The power of diabetes technology for young people living with t1 diabetes

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Declarations

JDRF is the type 1 diabetes research charity.

We are supported by a host of diabetes technology manufacturers.

JDRF believes everyone who wants and would benefit from type 1 diabetes technology should gain access to it.

Agenda

- Why consider using technology as an adjunct to education to support self-management for better clinical and psychosocial outcomes
- Policy support
- Statistical support
- Empirical support
- Barriers
- Recommendations

Types of technology

Flash glucose monitoring

Continuous glucose monitoring (CGM)

Insulin pump therapy

Pump systems with predictive low glucose suspend:

- Medtronic 640G
- Tandem t:slim X2 (aged 6+)
- Medtrum A6 Touchcare System (aged 2+)

Hybrid closed loop:

- Medtronic 670G (aged 7+)
- Unregulated options: session at 15.00 in the Tech & Digital Health Theatre

Why consider technology?

NICE NG18 1.2.67 Explain to children and young people with type 1 diabetes ... that an HbA1c target level of 48 mmol/mol (6.5%) or lower is ideal to minimise the risk of long-term complications.

NPDA 2017/18 The national unadjusted mean HbA1c for children and young people with Type 1 diabetes was 67.5 mmol/mol and the median was 64.0 mmol/mol.

National Paediatric Diabetes Audit 2017/18

	≤48 mmol/mol	≤53 mmol/mol	<58 mmol/mol	≥69 mmol/mol	>75 mmol/mol	>80 mmol/mol
2015/16	6.5%	14.7%	26.6%	38.6%	24.5%	17.9%
2016/17	7.5%	16.3%	28.9%	36.8%	23.1%	16.4%
2017/18	7.2%	16.1%	28.6%	36.7%	22.9%	16.5%

Figure 18: Percentage of children and young people with Type 1 diabetes achieving HbA1c targets, 2015/16 to 2017/18

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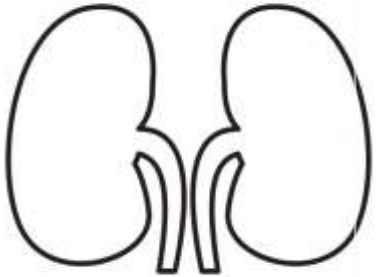
National Paediatric Diabetes Audit 2017/18



Albuminuria was found in 10.2% of young people aged 12 years and above with Type 1 diabetes.

Abnormal retinopathy screening was found in 12.8% of young people aged 12 and above with Type 1 diabetes.

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Why?

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Policy support for the use of flash

Criteria for NHS funding for flash glucose sensing (England)

- People with **Type 1 diabetes (T1D)** (OR …) & who need to do **>8 times daily** BG checks (demonstrated 3 months)
- **Pregnant** women with T1D - (12 months in total)
- T1D and a **disability and need carers** to help glucose monitoring
- T1D & **occupational or psychosocial circumstances** (6-month trial)
- Previous Libre **self-funders** who would have met these criteria AND have shown improvement in HbA1c since self-funding.
- rtCGM is more appropriate for people with T1D with recurrent severe hypoglycemia or impaired awareness of hypoglycemia...
- But T1D with **recurrent severe hypoglycemia or impaired awareness of hypoglycemia**, IF Flash would be more appropriate for the individual's specific situation than CGM or other options

Policy support for the use of CGM - NG18

Offer ongoing real-time CGM with alarms to children and young people with type 1 diabetes who have:

- Frequent severe hypoglycaemia (see notes below)
- OR impaired awareness of hypoglycaemia associated with adverse consequences (for example, seizures or anxiety)
- OR inability to recognise, or communicate about, symptoms of hypoglycaemia (for example, because of cognitive or neurological disabilities).

Policy support for the use of CGM - NG18

Consider ongoing real-time CGM for:

- Neonates, infants and pre-school children
- Children & young people who undertake high levels of physical activity (for example, sports at a regional, national or international level)
- Children & young people who have comorbidities (for example anorexia nervosa) or who are receiving treatments (for example corticosteroids) that can make blood glucose control difficult.”

Consider intermittent (real-time or retrospective) CGM to help improve blood glucose control in children & young people who continue to have hyperglycaemia despite insulin adjustment and additional support.

Policy support for the use of pumps - TA151

NICE TECHNOLOGY APPRAISAL 151 (2008)
This is only applicable to type 1 diabetes (there is insufficient evidence to routinely recommend pumps in type 2 diabetes, except for individual cases).

- If the person is under 12 years old and multiple daily injections are inappropriate or impractical, or
- If the person is aged 12 or older and hypos occur frequently or without warning, causing anxiety about recurrence and a negative impact on your quality of life

OR your HbA1c is still 8.5% or above despite carefully trying to manage your diabetes, including the use of Lantus or Levemir

Statistical support for the use of flash

ABCD audit of FreeStyle Libre device for flash glucose monitoring shows improved diabetes control in Type 1 diabetes and fewer hospital admissions - June 2019

Significant improvement in HbA1c particularly in those with higher levels before using flash.

~ 8/10 people reported they had fewer hypos; during the day in about 3/10 people and at night in about 4/10 people.

Significant improvement in hypo awareness, with ~1/10 people recovering hypo awareness (Gold Score falling to <4).

In the first 6/12 of follow up admissions linked to high bg occurred in 1.9% of people vs. 7.3% in the 12 months before flash use.

For hypoglycaemia admissions the equivalent figures were 0.5% in the 6/12 after, compared with 2.71% in the 12 months before.

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Statistical support for the use of CGM

National Paediatric Diabetes Audit 2017/18

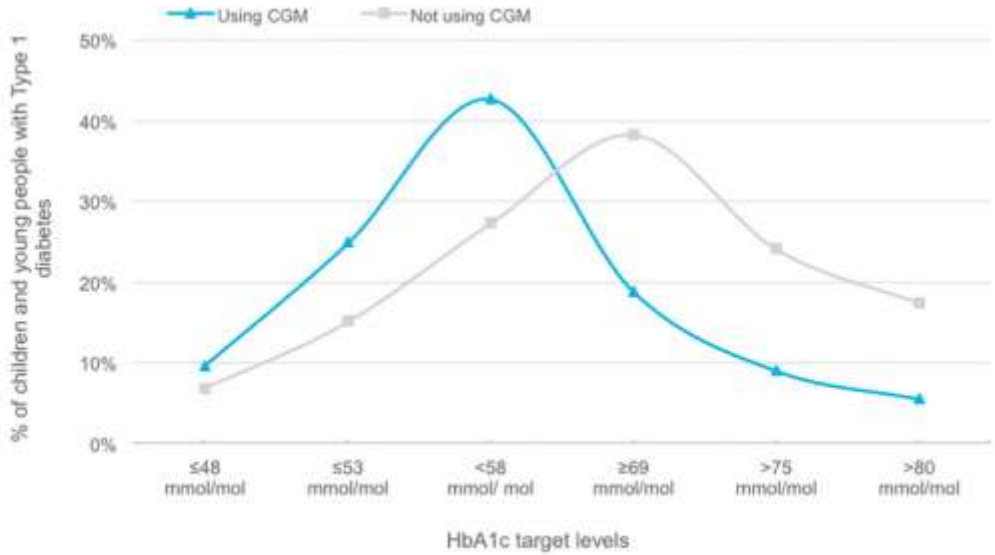

Figure 70: Percentage of children and young people with Type 1 diabetes achieving HbA1c targets by CGM usage, 2017/18

Lower HbA1c associated with CGM use (but caution because other factors not taken into account)

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Statistical support for the use of pumps

National Paediatric Diabetes Audit 2017/18

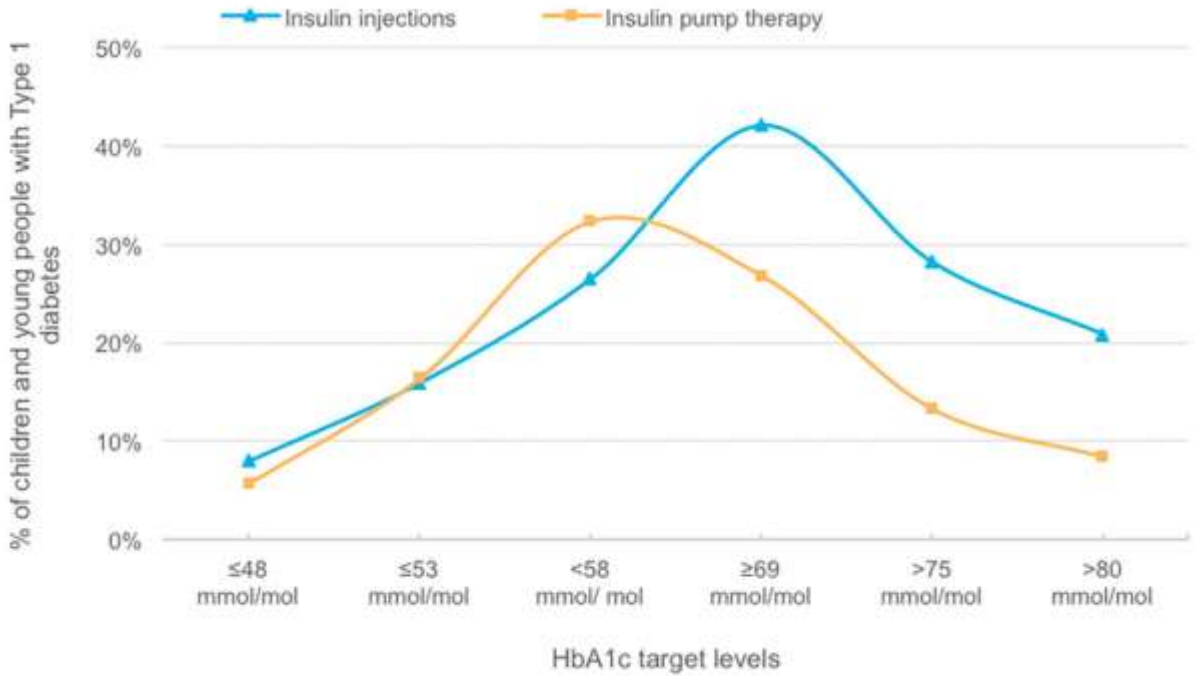

Figure 64: Percentage of children and young people with Type 1 diabetes achieving HbA1c targets by treatment regimen, 2017/18

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CGM use

National Paediatric Diabetes Audit 2017/18

- 9.4% using real time CGM with alarms (caution - missing data means less reliable) 9.4% England & Wales
- From 5.9% in East of England to 16.3% in Yorkshire & Humber
- Higher use in young children, shorter duration of diabetes, white ethnicity, living in Yorkshire & Humber, Wales, or NE & North Cumbria, and least deprived
- CGM-users are more likely to use a pump than injections

Pump use

National Paediatric Diabetes Audit 2017/18

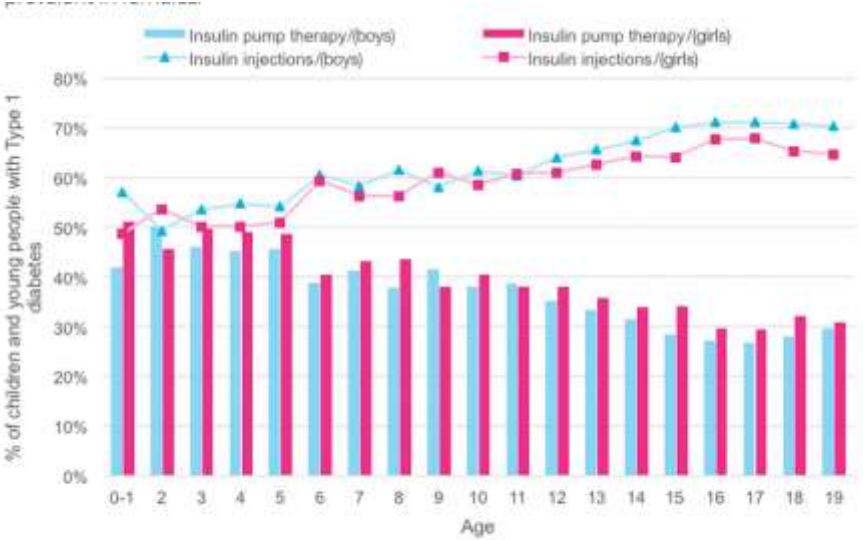

Figure 58: Percentage of children and young people with Type 1 diabetes recorded as using insulin injections or insulin pump therapy by age and sex, 2017/18

England & Wales 35.9%

From 30.9% in South West to 41.3% in Yorkshire & Humber

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Empericial support

Families With Diabetes National Network - CGM survey 2016

FWDNN survey 2016

- Q29: Do you feel having a CGM gives you the ability to intervene more to prevent highs and lows? Almost 100% said yes
- Q30: Do you think that having a CGM has given you the confidence to make more changes to how you treat hypos, hypers and use temp basal rates which have all contributed to better management? Almost 100% said yes

“I can text him at school to help remind him”

“Makes it much easier to catch highs and lows before they are extreme”

Empirical support - CGM

Families With Diabetes National Network - CGM survey 2016

Q. 42 In your own words what is the best thing about a CGM (parents)

Seeing the full picture - Giving child confidence and independence - It is like having a light turned on and seeing what has been going on - Better and tighter control - Positive impact on long term health - Ability to prevent hypos/hypers - Making informed decision on basal and bolus ratios - Letting your child be normal - Identify trends - Freedom - Difference between life and death - Gives you the ability to actually manage, not just fire fight - Fewer hospital admissions - Teaching our child good habits for life - Less finger prick tests - Better quality of life, being able to be a child - Saved my son's life - Not managing a complex condition in the dark - Feeling in control - Making informed decision on basal and bolus ratios

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Empirical support - CGM

Families With Diabetes National Network - CGM survey 2016

CYP Aged 5 - 19

Q49: If you have a CGM what are the top three best things about your CGM? • Preventing hypos and hypers • Less finger prick testing • Better control – can always see what levels are

“I can play with my friends and not worry”; “I can have more privacy”; “makes me less scared”; “gives me the confidence to go out independently”; “can do the same as my friends”; “I can be normal”; “my mum and dad can see my BG levels so it is not the first question they ask me”; “alerts - I can forget about my diabetes most of the time but know I am still safe” ; “keeps me safe at night”.

Q52: Does having a CGM make your life easier? Over 70% said A lot easier

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Families With Diabetes National Network - CGM survey 2016

CYP Aged 5 - 19

Q62: Please add anything else you would like to say about CGM?

“I am so unhappy without it. I find it hard to manage my diabetes without my CGM and I don’t like going to school and get a bad belly if my mum can’t monitor me” “It’s the most amazing thing that has happened to me since diagnosis” “it has made my life so much better I feel safe as the last seizure I had was in a car and was so frightening” “day to day life is easier” – “it gives me confidence to go out on my own” “it saved my life” – “ it makes me less scared” “I can sleep at night without fear” “I wouldn’t worry about going low and dying at night” “not so many extreme ups and downs so I feel better” “Don’t ever take it away – please”

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Barriers to technology

National Paediatric Diabetes Audit 2017/18

Several factors continue to be associated with higher HbA1c levels in children and young people with Type 1 diabetes. These factors include; being older, female, living in the more deprived areas of England and Wales, having non-White ethnicity, or longer duration of diabetes.

The gap between pump usage amongst children and young people with Type 1 diabetes living in the most and least deprived areas has widened with time, from 18.4% versus 26.3% (a difference of 7.9 percentage points) in 2014/15, to 29.0% versus 41.1%, in 2017/18, respectively (a difference of 12 percentage points).

Increased usage of CGM with alarms was associated with younger age, living in the least deprived areas and White ethnicity.

Insulin pump and CGM usage amongst children and young people with Type 1 diabetes was associated with better HbA1c outcomes. A causal relationship cannot be inferred given that lower HbA1c is associated with younger age and living in the least deprived areas and there is higher representation of children and young people with these characteristics within the cohorts of pump and CGM users.

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Recommendations

National Paediatric Diabetes Audit 2017/18

Recommendations 1.9.7 Treatment regimen Multidisciplinary paediatric diabetes teams should: Be aware of deprivation gradients associated with choice of insulin regimen and CGM usage.

Regional Networks/Commissioners should: Facilitate the use of treatment regimens tailored to suit the individual needs of the patient that aid the best possible diabetes control which are in line with local prescribing policy and in keeping with NICE (2015) guidance, and acknowledge and address barriers to doing so.

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National Children & Young People's Diabetes Network

www.cypdiabetesnetwork.nhs.uk

Working towards agreed standards of care, outcomes and process of quality assurance to establish the delivery of a world class service

Working together with children, young people and their families to ensure high quality care and support, to live a healthy and happy life

A library of resources for HCPs and families including BP guides, standards, NICE guidances, policies & audits

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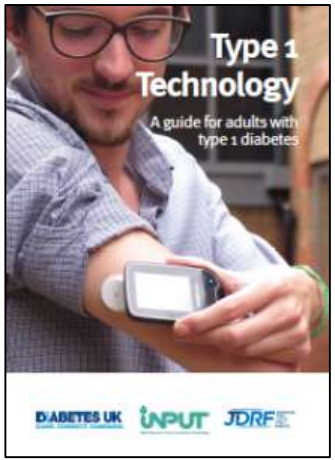
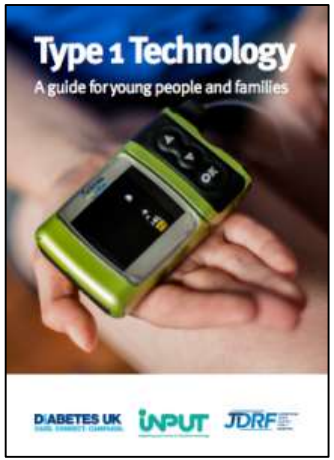
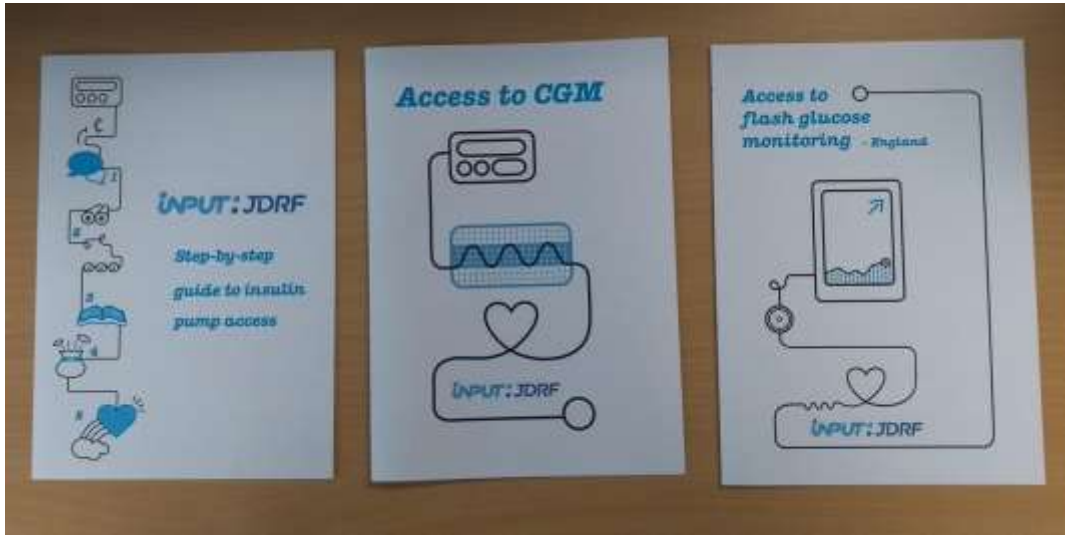
www.jdrf.org.uk







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