

Type 1 Diabetes Awareness and Safeguarding

Mark Weston

Paediatric Diabetes Specialist Nurse

Main Types of Diabetes

Type 1

- Develops mostly in childhood
- Rapid onset –leads to crisis if no intervention
- Causes unknown, but it is autoimmune rather than lifestyle
- Complete absence of insulin production
- Treated with insulin; healthy diet recommended but not a 'diabetic' diet

Type 2

- Develops mostly in adulthood
- Slow onset – can remain undetected
- Age, obesity and genetic causes
- Significant reduction in production of insulin
- Treated with tablets and diet (increasingly with insulin)
- No longer referred to as non-insulin dependent diabetes

Type 1 Incidence in UK: Background

- Diabetes is one of the most common chronic diseases in the UK, and the prevalence is increasing
- About 4.7 million people have diabetes.
- About 36,000 children under 19 years of age have diabetes (most children are diagnosed between the ages of 10 and 14 years)
- More than 5 million people will be diagnosed with diabetes by 2025, and more than 5.5 million by 2030.
- The UK has the 5th highest incidence rate in the world

Position	Country	Incidence (per 100,000)
1	Finland	57.6
2	Sweden	43.1
3	Saudi Arabia	31.4
4	Norway	27.9
5	United Kingdom	24.5
6	USA	23.7
7	Australia	22.5
8	Kuwait	22.3
9	Denmark	22.2
10	Canada	21.7

Normal Insulin Production

- **A hormone produced by a clump of cells in the pancreas**
- **Produced continuously to meet the continuous production of glucose from the liver**
- **Surges of insulin are produced in line with surges of glucose from eating foods containing carbohydrates**
- **Insulin unlocks glucose in the blood and releases it to the muscles and organs of the body to provide energy, growth and regeneration of cells.**
- **In this way insulin secretion achieves a steady state of blood glucose level of 4-7 mmol/l**

When Insulin is Absent.....The 4 Ts

3. Excessive loss of fluid through heavy and frequent weeing causing dehydration and **(Thirst)**

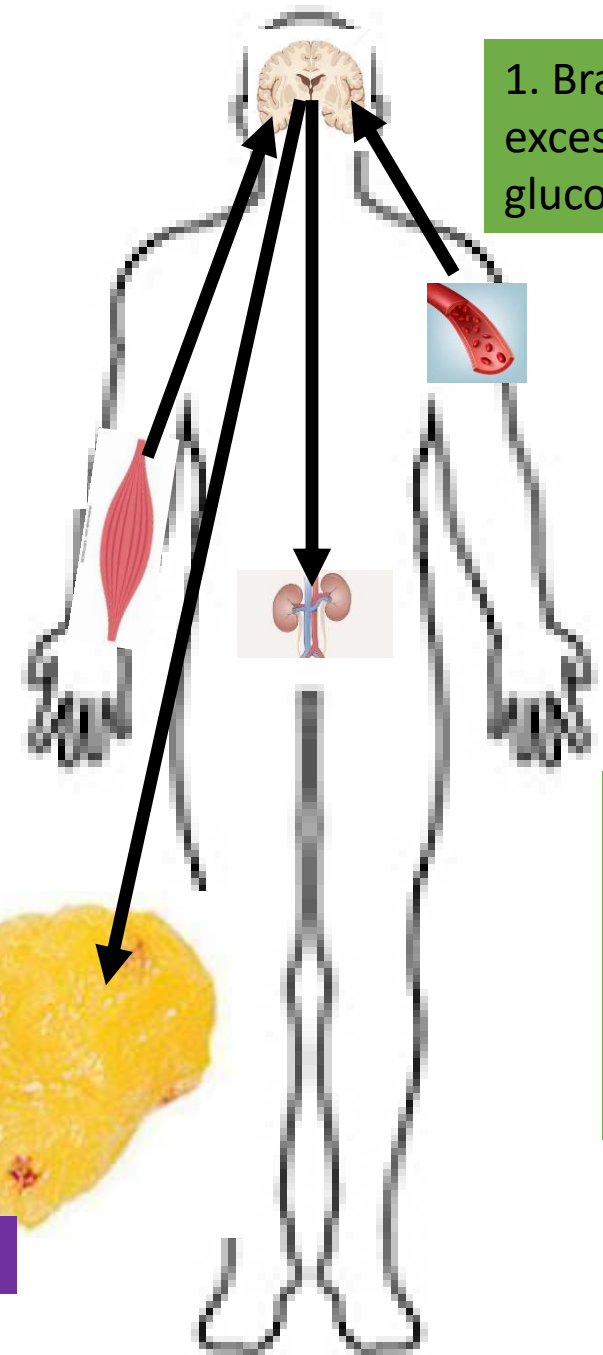
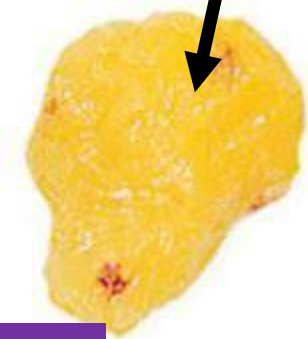
4. Because the glucose is not going to the muscles, where it is needed, the muscles 'complain' to the brain that they have no energy and must have more glucose, causing lethargy **(Tired)**

5. In response to the muscles' demands of more glucose the brain breaks down body fat to produce glucose, causing unexplained weight loss **(Thin)**

Ketones

1. Brain becomes aware of excessive build up of blood glucose levels in the blood

2. Brain instructs kidneys to secrete excess glucose...but glucose 'drags' out huge amounts of water with it causing excessing weeing **(Toilet)**



Signs of Undiagnosed Diabetes

- Toilet: Babies: very heavy nappies
Toddlers and young children: return to bed-wetting; accidents at school
Teenagers: frequent trips to the toilet in the night
- Thirst: an unquenchable thirst seen in all ages
- Tired: Difficulty in getting up for school
Struggling to keep up on a walk or in PE/Games
- Thin: Clothes feeling loose
Visual assessment, although often mistaken as normal body changes in physical development
- **Temperament: Intolerant, short-tempered**

Referral Pathway

- History of 4Ts is definitively a type 1 diagnosis
- Blood capillary finger-prick test
- Immediate referral to hospital with a positive result of 11.1mmol/l or more or even a suspicion of type 1 diabetes if unable to perform a capillary finger-prick test
- Unfortunately delayed diagnosis is common with blood tests delayed, emergency appointments not given or parental suspicions ignored
- In the UK around 25% of children at diagnosis present in the decompensated state of diabetic ketoacidosis (DKA), and these rates have remained unchanged over the past decade

(Cherubini et al, 2020; Royal College of Paediatrics and Child Health, 2022)

Recent Changes in Diabetes Management

- Insulins: Extra long-acting **Tresiba** has replaced conventional long-acting insulins
Extra rapid-acting **Fiasp** has replaced rapid-acting insulin
- Insulin pumps replacing pen injections mostly in younger age groups (and now closed-loop systems)
- Testing: Continuous glucose sensors have replaced finger-prick testing
- Technology: Mobile phone Apps available for insulin dose calculations, education and operating insulin pumps
Comprehensive data can be shared and downloaded

Closed Loop Systems



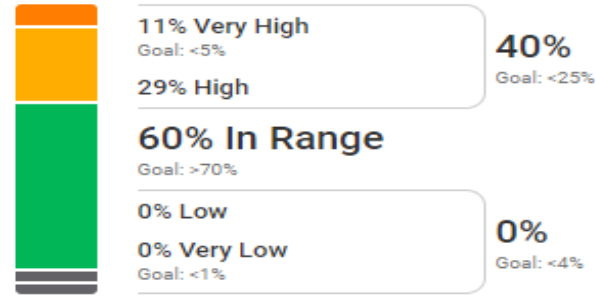
A sensor instructs the pump to give more or less insulin depending on BG levels without the child having to change anything



Time in Ranges

Goals for Type 1 and Type 2 Diabetes

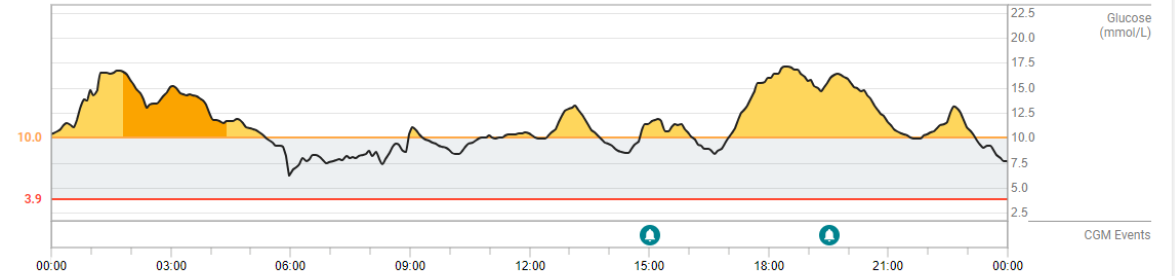
Each 5% increase in the Target Range is clinically beneficial.
Each 1% time in range = about 15 minutes per day



Target Range: 3.9-10.0 mmol/L
Very High: Above 13.9 mmol/L
Very Low: Below 3.0 mmol/L

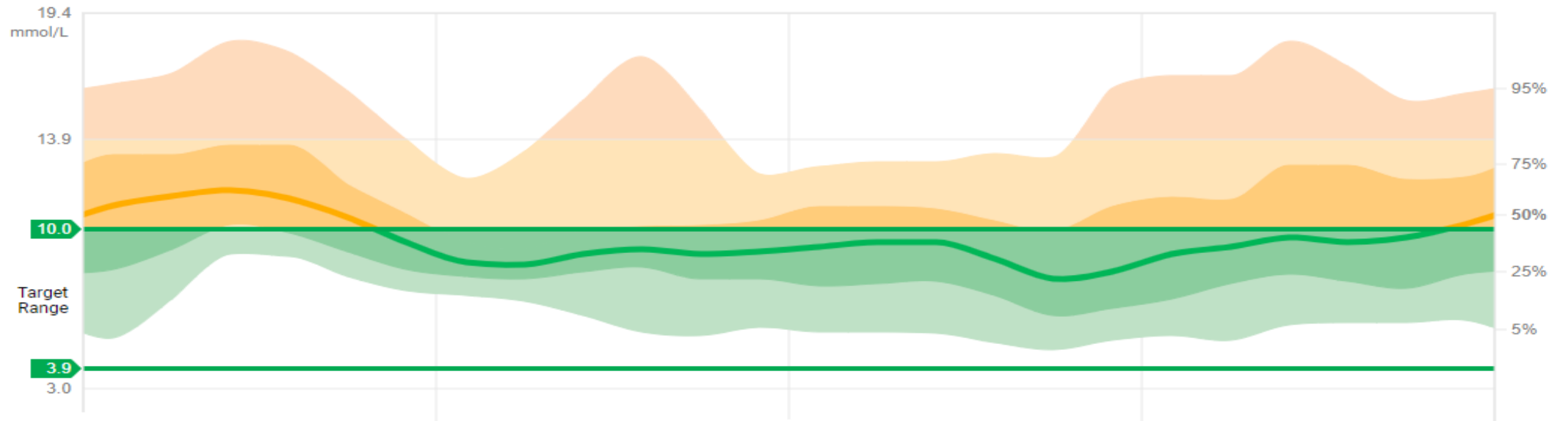
Detail and Quality of Data has Vastly Improved over Diabetes Log-Books

Fri, 2 Jun 2023



Ambulatory Glucose Profile (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if they occurred in a single day.



Despite Advances Diabetes remains a Relentless, Thankless and Difficult Condition to Manage.....

- Tight blood glucose margins – 4-7 mmol/l
- Physical growth, stress, hormonal changes, excitement, exercise, weather, diet all effect BG levels and are all beyond the control of the child or young person
- Carbohydrate counting with every meal – difficult, time-consuming, tedious, inconvenient
- Giving insulin – indiscreet, embarrassing –particularly for teenagers
- Fears of hypos, especially with sport and at night
- ‘Burn out’ and more cases of depression/low mood as well as eating disorders among CYP with diabetes
- No ‘day off’
- Only 15% children and young people approximately achieve target control

Diabetic Ketoacidosis Incidence in Children and Young People

Diabetic ketoacidosis is caused by an absence or significant insufficiency of insulin

- Omission of insulin
- Incorrectly managed pump failure
- Incorrectly managed underlying illness

In England and Wales, hospital admissions for diabetes ketoacidosis (DKA) among children and young people with Type 1 diabetes in 2017/18 was 2.7% (3.6% in Wales, and 2.6% in England)

(RCPCH: State of Child Health; March 2020)

Teenagers and Young Adults: The Difficult Years

- Physical growth/hormonal exacerbates glycaemic control
- Peer relationships/fitting-in/feeling normal
- Depression: estimated to affect 1 in 4 people with diabetes. Adolescents with type 1 diabetes have 5 times the rate of depression than adolescents who do not have T1D.
- Lack of privacy managing diabetes in public places: school/college/fast-food restaurants etc
- Conflicts of independence: privacy from parents/parental expectations
- Engagement with risky behaviour: alcohol, drugs, festivals etc
- Have the highest rate of DKA admissions, the highest HbA1c, poorest completion rate of clinical care processes and highest levels of DNAs than any other cohort of people with type 1 diabetes

Behaviour and Academic Performance

- Growing evidence suggests academic performance and achievement is affected by high and swinging blood glucose levels as well as the regular intrusion of having to manage blood glucose levels
- Poor concentration
- Poor memory retention
- Unfinished or illegible written work
- Angry/uncooperative/naughty behaviour
- Inability to resolve their blood glucose levels

Children genuinely forget things with high or rapidly changing blood glucose levels and often think they have followed instructions when they haven't.

Why Safeguard the Child with Type 1 Diabetes?

- Type 1 diabetes is a disability
- Acute crisis kills: 37 deaths from type 1 diabetes out of every 100,000 people aged between 15 and 24 (Diabetes UK; 2015)
- Poor diabetes control results in long-term health complications including blindness developing in their early twenties
- Depression is a major complication
- Life opportunities and achievements are compromised with neglectful adult care
- Insulin can be 'weaponised' to cause self-harm

Findings of Serious Case Review

- All under 18s must receive full child safeguarding protection
- Patchy inter-agency working and communication
- Lack of knowledge about Type 1 diabetes

Poor Diabetes Control is Usually a Consequence not a Cause

Any Questions...?