Tech in Young Adults

Tackling inequalities in access and closed loop in the insulin resistant.

Dr Jackie Elliott

Clinical lead for diabetes, Sheffield

Disclosures

- I have received fees for advisory boards / educational events from:
- Abbott, DEXCOM, Insulet, NovoNordisk, Roche & Sanofi

- Current Chair of DAFNE

NPDA
National Paediatric Diabetes Audit

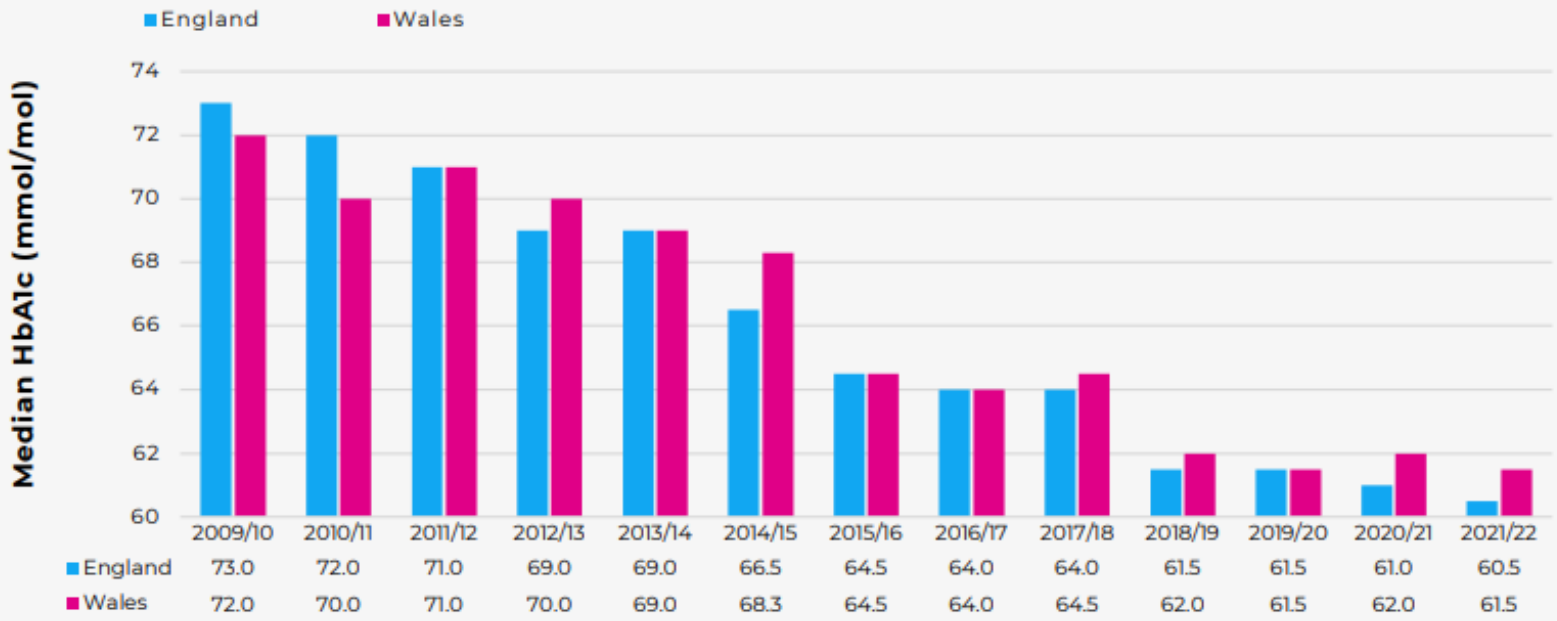
RCPCH Audits

National Paediatric Diabetes Audit (NPDA) Report on Care and outcomes 2021/22

HQIP
Healthcare Quality Improvement Partnership

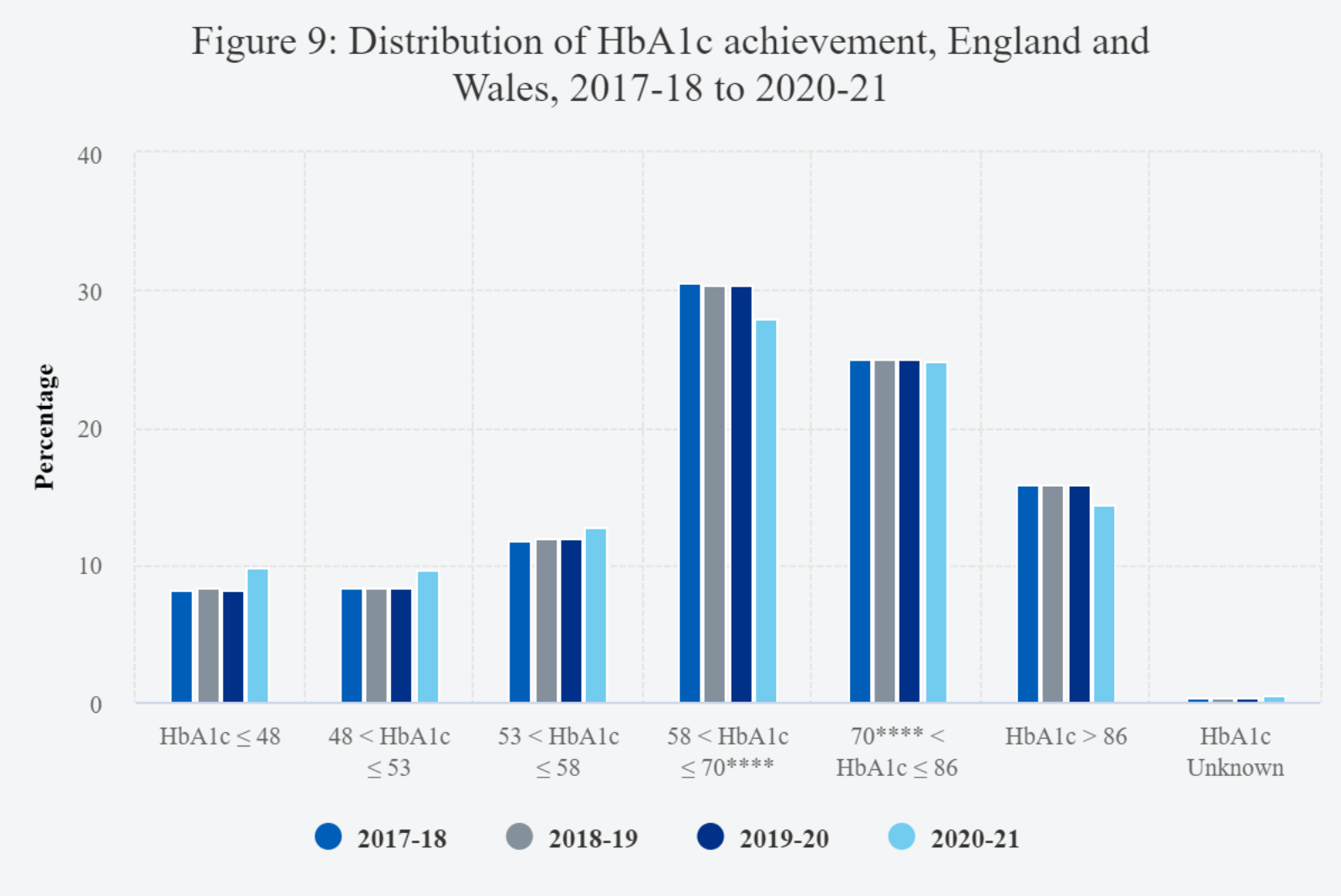
SECTION 05

Has there been longitudinal improvement in national HbA1c?



	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
England	73.0	72.0	71.0	69.0	69.0	66.5	64.5	64.0	64.0	61.5	61.5	61.0	60.5
Wales	72.0	70.0	71.0	70.0	69.0	68.3	64.5	64.0	64.5	62.0	61.5	62.0	61.5

Figure 4: Median HbA1c for children and young people with **all types of diabetes** in England and Wales, 2009/10 to 2021/22



32.3% achieved ≤58 mmol/mol

SECTION 07

What percentages of children and young people with Type 1 were using diabetes-related technologies in 2021/22?

IN ENGLAND AND WALES:

40.3% were using an insulin pump, compared t

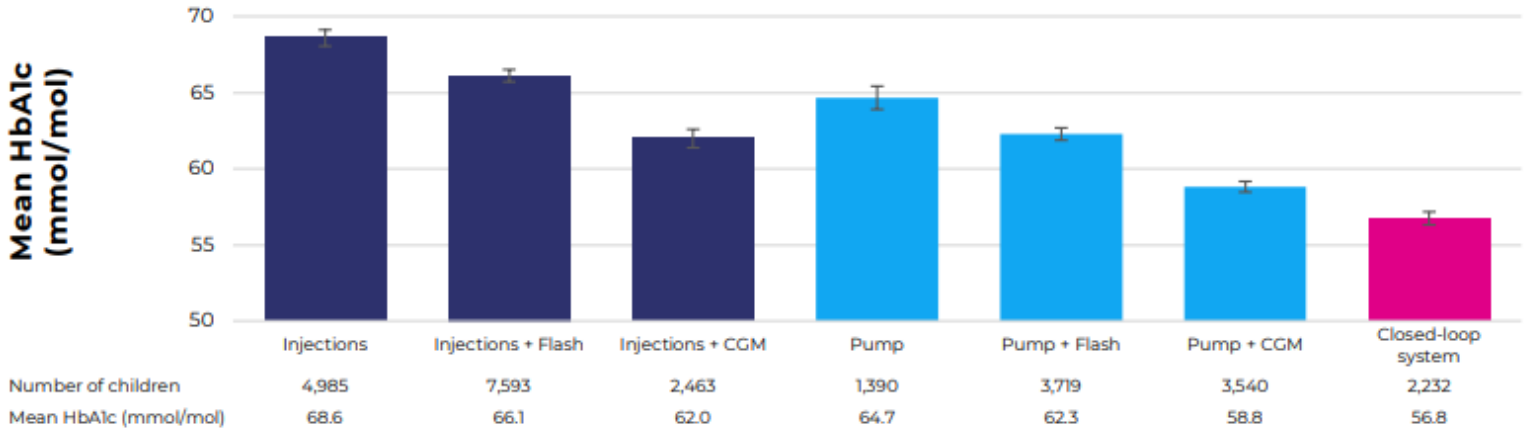
7.5% were using a closed loop system *(data not*

30.0% were using a real time continuous glucos injections or a pump), compared to **27.9%** in 20

43.7% were using a flash glucose monitor or a r

SECTION 08

What was the average HbA1c for children and young people with Type 1 diabetes using different diabetes-related technologies in 2021/22?

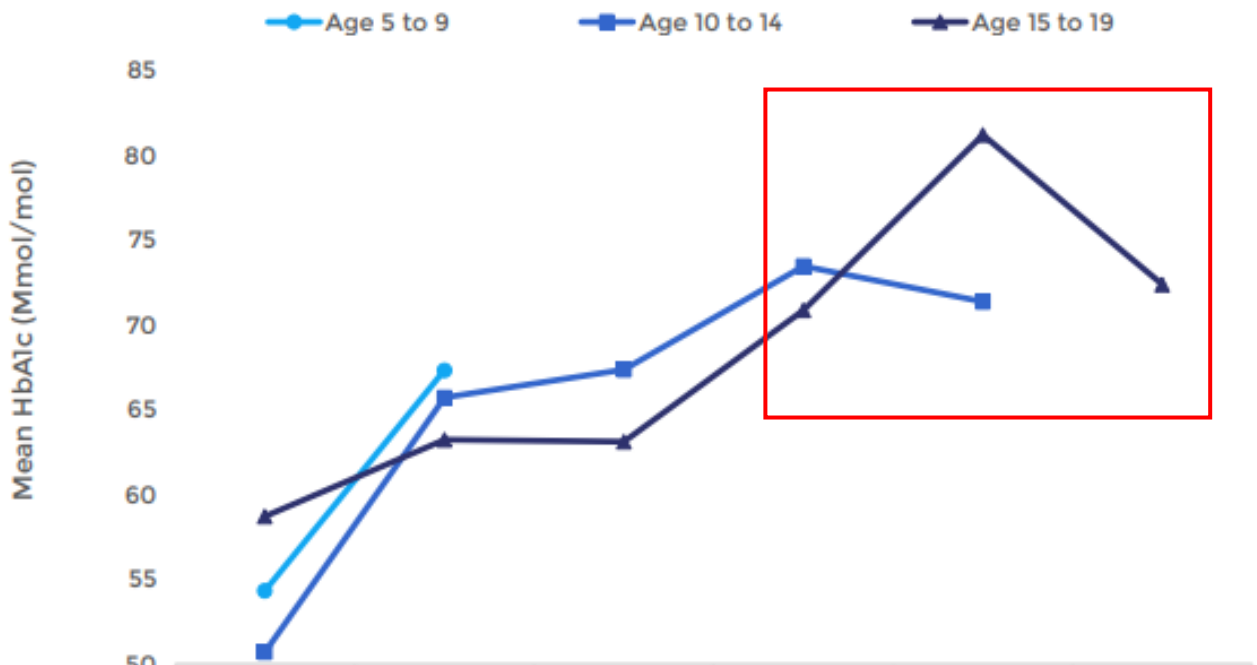


	Injections	Injections + Flash	Injections + CGM	Pump	Pump + Flash	Pump + CGM	Closed-loop system
Number of children	4,985	7,593	2,463	1,390	3,719	3,540	2,232
Mean HbA1c (mmol/mol)	68.6	66.1	62.0	64.7	62.3	58.8	56.8

Figure 6: Mean HbA1c for children and young people with Type 1 diabetes using different combinations of treatment regimen and glucose monitoring in 2021/22.

But a word of caution…..

NPDA National report 2020/21: Care processes and outcomes



	<1yr	1-2 yrs	2-3 yrs	3-4 yrs	4-5 yrs	5-10 yrs
Age 5 to 9	54.3	67.4				
Age 10 to 14	50.7	65.7	67.4	73.5	71.4	
Age 15 to 19	58.7	63.2	63.1	70.9	81.2	72.4

Figure 27: Mean HbA1c for children and young people with Type 1 diabetes in England and Wales by duration of diabetes and age group, 2020/21

National Diabetes Audit, 2017-21
Adolescent and Young Adult Type 1 Diabetes

England

16 June 2022

Recommendations

Recommendation 1

Adult services, both specialist and primary care, should develop systems to ensure that all adolescents and young adults continue to receive NICE recommended health checks after discharge from paediatric care.

Recommendation 2

Specialist paediatric and adult services should collaborate to develop systems of care that are aligned with the multiple life changes which accompany late adolescence/early adulthood in order to minimise age associated deteriorations in level of glucose control (15-20 years old) and frequency of diabetic ketoacidosis (15-18 years old).

Recommendation 3

Young adults with type 1 diabetes transferring from paediatric services and using insulin pump therapy should be supported by adult specialist services to continue and those who are eligible by NICE criteria should be offered insulin pump treatment.

Diabetes Care
American Diabetes Association

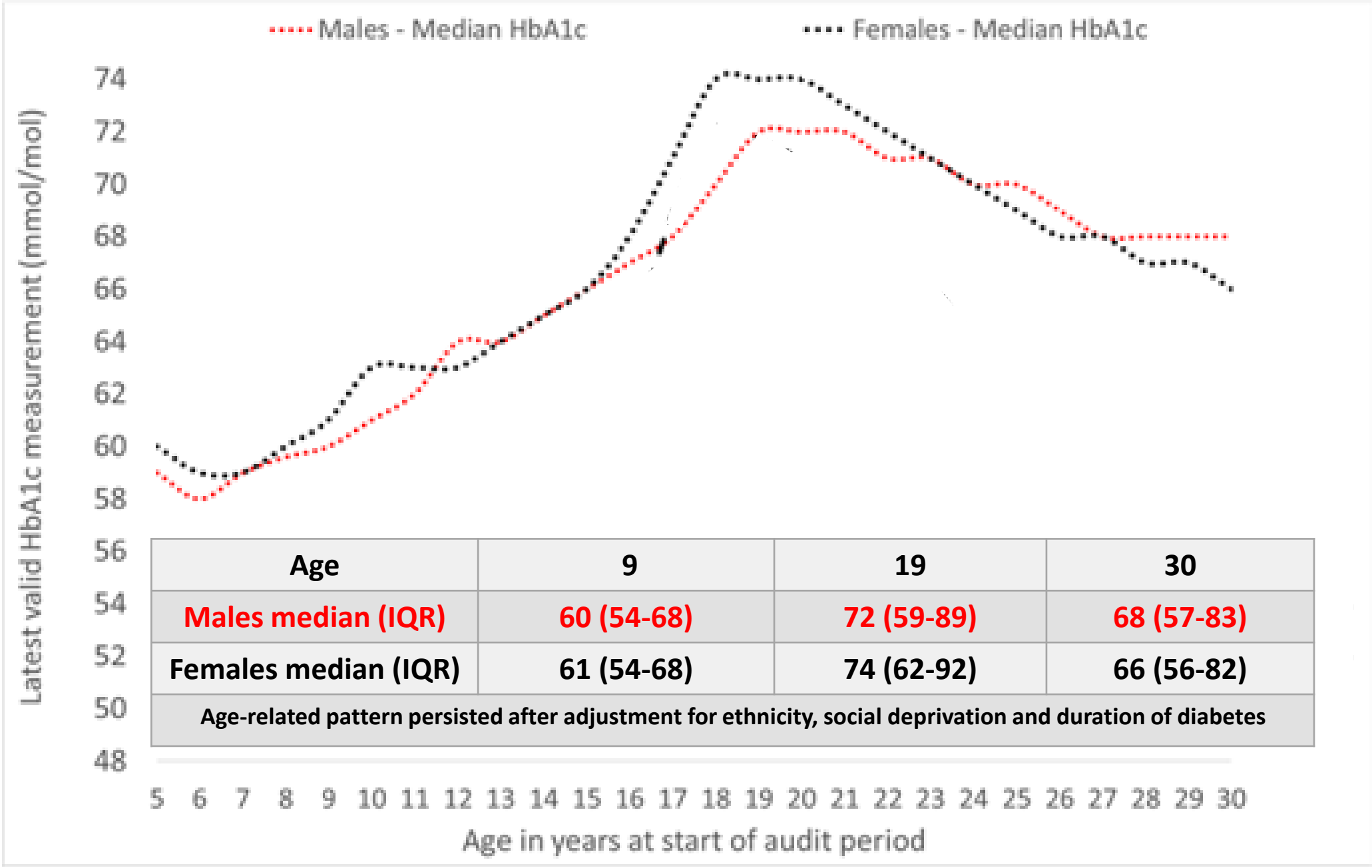
National Trends in Hyperglycemia and Diabetic Ketoacidosis in Children, Adolescents, and Young Adults With Type 1 Diabetes: A Challenge Due to Age or Stage of Development, or Is New Thinking About Service Provision Needed?

Naomi Holman, Emilia Woch, Colin Dayan, Justin Warner, Holly Robinson, Bob Young, and Jackie Elliott

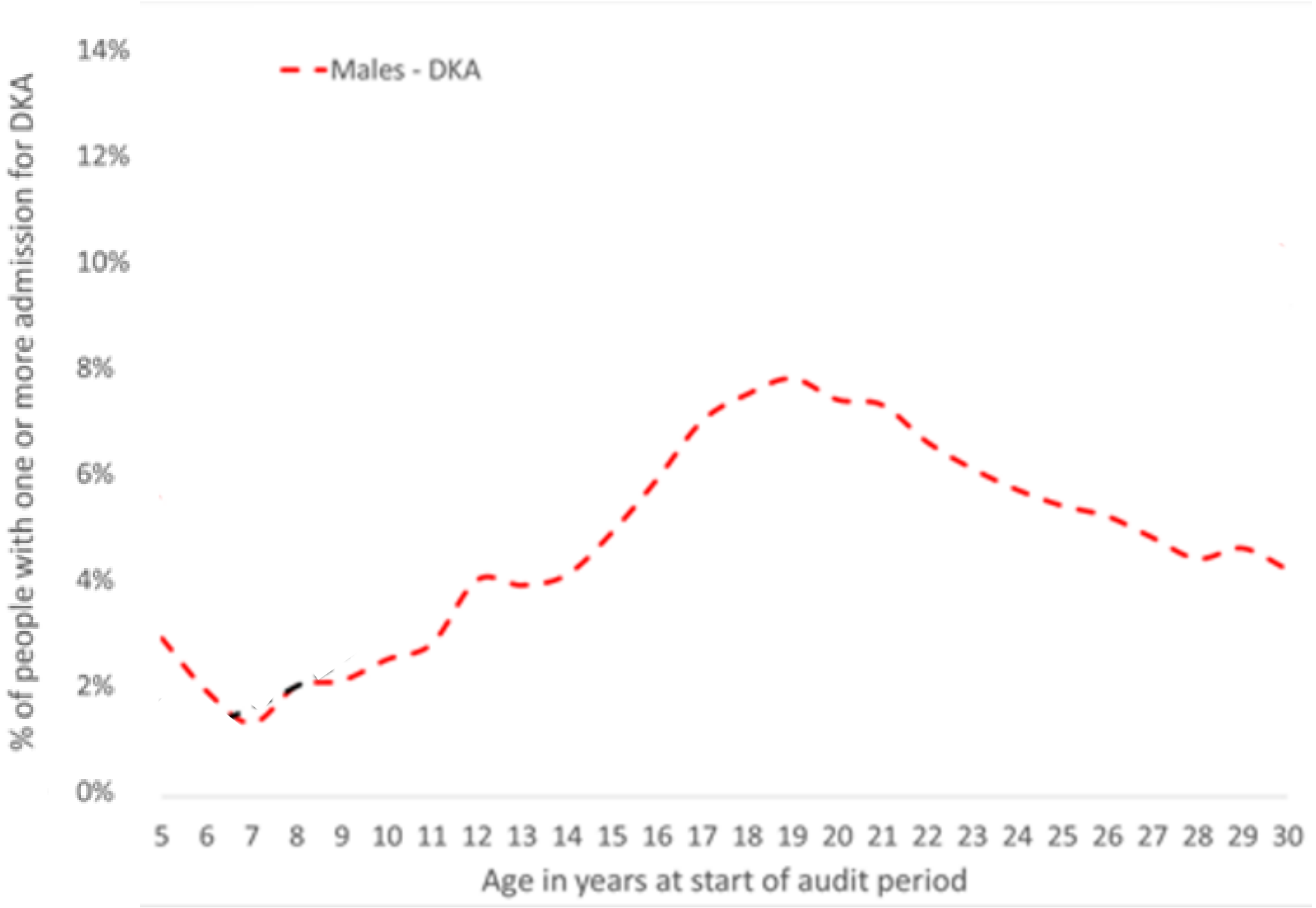
Diabetes Care 2023;46(7):1–5 | *https://doi.org/10.2337/dc23-0180*

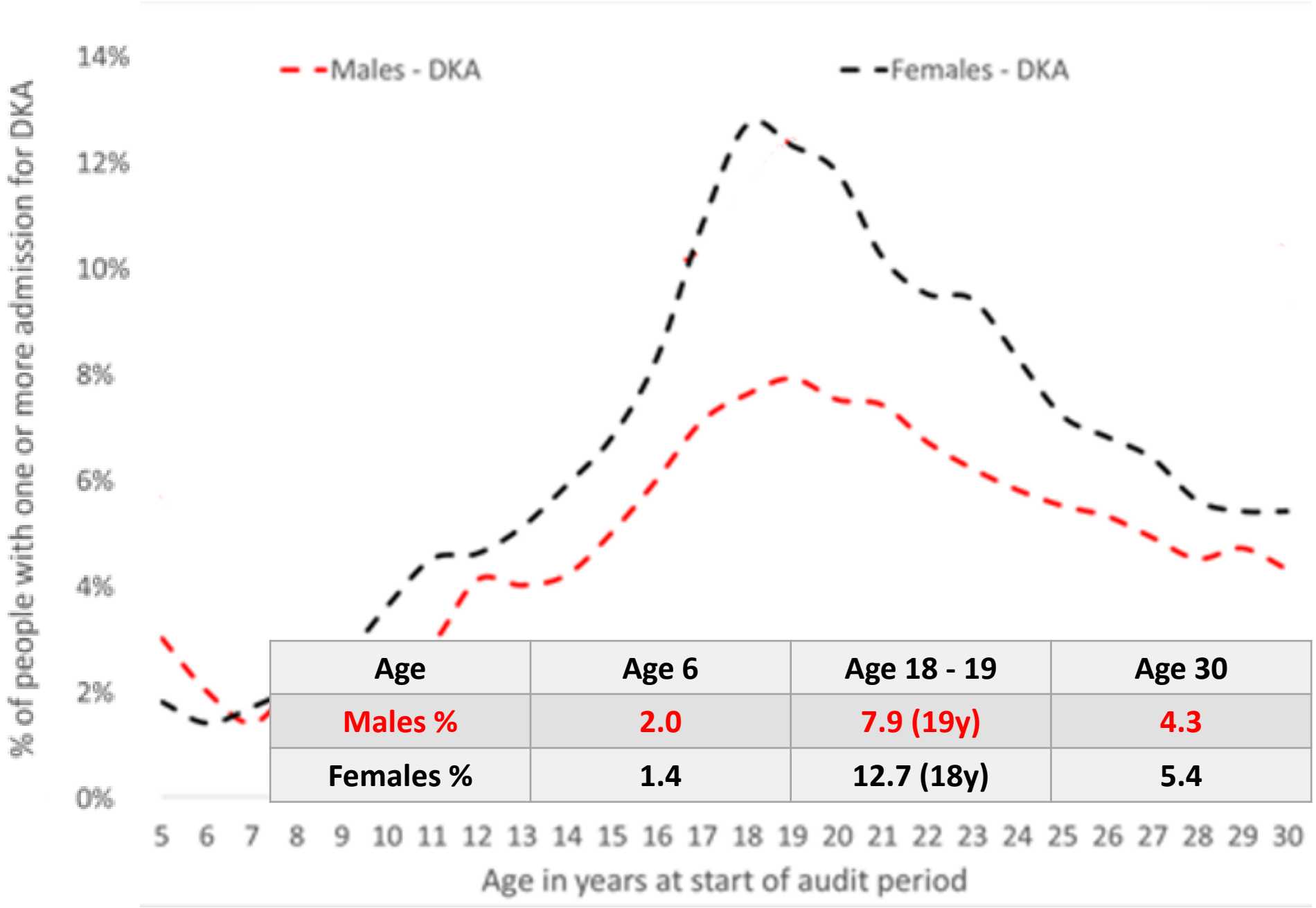
Adolescent and Young Adult further analysis and paper

- Combined data from NPDA and NDA over 3 years 2017 / 20
- Admission data from Hospital Episode Statistics
- NDA collated data from 97% of GP practices in this period and 202 specialist adult services



Age	9	19	30
Males median (IQR)	60 (54-68)	72 (59-89)	68 (57-83)
Females median (IQR)	61 (54-68)	74 (62-92)	66 (56-82)
Age-related pattern persisted after adjustment for ethnicity, social deprivation and duration of diabetes			


Males - DKA
% of people with one or more admission for DKA
14%
12%
10%
8%
6%
4%
2%
0%
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Age in years at start of audit period



Age	Age 6	Age 18 - 19	Age 30
Males %	2.0	7.9 (19y)	4.3
Females %	1.4	12.7 (18y)	5.4

Transition – what is your process like?

Like this?

Or like this?

Paediatrics

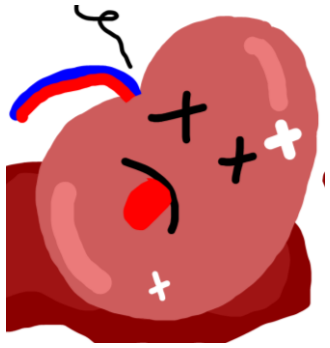
Adult Services

Paediatric Service

Eye Screening

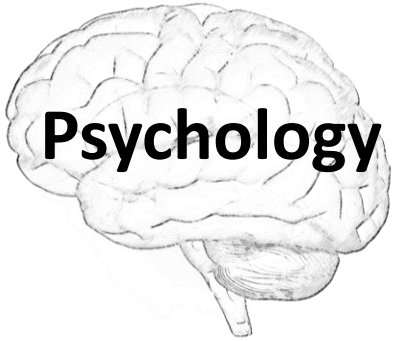
Employers

Prison



Renal Clinic

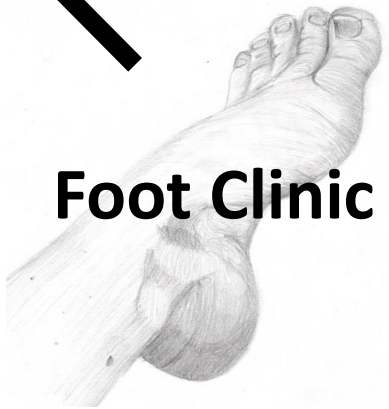
Young Persons Clinic



Psychology

Ante-natal clinic

Eating Disorders

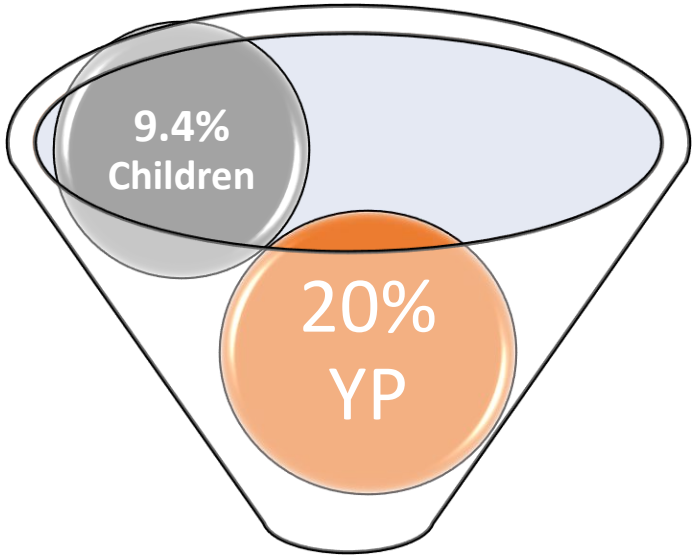


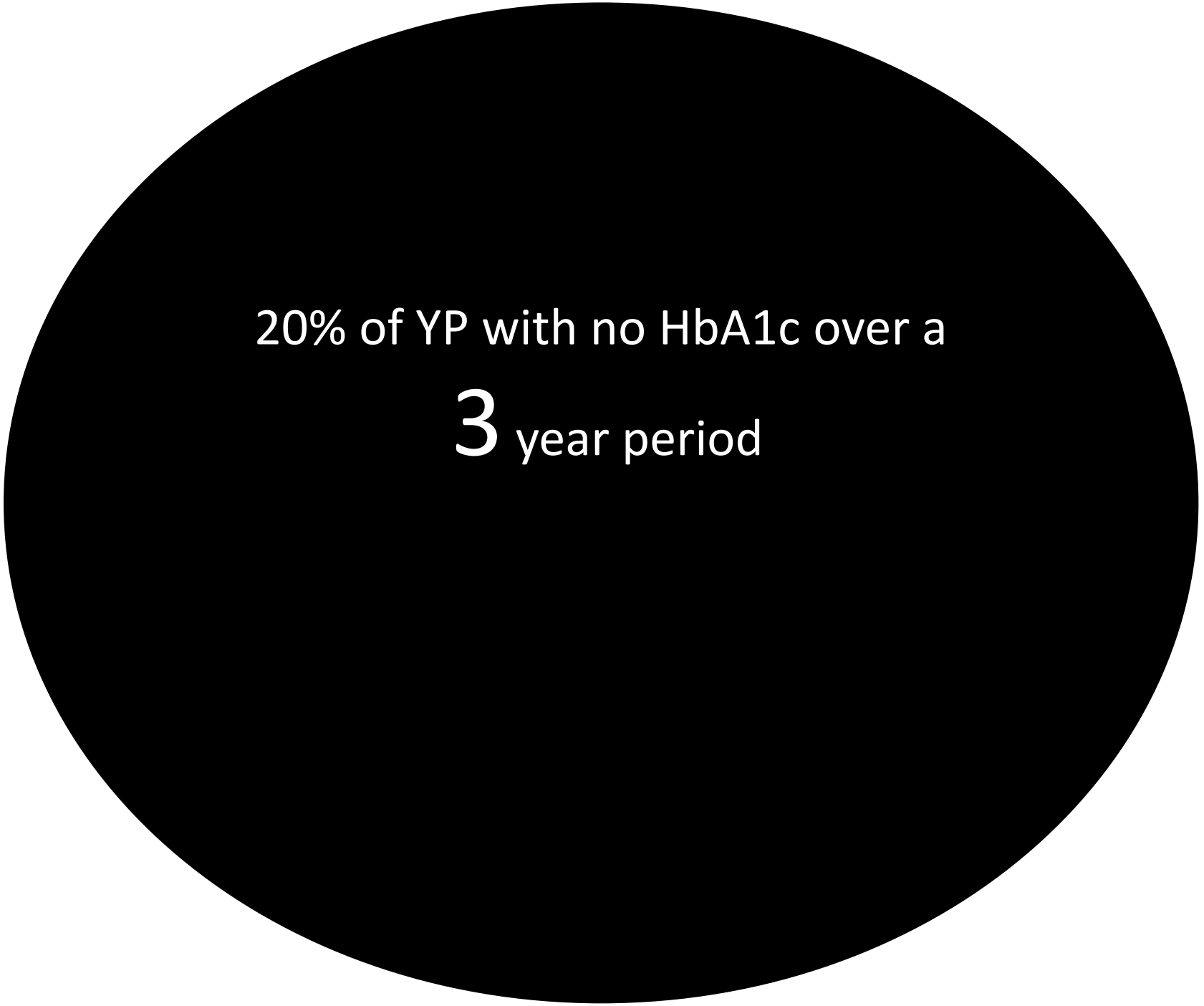
Foot Clinic

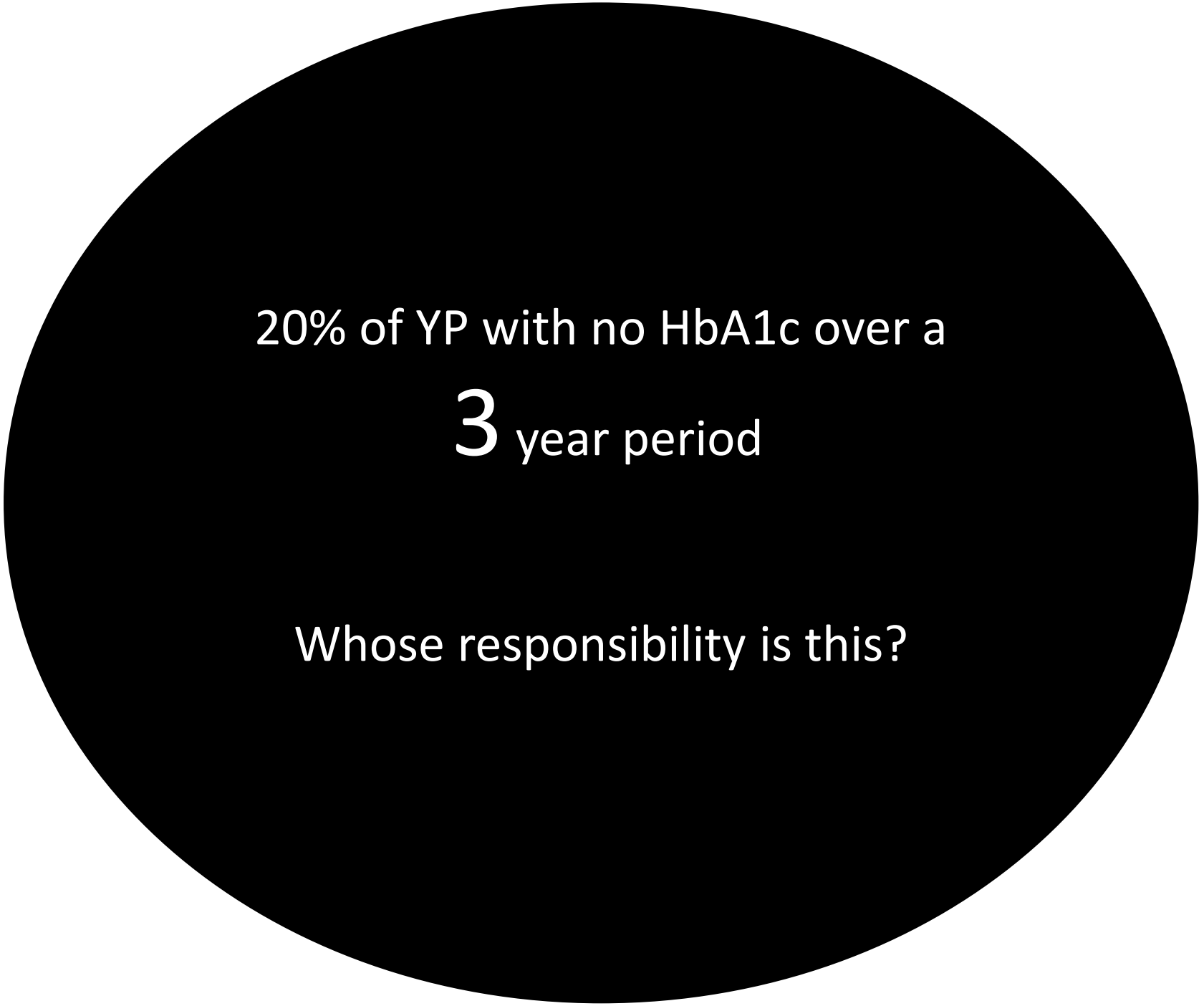
GP

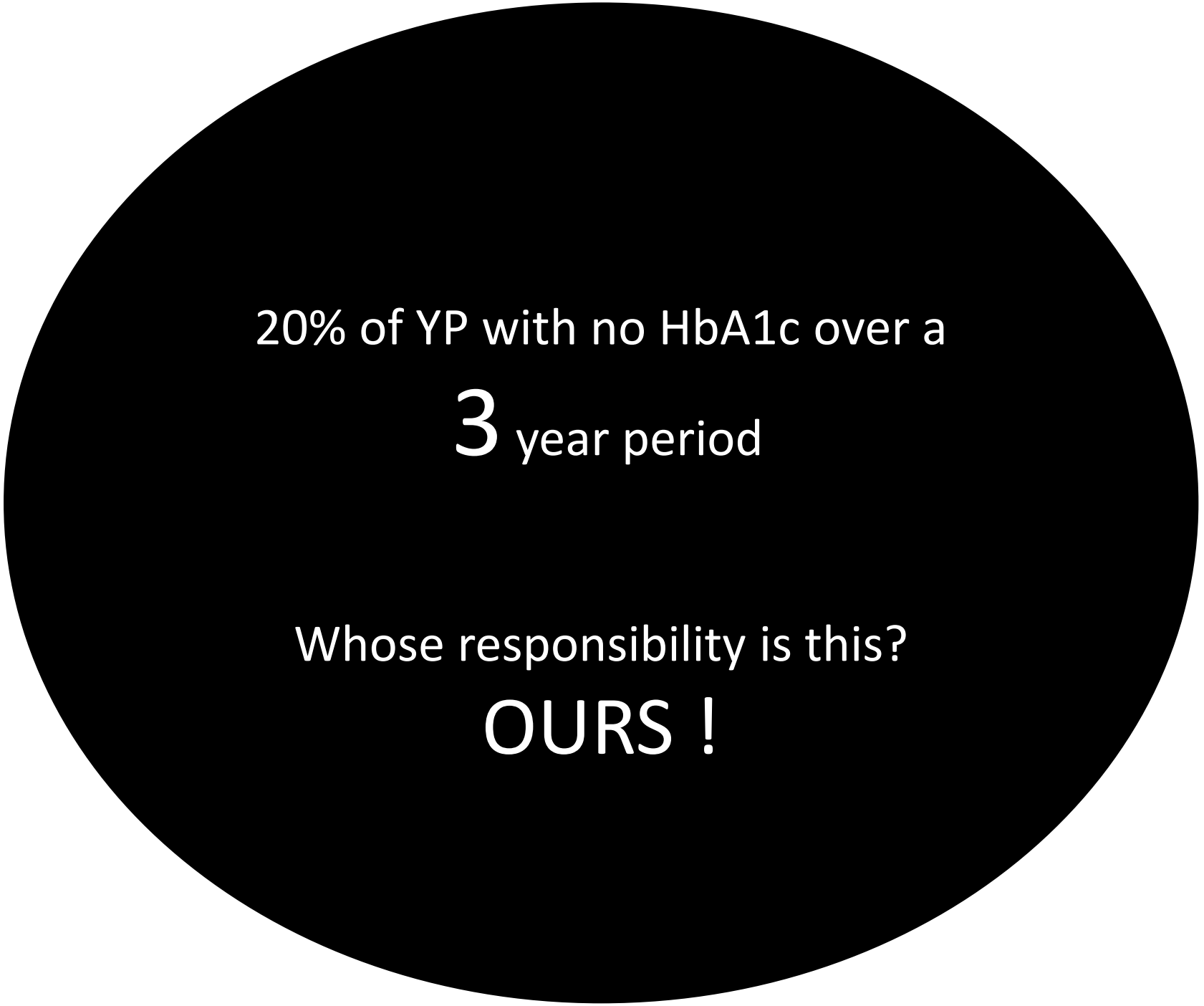
Paediatrics

Adult Services




20% of YP with no HbA1c over a
3 year period


20% of YP with no HbA1c over a
3 year period
Whose responsibility is this?


20% of YP with no HbA1c over a
3 year period
Whose responsibility is this?
OURS !

So do we know about the black hole?

5 care processes vs 8 =

37% higher chance of dying

(Holman et al ‘21)

So do we know about the black hole?

5 care processes vs 8 =

37% higher chance of dying

(Holman et al ‘21)

HbA1c 72 vs 68

But

10 years younger


T Together
E Everyone
A Achieves
M More


COLLABORATION
TOGETHER
TERM
WORKING
COMMUNITY
COMMUNICATION
INDUSTRY
SKILLS
SUCCESS
KNOWLEDGE
LEARNING
SECTION
BASED
CHALLENGED
PEER
BENEFITS
SOURCES
PRODUCTION
MANAGEMENT
SOFTWARE
GROUPS
WORK
PROJECT
PROJECTS
COMPLEX
LEADERSHIP
CORPORATION
POLITICAL
PEOPLE
GROUP
ORGANIZATION
COLLABORATIVE
DEVELOPMENT
COMMUNITIES
INTERNET
TOOLS
HELP
IMPROVE
CITATIONS
SOCIAL
ORGANIZATIONS
INCLUDE
RELIABLE
MEMBERS
SHARED
EDUCATION
BETWEEN
UNITED
SHARING
RESOURCES
THEORY
INTEREST
INCLUDING
COLLECTIVE
LARGE
ADDING
PRACTICE
TRADE
GOALS
INTERNATIONAL

Paediatrics

Adult Services

Draft NICE HCL Recommendations

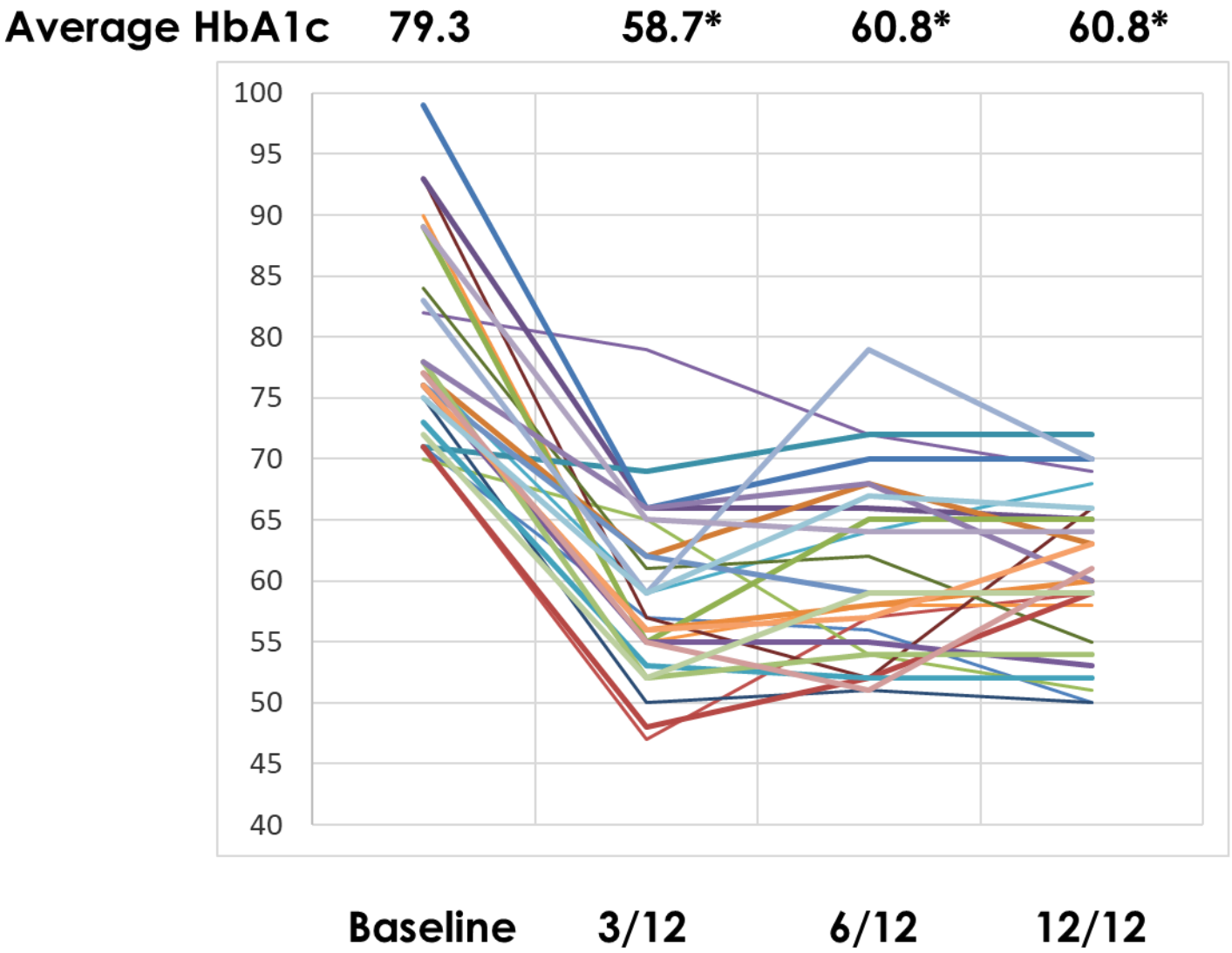
1) HCL in type 1 diabetes people who are having difficulty managing their condition and have an average HbA1c of 64 mmol/mol (8.0%) or more, despite optimal management with at least 1 of a pump, rtCGM, or isCGM

2) HCL in type 1 diabetes people if pregnant or planning a pregnancy

3) With support of trained MDT experienced in pumps and rtCGM

4) Person or their carer needs to understand and be able to use it, and is also attending a type 1 diabetes structured education programme

Sheffield NHS pilot HCL results (n=27)



17-25 years, n=15

Baseline 80.7

3/12 = 57.7

6/12 = 59.1

12/12 = 59.5

WHO SHOULD GET HCL TECHNOLOGY ?

EQUALITY OF OPPORTUNITY

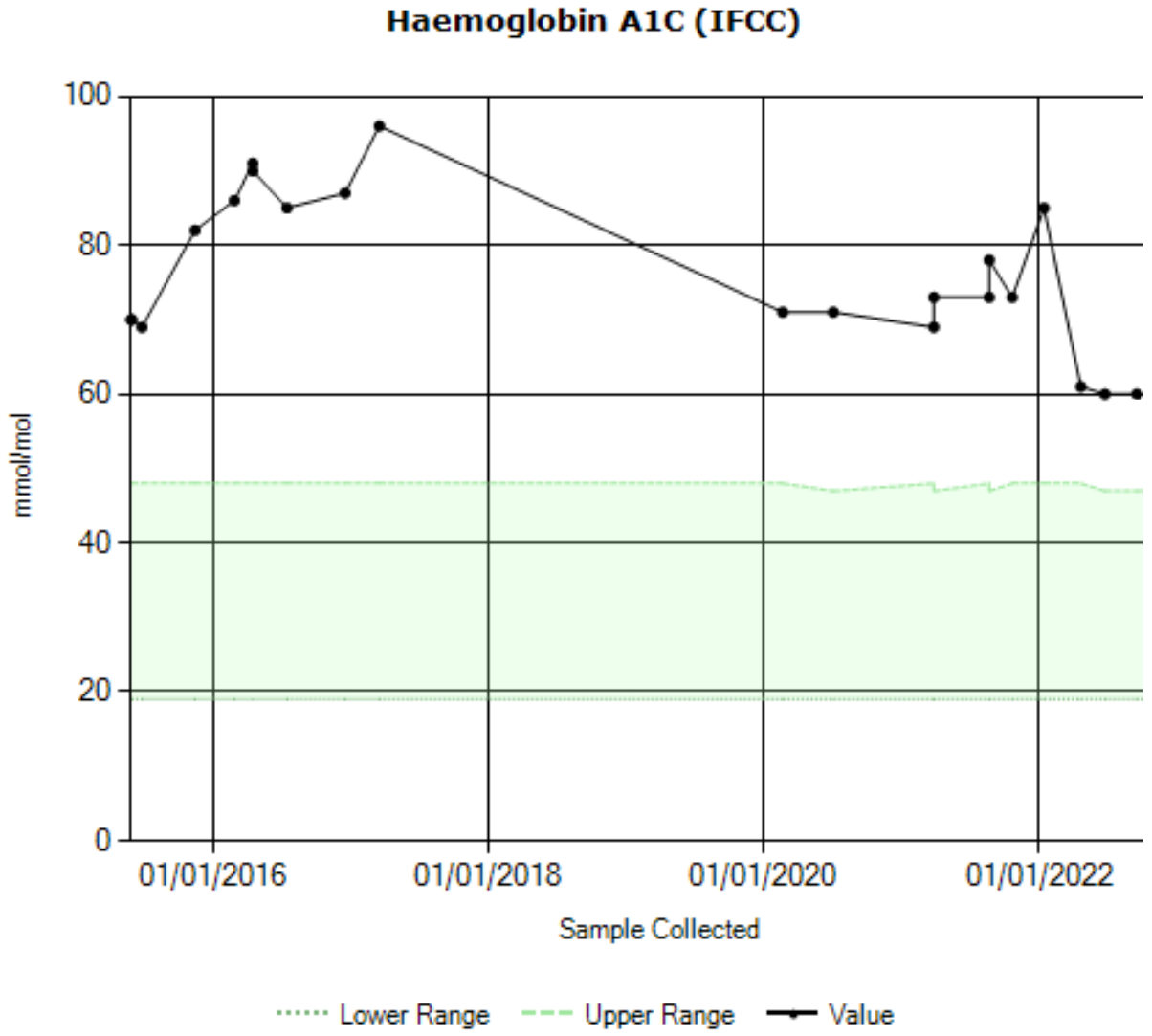
WHO SHOULD GET HCL TECHNOLOGY ?

EQUALITY OF OPPORTUNITY

EQUITY OF OUTCOMES

Case 1

Female, aged 23, diagnosed T1D aged 9, Maculopathy Jan ‘22



Good engagement

Regular clinic attendance

Tried metformin

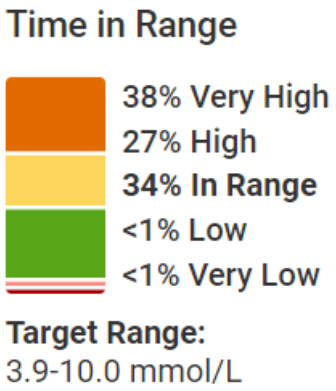
Was on SGLT2

Tried GLP-1

170 units

101.6 kg, BMI 40.7

Female, aged 23, diagnosed T1D aged 9, Maculopathy Jan ‘22



June ‘22,
HbA1c 60

TDD 100, ICR 4/5/4,
ISF 1:2, Tresiba 50

November HbA1c 52

15 Days Fri 2 Sep 2022 - Fri 16 Sep 2022

Average Glucose

11.7 mmol/L

Standard Deviation
4.7 mmol/L

GMI
8.4%

Time in Range

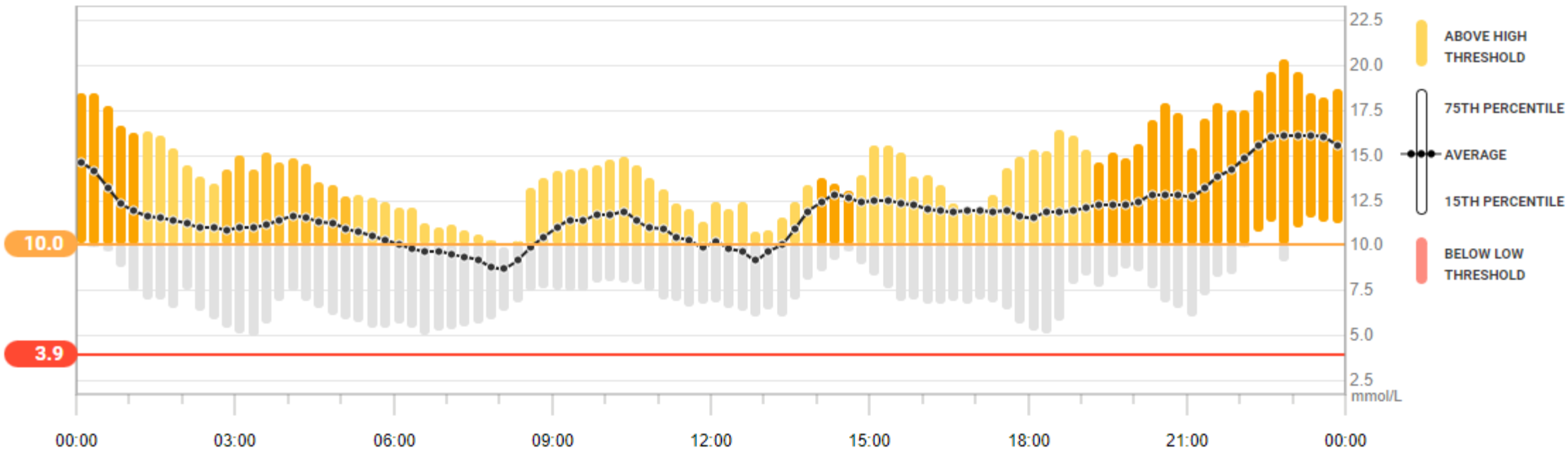
30% Very High
28% High
41% In Range
<1% Low
<1% Very Low

Target Range:
3.9-10.0 mmol/L

Sensor Usage

Days with CGM data
100%
15/15

Avg. calibrations per day
0.0



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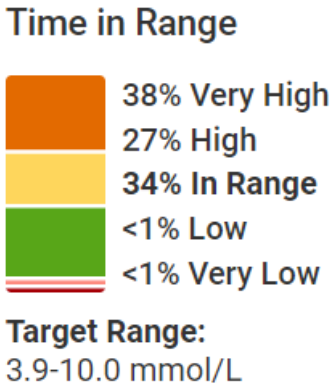
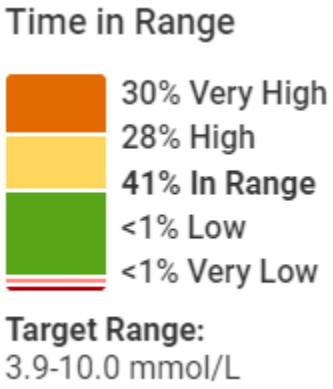


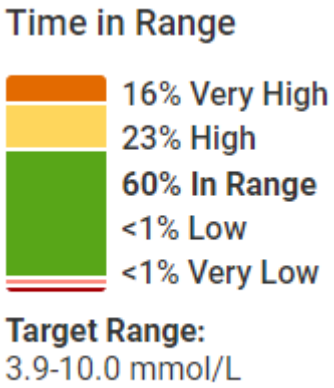
June ‘22,
HbA1c 60

TDD 101, ICR 4/5/4,
ISF 1:2, Tresiba 50



Sept ‘22
TDD 102.7, ICR 4/4/4,
ISF 1:1.5, Tresiba 65

Oct ‘22
TDD 105.3, ICR 4/4/3.5,
ISF 1:1, Tresiba 72



November HbA1c 52
TDD 98.3, ICR 4/4/3.5,
ISF 1:1, Tresiba 74

< > 28 Oct - 11 Nov, 2022

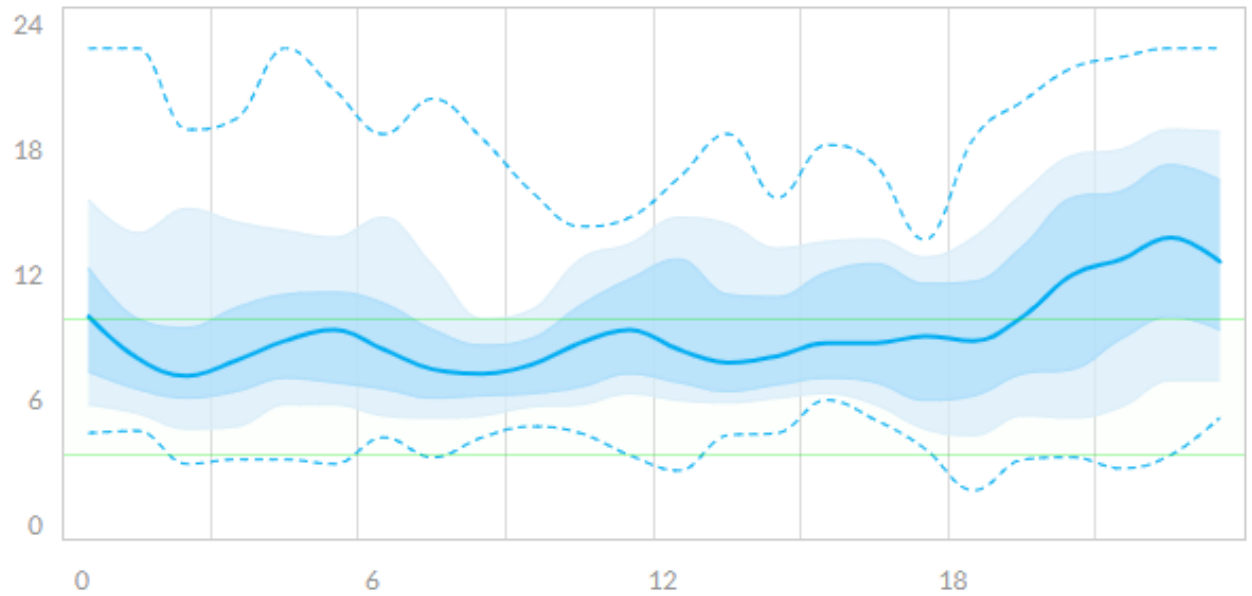
Custom Range

Glucose (CGM)

16%	Very High > 13.9 mmol/L
23%	High 10.1-13.9 mmol/L
60%	Target Range 3.9-10 mmol/L
1%	Low 3-3.8 mmol/L
0%	Very Low < 3 mmol/L

% Time CGM Active	98.5% (14.8 days)

GMI	7.6% (59.1 mmol/mol)
Average	9.9 mmol/L
SD	3.9 mmol/L
CV	39.2%
Median	8.9 mmol/L
Highest	HI mmol/L
Lowest	LO mmol/L



Insulin

42%
43.8 units
Basal/Day

58%
61.6 units
Bolus/Day

Daily Dose	105.4 units
Overrides (%)	0% (0 boluses)
# Bolus/Day	9.1

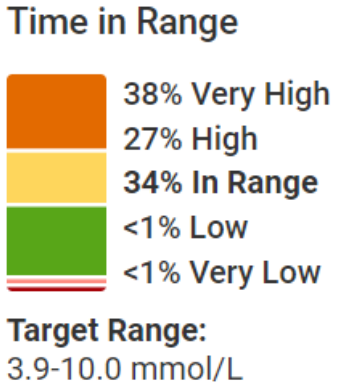
System Details

Tandem t:slim X2 (15d)

Control-IQ	96% (14d 10h)
Activity - Sleep	32% (4d 19h)
Activity - Exercise	0%
Manual	4% (14h)

Female, aged 23, diagnosed T1D aged 9, Maculopathy Jan ‘22

101.6, BMI 40.7



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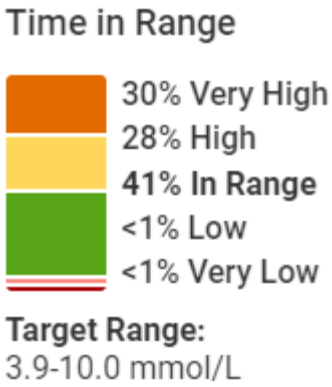
ISF 1:2, Tresiba 50



Sept ‘22
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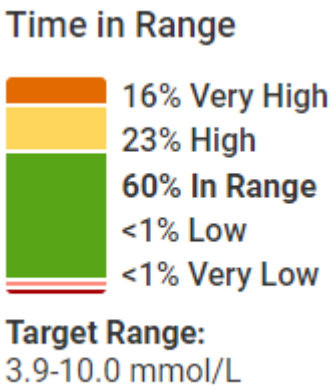
ISF 1:1.5, Tresiba 65

Oct ‘22
TDD 105.3, ICR 4/4/3.5,
ISF 1:1, Tresiba 72

104.2, BMI 41.7



November HbA1c 52
TDD 98.3, ICR 4/4/3.5,
ISF 1:1, Tresiba 74

Case 2

24 year old female

T1DM, diagnosed 2011, aged 14

- SE Asian background
- FH of type 2 diabetes, CVD and poor mobility
- 2016 travelling abroad on holiday, stopped pump, moved to insulin pens, BMI 29.9
- Pregnant, HbA1c est 79
- Dec 2016 HbA1c 42, healthy baby
- DKA Dec 2017, HbA1c 98, BMI 34.7
- Dec 2018 pregnant, HbA1c Sept 82
- 2019 Feb HbA1c 56, 2nd healthy baby
- Sept 2019 HbA1c 102
- Poor engagement throughout both pregnancies

Oct ’21

- Healthier diet, lost 3 kg, BMI 34.7, walking children to and from school, background insulin dose halved with DSN input for 4/12, ICR strengthened, HbA1c 58
- 2 children aged 4 and 2
- Commence metformin and start an insulin pump

Date	HbA1c	Weight	Insulin TDD	Other meds
4/8/22		100.5	72.2	Metformin 1g BD (2kg weight loss)

Date	HbA1c	Weight	Insulin TDD	Other meds
4/8/22		100.5	72.2	Metformin 1g BD (2kg weight loss)
9/9/22	58	101.0	84.4	+ Semaglutide 0.25 mg o/w

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4/11/22		98.2	53.2	+ Semaglutide 0.5 mg o/w
9/2/23	55	88		+ Semaglutide 0.5 mg o/w

Date	HbA1c	Weight	Insulin TDD	Other meds
4/8/22		100.5	72.2	Metformin 1g BD (2kg weight loss)
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4/11/22		98.2	53.2	+ Semaglutide 0.5 mg o/w
9/2/23	55	88		+ Semaglutide 0.5 mg o/w
2/6/23	45	85.6	44.6	+ Semaglutide 0.5 mg o/w

Thinking about another pregnancy next year – aware needs wash-out period

Case 3 – acute causes of increased insulin requirements – what happened at 1 am?