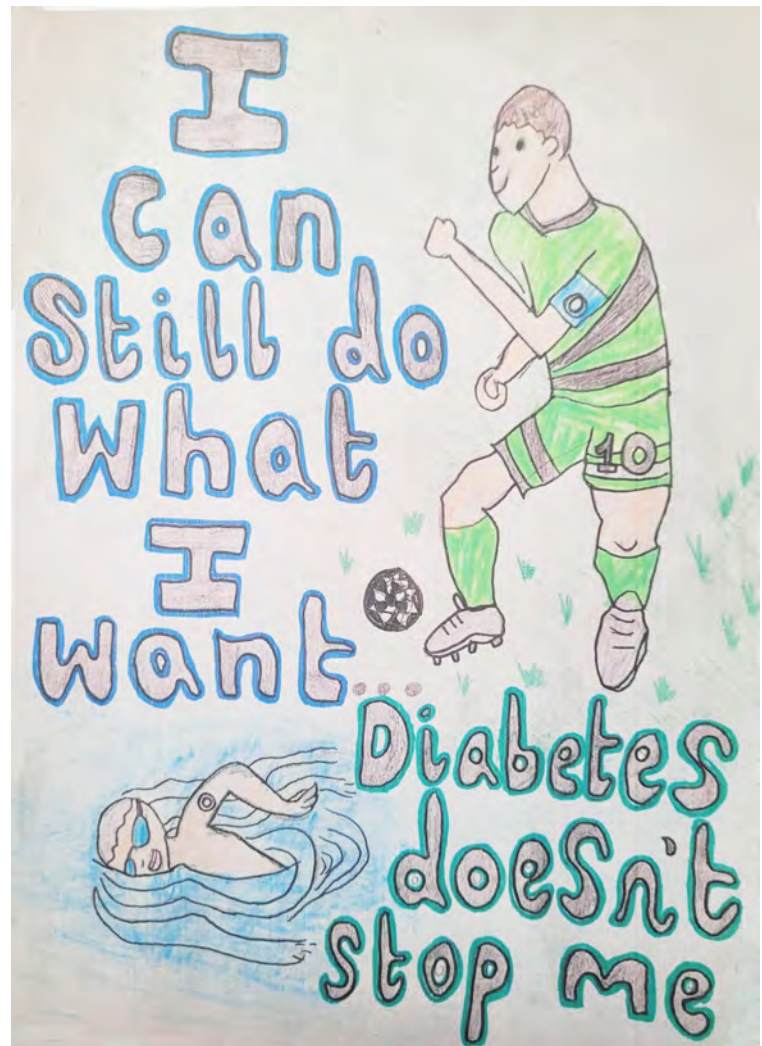


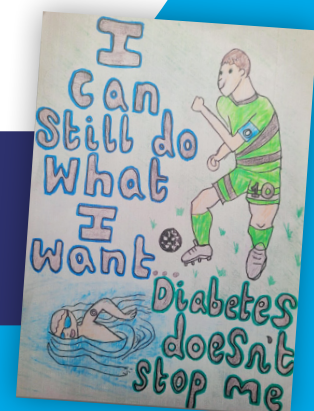
National Paediatric Diabetes Audit (NPDA) Report on Care and Outcomes 2022/23





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Introduction

The National Paediatric Diabetes Audit (NPDA) is managed by the Royal College of Paediatrics and Child Health (RCPCH) and commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP).

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HQIP is led by a consortium of the Academy of Medical Royal Colleges, and the Royal College of Nursing. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales.

HQIP holds the contract to commission, manage, and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies www.hqip.org.uk/national-programmes.

The NPDA has been reporting for 20 years. Data is submitted by healthcare professionals in Paediatric Diabetes Units (PDUs) in England and Wales about the care received by the children and young people with diabetes using their service.

The effectiveness of diabetes care is measured against NICE guidelines ([NG18, NICE 2015](#)) and includes treatment targets, health checks, patient education, psychological wellbeing, and assessment of diabetes-related complications including acute hospital admissions, all of which are vital for monitoring and improving the long-term health and wellbeing of children and young people with diabetes. In 2022/23, 100% of PDUs participated in the NPDA.

Further information:



Further information on the background, aims, and scope of the NPDA is available at:

<https://www.rcpch.ac.uk/work-we-do/clinical-audits/npda/about>

Extended analysis:



Expanded analysis of 2022/23 data, PDU level reports and posters, a glossary of terms used in this report, a line-of-sight table describing the evidence base for the recommendations made in this report, and links to Excel files of data at PDU, regional network and integrated care system levels are available within the annual reports page:

<https://www.rcpch.ac.uk/resources/npda-annual-reports>

PDU level, regional network, NHSE region, local health board and ICS level data is available at:

npda-results.rcpch.ac.uk

Key messages

The prevalence of children and young people cared for in PDUs in England and Wales has increased

from 33,251 in 2021/22 to 34,371 in 2022/23, despite a fall in the incidence of new cases.



The percentages of children and young people with Type 1 and Type 2 diabetes receiving all six key annual healthcare checks has increased

but there remains much variability between PDUs, and completion rates for those with Type 2 remain lower than for those with Type 1.



The overall median HbA1c for England and Wales has fallen

from 60.5mmol/mol in 2021/22 to 60.0mmol/mol, but excessive PDU variability in this outcome measure still persists.



Percentages of young people with early signs of micro and macrovascular complications

for both Type 1 and Type 2 diabetes show very little change in 2022/23 compared to the previous audit year.



Use of diabetes related technology has increased

in 2022/23 with around half of children and young people with Type 1 diabetes using insulin pumps (45.3%, compared to 40.3% in 2021/22) and half (48.6%, compared to 30.0% in 2021/22) using a real time continuous glucose monitor (rtCGM).



Lower HbA1c was associated with use of a hybrid closed loop system or rtCGM.



Use of hybrid close loop systems doubled

since the previous audit year, with 14.7% now using this technology compared to 7.5% in 2021/22.

Despite improvements in outcomes and use of technologies across different ethnicities and areas of deprivation, **inequalities remain evident.**

Around a quarter (23.3%) of all new cases of Type 1 diabetes had **diabetic ketoacidosis (DKA) at diagnosis** compared to 25.6% in 2021/22.



In terms of rtCGM use, the inequality gap by deprivation has reduced however the difference in use between Black and White children with Type 1 diabetes has widened from 8.6% in 2021/22 to 14% in 2022/23.



National recommendations

1

Commissioners of care should make sure that multidisciplinary diabetes teams are adequately staffed to manage the growing numbers of children and young people with Type 1 and Type 2 diabetes since 2020. These teams should be trained to encourage the best use of new diabetes-related technologies.

Action by: Integrated Care Boards across England and Local Health Boards across Wales.

2

Children and young people with Type 1 and Type 2 diabetes should have equitable access to diabetes care, regardless of social deprivation, ethnicity, or geography. Action is required to increase the proportion of those with Type 2 diabetes receiving recommended key annual health checks and to improve equity of access to diabetes treatment technology for Type 1 diabetes.

Action by: Integrated Care Boards across England; Local Health Boards across Wales, and the RCPCH, to provide a better understanding of ethnic and social deprivation variability.

3

Young people with diabetic retinopathy recorded in their previous annual screen should be invited for annual re-screening. Paediatric diabetes teams should be aware of which patients in their service have retinopathy and encourage them and their family to attend screening appointments when offered so that diabetes management advice can be appropriately tailored.

Action by: NHS Diabetic Eye Screening Programme in England (DESP), Diabetic Eye Screening Wales (DESW), Clinical teams within paediatric diabetes units in NHS Trusts and Local Health Boards across England and Wales.

4

Awareness of the symptoms of onset of Type 1 Diabetes should be raised to reduce presentation with diabetic ketoacidosis (DKA). This could include targeting healthcare professionals, school teachers and parents and reinvigoration of public awareness campaigns such as the Diabetes UK 4Ts.

Action by: The Office for Health Improvement and Disparities, NHS England, Public Health Wales and NHS Wales supported by the National Children and Young People's (CYP) Diabetes Network, and diabetes charities such as Diabetes UK and JDRF.

5

Studies should be funded to derive evidence for interventions supporting pre-diabetic children and young people to avoid progression to Type 2 diabetes.

Action by: Funding bodies such as the National Institute for Health and Care Research and Diabetes UK.

6

Studies should be funded to understand the progression from childhood signs of micro- and macro-vascular disease to the development of future diabetes complications, and to inform preventative interventions.

Action by: Funding bodies such as the National Institute for Health and Care Research, Diabetes UK and JDRF.

2022/23 Results Summary

SECTION 01

How many children and young people were receiving care from paediatric diabetes services in England and Wales?



There were **34,371 children** and young people receiving care from PDUs in 2022/23: 32,673 (95.1%) in England and 1,698 (5.0%) in Wales. There has been a steady increase in this prevalence since the COVID-19 pandemic in 2020/21 in England and Wales from 29,242 in 2019/20 to 34,371 in 2022/23.

Country	Total number of children and young people with diabetes	Type 1 diabetes	Type 2 diabetes	Other rare forms
England	32,673	30,647 (93.8%)	1,206 (3.7%)	820 (2.5%)*
Wales	1,698	1,629 (96.0%)	39 (2.3%)	30 (1.8%)*
England and Wales	34,371	32,276 (94.0%)	1,245 (3.6%)	850 (2.5%)*

Table 1: Numbers of children and diabetes being managed within PDUs in England and Wales, 2022/23

*Includes cystic fibrosis diabetes, maturity-onset diabetes of the young (MODY) and "unknown/unspecified" types of diabetes.

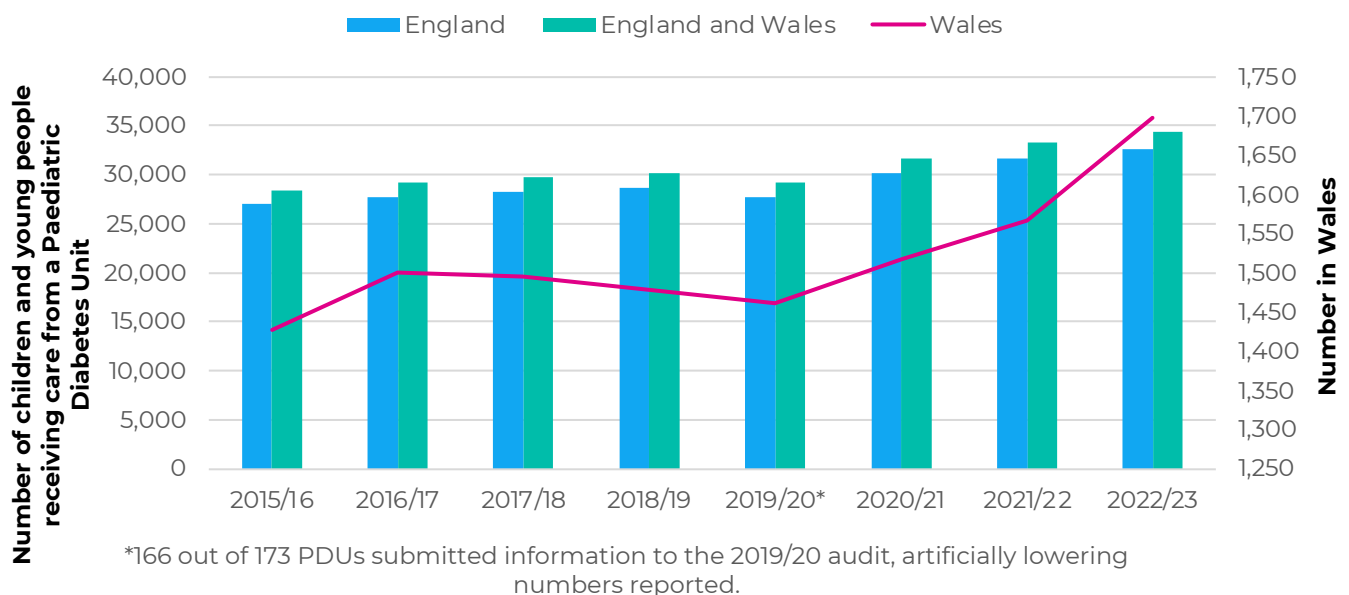


Figure 1: Total numbers of children and young people receiving care from PDUs in England and Wales, 2015/16 to 2022/23.

The incidence of Type 1 diabetes (0-15 years) decreased from **32.7** new cases per 100,000 in 2021/22 to **31.1** in 2022/23, with **3,610** new cases diagnosed and managed in PDUs in this audit year. Despite this reduction, the incidence rate remains higher than rates observed prior to the COVID-19 pandemic.

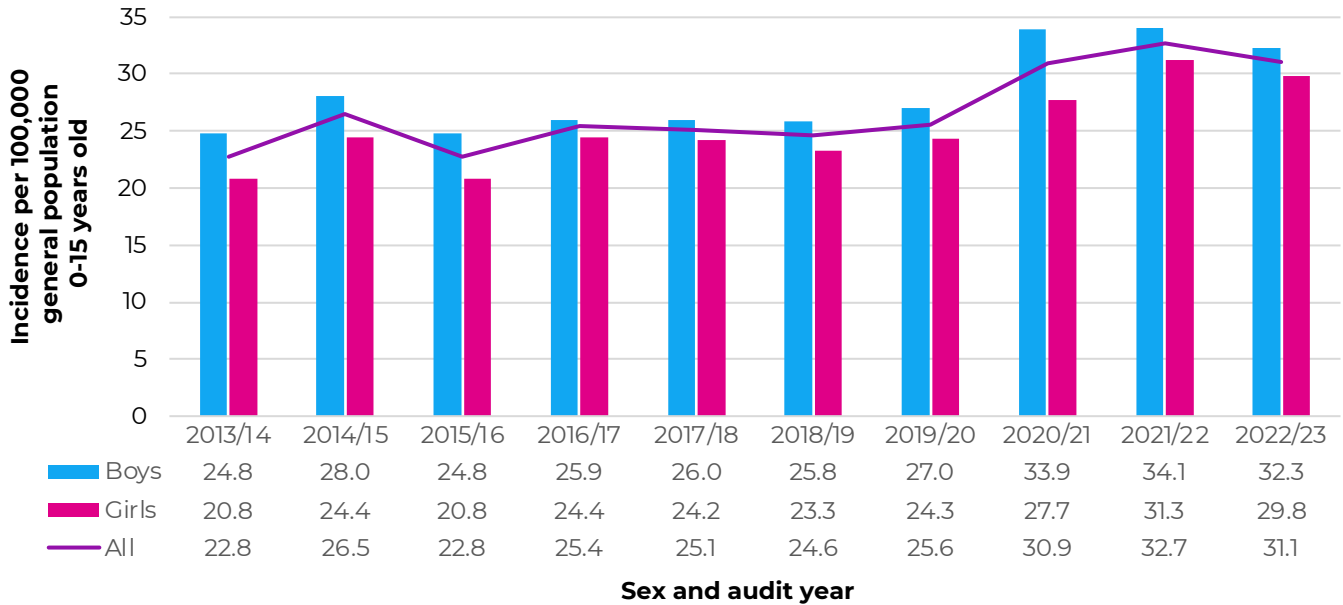
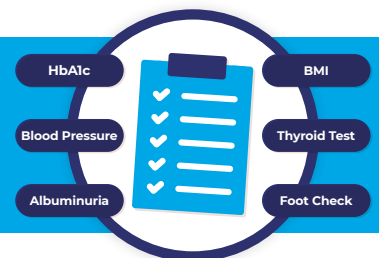


Figure 2: Incidence of Type 1 diabetes per 100,000 general population 0-15 years old in England and Wales, from 2013/14 to 2022/23

There were **1,245** children and young people in England and Wales being cared for in PDUs with Type 2 diabetes in 2022/23. Of these, there were **268** new cases – similar to the 281 new cases recorded in 2021/22.

SECTION 02

What percentages of children and young people received all six recommended health checks?



There were increases in the completion rates for all individual 'key' health checks in 2022/23 compared to the previous audit year.

63.4% of those with Type 1 diabetes aged 12 and above received all six 'key' annual health checks (HbA1c, BMI, blood pressure, thyroid function test, albuminuria screening, and foot checks), compared to 59.7% in 2021/22.

36.0% of those with Type 2 diabetes aged 12 and above received all six 'key' health checks (HbA1c, BMI, blood pressure, cholesterol, albuminuria screening, and foot checks), compared to 33.0% in 2021/22.

Eye screening for retinopathy was removed from annual 'key health check' reporting in the NPDA as it was reduced to biennial frequency from 2020/21 in many NHS Trusts and Health Boards (unless an abnormal result was observed in a previous screen), due to changes in national retinopathy screening guidance. However, it remains an essential component of paediatric diabetes care.

In 2022/23, **75.7% of those aged 12 years and above** who had an abnormal eye screen in 2021/22 and who were also captured in the 2022/23 dataset had an eye screen in 2022/23, up from 59.5% of those who had an abnormal eye screen result in 2020/21 and were recaptured in 2021/22.

A similar proportion (**75.9%**) of those aged 12 years and above who had a normal eye screen in 2021/22 and who were also captured in the 2022/23 dataset also received an eye screen in 2022/23.

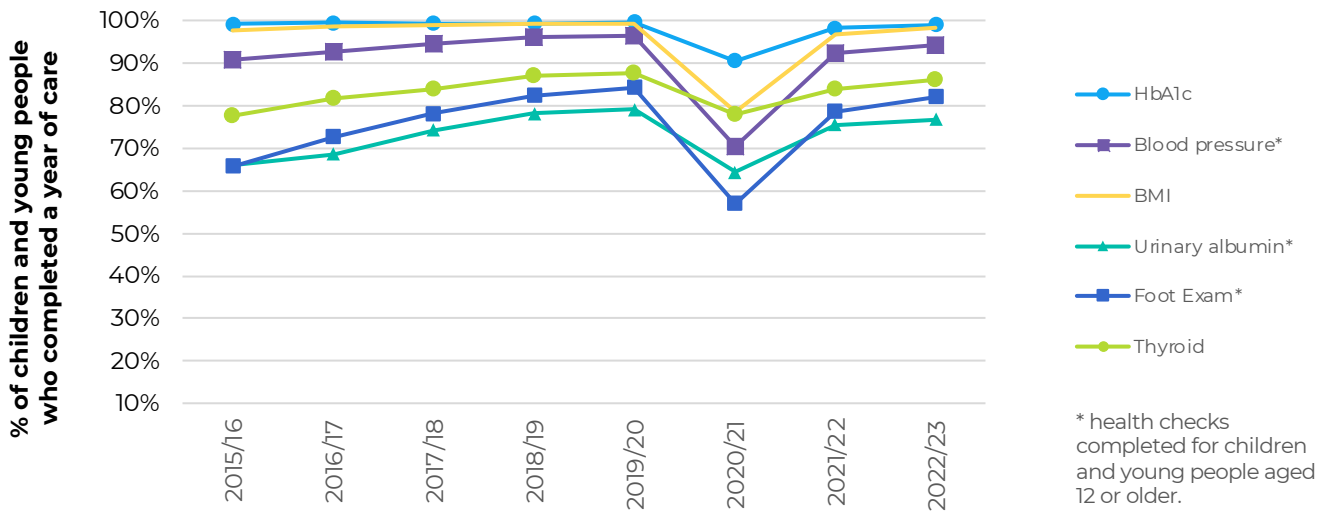


Figure 3: Percentage of children and young people with Type 1 diabetes receiving individual health checks, 2015/16 to 2022/23.

SECTION 03

What percentage of all recommended health checks were delivered by PDUs?



In 2022/23 the overall completion rate (the total number of the six 'key' annual health checks completed divided by the total that should have been provided based on the age of those included in the analysis) for 'key' annual health checks received by children and young people with Type 1 diabetes was **90.8%**, although completion rates varied between PDUs (Figure 4).

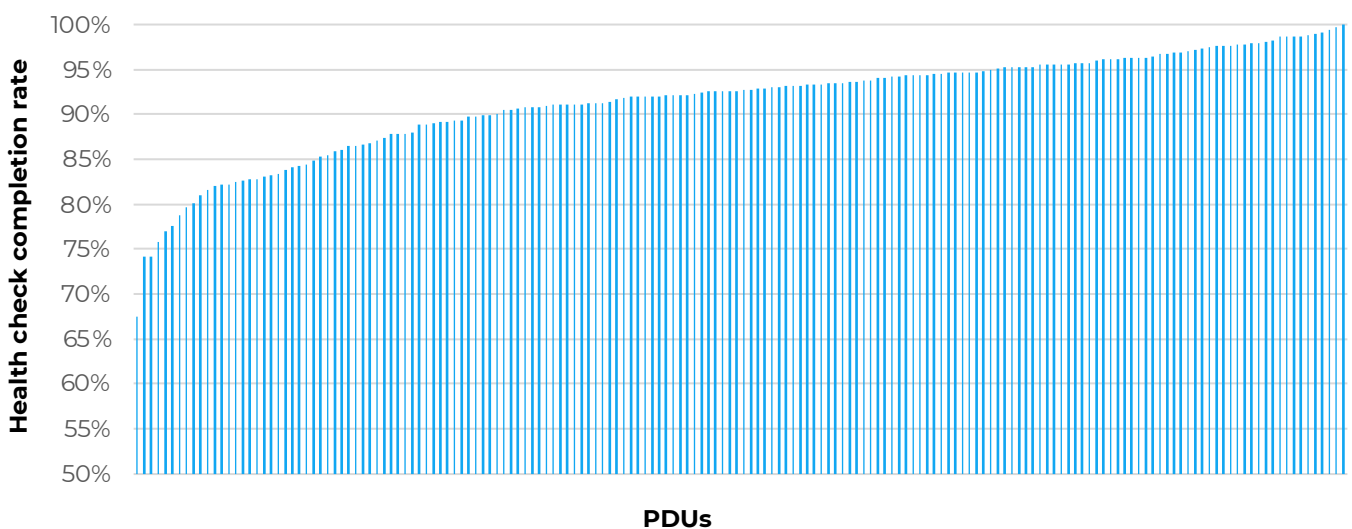


Figure 4: Column chart of health check completion rates for children and young people with Type 1 diabetes per PDU in England and Wales, 2022/23

SECTION 04

What percentages of children and young people with Type 1 diabetes received recommended checks at diagnosis?



85.2% received level three carbohydrate counting education within a fortnight of diagnosis, compared to 85.9% in 2021/22.

91.6% received screening for thyroid disease within three months of diagnosis, compared to 91.2% in 2021/22.

88.3% received screening for coeliac disease within three months of diagnosis, compared to 87.0% in 2021/22.

SECTION 05

Has there been an improvement in national HbA1c?



The national overall median HbA1c for children and young people with all types of diabetes in England and Wales was **60.0 mmol/mol** (60.0 mmol/mol for England and 60.0 mmol/mol for Wales), down from 60.5 mmol/mol in 2021/22.

The national median HbA1c for children and young people with Type 1 diabetes in England and Wales was **60.5 mmol/mol** (60.5 mmol/mol for England and 61.0 mmol/mol for Wales, Figure 5) down from 61.0 mmol/mol in 2021/22. The median HbA1c at PDU level ranged from 53.0 mmol/mol to 70.3 mmol/mol.

The national median HbA1c for Type 2 diabetes was **49.3 mmol/mol**, down from 50.0 mmol/mol in 2021/22.

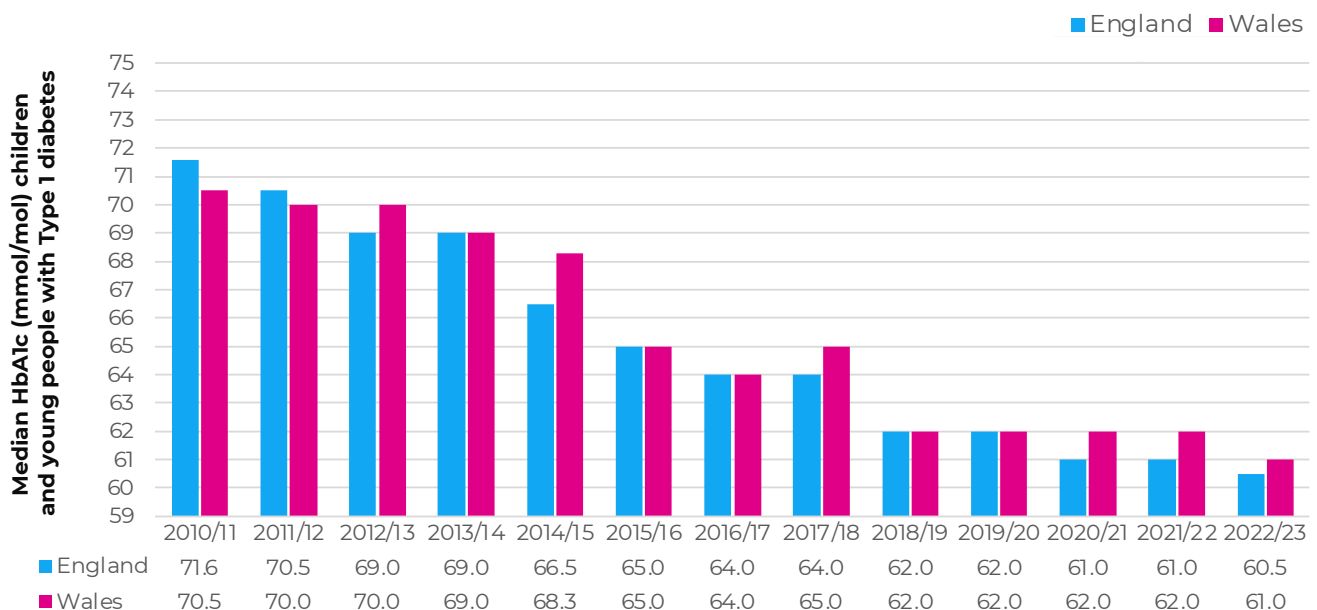


Figure 5: Median HbA1c for children and young people with Type 1 diabetes in England and Wales, 2010/11 to 2022/23.

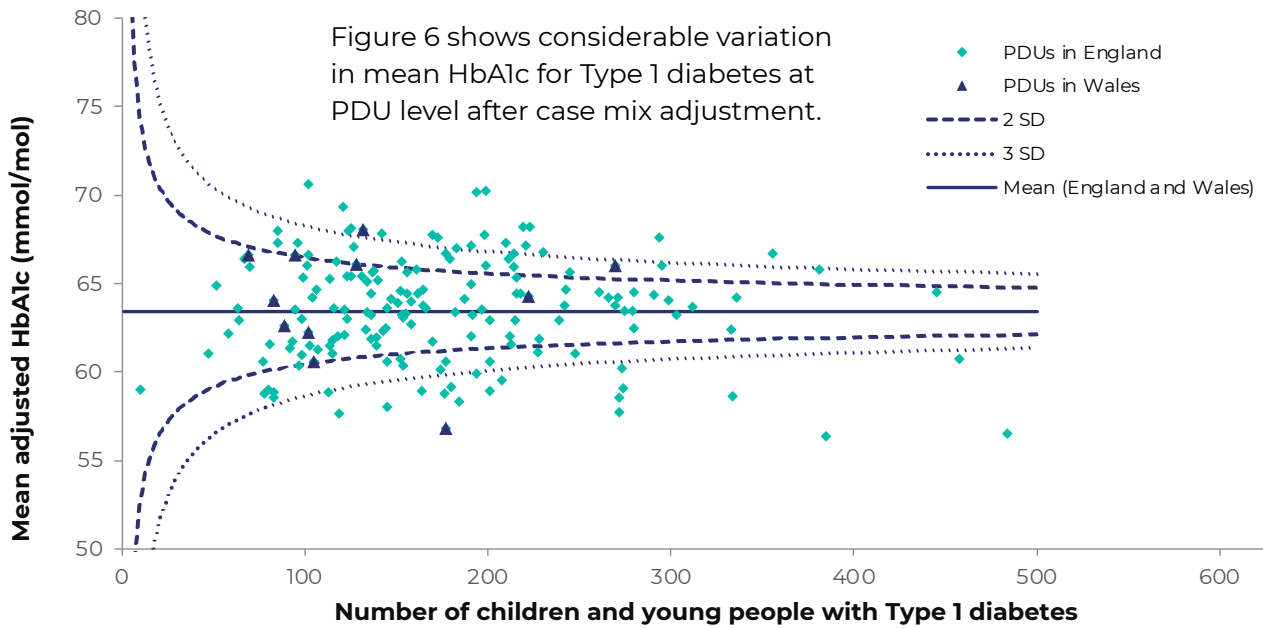


Figure 6: Funnel plot of mean case mix adjusted HbA1c by PDU for children and young people with Type 1 diabetes

SECTION 06

What percentages of children and young people with diabetes were at risk of macrovascular and microvascular complications?



There has been little change in percentages of children and young people with diabetes showing early warning signs of complications between 2021/22 and 2022/23, or the years preceding.

TYPE 1 DIABETES	TYPE 2 DIABETES
29.6% (aged 12 and above) had a diastolic or systolic blood pressure in the hypertensive range (>98th centile after correction for age and gender), compared to 29.9% in 2021/22.	46.5% (all ages) had a diastolic or systolic blood pressure in the hypertensive range (>98th centile after correction for age and gender), compared to 46.1% in 2021/22.
19.6% (aged 12 and above) had a total blood cholesterol of 5mmol/l or higher, compared to 19.0% in 2021/22. <small>(Cholesterol is no longer included in the health checks specified for Type 1 diabetes by NICE, however the NPDA continues to report the outcomes of the cholesterol tests undertaken and submitted as some PDUs consider it to merit continuing scrutiny).</small>	29.6% (all ages) had a total blood cholesterol of 5mmol/l or higher, compared to 27.9% in 2021/22.
41.7% (all ages) were overweight or obese (BMI>85th centile after correction for age and gender), compared to 42.3% in 2021/22.	93.5% (all ages) were overweight or obese (BMI >85th centile after correction for age and gender), compared to 92.8% in 2021/22.
10.9% (aged 12 and above) had an abnormal retinopathy screen, compared to 11.4% in 2021/22.	6.3% (aged 12 and above) had an abnormal retinopathy screen, compared to 8.4% in 2021/22.
10.4% (aged 12 years and above) had micro- or macroalbuminuria, compared to 11.5% in 2021/22.	21.4% (all ages) had micro- or macroalbuminuria, compared to 20.6% in 2021/22.

Table 2: Percentages of children and young people with Type 1 and Type 2 diabetes with evidence of risk factors for micro- and macrovascular complications, 2022/23

SECTION 07

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



Across England and Wales:

45.3% were using an insulin pump, compared to **40.3%** in 2021/22.

14.7% were using a closed loop system, compared to **7.5%** in 2021/22.

48.6% were using a real time continuous glucose monitor (rtCGM); either combined with insulin injections or a pump), compared to **30.0%** in 2021/22.

37.2% were using a flash glucose monitor or a modified flash monitor, compared to **43.7%** in 2021/22.

Country	Insulin pump*	Closed-loop system**	rtCGM*	Flash glucose monitor or modified flash monitor*
England	45.2% (13,348/29,548)	14.7% (4,510/30,647)	48.2% (13,163/27,293)	37.4% (10,195/27,293)
Wales	47.8% (760/1,591)	14.0% (228/1,629)	55.7% (828/1,487)	33.9% (504/1,487)
England and Wales	45.3% (14,108/31,139)	14.7% (4,738/32,276)	48.6% (13,991/28,780)	37.2% (10,699/28,780)

Table 3: Percentages of children and young people with Type 1 diabetes using diabetes-related technologies 2022/23.

*Denominator = the number of children and young people with Type 1 diabetes with a valid recorded treatment regimen.

**Proportion of all children and young people with Type 1 diabetes.

SECTION 08

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



Figure 7 shows that the mean HbA1c of children and young people using each technology combination increased between 2021/22 and 2022/23. However, the total number using technology combinations associated with lower mean HbA1c also increased (including insulin pumps in conjunction with CGMs or closed-loop systems). This has contributed to lower average national HbA1c (see Figure 5).

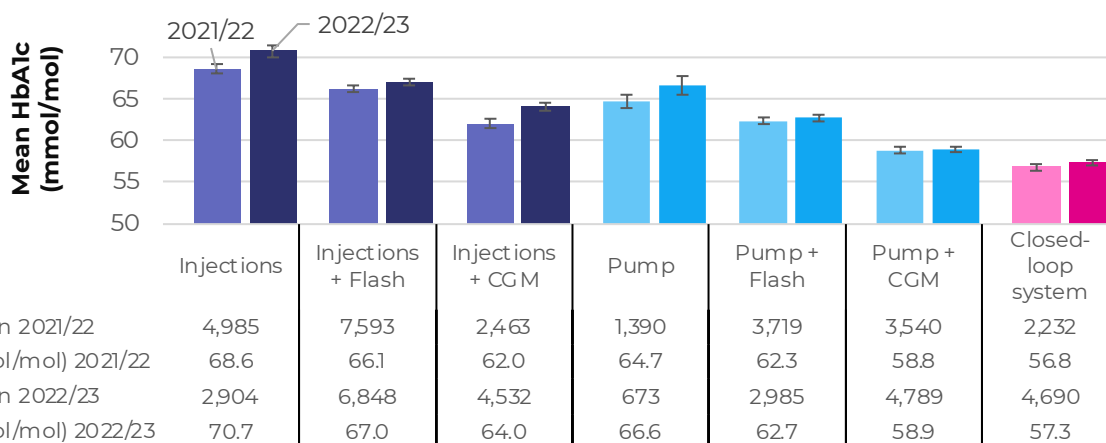


Figure 7: Mean HbA1c for children and young people with Type 1 diabetes using different combinations of treatment regimen and glucose monitoring in 2021/22 - 2022/23 (error bars represent 95% confidence intervals).

SECTION 09

What percentages of children and young people with Type 1 diabetes had diabetes-related hospital admissions?

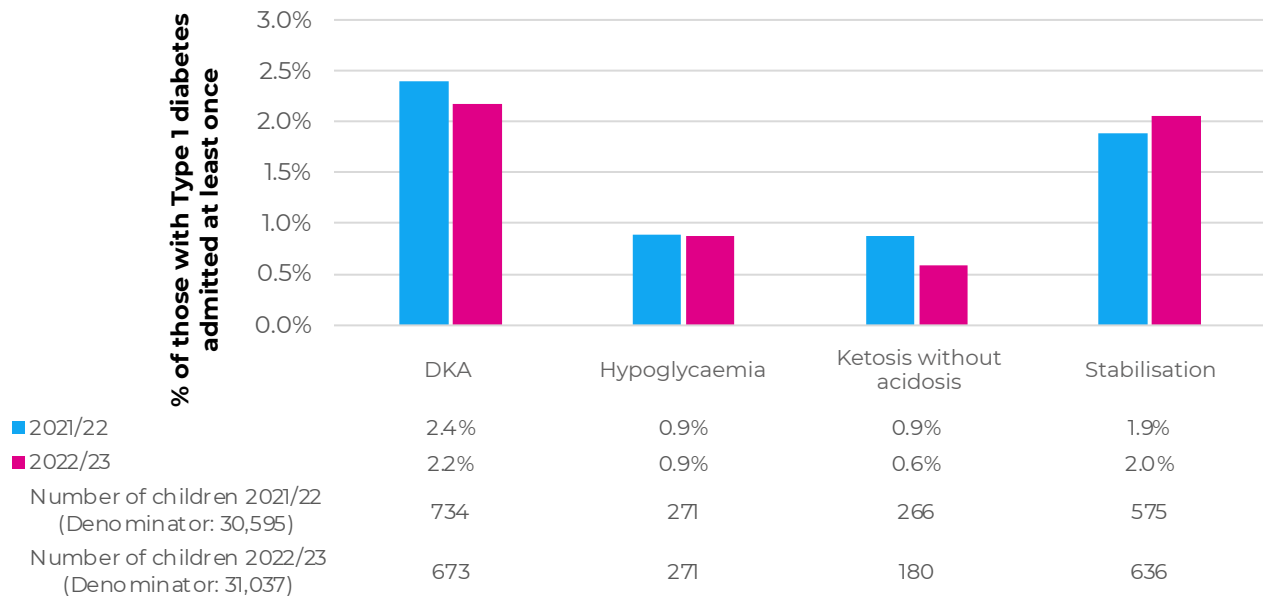


Figure 8: Percentages and numbers of children and young people with Type 1 diabetes admitted at least once for a diabetes-related cause not associated with diagnosis, 2021/22 and 2022/23.

23.3% of children and young people newly diagnosed with Type 1 diabetes presented with DKA at diagnosis in 2022/23 compared to 25.6% in 2021/22.

N.B. of the 172 PDUs participating in the 2022/23 audit, 165 submitted data on hospital admissions. Results above are based on the 31,037 children and young people with Type 1 diabetes receiving care at these PDUs. The percentage with DKA at diagnosis is lower than those reported in the NPDA Hospital Admissions report published in 2022, which combined PDU submitted data with HES and PEDW data. This result should therefore be interpreted with caution.

SECTION 10

How many children and young people with diabetes were assessed as requiring additional psychological support following assessment?



32.0% of those with Type 1 diabetes and known outcome of psychological assessment (n=21,827) were assessed as requiring additional psychological support outside of multidisciplinary team meetings compared to 39.0% in 2021/22.

41.4% of those with Type 2 diabetes and known outcome of psychological assessment (n=654) were assessed as requiring additional psychological support outside of multidisciplinary team meetings compared to 48.3% in 2021/22.

Spotlight on inequalities

NPDA results have shown persistent inequalities in HbA1c outcomes and use of diabetes-related technologies associated with ethnicity, deprivation, age, and sex. Presented here are three examples- extended analysis is presented separately and can be viewed and downloaded from the [NPDA annual reports page](#).

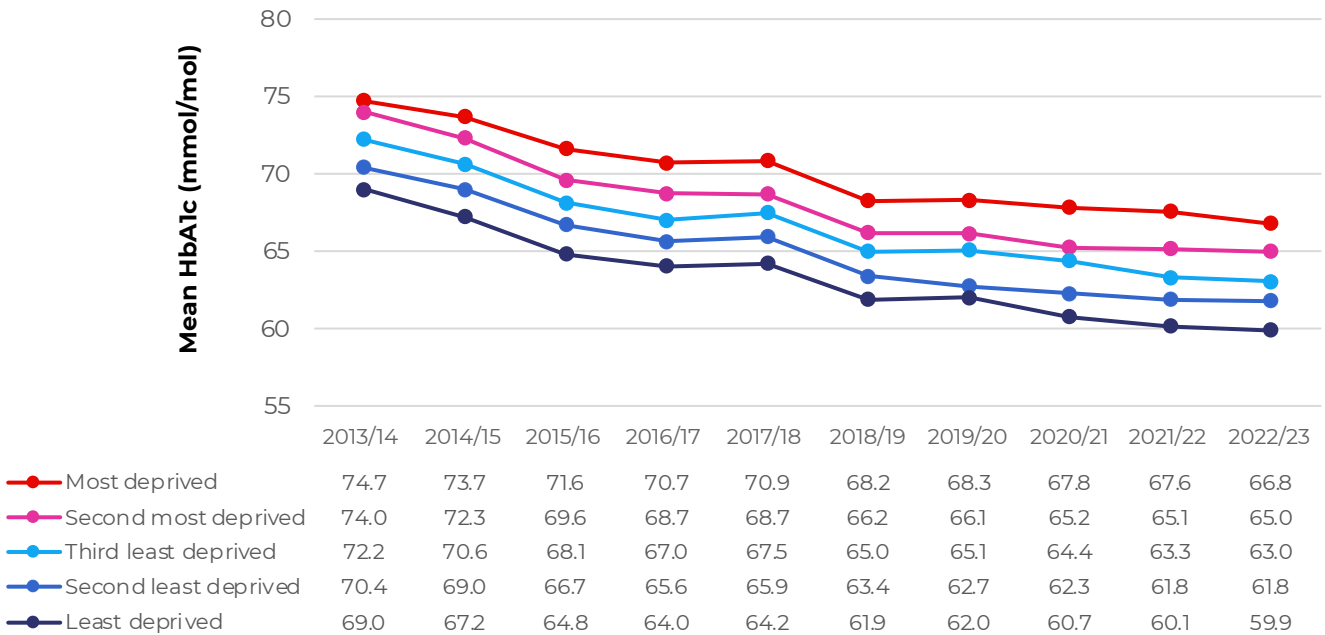


Figure 9: Mean HbA1c by deprivation quintile for children and young people with Type 1 diabetes, 2013 - 2023.

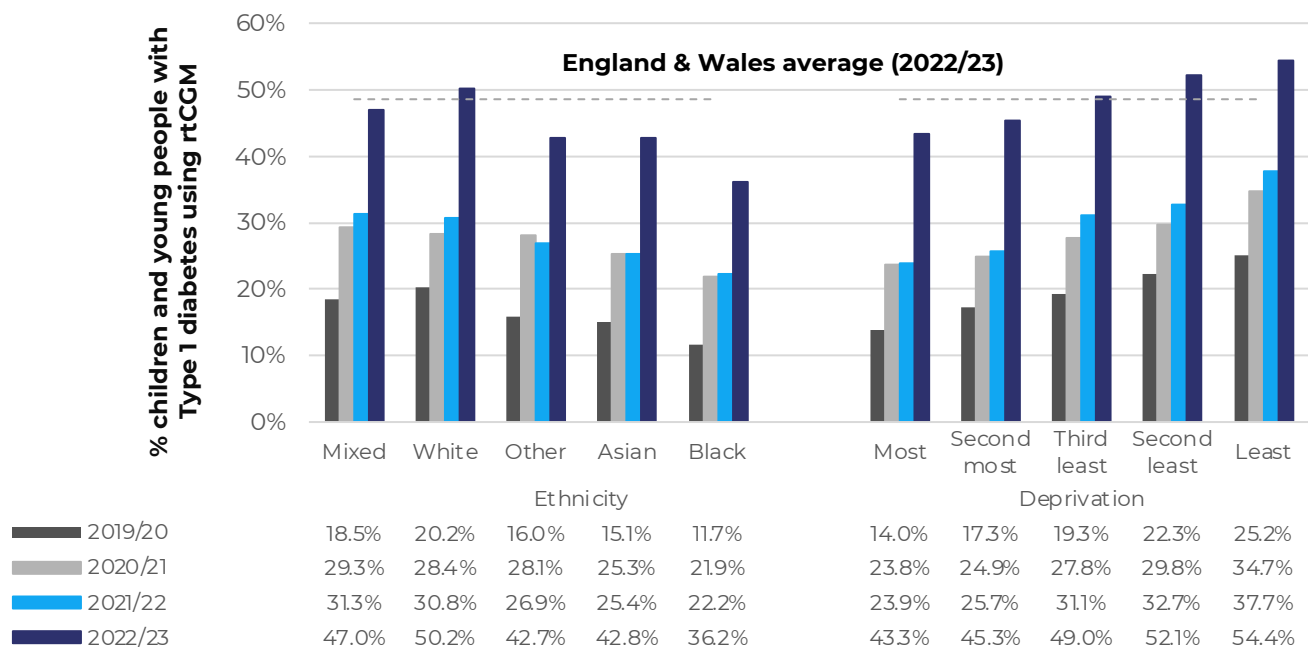


Figure 10: Use of rtCGM by ethnic category and deprivation quintile amongst children and young people with Type 1 diabetes: 2019/20- 2022/23

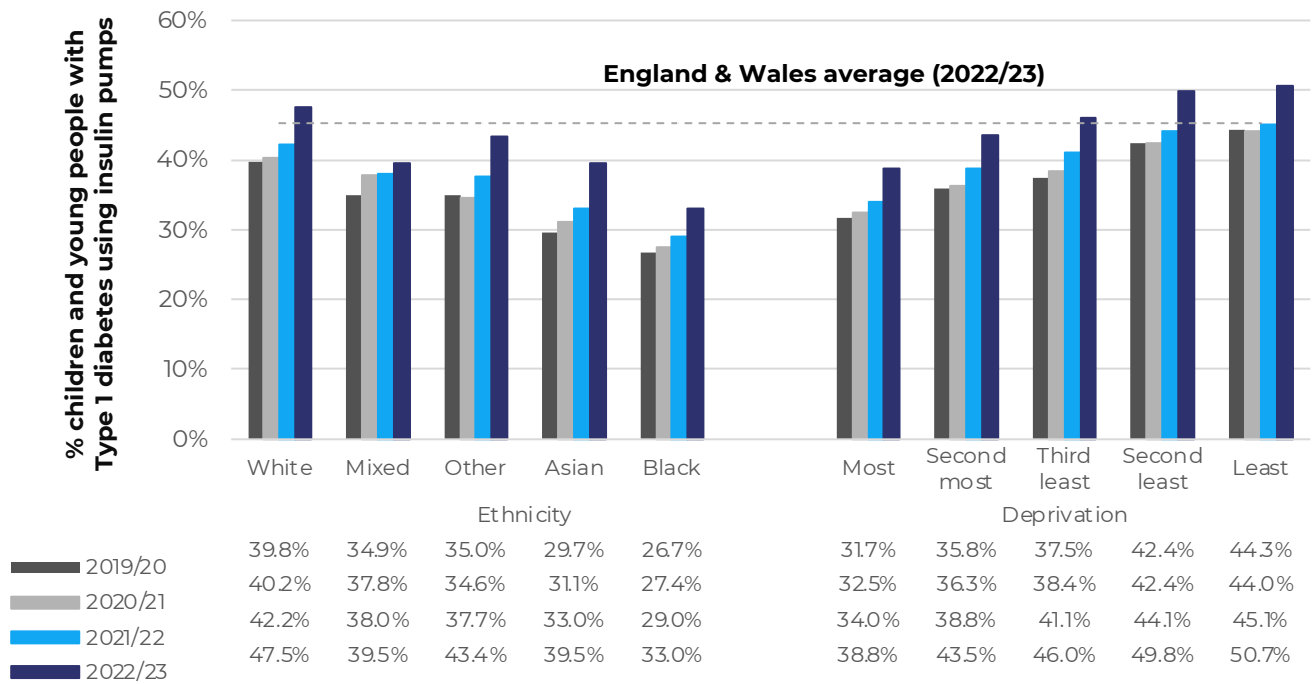


Figure 11: Use of insulin pump therapy by ethnic category and deprivation quintile amongst children and young people with Type 1 diabetes: 2019/20- 2022/23

Quality Improvement resources

The [RCPCH Diabetes Quality Improvement Website](#) provides multidisciplinary teams with the tools to identify, design and analyse their own interventions specific to the needs of the children and young people and their families that they care for.

A slide deck is available on the [NPDA reports page](#) for teams to customise with their own results, with prompts for team discussions around results, and links to relevant QI resources.

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**Healthcare Quality
Improvement Partnership (HQIP)**
Dawson House, 5 Jewry Street,
London EC3N 2EX



**Royal College of Paediatrics
and Child Health**
5-11 Theobalds Road,
London, WC1X 8SH