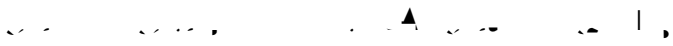




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The Royal College of Paediatrics and Child Health (RCPCH)

Foreword

Key terms used within this report

Artificial pancreas

An artificial pancreas is a system that automatically adjusts insulin doses based on real-time glucose readings. It typically consists of a continuous glucose monitor (CGM), a pump, and a control algorithm. The system aims to mimic the natural function of the pancreas, which releases insulin in response to rising blood glucose levels.

Continuous glucose monitor (CGM)

A continuous glucose monitor (CGM) is a small device that is inserted under the skin to measure glucose levels continuously. It provides real-time data on glucose levels, allowing for more frequent and accurate monitoring compared to traditional fingerstick tests.

DIY closed loop artificial pancreas

A DIY closed loop artificial pancreas is a custom-built system that combines a CGM, an insulin pump, and a control algorithm. It is designed to automatically adjust insulin doses based on real-time glucose readings, similar to a commercial artificial pancreas system.

Flash glucose monitoring

Flash glucose monitoring involves using a small device that is inserted into the skin to measure glucose levels. Unlike a CGM, it does not provide continuous data but allows for quick and easy glucose checks without the need for fingerstick tests.

HbA1c

HbA1c (glycated haemoglobin) is a blood test that measures the average glucose levels over the past 2-3 months. It is used to assess long-term blood sugar control and is a key indicator of diabetes management.

Insulin

Insulin is a hormone that regulates blood glucose levels. It is produced by the beta cells of the pancreas and is essential for the body to use glucose for energy. In people with diabetes, insulin levels are either low or absent, leading to high blood glucose levels.

Insulin pump therapy

Insulin pump therapy involves the use of a small pump that delivers insulin continuously through a tube inserted into the skin. The pump can be programmed to deliver a basal rate of insulin and can also be used to deliver bolus doses of insulin for meals or corrections.

Multiple daily injection insulin therapy

Multiple daily injection (MDI) insulin therapy involves the use of several injections of insulin throughout the day. This typically includes a long-acting insulin (basal) and several short-acting insulin (bolus) injections for meals and corrections.

Introduction

Key findings

Treatment regimen at diagnosis of Type 1 diabetes

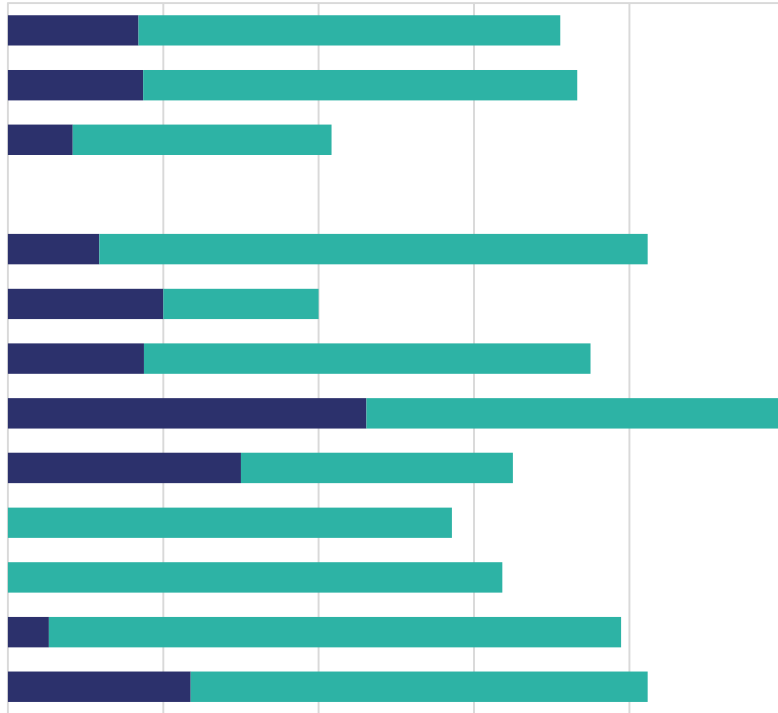
- 75% of children were prescribed insulin at diagnosis. This was a significant improvement on the 65% of children prescribed insulin at diagnosis in 2016-17.
- 25% of children were prescribed insulin at diagnosis. This was a significant improvement on the 15% of children prescribed insulin at diagnosis in 2016-17.
- 10% of children were prescribed insulin at diagnosis. This was a significant improvement on the 5% of children prescribed insulin at diagnosis in 2016-17.
- 5% of children were prescribed insulin at diagnosis. This was a significant improvement on the 2% of children prescribed insulin at diagnosis in 2016-17.
- 2% of children were prescribed insulin at diagnosis. This was a significant improvement on the 1% of children prescribed insulin at diagnosis in 2016-17.
- 1% of children were prescribed insulin at diagnosis. This was a significant improvement on the 0% of children prescribed insulin at diagnosis in 2016-17.

Initiating and discontinuing insulin pump therapy

- 10% of children initiated insulin pump therapy. This was a significant improvement on the 5% of children who initiated insulin pump therapy in 2016-17.

Figure 2: Typical wait time for insulin pump initiation following approval by country and region, 2017/18

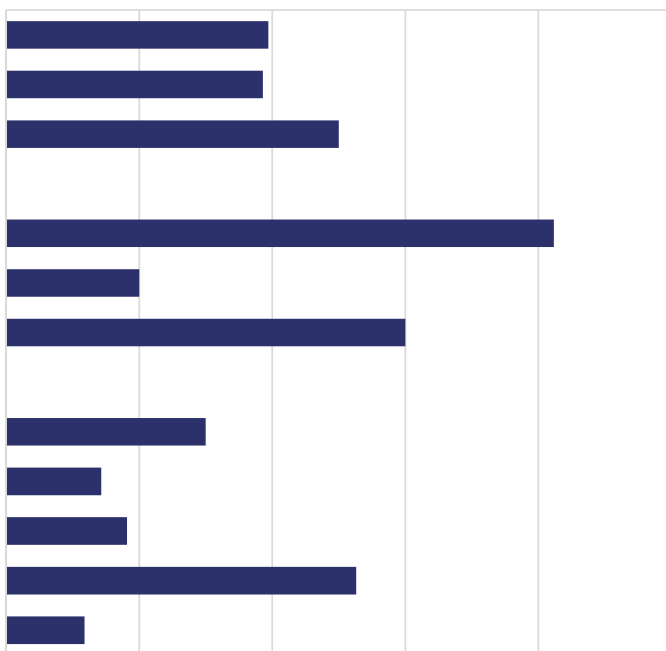
Figure 2: Typical wait time for insulin pump initiation following approval by country and region, 2017/18



Insulin pump usage and support

Figure 3: Percentage of PDUs with a dedicated insulin pump therapy clinic by country and region, 2017/18

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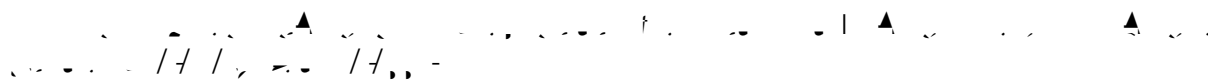


Figure 4: Case mix adjusted mean HbA1c and percentage of children and young people using an insulin pump by PDU, 2017/18

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Figure 8: Median HbA1c of children and young people with Type 1 diabetes using CGM or not by region and country, 2017/18

Figure 8: Median HbA1c of children and young people with Type 1 diabetes using CGM or not by region and country, 2017/18

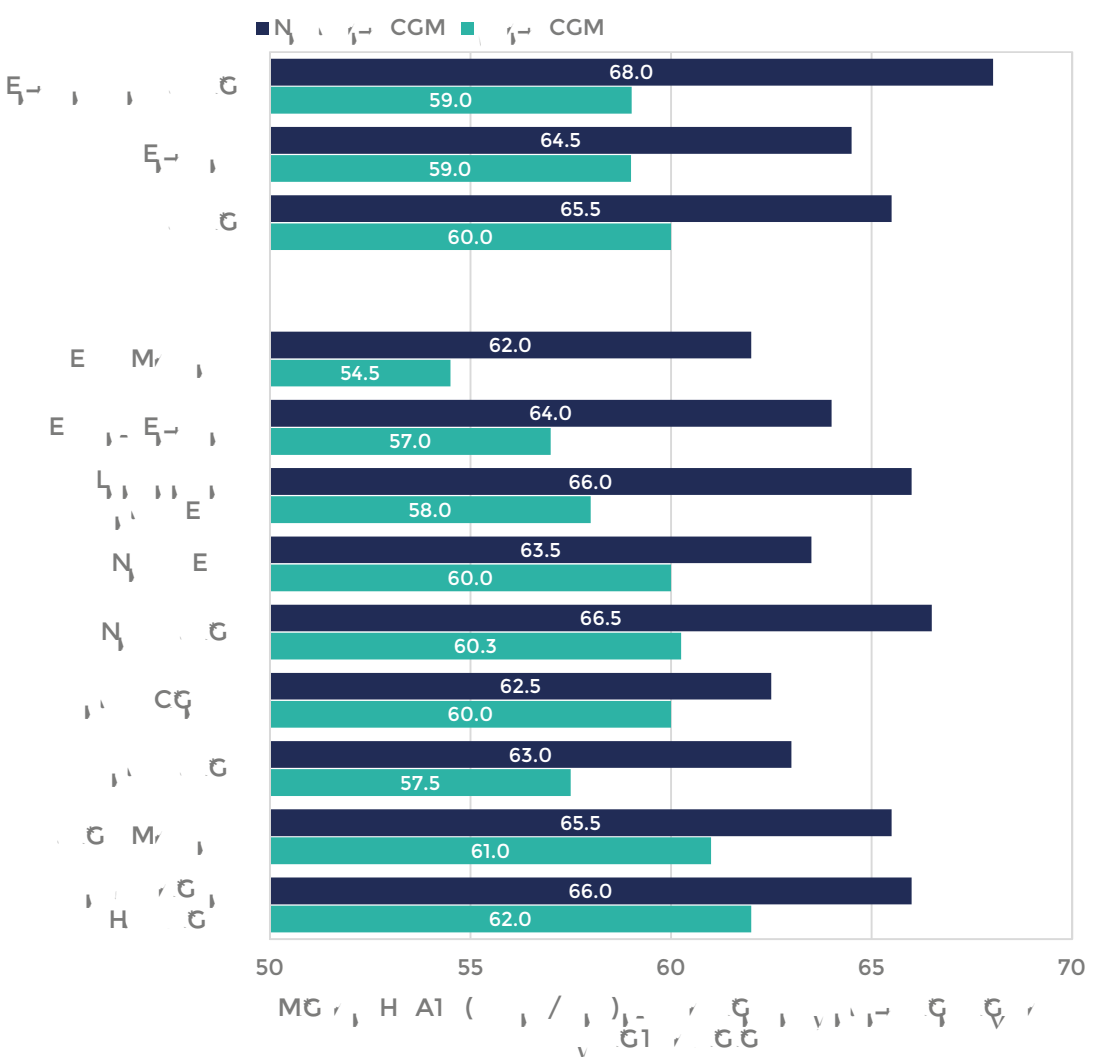


Figure 8: Median HbA1c of children and young people with Type 1 diabetes using CGM or not by region and country, 2017/18

Figure 8: Median HbA1c of children and young people with Type 1 diabetes using CGM or not by region and country, 2017/18

Table 1: Results of regression analysis of mean HbA1c by treatment regimen compared to MDI alone taking into account measurable socio-demographic co-factors.

Variable	Change in mean HbA1c (mmol/mol) (95% CI)	P-value
Treatment regimen and CGM usage (cf to MDI alone)		
Insulin pump therapy	-0.5 (0.1, -0.9)	0.01
Insulin pump therapy with CGM usage	-0.8 (0.2, -1.6)	<0.001
Insulin pump therapy with CGM usage (not using CGM)	-0.3 (0.1, -0.7)	0.001
Ethnic group (cf White)		
Black African	0.3 (0.1, 0.5)	<0.001
Black Caribbean	0.2 (0.1, 0.3)	<0.001
Black African/Caribbean	0.2 (0.1, 0.3)	<0.001
Other ethnicities	0.1 (0.0, 0.2)	0.001
White	0.0 (0.0, 0.0)	0.999
Other ethnicities (cf White)	0.1 (0.0, 0.2)	0.001
Black African (cf White)	0.3 (0.1, 0.5)	<0.001
Black Caribbean (cf White)	0.2 (0.1, 0.3)	<0.001
Black African/Caribbean (cf White)	0.2 (0.1, 0.3)	<0.001
Other ethnicities (cf White)	0.1 (0.0, 0.2)	0.001

Discussion

The findings of this audit highlight the need for continued investment in diabetes-related technologies. The audit identified a significant gap in the availability of continuous glucose monitoring (CGM) systems, particularly in the community setting. This is a key area for improvement, as CGM is essential for achieving optimal glycaemic control and preventing complications. The audit also identified a need for improved training and support for healthcare professionals and patients in the use of these technologies.

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The audit identified several areas for improvement in the use of diabetes-related technologies. In the area of insulin management, the audit found that many children were not receiving the most appropriate insulin regimen for their needs. This was often due to a lack of regular reviews and updates to their insulin prescriptions. The audit also identified a need for better education and training for healthcare professionals on the latest insulin technologies and delivery devices. Improving the coordination and communication between different healthcare professionals involved in the care of children with diabetes was also a key finding. This included the need for better sharing of information and resources between general practitioners, paediatric endocrinologists, diabetes nurses, and dietitians.

The audit also highlighted the importance of involving children and young people in decisions about their diabetes care. Many children were not fully aware of their condition or the importance of adhering to their treatment plans. Improving patient education and self-management skills was identified as a priority. This included providing age-appropriate information and resources to help children understand their diabetes and make informed choices about their care. The audit also identified a need for better support and resources for children and young people living with diabetes, including access to specialist services and peer support groups.

Overall, the audit identified a need for a more holistic and coordinated approach to the care of children with diabetes. This included addressing the needs of the child as a whole, not just their diabetes, and involving them in decisions about their care. Improving the use of diabetes-related technologies and ensuring that children have access to the latest and most appropriate care was a key goal of the audit. The audit also identified a need for better education and training for healthcare professionals and improved coordination and communication between different healthcare professionals.

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Conclusion

The audit identified several areas for improvement in the use of diabetes-related technologies. In the area of insulin management, the audit found that many children were not receiving the most appropriate insulin regimen for their needs. This was often due to a lack of regular reviews and updates to their insulin prescriptions. The audit also identified a need for better education and training for healthcare professionals on the latest insulin technologies and delivery devices. Improving the coordination and communication between different healthcare professionals involved in the care of children with diabetes was also a key finding. This included the need for better sharing of information and resources between general practitioners, paediatric endocrinologists, diabetes nurses, and dietitians.

Recommendations

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Data tables

Table 1: Summary of audit questions and data items. The table lists 10 audit questions (Q no.) and their corresponding data items, along with the number of patients in England and Wales, England, and Wales for each question.

Q no.	Question	Data item	England and Wales	England	Wales
1	1. How many patients had a blood glucose monitor (BGM) in the last 12 months?	Number of patients with a BGM in the last 12 months	1,234	1,100	134
2	2. How many patients had a continuous glucose monitor (CGM) in the last 12 months?	Number of patients with a CGM in the last 12 months	567	500	67
3	3. How many patients had a BGM in the last 12 months and a CGM in the last 12 months?	Number of patients with both BGM and CGM in the last 12 months	123	110	13
4	4. How many patients had a BGM in the last 12 months and a CGM in the last 6 months?	Number of patients with both BGM and CGM in the last 6 months	89	80	9
5	5. How many patients had a BGM in the last 12 months and a CGM in the last 3 months?	Number of patients with both BGM and CGM in the last 3 months	45	40	5
6	6. How many patients had a BGM in the last 12 months and a CGM in the last 1 month?	Number of patients with both BGM and CGM in the last 1 month	23	20	3
7	7. How many patients had a BGM in the last 12 months and a CGM in the last 1 week?	Number of patients with both BGM and CGM in the last 1 week	12	10	2
8	8. How many patients had a BGM in the last 12 months and a CGM in the last 24 hours?	Number of patients with both BGM and CGM in the last 24 hours	6	5	1
9	9. How many patients had a BGM in the last 12 months and a CGM in the last 12 hours?	Number of patients with both BGM and CGM in the last 12 hours	3	2	1
10	10. How many patients had a BGM in the last 12 months and a CGM in the last 6 hours?	Number of patients with both BGM and CGM in the last 6 hours	1	1	0

Q no.	Question	Data item	England and Wales	England	Wales
1	What percentage of children with type 1 diabetes have a CGM?	CGM use in children with type 1 diabetes		//	
		CGM use in children with type 1 diabetes (England)	77%	77%	77%
		CGM use in children with type 1 diabetes (Wales)	77%	77%	77%
2	What percentage of children with type 1 diabetes have a CGM?	CGM use in children with type 1 diabetes		/	
		CGM use in children with type 1 diabetes (England)	77%	77%	77%
		CGM use in children with type 1 diabetes (Wales)	77%	77%	77%

Acknowledgements

Report Editors

- Dr Sarah Hilditch, National Paediatric Diabetes Audit
- Dr Sarah Hilditch, National Paediatric Diabetes Audit
- Dr Sarah Hilditch, National Paediatric Diabetes Audit

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HQIP Support

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