T1D).
Objectives: To understand perspectives of youth with T1D and their parents during study participation.
Methods: C2D was piloted over 14 months with 26 participants identified as high-risk for suboptimalT1D outcomes at a pediatric hospital in the U.S. Midwest. We conducted virtual focus groups (two with adolescent participants [n=6]) and one with their parents [n=4]) to explore:

1. Motivators for adolescent mealtime bolus behavior within and beyond C2D and;
2. Perceived strengths and weaknesses of C2D. Focus groups were audio-recorded, transcribed, and analyzed based on selected constructs from the consolidated framework for implementation research.

Results: Overall, adolescents felt C2D's financial incentives and accompanying text notifications served as motivators for mealtime bolus engagement, with some identifying them as key in establishing habit. Parent perceptions on the appropriateness of financial incentives were mixed, as some had concerns that improvements may not be sustained. While some adolescents reported technical issues, all indicated they would participate in C2D again and recommend it to peers. Parents valued the technology within and outside of C2D that allowed their child's real-time blood glucose data to be shared with their clinics, finding this data-sharing central to facilitating individualized care. Beyond motivators introduced by the intervention, participants emphasized the importance of social support from others with T1D, with some also mentioning previous parent-provided financial incentives and fear of negative health outcomes.

Conclusions: Behavioral economic interventions, coupled with text message reminders show promise for motivating mealtime bolusing in adolescents with T1D. Future iterations of the intervention may consider including a peer support component to enhance program satisfaction and mealtime bolusing.

P-207 | A novel pilot program introducing behavioral health support at onset for youth with diabetes

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Introduction: Psychosocial issues are common among youth with diabetes and affect glycemic control and quality of life. While guidelines emphasize the importance of behavioral health (BH), implementation remains a challenge.

Objectives: We describe a novel program introducing BH support at diagnosis.

Methods: At a large academic children's hospital in Pittsburgh, PA, a psychologist rounds with the endocrine team twice weekly and meets 1:1 with families of youth newly diagnosed with diabetes, explaining the role of BH in diabetes management and offering follow-up care. We retrospectively reviewed charts of all patients admitted since program inception with a new diagnosis of type 1 or 2 diabetes (T1D or T2D) and examined characteristics of those who did (Group1) vs did not (Group2) meet the psychologist at onset.

Results: 145 youth (age 10.2±4.7 years, 51% female) were admitted over 6 months with a new diagnosis of T1D (84.1%) or T2D (15.9%). Rounding twice weekly, the psychologist met with 35.2% (n=51). There was no difference in sex, age, type of diabetes, BMI percentile (BMI%), or HbA1c between Group1 vs Group2 at diagnosis.

At the first outpatient diabetes visit (Visit 1), time interval since diagnosis, uptake of glucose sensors or insulin pumps, BMI%, HbA1c, delta-BMI% or delta-HbA1c since diagnosis were not different between groups for all youth and for those with T1D.

Among youth with T2D, albeit small numbers, Group1 (vs Group2) had higher HbA1c at diagnosis (14.5±1.8 vs 10.4±1.2) and at Visit1 (8±2.1 vs 6.4±0.9) yet exhibited a larger decrease in HbA1c between diagnosis and Visit1 (6.4±1.4 vs 3.9±1.4; p<0.05).

Variables (%, mean±SD, or median [IQR])	Group 1 (n=51)	Group 2 (n=94)	p-value
At diagnosis:			
- Age (yrs)	10.6±4.5	10.0±4.8	0.48
- Type of diabetes (%T1D)	88	82	0.32
- BMI percentile	64.4 [16.4-95.1]	65 [19-94.2]	0.91
- HbA1c (%)	11.9±2.6	11.2±2.2	0.09
At visit 1:			
- Time interval since diagnosis (days)	92.1±41.2	91.2±29.3	0.88
- Uptake of glucose sensors (%)	90	84	0.30
- Uptake of pumps (%)	11.7	12	0.99
- BMI percentile	85.8 [47.8-95.5]	81.4 [51.2-96.6]	0.94
- HbA1c (%)	7±1.6	6.7±1.0	0.22
- Delta BMI percentile (Visit 1 – Diagnosis)	-10.1 [1.3-30.5]	-5.7 [0.5-23.1]	0.47
- Delta HbA1c percentile (Visit 1 – Diagnosis)	-4.5±3.1	-4.3±2.5	0.69

Conclusions: BH intervention at diagnosis is feasible. Glycemic impact may be more significant in those with T2D, and not be seen early in the course during

honeymoon in those with T1D. Expanding the cohort and longer follow-up will allow further assessment and drive modifications of the intervention.

P-208 | Somatic symptoms, subjective health complaints and emotional and behavioural problems in children and adolescents with type 1 diabetes

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Introduction: Children and adolescents with type 1 diabetes have a higher risk of psychological problems, e.g. emotional and behavioural problems.
Objectives: To assess somatic symptoms, subjective health complaints and emotional and behavioural problems in children and adolescents with type 1 diabetes.
Methods: Children and adolescents with type 1 diabetes (age 8-18 years) completed the Giessen Subjective Complaints List Questionnaire (GBB-KJ), a measure of somatic symptoms and subjective health complaints used for assessment in psychosomatic medicine, the Strengths and Difficulties Questionnaire (SDQ), and measures of depression and anxiety. Clinical data, outcome parameter HbA1c and the prevalence of somatic symptoms, subjective health complaints and emotional and behavioural problems were analysed. The study was approved by the ethics committee.
Results: Overall, 257 children and adolescents with type 1 diabetes (median age 13.8 years, median HbA1c 7.7 %) participated in the study. Out of all, 36% of individuals had normal SDQ scores (score 0-15), 32% had slightly raised SDQ scores (score 16-19), and 32% had high SDQ scores (score 20-40), reflecting clinically significant emotional or behavioural problems. No significant correlation between HbA1c levels and total SDQ scores was present (p=0.38). Overall, 44% of females with type 1 diabetes within the age 11-14 years had above-average (i.e.>75.percentile) somatic symptoms and health complaints, whereas 30% of females above the age of 15 years had above-average (i.e.>75.percentile) somatic symptoms and complaints. In contrast, 47% and 48% of males (age 11-14 years and above 15 years) with type 1 diabetes had above-average (i.e.>75.percentile) somatic symptoms and health complaints.
Conclusions: Children and adolescents with type 1 diabetes are vulnerable with respect to somatic symptoms, subjective health complaints and emotional and behavioural problems. Screening for emotional and behavioural problems and psychosomatic disorders is advisable in clinical routine care.

P-209 | High rates of anxiety & Depressive symptoms in parents of young children with type 1 diabetes during and immediately after the COVID-19 pandemic

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Introduction: Parenting very young children with type 1 diabetes (T1D) can be challenging leaving some parents more vulnerable to feelings of anxiety and depression. We embarked on a randomized clinical trial (RCT) of a new parent-focused video telehealth intervention to reduce parent anxiety and depression in 2019; then the world faced a significant public health challenge, the novel coronavirus disease-2019 (COVID-19) pandemic.
Objectives: Our objective is to describe rates of clinically relevant anxiety and depressive symptoms in parents of very young children with T1D who enrolled in our RCT from 2019-2023.
Methods: From a US sample, we recruited parents of children (2-6 years-old) for our RCT. Parents completed screeners for depressive (Center for Epidemiological Studies Depression Scale- Revised [CESD-R]) and anxiety (PROMIS-Anxiety [PROMIS-A]) symptoms at baseline, prior to any treatment. We examined rates of clinically relevant depressive and anxiety symptoms by enrollment year. We also correlated parents' symptoms to child HbA1c.
Results: Our sample includes n=167 parents-child dyads. Child mean age is 4.3±1.2 years, mean time since T1D diagnosis is 1.5±1.9 years, and mean child HbA1c is 7.6±1.2%. Children are 88% Non-Hispanic White and 46% girls. Ninety-two percent of parents

self-reported as mother. Table 1 shows rates of clinically relevant parent-reported anxiety and depressive symptoms by study year. Notably, rates of clinically relevant symptoms appear to increase in recent years.

Overall, child HbA1c correlated with parent-reported depressive symptoms (r=0.24, p<0.01) but not anxiety symptoms (p>0.05).

	2020	2021	2022	2023*
Baseline Completed (N)	27	11	96	29
Clinically relevant CESD-R	6 (22%)	4 (36%)	48 (50%)	15 (52%)
Clinically relevant PROMIS-A	1 (3.7%)	0 (0%)	5 (5.2%)	11 (38%)

Note. *Reflect data collected through April 2023

Table 1. Rates of clinically relevant anxiety and depressive symptoms among parents by trial year.

Conclusions: Parents of very young children with T1D may experience high rates of clinically relevant anxiety and depressive symptoms, with rates increasing post-pandemic. Parents of very young children with T1D may benefit from screening and treatment to help reduce anxiety and depressive symptoms.

P-210 | Impact of moving to a new neighborhood and child opportunity index 2.0 (COI) on near term hemoglobin A1c (A1c) in youth with type 1 diabetes (T1D)

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Introduction: Life stressors, such as changes in living situation, can negatively impact access to diabetes care and outcomes for youth with T1D.

Objectives: The Child Opportunity Index 2.0 (COI) measures neighborhood conditions related to child health. We investigated the impact of moving to a new neighborhood on glycemic control with additional attention to the impact of moving to a neighborhood defined by lower COI.

Methods: We analyzed electronic health records collected between 2016 and 2022 from a network of pediatric diabetes clinics in the Midwest USA. Patient addresses were geocoded using Degauss geocoding software. These data were combined with the publicly available COI data which assigns each census tract (containing ~4,000 people) to one of five neighborhood opportunity categories (very low, low, moderate, high, or very high) based on how it compares to other census tracts in the metro area. For a move to qualify for analysis, it must have been to a different census tract. We analyzed youths' A1c results at three time points: (1) 30-150 days prior to the move, (2) within 30 days following the move, and (3) the first follow up visit, 60-180 days after the move.

Results: We identified 241 moves to a new census tract by youth with T1D (13.7 ± 4.0 years old, 58% non-Hispanic white, 28% commercial insurance, 45% female) and their families. Of these, 73 were moves to a neighborhood in a lower COI category. The mean(±SD) A1c change from pre-move to immediately post-move was −0.09% (±1.09). Mean HbA1c change from post-move to follow up was -0.0 9% (±0.97). Moving to a lower-COI neighborhood did not associate with a significant change in A1c in the immediate or near-term post-move periods.

	All Moves	Moves to Neighborhood with Equal or Better COI Category	Moves to Neighborhood in Lower COI Category	p value
Count of Individuals	241	168	73	
HbA1c(%) Before Move	9.54 ± 2.10	9.48 ± 2.00	9.68 ± 2.33	> 0.05
HbA1c(%) Post-Move	9.48 ± 2.01	9.45 ± 2.03	9.55 ± 1.98	> 0.05
HbA1c(%) Change during Move	-0.09 ± 1.09	-0.08 ± 1.13	-0.13 ± 1.0	> 0.05
HbA1c(%) Change Post-Move to Follow Up	-0.09 ± -0.97	-0.18 ± 1.02	0.10 ± 0.82	> 0.05

Conclusions: Although moving can disrupt the pattern of family life, we did not find an association with A1c increases in this study cohort. Future efforts should assess the impact of diabetes care team continuity and the reasons behind family moves to better understand this finding.

P-211 | Executive functions and glycometabolic control among children and adolescents with type 1 diabetes in multi-injection therapy and insulin pump therapy

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Introduction: Type 1 diabetes (DT1) has a severe impact on neuropsychological development, with important implications for onset and maintenance of long-term comorbidities.
In particular, the most affected cognitive domain is executive functions (EF) which includes cognitive flexibility, working memory and inhibition abilities.
These functions are crucial for adherence to treatment and glycometabolic control.
Objectives: To verify potential differences in cognitive flexibility, inhibition and working memory in school-age children with insulin pump treatment (CSII) and in multiple daily injection therapy (MDI) shortly after diagnosis (<3 years).
Methods: 50 children (26F) of school age (7-17 years; M=11.76 ± 2.75), 26 in MDI (52%), 24 in CSII (48%) were included in this study. The following glycemic metrics were collected: TIR%, TAR%, TBR%, HbA1c.
Computerized tasks were administered to investigate EF: set-shifting task for cognitive flexibility, N-back task for working memory and antisaccade task for inhibition (an eye-tracker was used to record eye movements).
Results: Descriptive analyses showed sample HbA1c mean 7.04%, CSII TIR mean= 69.7%, MDI TIR mean=53.9.
Regression analyses revealed that youth aged >12 years on MDI therapy witch have longer reaction times in the more difficult condition of set-shifting showed lower TIR% (p= 0.003), as well as longer time in TAR% (p= 0.010).
Furthermore, youth aged >12 years in MDI have a higher accuracy in the antisaccade task, which investigates oculomotor inhibition, than their peers in CSII (p<.001).
Conclusions: The present study highlighted the reciprocal relationship between glycometabolic control and cognitive performance in the domain of cognitive flexibility and processing speed, aspects that mostly influence the performance of crystallized intelligence (QI).
Furthermore, a high activation of the inhibitory system in MDI patients emerged. Confirming these results on larger series, would further endorse the importance of early metabolic control and the use of technology.

P-212 | Associations between the child opportunity index 2.0 (COI) and hemoglobin A1c (A1c) during the first year following a diagnosis with type 1 diabetes (T1D)

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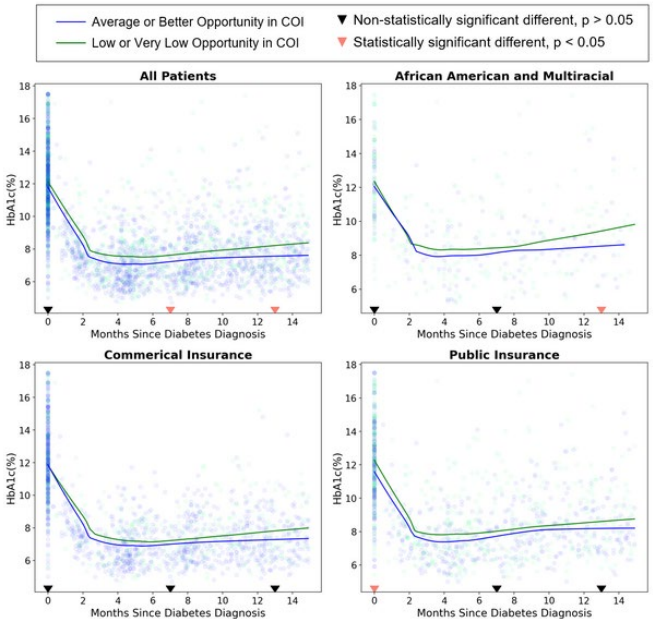
Introduction: To provide patient-centered care to youth with T1D, clinicians must understand any social barriers to health.
Objectives: We examined whether the COI is associated with A1c at onset and during the first year after T1D diagnosis.
Methods: The COI is a measure of neighborhood opportunity across three domains: education, health and environment, and social and economic. We geocoded patient addresses and mapped them to census tracts.
We combined COI data from diversitydatakids.org with electronic health record data collected between 2018 and 2022 from a network of pediatric diabetes centers in the Midwest USA. Individuals were coded as living in a low opportunity area at diagnosis if the COI for their census tract was at the 40th percentile or lower (LO-COI; ≥41st percentile=HI-COI) for the metro area. We applied LOWESS smoothing to visualize trends across the population and key subgroups.

Results: We analyzed data for 784 unique individuals (age 9.9 ± 4.3, 46% female, 13% Black or multiracial [B/MR], 58% commercial insurance) with >2,900 A1c results. LOWESS curves for those in the LO-COI group are higher than those in the HI-COI group at nearly all points for each of the cohorts.

We conducted two-sided t-tests for differences at three points for each population (onset, months 6-7, and months 12-13). A1c was higher in the LO-COI group at months 6-7 [7.9% LO-COI vs. 7.3% HI-COI, p<0.01] and months 12-13 [8.3% LO-COI vs. 7.7% HI-COI, p<0.01] , in those on public insurance at diabetes onset [12.3% LO-COI vs. 11.8% HI-COI, p<0.05], and in B/MR youth at months 12-13 [10.1% LO-COI vs. 8.7% HI-COI, p<0.05].



Conclusions: During the first year after T1D diagnosis, mean A1c was higher in youths living in a low opportunity neighborhood, as well as in minority youths and those on public insurance. COI may help clinicians identify individuals at risk for worsening glycemia post-diagnosis and may identify those patients and families experiencing unique barriers to care.

P-228 | What can those with a lived experience of type 1 diabetes and disordered eating (T1DE) teach us about the development of eating disorders in paediatric diabetes care. Early observations from prevent T1DE study

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Introduction: People living with Type 1 Diabetes (T1D) have a lifetime risk of disordered eating behaviours (DEB) (Wisting, Skrivarhaug et al. 2018) and increased psychological distress, morbidity and mortality (Gibbings, Kurdyak et al. 2021).

Expert opinion and pre-hypothesised understanding informs much of our understanding around the correlation between T1D and DEB (Murphy and Pigott 2021).

Objectives: This research aims to further current understanding of the development of disordered eating within paediatric diabetes care

Methods: Participants were recruited via Diabetes UK patient groups and the diabetes online community (@preventT1DE). Expressions of interest and eligibility screening were completed via online registration. Participants who met T1DE diagnostic criteria in the past 2 years were signposted to their medical team and eating disorder charities.

Eligible participants were invited to take part in semi-structured interviews to understand more about the development of DEB in T1D. This retrospectively explored their diabetes journey, DEB journey, home life and friendships during childhood.

Each interview was transcribed with initial field notes which were utilised to develop these early observations before further thematic analysis. Cardiff Metropolitan University Ethics was granted. Approval was received from Diabetes UK research team. This research is funded by RCBC Wales.

Eligibility criteria	Exclusion
Type 1 Diabetes	Meets proposed Type 1 Diabetes and Disordered Eating (T1DE) in past 2 years (Chapman, Partridge et al., 2022)
Received care from a paediatric diabetes team in the United Kingdom	

Results: Early observations and field notes before analysis were considered after 7 interviews. DEB varied significantly amongst participants. All participants had overweight in childhood. 5/7 reported Diabetic Keto Acidosis (DKA) during their DEB journey. Early emerging themes of trauma, health care professional (HCP) weight stigma and childhood obesity were noted.

Conclusions: The voice of people with a lived experience of T1DE is fundamental to understanding. These early themes of trauma, obesity and HCP weight stigma may emerge in analysis. This requires coding and in-depth analysis before further conclusions can be made

P-230 | 'Swimming with the T1DE' - using the arts within health to raise awareness of type 1 diabetes and disordered eating (T1DE)

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Introduction: In 2021 adults from Wales with a lived experience of T1DE were invited to take part in an arts-based project to raise awareness of the complexity of T1DE. Funded by the All Wales Diabetes Implementation Group, Breathe Creative, an arts-based company from Wales who focus on the use of art to positively impact on physical and mental health and wellbeing, led virtual workshops to explore the risks, issues and links of T1DE, resulting in a powerful animation.

Objectives: To raise awareness of T1DE amongst the diabetes community and healthcare professionals in order to increase understanding and promote better co-ordination of care amongst diabetes and mental health/eating disorder services.

Methods: Over ten weeks, four participants (3 females, 1 male) shared their experiences of T1DE through reflection, creative writing, and art. Katja Stiller, Therapeutic Arts Facilitator and Counsellor, led the sessions with the support of Rachael Humphreys, AWDIG Steering Group member for T1DE and Paediatric Diabetes Specialist Nurse.

Using Mindfulness and Emotional Freedom Therapy to create a safe and relaxing space, the four participants were able to honestly and safely reflect on their experiences in a creative way. Creative tasks focused on their diagnosis, their relationship with diabetes, the significance of numbers and control when trying to manage their diabetes (for example glucose readings, targets, HbA1c, counting carbohydrates), and their hope for courageous conversations and co-ordinated care from healthcare professionals in identifying T1DE.

Results: Jane Hubbard, BAFTA award winning Animator, used the creative work to produce the script and style of the animation. With input from the participants throughout the animation process, the end result is a powerful insight into what it is like to live with Type 1 Diabetes and the difficulties that can arise with their relationship with food, leading to T1DE. The animation can be viewed here:
www.youtube.com/watch?v=0McVei11Er8&t=3s

Conclusions: The underlying message is that healthcare professionals need to recognise that T1DE is a significant risk and that courageous conversations need to take place in order to identify patients who are experiencing T1DE so that appropriate care and treatment can be provided. By working closely with mental health and eating disorder teams, healthcare professionals within diabetes care can identify patients at risk, screen appropriately, liaise with, and refer to, the right professionals for treatment.

P-241 | Diabetes patient and family focus group program: a new initiative to incorporate the voice of the consumer!

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Introduction: Diabetes mellitus (DM) is a challenging chronic medical condition requiring active participation of patient/families in self-care and this is key to optimal DM care and to address social determinants of health.

Objectives: Initiation of family-centered groups for DM patients, focused on sharing perspectives to improve diabetes management.

Methods: Diabetes team members meet with patients/families 2-3 times annually over dinner. Eight focus group sessions have been conducted since the launch in 2019. Agenda items are preplanned.

Topics that have been discussed thus far include but not limited to: diabetes daily management, sick day management, DM technologies, school diabetes resources, medical handicap/insurance, and strategies and resources for coping with DM, insurance, foods over holidays, and optimal use of diabetes technologies.

Our groups encompass diversity in age, gender, ethnicity, race, socio-economic backgrounds, allowing for families to correlate their experiences with other families.

Results: Participation in these sessions has demonstrated encouragement in a desire of patients/ families to increase their technology usage, improve emotional support, develop coping mechanisms, decrease difficulty with social determinants of health, and improved health literacy. In addition, this has allowed the DM team to identify areas for practice change.

Some of the feedback testimonials include: "I do not feel alone", "Great to feel our feedback matters", "We are all on different paths but still some similarity".

Conclusions: The sentiments expressed showcase what a difference inclusion of families in these sessions can make in their lives. We plan to continue to augment these sessions further to every 3 months and to extend to a greater number of families per session.

This concept of inclusion of patients and families in care of patients may also be beneficial in other chronic medical conditions.

P-249 | Observing, 'doing' and 'making' gender in paediatric type 1 diabetes care, at home and in the clinic: multiple-stakeholder perspectives

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Introduction: In diabetes care, increased emphasis is put on person-centred care in order to align with the individual needs and circumstances of youth with diabetes. Among other factors, sex and gender constitute inherent dimensions of a person with diabetes' identity. These sex and gender differences are apparent in diabetes health and medicine and could have a potential impact on care.

Objectives: To investigate the perspectives of Dutch care professionals, parents and persons living with type 1 diabetes on gender dynamics in paediatric type 1 diabetes care.

Methods: 15 Semi-structured interviews were held with care professionals, supplemented by two focus groups with parents of children with diabetes (n=12 parents) and three semi-structured interviews with two experts by experience and a mother.

Two respondent validation interviews were conducted, one with two care professionals and one with an expert by experience.

Participant observations were conducted at three clinics, a diabetes sports day, weekend for young people and their families, and a high-school. An inductive framework analysis was done, informed by relational theory on gender.

Results: Care professionals 'did' and 'made' gender differences together with young people, manifesting as communicative difficulties, in particular between female care professionals and young boys. Boys were considered less skilled in articulating their needs compared to girls. At home, care professionals and parents observed, 'did' and 'made' gender differences by perpetuating gendered divisions of labour.

As traditional caretakers, mothers risk focusing excessively on the diabetes of their child whilst fathers remained more at a distance.

Conclusions: Gender patterns have negative implications on those involved in paediatric type 1 diabetes. Leaving tacit, the gendered communicative issues across child-parent and child-care professional

dyads can sustain invisible friction in a care system that normatively expects verbal participation and increased self-management.
Findings may encourage care professionals and parents to engage with the potential impact of gender dynamics on diabetes practices. Incorporating these dynamics as conversational tools would contribute to improving type 1 diabetes care for young people.

P-252 | Attachment in close relationships and glycemic outcomes in children with type 1 diabetes

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Introduction: Psychological stress can contribute to diabetes control through physiological mechanisms or by poorer adherence to diabetes treatment. Child – parent attachment can have a decisive influence on the regulation of individual's stress response. Child's morning cortisol level may be another indicator of psychological stress.
Objectives: The aim of our study was to evaluate how child's psychological features, reflecting in child's or parents' attachment patterns and child's morning cortisol levels influence glycemic outcomes measured with average HbA1c and HbA1c variability over 4 years, moreover to time in range (TIR).
Methods: 101 children with type 1 diabetes (T1D) and one of their parents/carers were assessed at baseline for children's attachment (Child Attachment Interview; CAI) and parents' attachment (Relationship Structures Questionnaire; ECR-RS). Morning saliva cortisol samples were taken before interviewing children. HbA1c was measured on regular three-monthly visits during a four-year follow-up and data for TIR was exported form blood glucose measuring devices. Multivariate linear regression models were built to determine independent predictors of glycemic outcomes.
Results: More girls than boys were securely attached to their mothers. Results of regression models show that securely attached girls (CAI) had higher average HbA1c than insecurely attached girls (B = -0.64, p = 0.03). In boys, the more insecure parent attachment style (ECR-RS), the poorer the child's glycemic outcome - higher average Hb1Ac (B = 0.51, p = 0.005), higher HbA1c variability (B = 0.017, p = 0.011) and lower TIR (B = -8.543, p = 0.002).
Conclusions: Our findings suggest that attachment in close relationships is associated with glycemic outcomes in children with T1D with important differences between sexes. Sex specific approach should be considered in management of children with poorer glycemic outcomes.

P-278 | Quality of life in children with type 1 diabetes

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Introduction: Diabetes paces a burden on family life and daily routine that can be reduced by the proper disease management program. The outcomes of diabetes may be largely determined by the patient and caregiver behavior.
Objectives: To evaluate of children from 8-18 y/o with T1DM, to compare perceived by their parents, to understand gender and other factors influence and disease management.
Methods: We conducted prospective non-randomized cross-sectional study. Children with T1DM were identified from pediatric endocrinology department. The age of child at the moment of questionnaire administration had to be from 8-18 years old. For the study we used the validated adapted PedsQL Pediatric Quality of Life Inventory 3.0 Diabetes Module of child.
Results: A total of 236 children with T1DM and their primary caregivers participated in this study including 45% girls and 55% boys. Parents were either uneducated 63.64% or had secondary school education 36.36%. In most of the cases insulin was injected by child 63.64%. There was statistically significant difference in mean HbA1C levels by gender: 9

(±1.78) for girls and 7.93 (±1.0) (p<0.001). Children with uneducated primary caregiver hadn't been on diet compared to children whose mother had secondary school education (p value 0.0138).
In the results of Paired t-test of HRQOL scores received from children and their mothers for the same question we found statistically significant difference between the score means for 15 items, where primary caregivers mostly underestimated HRQOL related to their child's disease. They only overestimated problems associated with finger pricking and insulin shots, whereas children don't find it to be hard.
Conclusions: In group of T1DM children girls seem to be more sensitive towards pain and difficulties associated with the disease, boys experienced more difficulties related to treatment compliance and parents' involvement. Primary caregivers mostly underestimated the child's PedsQL .

P-282 | Quality of life in youth with type 1 diabetes and Celiac disease

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Introduction: Parents of children diagnosed with type 1 diabetes (T1D) at a younger age report greater psychological challenges in managing and coping with T1D. Little is known about the mental health impact of parents of children diagnosed with celiac disease (CD) and T1D.
Objectives: We evaluated health-related quality of life (HRQOL) in youth with a dual diagnosis of CD and T1D according to age at diagnosis to determine whether age impacts parental quality of life or mental health.
Methods: Parents of youth ages 2-19 with CD and T1D followed at a large pediatric tertiary care center were eligible to participate. Demographic, clinical, and laboratory data were collected via chart review, insulin pump, and continuous glucose monitoring software. The Celiac Disease Quality of Life questionnaire (CDQL), Type 1 Diabetes and Life (T1DAL), and a 10-item, Likert scale tool were used to assess HRQOL. Data were collected and managed using the Research Electronic Data Capture (REDCap) database. T-tests were used to compare outcomes.
Results: Of 137 eligible parents, 43 responded (31.4%) and 21 (15.3%) completed all survey measures. Other than expected differences in child age, other demographic characteristics did not differ between the two groups (48% female youth, 86% female parent, 90% diagnosed with T1D before CD, T1D duration 4.9±3.2 years, 95% insulin pump users, 100% CGM users). T1DAL (55± 19 vs 45± 12, p=0.17) and CDQL (29± 6 vs 29 ± 5, p=0.69) scores did not differ between the groups.
Parents of youth diagnosed before 6 years of age reported a greater impact of CD on their own mental health (6.9±1.7 vs 4.3±2.6, p=0.01) and this approached significance for T1D (8.2±1.9 vs 6.4±2.3, p=0.06).
Conclusions: Parents of children diagnosed with CD and T1D at a younger age reported a greater impact of CD on their own mental health than parents of youth who were older at diagnosis. These results indicate the need for additional mental health support for families of young children with both CD and T1D.

P-300 | The "losvast" ("loose tight") parent training in pediatric type 1 diabetes - what works for whom and under what circumstances

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Introduction: The *"LosVast"* ("Loose Tight") parent training aims to guide parents of children with type 1 diabetes (T1D) towards more positive child coaching. It was developed practice based, with broad, nationwide clinical uptake and adoption in guidelines. Prior to outcome evaluation, we first need to make explicit how and why the program is assumed to work, for whom and under what circumstances.

Objectives: To propose a model, based on current knowledge and experience, of:
1. What contexts play a role, and;
2. What mechanisms should be triggered to enhance positive parenting behaviour.

Methods: Qualitative analysis of:
A. Interviews with program developers and facilitators,
B. Parent training literature, and;
C. The course manual.

Results: Figure 1 depicts the proposed model. Many contexts play a role in how content and delivery of LosVast is experienced. These can be grouped into four broad categories of parent, child, group and facilitator characteristics. Jointly, the program and contexts trigger several mechanisms of increased awareness, knowledge, skills, self-compassion, self-efficacy, motivation, reflection, empathy with their child and a sense of group coherence among participants. Activation of (some of) these mechanisms is necessary to change parenting behavior. As an illustration of a mismatch between context and program: parents from other cultural backgrounds may value respect over positive reinforcement. As a consequence, reflection on parenting and motivation to change parenting behavior are less activated, as is sense of group coherence. This then negatively affects intended outcomes.

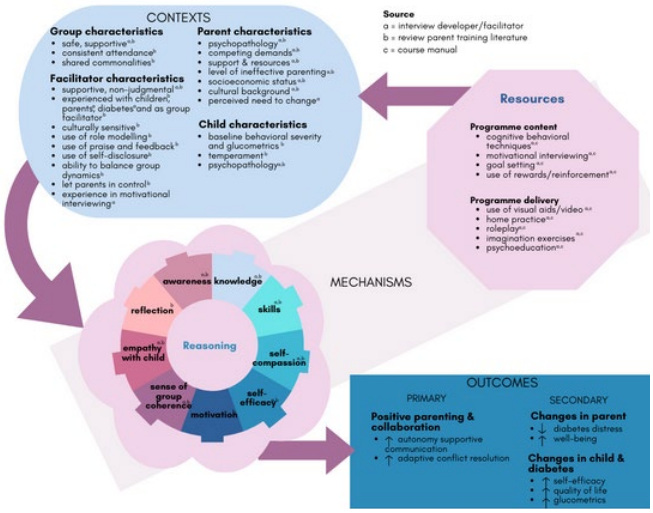

Figure 1.

Conclusions: Changes in parenting behavior are not the result of mere delivery of the LosVast program, but are susceptible to a complex interplay between contexts and mechanisms. Clarifying these relations guides further evaluation and adaptation of the training in real-world settings, leading to a more tailored approach.

P-336 | Improvements in psychological and diabetes self-care outcomes for children and adolescents attending diabetes camps, Auckland, New Zealand, 2023

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Introduction: Diabetes camps have been deemed an important part of diabetes care: providing education, support, and a greater sense of what is now termed 'common humanity' for the children and families attending. In Aotearoa New Zealand, Diabetes New Zealand have been running camps for 40 years, however the impact on camp and psychological outcomes has not been studied.

Objectives: We aimed to examine psychological and glycaemic outcomes in children attending the 2023 summer camp.

Methods: An observational study for children (9-14 years) attending Auckland diabetes camp 2023 examining pre/post differences in glycemic control, self-care behaviours, self-compassion, distress, quality of life, and self-efficacy assessed at baseline, 1-week, and then 3 and 6 months. Parental measures included distress and burden, self-efficacy, and quality of life.

Results: 27 children with T1D and a key caregiver (87%) participated in the study. mean age 11 (1.3)* yrs, 44% female and diabetes duration of 4.8 yrs (3.6). Data on baseline, 1-week showed:
Children 8-12 yrs demonstrated less feelings of isolation (p=0.0140).
Adolescents 13-14 yrs demonstrated more significant improvements in psychological outcomes; improved diabetes related burden (p= 0.0263), self-efficacy (p=0.0086), self-care (p=0.0320), and less feelings of being overwhelmed by their emotions (p=0.0417).
Parent perceptions of children's psychological well-being demonstrated improved diabetes related burden (p=0.0230) and self-efficacy (p=0.0207), however lower quality of life for children 1 week following camp (p=0.0057) especially in the treatment adherence (p= 0.0162) and worry (p=0.0100) domains. 3-month data under analysis.
**Mean ±SD*

Conclusions: Children attending camp demonstrated improved short term psychological outcomes following camp. Results will offer insight into the impact of diabetes camps and guide future adaptions.

P-357 | Turning the tide of 'T1DE' (type 1 diabetes & eating disorders)

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Introduction: Although eating disorders in children and young people (CYP) with type 1 diabetes mellitus (T1DM) are associated with increased morbidity and mortality, they are often under-recognised in practice.

A thorough understanding of the range of issues affecting CYP with T1DM is critical to establishing the diagnosis, management, and good outcomes.

Objectives: To review the literature on disordered eating and diagnosed eating disorders in CYP with T1DM.

Methods: A review of the literature on disordered eating and diagnosed eating disorder in CYP with T1DM.

Results: The review shows that in addition to the burden of chronic disease, other factors that are related to diabetes such as dietary intake precision and insulin omission or restriction, contribute to disordered eating behaviours and clinical eating disorders in CYP with T1DM.

The warning signs of eating disorders in CYP with diabetes include weight loss and poor glycaemic control, among other things.

Early treatment outcome studies for disordered eating in T1DM were limited by small size, lack of comparison groups, and high drop-out rates.

However recent research including:

- Safe Management of People with T1DM and Eating Disorder Study (STEADY) – Cognitive Behavioural treatment specifically for Disordered Eating in T1DM
- Eating disorder prevention manual (Body project) tailored for T1DM.
- A small pilot study of iACT (Acceptance and Commitment Therapy Tailored for T1DM) have shown promise.

Conclusions: The results identify promising management strategies for disordered eating behaviours and clinical eating disorders in CYP with T1DM. Nonetheless, a high index of suspicion for early recognition and adequate management through shared care is paramount.

P-369 | Racial and ethnic disparities in symptoms of anxiety, depression, and eating disorders in adolescents with T1D

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Introduction: Youth of color with type 1 diabetes (T1D) have worse health outcomes compared to non-Hispanic White children.

Objectives: This study examined racial and ethnic differences in symptoms of generalized anxiety, depression, and disordered eating in adolescents with T1D.

Methods: N=343 adolescents (Mage=13.9+2.1yrs.; MA1C=8.1+1.8%; 71.6% non-Hispanic White; 15.3% Hispanic or Latinx; 50.5% female) completed the General Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-8 (PHQ-8); scores >10 are elevated), and the Diabetes Eating Problems Survey-Revised (DEPS-R scores >20 elevated).

Results: Youth of color had a higher percentage of elevated scores on the PHQ-8 and DEPS-R compared to non-Hispanic White youth (PHQ-8: $\chi 2=11.9$, $p<0.005$; DEPS-R: $\chi 2=10.3$, $p<0.05$). Overall, 22.7% of adolescents reported GAD-7 scores ≥10, 21.2% reported PHQ-8 scores ≥10, and 20.7% reported DEPS-R scores ≥20.

Rates of elevation on Questionnaires:

	Black or African American	Multi-racial	Hispanic/ Latinx of any race	non-Hispanic White
GAD-7	23.1%	34.6%	32.2%	15.5%
PHQ-8	22.2%	38.2%	24.7%	17.6%
DEPS-R	31.3%	31.3%	29.0%	16.8%

Conclusions: Adolescents with T1D from racial and ethnic minority backgrounds experience higher rates of elevated scores on anxiety, depression, and disordered eating screening measures compared to non-Hispanic White adolescents.

An important first step to reducing racial and ethnic disparities is appropriately identifying adolescents in need of psychological treatment through routine psychosocial screening at clinic appointments.

P-370 | Youth are anxious when they learn they are at risk for T1D

H. O'Donnell[1], F. Dong[1], S. Johnson[2], C. Geno Rasmussen[1], B. Frohnert[1], A. Steck[1], K. Bautista[1], F. Sepulveda[1], M. Rewers[1], K. Simmons[1]
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Introduction: Several studies have documented the psychological experience of caregivers participating in screening and monitoring programs with their children– caregiver anxiety about their child developing T1D, risk perception accuracy and actions taken to prevent T1D. However, there is a paucity of data on the psychological experience of children participating in such studies.

Objectives: The objective of this abstract is to describe anxiety about developing T1D in a sample of youth from the general population with ≥1 positive islet autoantibody.

Methods: The Autoimmunity Screening in Kids (ASK) study screens for IA in general population youth residing in Colorado, USA. Youth positive for ≥1 IA are invited to enroll in a follow-up monitoring study to prevent diabetic ketoacidosis at onset of clinical T1D and facilitate enrollment into prevention trials. This study included 125 youth ages 10-15 years (56% female; 8.8% with a family history of T1D) with positive screening results who confirmed IA+ at a separate visit. Nearly half (49.6%) were positive for a single IA, 24.8% were positive for a single IA by two methods, and 25.6% were positive for multiple IA.

Study participants completed a version of the child state anxiety inventory (SAI-CH-6) adapted to specifically assess anxiety about developing T1D in youth at their first visit following learning they are confirmed to be IA+. Scores ≥ 1 SD above the mean of the normative data (i.e., >36) are indicative of high anxiety.

Results: Based on normative data, we would expect 16% of youth to have high anxiety scores. The majority of youth reported high anxiety about developing T1D. Depending on age, 45%-77% of youth had an elevated SAI-CH-6 score.

Age	10 (n = 27)	11 (n = 23)	12 (n = 23)	13 (n = 20)	14 (n = 20)	15 (n = 12)
Mean (SD)	41.4 (7.5)	37.7 (9.1)	37.7 (7.4)	37.1 (4.9)	37.8 (7.0)	39.3 (5.6)
% >36	77.8%	60.9%	56.5%	45.0%	60.0%	75.0%

Table 1. Mean anxiety about T1D and percent elevated by age

Conclusions: High anxiety about developing T1D is a common reaction for youth found to be IA+ through general population screening. Screening programs must be prepared to adequately address anxiety created by IA screening.

P-388 | Who returns for confirmation after initial positive islet autoantibody results?

H. O'Donnell[1], F. Dong[1], S. Johnson[2], C. Geno Rasmussen[1], B. Frohnert[1], A. Steck[1], K. Bautista[1], F. Sepulveda[1], M. Rewers[1], K. Simmons[1]
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Introduction: The benefits of screening for islet autoantibodies (IA) include DKA prevention and access to therapies that may delay disease onset, but these can never be fully realized unless screening results are confirmed and high-risk people actively engage in follow-up visits.

Objectives: We attempted to identify factors predicting completion of the confirmation test after initial IA+ screening.

Methods: The Autoimmunity Screening in Kids study screens youth in Colorado for IA in multiple locations across the community. If a child screens positive for ≥1 IA, the study team requests the family complete a confirmation visit with venipuncture to obtain serum. Multiple logistic regression was used to examine factors associated with completing a confirmation visit.

Results: N=730 of 991 (74%) of participants who screened positive for IA returned for confirmation. Child sex and first-degree relative status were not significant. Youth with higher risk IA screening results (i.e., single by two methods or multiple) were more likely to complete a confirmation visit than youth with a single IA by one method. Younger children (<13 yrs) were more likely to complete confirmation compared to adolescents 13-18 yrs.

Hispanic youth were just as likely to return for confirmation as Non-Hispanic White youth but youth from other racial and ethnic backgrounds were less likely to complete a confirmation visit than Non-Hispanic White youth.

Effect	OR	95% Wald confidence limits	Pr> ChiSq	% Return for Confirmation
Child Age (Ref=Adolescent 13-18 yrs)				75%
Child <13 yrs	1.61	1.16-2.25	0.005	69%
Initial Autoantibody Screening Results (Ref= Single IA+ by One Method)				69%
Single IA+ by Two Methods	2.14	1.40-3.28	0.0005	81%
Multiple IA+	2.97	1.79-4.92	<0.0001	87%
Child Race/Ethnicity (Ref=Non-Hispanic White)				79%
Hispanic	0.91	0.64-1.28	0.58	74%
All other	0.37	0.27-0.59	<0.0001	57%

Table 1. Factors associated with returning for confirmation after positive IA screening.

Conclusions: The study team's knowledge about high-risk IA screening results (i.e., single by two methods or multiple) may influence messaging with these participants that results in increased rates of completed confirmation visits.

Caregivers of adolescents may have more trouble getting adolescents to return for confirmation given their age and increased autonomy compared to younger children. Barriers to completing confirmation visits for racial and ethnic minorities must be assessed to ensure equal access to screening for IA and pre-symptomatic T1D treatments.

P-390 | Higher prevalence of mental health impairment in youth with diabetes and association of higher HbA1c with physical complaints

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Introduction: An increased prevalence of mental health impairments has been reported for adolescents with type 1 diabetes (T1D). Although psychosocial factors bear the potential to have a detrimental impact on glycemic control, health professionals are insufficiently trained to recognize and accommodate problems in this field.

Objectives: We aimed to determine the prevalence and the type of mental health impairment in adolescents in our outpatient diabetes clinic and to assess the relationship between mental health problems and glycemic control.

Methods: YSR11-18R assesses the scales: anxious/depressive, regressive/depressive, physical complaints, social problems, thinking, and repetitive problems, attention problems, rule-breaking and aggressive behaviour and measures socially desirable behaviours.

Student's t tests were used to compare the results in two groups, patients with good (HbA1c $\leq$ 7.7%), and less good glycemic control (HbA1c > 7.7%).

Results: In 29 adolescent patients (15 girls, 14 boys), aged 14.9 years (range: 13-18), median HbA1c was 7.8% (range 6.1-14.3%). In 3 questionnaires manifest psychiatric comorbidities were detected, while 3 showed less severe psychopathologies, thus 10 percent of YSR tests in our cohort were abnormal.

The individual problem scales showed that highest T-values (means ± SD) were achieved in the fields regressive/depressive (T 55.7 ± 9), anxious/depressive (T 55.79 ± 9) and attention problems (T 55.6 ± 6.4). HbA1c $\leq$ 7.7% was associated with significantly less (p = 0.03) physical complaints; adolescents with HbA1c > 7.7 had a tendency towards rule-breaking behaviour (p=0.08).

High scores were obtained in the socially desirable responses (Highest score 2, mean 1.53 ± 0.30 SD). Good glycaemic management was associated with fewer physical complaints, while adolescents with impaired glycemic control showed a tendency towards rule-breaking behaviour.

Conclusions: There is an increased prevalence of psychosocial impairment in T1D adolescents but poor glycemic control is mainly associated with physical complaints. YSR testing allows for detection of psychologic problems in adolescents with T1D and thus could allow for targeted interventions.

P-392 | Improving provider-patient relationships in treatment of young adult type 1 diabetes: a digital survey in the United States

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Introduction: Type 1 diabetes mellitus (T1D) is a chronic illness that requires constant monitoring and management of blood glucose levels. Young adults with T1D face unique challenges as they age through transitional periods and milestones, requiring them to adapt their medical management to novel environments such as the workforce.
Evidence has shown that a trusting relationship with a diabetes care provider can be crucial in meeting T1D goals and developing resilience to life changes.
Objectives: This study focuses specifically on young adults aged 18-25 living with T1D in the United States and aims to identify strengths and areas of improvement for provider-patient relationships within young adult T1D care.
Methods: An online 15-question Qualtrics survey was distributed across social media over one month. Responses to the survey, including an adaptation of the Health Care Climate Questionnaire (HCCQ; Williams et al., 1996) were studied using descriptive, inferential, and causal statistical analysis.
Results: Higher measurements of provider-patient trust were associated with improvements in A1C and self-perceived improvements in diabetes control, whereas lower measurements of trust were associated with higher A1Cs and worsened diabetes-related stress. 81% of patients who identified as black, indigenous, and people of color (BIPOC) did not have a provider who shared the same background as them, and this group was more likely to see no change or worsening in their diabetes-related stress.
Additionally, diabetes-specific stressors and diabetes burnout was the most selected topic that participants wanted their provider to address more often.
Conclusions: Strong provider-patient relationships that facilitate trust and connection were related to lower HbA1C, improved diabetes control, and improved diabetes-related stress. More BIPOC can be incorporated into future studies to better understand the unique challenges of this young adult population and the role providers can play in promoting health equity in the treatment of T1D.

P-397 | Sexual knowledge and contraceptive use in adolescents with type 1 diabetes in comparison with their healthy peers

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Introduction: Adolescents with type 1 diabetes mellitus (T1D) may differ from their healthy peers in respect to sexually transmitted diseases (STDs) knowledge and contraceptive use.
Objectives: We aimed to explore sexual knowledge and contraceptive use and associated factors in T1D adolescents compared to healthy peers.
Methods: Fifty- eight T1D adolescents (mean±SD age 16.3±2.0 years, disease duration 6.7±3.5 years, HbA1c:8.0±1.3%) were compared to 116 healthy controls (matching 1:2 for school and gender). Anonymous questionnaires were used to evaluate sexual knowledge and contraceptive methods.
Results: The commonest contraceptive method was the condom (T1D:71.4%, controls:73.1%). The birth pill was reported by 11.8% patients and by 8.3% controls, no protection by 23.5% patients and by 10.2% controls, while double protection (≥2 methods) was reported by 35% patients and 27.7% controls.
Among patients, the double protection group was characterized by older age at sexual debut (16.4 vs 15.8 yrs, p=0.010). The low protection group (no contraception/withdrawal) was characterized by older patients' age (17.0 vs 16.5 yrs, p=0.023) and younger paternal age (41.0 vs 51.9 yrs, p=0.046).
Among controls, double protection use was more frequent among groups with married vs divorced parents (34.3% vs 10%, p=0.042).
Conclusions: The commonest contraceptive method for both groups was the condom, while 23.5% patients and 10.2% controls used no protection. The

degree of contraception use among patients was associated with age and parental age and with the family situation in controls.

P-398 | How the 'Nurture Parents Program' improved the parent's mental health and the positive impact on their children with type 1 diabetes

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Introduction: Parents of children with type 1 diabetes can show a higher rate of depression, anxiety, and post-traumatic stress disorder. Supporting parent's mental health increases their capacity to parent a child with type 1 diabetes. Increasing a parent's well-being increases the whole family's mental health and ultimately metabolic control of type 1 diabetes. Diabetes Australia recognised this need and funded counselling for parents with the support from the Future Generation.
Objectives: **Aim:** The Nurture Parents Program was designed to benefit children living with type 1 diabetes by improving parents and carers mental health and resilience.
Subjects: 127 parents and carers of children with type 1 diabetes had 500 counselling sessions amongst them via telehealth across Australia. 109 parents completed the mental health questionnaire to analyse.
Methods: The Depression, Anxiety and Stress Scale 21 Questions (DASS21) was completed by the parents before counselling commenced and at the end of counselling. The session amounts varied from 3-6 sessions with an average of 4 sessions per parent.
Results: This program highlighted the effectiveness of parent counselling. The parents who entered the program showed 43% of them reported either severe or extremely severe stress, anxiety, or depression. Majority of the parents reported moderate levels and post completion of counselling the majority reported normal levels on the scales of stress, depression, and anxiety.

Paired Samples T-Test

Before	After		Statistic	df	Mean Difference	SE Difference		Effect size
Dep1	Dep2	Student's t	8.58	108	<0.001	5.19	0.620	Cohen's d	0.823
Anx1	Anx2	Student's t	9.54	108	<0.001	5.31	0.541	Cohen's d	0.952
Str1	Str2	Student's t	11.99	108	<0.001	8.77	0.732	Cohen's d	1.148

Conclusions: Parents of children with type 1 diabetes should have access to diabetes counselling as the research shows the effectiveness of counselling in reducing mental health pressures.
Decreasing these risks supports their parenting capacity and impacts on their child with type 1 diabetes. Research shows that a parent's mental health directly impacts a child's mental and physical health.

P-402 | Content validity and reliability test of type 1 diabetes distress scale Indonesian version as a distress test tool for adolescent with type 1 diabetes mellitus

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Introduction: Diabetes Mellitus (DM) is a chronic disease that has the potential to experience more severe complications for the patient's lifetime. This is what causes many T1DM patients experience distress.
The prevalence of distress in adolescents with T1DM reaches 42%. The T1-DDS questionnaire is a valid and reliable questionnaire, but there are no studies that specifically use this questionnaire in adolescents with T1DM.
Objectives: This study aims to adapt the T1-DDS questionnaire into Indonesian and prove the validity and reliability of the questionnaire.
Methods: This study used a cross-sectional study design that recruited adolescent subjects aged 10-18 years who had been diagnosed with T1DM for at least 6 months. The translation of the questionnaire was carried out by certified translators.
The validity of the content was assessed by 11 related experts. The results of the assessment of all experts are presented in the form of I-CVI and S-CVI scores. Content validity also assessed the correlation of

each statement to the mean T1-DDSscore and each of its subscales. Reliability testing was assessed using at Cronbach's alpha value.

Results: A hundred adolescents with T1DM were recruited using the consecutive sampling method. The mean value of I-CVI and S-CVI is 0.97. The correlation of the Indonesian version of SDD-T1 statements with each subscale is 0.7-0.8. The Cronbach's alpha value of this questionnaire is 0.9 with very good internal consistency.

Conclusions: The Indonesian version of the SDD-T1 Questionnaire is proven to be valid and reliable as a screening tool for distress in adolescents with T1DM

P-408 | The effectiveness of the STEP parenting skills program among parents of children with 1 type diabetes for diabetes type 1 management

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Introduction: Parents raising a child withT1DM have many tasks: they must ensure good disease management to avoid complications in the future, while simultaneously teaching these procedures to the child and developing their psychological qualities towards psychological maturity.

Parenting style may positively or negatively affect the relationship between a parent's involvement and the child's illness management.

Parenting skill programs can help reduce excessive parental control and provide more autonomy and encouragement [18], something that is especially relevant to children with diabetes [19].

Objectives: The aim of the study –to reveal the efficiency of the adapted STEP program (hereinafter STEP T1DM) for diabetes type 1 (hereinafter T1DM) management.

Methods: The study data were collected in two groups:

1. Experimental group – parents of children with T1DM participated in the STEP T1DM program (75 parents);
2. Comparison group – parents of children with T1DM who did not participate in the STEP T1DM program (81 parents).

The STEP T1DM program effectiveness study consists of three parts:

1. Pre-assessment.
2. Post-assessment
3. Follow-up-assessment

The results of gHbA1c were used to evaluate the management of T1DM.

Dispersion analysis of blocked data using ANOVA parametric samples and Friedman test non-parametric samples revealed T1DM management.

Results: One of the tasks of the research was to evaluate the effectiveness of the STEP T1DM program for the management of T1DM. HbA1c levels were evaluated 3 times (during pre-, post- and follow-up assessments). The decline in indicators suggests that the program has a positive impact on illness management.

The analysis of the data presented in Fig. 1 below shows the long-term positive effects of the STEP T1DM program on T1DM management over a period of 3 to 4 months.

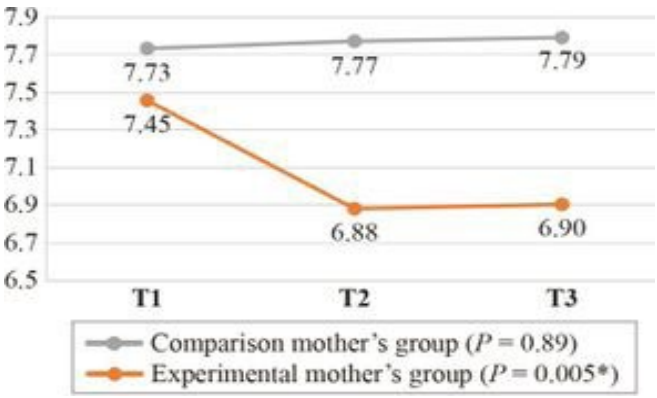

Fig. 1.

Conclusions:

- The STEP parenting skill development program had short- and long-term positive effects on a child's type 1 diabetes management.

DIABETES PATHOGENESIS, EPIDEMIOLOGY AND ETIOLOGY

P-173 | Fruit, berry, and vegetable consumption and the risk of islet autoimmunity and type 1 diabetes in children – the dipp birth cohort

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Introduction: Prospective studies on the association between fruit, berry, and vegetable consumption and the risk of type 1 diabetes development are few.

Objectives: We explored the association between consumption of fruits, berries, and vegetables in early childhood and the risk of developing islet autoimmunity and type 1 diabetes in genetically at-risk children.

Methods: Food consumption data were available from 5,674 children in the Finnish Type 1 Diabetes Prediction and Prevention (DIPP) cohort study. Diet was assessed with 3-day food records at the age of 3, 6, and 12 months and then annually up to 6 years of age. The association between food consumption and the risk of islet autoimmunity (repeated positivity to islet cell autoantibodies plus at least one biochemical autoantibody out of 3 measured), type 1 diabetes, and progression to type 1 diabetes was analyzed using joint models adjusted for energy intake, sex, HLA genotype, and family history of diabetes.

Results: During the 6-year follow-up, 247 children (4.4%) developed islet autoimmunity and 94 (1.7%) type 1 diabetes. Furthermore, 64 (12.7%) out of 505 children with at least one repeatedly positive autoantibody progressed from islet autoantibody positivity to type 1 diabetes.

The consumption of cabbages was associated with decreased risk of islet autoimmunity (HR 0.83; 95% CI 0.73, 0.95, per 1 gram/megajoule increase in consumption) and the consumption of berries with decreased risk of type 1 diabetes (0.60; 0.47, 0.89).

The consumption of banana was associated with increased risk of islet autoimmunity (1.08; 1.04, 1.12) and type 1 diabetes (1.11; 1.01, 1.20) while the consumption of apple fruits (1.11; 1.00, 1.23) and potato (1.08; 1.02, 1.14) was associated with increased risk of progression from islet autoantibody positivity to type 1 diabetes.

Conclusions: Consumption of fruits, berries, and vegetables showed both risk-decreasing and risk-increasing associations with type 1 diabetes-related outcomes, depending on the food group and the outcome.

P-174 | Serum concentrations of trace elements in children with newly diagnosed type 1 diabetes: a prospective case-control study

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Introduction: Type 1 diabetes (T1D) is a metabolic condition with multiple underlying causes. The role of micronutrients has been studied as prophylactic or therapeutic agents, however, most studies have been conducted in adult patients with either T1D or type 2 diabetes.

Objectives: To measure plasma serum concentrations of micronutrients in children with newly diagnosed T1D and near age and sex-matched controls.

Methods: Fifty-eight cases were enrolled from Pediatric Diabetes Clinic or Pediatric Endocrinology ward based on eligibility for inclusion. Near age and sex-matched controls were also enrolled. Trace elements were analyzed in serum samples by inductively coupled plasma mass spectrometer (ICP-MS).
Results: T1D cases were recruited at a median duration of 8 days (4.7-27.2) from the diagnosis of diabetes. The mean age of the T1D children was 7.17 years and 60.3% were males. 62% of children had either of the osmotic symptoms at presentation and 38% presented in hyperglycaemic crisis. Among cases, 24 children (41.4%) had a family history of type 2 diabetes. The diagnosis of T1D was confirmed by measuring Hb1Ac, C-peptide levels, and pancreatic autoantibody positivity.
The mean ± SD levels of Mn (1.96±0.48 μg/dl) in cases were found to be significantly low ($p<0.001$) as compared to the controls (2.51±0.64 μg/dl) and Se levels (12.8±17.3 μg/dl) were found to be significantly high in cases ($p <0.001$) as compared to controls (7.68±2.5 μg/dl).
The mean levels of chromium, iron, cobalt, copper, and zinc in cases were not statistically significant as compared to the controls.
Conclusions: The low serum concentration of Mn and high concentration of Se at the onset of T1D might be associated with the development of T1D in children. The monitoring and management of trace elements might prove beneficial in achieving better glycemic control in children with T1D.

P-176 | 3 screen ICATM ELISA – a new tool to identify pre-clinical diabetes in first-degree relatives of patients with type 1 diabetes (pre-d1abetes study)

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Introduction: Overt clinical symptoms of type 1 diabetes (T1D) are often preceded by a pre-clinical stage of varying duration. Diagnosis of the pre-clinical stage is difficult and is based on the presence of specific islet autoantibodies in the subject's blood.
Objectives: Apparently healthy first-degree relatives of patients with T1D were tested using the 3 Screen ICATM ELISA (RSR Ltd) for combined testing for autoantibodies to GAD65 (glutamic acid decarboxylase, 65 kDa isoform), ZnT8 (zinc transporter 8), and the islet antigen IA-2. 3 Screen positives were subsequently tested for individual auto anti bodies. Potentially, approximately 70% of individuals with two or

more types of diabetes associated auto anti bodies (including insulin auto anti bodies; IAA) will need insulin treatment over the next 10 years.

Methods: A total of 1227 subjects (age 1–18 years) were recruited from clinical Centers from Białystok (n = 237), Rzeszow (n = 80), Poznan (n = 74), Warsaw IP-CZD (n = 147), Warsaw WUM (n = 42), Opole (n = 106), Wrocław (n = 90), Gdansk (n= 55), Łódź (n= 165), Katowice (n= 46), Krakow (n= 14), Szczecin (n = 20), Bydgoszcz (n = 73), Lublin (n = 42). Serum samples collected by the coordinating clinics were tested by 3-Screen at FIRS Laboratories, RSR Ltd (Cardiff, UK).

Results: Out of 1227 samples n = 105 (8.5%) were 3 Screen positive. Testing in individual autoantibody assays identified 70 children (5.7%) with multiple auto anti bodies who were diagnosed with pre-clinical diabetes.

These children were followed-up with a normal glucose tolerance test and glycated hemoglobin determinations.

Conclusions: Early detection of islet autoantibodies by 3 Screen identifies pre-clinical T1D preceding development of carbohydrate abnormalities. This opens up opportunities for the therapeutic interventions in innovative clinical programs.

Patient follow up with early education and multidirectional diabetes care should prevent occurrence of ketoacidosis associated with severe clinical manifestations.

P-178 | Lower percentage of NK cells in children with type 1 diabetes and their siblings

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Introduction: The pathogenesis DM1 involves genetic and environmental factors as well as the patient's immune system. The role of NK cells in the pathogenesis of this disease has been not clarified.

Objectives: Evaluation the population of NK cells and autoantibodies to pancreatic beta cells in the group of children with type 1 diabetes and their healthy siblings in comparison with children from families with no history of autoimmune diseases.

Methods: The research included 76 children with type 1 diabetes, 101 children from the sibling group and 30 children from the control group. Peripheral blood was analyzed on a FACSCalibur flow cytometer (Becton Dickinson) to evaluate the NK cell population. The results are shown as the percentage of NK cells among lymphocytes.

Results: The mean percentage of NK cells in children with type 1 diabetes (10.59 ± 5.37) and in the sibling group (11.93 ± 5.62) was statistically reduced compared to the control group (14.89 ± 7.78) in sequence.

There was no statistically significant difference in the percentage of NK cells between the group of children with type 1 diabetes and their siblings.

In the group of siblings, the younger the child, the lower the reported percentage of NK cells. This relationship was statistically significant. In the group of children with type 1 diabetes, a similar relationship was not found.

The concentration of anti-IA2 and anti-Znt8 antibodies was statistically significantly higher in the sibling group compared to the control group, and the concentration of anti-GAD antibodies was comparable in both groups.

In the group of children with type 1 diabetes, a positive correlation was demonstrated between a reduced percentage of NK cells and the coexistence of anti-GAD and anti-ZnT8 antibodies. There is no similar relationship in the group of siblings.

Conclusions: The reduced percentage of NK cells in children with DM1 and their siblings compared to the control group suggests that NK cells and genetic predisposition underlie the pathogenesis of type 1 diabetes.

P-179 | Vascular endothelial growth factor (VEGF) As the predictor microangiopathy in obese and diabetic children

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Introduction: Vascular endothelial growth factor (VEGF) is a signal protein produced by cells that stimulates vasculogenesis and angiogenesis. It is part of the system that restores the oxygen supply to tissues when blood circulation is inadequate. Serum concentration of VEGF is high in bronchial asthma and diabetes mellitus. Overexpression of VEGF can cause vascular disease in the retina of the eye and other parts of the body.

Objectives: The aim of this study is comparison between circulating VEGF levels in children with diabetes type 1, obese and healthy children.
Methods: The study concerned 90 children with diabetes type 1, 60 children with obesity without diabetes and 60 healthy children. The blood has been taken fasten from peripheral vein. The VEGF was checked by ELISA in all children. In serum were checked the cholesterol, triglycerides, insulin and glucose level and Hb A1c.
Results: The VEGF mean levels were highest in children with obesity 356,55 pg/ml (SD 169,44 pg/ml). In children with DM1 mean VEGF was 254,88 pg/ml (SD 167,89 pg/ml). The lowest levels of VEGF was observed in group healthy children: mean 188,75 pg/ml (SD 144,88 pg/ml).
We noticed statistic significant differences between group of diabetic and obese children and healthy children. The results were correlated with BMI, and with calculated HOMA. It was observed not any correlations between VEGF and cholesterol level or triglycerides.
Conclusions: High levels in peripheral blood – marker of vasculogenesis and predictor of microagiopathy VEGF is more connected with obesity then with diabetes type 1.

P-223 | A diabetes can hide another: always think about type 1 diabetes in children

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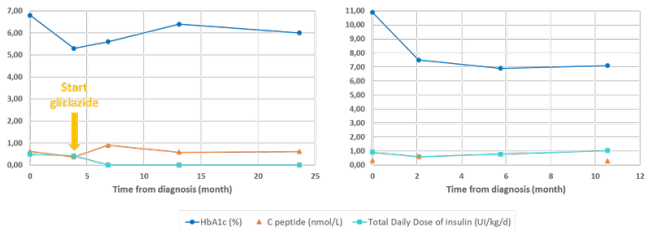
Introduction: Monogenic diabetes account for 1 to 6 % of pediatric diabetes while type 1 diabetes for over 90%.
Objectives: We report the story of a family where monogenic and type 1 diabetes coexist.
Methods: Case report.
Results: We report the case of a 16 year old boy who presented for glycosuria detected to the school medical visit, without weight loss, polyuria or polydipsia. He is the eldest of three children. The parents are of Moroccan origin, not consanguineous. Laboratory investigations showed HbA1c at 6.8 % (51 mmol/l) and C peptide level at 0.6 µg/l. There were no ketosis. We performed an oral glucose tolerance test showing a fasting glucose level at 155 mg/dl and after two hours at 310 mg/dl with an insufficient insulin level at 134 pmol/l. The diagnosis of diabetes is confirmed. The teenager is hospitalized and, while awaiting the results of immunological and genetic markers, insulin therapy is started. IAA, ICA, GADA and IA2A were negative.
The genetic analysis showed an heterozygote c.236A>T p.(Glu79Val) variant in the HNF-1-alpha gene. The current meaning of this variant is unclear.
Following this result, we empirically introduced gliclazide and the insulin was quickly weaned based on blood glucose monitoring. Metabolic control remained optimal with gliclazide 120 mg/d.
We proposed genetic research of this variant in the parents: the mother has the same variant, without diabetes, the brothers do not have it.
However, one year later, the second brother, at the age of 13, presented with polyuria, urinary urgency, polydipsia and a 5% weight loss. In consultation, glucose level was measured at 433 mg/dl, HbA1c at 10.9% (95 mmol/l) and C peptide diminished to 0.314 nmol/l. There were no ketosis.
The teenager is hospitalized to start subcutaneous insulin therapy. IAA (1.1 %), ICA (50 U JDF) and GADA (52.6 U/ml) were positive, confirming the diagnosis of type 1 diabetes.



Conclusions: Diabetes in youth is a heterogeneous disease that can vary widely in clinical presentation and course. As the most common form of diabetes in children is type 1 diabetes, a family history of monogenic diabetes does not exclude the development of type 1 diabetes.
If the diagnosis in unclear, the presence of at least one diabetes-associated autoantibody confirms the diagnosis of type 1 diabetes.
Establishing a correct diagnosis has important implications for guiding appropriate education, treatment, prognosis and genetic counselling.

P-269 | Clinical profile of immunemediated versus idiopathic type 1 diabetes in children – an observational study

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Introduction: International Society for Pediatric and Adolescent Diabetes proposed two subcategories for type 1 diabetes mellitus (T1DM): immune-mediated type 1 diabetes (IDM) and non-immune-mediated or idiopathic type 1 diabetes (NIDM).
The absence of β-cell autoimmune markers, permanent insulinopenia and susceptibility to ketoacidosis define the second category, whose pathogenesis remains unclear.
The aim of this study is to evaluate differences in presentation between the two categories.
Objectives:
1. Prevalence of NIDM in a cohort of T1DM
2. Demographic, clinical and laboratory features of immune mediated vs idiopathic T1DM
Methods: This was a retrospective cohort study of patients between ages 6months to 18 years with β-cell autoimmune markers performed at diagnosis. Patients with suspicion of another specific type of diabetes were excluded.
We obtained two groups: IDM (≥ 1 positive antibody) and NIDM (negative antibodies).
Age, anthropometry, duration of symptoms, clinical presentation, blood glucose at admission, A1C, were evaluated.
Quantitative and qualitative data was represented as Mean +/- standard deviation (SD) and frequencies/ proportions respectively.
Shapiro Wilk test used to assess normality. t test and Fischer exact test/ chi square test was used for quantitative and qualitative variables. $p < 0.05$ - statistically significant. Analysis was done by SPSS22.
Results: Total number of patients enrolled: 38, Idiopathic group 5/ 38.

	IDM n= 33 (86.8%) Mean (SD)	NIDM N= 5 (13.2%) Mean (SD)	p	95% Confidence interval (CI)
Female n (%)	16 (48.5%)	4 (80%)	0.344	-
Mean age at diagnosis (years)	14.27 (13.40)	17.2 (7.16)	0.568	(- 4.62, 2.58)
Mean duration of symptoms (days)	16.2414 (13.12)	17.20 (7.15)	0.875	(-13.32, 11.40)
Mean pH	7.22 (0.192)	7.20 (0.238)	0.858	(-2.65, 0.22)
Mean GRBS (mg/ dl)	488.53 (100.91)	428.20 (55.02)	0.203	(-34.15, 158.81)
Mean HBA1C (%)	11.85 (2.20)	12.46 (3.47)	0.613	(-3.04, 1.82)
Severe DKA n (%)	12 (36)	0	0.158	-

Conclusions: Prevalence of idiopathic T1DM in a cohort of T1DM was 13.2%. Severe DKA was seen in immune mediated T1DM, none of the idiopathic group presented in severe DKA.
Younger age of onset, higher mean blood glucose and lesser mean duration of symptoms was seen in immune mediated group but not statistically significant, probably limited by small sample size.

P-356 | Could serum metabolites be potential biomarkers in children with type 1 diabetes? A pilot studies

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Introduction: Recent studies suggest connection between specific metabolic profile and islet autoimmunity. Early metabolic changes are attributed to many biochemical pathways which may have important implications for the understanding of type 1 diabetes (T1D) pathophysiology and early disease detection and prevention.

Objectives: Therefore, the aim of our study was a pilot assessment of the metabolic profile of children with T1D.

Methods: Study included 30 patients with T1D (median age 11; range 5-17), 21 (70.0 %) girls and 9 (30.0 %) boys. Control group consisted of 11 apparently healthy children (median age 9; (range 4-17): 6 (55.0 %) girls and 5 (45.0 %) boys.

Metabolic profiles of serum samples were analyzed with the AbsolutelDQ® p180 kit (Biocrates Life Sciences). Statistical analysis was performed using R version 4.1.0.

Results: Among 188 tested metabolites (21 amino acids, 21 biogenic amines, one of the monosaccharides, 40 acylcarnitines, 90 glycerophospholipids, 15 sphingomyelins) 151 (80.3%) were detected in more than 75.0 % of tested samples. Seven of the analyzed amino acids (33.0%) were decreased in T1D serum samples.

Among of tested biogenic amines, 5 (23.8%) were statistically different ($p<0.05$) between T1D and control samples. 36 significant changes ($p<0.05$) in glycerophospholipids (92.3%) were mainly phosphatidylcholines. 15 metabolites showed good and very good discriminatory power in ROC analyzes.

The highest diagnostic power to discriminate T1D patients was shown for octadecenoylcylcarnitine (C18:1) and phosphatidylcholine acyl-alkyl C42:5 (PC aa 42.5), with area under the curve (AUC): 0.923 and 0.915, respectively.

Conclusions: Certainly, metabolites showing altered concentrations can be suggested as a potential serum biomarker for the diagnosis of T1D, but confirmation of the results in a larger cohort is required.

Considering the changes in the phosphatidylcholines group, one can speculate about the relationship between barrier damage and the development of type 1 diabetes.

P-413 | Normal insulin and C-peptide levels in overweight children diagnosed with diabetes: what type is it?

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Introduction: The increase in obesity prevalence among children and adolescents has also impact on the pediatric population with type 1 diabetes (T1D). At clinical presentation, obese T1D patients may show clinical and laboratory findings compatible with Type 2 Diabetes (T2D), making the differential diagnosis difficult.

Objectives: To underline the higher C-peptide levels at recognition in overweight and obese children and adolescents diagnosed with T1D.

Methods: The characteristics of two cases with increased body mass index (BMI) and diagnosis of T1D are presented.

Results: Case 1 was an 11-year-old girl with a 1-month history of polyuria, polydipsia and weight loss. Clinical examination revealed overweight (BMI 22.66 kg/m^2) and acanthosis nigricans. Laboratory testing revealed fasting hyperglycemia (291 mg/dl) without diabetic ketoacidosis (DKA), elevated glycated hemoglobin (12.1%), and normal fasting insulin (14.8 μIU/ml) and C-peptide (2.84 ng /ml) levels. Case 2 was an 8 $^{3/12}$-year-old girl referred for hyperglycemia. She complained of a one-month history of fatigue, polyuria, polydipsia and weight loss. The clinical examination revealed obesity (BMI 23.67kg/m^2) and acanthosis nigricans.

Laboratory testing revealed fasting hyperglycemia (291 mg/dl) without DKA, elevated glycated hemoglobin (9.9%), and normal insulin (12.7 μIU/ml) and C-peptide (1.88 ng/ml) levels. Both patients were commenced on intensive insulin therapy by multiple insulin injections.

Normal insulin and C-peptide levels along with the absence of DKA in children with elevated BMI and evidence of insulin resistance reasonably raised the question of diabetes type. Positive pancreatic autoantibodies confirmed the diagnosis of T1D.

Conclusions: Children with increased BMI have slightly more residual pancreatic β-cell function at diagnosis compared to children of normal BMI. Ini-

tially elevated C-peptide and insulin values, not indicative of T1D, make the differential diagnosis from T2D difficult.

P-175 | Low economic standard may be associated with increased risk of diabetic ketoacidosis in Swedish children with new-onset type 1 diabetes

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Introduction: The risk of diabetic ketoacidosis (DKA) in children with new-onset diabetes has been associated with socioeconomic factors in several studies. Disposable income may be associated with DKA even in a high-income country with extensive access to public healthcare such as Sweden.
Objectives: The aim of this study is to analyze household disposable income and low economic standard in relation to the incidence of DKA in children with new-onset type 1 diabetes in Sweden.
Methods: Two different sources of data were used: The Swedish National Diabetes Register (NDR) and the longitudinal integrated database for health insurance and labor market studies (LISA).
Data were used regarding children admitted for type 1 diabetes in Sweden from January 1, 2006, to December 31, 2019. The definition of DKA was pH < 7.30 at hospital admission.
Disposable income per consumption unit was calculated from LISA and adjusted for inflation with 2019 as the index year. Low economic standard/relative poverty was defined as under 60% of the median disposable income per consumption unit in the whole population. Logistic regression was used to predict the effect of disposable income on the probability of DKA. Households with low vs non-low economic standard and DKA cases vs non-DKA cases were compared using the Pearson chi-square test and relative risk for DKA was calculated.
Results: There was a significant association between household disposable income and DKA (p=0.014). DKA was more common in households with low economic standard/relative poverty (28.2% vs 19.6%, relative risk 1.44, p<0.001).
Conclusions: Even in a high-income country like Sweden with universal public access to healthcare, low economic standard/relative poverty is associated with a higher incidence of DKA at new-onset type 1 diabetes.

P-177 | Evaluation of the partial remission period after diagnosis of type 1 diabetes based on insulin dose adjusted A1c (IDAA1c)

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Introduction: The partial remission period (PRP) is characterized by residual endogenous insulin secretion after type 1 diabetes (T1D) diagnosis and insulin therapy initiation. PRP is associated with better glycemic control and a lower prevalence of long-term microvascular complications and is a critical period for preserving beta cell function and investigating immunomodulatory therapeutic options. However, the factors involved in its development and progression have not been fully established.
Objectives: To evaluate the characteristics and factors associated with PRP in patients with T1D over the first 3 years of follow-up To establish the utility of its definition based on insulin dose adjusted A1c (IDAA1c) in relation to definitions based on total daily insulin dose.
Methods: The PRP was retrospectively evaluated in 103 newly diagnosed T1D patients followed continuously for 3 years using the definition based on IDAA1c ≤ 9 compared with definitions using the total daily insulin dose (TDD).

Results: PRP criteria based on IDAA1c was met by 63% of the studied patients. The highest prevalence of PRP was found in the 3rd month after diagnosis, with 48.1% of patients achieving an IDAA1c ≤ 9. The mean duration of PRP was 8.6 months +/- 8 months.
At 12 months after diagnosis, 21.9% of patients were in PRP, at 24 months 10.8%, and at 36 months 5.9%.
DKA at diagnosis, A1c at diagnosis, ICU admission, and the maximum insulin dose required during admission at diagnosis were significantly related to the subsequent development of PRP ($p<0.05$).
Of the patients who met the PRP definition based on IDAA1c criteria at 3rd month after diagnosis, 75.6% did not meet a TDD < 0.3 U/kg/day and 37.8 % did not meet a TDD < 0.5 U/kg/day.
Conclusions: 1. The prevalence and duration of PRP in our series were consistent with previous reports.
2. The development of PRP is negatively related to indicators of severity at diagnosis.
3. IIDAA1c seems to be a more sensitive parameter for defining PRP than definitions employing a TDD.

P-180 | Spatial association between the multidimensional poverty index and glycated hemoglobin control in patients with diabetes in Colombia: a population-based secondary data analysis

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Introduction: Socioeconomic inequalities in diabetes have been associated with less control of the disease and a higher probability of complications.
Objectives: The present study examined the spatial association between the multidimensional poverty index and the proportion of patients with diabetes presenting a glycated hemoglobin (HbA1c) less than 7% in Colombia.
Methods: Ecological study using secondary data aggregated at the departmental level. The multidimensional poverty index was collected from the Colombian National Administrative Department of Statistics for the year 2021.
The proportion of patients with diabetes who had a HbA1c less than 7% were derived from the High-Cost Account during the year 2021.
We calculated Moran's I statistics and local indicators of univariate (LISA) and bivariate (BiLISA) spatial association along with significance map, cluster map and Moran's scatter plot.
Queen's first-order contiguity matrix was used to produce spatial weights.
Results were based on 99999 permutations with a pseudo-significance level of 0.05.

Results: The multidimensional poverty index (Global Moran's I: 0.417, p <0.001) and the proportion of patients with diabetes who had a HbA1c less than 7% (Global Moran's I: 0.451, p <0.001) showed positive and statistically significant values with a cluster pattern. In the case of the bivariate local Moran's I, a value of -0.385 (p < 0.001) was obtained between both variables.

The BiLISA measures showed the conformation of clusters by departments, indicating the clustering of a low poverty index and a high proportion of patients with HbA1c less than 7% in the northeastern and central region of the country.

On the contrary, a grouping with a high poverty index and a low proportion of patients with HbA1c less than 7% was found in the eastern and southeastern regions of the country.

Conclusions: Public health actions aimed at the metabolic control of patients with diabetes should be implemented in regions with greater socioeconomic inequalities.

P-181 | 20-year trends in incidence and prevalence of childhood onset type 1 diabetes in British Columbia, Canada

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Introduction: Rising rates of childhood type 1 diabetes (T1D) have been reported globally but more recent data is lacking.

Objectives: We described incidence and prevalence trends of T1D in children <20 years of age in British Columbia (BC), Canada from 1997 to 2019.

Methods: We used linked administrative data (out-patient physician visits, hospitalizations, prescription dispensations, demographics) from 1992 / 93 to 2019 / 20.

We used a validated pediatric diabetes case-finding definition and diabetes differentiating algorithm. Date of diagnosis was when the first diabetes-related diagnostic code appeared in the outpatient/inpatient record, or the first prescription dispensation for a diabetes medication.

After excluding cases from 1992 to 1996 (run-in period), age standardized incidence and prevalence was calculated. Annual percent change (APC) was calculated using Joinpoint Regression Program (version 4.9.1.0), overall and by sex.

Results: There were 204 new cases of T1D in 1997 (age-adjusted incidence rate (IR) 20.99 cases per 100,000 [95% confidence interval (CI): 18.11, 23.87]) peaking in 2008 with 285 new cases (IR 31.76 per 100,000 [95% CI: 28.06, 35.46]).

From 1997 to 2007, APC was 3.1 (95% CI: 1.5, 4.6; p=0.001) with a decreasing trend from 2008 to 2019 (APC -1.3; 95% CI: -2.4, -0.2; p=0.021).

There were 1,994 prevalent cases of T1D in 2002 peaking at 2,533 cases in 2013 followed by 2,397 cases in 2019. From 2002 to 2013, the age-standardized prevalence increased from 0.2 (95% CI: 0.191, 0.209) to 0.267 (95% CI: 0.256, 0.277) per 1,000 cases. In 2019, prevalence was 0.244 cases per 1,000 (95% CI: 0.234, 0.254). Prevalence increased from 2002 to 2008 (APC 3.3; 95% CI: 2.9, 3.7; p<0.001) with a slower rise from 2008 to 2013 (APC 1.8%; 95% CI: 1.1, 2.5; p<0.001) and a declining prevalence from 2013 to 2019 (APC -2.6; 95% CI: -1.9, -1.2; p<0.001).

Conclusions: Recent data from BC, Canada indicate declining incidence and prevalence of childhood T1D over the last decade.

P-182 | High increase in the incidence of type 1 diabetes in children in central Poland over the past 40 years

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Introduction: The prevalence of type 1 diabetes has increased worldwide. Epidemiological studies on long-term trends provide information for appropriate health management.

Objectives: To assess the changes of type 1 diabetes (T1D) incidence rate in central Poland (Lodz Province) since 1983 to 2022 year.

Methods: This was a prospective observational study performed in a reference center for pediatric diabetes care for Lodz Province (LP) . Our centre provides continued services to the whole LP population (currently 2.4M people, 360K children).
Each case of new-onset diabetes between years 1983 and 2022 in children between 0 and 14 y.o. was noted, together with basic demographic information (sex, place of living, date of birth, date of diagnosis – defined as date of first administration of insulin). Children living outside LP were excluded from cases count.
Case ascertainment was backed up by yearly check-up in neighboring regions and adding those living in LP but diagnosed outside.
T1D diagnosis was based on available guidelines at given time: clinical presentation and assessment of autoantibodies and c-peptide when those assays became available and common. Known or later discovered cases of other types of diabetes were excluded.
Demographic data were acquired from the Poland`s General Statistical Office.
Results: In the analyzed period, T1D incidence rate increased considerably from 3.29/100000 (95%CI: 2.01-5.08) in 1983 to 30.4 (24.87-36.80) in 2022. Average annual percentage change of incidence rate was 5.61% (95%CI: 4.97%-6.62%).
Joinpoint analysis detected two distinct periods of incidence rate increase: rapid increase in 1983-2006 (annual percentage increase 7.24%) and slower increase in 2006-2022 (3.32%). Three outliers with high incidence rates (2016: 35.81/100000 person-years, 2017: 34.22, 2021: 38.98) were observed.
Conclusions: Over the past 40 years, the incidence of T1D in Lodz province has increased significantly, but the rate of increase appears to be slowing.

P-227 | Fifty years (1972-2022) Of childhood diabetes in the pediatric Ward

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Introduction: The epidemic and the precocity of onset of T1D in children have inevitably increased over the past 25 years.
Objectives: This work aims to show the reality of this evolution through the incidence register of the department of Oran, the recruitment of the Pediatric Service "C" of the University Hospital of Oran and the profile of the cohort regularly followed.
Methods: Descriptive single-center study on a population where the incidence of T1D before the age of 15 currently exceeds 30/100,000 and whose prevalence was 1/458 children under 15 at the end of 2022. The cohort includes subjects reporting at least 3 visits in the past 15 months
Results: From 1973 to 2022, 5091 incident cases, of which 45% reside outside the original department, 52% of boys, were received, increasing from a few dozen/year in the 1970s to 250/year in the last five-year period with in particular 73% fewer 10 years, a notable adiposity rebound, a reversal of seasonality, 22% inaugural ketoacidosis and an initial HbA1c of 10.75%±2.22%.
The regularly followed cohort is 1258, of which 33% outside the department, 3.78 ± 1.67 visits / last 15 months / child, average age 13.68 ±6.25, median 13.79, 42% over 15 years old, last HbA1c of 8.03±1.63%, median at 7.8.
The current glycemic balance is strongly correlated with the age and the seniority of the diabetes -particularly deleterious in the conjunction 15-20 years of age and 5-10 years of duration-, with the socio-economic conditions and the educational and professional occupation. Age at onset, sex and place of residence have no notable effects
Conclusions: We confirm by this work covering 50 years of recording, more than 5000 recruitments and a large current cohort, the reality of the childhood diabetes epidemic with an annual growth rate of more than 10% over the past 25 years.
The significance of the non-infectious environment was established on the observation of the loss of seasonality and on the phenomenon of acceleration associated with the emergence of childhood obesity.

P-238 | Clinical profile of diabetes among children and adolescents at type 1 diabetes centre, Kota, Rajasthan, India

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Introduction: Very less information is available on presentation, characteristics and types of youth-onset diabetes in Rajasthan, with limited publications from Rajasthan, India.
Objectives: This study is based on the clinical features of children and adolescents at the time of onset of diabetes at Ramchandani Diabetes Care & Research Centre, Kota, Rajasthan, India.
Methods: Based on the review of clinical features of all children and adolescents with newly diagnosed diabetes at Ramchandani Diabetes Care & Research Centre, Kota, Rajasthan, India from January 2018 to December 2020.
Results: Total 72 new patients presented with diabetes in 2018-2020, of which 55.6% were female. They were diagnosed as type 1 by clinical features and history given by family members. There median age was 16.5 yrs. Common clinical features were polyurea (98%), polydipsia (95.5%), weight loss (70%).
Approx 20% children were diagnosed as a type 1 after viral fever. Approx 50% patients were diagnosed after DKA. Median diabetes duration was 4.1 yrs.
In this year no diabetic type 2 adolescents or children was diagnosed, 100% were diagnosed as type 1. Mean HbA1c was 9.6, only 1 percent patient admitted in hospital due to severe hypoglycemia, 2.1% patients were affected by diabetic retinopathy. 20.4% children did not have a refrigerator at their home, so they used clay pot to store insulin.
Conclusions: In this study,the outcome was that females are more prone to become diabetic type 1. So proper, education, screening and diagnosis are very important. Community and health professional awareness should be must.

P-313 | Hypoglycemia in children with type 1 diabetes in Quebec, Canada: A BETTER registry study

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Introduction: An estimated 600,900 children are living with type 1 diabetes (T1D) worldwide. Hypoglycemia is the most common complications of insulin therapy and is an important barrier to maintaining euglycemia. Parents and caregivers oversee or aid with the care and management of their T1D.
Children with T1D experience more frequent severe hypoglycemic episodes compared to adults and are at greater risk for disruptions in cognitive function and neuropsychological development.
Objectives: This study aims to describe children's (≤14 y/o) experience with hypoglycemia, using data from a T1D registry in Canada.
Methods: Descriptive cross-sectional study design from the BETTER Registry (BEhaviours, Therapies, TEchnologies and hypoglycemic Risk in T1D) (NCT03720197). Parents of children ≤14 y.o. completed an online survey of sociodemographic variables, diabetes and hypoglycemia history, current treatment, and impaired hypoglycemia awareness (IAH). Children were divided into 3 groups 0-5 y.o., 6-11 y.o. and 12-14 y.o. Chi-square test was used for categorical variables and one-way analysis of variance for continuous variables.
Results: A total of 323 parents completed the survey. On average, children were 9.3 ± 2.9 years with a diabetes duration of 2.9 ± 2.9 years, 46% female, 86% white, 42% used an insulin pump and 72% used a continuous glucose monitor. 73% of children experi-

enced a serious hypoglycemia event (<3mmol/L) in the last month, but number of events didn't differ between groups. Last severe hypoglycemia event (requiring assistance or glucagon) was not significantly different between the groups (p=0.073).
The last month IAH was experienced significantly more in the 0-5 y.o. compared to the other groups, with 29% having felt no symptoms at onset.
Conclusions: Hypoglycemia and IAH are highly prevalent in children ≤14 y.o. Children diagnosed between <5 y.o are the most at risk for a severe hypoglycemia event.
Patient-reported outcomes are an important first step to understanding the burden of T1D in vulnerable populations.

P-382 | Clinical profile of type 1 diabetes in children: a hospital-based cross-sectional study in Myanmar

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Introduction: Type 1 Diabetes is a common pediatric endocrine disorder and is increasing each year, mainly in younger children. Its clinical features and associated factors are essential for the diagnosis of children and thus for the prevention of serious outcomes such as DKA
Objectives: To describe the clinical profile of type 1 diabetes in children and to evaluate the factors associated with poor glycemic control and associated comorbid conditions
Methods: A hospital-based cross-sectional descriptive study was conducted at a diabetes clinic and medical units of 550 bedded Children Hospital, Mandalay, Myanmar from January to December 2020. 52 children, aged between 1-16 years, were included in this study
Results: In this study, 52 children with T1DM were involved. Most of them were female and the common age group was 5-10 years.
Polyuria, Polydipsia, and weight loss are the major presenting symptoms and DKA was an initial presentation in 40%. 65% of children didn't achieve optimal glycemic control. 67% of children used premixed insulin twice daily regimen.
Most children had no associated comorbid conditions such as hypertension, dyslipidemia, and thyroid dysfunction.
Conclusions: In this study, females were more common, and major symptoms are polyuria, polydipsia and weight loss. Most of them presented with DKA at the time of diagnosis.
In addition to the disease's demographic characteristics and clinical presentation, this study emphasized the factors related to poor glucose control.
After finding out these factors, there was no significant statistical association between glycemic control and age of onset, time spent for physical activities, and nutritional status in terms of BMI.
This study is important because accurate epidemiological data are important to guide the planning of healthcare systems and policies to further improvement of diabetes care in the country. Awareness among parents/public about the symptoms of diabetes is needed as it may result in a timely diagnosis of diabetes and may prevent serious outcomes.

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