

National Diabetes Audit

Key findings about the quality of care for children and young people with diabetes in England and Wales

Report for the audit period 2005-2006



Prepared in association with:



The collection of data for the National Diabetes Audit from children in Wales has been coordinated through the Brecon Group. This group, set up over 10 years ago, comprises 14 centres in Wales where children with diabetes are cared for and 3 centres along the border between Wales and England. The Brecon group is an all Wales Paediatric Diabetes interest group and keeps a central register of all children living in Wales with a diagnosis of diabetes. Currently we have 1,053 children registered under the age of 16 years receiving treatment. The existence of the register and a central data co-ordinator in Wales has enabled us, over the last 5 years, to perform successful audit amongst centres in Wales. This has also lead to an easier identification of children for submission of data to the National Diabetes Audit which ultimately will allow us to compare outcomes of care from children in Wales with other parts of the UK. Congratulations should go to all centres in Wales who have contributed data to the National Diabetes Audit and well done for all your hard work.



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This report presents the main findings from the third year of the National Diabetes Audit of paediatric specialist units in England and Wales. The report provides key findings about the quality of care for children and young people with diabetes in England and Wales. It also provides recommendations for both national and local organisations based on the analysis of the audit data.

The Full Report, the Executive Summary and Abridged Report about the quality of care for people with diabetes in England and Wales will compliment this report. The Full Report is available as a PDF file download only and can be found at: <http://www.ic.nhs.uk/our-services/improving-patient-care/the-national-clinical-audit-support-programme-ncasp/audit-reports/diabetes>. For further information about the report contact The Information Centre for health and social care's (The IC) Contact Centre 0845 300 6016 or email: enquiries@ic.nhs.uk quoting document reference 19040507.

The Executive Summary is available to download from: <http://www.ic.nhs.uk/our-services/improving-patient-care/the-national-clinical-audit-support-programme-ncasp/audit-reports/diabetes>. Printed copies of the report can be ordered from The IC's Contact Centre 0845 300 6016 or email: enquiries@ic.nhs.uk quoting document reference 05070107.

The Abridged Report is available to download from: <http://www.ic.nhs.uk/our-services/improving-patient-care/the-national-clinical-audit-support-programme-ncasp/audit-reports/diabetes>. Printed copies of the report can be ordered from The IC's Contact Centre 0845 300 6016 or email: enquiries@ic.nhs.uk quoting document reference 19040707.

Electronic copies of this report can be found at: <http://www.ic.nhs.uk/our-services/improving-patient-care/the-national-clinical-audit-support-programme-ncasp/audit-reports/diabetes>. Printed copies of this report can be ordered from The IC's Contact Centre 0845 300 6016 or email: enquiries@ic.nhs.uk quoting document reference 19040607.

For further information about this report, contact The IC's Contact Centre 0845 300 6016 or email: enquiries@ic.nhs.uk.

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And finally, thanks to all those who have worked hard to encourage participation and submit data to the audit, including clinicians, managers, diabetes leads, clinical audit, service improvement and administrative staff. Their efforts and commitment have contributed to the ongoing development of the NDA at a particularly difficult period of NHS reorganisation.

Foreword

This is the third report prepared by the National Diabetes Audit team based on information submitted by paediatric units in England and Wales. It is encouraging that the number of centres looking after young people with diabetes and the number of children whose data are being submitted is continuing to increase.

However, in some places there still remain difficulties which, for one reason or another, prevent data being submitted and we hope to be able to address these in the foreseeable future, possibly by making a suitable database available on the internet and therefore not dependent on individual IT departments.

The recent publication of the document 'Making Every Young Person with Diabetes Matter' by the Department of Health's Children and Young Person's Working Group will hopefully help to strengthen the argument in favour of making available an environment in which data can be more easily gathered and submitted.

One major issue which has arisen during the course of the year is how best to make the information which has been submitted most useful to those units that have participated. It is axiomatic that there is no point in going to great efforts to collect and submit data if it is not possible to benefit from the information provided and to be able to 'benchmark' against other units. This has raised the question of how best to enable individual units to compare their own data to those of others since, in past years, it has often been difficult for units to identify themselves as a result of the anonymisation process built into the report. This has raised the issue of 'de-anonymisation'. The results of the survey conducted to investigate how much this course was favoured have shown that, whilst most are in favour, some units have been wary of de-anonymisation. As a result we have not gone down this road for this year's report pending further discussion.

It is to be hoped that there will be an increasing number of submissions for future years and that we can work towards getting 100 per cent of data in order to make these as meaningful as possible. We must bear in mind that the principal aim of the NDA is to improve the quality of life and long-term prospects of children and young people with diabetes as much as possible by providing them with first class care and support. We can only know if this is being achieved if we gather the information needed.



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Summary of key findings

This is the third paediatric report of the National Diabetes Audit (NDA) and presents the main findings for the paediatric analysis for England and Wales. The audit is commissioned by the Healthcare Commission and was developed in partnership with Diabetes UK. Clinical and professional guidance is provided by the NDA Paediatric Advisory Group, which has a vital role in guiding the paediatric audit. The membership of the Paediatric Advisory Group can be found in Appendix A.

A number of important findings have been identified from the 2005-2006 audit data, based on the paediatric units that participated in the audit.

- There has been a 65 per cent increase in participation in the audit, with information received on 12,924 children and young people with diabetes in England and Wales.
- On average, 8.71 per cent of children and young people under the age of 16 experienced at least one episode of diabetic ketoacidosis in the audit period. This is a slight increase on the 2004-2005 audit result of 8.2 per cent. Again, more girls than boys experience ketoacidosis.
- Care process data have been submitted to the 2005-2006 audit from English and Welsh specialist paediatric units. Overall, 77.31 per cent of children and young people have had their HbA1c recorded at least once in the audit period.
- There is a year-on-year increase in the numbers of children and young people who have an HbA1c recording. This is across all age bands.
- Not All Care Processes are recommended for all ages. However, only 16 per cent of those aged 12-15 years old received eye and foot exams and 17 per cent had their cholesterol checked in the audit year. This is similar to the findings from the 2004-2005 audit and for cholesterol is a reduction from the first year of the audit (22 per cent in 2003-2004).
- More males than females achieve the National Institute for Health and Clinical Excellence (NICE) guidelines for HbA1c of <7.5 per cent and cholesterol levels of <5 mmol/litre. This pattern is found in children and young people aged 12 to 24 years old.
- Overall, 79.03 per cent of children and young people achieve the NICE cholesterol guideline of <5.0mmol/litre.
- 30 per cent of children and young people have HbA1c recordings of >9.5 per cent. More females than males have HbA1c readings of >9.5 per cent. This pattern is found in children and young people aged 12 to 24 years old.

Introduction

Type 1 diabetes is one of the most frequent chronic diseases of children and young people. The needs of children and young people with type 1 diabetes and their families are different from the needs of adults with type 1 diabetes and as such, the way that services are delivered will differ from adult services.

The Audit Commission in Wales: *'Diabetes Services in Wales'*¹ found that "...care for children and young people with diabetes is provided primarily by specialist staff based in acute hospitals. Specialist paediatric diabetic nurses play a crucial role in the delivery of diabetes services to children and young people."

The prevalence of all types of diabetes is increasing in children and young people. *'Making Every Young Person with Diabetes Matter'*² asserts that the UK has the highest number of children and young people diagnosed with diabetes and the lowest number of children achieving good diabetes control.

Current estimates of the diabetic population of children and young people suggest that there are approximately 25,000 people with type 1 diabetes under the age of 25. Furthermore, Ehtisham et al suggest that there are as many as 1,400 children and young people with type 2 diabetes in the UK.³

Research by Gardner SG, Bingley PJ, Sawtell PA, Weeks S, Gale EAM and the BOX Study Group⁴ demonstrated a rising incidence of type 1 diabetes in children across all age bands over a 20 year period, but was most rapid in children under 5 years old.

There are a number of less common types of diabetes that particularly affect children and young people. Of these, the NDA collects data on Maturity Onset Diabetes of the Young (MODY). The estimated prevalence for MODY is 1-2 per cent.

NICE guidance addresses the diagnosis and management of children and young people with type 1 diabetes⁵ it covers:

- initial management at diagnosis (including consideration of admission criteria and initial insulin regimens)
- continuing care of children and young people with type 1 diabetes
- ongoing monitoring of glycaemic control
- management of hypoglycaemia and hypoglycaemic coma
- prevention and management of diabetic ketoacidosis (including the management of intercurrent illness)
- peri-operative management of children and young people with type 1 diabetes
- surveillance for complications
- the special needs of young people (adolescents) and the interface between paediatric and adult services.

The Diabetes National Service Frameworks (NSFs)^{6,7} for England and Wales also set standards for the delivery of care to children and young people with diabetes.

Diabetes NSF – standard 5

“All children and young people with diabetes will receive consistently high-quality care and they, with their families and others involved in their day-to-day care, will be supported to optimise control of their blood glucose and their physical, psychological, intellectual, educational and social development.”

Diabetes NSF – standard 6

“All young people with diabetes will experience a smooth transition of care from paediatric diabetes services to adult diabetes services, whether hospital or community based, either directly or via a young people’s clinic. The transition will be organised in partnership with each individual and at an age appropriate to and agreed with them.”

What does the National Diabetes Audit measure?

The Paediatric National Diabetes Audit aims to provide answers to the following questions:

- how many children and young people with

diabetes are cared for in paediatric units?

- what is the annual rate of ketoacidosis for children and young people registered with diabetes?
- what proportions of children and young people with diabetes are getting the key processes of diabetes care?
- what proportions of children and young people with diabetes achieve treatment targets?

Complication information in the NDA for paediatric units focuses on diabetic ketoacidosis. In addition, information on care processes is gathered and analysed in a manner that is relevant for paediatric diabetes services. This is reviewed in more detail within the relevant sections of this report.

Each of the audit questions are discussed and the key findings from the 2005-2006 audit period are presented. Where appropriate, comparisons are made with data from the previous audit years of 2003-2004 and 2004-2005.

To undertake more detailed and locally based analyses, users should access the NDA toolkit directly.

The NDA provides free training on the use of the analysis toolkit and has developed a course solely for paediatric participants. For more information about the NDA and to register interest for the training please visit: <http://www.ic.nhs.uk/our-services/improving-patient-care/the-national-clinical-audit-support-programme-ncasp/diabetes/events>.

The NDA has worked to develop additional analyses for the paediatric data following guidance from the NDA Paediatric Advisory Group. The new analysis of median HbA1c is available in the analysis toolkit.

The project has also consulted with those involved in clinical care of children and young people about whether the analysis in the toolkit and in the annual report should use unit or hospital names. The majority would prefer to use unit names. The Paediatric Advisory Group will be taking this forward. In the interim, this report uses anonymised codes. Units can request a copy of their code by emailing: diabetes@ic.nhs.uk.

Participation

Many paediatric units are working predominantly with paper-based methods of record-keeping and to collect and submit data electronically in these circumstances has not been easy or straightforward. Ideally, information on the complete dataset should be submitted to the audit (see Appendix G). This is not always possible, especially for units that do not have supporting clinical IT systems. Because of this a number of units have submitted partial data and have provided information about registrations with limited information on care processes and treatment targets. The NDA has provided standardised forms in excel or access format that can be completed as part of the data submission process. These are available from the NDA web pages: <http://www.ic.nhs.uk/our-services/improving-patient-care/the-national-clinical-audit-support-programme-ncasp/diabetes>. The majority of paediatric units submit data to the NDA in this way. It is also possible to co-ordinate submission of data via district registers and central co-ordination; the Yorkshire network and Welsh units participate in the audit by this approach. For those units that have the TWINKLE IT system it is possible to submit data by use of an electronic extract. This is also possible with the DIAMOND IT system, which is in use in some paediatric units.

Prior to the National Diabetes Audit, Diabetes UK conducted a national audit of children (0-16 years) with diabetes for 2000, 2001 and 2002. A number of findings from the Diabetes UK audits provide useful benchmarks and are included for comparison.

In total, 102 paediatric units successfully submitted data to the 2005-2006 audit, 89 in England and 13 in Wales. When compared to the 28 units that took part in the first NDA in 2003-2004, it is clear that those involved in the care of children and young people with diabetes have made an enormous commitment and effort to participate. 25 paediatric units are registered for the audit, but have not managed to submit data this audit period. This compares to 29 paediatric units that registered but did not submit data in the 2004-2005 audit year.

There is no national record of specialist paediatric units in the UK that deliver diabetes care to children and young people. The NDA has been working with

the support of the NDA Paediatric Advisory Group and the National Diabetes Support Team (NDST) regional programme managers to identify and develop this information. This is an ongoing effort to ensure that the unit information is as accurate as possible. The analysis within this report is based on our work to date, which indicates that there are 198 specialist paediatric units delivering diabetes care in England and Wales.

Recommendation

It is recommended commissioners in England and Wales support specialist paediatric diabetes services with clinical IT systems that enable participation in national clinical audit to reduce the burden of data collection. Such systems should also ensure compatibility between paediatric, young people and adult services to support smooth transition of care.

Guidance on audit for commissioners can be found in 'Making Every Young Person with Diabetes Matter.'²

Recommendation

It is recommended that the Welsh Assembly continue to support the implementation of the diabetes NSF within Wales and encourage participation in national clinical audit within adult services in primary and secondary care.

Detailed analysis

Registrations

The NDA asks:

- **how many children and young people with diabetes are cared for in paediatric units?**

Children with diabetes receive the majority of their care in specialist paediatric units. This was also found by the 2007 DiabetesE⁸ report, which stated:

“Only 54 per cent of PCTs have guidelines for the management of children and young people with diabetes. Despite this, 80 per cent refer all children and young people on the day of diagnosis to a paediatrician with a special interest in diabetes and 98 per cent of children and young people have their long-term condition managed by such a paediatrician.”

Wales launched the All Wales Consensus Guidelines for the Management of Children and Young people with diabetes – Standards 5 and 6 of the National Service Framework in May 2007.

For the 2005-2006 audit year, 12,924 records were successfully submitted to the NDA by specialist paediatric units. This is an increase of 5,083 records from the previous audit year and represents a 65 per cent increase in data submission. There has been increased participation over the three years of the NDA in the paediatric audit (Figure 1).

Figure 1: Time trend: registration information from specialist paediatric units in England and Wales

	Registrations		
	2003-2004	2004-2005	2005-2006
England	3,484	7,073	11,713
Wales	0	768	1,211
(National Value)	3,484	7,841	12,924

In England, 11,713 records were successfully submitted from 89 specialist paediatric units. This represents a unit participation rate of 48 per cent (based on current information of 184 specialist paediatric units in England). In Wales, 1,211 records were submitted from 13 specialist paediatric units. This represents a unit participation rate of 93 per cent (based on information on 14 specialist paediatric units in Wales).

Overall, the NDA holds data on approximately 50 per cent of children and young people (0-24) in England and Wales with diabetes. In Wales, this rises to 93 per cent as almost all Welsh units have participated in the audit.

Figure 2: Registrations for paediatric units in England

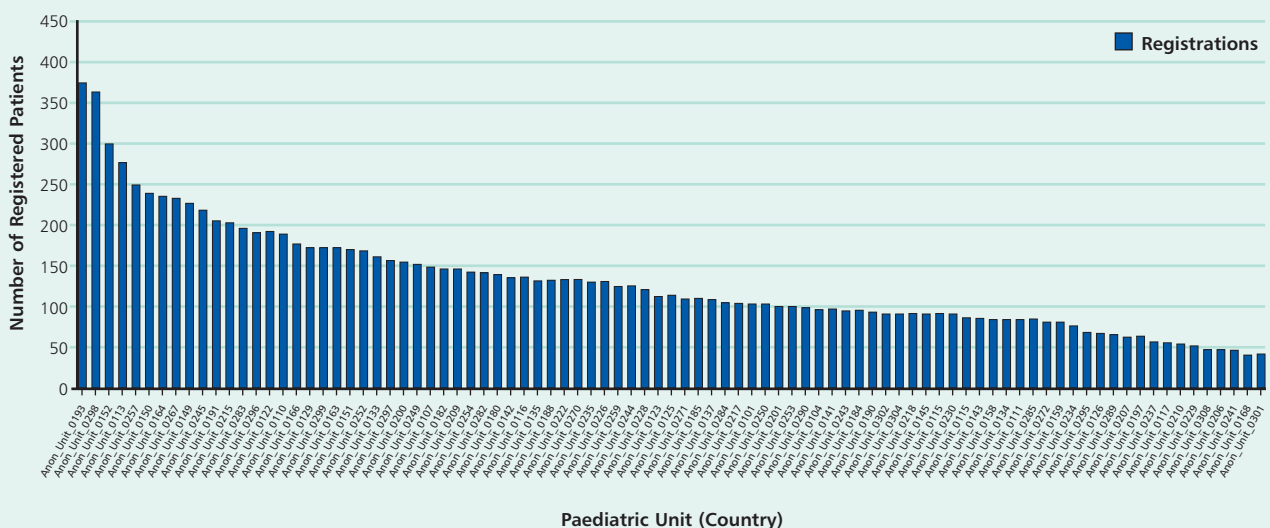
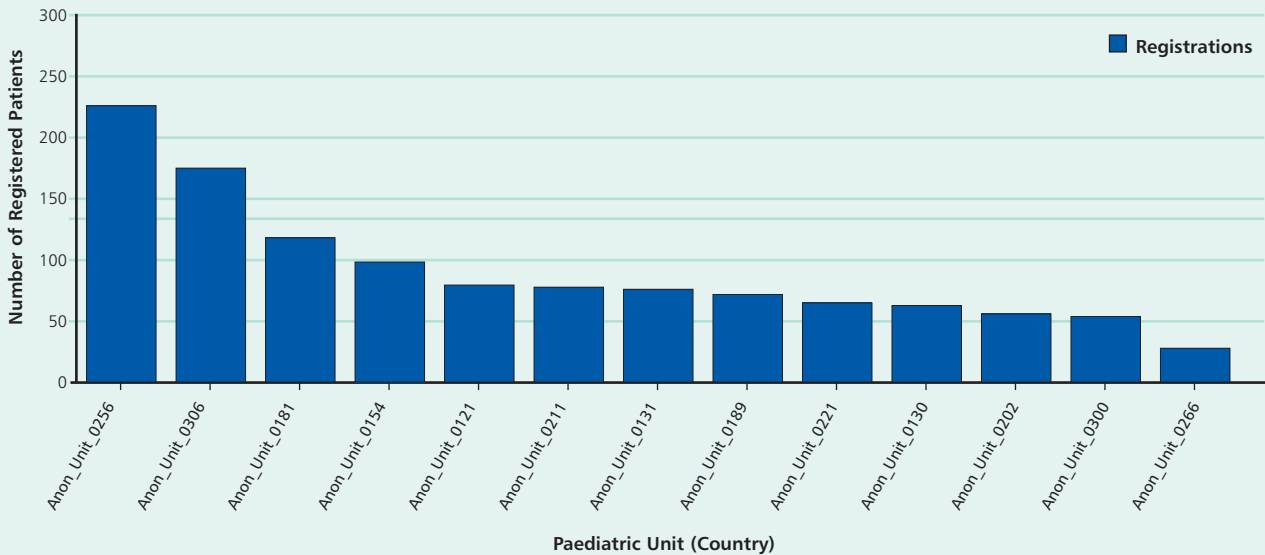


Figure 3: Registrations for paediatric units in Wales



In total, 102 Specialist Paediatric units across England and Wales submitted data to the audit which is a unit participation increase of 37 per cent from the previous audit year. Full details of the paediatric units and registration status can be found in Appendix C.

The number of successful records submitted to the NDA by individual specialist paediatric units ranges from 29 to 375, which is indicative of the variation in the size of diabetic caseload for specialist paediatric units in England and Wales.

Registrations and sex

The general distribution of diabetes prevalence by sex has not varied widely over the period that audits have been undertaken by either Diabetes UK (2000-2002) or the NDA (2003-2004 onwards).

Combined data analysis for registrations and sex from England and Wales can be seen as a time trend in Figure 4. Welsh paediatric units did not participate in the first year of the NDA.

Figure 4: Time trend: registration information by sex: England and Wales combined



The time trend analysis follows the same pattern as in the first two years of the audit. There are slightly more males registered (51.45 per cent) than females (48.39 per cent).

The time trend for total registrations is illustrated in Figure 5.

Figure 5: Time trend: registration information from specialist paediatric units in England and Wales

Sex	Registrations					
	2003-2004		2004-2005		2005-2006	
Not Known	0		1	<1%	17	0.13%
Male	1,785	51.2%	4,006	51.0%	6,650	51.4%
Female	1,699	48.7%	3,833	48.8%	6,254	48.3%
Not Specified	0		1	<1%	3	0.02%
(National Value)	3,484		7,841		12,924	

* The affects of rounding may skew the percentage totals

The highest numbers of registrations are found in those aged 12 to 15 years, which was also the finding of the 2004-2005 audit (Figure 7).

Figure 7: Time trend: registration numbers by current age band: combined totals from England and Wales

Age Band	Registrations					
	2003-2004		2004-2005		2005-2006	
0 - 4 yrs	174	4.9%	405	5.2%	633	4.9%
5 - 11 yrs	1,353	38.8%	2,808	35.8%	4,462	34.5%
12 - 15 yrs	1,363	39.1%	3,057	38.9%	5,075	39.3%
16 - 24 yrs	594	17.0%	1,567	19.9%	2,741	21.2%
No data	0		4	<1%	13	<1%
(National Value)	3,484		7,841		12,924	

* The affects of rounding may skew the percentage totals

As anticipated, the lowest numbers of registrations are in those aged 0 to 4 years. This also follows the same trend as the 2004-2005 audit.

Registrations and age

The combined analysis for England and Wales, registrations by current age is illustrated in Figure 6 (below).

Figure 6: Registrations by current age band: combined totals for England and Wales

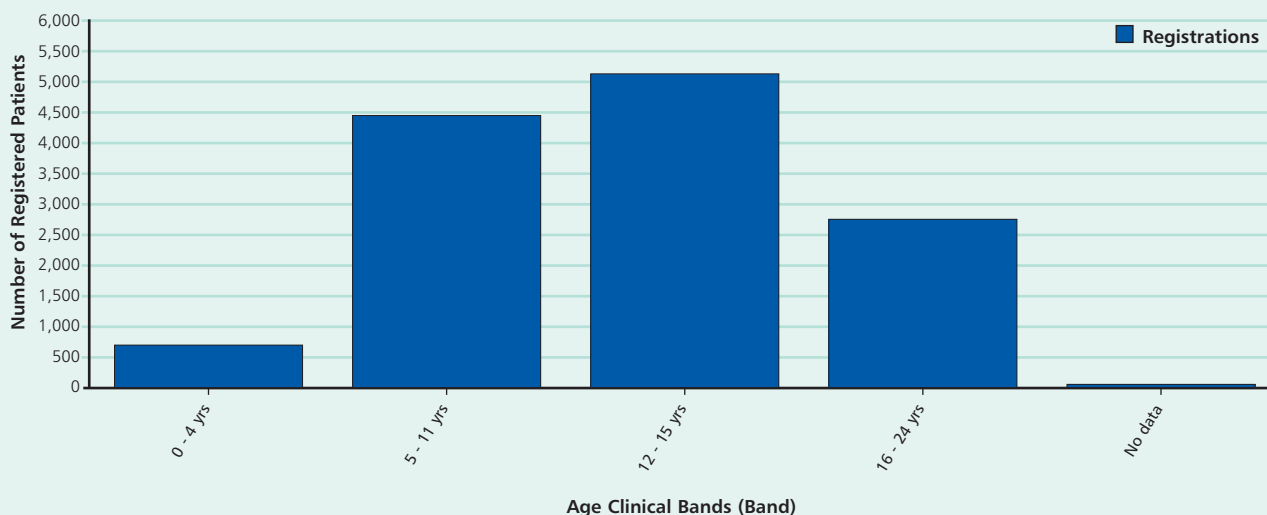


Figure 8: Registration age bands: totals and percentages for England and Wales

Age Band	England		Wales		Total	
0 - 4 yrs	566	5%	67	6%	633	5%
5 - 11 yrs	4,087	35%	375	31%	4,462	35%
12 - 15 yrs	4,649	40%	426	35%	5,075	39%
Under 16s subtotal	9,302	79%	868	72%	10,170	79%
16 - 24 yrs	2,400	20%	341	28%	2,741	21%
Unknown Age	11		2		13	
Total	11,713		1,211		12,924	

Registrations and ethnicity of children with diabetes

Ethnic origin was recorded for 66.13 per cent of registrations submitted from paediatric units in England. This is a decrease from the 2004-2005 audit figure of 70 per cent.

Ethnic origin was recorded for 84.55 per cent of registrations submitted from paediatric units in Wales. This was also a decrease from the 2004-2005 audit figure of 100 per cent.

Combined analyses for both England and Wales shows that 67.85 per cent of data submitted have a recording of ethnic origin (a decrease from last year of 72.52 per cent). This change may be due to difficulties experienced by paediatric units in submitting the full dataset to the audit. However, units should ensure that ethnicity is recorded for all children and young people with diabetes. Understanding of ethnicity is vital to developing appropriate care programmes.

There are only slight differences in the percentages of children and young people with diabetes (under 16 years old) across ethnic categories between the 2004-2005 audit year and the 2005-2006 audit year. As in the 2004-2005 audit year, the highest percentage of children and young people identify as White (62 per cent), with 3 per cent identifying as Asian and 1 per cent identifying as Black.

Figure 9: Time trend: registration by ethnicity 2004-2005 to 2005-2006: <16 years, for England and Wales

Indicator	Registrations			
	2004-2005		2005-2006	
White	4,002	64%	6,293	62%
Asian	173	3%	270	3%
Black	95	2%	111	1%
Other	161	3%	169	2%
Not stated	1,839	29%	3,327	33%
Total	6,270		10,170	

* The affects of rounding may skew the percentage totals

Type of diabetes in children <16 years

The NDA data shows that there are small but increasing numbers of children and young people being diagnosed with type 2 diabetes and Maturity Onset Diabetes of the Young (MODY).

However, the increasing numbers of children identified with MODY are a fluctuating percentage of the overall numbers of children with diabetes over the three audit years. This could be a function of increasing numbers of records that are submitted to the audit (Figure 10 overleaf).

This may also result in the slight fluctuations in the percentages across all types of diabetes over the three audit years.

The highest number of registrations in children and young people <16yrs is for type 1 diabetes (94 per cent). This follows the same trend as the previous three audit years (Figure 10 overleaf).

Following the same trend as in the 2004-2005 audit, the number of children with type 2 diabetes increases with age and peaks in children and young people aged between 12 and 15, although the overall numbers are still small.

Figure 10: Time trend: diabetes type: specialist paediatric units in England and Wales <16

Type of diabetes	Registrations 2003-2004		Registrations 2004-2005		Registrations 2005-2006	
	Numbers of children <16	Percentage	Numbers of children <16	Percentage	Numbers of children <16	Percentage
Type 1	2,722	94.2%	6,078	96.9%	9,513	93.5%
Type 2	37	1.3%	73	1.2%	122	1.2%
MODY	3	<1%	7	<1%	23	<1%
Other specified	114	3.9%	100	1.6%	351	3.5%
Not specified	14	<1%	12	<1%	161	1.6%
(National Value)	2,890		6,270		10,170	

* The affects of rounding may skew the percentage totals

Figure 11: Type of diabetes by ethnic group for children and young people

	White		Asian		Black		Other		Not Stated		Total
	Patient numbers	%	Patient numbers	%	Patient numbers	%	Patient numbers	%	Patient numbers	%	
Under 16											
Type 1	5,956	94.64%	214	79.26%	95	85.59%	154	91.12%	3,094	93.00%	9,513
Type 2	48	0.76%	19	7.04%	7	6.31%	4	2.37%	44	1.32%	122
MODY	15	0.24%	0		0		2	1.18%	6	0.18%	23
Other	143	2.27%	27	10.00%	8	7.21%	8	4.73%	165	4.96%	351
Not Specified	131	2.08%	10	3.70%	1	0.90%	1	0.59%	18	0.54%	161
Under 16 Sub Total	6,293		270		111		169		3,327		10,170
Aged 16-24											
Type 1	1,659	94.69%	70	74.47%	22	78.57%	42	87.50%	747	91.21%	2,540
Type 2	31	1.77%	16	17.02%	5	17.86%	3	6.25%	20	2.44%	75
MODY	1	0.06%	0		0		0		1	0.12%	2
Other	46	2.63%	7	7.45%	1	3.57%	3	6.25%	51	6.23%	108
Not specified	15	0.86%	1	1.06%	0		0		0		16
16-24 Sub Total	1,752		94		28		48		819		2,741
No data (all ages)	5		0		0		0		8		13
Total	8,050		364		139		217		4,154		12,924

The highest numbers of registrations for type 1 diabetes are in the white ethnic category (5,956).

The highest numbers of registrations for type 2 diabetes are also in the white ethnic category (48). However, the findings for the 2005-2006 audit show that there are proportionally more BME children and young people with type 2 diabetes than white children, although the numbers are still small (Figure 11). This was also found in the 2003-2004 audit.

Deprivation for children <16 years

The postcode of the person with diabetes is used to derive a ward code. This is then used to assign an IMD 2004 deprivation score. Quintile 1 represents the least deprived areas and Quintile 5 the most deprived areas. Where it is not possible to map from postcode to ward code it is recorded as 'no data'.

The analysis is based on small numbers, so firm conclusions are difficult to draw. However, the only consistent trend is a reduction in the percentage of children and young people with diabetes across the audit years in Quintile 5. However, changes may be influenced by the location of the participating paediatric units.

Generally, as in the 2004-2005 audit the diabetic population is fairly evenly spread across all the quintiles.

Figure 12: Time trend: deprivation quintiles <16 years

Deprivation Quintile	Percentage of Registrations		
	2003-2004	2004-2005	2005-2006
No data	8%	16%	9%
Quintile 1	16%	14%	18%
Quintile 2	18%	19%	18%
Quintile 3	16%	16%	19%
Quintile 4	18%	15%	17%
Quintile 5	25%	20%	19%

*These figures may be affected over the audit years due to changes in deprivation analysis.

Age at diagnosis of diabetes

The average age at diagnosis in the 2005-2006 audit year was 7.70 years old. There is little difference from the 2004-2005 age at diagnosis of 7.69 years old.

The data on mean age at diagnosis by paediatric unit are available in Appendix D.

Figure 13: Mean Age at diagnosis by paediatric unit

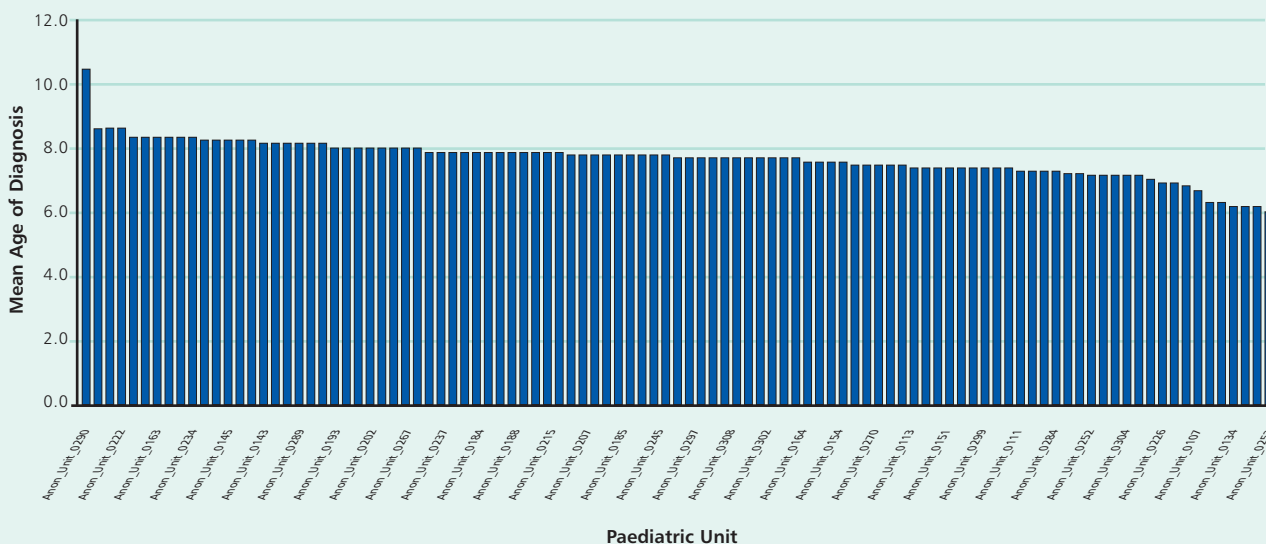


Chart for illustrative purposes only: full details are contained within Appendix D

The National Diabetes Audit enables the Yorkshire Paediatric Diabetes Network to evaluate the outcome of patient care



Participation in the National Diabetes Audit has helped the Yorkshire Paediatric Diabetes Network achieve the standards of care set out in the National Service Framework for Diabetes.

The Network and Register

The Yorkshire Paediatric Diabetes Network, a collaboration of 16 regional units, operates in partnership with the Yorkshire Register of Diabetes in Children and Young People.

This specialist population based register contains demographic and clinical details for more than 5,600 children and young people diagnosed with diabetes since 1978. It relies on data input from all 16 regional units.

Heading up this project is Professor Patricia McKinney at the University of Leeds, who works in partnership with Dr Fiona Campbell, Consultant Paediatrician and Clinical Director at St James's University Hospital Leeds and clinical colleagues throughout Yorkshire. Funding for the register is provided by the Department of Health although additional resources for data processing, analysis and dissemination are provided by the Paediatric Epidemiology Group, University of Leeds.

The Register had undertaken three regional clinical audits pre-2005 and now facilitates the submission of data to the National Diabetes Audit. This relies on major collaborative partnerships across all specialisms within the units and has proved extremely fruitful. During 2005-2006, the Register facilitated the submission of audit data to the National Diabetes Audit on behalf of the majority of clinics in Yorkshire.

Efficient data collection

Key to clinical participation, and the effective submission of data, is the collaboration between academics and clinicians and general local support such as diabetes specialist nurses, administrators and secretaries. The Yorkshire Register also benefits from having a register manager and administrative assistant who encourage participation.

Paediatric Epidemiologist Patricia McKinney explains:



Patricia McKinney

'We could not gain clinical input without cooperation from a number of people - clinicians, GPs, nurses, patients and their families. We find that information feedback is crucial so that everyone understands how useful this data is and is encouraged to give their support. We explain the benefits across many different levels - from clinical practice to the planning of services and providing the evidence that is required to secure additional resources.'

'This feedback obviously works. 81 per cent of GPs across Yorkshire participated in the most recent data collection and we are very proud of that.'

Benefits to participants

One of the main benefits of participation in the National Diabetes Audit has been providing clinicians, nurses, NHS trusts, GPs, commissioners, patients and patients groups with vital information on the services they provide and the delivery of care.

Clinical Director Fiona Campbell explains:

'The Register provides everyone involved with easy to digest reports on current levels of care. This way, units can look at improving performance and more effective targeting of patients so that they achieve the standards of care set out in the National Framework for Diabetes. For patients, we can provide regular feedback on how their local hospital, GP is performing in managing their diabetes.'

In Yorkshire, the audits have been used by clinicians to improve resources for children with diabetes. For instance the first regional audit showed that few clinics had the services of nutritionists. Three years later audits have shown that almost every clinic provide this service. In a similar way, auditing has secured units the services of diabetes specialist nurses, which impacts greatly on patient care.



Fiona Campbell

The Yorkshire Diabetes Register is recognised as an academic centre of excellence. To date over 30 scientific papers have been published in peer review journals relating to the epidemiology of diabetes in the young. The data has also been presented at national and international scientific meetings. The Register also receives a number of adhoc requests for a variety of reports and is utilised as a vital general information resource for clinicians and academics alike.

Overcoming barriers

Barriers to participation in the project have included lack of IT facilities in a number of NHS hospital sites and lack of local support. The Yorkshire team ensures that the Register has a dedicated manager and administrative assistant who work to foster and maintain active collaboration and help solve problems presented by individual units. Training is also provided to ensure that data is managed properly. Continuous feedback to the healthcare teams, patients and GPs about diabetes in Yorkshire provides useful benchmarks and local comparisons. This has been critical to maintaining momentum and encouraging participation in the data collection process.



August 2007

Diabetic Ketoacidosis (DKA) in children with diabetes

The NDA asks:

- **what is the rate of ketoacidosis for children registered with diabetes?**

The purpose of this audit question is to analyse the rate of ketoacidosis for children registered with diabetes and assess the services provided to ensure smooth transition in to adult care. This is reflected in the standards set out in the Diabetes NSF.^{6, 7}

NSF for diabetes: Standard 5

“All children and young people with diabetes will receive consistently high-quality care and they, with their families and others involved in their day-to-day care, will be supported to optimise the control of their blood glucose and their physical, psychological, intellectual, educational and social development”.

Data from children and young people diagnosed with diabetes within the audit year have been excluded throughout this section of the report to ensure that ketoacidosis (DKA) at diagnosis is not included. This means that the rates might be slightly under-reported as some children may have had more than one episode in the year of diagnosis.

This is the first audit year that Welsh paediatric units have been able to submit information on DKA. Data on DKA from paediatric units are supplemented with information on DKA from the Hospital Episode Statistics (HES) database for England and the Patient Episode Database for Wales (PEDW). This analysis is available in the NDA toolkit.

Diabetic ketoacidosis happens when the body starts to break down fat for energy and ketones build up in the blood and urine. Blood glucose levels are also very high. Diabetic ketoacidosis is a medical emergency and can be life threatening.

Analysis of DKA for England and Wales combined, using 1 year of HES and PEDW data (Figure 14 above) shows that:

- 8.71 per cent of children aged under 16 years and 8.89 per cent of children and young people under 24 years experienced at least one episode of DKA

Figure 14: Diabetic ketoacidosis: time trend: age bands 0-24: England and Wales combined

Age Band	Registrations	Prevalence % in Audit Year	Prevalence % in Previous 5 Years
0 - 4 yrs	633	15.01	34.60
5 - 11 yrs	4,462	7.35	20.17
12 - 15 yrs	5,075	9.12	23.25
Under 16s Subtotal	10,170	8.71	22.61
16 - 24yrs	2,741	9.60	22.18
Unknown Age	13		7.69
Total	12,924	8.89	22.50

- for under 16s, there is higher prevalence of DKA in females (9.56 per cent) compared to males (7.82 per cent)
- this gap widens between females aged 16 to 24 (11.55 per cent) and males aged 16 to 24 (7.72 per cent)
- the prevalence of DKA for young people aged 16 to 24 is 9.54 per cent.

Figure 15: Diabetic ketoacidosis by sex

Age Band	Female %	Male %	Sub Total %	Not Specified Sex %	Total %
Under 16	9.56	7.82	8.67	50.00	8.71
16-24	11.55	7.72	9.54	40.00	9.60
Total	9.96	7.79	8.84	47.06	8.89

DKA, deprivation and ethnicity

Figure 16: Prevalence of ketoacidosis by deprivation quintile: England and Wales ages 0-24 years



Further analysis reveals that the highest prevalence of DKA in the most deprived quintile (10.74 per cent) compared to 7.55 per cent in the least deprived quintile. It appears that managing diabetes is more difficult for those in areas of higher deprivation.

The highest prevalence of DKA is found in the Black Ethnic Group (11.51 per cent), which is 2.62 per cent higher than the national average of 8.89 per cent. However it must be noted that this is based on only a small number of registrations for this group (139). The lowest prevalence of DKA can be found in the Asian group at 5.22 per cent.

Figure 17: Prevalence of ketoacidosis by ethnic group (ages 0-24) England and Wales

	% Prevalence 2003-2004 (n=3,484)	% Prevalence 2004-2005 (n=7,073)	% Prevalence 2005-2006 (n=12,924)
White	6.98	8.13	8.72
Asian	5.85	7.14	5.22
Black	8.99	6.90	11.51
Other	6.85	10.10	6.91
Not Stated	8.29	8.09	9.56
Total	7.38	8.12	8.89

Structured care for children and young people with diabetes

The NDA asks:

- what proportion of children with diabetes receiving care from specialist paediatric units are getting the key processes of care?

The Diabetes NSFs^{6,7} Standard 5: Clinical care of children and young people with diabetes, states:

“All children and young people with diabetes will receive consistently high quality care and they, with their families and others involved in their day to day care, will be supported to optimise the control of their blood glucose and their physical, psychological, intellectual, educational and social development.”

The rates of carrying out care processes vary considerably between specialist units. Many units do not record care process information electronically, and complete information was not always submitted to the audit. Not all of the care processes outlined in the Diabetes NSF Delivery Strategy and measured through the National Diabetes Audit are recommended for children of all ages. Guidelines specify age 12 for starting most care processes.

The NDA collects data for a number of care processes recommended by NICE⁵, in particular the guidance that states: children and young people with type 1 diabetes should be offered screening for:

- retinopathy annually from the age of 12 years
- microalbuminuria annually from the age of 12 years
- blood pressure annually from the age of 12 years
- annual foot care reviews
- height and weight measurement and BMI calculationⁱ

These form part of the screening process for complications and associated conditions.

The majority of diabetic paediatric units do not have supporting clinical IT systems. This means that not all paediatric diabetic units have been able to submit care process information that is carried out as part of an annual surveillance review. The analysis for this section is conducted on those patients for whom data has been submitted. Full details of the data submitted from each participating paediatric unit can be found in Appendix E.

For the 2005-2006 audit, 20 paediatric units (19.6 per cent of submitting units) submitted data on “all care processes” for some of their patients, compared to 12 units (18.7 per cent of submitting units) in the 2004-2005 audit year.

As in previous audits, as a general trend, HbA1c is the most highly recorded and likely to be the most commonly undertaken care process. There has been a year-on-year increase in the percentage of patients submitted to the audit who have an HbA1c recording (77.31 per cent) this year compared to last year of (72.72 per cent). This is an increase of 4.59 per cent.

There is an increasing trend of recording HbA1c across the age bands. This is a steady increase in the percentage recorded year-on-year. The highest percentage is found in children and young people aged 12 to 15.

Interestingly, the percentage of blood pressure recorded is going down year-on-year. This was 39.31 per cent in the 2004-2005 audit year and is 36.97 per cent in the 2005-2006 audit year, which is a decrease

of 2.34 per cent. The same trend can be seen in the care processes for cholesterol, eye examination and foot examination. There may be a number of reasons for this e.g. a lack of recording this information or incomplete data submissions to the audit. Reducing care processes may also be the result of early adopters being best performers or having more complete datasets. Specialist units should examine their own data to ensure that these care processes are being carried out and recorded appropriately.

Care should be taken with the interpretation of care process analysis because of limitations due to the variability of completeness of data from specialist paediatric units.

Figure 18: Care process percentage of registered patients for ≥12 years by country

Care Process Type	England		Wales	
	12 - 15 Years	16 - 24 Years	12 - 15 Years	16 - 24 Years
HbA1c	79.50	77.92	69.72	58.36
BMI	57.60	56.88	17.84	6.74
Blood Pressure	43.17	44.67	16.67	6.45
Albumin	24.48	23.54	19.01	10.56
Creatinine	20.52	22.46	21.13	8.80
Cholesterol	16.35	20.50	20.42	8.21
Eye Exam	16.80	14.38	11.74	4.99
Foot Exam	16.41	14.17	17.84	7.04
All Care Processes	2.71	2.58	3.29	1.17
Registered Patients	4,649	2,400	426	341

For both England and Wales the percentages of care processes carried out are highest in the 12-15 year age band.

ⁱThis is only part of the screening recommended

Figure 19: Care process percentage of registered patients, by sex and country

Care Process Type	England		Wales	
	Female	Male	Female	Male
HbA1c	78.54	78.87	64.84	62.72
BMI	55.35	54.76	12.69	11.84
Blood Pressure	40.57	38.64	12.35	10.56
Albumin	21.42	20.98	13.21	13.12
Creatinine	20.28	18.67	14.92	13.60
Cholesterol	16.43	14.71	14.75	12.96
Eye Exam	14.78	13.91	6.69	7.20
Foot Exam	15.76	14.90	12.69	11.84
All Care Processes	2.43	2.49	1.72	2.24
Registered Patients	5,671	6,025	583	625

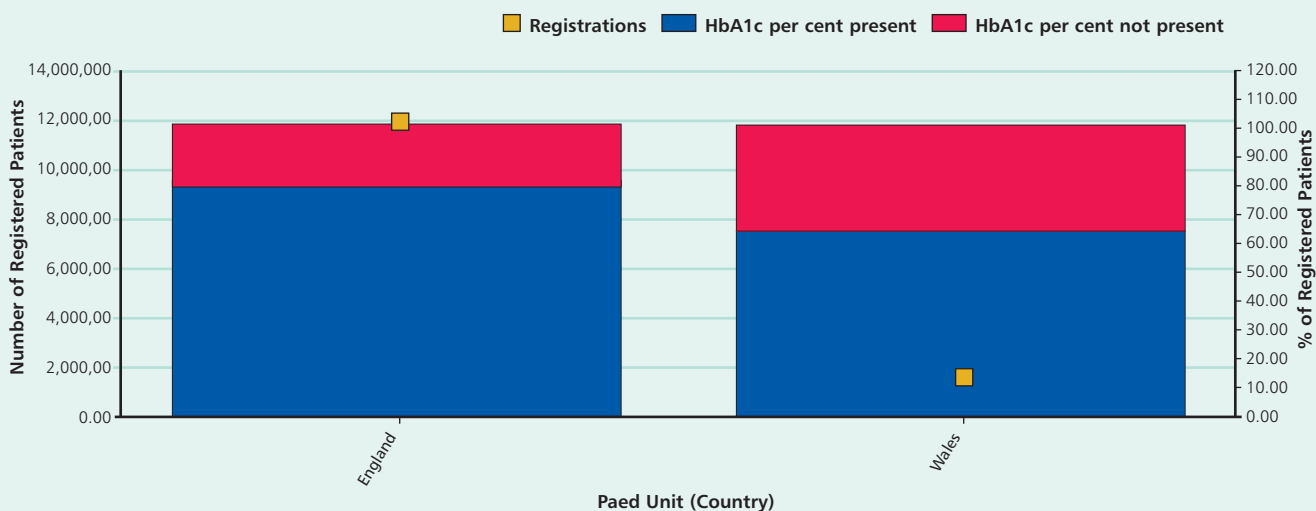
For England, the majority of care process percentages are higher for females than males with the exception of the percentage of registered patients with an HbA1c value. This is slightly higher in males (78.87) than females (78.54). This is also the case for all care processes where the percentage of males is again slightly higher than females.

Wales follows the same trend as England. However, the percentage of registered patients with an eye exam is slightly higher for males (7.20) than females (6.69), which is also the case for all care processes.

For England, the highest care process percentages for the majority of care processes are for children and young people with type 1 diabetes. The exception to this is for BMI, Creatinine and Cholesterol, where the percentage is higher for children and young people with type 2 diabetes. The percentage for all care processes is highest for children and young people with type 1 diabetes at 2.54 per cent. However, the numbers of children and young people with type 2 diabetes are small.

For Wales, there does not seem to be a distinct diabetes type where the care process percentage is highest. However, the percentage of children and young people with diabetes who receive all care processes is again higher for type 1 diabetes at 2.05 per cent.

Figure 20: Percentage of registered patients with an HbA1c recording, by country



Median HbA1c analysis

The following section incorporates the new analysis of median HbA1c, available at unit level within the NDA analysis toolkit.

Of the 12,924 records submitted by specialist paediatric units from England and Wales 9,943 (77 per cent) had an HbA1c recording present leaving 2,981 (23 per cent) without a recording.

Figure 21 is shown for illustrative purposes only (50 units). 102 units have submitted data to the audit

and full details of HbA1c recordings per unit can be found in the NDA analysis toolkit and Appendix F.

The percentage of males and females with an HbA1c value present are comparable i.e. males at 76.98 per cent and females at 76.88 per cent, despite there being more registrations for males (6,650: England and Wales) than females (6,261).

The details of the percentage of registered patients with an HbA1c value recorded, by age band, for England and Wales combined are contained in Figures 22 (below) and 23 (overleaf).

Figure 21: Number of registered patients with an HbA1c value present, by paediatric unit, for England and Wales

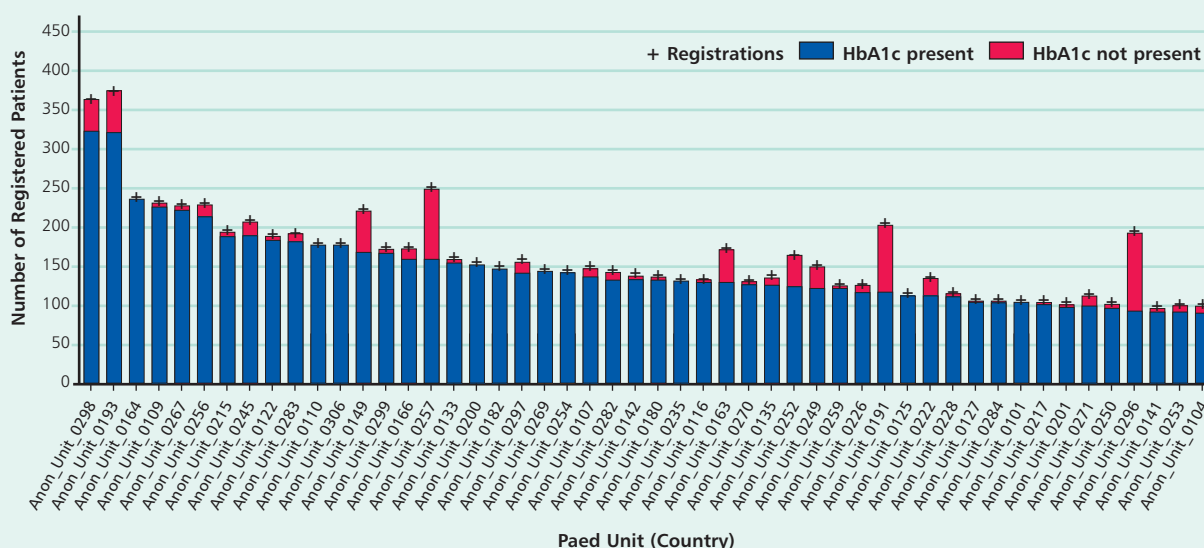


Figure 22: Percentage of registered patients with an HbA1c value recorded, by age band, for England and Wales

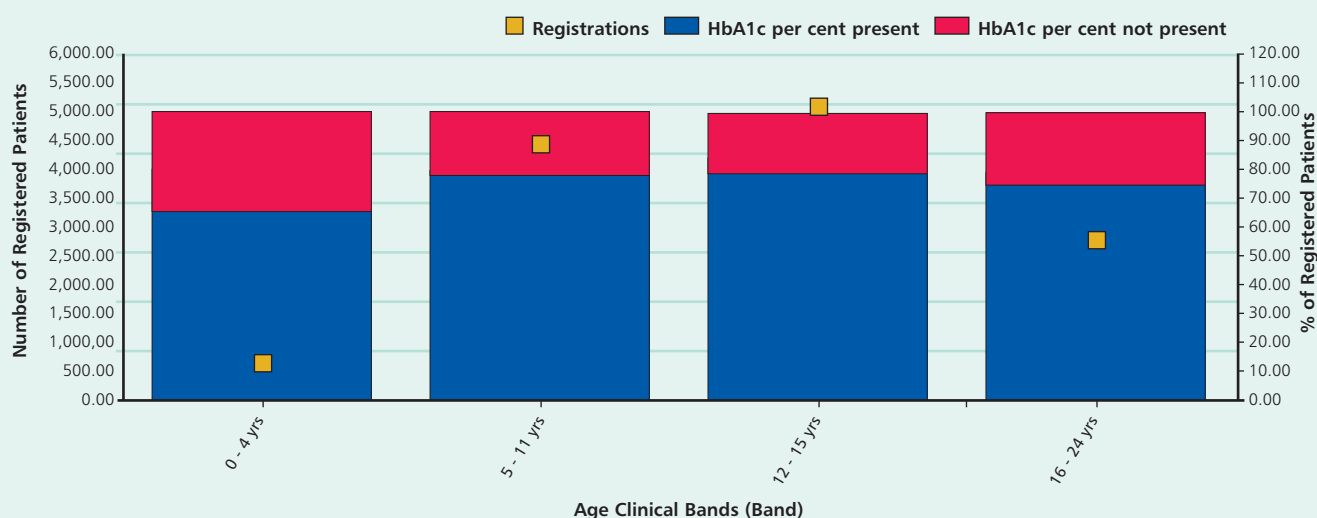


Figure 23: Percentage of registered patients with an HbA1c value recorded, by age band, for England and Wales

	Registrations	HbA1c per cent present	HbA1c per cent not present
0 - 4 yrs	633	66.03	33.97
5 - 11 yrs	4,462	78.24	21.76
12 - 15 yrs	5,075	78.27	21.73
16 - 24 yrs	2,741	74.97	25.03
(National Value)	12,911*	76.96	23.04

*Does not include the number of registrations (13) with age unknown.

The median HbA1c for England and Wales are similar, despite differences in diabetic population sizes. The median for England is 8.7 per cent and the median for Wales is 8.8 per cent.

For England, the lower quartile is 7.8 per cent and the upper quartile is 9.8 per cent.

For Wales, the lower quartile is 7.8 per cent and upper quartile is 10.0 per cent.

From this we can see that, 25 per cent of children and young people have an HbA1c value of over 9.8 per cent in England and over 10 per cent in Wales.

The interquartile range is 2.0 for England and 2.2 for Wales.

More detailed analysis shows that for England there are 2,293 children and young people with an HbA1c value of over 9.8 per cent.

The same analysis shows that for Wales there are 193 children and young people with an HbA1c value of over 10 per cent.

If these levels were sustained over time then these children and young people would be at increased risk of the complications associated with diabetes, such as cardiac failure, myocardial infarction, stroke, diabetic ketoacidosis, amputation and blindness.

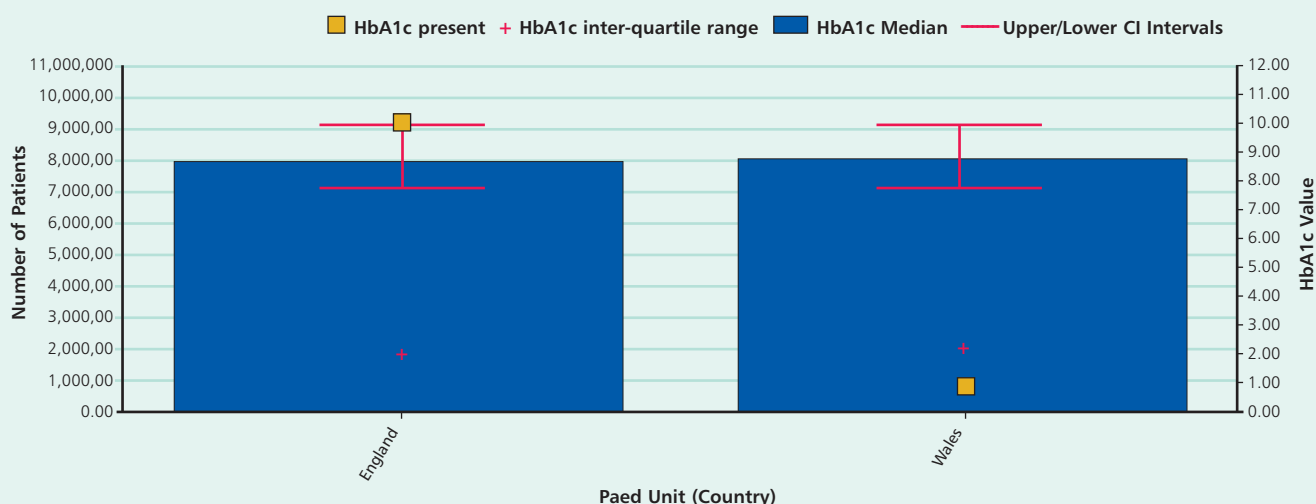
Achievement of treatment targets

The NDA asks:

- **What proportions of children with diabetes achieve treatment targets?**

Targets for HbA1c have been published in NICE guidelines. There is substantial research that recognises the importance of keeping blood glucose levels as close as possible to the normal range for people without diabetes. This is known to prevent or delay the onset of long-term vascular complications of diabetes. Examination for the early detection of complications is important to support

Figure 24: Median HbA1c value and inter-quartile range, by country



self-management and minimise the effects of diabetic complications when they occur. If blood glucose levels are too high there is a risk of developing problems with eyes, kidneys, feet, nerves and heart later in life. On the other hand if the blood glucose gets too low then there is a risk of hypoglycaemia.

The NDA examines the HbA1c and cholesterol results of children and young people with diabetes. The following analyses are based on data for children and young people that have a recording of HbA1c and cholesterol levels.

HbA1c

Analysis of data from children and young people with a target recorded from both England and Wales shows that:

- 16.63 per cent achieved the HbA1c NICE target of <7.5 per cent. However, 53.66 per cent of children and young people have HbA1c levels of ≥ 7.5 per cent and ≤ 9.5 per cent
- overall, 29.65 per cent of children and young people with diabetes have HbA1c levels of >9.5 per cent. Of these, the highest percentage of patients have an HbA1c recording of >9.5 per cent and ≤ 11.5 per cent (Figure 25)

Figure 25: Percentage of children and young people within HbA1c target bands

HbA1c Value	Number of Patients	Percentage of Patients
≤ 6.5	535	5.38
>6.5 and ≤ 7.5	1,308	13.15
>7.5 and ≤ 9.5	5,152	51.82
>9.5 and ≤ 11.5	2,198	22.11
>11.5 and ≤ 13.5	552	5.55
>13.5 and ≤ 15.5	176	1.77
>15.5 and ≤ 17.5	21	0.21
>17.5	1	0.01

- a higher percentage of males (17.41 per cent) than females (15.77 per cent) achieve the NICE guideline HbA1c target of <7.5 per cent. This trend has also been observed in the previous audit years

Figure 26: HbA1c levels: results for England and Wales

Age Band	Gender	% Achieving HbA1c Targets		
		<7.5 per cent	≤ 9.5 per cent	>9.5 per cent
Under 16 years	Male	17.17	55.99	26.85
	Female	15.80	55.49	28.71
	Total	16.50	55.74	27.76
16 to 24 years	Male	18.41	45.61	35.98
	Female	15.63	45.87	38.51
	Total	17.06	45.73	37.20
All ages	Male	17.41	53.87	28.71
	Female	15.77	53.49	30.74
	Total	16.62	53.69	29.69

**This table does not include the results for those without a specified sex type.*

- a higher percentage of younger people (aged under 11) achieve the HbA1c target of <7.5 per cent. The lowest percentage of young people achieving this target is in those aged 12 to 15 years.

The percentage of children and young people achieving the HbA1c target of <7.5 per cent seems stable across all the ethnic groups and has very little variance.

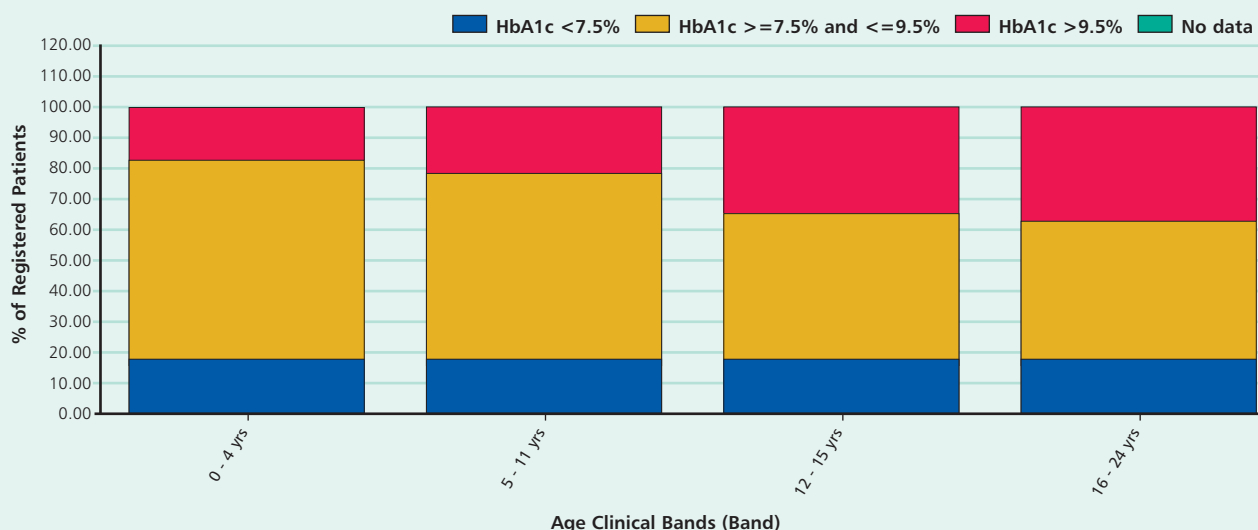
Median HbA1c rates per unit can be found in Appendix F.

Recommendations

It is recommended clinicians and the multidisciplinary care team ensure that children and young people with HbA1c levels consistently above 9.5 per cent are offered additional support by their diabetes team in order to help them improve their glycaemic control and minimise the risk of diabetic ketoacidosis and long-term complications.

It is recommended that commissioners ensure effective models of care are procured and equitably monitored with a view to improving outcomes for all children and young people with diabetes across England and Wales.

Figure 27: HbA1c levels by age bands (clinical): England and Wales – children and young people with HbA1c levels recorded



Cholesterol

Although NICE guidelines do not state that cholesterol should be tested for all ages, results have been analysed from the data submitted to the NDA and are shown for interest.

Overall, 79.03 per cent of children and young people achieve the NICE cholesterol guideline of <5.0 mmol/litre.ⁱⁱ

Figure 28: Percentage of patients with targets recorded achieving the NICE cholesterol target <5.0mmol/litre, by age band, for data from both England and Wales

Age Band	Registrations	Target Achieved %
0 - 4 yrs	50	86.00
5 - 11 yrs	522	82.76
12 - 15 yrs	801	78.28
16 - 24 yrs	476	75.42
No data	1	100.00
(National Value)	1,850	79.03

There is a pattern of decreasing control with the move to teenage years. It is understood that maintaining control in teenage years and transition of care is extremely difficult.

ⁱⁱ NICE do not recommend cholesterol testing for all ages

Figure 29: Cholesterol treatment target rates, England and Wales, children and young people with a cholesterol reading

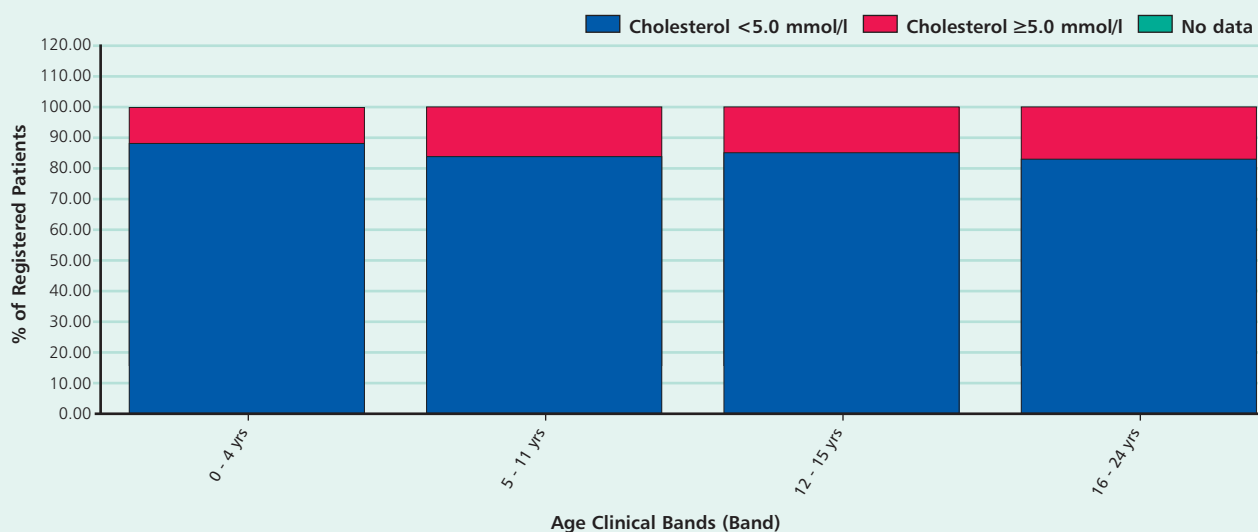
Age Band	Gender	Percentage Achieving Cholesterol Target < 5 mmol/litre
12 - 15 yrs	Male	85.19
	Female	72.10
16 - 24 yrs	Male	83.33
	Female	67.37
12 - 24 yrs	Male	84.47
	Female	70.41

For children and young people over 12 years of age, a higher percentage of males (84.47 per cent) than females (70.41 per cent) achieve the <5mmol/litre cholesterol target, which is the same trend as the HbA1c targets.

Again, the higher percentage of children and young people achieving the target are in the lower ages; under 11 (Figure 30).

There is little variance found in the achievement of the cholesterol target across ethnic group or deprivation quintile.

Figure 30: Achievement of cholesterol target by age band: England and Wales, children and young people with a cholesterol level recorded



Structured education

The NDA has incorporated structured education into the audit dataset, but no information has been collected from paediatric units on this for the 2005-2006 audit.

The NICE guidance 'Diagnosis and management of type 1 diabetes in children and young people'⁵ recommends that:

"Children and young people with type 1 diabetes and their families should be offered timely and ongoing opportunities to access information about the development, management and effects of type 1 diabetes."

It also states that:

"...the method of delivering education and content will depend on the individual and should be appropriate for the child's or young person's age, maturity, culture, wishes and existing knowledge within the family".

The importance of improving the care of people with diabetes is highlighted in the 'National Service Framework for Diabetes: Standards'^{6,7}, published in 2001. Standard 3 of the NSF states that:

"...all children, young people and adults with diabetes will receive a service which encourages partnership and decision-making, supports them in managing their diabetes and helps them to adopt and maintain a healthy lifestyle".

Structured education is one of the key interventions needed to achieve Standard 3.

The NICE Health Technology Appraisal (TA60)⁹ on patient education model recommends patient education for all people with diabetes. The funding direction also states that it must be implemented by January 2006.

"It is recommended that structured patient education is made available to all people with diabetes at the time of initial diagnosis and then as required on an ongoing basis, based on a formal, regular assessment of need".

The Department of Health Patient Education Working Group found that there was no nationally evaluated paediatric or adolescent structured education being delivered systematically in the UK.

This is supported by information from the NDA Paediatric Advisory Group and Paediatric Steering Group, which indicates that education about diabetes and its effect is being delivered to children and young people and their families, but not as part of a nationally recognised programme.

It is clear that there is ongoing work to research and develop structured education programmes for children and young people. The NDA would welcome support for this from the Department of Health and all those involved in the care of children and young people with diabetes.

Data analysis and limitations

The NDA incorporates complication information from the Hospital Episode Statistics (HES) database for England and the Patient Episode Database for Wales (PEDW) for children and young people with diabetes. The data are linked to submitted patient records by NHS number to give one patient - one record (with the exception of complication incidence).

There are some known limitations with this approach to analysing complications:

- only admitted patients will be identified. The HES extract incorporated into the audit does not include outpatient information due to the poor coding inherent within this data
- any over coding or incorrect coding of complications will affect the analysis, either resulting in an over or under-statement of the true rates
- analysis for complication incidence in the NDA toolkit is at the level of incidence per 100.

Each distinct release of the data stands alone and changes cannot necessarily be tracked back through earlier releases. Each release will accord with the relevant annual report. However, ongoing changes to the dataset and the analysis may change the outcomes. In order to build comparative time trends within each release the historical data are run against the same criteria as the data from the audit year. The latest release of the toolkit will provide the most valid method of data comparison across audit years.

Care should be taken not to draw false inferences from headline figures in the analysis. For example, complication prevalence rates which appear to be very high or very low may simply be a function of very small numbers of patients. Care must be taken when interpreting the data analysis at an organisational level.

Analysis in the paediatric report may be based on submission of an incomplete dataset and care should be taken in interpreting the results due to this.

Appendix A

NDA Paediatric Advisory Group

The NDA Paediatric Advisory Group provides vital knowledge on issues surrounding children and young people with Diabetes. Members provide strategic direction to the paediatric audit.

Members

Dr Jeremy Allgrove [Consultant in Paediatric Endocrinology and Diabetes, East London Centre for Paediatric and Adolescent Diabetes, Royal London Hospital](#); [Representative of Royal College of Paediatrics and Child Health](#)

Dr Julie Edge [Consultant in Paediatric Diabetes and Endocrinology, John Radcliffe Hospital, Oxford](#)

Dr Fiona Campbell [Consultant Paediatrician and Clinical Director of Paediatric Medicine, St James' University Hospital, Leeds](#)

Dr Justin Warner [Consultant Paediatric Endocrinologist, University Hospital of Wales](#)

Professor Tricia McKinney [Paediatric Epidemiologist, University of Leeds](#)

Jo Dalton [Children's Diabetes Nurse, Cumbria](#)

Jonathan Mimmagh [Children's Diabetes Nurse, North West](#)

Clare Beard [Child and Adolescent Diabetes Programme Manager, National Diabetes Support Team \(NDST\)](#)

Charlotte Gosden [Diabetes UK](#)

NDA Paediatric Steering Group

The majority of the NDA Paediatric Steering Group members are clinicians. They encourage participation and submission of data to the audit. Members also act as regional focal points for clinical queries regarding the NDA.

Members

Jeremy Allgrove [North Thames](#)

Fiona Campbell [Yorkshire](#)

Julie Edge [Oxford](#)

Kath Price [Trent](#)

Christine Burren [South West](#)

Nicola Trevelyan [Wessex](#)

Murray Bain [South Thames \(West\)](#)

Bill Lamb [Northern](#)

Jo Blair [North West](#)

Justin Warner [Wales](#)

Tricia McKinney [Paediatric Epidemiologist, Leeds University](#)

Carlo Acerini [Anglia](#)

Charles Buchanan [South Thames \(East\)](#)

Gill Challener [Anglia](#)

Antoinette Macaulay [Wessex](#)

Gill Salt [West Midlands](#)

Martha Ford-Adams [South Thames \(East\)](#)

Jo Dalton [Children's Diabetes Nurse, Cumbria](#)

Jonathan Mimmagh [Children's Diabetes Nurse, North West](#)

Charlotte Gosden [Diabetes UK](#)

Clare Beard [Child and Adolescent Diabetes Programme Manager, National Diabetes Support Team \(NDST\)](#)

NDA User Group

The NDA User Group represent the views of the NDA users and contribute to the ongoing development of the audit. The group encourages participation in the NDA and the sharing of best practice.

Members

Dr Douglas Russell [Medical Director,](#)
[Tower Hamlets PCT](#)

Dr Ivor Lewis [Consultant Paediatrician,](#)
[East Surrey Hospital](#)

Amanda McGough [Hambleton and](#)
[Richmondshire PCT](#)

Gill Saunders [Diabetes Network Manager,](#)
[Swindon PCT](#)

Jacqueline Watson [Clinical Audit Facilitator,](#)
[Sunderland PCT](#)

Jacquie Everett [Quality and Improvement Facilitator,](#)
[Oldham PCT](#)

Georgina Mvere [Clinical Audit and Service](#)
[Development Facilitator, Basildon PCT](#)

Craig Deerfield [Clinical Audit Facilitator,](#)
[Birmingham PCT](#)

Afaf Boutros [Quality Improvement Lead,](#)
[Southwark PCT](#)

Chris Soper [Diabetes Lead, Central Cornwall PCT](#)

Teresa Dodd [IT Development Specialist, Sheffield](#)
[Teaching Hospital](#)

Dr Adrian Scott [Consultant Physician in Diabetes](#)
[and General Medicine, Sheffield Teaching Hospital](#)

Appendix B

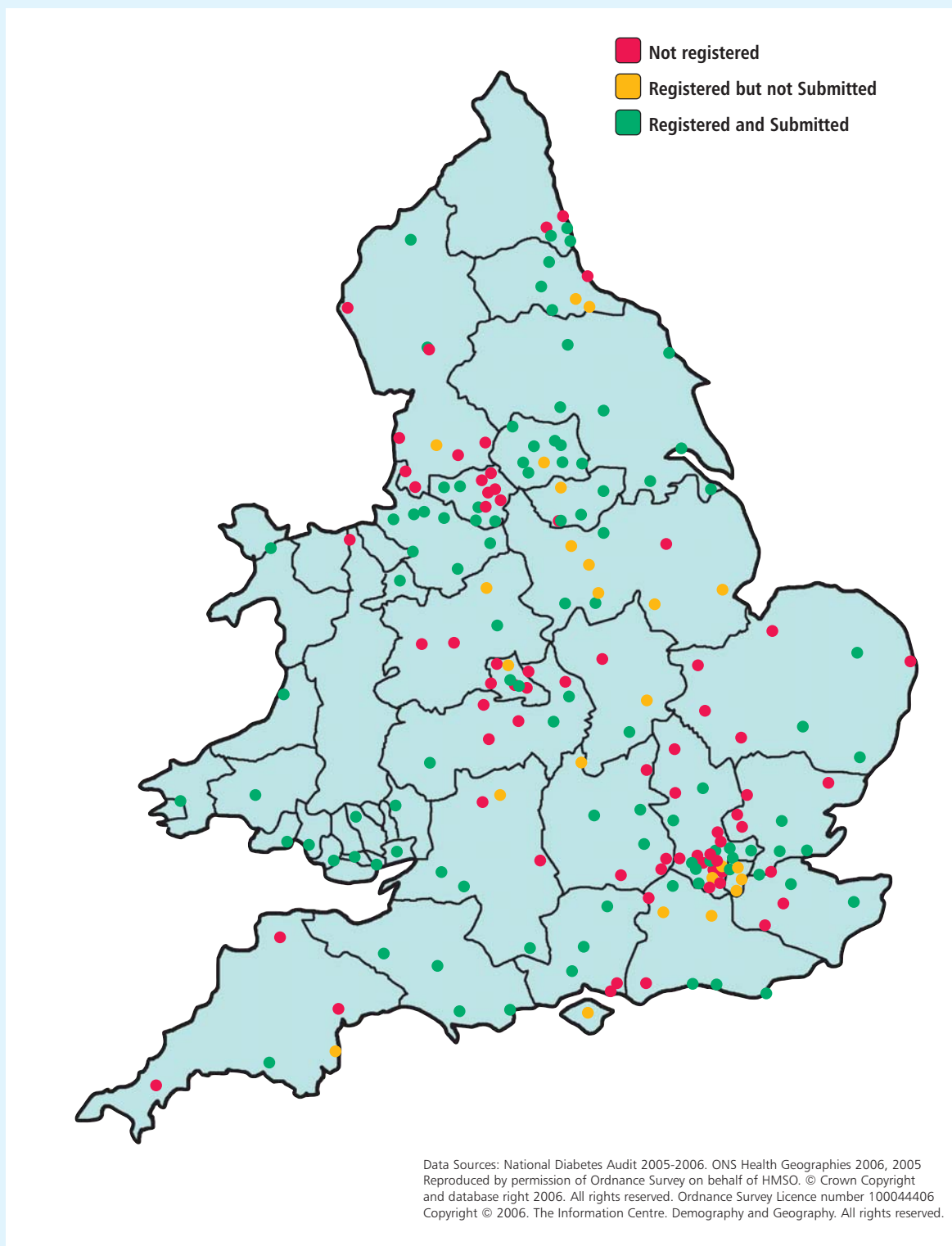
The Diabetes NSF Standards for England and Wales

Standard 1: Prevention of type 2 diabetes	1 The NHS will develop, implement and monitor strategies to reduce the risk of developing type 2 diabetes in the population as a whole and to reduce the inequalities in the risk of developing type 2 diabetes.
Standard 2: Identification of people with diabetes	2 The NHS will develop, implement and monitor strategies to identify people who do not know they have diabetes.
Standard 3: Empowering people with diabetes	3 All children, young people and adults with diabetes will receive a service which encourages partnership in decision-making, supports them in managing their diabetes and helps them to adopt and maintain a healthy lifestyle. This will be reflected in an agreed and shared care plan in an appropriate format and language. Where appropriate, parents and carers should be fully engaged in this process.
Standard 4: Clinical care of adults with diabetes	4 All adults with diabetes will receive high-quality care throughout their lifetime, including support to optimise the control of their blood glucose, blood pressure and other risk factors for developing the complications of diabetes.
Standards 5 and 6: Clinical care of children and young people with diabetes	<p>5 All children and young people with diabetes will receive consistently high-quality care and they, with their families and others involved in their day-to-day care, will be supported to optimise the control of their blood glucose and their physical, psychological, intellectual, educational and social development.</p> <p>6 All young people with diabetes will experience a smooth transition of care from paediatric diabetes services to adult diabetes services, whether hospital or community-based, either directly or via a young people's clinic. The transition will be organised in partnership with each individual and at an appropriate age to and agreed with them.</p>
Standard 7: Management of diabetic emergencies	7 The NHS will develop, implement and monitor agreed protocols for rapid and effective treatment of diabetic emergencies by appropriately trained health care professionals. Protocols will include the management of acute complications and procedures to minimise the risk of recurrence.
Standard 8: Care of people with diabetes during admission to hospital	8 All children, young people and adults with diabetes admitted to hospital, for whatever reason, will receive effective care of their diabetes. Wherever possible, they will continue to be involved in decisions concerning the management of their diabetes.
Standard 9: Diabetes and pregnancy	9 The NHS will develop, implement and monitor policies that seek to empower and support women with pre-existing diabetes and those who develop diabetes during pregnancy to optimise the outcomes of their pregnancy.
Standards 10, 11 and 12: Detection and management of long- term complications	<p>10 Detection and management of long-term complications All young people and adults with diabetes will receive regular surveillance for the long-term complications of diabetes.</p> <p>11 The NHS will develop, implement and monitor agreed protocols and systems of care to ensure that all people who develop long-term complications of diabetes receive timely, appropriate and effective investigation and treatment to reduce their risk of disability and premature death.</p> <p>12 All people with diabetes requiring multi-agency support will receive integrated health and social care.</p>

Appendix C

Paediatric Unit Participation

Map of NDA Participation by Paediatric Unit 2005-2006



NDA Participation by Paediatric Unit 2005-2006

ENGLAND

North East Strategic Health Authority

PZ160 Bishop Auckland General Hospital

PZ161 Darlington Memorial Hospital

PZ027 Friarage Hospital, Northallerton

PZ163 North Tees General Hospital,
Stockton-on-Tees

PZ120 North Tyneside General Hospital

PZ107 Queen Elizabeth Hospital, Gateshead

PZ032 Royal Victoria Infirmary,
Newcastle-Upon-Tyne

PZ141 South Tyneside District Hospital

PZ080 Sunderland Royal Hospital

PZ133 James Cook University Hospital,
Middlesbrough

PZ210 University Hospital of Hartlepool

PZ162 University Hospital Of North Durham

North West Strategic Health Authority

PZ170 Arrowe Park Hospital

PZ106 Victoria Hospital, Blackpool

PZ204 Booth Hall Childrens Hospital

PZ205 Burnley General Hospital

PZ179 Countess of Chester Hospital NHS
Foundation Trust

PZ150 Cumberland Infirmary

PZ029 Fairfield General Hospital

PZ030 Leighton Hospital

PZ009 Macclesfield District General Hospital

PZ167 Morecambe Bay Trust

PZ110 Ormskirk and District General Hospital

PZ091 Queen's Park Hospital, Blackburn

PZ074 Royal Liverpool Children's NHS Trust

PZ206 Rochdale Infirmary

PZ104 Royal Albert Edward Infirmary

PZ177 Royal Bolton Hospital

PZ136 Royal Manchester Children's Hospital

PZ044 Royal Oldham Hospital

PZ183 Royal Preston Hospital

PZ063 Southport District General Hospital

PZ043 St Mary's Hospital for Women and
Children, Manchester

PZ069 Stepping Hill Hospital, Stockport

PZ140 Tameside General Hospital

PZ134 Trafford General Hospital

PZ049 Warrington General Hospital

PZ022 West Cumberland Hospital

PZ208 Westmorland General Hospital

PZ153 Whiston Hospital

PZ015 Wythenshawe Hospital

East of England Strategic Health Authority

PZ041 Addenbrooke's Hospital

PZ019 Basildon and Thurrock Hospital

PZ220 Bedford Hospital

PZ076 Colchester General hospital

PZ099 East and North Hertfordshire NHS Trust

PZ172 Watford General Hospital

PZ198 Herts and Essex Hospital

PZ086 Hinchingsbrooke Hospital

Key: **Not registered** **Registered but not Submitted** **Registered and Submitted**

PZ181 Ipswich Hospital NHS Trust
PZ127 James Paget Healthcare Trust
PZ010 Luton and Dunstable Hospital
PZ171 Mid Essex Hospital
PZ002 Norfolk and Norwich University Hospital
PZ131 Peterborough District Hospital
PZ200 Princess Alexandra Hospital, Harlow
PZ156 Queen Elizabeth Hospital, Kings Lynn
PZ146 Southend Hospital
PZ201 St Margaret's Hospital, Essex
PZ072 West Suffolk Hospital, Bury St Edmunds

Yorkshire and Humber Strategic Health Authority

PZ047 Airedale General Hospital
PZ149 Barnsley District General Hospital
PZ016 Bassetlaw District General Hospital
PZ166 Calderdale Royal Hospital
PZ226 Dewsbury and District Hospital
PZ020 Diana, Princess of Wales Hospital, Grimsby
PZ006 Doncaster Royal Infirmary
PZ129 Harrogate District Hospital
PZ186 Huddersfield Royal Infirmary
PZ026 Hull Royal Infirmary
PZ101 Leeds General Infirmary
PZ003 Pinderfields General Hospital
PZ090 Pontefract General Infirmary
PZ164 Rotherham General Hospital
PZ123 Ryegate Children's Centre

PZ112 Scarborough General Hospital
PZ053 Scunthorpe General Hospital
PZ219 Sheffield Children's Hospital
PZ155 St James's University Hospital, Leeds
PZ105 St Luke's Hospital, Bradford
PZ114 York District Hospital

East Midlands Strategic Health Authority

PZ064 Chesterfield Royal Hospital
PZ005 Derbyshire Children's Hospital
PZ168 Grantham and District Hospital
PZ174 Kettering General Hospital
PZ180 Kings Mill Hospital, Sutton-in-Ashfield
PZ055 Leicester Royal Infirmary
PZ048 Lincoln County Hospital
PZ004 Northampton General Hospital
PZ116 Nottingham University Hospital
PZ128 Pilgrim Hospital, Nottingham
PZ042 Queen's Medical Centre, Nottingham

West Midlands Strategic Health Authority

PZ073 The Alexandra Hospital, Redditch
PZ108 Birmingham Children's Hospital
PZ097 Birmingham City Hospital Trust
PZ040 Birmingham Heartlands Hospital
PZ121 George Eliot Hospital
PZ078 City General Hospital, Stoke-on-Trent
PZ144 Good Hope Hospital
PZ111 Hereford County Hospital

Key: **Not registered** **Registered but not Submitted** **Registered and Submitted**

PZ084 Kidderminster General Hospital	PZ195 Central Middlesex Hospital
PZ222 New Cross Hospital, Wolverhampton	PZ130 Chelsea and Westminster Hospital, London
PZ094 Princess Royal Hospital, Telford	PZ191 Ealing Hospital NHS Trust
PZ095 Royal Shrewsbury	PZ196 Great Ormond Street Hospital
PZ223 Sandwell General Hospital	PZ082 Guy's and St Thomas
PZ065 Staffordshire General Hospital	PZ197 Hammersmith Hospital
PZ178 The Manor Hospital	PZ102 Hillingdon Hospital
PZ122 Walsgrave Hospital	PZ215 Kings College Hospital, London
PZ138 Warwick Hospital	PZ057 Kingston Hospital
PZ225 Worcestershire Royal Hospital	PZ062 Mayday University Hospital
	PZ058 Newham General Hospital
South Central Strategic Health Authority	PZ199 North Middlesex University Hospital
PZ046 Horton General Hospital	PZ089 Northwick Park Hospital
PZ007 John Radcliffe Hospital, Oxford	PZ142 Oldchurch Hospital
PZ066 King Edward VII Hospital, Windsor	PZ085 Princess Royal University Hospital
PZ145 Milton Keynes General Hospital	PZ151 Queen Elizabeth Hospital, London
PZ159 North Hampshire Hospitals NHS Trust	PZ175 Queen Mary's Hospital, Sidcup
PZ035 Royal Berkshire Hospital	PZ050 Queen Mary's Hospital for Children, Epsom and St Helier Trust
PZ034 Royal Hampshire County Hospital	PZ157 Royal Free and University College Hospital, London
PZ109 Southampton General Hospital	PZ023 St George's Hospital, London
PZ075 St Mary's Hospital, Isle of Wight	PZ051 The General Hospital, St Helier
PZ148 St Mary's Hospital, Portsmouth	PZ202 St Mary's Hospital, London
PZ028 Stoke Mandeville Hospital	PZ059 The Royal London Hospital
PZ021 Wexham Park Hospital	PZ203 University College Hospital, London
PZ038 Wycombe General Hospital	PZ118 University Hospital Lewisham
	PZ182 West Middlesex University Hospital
London Strategic Health Authority	PZ036 Whipps Cross University Hospital
PZ033 Barking, Havering and Redbridge NHS Trust	PZ045 Whittington Hospital
PZ012 Barnet and Chase Farm NHS Trust	

Key: **Not registered** **Registered but not Submitted** **Registered and Submitted**

South East Coast Strategic Health Authority

PZ119 Darent Valley Hospital
PZ024 East Kent Hospitals NHS Trust
PZ184 Eastbourne District General Hospital
PZ218 Frimley Park Hospital
PZ214 Gravesend and north Kent Hospital
PZ125 Maidstone Hospital
PZ126 Medway Maritime Hospital
PZ216 Pembury Hospital
PZ135 Royal Alexandra Children's Hospital
PZ088 Royal Surrey County hospital
PZ176 St Peter's Hospital, Chertsey
PZ031 St Richard's Hospital, Chichester
PZ213 Surrey and Sussex NHS Trust
PZ018 Worthing Hospital

South West Strategic Health Authority

PZ139 Bristol Royal Hospital for Children
PZ192 Cheltenham General Hospital
PZ096 Derriford Hospital
PZ017 Dorset County Hospital
PZ229 Gloucestershire Royal Infirmary
PZ137 Musgrove Park Hospital
PZ100 North Devon District Hospital
PZ054 Poole Hospital NHS Trust
PZ067 Royal Cornwall Hospital
PZ060 Royal Devon and Exeter Hospital
PZ068 Royal United Hospital, Bath
PZ169 Salisbury District Hospital

PZ221 The Great Western Hospital, Swindon

PZ152 Torbay Hospital

PZ173 Yeovil District Hospital

WALES

North Wales Regional Office

PZ011 Glan Clwyd District General Hospital
PZ187 Wrexham Maelor Hospital
PZ132 Ysbyty Gwyneda Hospital

Mid and West Wales Regional Office

PZ092 Princess Of Wales, Bridgend
PZ185 Bronglais General Hospital
PZ193 Neath Port Talbot Hospital
PZ001 Singleton Hospital
PZ056 West Wales General Hospital
PZ190 Withybush General Hospital

South East Wales Regional Office

PZ052 Nevill Hall Hospital
PZ228 Prince Charles Hospital
PZ189 Royal Glamorgan Hospital
PZ188 Royal Gwent Hospital
PZ113 University Hospital of Wales

Key: **Not registered** **Registered but not Submitted** **Registered and Submitted**

Appendix D

Mean Age at Diagnosis by Paediatric Unit

Anon unit code	Mean Age	Anon unit code	Mean Age	Anon unit code	Mean Age
Anon_Unit_0181	8.4	Anon_Unit_0166	7.7	Anon_Unit_0142	7.7
Anon_Unit_0150	7.3	Anon_Unit_0188	7.9	Anon_Unit_0163	8.4
Anon_Unit_0134	6.3	Anon_Unit_0253	6.2	Anon_Unit_0145	8.3
Anon_Unit_0200	7.4	Anon_Unit_0152	7.5	Anon_Unit_0207	7.8
Anon_Unit_0215	7.9	Anon_Unit_0270	7.5	Anon_Unit_0271	7.3
Anon_Unit_0244	7.8	Anon_Unit_0126	6.3	Anon_Unit_0201	8.1
Anon_Unit_0164	7.7	Anon_Unit_0121	7.8	Anon_Unit_0234	8.3
Anon_Unit_0158	7.0	Anon_Unit_0151	7.5	Anon_Unit_0297	7.7
Anon_Unit_0159	7.6	Anon_Unit_0110	8.0	Anon_Unit_0111	7.4
Anon_Unit_0206	8.0	Anon_Unit_0252	7.2	Anon_Unit_0180	7.6
Anon_Unit_0190	8.1	Anon_Unit_0304	7.1	Anon_Unit_0254	7.4
Anon_Unit_0222	8.6	Anon_Unit_0122	7.9	Anon_Unit_0299	7.4
Anon_Unit_0245	7.8	Anon_Unit_0272	7.8	Anon_Unit_0289	8.2
Anon_Unit_0104	8.4	Anon_Unit_0298	7.5	Anon_Unit_0259	7.7
Anon_Unit_0109	7.4	Anon_Unit_0113	7.5	Anon_Unit_0243	7.5
Anon_Unit_0267	8.0	Anon_Unit_0197	8.2	Anon_Unit_0127	7.2
Anon_Unit_0308	7.7	Anon_Unit_0295	7.2	Anon_Unit_0269	7.0
Anon_Unit_0217	7.9	Anon_Unit_0256	7.9	Anon_Unit_0285	7.8
Anon_Unit_0141	7.4	Anon_Unit_0249	8.3	Anon_Unit_0241	6.3
Anon_Unit_0228	8.7	Anon_Unit_0230	8.3	Anon_Unit_0266	8.2
Anon_Unit_0123	7.8	Anon_Unit_0284	7.3	Anon_Unit_0302	7.7
Anon_Unit_0191	7.3	Anon_Unit_0182	7.9	Anon_Unit_0211	7.9
Anon_Unit_0149	7.5	Anon_Unit_0283	8.0	Anon_Unit_0306	8.0
Anon_Unit_0117	6.2	Anon_Unit_0229	7.9	Anon_Unit_0154	7.6
Anon_Unit_0237	7.9	Anon_Unit_0131	6.7	Anon_Unit_0300	7.9
Anon_Unit_0235	7.7	Anon_Unit_0301	8.6	Anon_Unit_0125	7.7
Anon_Unit_0250	7.1	Anon_Unit_0226	7.0	Anon_Unit_0189	7.8
Anon_Unit_0202	8.0	Anon_Unit_0185	7.8	Anon_Unit_0168	7.8
Anon_Unit_0184	7.9	Anon_Unit_0133	8.3	Anon_Unit_0296	6.1
Anon_Unit_0107	6.8	Anon_Unit_0143	8.2	Anon_Unit_0101	8.2
Anon_Unit_0130	8.3	Anon_Unit_0193	8.1	Anon_Unit_0221	7.5
Anon_Unit_0290	10.6	Anon_Unit_0210	7.7	Anon_Unit_0129	N/A
Anon_Unit_0135	8.2	Anon_Unit_0257	7.9		Diagnosis
Anon_Unit_0116	8.2	Anon_Unit_0282	7.7		year not
Anon_Unit_0218	7.1	Anon_Unit_0115	7.5		submitted

Appendix E

Care Process Percentage Recorded by Paediatric Unit

Data from patients over 12 years old

<i>Anon Unit Code</i>	<i>Registrations >=12 YEARS</i>	<i>HBA1C</i>	<i>BMI</i>	<i>BP</i>	<i>ALBUMIN</i>	<i>CHOLESTEROL</i>	<i>CREATININE</i>	<i>EYE EXAM</i>	<i>FOOT EXAM</i>	<i>ALL CARE PROCESSES</i>
Anon_Unit_0193	246	85.37	88.62	32.93	0	0	0	0	0	0
Anon_Unit_0298	232	90.52	92.67	36.64	1.72	2.59	3.88	0.86	21.12	0
Anon_Unit_0152	157	0	17.83	0	0	0	0	0	0	0
Anon_Unit_0113	189	0	0	0	0	0	0	0	0	0
Anon_Unit_0257	147	68.03	60.54	57.14	20.41	43.54	48.98	0	0	0
Anon_Unit_0150	127	0	0	0	0	0	0	0	0	0
Anon_Unit_0164	167	100	0	0	0	0	0	0	0	0
Anon_Unit_0109	128	98.44	92.97	63.28	42.19	17.97	50.78	52.34	2.34	0
Anon_Unit_0267	132	98.48	97.73	97.73	28.79	0.76	0.76	0	0	0
Anon_Unit_0149	139	79.86	78.42	0	0	0	0	0	0	0
Anon_Unit_0245	135	88.15	80	58.52	23.7	33.33	60	2.22	38.52	0.74
Anon_Unit_0191	143	53.85	0	0	0	0	0	0	0	0
Anon_Unit_0215	109	98.17	99.08	88.99	62.39	0	0	0	0	0
Anon_Unit_0283	109	97.25	93.58	45.87	38.53	4.59	2.75	0.92	0.92	0
Anon_Unit_0296	73	56.16	9.59	17.81	12.33	0	1.37	9.59	6.85	0
Anon_Unit_0122	121	95.87	0	0	0	0	0	0	0	0
Anon_Unit_0110	121	100	0	99.17	0	0	0	52.89	19.01	0
Anon_Unit_0166	101	92.08	92.08	92.08	92.08	0	0	73.27	66.34	0
Anon_Unit_0129	128	3.13	0	0	0	0	0	0	0	0
Anon_Unit_0299	93	98.92	98.92	98.92	74.19	84.95	90.32	0	0	0
Anon_Unit_0163	116	74.14	75	75	39.66	56.03	62.07	75	74.14	36.21
Anon_Unit_0151	93	27.96	31.18	0	0	0	6.45	0	0	0
Anon_Unit_0252	101	67.33	67.33	0	38.61	25.74	15.84	67.33	67.33	0
Anon_Unit_0133	112	96.43	97.32	67.86	53.57	9.82	11.61	0.89	5.36	0
Anon_Unit_0297	89	93.26	94.38	82.02	60.67	77.53	79.78	52.81	75.28	28.09
Anon_Unit_0200	88	98.86	0	0	0	0	0	0	0	0
Anon_Unit_0249	104	100	100	100	100	100	100	3.85	0.96	0.96
Anon_Unit_0107	74	95.95	0	0	0	0	0	0	0	0
Anon_Unit_0182	89	100	0	0	0	0	0	0	0	0
Anon_Unit_0269	73	100	83.56	9.59	0	0	0	0	0	0
Anon_Unit_0254	80	100	100	100	1.25	1.25	1.25	0	6.25	0
Anon_Unit_0282	85	97.65	0	0	0	0	0	0	0	0
Anon_Unit_0180	88	100	96.59	54.55	38.64	3.41	28.41	71.59	2.27	0
Anon_Unit_0142	79	96.2	0	0	0	0	0	0	0	0
Anon_Unit_0116	88	96.59	95.45	94.32	75	84.09	81.82	68.18	61.36	48.86

<i>Anon Unit Code</i>	<i>Registrations >=12 YEARS</i>	<i>HBA1C</i>	<i>BMI</i>	<i>BP</i>	<i>ALBUMIN</i>	<i>CHOLESTEROL</i>	<i>CREATININE</i>	<i>EYE EXAM</i>	<i>FOOT EXAM</i>	<i>ALL CARE PROCESSES</i>
Anon_Unit_0135	86	93.02	88.37	60.47	70.93	76.74	68.6	70.93	65.12	38.37
Anon_Unit_0188	81	60.49	76.54	100	1.23	0	0	9.88	9.88	0
Anon_Unit_0222	82	81.71	58.54	54.88	14.63	51.22	52.44	18.29	20.73	1.22
Anon_Unit_0270	78	98.72	1.28	32.05	0	0	0	15.38	0	0
Anon_Unit_0235	68	100	100	94.12	75	8.82	0	0	73.53	0
Anon_Unit_0226	66	96.97	96.97	96.97	86.36	0	19.7	81.82	0	0
Anon_Unit_0259	71	95.77	94.37	47.89	14.08	18.31	22.54	0	33.8	0
Anon_Unit_0244	77	0	0	0	0	0	0	0	0	0
Anon_Unit_0228	77	98.7	96.1	71.43	32.47	0	3.9	1.3	0	0
Anon_Unit_0123	74	0	72.97	0	0	0	0	0	0	0
Anon_Unit_0125	62	100	100	100	38.71	8.06	3.23	0	0	0
Anon_Unit_0271	61	90.16	90.16	39.34	24.59	37.7	32.79	32.79	34.43	0
Anon_Unit_0185	74	56.76	0	1.35	0	0	0	0	0	0
Anon_Unit_0127	59	100	100	100	55.93	0	0	64.41	8.47	0
Anon_Unit_0284	54	98.15	100	0	0	0	0	0	0	0
Anon_Unit_0217	59	98.31	0	1.69	5.08	0	1.69	0	0	0
Anon_Unit_0101	72	100	93.06	93.06	81.94	79.17	83.33	0	0	0
Anon_Unit_0250	63	96.83	0	39.68	52.38	74.6	38.1	1.59	9.52	0
Anon_Unit_0201	66	98.48	98.48	75.76	50	25.76	80.3	37.88	39.39	4.55
Anon_Unit_0253	37	97.3	0	0	0	0	0	0	0	0
Anon_Unit_0290	68	94.12	0	0	0	0	0	0	0	0
Anon_Unit_0104	62	96.77	95.16	64.52	30.65	19.35	4.84	6.45	1.61	0
Anon_Unit_0141	58	94.83	96.55	74.14	0	81.03	77.59	63.79	72.41	0
Anon_Unit_0243	52	84.62	90.38	84.62	50	51.92	44.23	0	0	0
Anon_Unit_0184	53	92.45	3.77	60.38	39.62	32.08	86.79	45.28	47.17	1.89
Anon_Unit_0190	63	65.08	63.49	52.38	39.68	3.17	15.87	50.79	65.08	0
Anon_Unit_0302	56	100	37.5	16.07	0	0	0	0	0	0
Anon_Unit_0304	44	100	77.27	70.45	54.55	77.27	79.55	34.09	79.55	15.91
Anon_Unit_0218	49	97.96	95.92	91.84	0	0	0	2.04	0	0
Anon_Unit_0145	65	100	98.46	90.77	15.38	9.23	15.38	33.85	46.15	0
Anon_Unit_0230	57	100	100	70.18	64.91	75.44	75.44	36.84	0	0
Anon_Unit_0115	49	93.88	0	0	0	0	0	0	0	0
Anon_Unit_0143	58	98.28	96.55	63.79	29.31	22.41	12.07	44.83	15.52	0
Anon_Unit_0158	47	0	0	0	0	0	0	0	0	0

<i>Anon Unit Code</i>	<i>Registrations >=12 YEARS</i>	<i>HBA1C</i>	<i>BMI</i>	<i>BP</i>	<i>ALBUMIN</i>	<i>CHOLESTEROL</i>	<i>CREATININE</i>	<i>EYE EXAM</i>	<i>FOOT EXAM</i>	<i>ALL CARE PROCESSES</i>
Anon_Unit_0134	35	0	8.57	0	0	0	0	0	0	0
Anon_Unit_0111	51	98.04	94.12	82.35	33.33	11.76	15.69	29.41	0	0
Anon_Unit_0285	50	96	98	70	32	80	78	72	72	32
Anon_Unit_0272	42	88.1	90.48	80.95	61.9	0	26.19	0	69.05	0
Anon_Unit_0159	57	100	100	85.96	66.67	91.23	91.23	12.28	29.82	3.51
Anon_Unit_0234	48	95.83	0	0	0	0	0	0	0	0
Anon_Unit_0295	35	88.57	77.14	5.71	2.86	2.86	2.86	8.57	2.86	2.86
Anon_Unit_0126	28	0	3.57	0	0	0	0	0	0	0
Anon_Unit_0289	41	92.68	92.68	75.61	60.98	63.41	92.68	19.51	68.29	2.44
Anon_Unit_0207	44	100	93.18	25	34.09	77.27	86.36	22.73	29.55	2.27
Anon_Unit_0197	43	100	0	93.02	30.23	0	0	0	0	0
Anon_Unit_0237	34	100	97.06	94.12	85.29	11.76	17.65	52.94	38.24	0
Anon_Unit_0117	29	96.55	0	0	0	0	0	0	0	0
Anon_Unit_0210	37	94.59	97.3	94.59	43.24	0	32.43	81.08	81.08	0
Anon_Unit_0229	30	10	6.67	0	6.67	0	3.33	6.67	6.67	0
Anon_Unit_0308	34	94.12	94.12	85.29	76.47	20.59	88.24	2.94	8.82	0
Anon_Unit_0206	32	100	0	0	0	0	0	0	0	0
Anon_Unit_0241	24	91.67	91.67	70.83	29.17	0	8.33	33.33	79.17	0
Anon_Unit_0168	22	100	100	100	81.82	95.45	100	40.91	100	36.36
Anon_Unit_0301	29	100	93.1	55.17	51.72	27.59	72.41	48.28	17.24	6.9
Anon_Unit_0256	153	94.12	0	0	0	0	0	0	0	0
Anon_Unit_0306	119	100	0	0	0	0	0	0	0	0
Anon_Unit_0181	64	0	0	0	0	0	0	0	0	0
Anon_Unit_0154	67	43.28	44.78	44.78	25.37	44.78	44.78	32.84	37.31	16.42
Anon_Unit_0121	55	90.91	0	0	0	0	0	0	0	0
Anon_Unit_0211	47	0	0	0	0	0	0	0	0	0
Anon_Unit_0131	41	92.68	90.24	63.41	75.61	36.59	36.59	70.73	0	0
Anon_Unit_0189	52	88.46	0	0	0	0	0	0	0	0
Anon_Unit_0221	31	100	100	96.77	80.65	83.87	100	38.71	87.1	22.58
Anon_Unit_0130	45	82.22	0	0	82.22	82.22	82.22	0	80	0
Anon_Unit_0202	41	0	0	0	0	0	0	0	0	0
Anon_Unit_0300	34	0	0	0	0	0	0	0	0	0
Anon_Unit_0266	18	11.11	5.56	38.89	38.89	38.89	38.89	22.22	66.67	0
	7816	77.56	52.99	40.58	23.29	17.49	20.64	15.26	15.39	2.64

Appendix F

HbA1c Results by Paediatric Unit

Anon Unit Names	Number of Records	% with HbA1c recorded	Median HbA1c
Anon_Unit_0193	375	86.1	8.1
Anon_Unit_0298	361	90.6	8.9
Anon_Unit_0152	300	0.0	0.0
Anon_Unit_0113	278	0.0	0.0
Anon_Unit_0257	249	63.1	9.3
Anon_Unit_0150	240	0.0	0.0
Anon_Unit_0164	236	100.0	8.6
Anon_Unit_0109	232	98.7	9.1
Anon_Unit_0256	230	92.2	8.9
Anon_Unit_0267	227	98.7	9.3
Anon_Unit_0149	222	76.1	9.2
Anon_Unit_0245	207	91.3	9.0
Anon_Unit_0191	203	57.6	8.8
Anon_Unit_0215	195	98.0	8.7
Anon_Unit_0283	192	94.3	8.4
Anon_Unit_0296	192	49.0	8.6
Anon_Unit_0122	190	97.4	8.8
Anon_Unit_0110	179	99.4	8.1
Anon_Unit_0306	178	100.0	9.1
Anon_Unit_0129	173	19.1	8.0
Anon_Unit_0166	173	90.8	9.0
Anon_Unit_0299	172	98.3	8.6
Anon_Unit_0163	171	76.6	9.2
Anon_Unit_0151	169	33.1	8.1
Anon_Unit_0252	163	76.1	8.7
Anon_Unit_0133	158	96.8	9.3
Anon_Unit_0297	155	92.3	8.5
Anon_Unit_0200	152	99.3	8.9
Anon_Unit_0249	148	83.8	8.4
Anon_Unit_0107	146	93.8	8.5
Anon_Unit_0182	146	100.0	8.1
Anon_Unit_0254	143	99.3	8.1
Anon_Unit_0269	143	100.0	8.9
Anon_Unit_0282	140	95.7	8.5

Anon Unit Names	Number of Records	% with HbA1c recorded	Median HbA1c
Anon_Unit_0142	137	97.1	8.6
Anon_Unit_0180	137	97.1	8.6
Anon_Unit_0135	134	93.3	8.9
Anon_Unit_0116	134	97.8	8.5
Anon_Unit_0222	133	82.7	8.8
Anon_Unit_0188	133	60.2	8.6
Anon_Unit_0235	131	100.0	8.7
Anon_Unit_0270	131	99.2	9.0
Anon_Unit_0226	125	95.2	9.0
Anon_Unit_0259	125	97.6	8.9
Anon_Unit_0244	122	0.0	0.0
Anon_Unit_0181	119	0.0	0.0
Anon_Unit_0228	112	96.4	8.6
Anon_Unit_0123	112	0.0	0.0
Anon_Unit_0125	111	100.0	9.0
Anon_Unit_0271	110	90.0	9.0
Anon_Unit_0185	109	53.2	9.0
Anon_Unit_0284	105	98.1	8.8
Anon_Unit_0127	105	99.1	8.2
Anon_Unit_0217	104	98.1	8.9
Anon_Unit_0101	103	100.0	8.3
Anon_Unit_0250	101	96.0	8.5
Anon_Unit_0201	101	99.0	9.7
Anon_Unit_0253	100	93.0	8.9
Anon_Unit_0154	100	59.0	8.8
Anon_Unit_0104	97	94.9	9.5
Anon_Unit_0290	97	93.8	8.8
Anon_Unit_0141	96	96.9	8.3
Anon_Unit_0243	96	80.2	9.5
Anon_Unit_0184	93	93.6	8.7
Anon_Unit_0190	92	73.9	8.4
Anon_Unit_0218	92	95.7	8.9
Anon_Unit_0304	92	100.0	8.6
Anon_Unit_0302	92	98.9	9.2

Anon Unit Names	Number of Records	% with HbA1c recorded	Median HbA1c
Anon_Unit_0230	91	98.9	8.8
Anon_Unit_0145	91	100.0	8.2
Anon_Unit_0115	87	92.0	8.6
Anon_Unit_0143	86	97.7	7.7
Anon_Unit_0158	85	0.0	0.0
Anon_Unit_0134	84	0.0	0.0
Anon_Unit_0111	84	95.2	8.8
Anon_Unit_0285	84	97.6	9.6
Anon_Unit_0272	81	91.4	9.1
Anon_Unit_0121	81	92.6	9.4
Anon_Unit_0159	80	96.3	8.5
Anon_Unit_0211	80	0.0	0.0
Anon_Unit_0131	78	93.6	8.2
Anon_Unit_0234	77	88.3	8.3
Anon_Unit_0189	73	86.3	7.5
Anon_Unit_0295	69	88.4	9.6
Anon_Unit_0126	68	1.5	0.0
Anon_Unit_0289	68	83.8	8.8
Anon_Unit_0221	66	97.0	9.1
Anon_Unit_0130	64	70.3	9.2
Anon_Unit_0197	63	100.0	8.1
Anon_Unit_0207	63	98.4	9.0
Anon_Unit_0117	59	96.6	8.7
Anon_Unit_0237	59	96.6	8.3
Anon_Unit_0202	58	0.0	0.0
non_Unit_0210	57	96.5	8.9
Anon_Unit_0300	55	0.0	0.0
Anon_Unit_0229	54	3.7	0.0
Anon_Unit_0308	49	95.9	8.5
Anon_Unit_0206	48	100.0	8.5
Anon_Unit_0241	46	84.8	8.2
Anon_Unit_0301	44	97.7	8.9
Anon_Unit_0168	44	90.9	8.5
Anon_Unit_0266	29	6.9	0.0

Appendix G

The National Diabetes Audit Dataset: Annotated for Paediatric Unit Submissions

For each patient please submit

Field No.	Data item name	M/O	Permitted values	Notes
1.	NHS number	M	Format (10N). 10 digit numeric	
2.	Type of data	M	1 Demographic/observation data	
3.	Year of Birth	M	Year: (format CCYY)	
4.	Postcode of usual address	M	The patient's postcode	The postcode will be translated to Super Output Area (SOA) and only the SOA will be stored centrally.
5.	Sex	M	National Codes are used: 0 Unknown 1 Male 2 Female 9 Not specified	
6.	Ethnic category	O	National Codes are used: A British B Irish C Any other White background D White and Black Caribbean E White and Black African F White and Asian G Any other mixed background H Indian J Pakistani K Bangladeshi L Any other Asian background M Caribbean N African P Any other Black background R Chinese S Any other ethnic group Z Not stated	
7.	Death Date	O	Date: (format CCYY-MM-DD)	
8.	GP Practice Code	O	Format X99999, where X can be A-H, J-N, P, W, Y	
9.	NHS organisation code (provider code)	M	This is your NHS organisation code. Format PZXXX– Paediatric Unit code	
10.	Source Unit	M	P	Should be set to "P" for all patients being treated in paediatric units. Should be null for patients being treated in all other units.

Field No.	Data item name	M/O	Permitted values	Notes
11.	Year of Diagnosis (Diabetes)	O	Year: (format CCYY)	
12	Diabetes type	M	01 type 1 02 type 2 06 MODY 08 Other specified 99 Not Specified	Organisations should determine the type of diabetes from local coding systems. Where type 1 or type 2 cannot be derived e.g. a coding of NIDDM or IDDM is used the type should be coded as 08 Other specified
13.	Person observation (BMI)	O	Format 99.9	Only required for children aged 12 years and above
14.	Observation Date (BMI)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided. Also add date if height/weight measurement has been taken for children of all ages.
15.	Systolic Blood Pressure	O	Format (3N). 3 digit numeric	Only required for children aged 12 years and above
16.	Observation Date (Blood pressure)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
17.	Diastolic Blood Pressure	O	Format (3N). 3 digit numeric	Only required for children aged 12 years and above
18.	Observation Date (Blood pressure)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
19.	Person observation (HbA1c Level)	O	Format 99.9	Whilst not mandatory this is the most important care process data item for the audit
20.	Observation Date (HbA1c level)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
21.	Person observation (Serum Creatinine Level)	O	Format (4N). 4 digit numeric	Only required for children aged 12 years and above
22.	Observation Date (Serum creatinine level)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
23.	Person observation (Urinary Albumin Level)	O	Format 9999.99	Only required for children aged 12 years and above
24.	Urinary Albumin Level Testing Method	O	01 Albumin concentration (mg/L) 02 Albumin creatinine ratio (mg/mmol) 03 Timed overnight albumin (ug/min) 04 24hr albumin excretion (mg/24hr)	

Field No.	Data item name	M/O	Permitted values	Notes
25.	Albuminuria Stage	O	01 Normoalbuminuria 02 Microalbuminuria 03 Macroalbuminuria	
26.	Observation Date (Urinary Albumin level)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
27.	Person observation (Total Serum Cholesterol Level)		O Format 99.9	Only required for children aged 12 years and above
28.	Observation Date (Cholesterol level)	O	Date: (format YYYY-MM-DD)	Mandatory if observation value provided
29.	Diabetes routine review (eye)	O	01 Carried out 02 Not done 03 Not necessary	Only required for children aged 12 years and above
30.	Observation Date (Eye examination)	O	Date: (format YYYY-MM-DD)	Mandatory if observation value provided
31.	Diabetes routine review (foot)	O	01 Carried out 02 Not done 03 Not necessary	Only required for children aged 12 years and above
32.	Observation Date (Foot examination)	O	Date: (format YYYY-MM-DD)	Mandatory if observation value provided
33.	Smoking Status	O	National codes: 1 Current smoker 2 Ex-smoker 3 Non-smoker history unknown 4 Never smoked 9 Unknown	Not collected for paediatric data
34.	Observation Date (Smoking status)	O	Date: (format CCYY-MM-DD)	
35.	Patient education review	O	01 Carried out 02 Not done	
36.	Observation Date (patient education review)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
37.	Diabetes Structured Education programme offered	O	01 Carried out 02 Not done	

Field No.	Data item name	M/O	Permitted values	Notes
38.	Observation date (Diabetes Structured Education programme offered)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided
39.	Diabetes Structured Education programme attended	O	01 Carried out 02 Not done	
40.	Observation date (Diabetes Structured Education programme attended)	O	Date: (format CCYY-MM-DD)	Mandatory if observation value provided

For each episode of ketoacidosis you should also submit the following records:

Field No.	Data item name	Permitted values
1	NHS Number	n10
2	Type of data	2 Conditions/complications/procedure data
3	Diagnosis/procedure scheme in use	Format n3 872 – ICD-10 (This will always be 872)
4	Diagnostic coding (Diabetes relevant ICD-10)	E10.1 Insulin-dependent diabetes mellitus with ketoacidosis E11.1 Non-insulin-dependent diabetes mellitus with ketoacidosis E13.1 Other specified diabetes mellitus with ketoacidosis E14.1 Unspecified diabetes mellitus with ketoacidosis E10.0 Insulin-dependent diabetes mellitus with ketoacidosis and coma E11.0 Non-insulin-dependent diabetes mellitus with ketoacidosis and coma E13.0 Other specified diabetes mellitus with coma E14.0 Unspecified diabetes mellitus with coma
5	Observation Date (Diabetes relevant diagnosis)	Date: (format YYYY-MM-DD)

Note: multiple occurrences of record type 2 (ketoacidosis) for a single NHS number within the audit period are permitted.

References

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- 2 Department of Health (2007), *Making Every Young Person with Diabetes Matter: Report of the Children and Young People with Diabetes Working Group*. London: Department of Health.
- 3 Ehtisham S, Hattersley AT, Dunger DB, Barrett TG, (2004), First UK survey of paediatric type 2 diabetes and MODY, for the British Society for Paediatric Endocrinology and Diabetes Clinical Trials Group. *Archives of Disease in Childhood (Jun)*, 89(6): 526–9.
- 4 Gardner SG, Bingley PJ, Sawtell PA, Weeks S, Gale EAM and the BOX Study Group. Rising incidence of insulin-dependent diabetes in children aged under 5 years in the Oxford Region: time trend analysis.
- 5 NHS National Institute for Clinical Excellence (NICE) (2004), *Clinical Guideline 15*, developed by the National Collaborating Centre for Woman’s and Children’s Health and the National Collaborating Centre for Chronic Conditions: Type 1 diabetes: diagnosis and management of type 1 diabetes in children, young people and adults.
- 6 Department of Health (2001), *National Service Framework for Diabetes: Standards*.
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<http://wales.nhs.uk/sites3/documents/334/diabetes-standards-wales.pdf>.
- 8 Innove (2007), *How PCTs are improving their performance: Findings from DiabetesE, Second National Report*. www.innove.co.uk.
- 9 *Technology Appraisal Guidance 60: Guidance on the use of Patient-education models for diabetes (2003)* <http://guidance.nice.org.uk/TA60>.

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