# Meeting report: EASD Annual Meeting 2023

**The 59th European Association for the Study of Diabetes (EASD) Annual Meeting was held in Hamburg from 2–6 October 2023. Here we present a selection of highlights for nurses with an interest in diabetes.**

## HCL technology improves glycaemia for pregnant women with type 1 diabetes

Hybrid closed-loop (HCL) technology helps pregnant women with type 1 diabetes manage their blood glucose levels better than with insulin pumps or multiple daily injections, new trial results suggest. HCL systems link insulin pumps and continuous glucose monitors using a computer algorithm, in order to calculate the amount of insulin to deliver.

Hormonal changes and altered eating patterns during pregnancy mean that most women with type 1 diabetes find it hard to meet their glycaemic goals. Complications, such as premature birth, the need for intensive care and macrosomia, affect one in every two newborn babies. Low blood glucose levels, excess weight gain and high blood pressure are common in mothers.

The investigators compared HCL technology with traditional continuous glucose monitoring and insulin pump systems, where women, supported by specialist diabetes maternity teams, make multiple decisions each day about insulin doses. Half of a cohort of 124 pregnant women with type 1 diabetes aged 18–45 years were randomised to use HCL technology, while the others used traditional insulin therapy. The study, which took place in nine centres across the UK, followed the women for around 24 weeks (from 10–12 weeks until end of pregnancy).

On average, women used the HCL technology for >95% of the time. It helped to substantially reduce maternal blood glucose levels throughout pregnancy, with users spending more time in target range compared with traditional methods (68% vs 56%, equating to 2.5–3.0 additional hours/day). Initiation was safely achieved in the critical first trimester.

Blood glucose improved across all ages and regardless of previous levels. This was achieved without additional hypoglycaemic events and without additional insulin. Women using HCL technology also gained 3.5 kg less weight and had fewer blood pressure complications during pregnancy.

Women in the HCL group had fewer antenatal clinic appointments and fewer out-of-hours calls, suggesting that it can save time for pregnant women and for maternity services. The authors state that, in an area where progress has been limited, this technology offers a new option to help pregnant women manage their diabetes.

The study has been published in the *N Engl J Med*.

## Breastfeeding linked to lower body fat levels at 9 years of age

Research has linked higher levels of body fat later in childhood with the use of infant formula and the early introduction of fizzy drinks.

Investigators in the US found that babies who were breastfed for at least 6 months had a lower percentage of body fat by the age of 9 years, compared to those who were never breastfed or received breast milk for less than 6 months.

Additionally, those who were not given fizzy drinks before 18 months had a lower fat mass at 9 years.

The study aimed to expand upon previous research by examining associations in infant feeding practices with percentage fat mass, a more precise measure of childhood adiposity than BMI.

Researchers analysed data from over 700 mother–child pairs who were taking part in a longitudinal cohort study into how a mother's lifestyle and environment can affect her child's growth and development. When their children were 6 and 18 months old, the mothers were interviewed about feeding practices, including the duration and exclusivity of breastfeeding versus formula feeding, and the age at which their children were introduced to solids and liquids other than breast milk or formula.

Across the cohort, the majority of infants (65%) were breastfed for at least 6 months, 27% were introduced to other foods at 4 months or younger, and 14% had been given fizzy drinks by 18 months. The average fat mass was 19.7% at 5 years and 18.1% at 9 years.

Infant feeding patterns were not associated with differences in body mass at 5 years. However, shorter breastfeeding duration and early introduction of fizzy drinks were positively associated with faster increases in body fat at ages 5 and 9 years. Those breastfed for less than 6 months had an average 3.5% more body fat at 9 years than those breastfed for 6 months or more.

Previous research has suggested that the link between breastfeeding and obesity risk may relate to differences in the nutrient composition of human milk compared to infant formula. Differences in appetite regulation and the impact of human milk on the infant microbiome may also have biological effects.

The age of introduction to other foods was not strongly associated with percentage fat mass.

The authors conclude that their findings add to the body of evidence supporting the health benefits of breastfeeding for both mothers and their children. They also support the importance of delaying the introduction of energy-dense drinks with no nutritional value during this life stage.

## Tirzepatide effective in people with early-onset type 2 diabetes

The dual GIP/GLP-1 receptor agonist tirzepatide appears to be as effective at treating early-onset type 2 diabetes (EOT2D) as it is at treating type 2 diabetes diagnosed later in life, according to data presented at the meeting.

EOT2D, defined as type 2 diabetes diagnosed before the age of 40 years, has a more aggressive disease course than the later-onset variety; the insulin-producing beta-cells deteriorate more quickly and there is often a lesser response to glucose-lowering drugs in people with EOT2D than in those with later-onset diabetes.

In this *post hoc* analysis, data from the SURPASS programme of phase 3 trials of tirzepatide was used to compare the effect of tirzepatide on glycaemic control, body weight and cardiometabolic markers in people with EOT2D ($n$=873) and later-onset diabetes ($n$=3394) after 40 or 52 weeks of treatment. Despite being younger, those with EOT2D had higher blood glucose, BMI and lipid levels than those with later-onset diabetes.

Tirzepatide was found to be equally effective in young- and later-onset type 2 diabetes, with similar improvements in $HbA_{1c}$ (approximately 25 mmol/mol) and body weight (up to a ~14% reduction from baseline) between the two groups at follow-up. Waist circumference, triglycerides and HDL cholesterol, and systolic blood pressure also improved to similar extents in both groups.

Commenting on the results, the study lead, Professor Melanie Davies (University of Leicester) concluded: "Early-onset type 2 diabetes is not only more aggressive, it usually responds less well to drugs, which means our findings are really encouraging. Further research is now needed to evaluate whether starting treatment with tirzepatide and similar drugs early improves long-term outcomes in this important group."

## Worldwide audit shows benefits of testosterone replacement therapy in men with type 2 diabetes

Real-world data from an ongoing international audit of testosterone deficiency in men with type 2 diabetes was presented at the meeting and suggests that testosterone replacement therapy (TRT) improves glycaemic control for up to 2 years.

The audit, led by the Association of British Clinical Diabetologists (ABCD), allows anonymised data input from new and retrospective patients who have commenced on TRT as well as those with testosterone deficiency who are not treated. The aim is to determine the real-world benefits and safety of TRT on symptoms, glycaemic control, obesity and other cardiometabolic risk factors, and on cardiovascular events and diabetes complications. In total, 34 centres in eight countries, including 428 patients (average age 71 years) have so far joined the audit.

The TRT formulations included gels and long-acting injections. The researchers evaluated $HbA_{1c}$ on paired data after 3, 12 and 24 months. Early data demonstrated reductions in $HbA_{1c}$ at all of these time points:
- At 3 months ($n$=81): 4.9 mmol/mol.
- At 12 months ($n$=121): 9.6 mmol/mol.
- At 24 months ($n$=101): 15.4 mmol/mol.

These results were likely to be due to the ongoing effect of testosterone on insulin resistance and fat reduction.

Estimates suggest that around 40% of men with type 2 diabetes have symptomatic testosterone deficiency. Testosterone deficiency is linked with adverse effects on cardiovascular risk factors, osteoporosis and psychological wellbeing, and is associated with double the risk of death in men with type 2 diabetes.

TRT has previously been shown to reduce insulin resistance, $HbA_{1c}$, cholesterol, obesity and mortality in men with type 2 diabetes and testosterone deficiency. However, many diabetologists are unaware of the association between testosterone and diabetes, and uptake of TRT has been slow in practice due to conflicting findings on cardiovascular risks. A recent multicentre randomised controlled trial on the cardiovascular safety of TRT, however, found no difference in major adverse cardiovascular events between the TRT and placebo groups (Lincoff et al, 2023).

Commenting on the present findings, the study lead, Professor Hugh Jones (Barnsley Hospital), said that the ongoing audit would allow for more and longer-term data to determine which individuals would be likely to respond to TRT. He added that, "These findings will also form the evidence basis for general practitioners and endocrinologists to proactively ask patients with type 2 diabetes about their symptoms and investigate and diagnose testosterone deficiency appropriately and treat them with testosterone where indicated."

Learn more about the ABCD audit here.

## Diabetes screening in A&E

Emergency department screening could detect thousands of undiagnosed prediabetes and diabetes cases, a study in a UK hospital suggests.

The study included patients visiting the A&E department at Tameside and Glossop Integrated Care NHS Foundation Trust, all without a diabetes diagnosis and selected at random, who were given an $HbA_{1c}$ test at admission. Prediabetes was defined as $HbA_{1c}$ 39–47 mmol/mol (a lower cut-off point than the 42–47 mmol/mol typically used in the UK) and diabetes as $HbA_{1c}$ 48 mmol/mol or higher.

Of the 1388 inpatients screened, 848 (61%) had normal blood glucose levels; however, 420 (30%) were found to have prediabetes (mean $HbA_{1c}$ 41 mmol/mol, mean BMI 28.6 kg/m²) and a further 120 (9%) were diagnosed with type 2 diabetes

(mean HbA$_{1c}$ 51 mmol/mol, mean BMI 31.2 kg/m²). People of South Asian and other ethnic-minority backgrounds were twice as likely to be diagnosed with prediabetes or diabetes as Caucasians.

Identifying new cases of diabetes earlier could allow the delay or prevention of diabetes complications, whilst identifying people with prediabetes would allow referral to the NHS Diabetes Prevention Programme (if in England) before the condition fully develops.

## Sarcopenia and risk of death from heart disease in people with diabetes

Low muscle mass is associated with a two-fold risk of death from cardiovascular disease (CVD) in people with diabetes, according to new research. An association between age-related loss of muscle mass and strength (known as sarcopenia) CVD and mortality in diabetes is known to exist, but the extent to which it was influenced by blood glucose control or by complications of the diabetes has been unclear.

Investigators analysed data from the US National Health and Nutrition Examination Survey (NHANES) on 1514 adults with diabetes. The 196 participants with low muscle mass (55.6% female) had a mean age of 63.5 years and mean diabetes duration of 14.5 years. The remaining 1318 participants with normal muscle mass (48.3% female) had a mean age of 54 years and mean diabetes duration of 10.4 years.

During follow-up of an average 9.3 years, there were 413 deaths from any cause (106 low muscle mass and 307 normal muscle mass). 147 of these were from CVD (42 low and 105 normal muscle mass).

Those with low muscle mass were 44% more likely to die of any cause than those with normal muscle mass, and were also twice as likely to die from CVD.

Further analysis indicated that low muscle mass was linked with all-cause and CVD mortality irrespective of HbA$_{1c}$ and microvascular complications. It was also independent of frailty.

The authors concluded that the increased risk of death was mediated by the sarcopenia itself, and that more research is needed to determine the mechanisms. They also stated that the consideration of body composition is important when treating obesity and managing weight in people with diabetes, as measuring body weight does not reveal if someone is sarcopenic. ∎