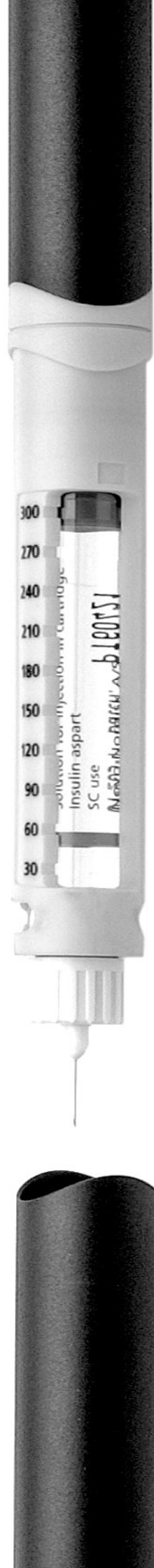


National Diabetes Audit Executive Summary 2009-2010



Prepared in partnership with:



The Healthcare Quality Improvement Partnership (HQIP) promotes quality in healthcare. HQIP holds commissioning and funding responsibility for the National Diabetes Audit and other national clinical audits.



The NHS Information Centre for Health and Social Care (The NHS IC) is England's central, authoritative source of essential data and statistical information for frontline decision makers in health and social care. The NHS IC managed the publication of the 2009-2010 annual report.



Diabetes UK is the largest organisation in the UK working for people with diabetes, funding research, campaigning and helping people live with the condition.



Diabetes

NHS Diabetes works to raise the quality of diabetes care in England by supporting and working with the healthcare community and people with diabetes. The team's role is to ensure the delivery of the Diabetes National Service Framework – a pledge to improve diabetes care in England across the board by 2013. In partnership with people with diabetes, we help develop and support new guidelines, standards and systems designed to improve care, and then encourage the widespread implementation of these new initiatives.



Diabetes Health Intelligence (a strategic programme of Yorkshire and Humber Public Health Observatory) has a commitment to support the diabetes community by providing timely, quality assured national diabetes health analysis and intelligence. Diabetes Health Intelligence actively uses national diabetes audit data throughout its products and tools.



The National Diabetes Information Service (NDIS) provides support to the NHS by providing streamlined access to a comprehensive suite of diabetes information products, datasets and tools. NDIS provides health commissioners, providers and people with diabetes with the necessary information to aid decision making and improve services on a local and national level.



The British Society for Paediatric Endocrinology and Diabetes (BSPED) aims to advance education in paediatric endocrinology and related subjects by promoting research in such areas and disseminating the useful results of such research.

National Diabetes Audit Executive Summary 2009-2010

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

Report for the audit period
2009-2010

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Foreword

Do the basics well

We live in the 21st Century. Painstaking research over many years studying thousands of people with diabetes has provided good evidence for the care that will help keep people with diabetes alive and well. Libraries and the internet are bursting with evidence-based guidance for patients and healthcare professionals summarised in the NICE Quality Standard for Diabetes. So why do many people with diabetes not get all the care they need, especially younger people? In other words, "we know what to do, so why aren't we doing it?"

All those who have contributed to the National Diabetes Audit (NDA), and everyone involved in running and analysing it are to be congratulated on a phenomenal success. The world's largest published audit has grown still more and now includes 1,929,985 records from people with diabetes in England, 17,796 of them under 16 years old. This totals over 80 per cent of people with diabetes in England. The audit includes all recorded data for participants, with no exceptions.

The NDA results continue to show gradual improvements in care, but despite last year's reminders, still only half the people with Type 2 diabetes, and less than a third of those with Type 1 diabetes have all nine of the basic care processes. These processes monitor treatable risks for diabetic tissue damage, and detect the early damage itself so that treatment can be given to prevent deterioration. But we know that at least 95 per cent of patients with Type 2, and 86 per cent of those with Type 1 diabetes have seen their care provider at least once in the year because their blood pressure was recorded. So why are all the basic checks not being done? And why, when problems such as high blood pressure are found, are we not doing better at improving it?

As last year, the NDA shows that younger people with diabetes aged 16 - 55 are less likely than older patients to receive all their basic checks. Some 444,000 of them have glucose levels that put them at risk of diabetic complications such as blindness or kidney failure. Failure to support and educate patients to control glucose safely in Type 1 diabetes increases the risk of diabetic ketoacidosis (DKA), a rapid-onset, potentially fatal complication. Over one in ten people with diabetes have had DKA in the past 5 years. In many cases this could have been prevented.

Diabetes care is a partnership between people with diabetes and healthcare professionals. We need to ensure that people with diabetes know what they need to do to look after themselves to stay well, and that they are assertive in ensuring that they have all the checks and treatment they need. Health care managers and clinical staff need to work together to provide accessible care (both geographically and at appropriate times) tailored to patients needs, and be rigorous about ensuring that every patient has every check and receives appropriate treatment tailored to his or her needs and wishes.

The NICE Quality Standard for Diabetes defines optimal care of adults with diabetes and the NDA provides much of the data to measure compliance with the Quality Statements. So all diabetes services are urged to participate.

We all know what to do, so why aren't we doing it? Don't just sit there. Do something! Do the basics well.

DH Gateway reference 16065

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Rowan Hillson

Introduction

This is the seventh annual report of the National Diabetes Audit (NDA) presenting the key national findings from 2009-2010 in all age groups. The NDA includes data from both primary and secondary care participants. Another report based exclusively on data from specialist paediatric units providing care for children and young people with diabetes is published separately. The NDA provides overall, sequential and comparative information at GP, hospital, PCT, regional and national levels.

The National Diabetes Audit (NDA) is commissioned and sponsored by the Healthcare Quality Improvement Partnership (HQIP) following advice to the Department of Health from the National Clinical Audit Advisory Group (NCAAG).

The NDA currently covers four 'core care' components of the National Service Framework (NSF) for Diabetes¹. Care Process and Treatment Target standards are derived from NICE Clinical Guidelines², including CG015³, CG66⁴ and CG87⁵ and NICE diabetes in adults quality standards⁶.

1. Registrations:

Is everyone with diabetes diagnosed and recorded on a practice diabetes register?

2. Care Processes:

What percentage of people registered with diabetes received the nine key processes of diabetes care (Measure: Weight, Blood Pressure, HbA1c, Urine Albumin Creatinine Ratio (UACR), Serum Creatinine, Serum Cholesterol; Assess: Eyes, Feet, Smoking)?

3. Treatment Targets:

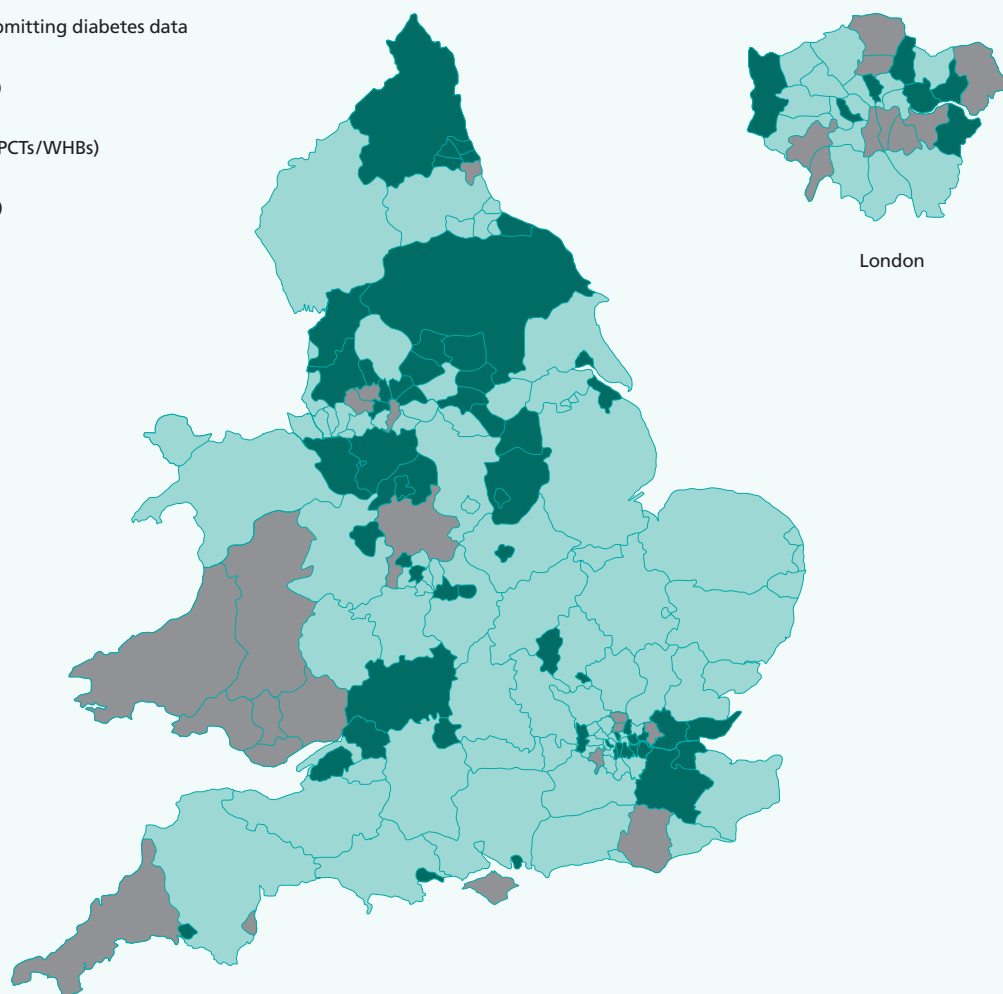
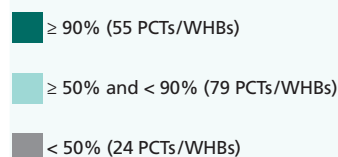
What percentage of people registered with diabetes achieved NICE defined treatment targets for glucose control, blood pressure and blood cholesterol?

4. Complications:

For people with registered diabetes what are the rates of acute and long term complications (disease outcomes)?

Figure 1
Participation in the 2009-2010 National Diabetes Audit by Primary Care Trust (PCT) / Welsh Health Board (WHB)

Percentage of practices submitting diabetes data



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Key Findings England

Participation

GPs in all 151 Primary Care Trusts (PCT) in England participated in the NDA; data was submitted from 6507 out of 8357 recorded practices in England. Furthermore, 61 acute hospitals from across 53 of the 166 acute hospital trusts and 141 of 177 registered paediatric units in England also participated in the 2009-2010 NDA.

In 55 PCTs more than 90 per cent of the practices participated, in only 24 PCTs was the participation less than 50 per cent, while 21 PCTs included every practice (Figure 1).

Data on 1,881,701 people with diabetes was collected from General Practices, with an additional 48,284 registrations contributed from Specialist Services alone. Of the 1,929,985 records from people with diabetes collected in England, 17,796 are under 16 years of age. The NDA contains 81.1 per cent of the 2.34 million people aged 17 years and over with diagnosed diabetes reported by the Quality and Outcomes Framework (QOF). This is a 16.4 per cent increase in the number of records from people with diabetes included in the audit when compared to 2008-2009.

Registrations

Increasing prevalence

For participating practices the average prevalence of diagnosed diabetes is 4.35 per cent, which is a 5.3 per cent increase in diabetes prevalence since 2008-2009 (4.13 per cent). Breakdown of diabetes type was:

- 3.87 per cent had a recorded diagnosis of Type 2 diabetes
- 0.40 per cent had a recorded diagnosis of Type 1 diabetes
- 0.03 per cent another specified type of diabetes
- 0.04 per cent the type of diabetes was unspecified

The prevalence of diagnosed diabetes is higher in males (M) than females (F):

- Type 1 diabetes - 0.46 per cent M and 0.34 per cent F (p < 0.0001)
- Type 2 diabetes - 4.35 per cent M and 3.41 per cent F (p < 0.0001)

The annual rate of increase in the recorded prevalence of diabetes during the 7 years of the audit has varied from 1.6 to 6.6 per cent. In 2009-2010 the prevalence of diagnosed diabetes was 33.4 per cent greater than in 2003-2004 (3.26 per cent to 4.35 per cent). This could be due to an actual increase, an increase in case finding, a change in recording accuracy, changes in the demographics of participating health economies or any combination of these factors.

The prevalence of diabetes for people aged '16 years and over' is higher (5.24 per cent) than for all ages (4.35 per cent). This is because diabetes is less common in children. The '16 and over' prevalence is comparable to the prevalence reported by QOF, 5.40 per cent, which excludes the '16 and under'. The Association of Public Health Observatories (APHO) Diabetes Prevalence Model⁷ for the '16 and over', results in a mean expected prevalence of 7.06 per cent. This implies that for every three people aged 16 and over, with diagnosed diabetes, there could be one with undiagnosed diabetes.

Geographic variation

The NDA prevalence differs from that reported by QOF because the NDA denominator includes all ages and not just people over the age of 17 years. Analysis shows that the likelihood of being diagnosed with diabetes is not influenced by location or socioeconomic status. The appreciable geographic variation in prevalence of diagnosed diabetes reflects genuine differences.

Regional prevalence of diabetes is highest in the West Midlands SHA (4.75 per cent) and lowest in South Central SHA (3.82 per cent). Between PCTs in which more than 50 per cent of practices participated the variation is greater (2.76 per cent to 6.36 per cent).

This variation is due mainly to differences in the prevalence of Type 2 diabetes (Table 1) and reflects the variations predicted by the APHO diabetes prevalence model due to differences in population composition (age, deprivation, ethnic group). The total number of patients with a diagnosis of Maturity Onset Diabetes in the Young (MODY) recorded in their care record was only 432 (range per SHA region 22 - 72).

Table 1
Maximum / minimum diabetes prevalence by diabetes type and SHA

Diabetes type	Maximum prevalence	Minimum prevalence
Type 1	0.45 (North East SHA)	0.32 (London SHA)
Type 2	4.29 (West Midlands SHA)	3.33 (South Central SHA)
'Other' specified	0.05 (South West SHA)	0.01 (Yorkshire & The Humber SHA)
Not specified	0.08 (East of England SHA)	0.01 (North West SHA)

Effects of ethnicity, age and deprivation

In 72.1 per cent of cases ethnic origin was recorded (up from 63.9 per cent in 2008-2009). Social deprivation was assigned in 99.98 per cent of records using Indices of Multiple Deprivation (IMD) 2007⁸ based on the Lower Super Output Area (LSOA) of the patient. People with diabetes included in the NDA analysis are assigned to a deprivation quintile with Q1 being the 20 per cent least deprived and Q5 the 20 per cent most deprived.

Recorded ethnicity in Type 1 diabetes was shown to be:

- 87.2 per cent White
- 5.3 per cent Asian
- 3.0 per cent Black
- 4.5 per cent 'Other'

This is similar to the national population profile (88.25 per cent White, 5.7 per cent Asian, 2.83 per cent Black, 3.22 per cent 'Other'). For Type 1 diabetes there is no association of prevalence with social deprivation. Between ages 10 years and 80 years Type 1 diabetes is found in a remarkably consistent proportion of the population (0.34-0.55 per cent).

By contrast, Type 2 diabetes is strongly associated with age, ethnicity and social deprivation. Type 2 diabetes rises in prevalence from 0.05 per cent for ages 16-24 years and peaks at 14.44 per cent at ages 70-84 years.

In Type 2 diabetes ethnicity percentages were:

- 77.7 per cent White
- 13.2 per cent Asian
- 4.3 per cent Black
- 4.8 per cent 'Other'

The prevalence of Type 2 diabetes rose from 3.18 per cent in the least deprived quintile (Q1) to 4.49 per cent in the most deprived quintile (Q5). Furthermore, the effect of deprivation on the prevalence of Type 2 diabetes is most pronounced in the 16 to 55 years age range (Table 2). In those aged 70 years and over, similar numbers of Q1 (12.1 per cent) and Q5 (14.8 per cent) have Type 2 diabetes, but under the age of 55 Type 2 diabetes is more than twice as common in Q5 (3.0 per cent) as Q1 (1.3 per cent). This may reflect lifestyle differences in exercise, diet and weight.

Table 2
Type 2 prevalence by age band and deprivation quintile

Age Band (years)	Diabetes Prevalence in Type 2 by age band and deprivation quintile				
	Least deprived - Q1	Q2	Q3	Q4	Most deprived - Q5
0 - 5	0.00	0.00	0.00	0.00	0.00
6 - 10	0.00	0.00	0.00	0.00	0.00
11 - 15	0.00	0.01	0.01	0.01	0.02
16 - 24	0.02	0.03	0.04	0.06	0.08
25 - 39	0.30	0.37	0.51	0.68	0.98
40 - 54	2.13	2.55	3.14	4.00	5.32
55 - 69	7.18	8.25	9.06	9.88	11.44
70 - 84	12.74	14.07	14.78	15.11	15.77
85+	9.37	10.57	10.72	10.84	9.95
National	3.18	3.64	3.93	4.12	4.49

The prevalence of diabetes, all types, rises steadily from 0.42 per cent in the 16-24 years age group to 15.05 per cent in the 70-84 years age group. Young and middle aged people with diagnosed diabetes represent just over 25 per cent of the total:

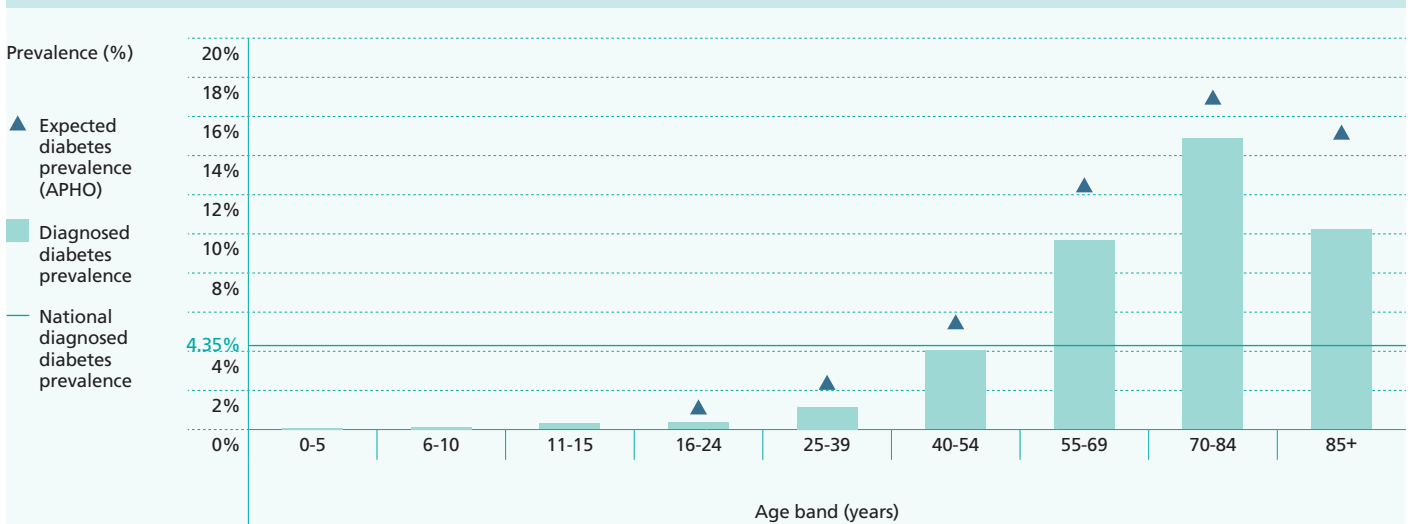
- 121,899 (6.4 per cent) are aged 16-39 years
- 364,707 (19.2 per cent) are aged 40-54 years

However, the greatest difference between predicted and diagnosed prevalence is in the younger age groups (Figure 2):

- Ages 16-24 - diagnosed prevalence 0.42 per cent, predicted prevalence 1.26 per cent
- Ages 40-54 - diagnosed prevalence 4.03 per cent, predicted prevalence 5.48 per cent
- Ages 70-84 - diagnosed prevalence 15.05 per cent, predicted prevalence 16.90 per cent

This suggests that a much higher percentage of older people than younger people are being diagnosed promptly although of course the absolute number of undiagnosed is greater in the 55-69 years age group (200,000) than in the 25-39 years age group (100,000).

Figure 2
Expected and diagnosed diabetes prevalence by age band



Body Mass Index (BMI)

For Type 1 diabetes the distribution of BMI is similar to the national population, but considerably skewed towards obesity in people with Type 2 diabetes (Figure 3, 4).

In people with Type 1 diabetes:

- Aged 16-54 years:
 - 43.3 per cent are normal or underweight
 - 34.4 per cent are overweight
 - 22.2 per cent are obese
- Aged 55 years and over:
 - 27.2 per cent are normal or underweight
 - 38.4 per cent are overweight
 - 34.4 per cent are obese

In people with Type 2 diabetes:

- Aged 16-54 years:
 - 10.0 per cent are normal or underweight
 - 26.9 per cent are overweight
 - 63.0 per cent are obese
- Aged 55 years and over:
 - 16.3 per cent are normal or underweight
 - 36.0 per cent are overweight
 - 47.6 per cent are obese

Figure 3
Percentage of people with Type 1 diabetes by BMI band and age group

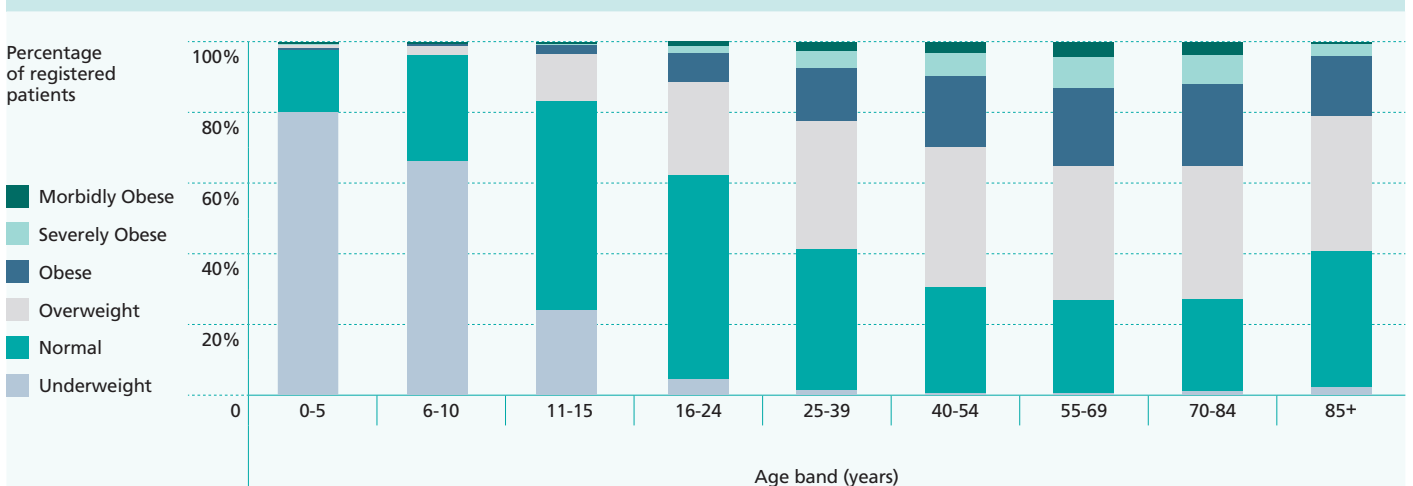
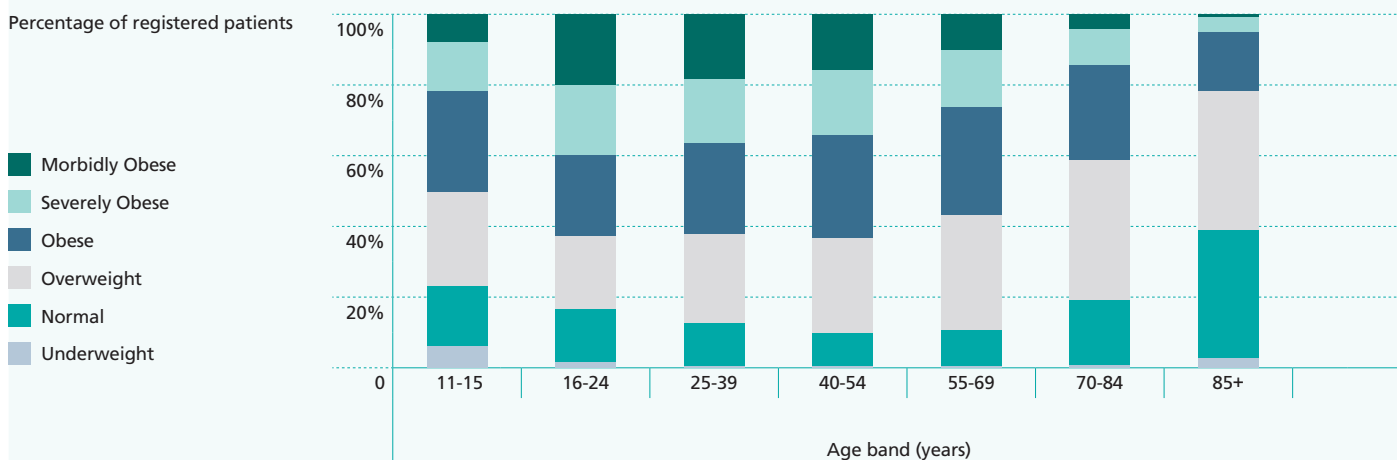


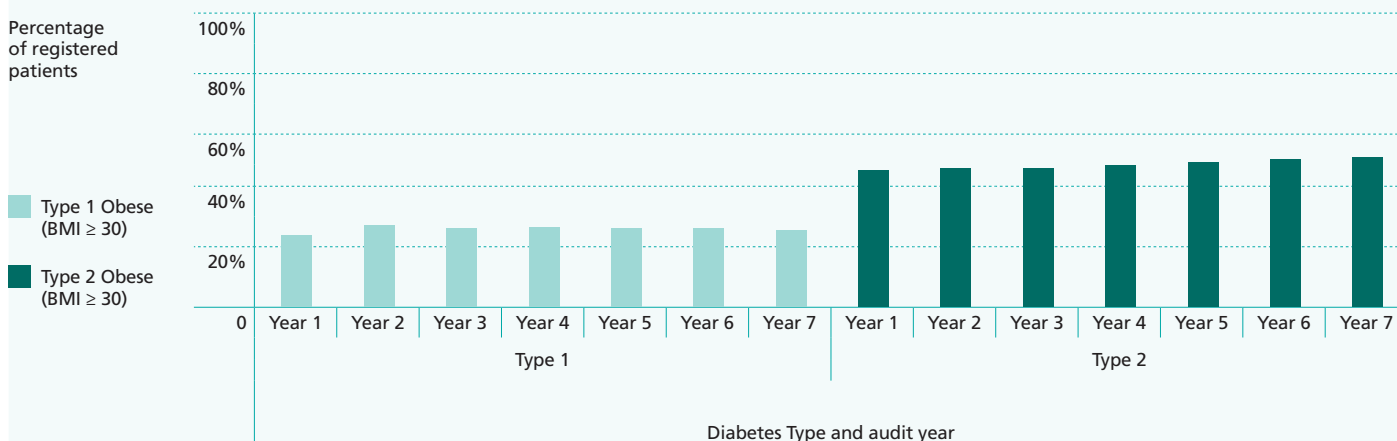
Figure 4
Percentage of people with Type 2 diabetes by BMI band and age group



The 2008 Health Survey for England found the prevalence of obesity (BMI >30kgm⁻²) to be 24 per cent in men and 25 per cent in women^{9, 10}. Results from the 2009-2010 audit show that people with Type 1 diabetes had similar levels of obesity to the figures from the Health Survey, but the rates of obesity in people with Type 2 diabetes were twice those in the Health Survey.

Over the seven years of the audit, obesity (BMI>30 kgm⁻²) has increased by 7.9 per cent in Type 1 diabetes (from 24.1 per cent to 26.0 per cent) and 8.8 per cent in Type 2 diabetes (from 46.4 per cent to 50.9 per cent, [Figure 5](#)).

Figure 5
Changing prevalence over time of obesity by diabetes type



Care processes

All processes (bundle completion)

The percentage of patients receiving all of the nine, National Institute for Clinical Excellence (NICE) recommended, care processes (the core annual review 'bundle') continues to increase. In 2009-2010, 52.9 per cent of people with Type 2 diabetes and 31.9 per cent of people with Type 1 diabetes received all nine care processes as compared to only 8.1 and 6.8 per cent respectively seven years ago but that means almost half of people with Type 2 and two thirds of people with Type 1 diabetes still do not achieve this basic standard of care.

Variation by care process

Blood pressure measurement remains the most frequently recorded process at 95.4 per cent in Type 2 diabetes and 86.6 per cent in Type 1 diabetes. Because this could only be recorded in the patient record following an attendance for measurement, it follows that most people with diabetes must be meeting with their care providers at least annually.

The audit shows some care processes are done frequently:

- Weight measurement (90.5 per cent Type 2, 83.2 per cent Type 1)
- HbA1c (92.6 per cent Type 2, 87.0 per cent Type 1)

However, for care processes that check for the emergence of early complications, the overall upward trend still leaves large proportions of patients, particularly Type 1 diabetes, unassessed.

- Retinopathy Screening (78.9 per cent Type 2, 68.1 per cent Type 1)
- Foot Risk Assessment (85.2 per cent Type 2, 67.8 per cent Type 1)
- Renal (UACR) Risk Assessment (73.7 per cent Type 2, 54.4 per cent Type 1)

Effects of age, sex, deprivation and ethnicity

Social deprivation, sex, and duration of diabetes do not affect the likelihood of the care processes being completed. However, age does have an effect with younger people less frequently receiving the core processes of care (Figure 6). Ethnicity is also associated with small differences in completion of all care processes (White 52.8, Asian 49.9, Black 49.6 and 'Other' 48.4 per cent).

Geographical variation

There are big variations between health economies in the percentage of patients receiving the care processes. In 19 PCTs 'all nine care processes' are completed in more than 60 per cent of patients, with a maximum value of 68.7 per cent, whereas, in 2 PCTs the figure is less than 10 per cent, with a minimum value of 6.4 per cent (Figure 7).

Figure 6
'All nine care processes' completed by age band

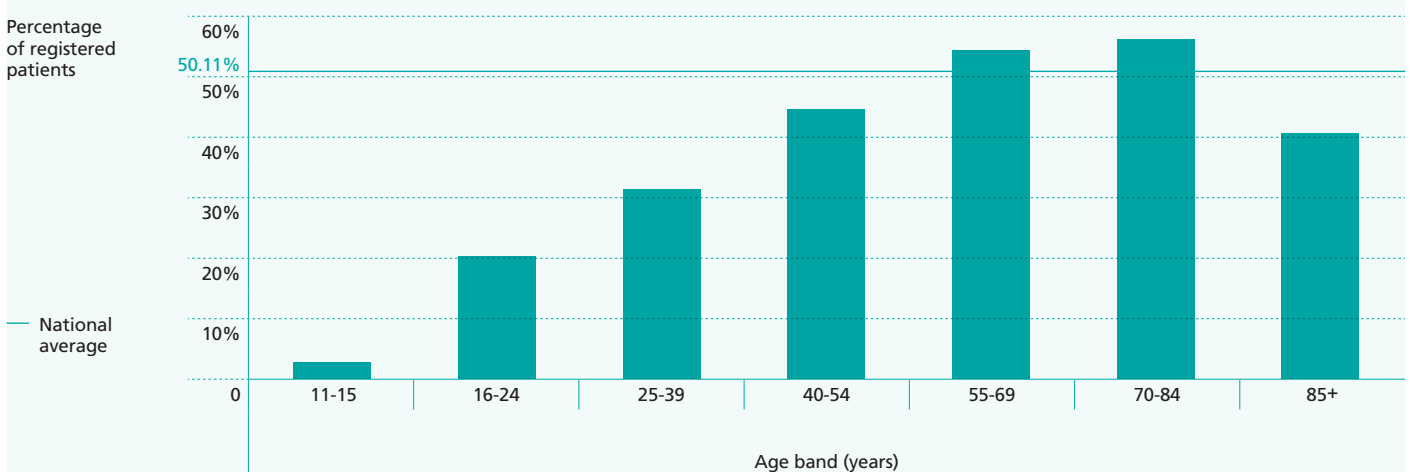


Figure 7
Percentage of patients receiving 'all nine care processes' by PCT

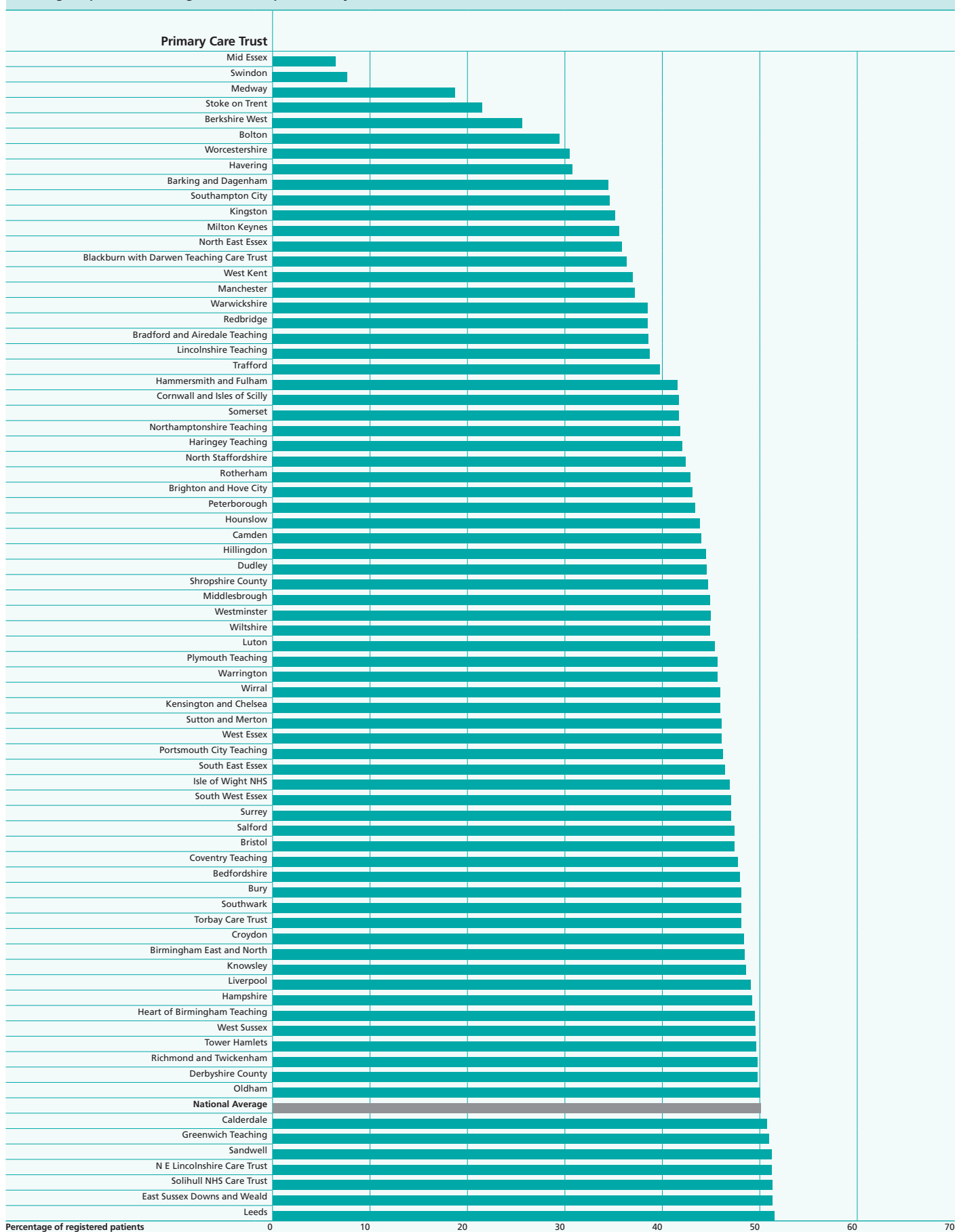
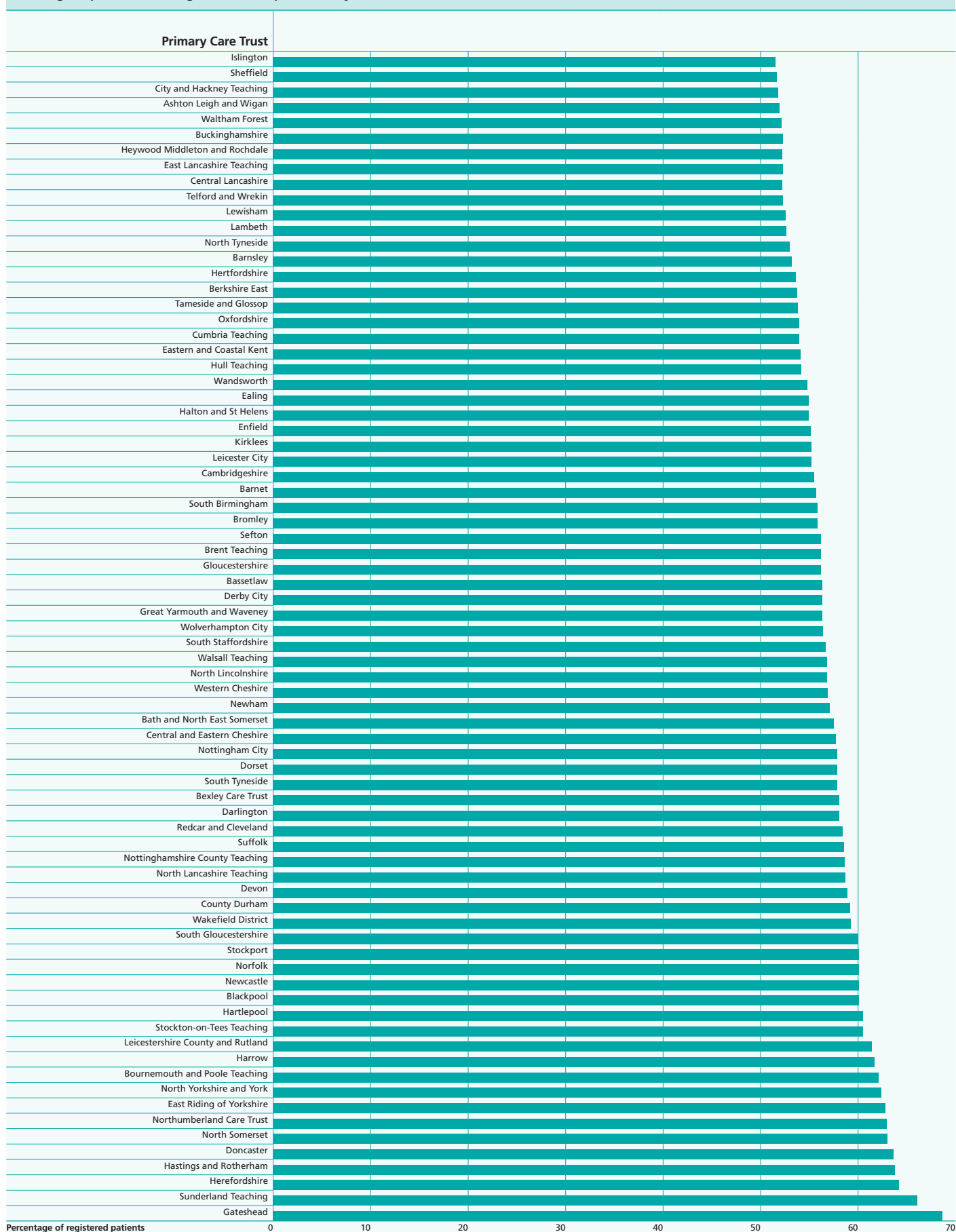


Figure 7 (continued)

Percentage of patients receiving 'all nine care processes' by PCT



Treatment targets

Glucose control (HbA1c)

85.8 per cent of records from people with Type 1 diabetes and 91.0 per cent of people with Type 2 diabetes included an HbA1c measurement.

The NICE recommended HbA1c of ≤ 7.5 per cent (59mmol/mol) target was achieved in 66.5 per cent of the measurements from people with Type 2 diabetes but only 28.2 per cent of the measurements from people with Type 1 diabetes. Thus, overall 37.0 per cent of people with diabetes are at high risk of future complications due to glucose control above recommended levels.

Furthermore, 17.0 per cent of people with Type 1 diabetes and 6.7 per cent of people with Type 2 diabetes have very high risk glucose control (HbA1c of >10 per cent, 86mmol/mol). These overall results are very similar to those found in the 2006-2007, 2007-2008 and 2008-2009 audits.

Effects of age, deprivation and ethnicity

There are appreciable sub group differences in the rates of achieving target glucose control. Younger age, more social deprivation and Asian or Black ethnicity were associated with higher risk glucose control (Figures 8, 9, 10).

For Type 1 diabetes

HbA1c of ≤ 7.5 per cent (59mmol/mol):

- More likely with increasing age
- More likely with decreasing social deprivation

HbA1c >10.0 per cent (86mmol/mol):

- Highest in the 16-24 years age band (33.0 per cent)
- Lowest in the 70-84 years and over age band (8.1 per cent)
- Associated with social deprivation:
 - Least deprived (Q1) 12.1 per cent
 - Most deprived (Q5) 23.7 per cent
- Associated with ethnicity:
 - White 16.8 per cent
 - Asian 21.5 per cent
 - Black 18.1 per cent

For Type 2 diabetes

HbA1c of ≤ 7.5 per cent (59mmol/mol):

- More likely with older age:
 - 53.4 per cent age <55 years
 - 74.4 per cent >70 years
- Associated with less social deprivation:
 - Least deprived (Q1) 69.6 per cent
 - Most deprived (Q5) 63.1 per cent
- Associated with ethnicity:
 - White 68.3 per cent
 - Asian 56.9 per cent
 - Black 60.9 per cent
 - Other 64.8 per cent
- Less likely with increasing obesity:
 - 73.4 per cent achieved target when BMI was 18.5 - 24.9
 - 58.7 per cent achieved target when BMI was ≥ 40 .

HbA1c of > 10 per cent (86mmol/mol):

- Less likely with increasing age
- Associated with social deprivation:
 - Least deprived (Q1) 4.9 per cent
 - Most deprived (Q5) 8.8 per cent
- Associated with ethnicity:
 - White 6.1 per cent
 - Asian 9.4 per cent
 - Black 11.0 per cent

Figure 8
HbA1c \leq 7.5 per cent (59mmol/mol) target achievement by gender and diabetes type

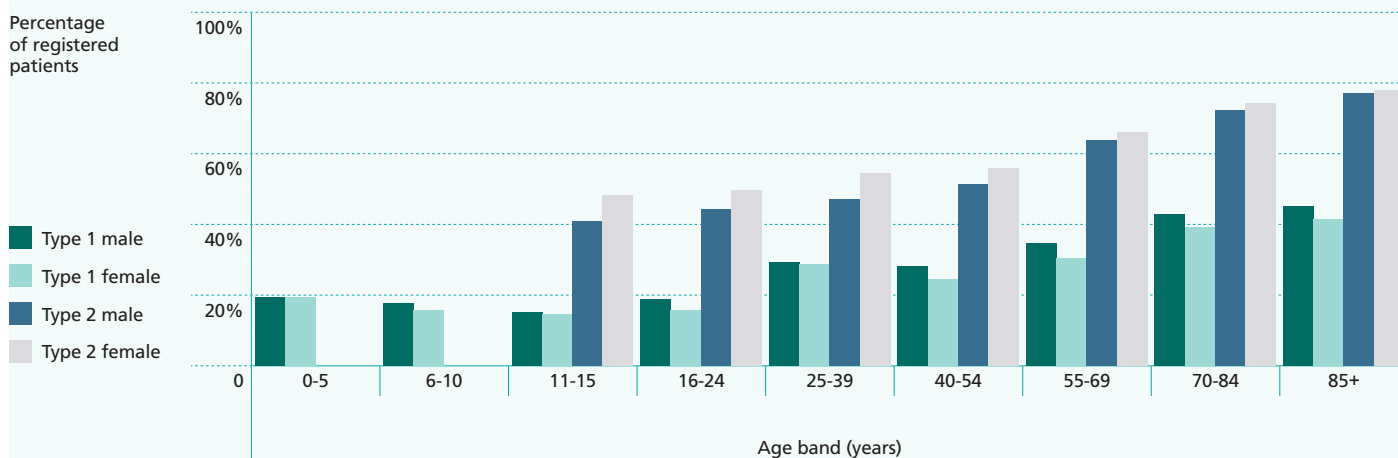


Figure 9
HbA1c \leq 7.5 per cent (59mmol/mol) target achievement by gender and social deprivation

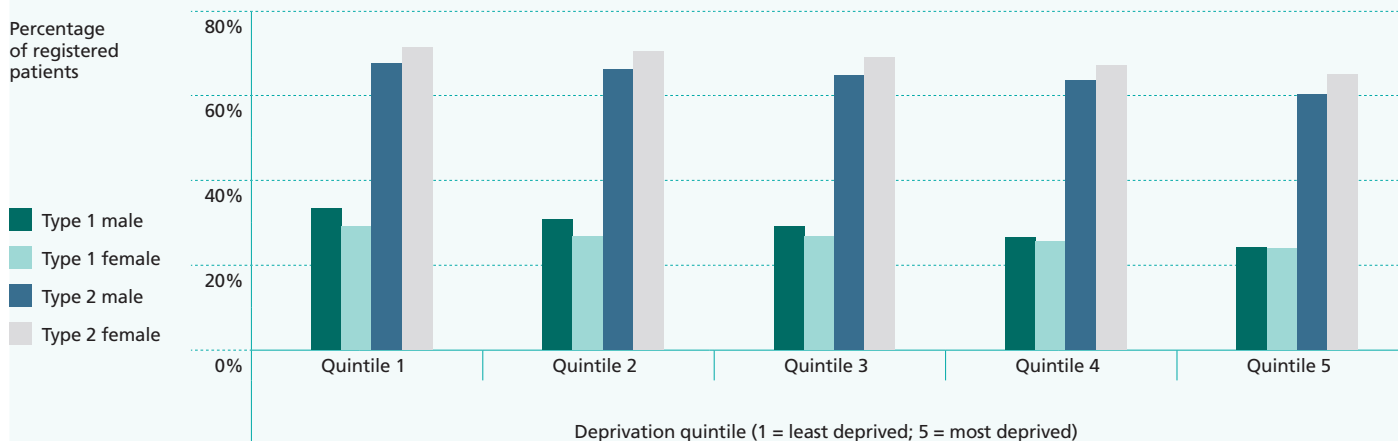
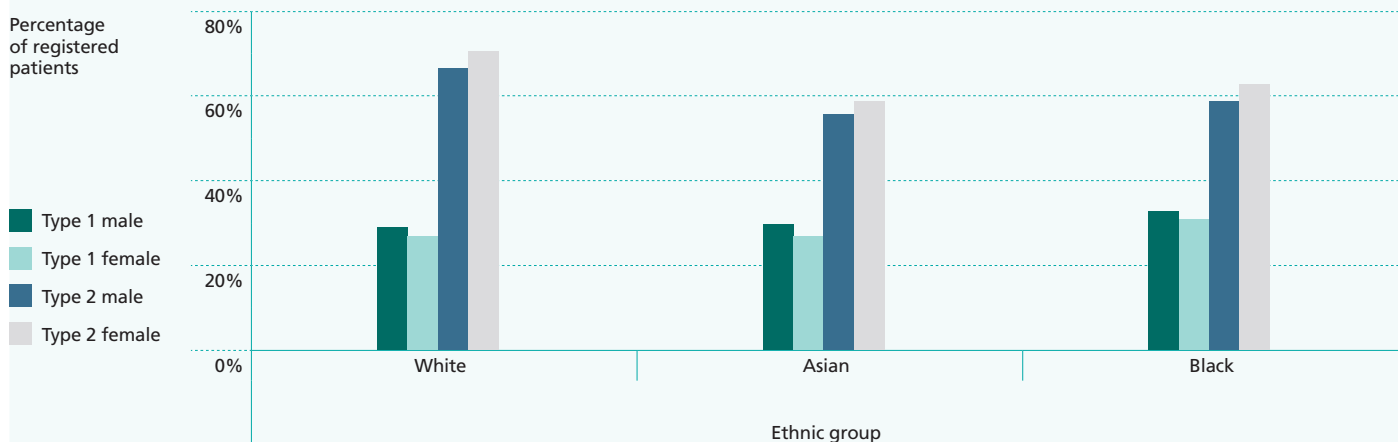


Figure 10
HbA1c \leq 7.5 per cent (59mmol/mol) target achievement by gender and ethnicity



Blood pressure

86.6 per cent of people with Type 1 diabetes and 95.4 per cent of people with Type 2 diabetes had their blood pressure (BP) measured in 2009-2010. The NICE revised (2008) overall combined blood pressure target is 140/80. However, there is a more stringent target of 130/80 for those with evidence of eye, kidney or vascular disease.

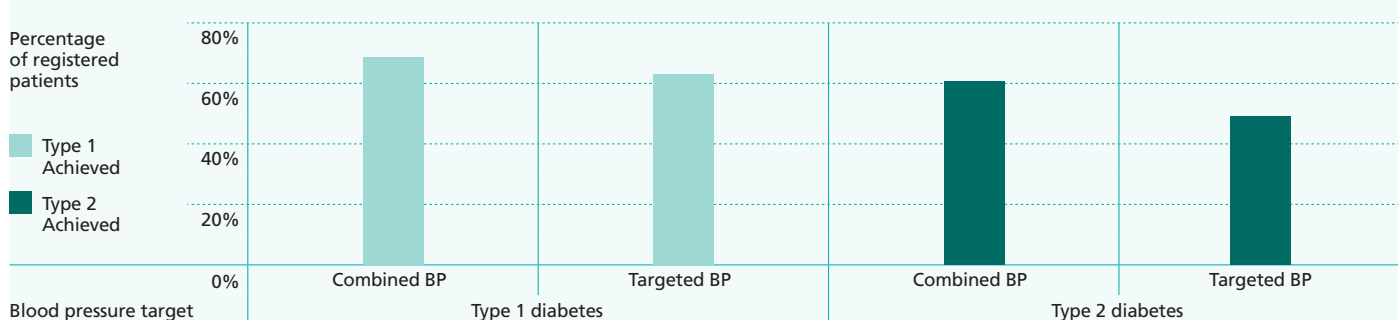
The combined BP 140/80 target was achieved in 69.3 per cent of people with Type 1 diabetes and 60.7 per cent of people with Type 2 diabetes.

NICE 'targeted BP'

When the blood pressure target of 140/80 was applied only to those without recorded eye, kidney or vascular disease (EKV-) and the target of 130/80 was applied to those with recorded eye, kidney or vascular disease (EKV+), collectively termed 'targeted BP', the number of people achieving the NICE recommended targeted BP fell to 63.3 per cent in Type 1 and 49.5 per cent in Type 2 diabetes. Thus:

- People with Type 2 diabetes are less likely to achieve their blood pressure target than people with Type 1 diabetes (Figure 11)
- Many patients with eye, kidney or vascular disease who achieve the 140/80 target do not achieve the complication related 130/80 target

Figure 11
BP achievement by type of diabetes. Combined BP is where <140/80 applied to all persons with diabetes. Targeted BP is where a <140/80 for those without recorded eye, kidney or vascular disease (EKV-) and <130/80 for those with recorded eye, kidney, or vascular disease (EKV+)



Effects of body mass index and ethnicity

In both Type 1 and Type 2 diabetes, sex and social deprivation were not related to variation in NICE targeted blood pressure achievement rates. However, people from the Black ethnic group are less likely to achieve the NICE targeted blood pressure than people from White, Asian and 'Other' ethnic groups (Figure 12). Furthermore, obesity is inversely correlated to targeted blood pressure achievement rates (Figure 13):

- 72.4 per cent of people with Type 1 diabetes who are in the 'normal' BMI band achieve the NICE targeted BP, whereas only 44.4 per cent of 'morbidly obese' Type 1 diabetics achieve their NICE targeted BP
- 56.5 per cent of people with Type 2 diabetes who are in the 'normal' BMI band achieve the NICE targeted BP, whereas only 42.9 per cent of 'morbidly obese' Type 2 diabetics achieve their NICE targeted BP

Figure 12
Percentage of registered patients achieving the NICE targeted blood pressure by ethnic group and diabetes type

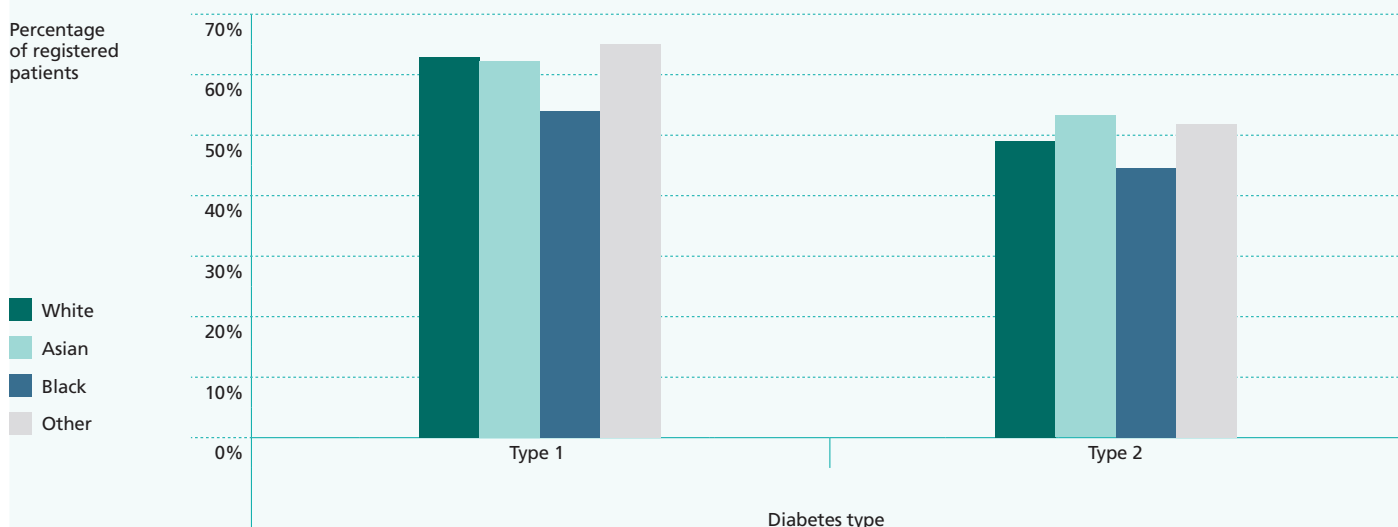
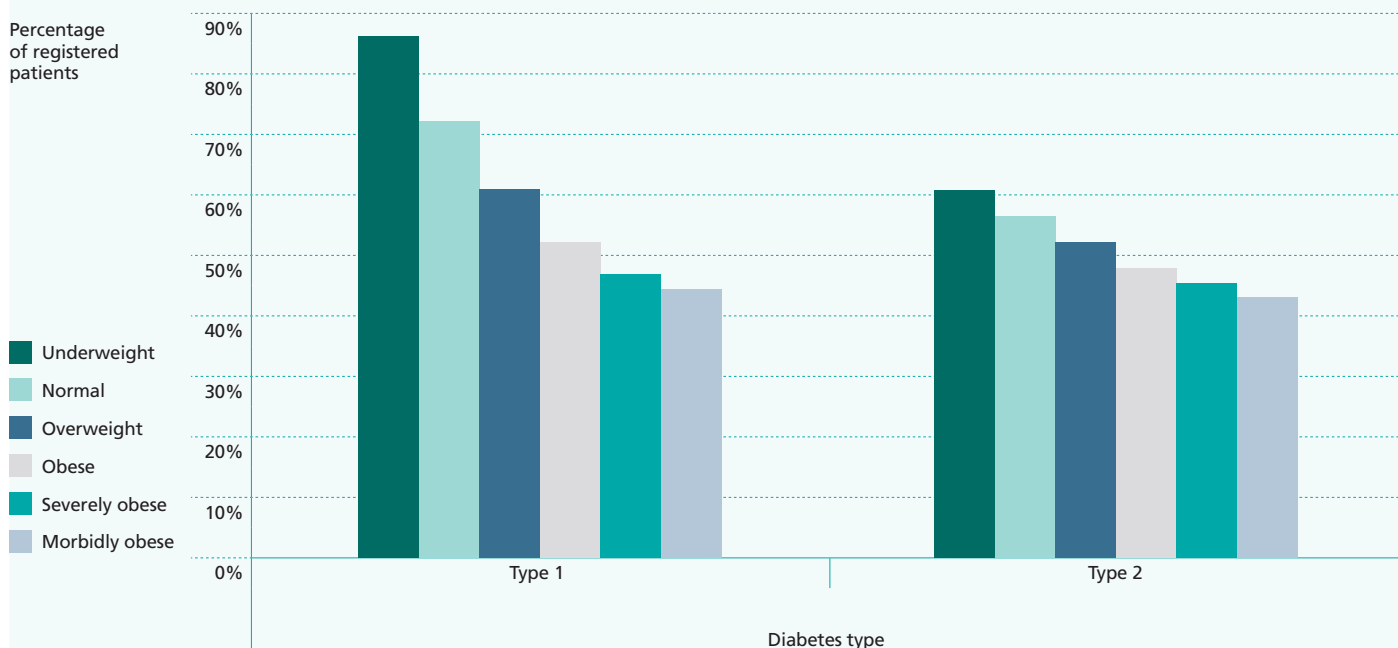


Figure 13
Percentage of registered patients achieving the NICE targeted blood pressure by BMI band and diabetes type



Cholesterol

74.8 per cent of people with Type 1 diabetes and 92.4 per cent of people with Type 2 diabetes had their cholesterol measured in 2009-2010.

- The NICE cholesterol target of <5.0 mmol/l was achieved by 72.5 per cent of people with Type 1 diabetes and 78.3 per cent of people with Type 2 diabetes
- The more stringent target of <4.0 mmol/l introduced in 2008 was achieved in only 30.2 per cent of people with Type 1 diabetes and 40.9 per cent of people with Type 2 diabetes

Effects of age

Age was strikingly the most significant association with cholesterol target achievement. Over 80 per cent of both Type 1 and Type 2 patients, older than 55 years, achieved the <5.0 mmol/l target, whereas in the 16-40 years age bands it was 63.4 per cent. There was a much higher target achievement percentage in the 40-54 years age band (70.6 per cent Type 1 and 70.2 per cent Type 2) than in the 16-24 age band (68.4 per cent Type 1 and 58.3 per cent Type 2), possibly due to age 40 years being a common clinical threshold for offering cardiovascular risk reduction with statin treatment. There were no associations with deprivation or ethnicity.

Complications

The complications of diabetes are the final outcomes of care. Of all aspects of diabetes they have the greatest costs to the patient and the health service. The treatment targets are sometimes called 'intermediate outcomes' because their achievement reduces the risk of developing complications. Apart from diabetic ketoacidosis (DKA) in Type 1 diabetes, which is an immediate consequence of treatment failure, the other complications arise only after many years of exposure to high blood glucose, high blood pressure and high cholesterol. Therefore, the evidence of lower rates of care process and treatment target

achievement in younger people with diabetes is of great cause for concern in respect of their future health. Complications prevalence is defined as the number of people who have had one or more records of a specific complication over a defined time period - either one year (1 year prevalence) or five years (5 year prevalence).

In patients with diabetes the rates of several complications - myocardial infarction, heart failure, retinopathy treatment and amputation - recorded in the NDA have remained relatively stable (Figures 14,15). However, cardiovascular complications are appreciably higher than in the population overall (Table 3).

Table 3
Complication prevalence in people with diabetes and the general population

Complications	1 year prevalence (%)	
	People with diabetes	National*
Ketoacidosis	0.48	0.02
Angina	3.13	0.64
Myocardial Infarction	0.60	0.16
Cardiac failure	1.58	0.39
Stroke	0.69	0.22
End stage kidney disease treatment	0.38	0.08
Diabetic retinopathy treatments	0.42	0.03
Minor amputation	0.13	0.01
Major amputation	0.07	0.01

* Rates for the whole population of England, including people with diabetes

Some complications, notably DKA in Type 1 diabetes and overall rates for both stroke and end stage kidney disease (ESKD) treatment show steady upward trends (Figure 14). Because of the increasing prevalence of diabetes the absolute number of patients with complications is still increasing even among the complications with stable overall rates. This has important implications for the impact of diabetes on health service resources. Where trends are evident many factors may be influential. For example, in respect of major and minor amputations in Type 2 diabetes (Figure 15), the downward trends may be due to any combination of the following: an increasing denominator (rising numbers of people with recently diagnosed diabetes); changing demographics (younger people living longer with diabetes, elderly people living shorter with diabetes); changing lifestyles (alcohol, smoking); and improved treatment (ulcer management and foot care protection).

Figure 14
 '5 year prevalence' complication trends in Type 1 diabetes

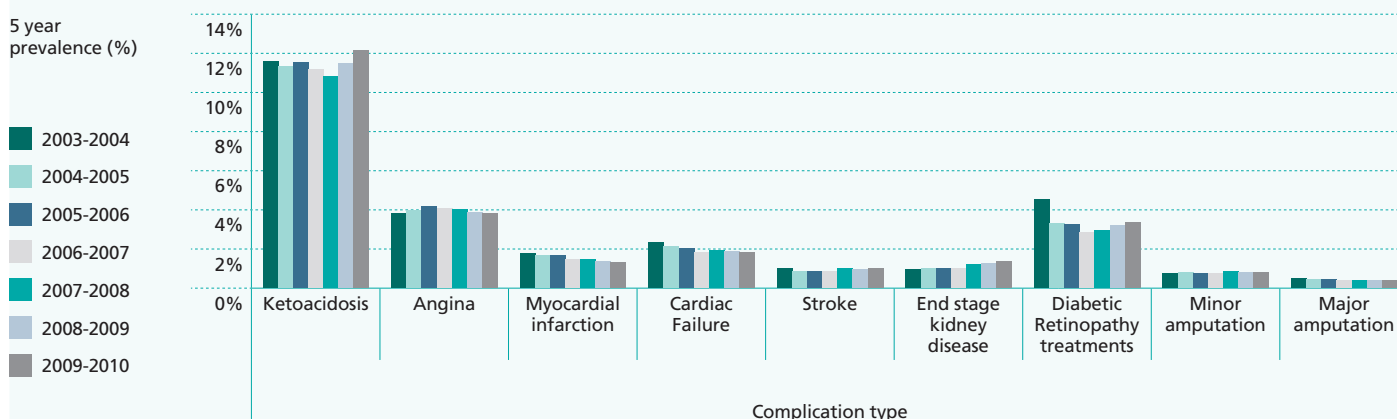
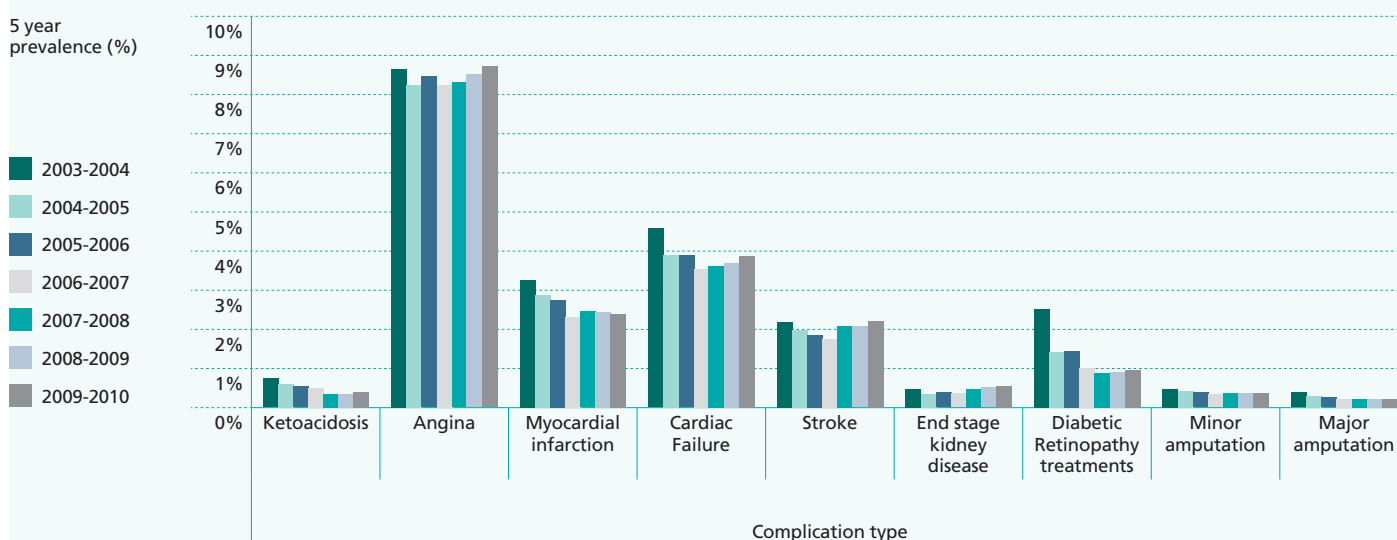


Figure 15
 '5 year prevalence' complication trends in Type 2 diabetes



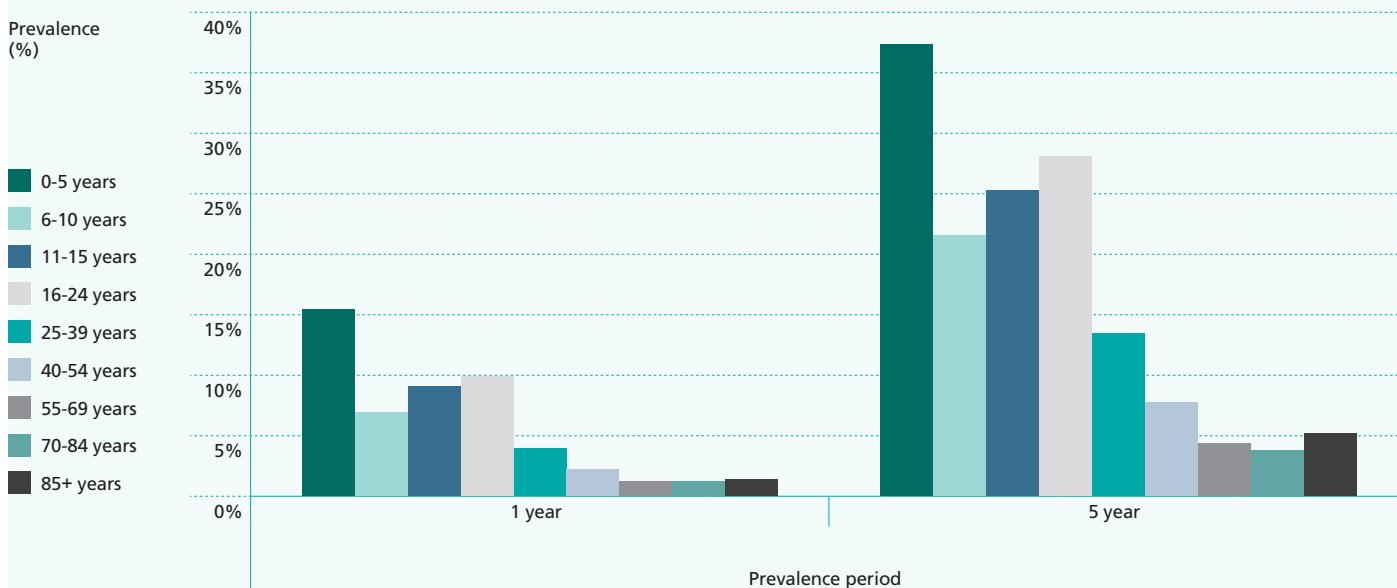
Ascertainment reliability

The prevalence of complications is ascertained by determining which people with diabetes identified in the NDA have had relevant admissions recorded in the Hospital Episodes Statistics database (HES). This overcomes the concern that people with diabetes admitted to hospital with complication identifying diagnoses will be missed because diabetes was not included in the hospital discharge coding. Prevalence is defined as the number of people who have had one or more records of a specific complication over the defined time period. Incidence is defined as the total number of times a specific complication has occurred within the defined time period.

Diabetic ketoacidosis

The 5 year prevalence of DKA recorded in people with Type 1 diabetes was over 12 per cent. 3.9 per cent had DKA during 2009-2010. DKA is more prevalent in young people with Type 1 diabetes (Figure 16).

Figure 16
 '1 year prevalence' and '5 year prevalence' of diabetic ketoacidosis in people with Type 1 diabetes by age band



End stage kidney disease (ESKD)

The '5 year prevalence' of ESKD treatment (dialysis or transplantation) continues to increase. In Type 1 diabetes it has risen from 1.03 per cent in 2003-2004 to 1.36 per cent in 2009-2010; the corresponding figures for Type 2 diabetes are 0.44 per cent and 0.55 per cent (Figure 17). This implies that in England approximately 3000 people with Type 1 diabetes and 11500 people with Type 2 diabetes presently receive dialysis or kidney transplantation.

The low rates of urine albumin creatinine testing (see section: [care processes](#)) and complication related BP control (see section: [treatment targets – blood pressure](#)) suggest that many opportunities are being missed to detect kidney disease early and reduce its progression. The prevalence of ESKD treatment increases sharply when the duration of diabetes is over 20 years, this is true for both Type 1 and Type 2 diabetes (Figure 18). When combined with the peak age data, highlighted in Table 4, it is clear that the greatest opportunity to reduce ESKD would be more effective preventive care of younger patients.

Figure 17
 '5 year prevalence' of end stage kidney disease treatment over the 7 audit years by diabetes type

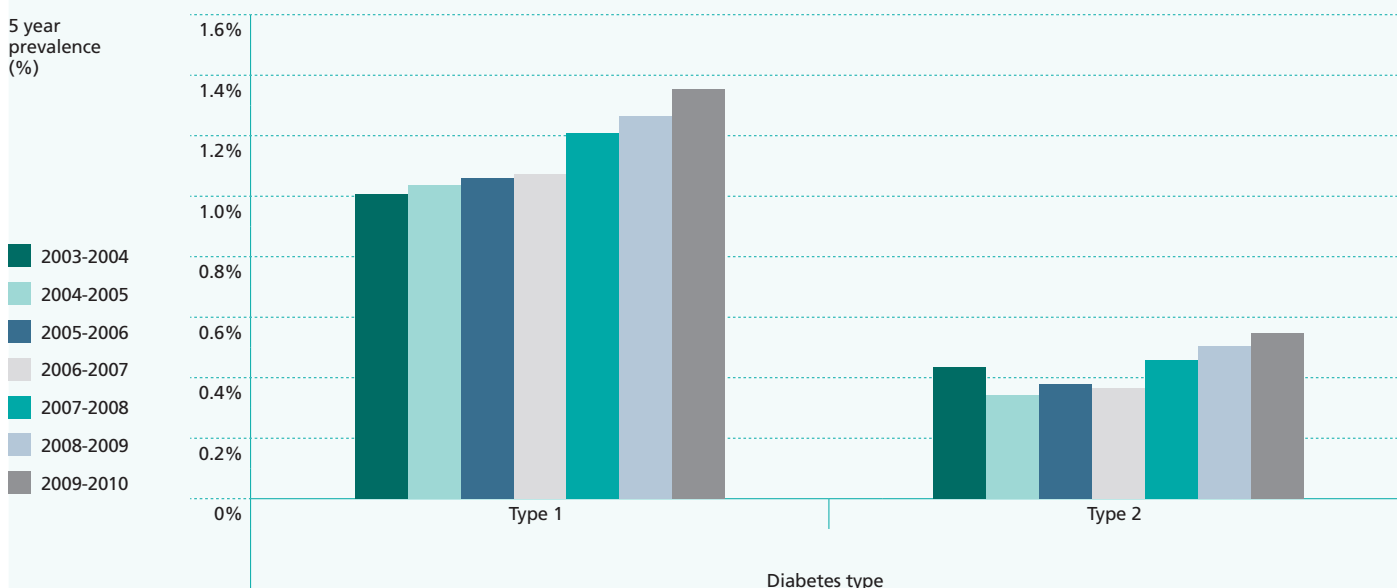
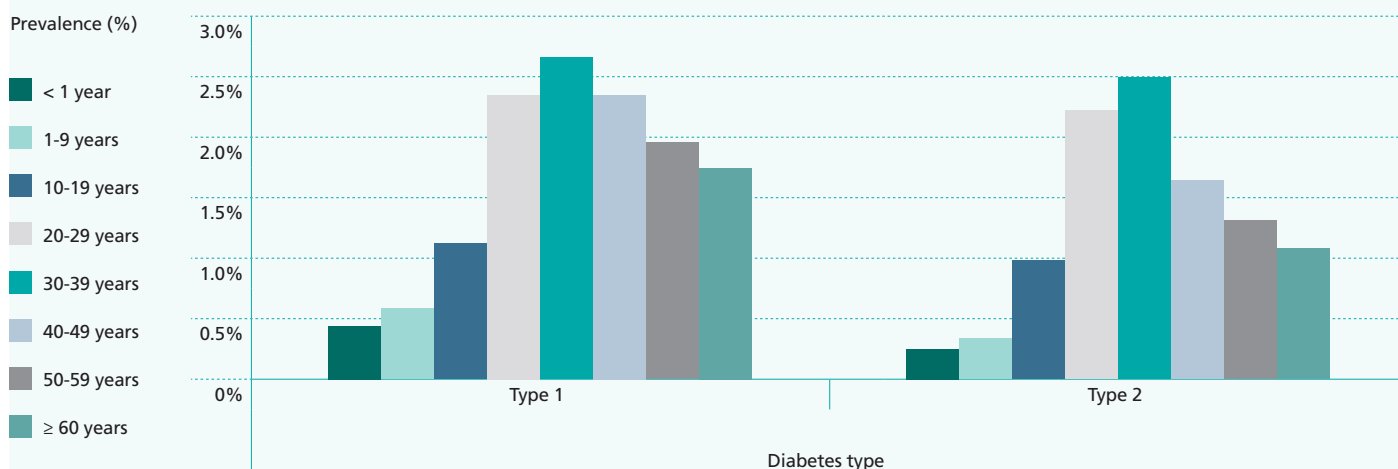


Figure 18
 '5 year prevalence' of end stage kidney disease treatment by duration of diabetes and diabetes type



Effects of age, sex and deprivation

All diabetic complications apart from DKA become more likely with increasing age and duration of diabetes. However, appreciable numbers start appearing in people aged 40 years and over, and after 10-20 years of diagnosed diabetes. DKA is more common in females, while ESKD and amputation are more common in males. All complications are associated with social deprivation (Table 4).

Table 4
 '5 year prevalence' profile for complications, by diabetes type including sex prevalence ratio, deprivation quintile prevalence ratio, peak age band, PCT range

	Type 1 diabetes			Type 2 diabetes	
	DKA	ESKD	Major Amputation	ESKD	Minor Amputation
Male prevalence: Female prevalence ratio	0.8	1.1	2.1	1.2	2.3
Quintile 5 prevalence: Quintile 1 prevalence ratio	1.9	1.6	2.0	1.5	1.3
Peak age band	16 - 24	40 - 54	70 - 84	70 - 84	85+
PCT prevalence (min - max)	8.17 - 19.53	0.30 - 3.53	0.00 - 1.51	0.20 - 1.35	0.13 - 0.79

Variation in complication rates

In addition there is substantial geographical variation in complication rates at SHA regional level, which becomes more pronounced when stratified at PCT level (Figures 19, 20, 21). In Figures 19, 20 and 21, the differences between the data points within the funnels are due to 'normal cause' variation, the spread of which is determined by the size of the population (larger populations have smaller 'normal cause' variation limits than small populations). However, data points outside the funnel cannot be ascribed to 'normal cause' variation and implying that other, 'special cause' factors should be sought.

Figure 19

Funnel plot of PCT '5 year prevalence' of diabetic ketoacidosis in Type 1 diabetes by number of registrations with Type 1 diabetes in PCT

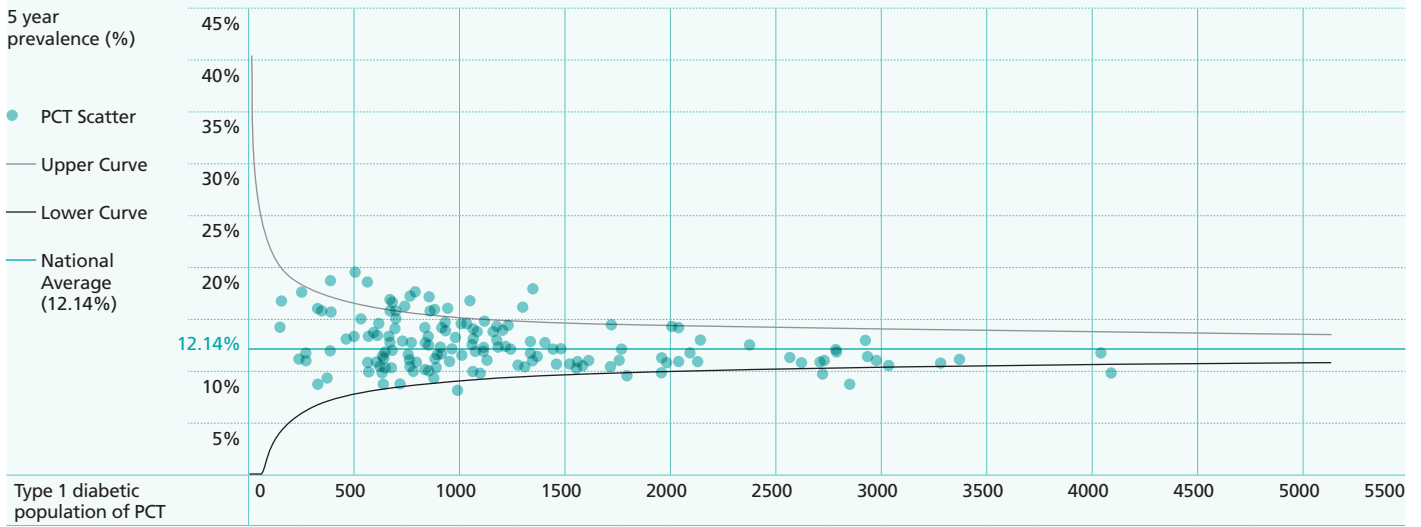


Figure 20

Funnel plot of PCT '5 year prevalence' of end stage kidney disease treatment in Type 2 diabetes by number of registrations with Type 2 diabetes in PCT

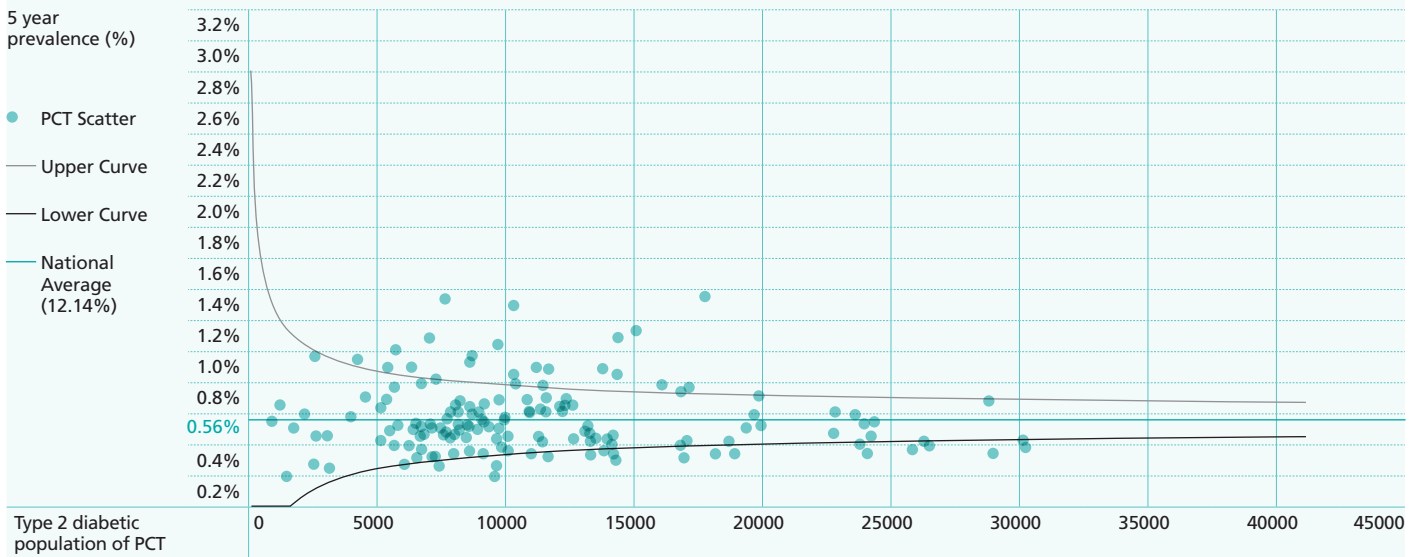
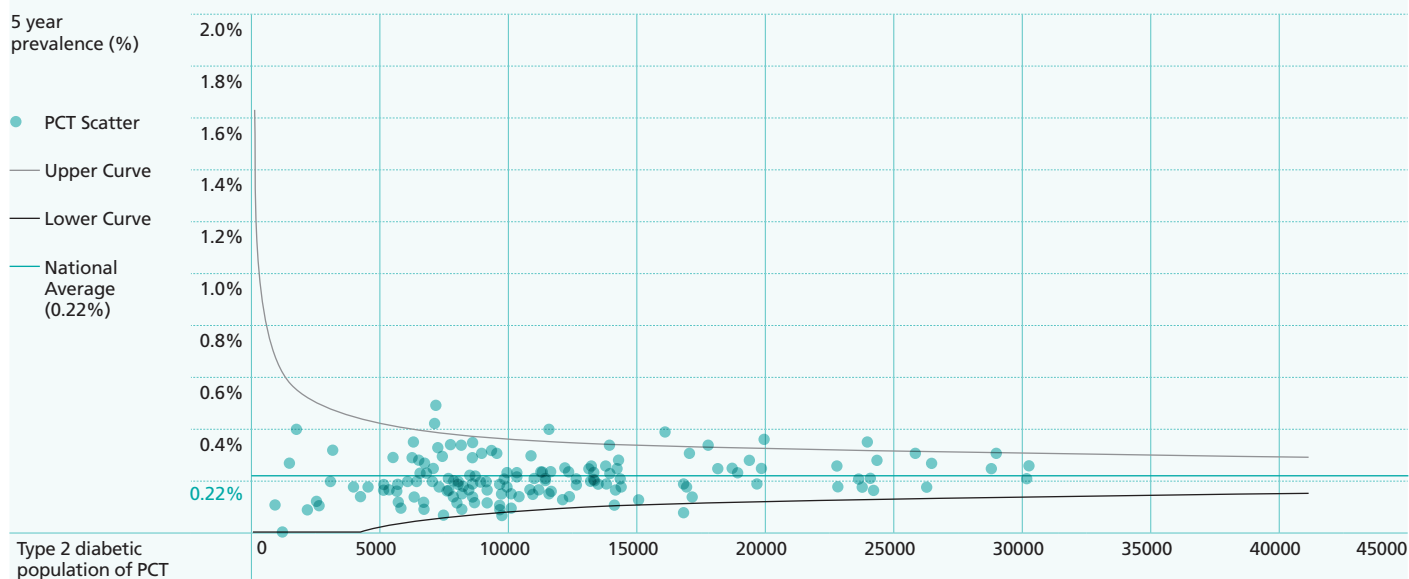


Figure 21

Funnel plot of PCT '5 year prevalence' of major amputation in Type 2 diabetes by number of registrations with Type 2 diabetes in PCT



Differences in outcomes or differences in treatments?

The numbers of diabetic complications recorded may be due to factors related to diabetes and its treatment alone, to the availability of end stage treatments or to locality variations in end stage treatment choices and effectiveness.

Figure 19 highlights the variation in DKA rates. This is likely to reflect diabetes related self-care and supported care factors alone.

However, the variation in ESKD treatment rates (Figure 20) could be due either to true differences in the rates of Diabetic ESKD consequent on the effectiveness of preventive care (key processes and treatments) or it could be because more dialysis and transplantation is available in some areas than others or it could be due to a combination of the two. A preliminary analysis of NDA data suggests that the prevalence of Estimated Glomerular Filtration Rate (eGFR) <15ml/min/1.73m² (the level below which renal replacement treatment is usually implemented) varies twofold-threefold between PCT areas. Further work is underway to investigate the relative contributions of the possible explanation.

Amputation rates continue to show appreciable variation as was highlighted in the NHS Atlas of Variation¹¹, which displayed some of the 2008-2009 NDA data. Treatment variation in amputation rates could reflect differences in primary and secondary preventive care or in the treatment choices and their effectiveness during management of limb threatening diabetic foot disease. (Figure 21).

Key Findings Wales

The NDA collects data from primary care as well as specialist paediatric units in Wales. The NDA analysis of the data allows participants at GP, hospitals and Welsh Health Boards to benchmark their services against national guidelines.

Participation

2009-2010 is the third year Wales have participated in the National Diabetes Audit. 193 General Practices, or 39.8 per cent of the practices in Wales participated. The number of participating practices has almost trebled since the 2007-2008 audit. Practices from all seven of the Welsh Health Boards contributed to the 2009-2010 audit. Individual Health Board participation ranged from 21.1 per cent to 60.3 per cent.

67,869 registrations were collected from General Practices in Wales. A further 866 paediatric unit registrations were identified from secondary care records unknown to primary care. The total number of registrations submitted to the National Diabetes Audit has increased by 34.5 per cent since the previous audit year.

Registrations

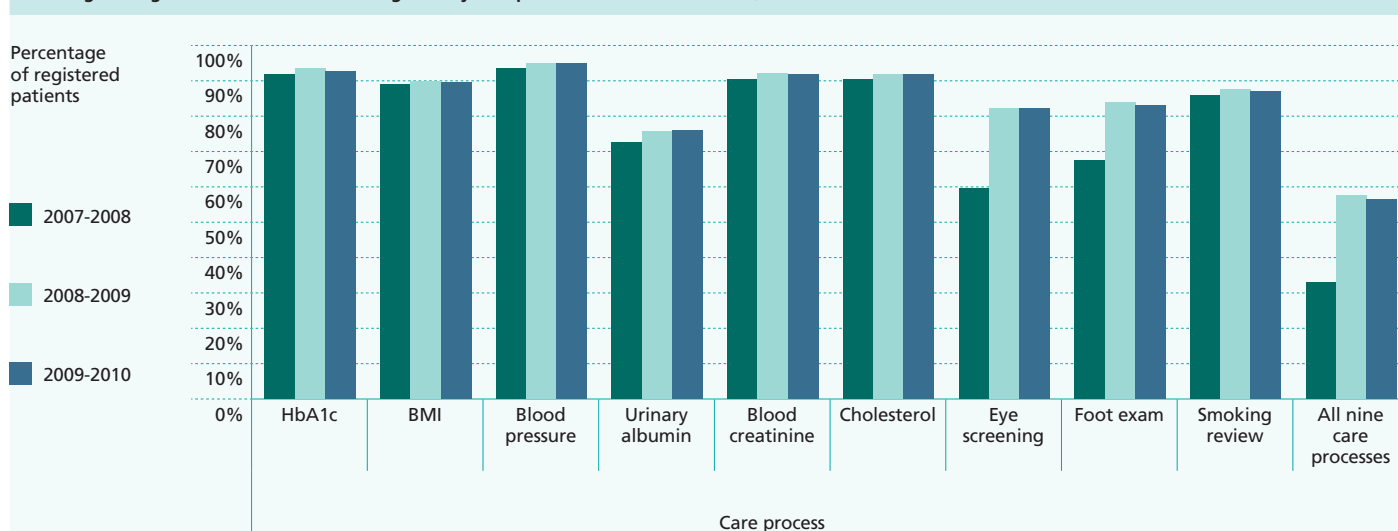
Amongst participating practices the prevalence of diagnosed diabetes averaged 4.94 per cent. This is higher than the average prevalence in England (4.35 per cent).

- The prevalence of diabetes amongst participating practices in Wales has increased since 2007, from 4.45 per cent during the 2007-2008 audit, to 4.67 per cent during the 2008-2009 audit, to the current prevalence of 4.94 per cent
- The prevalence of diabetes continues to be higher in males (5.62 per cent) than in females (4.29 per cent)
- 7382 (10.7 per cent) of people with diabetes were diagnosed within the audit year. This is similar to the figure for England, 11.2 per cent

Care processes

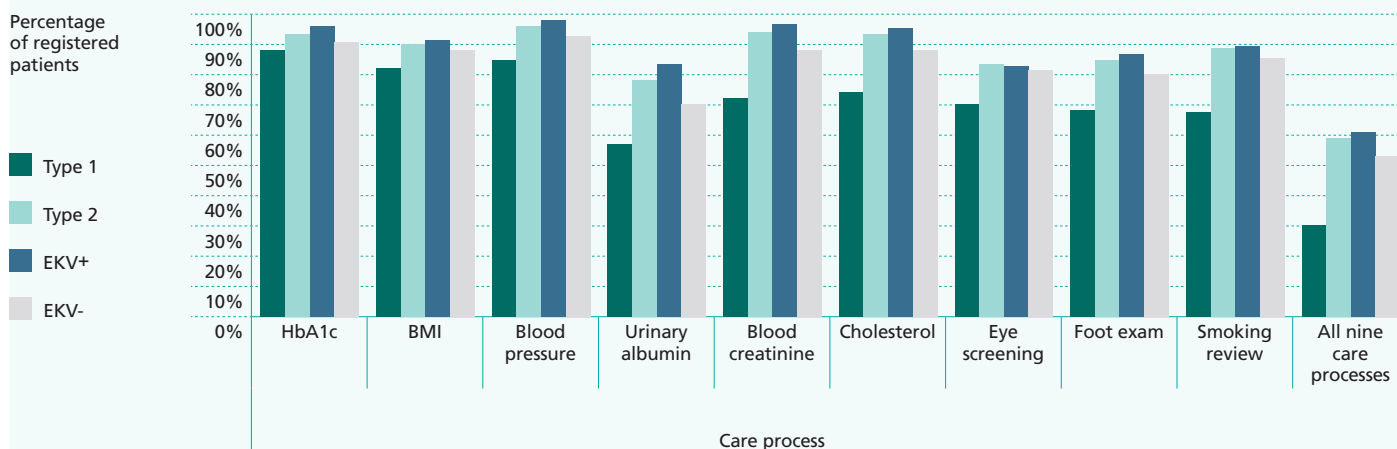
In Wales, 56.6 per cent of all people with diabetes received all nine care processes. This is similar to the previous audit year when 57.7 per cent of people with diabetes received all nine care processes. Furthermore, it is higher than for England (50.1 per cent). Care process trends have remained similar for the past three audit periods (Figure 22).

Figure 22
Percentage of registrations in Wales receiving the key care processes for the 2007-2008, 2008-2009 and 2009-2010 audits



As found in the previous audit year, care processes were recorded less frequently in people with Type 1 diabetes compared to those with Type 2 diabetes, this may be because more of this data is recorded in specialist services that often do not have electronic records. People with diabetes who also have eye, kidney or vascular disease (EKV+) had higher rates of all the recorded care processes compared to those without (Figure 23).

Figure 23
Percentage of registrations in Wales with care processes recorded for different population types



Treatment targets

Glucose control (HbA1c)

63.0 per cent of people with diabetes had an HbA1c value within the NICE recommended lower risk (for future complications) range of ≤ 7.5 per cent, similar to the value for England. However, there are still 7.9 per cent of people with glucose levels at very high risk of future complications (HbA1c > 10.0 per cent).

- The NICE recommended HbA1c ≤ 7.5 per cent target was achieved by 68.1 per cent of the measurements from people with Type 2 diabetes but only 24.3 per cent of the measurements from people with Type 1 diabetes
- For Type 1 diabetes a target of HbA1c of ≤ 7.5 per cent achievement decreases with increasing deprivation. The same applies for Type 2 diabetes (Figure 24)
- For Type 1 diabetes a target of HbA1c of ≤ 7.5 per cent achievement increases with age band (Figure 25). The pattern with Type 1 differs, in that achievement initially decreases and then increases become apparent from, 40-45 years of age
- Stratification of the diabetic population of Wales according to their body mass index (BMI) identifies the highest percentage of people with diabetes who achieved the NICE HbA1c target of ≤ 7.5 per cent was the overweight band (66.7 per cent), the underweight band had the lowest percentage (48.9 per cent) although more underweight people with diabetes are achieving their NICE recommended HbA1c target since the 2008-2009 audit (45.3 per cent) (Figure 26)

Figure 24
HbA1c \leq 7.5 per cent (59 mmol/mol) target achievement by diabetes type and social deprivation (Quintile 1 = least deprived; Quintile 5 = most deprived)

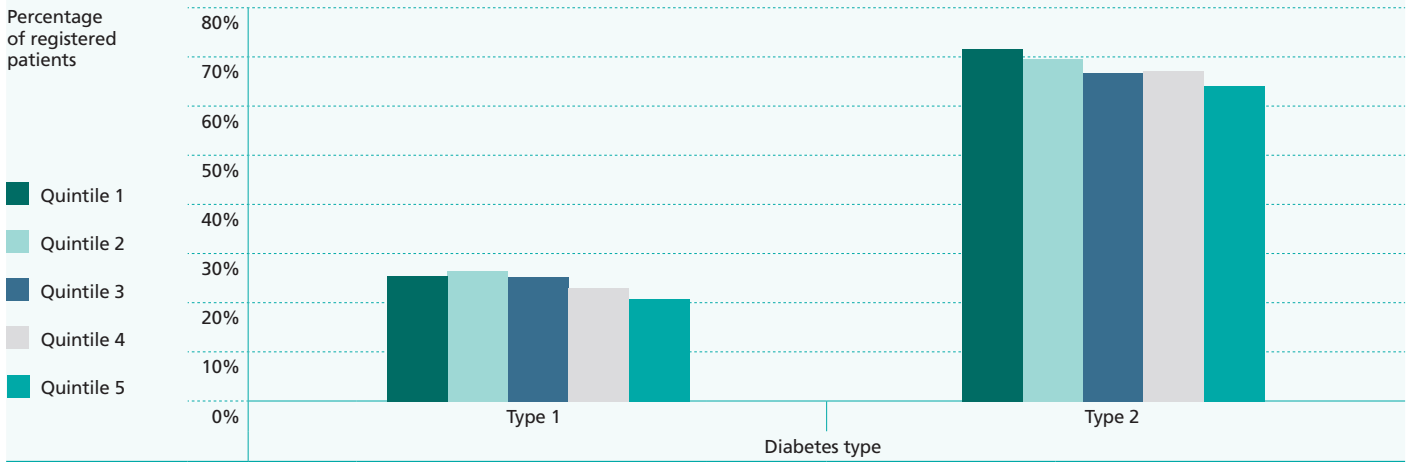


Figure 25
HbA1c \leq 7.5 per cent (59 mmol/mol) target achievement by age and diabetes type

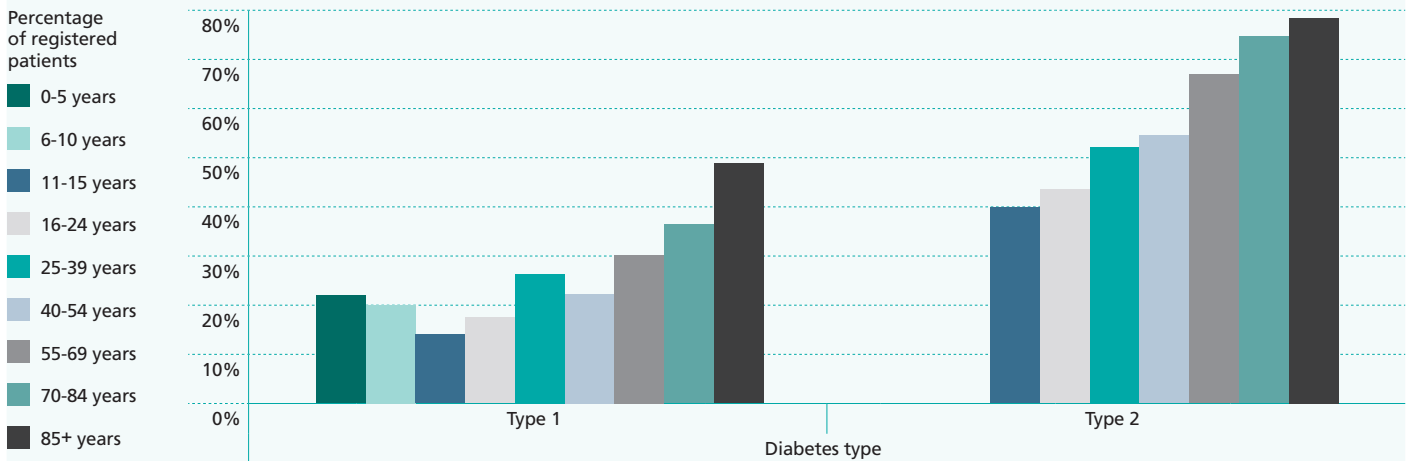
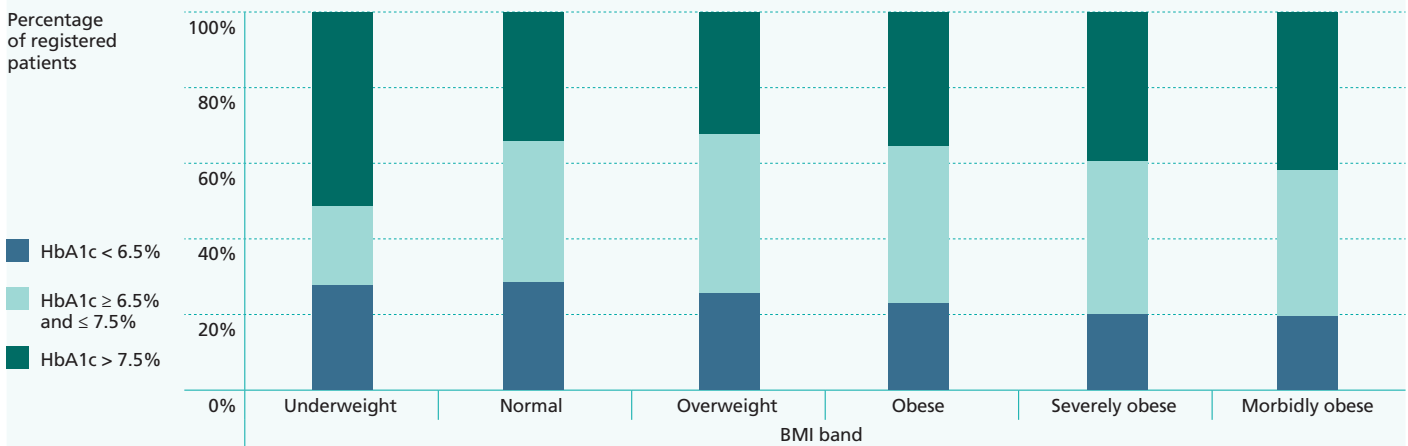


Figure 26
Percentage of people with diabetes in Wales achieving the NICE recommended HbA1c target by BMI band, for the 2009-2010 audit period



Blood pressure

Blood pressure was measured in 94.7 per cent of people recorded with diabetes; 84.5 per cent of people with Type 1 and 95.7 per cent of people with Type 2.

The combined BP target of 140/80 was achieved by 70.0 per cent of people with Type 1 diabetes and 60.9 per cent of those with Type 2 diabetes.

When the blood pressure target of 140/80 was applied only to those without recorded eye, kidney or vascular disease (EKV-) and the target of 130/80 was applied to those with recorded eye, kidney or vascular disease (EKV+), collectively termed 'targeted BP', the number of people achieving the NICE targeted BP fell to 64.0 per cent in Type 1 and 50.0 per cent in Type 2 diabetes. In total, 51.1 per cent of all people with diabetes achieved their NICE targeted blood pressure.

- People with Type 2 diabetes are less likely to achieve their blood pressure target than people with Type 1 diabetes
- Many patients with eye, kidney or vascular disease who achieve the 140/80 target do not achieve the complication related 130/80 target

A higher percentage of people with diabetes in Wales achieved their NICE recommended BP targets than people with diabetes in England.

Cholesterol

73.4 per cent of people with Type 1 diabetes and 92.4 per cent of those with Type 2 diabetes had their cholesterol measured during the 2009-2010 audit period.

- The NICE cholesterol target of < 5.0mmol/l was achieved by 75.2 per cent of people with Type 1 and 78.3 per cent of those with Type 2 diabetes
- The 2008 revised, more stringent, NICE cholesterol target of < 4.0mmol/l was achieved by 33.5 per cent of people with Type 1 and 40.5 per cent of those with Type 2 diabetes

A higher percentage of people with diabetes in Wales achieve their NICE recommended cholesterol targets than people with diabetes in England.

Complications

The prevalence of complications for participating organisations, ascertained by linking the Welsh NDA data to the Patient Episode Database for Wales (PEDW), have been analysed for people with diabetes in Wales. In general, the '5 year prevalence' pattern of complication types remains very similar to those reported in the previous two audit years. However, there is an appreciable drop in the '5 year prevalence' of diabetic ketoacidosis over the three years of the Welsh NDA (Figure 27).

The '1 year prevalence' of certain complication outcomes is much more pronounced in people with diabetes than the national population, when grouped by people aged 40 years and above (Figure 28). As shown in Figure 28, people aged 40 years and over with diabetes are twice as likely to have angina, cardiac failure or ESKD than the population of Wales as a whole.

Figure 27
 '5 year prevalence' for complications in people with diabetes in during the 2007-2008, 2008-2009 and 2009-2010 audits

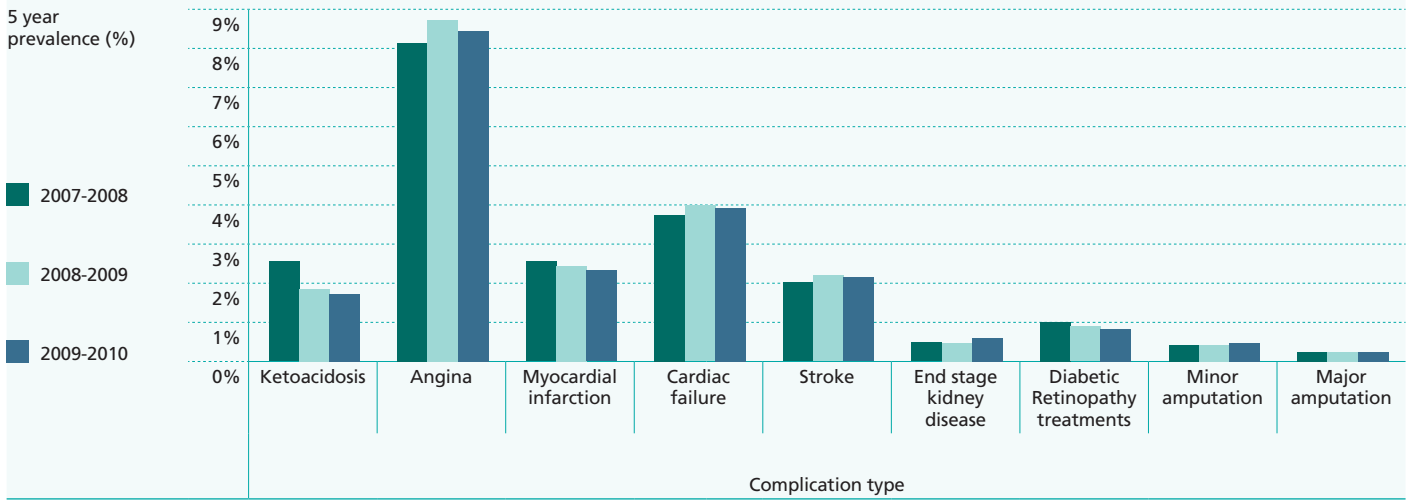
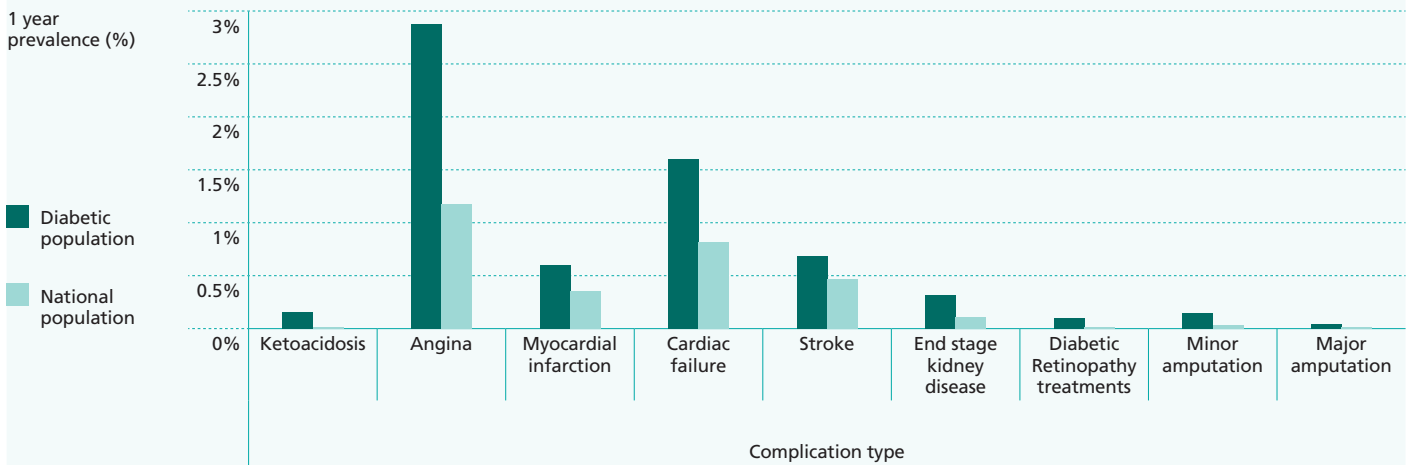


Figure 28
 '1 year prevalence' for complications in people aged 40 years and over, for both the national (Wales) and diabetic population



Children and young people with diabetes

The NDA carries out a parallel audit involving specialist paediatric units in England and Wales. This provides an overview of the care for children and young people with diabetes. The full findings can be found in the NDA 2009-2010 Children and Young People annual report. The summary key findings for specialist paediatric units providing diabetes care are repeated below.

- 19,558 records on children and young people, from 155 paediatric units, were submitted to the 2009 – 2010 audit. This is 25 per cent more than 2008 – 2009 and equates to 85 per cent of the 22,947 children age 0-17yr identified by the 2009 RCPCH survey¹²
- 98.4 per cent of children and young people are recorded with Type 1 diabetes and only 1.6 per cent with Type 2 diabetes
- Slightly over half (52 per cent) of the children and young people with diabetes were male
- 9.0 per cent of children and young people with diabetes experienced at least one episode of diabetic ketoacidosis (DKA) in 2009-2010. DKA was more frequent in girls than boys, more common in teenage years and often recurrent. There was a large variation in recurrence rates between treatment centres
- In 2009-2010 88.4 per cent of children and young people with diabetes had an HbA1c value recorded, but in children and young people over the age of 12 only 4.1 per cent had all the National Institute of Clinical Excellence (NICE) key processes of care recorded
- Only 14.5 per cent of those with an HbA1c measurement achieved the NICE recommended HbA1c target of < 7.5 per cent (59 mmol/mol). Over 30 per cent of children and young people have a high risk (for future complications) HbA1c measure of > 9.5 per cent (82 mmol/mol)

Key points and recommendations

1. Increasing Prevalence of Type 2 diabetes

The number of people with diagnosed Type 2 diabetes is increasing each year especially in deprived communities.

Recommended actions for commissioners:

- Ensure service capacity to cope with rising numbers
- Implement Type 2 diabetes prevention programmes

2. Preventing Complications

37 per cent of people with diabetes are at high risk of future complications due glucose control levels above the recommended range (HbA1c > 7.5 per cent, 59 mmol/mol); furthermore 17.0 per cent of people with Type 1 diabetes and 6.7 per cent of people with Type 2 diabetes have very high risk glucose control (HbA1c > 10 per cent, 86mmol/mol). High risk levels are associated with younger age and social deprivation.

Recommended actions for commissioners and Providers:

- Address the inequitable treatment outcomes related to:
 - Type 1 diabetes
 - Younger age (< 40 years)
 - Low socio-economic status

3. Variation in Prevalence of Complications

There are substantial geographic differences in the frequency of disabling and expensive diabetic complications and their treatment e.g. DKA, dialysis/transplantation, Lower limb amputation.

Recommended actions for commissioners and providers:

- Where their results are in the bottom quartile commissioners and providers of diabetes care should urgently investigate and address the causes of:
 - Any high rates of new complications (preventive care dependent)
 - Any poor outcomes of treating established disease (reactive care dependent)

4. Children and Young People

Children and young people with diabetes have the worst rates of very high risk glucose control and of the acute metabolic complication Diabetic Ketoacidosis.

Recommended actions for commissioners and providers:

- Paediatric diabetes teams should work in partnership with children, young people and their parents to find ways of improving glucose control
- Commissioners should use evidence and information to ensure that services for children and young people develop and deliver the capacity and capability to improve diabetes care

Online Analysis

This Executive Summary presents the key findings from the seventh year of the National Diabetes Audit (NDA). It provides recommendations for both national and local organisations based on the analysis of the audit data.

This summary of key findings is supported by the NDA Dashboard containing national and local results for the 2009-2010 audit period for both England and Wales.

Local health economies and care providers can learn more about the details of their own services and how they compare with other services by consulting the NDA dashboard or the online analysis tool Performance Indicator Analysis Online (PIANO). For more information on PIANO or to download the NDA dashboard visit the NDA webpage at:

<http://www.ic.nhs.uk/diabetesaudits>

For further information about this report or the NDA Dashboard, please contact The NHS Information Centre's Contact Centre on 0845 300 6016 or email enquiries@ic.nhs.uk.

References

1. National service framework for diabetes: standards
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002951
2. NICE Diabetes – complete guidelines
<http://guidance.nice.org.uk/Topic/EndocrineNutritionalMetabolic/Diabetes>
3. NICE guidelines CG15: Diagnosis and management of type 1 diabetes in children, young people and adults
<http://www.nice.org.uk/CG15>
4. NICE guidelines CG66: Type 2 diabetes: the management of type 2 diabetes
<http://www.nice.org.uk/CG66>
5. NICE guideline CG87: Type 2 Diabetes – newer agents
<http://www.nice.org.uk/CG87>
6. NICE – Diabetes in adults quality standard
<http://www.nice.org.uk/guidance/qualitystandards/diabetesinadults/diabetesinadultsqualitystandard.jsp>
7. APHO Diabetes Prevalence Model
<http://www.yhpho.org.uk/default.aspx?RID=81090>
8. The English Indices of Deprivation 2007: Summary
<http://www.communities.gov.uk/publications/communities/indicesdeprivation07>
9. NHS IC Statistics on obesity, physical activity and diet: England, 2010
http://www.ic.nhs.uk/webfiles/publications/opad10/Statistics_on_Obesity_Physical_Activity_and_Diet_England_2010.pdf#2.2.1
10. National Obesity Observatory
http://www.noo.org.uk/NOO_about_obesity/
11. NHS Atlas of Variation
http://www.rightcare.nhs.uk/atlas/qipp_nhsAtlas-LOW_261110c.pdf
12. Growing up with Diabetes: children and young people with diabetes in England, Royal College of Paediatrics and Child Health, March 2009

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