The Healthcare Quality Improvement Partnership (HQIP). The National Diabetes Inpatient Audit is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit Programme (NCA). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement, and in particular to increase the impact that clinical audit has on healthcare quality in England and Wales. HQIP holds the contract to manage and develop the NCA Programme, comprising more than 30 clinical audits that cover care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual audits, also funded by the Health Department of the Scottish Government, DHSSPS Northern Ireland and the Channel Islands.

The Health and Social Care Information Centre (HSCIC) is the trusted source of authoritative data and information relating to health and care. The HSCIC managed the publication of the 2013 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.

The national cardiovascular intelligence network (NCVIN) is a partnership of leading national cardiovascular organisations which analyses information and data and turns it into meaningful timely health intelligence for commissioners, policy makers, clinicians and health professionals to improve services and outcomes.
Key findings about the quality of care of inpatients with diabetes in England and Wales

Report for the audit period 2013
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We are delighted to present the National Diabetes Inpatient Audit (NaDIA) 2013 results for England and Wales and would again like to thank all the teams who have worked hard to contribute to this unique and valuable insight into the care of inpatients with diabetes. Including the pilot, this is the fifth year of NaDIA and it is impressive that despite the enormous amount of work involved, the participation rate remains high demonstrating the value diabetes teams place in the data and their determination to improve inpatient diabetes care.

This report presents the 2013 results and analyses the changes in activity and outcomes over the last three years for England and Wales combined. Data from 2010 for England (Wales did not participate in 2010) are also presented but the changes for England over the whole period are not separately analysed.

The data demonstrates a steady rise in the percentage of beds occupied by people with diabetes, from 14.6 per cent in 2010 to 15.8 per cent in 2013, in line with the reported increase in the prevalence of diabetes and the ageing population. Indeed in this year for the first time the number of patients included in the audit exceeded 14,000. The data from these audits will therefore become increasingly important in helping diabetes teams to improve care in their hospitals as well as helping to maintain a national overview of care.

The demographics of the patients in hospital are largely unchanged, again testifying to the robustness of the audit.

As with previous years, patient participation in the experience questionnaire was excellent at 54.9 per cent; of the patients that did not complete a patient experience questionnaire, almost half were reported to be cognitively impaired which may have prevented their participation. Disappointingly, there has been little improvement in patient experience over the three years.

In contrast there have been significant and continuous improvements in many aspects of patient care and clinical outcomes. More patients are having foot examinations on admission, the number of hospitals with multidisciplinary foot care teams has increased and there has been a significant reduction in hospital acquired foot lesions. Medication and in particular insulin prescription errors have significantly declined and there has been an improvement in the use of insulin infusions. There has also been a reduction in hypoglycaemic rates. These improvements are welcomed. However, prevention of episodes of severe hypoglycaemia requiring injectable treatment and diabetic ketoacidosis developing in hospital require greater focus as these are serious harms, probably related to mismanagement of insulin, that have remained unchanged over the three years.

As in previous years the majority of diabetes teams have introduced changes in their practices to improve care, including adopting the new Joint British Diabetes Societies protocols and safe practices around insulin use and glucose management. There has also been a significant increase in the proportion of patients with diabetes who have been seen by a member of the diabetes team. Unfortunately, despite the increased activity of these inpatient teams, diabetes specialist staffing levels have not significantly changed and nearly one third of sites still have no diabetes inpatient specialist nurse. To improve the care and experience of inpatients with diabetes addressing these staffing deficiencies should be a priority, especially as the burden of inpatient diabetes will inevitably increase.

Gerry Rayman
National Clinical Lead for Inpatient Diabetes
Key messages from the audit

Prevalence
1. The percentage of beds in acute hospitals occupied by people with diabetes increased to 15.8 per cent in the 2013 audit (from 15.3 per cent in 2012).

Diabetes teams and staffing
2. Referral processes still need improvement - the proportion of inpatients requiring a diabetes team referral that were actually seen by the team has increased, but is still below two thirds.
3. The majority of diabetes teams reported an increase in referrals/patient contacts; however, there was no significant increase in staffing levels.
4. Diabetes inpatient specialist nurse (DISN) availability has still not improved – almost one third of sites still have no DISN.

Medication errors and patient harm
5. The proportion of drug charts with one or more medication (prescription or management) errors has reduced – the main reduction is in prescription errors (insulin or oral hypoglycaemic agents).
6. The proportion of infusions reported by healthcare teams as inappropriate, too long or inadequately monitored has not improved.
7. Prevention of hypoglycaemia requiring injectable treatment and diabetic ketoacidosis requires more focus – the frequency of these serious complications has not reduced since the audit began.

Foot care
8. Although the provision of multidisciplinary diabetic foot care teams (MDFTs) has improved significantly since the audit began, 28 per cent of sites still do not have a MDFT.
9. More inpatients received a foot risk assessment than in previous years, but more than half of inpatients still had no documented foot assessment.
10. More than one third of inpatients admitted with active foot disease did not receive any input from the MDFT within the first 24 hours of their hospital stay.

Patient experience
11. Patient satisfaction measures have not improved – for example, 15 per cent of patients reported that the hospital did not provide the right type of food to manage their diabetes.
Key findings

Participation

NaDIA 2013 was carried out by diabetes teams in acute hospitals in England and Wales on a nominated day between 16 and 20 September 2013; 211 sites (representing 142 Trusts in England and 6 Local Health Boards in Wales) took part. These sites submitted bedside data from 14,198 inpatients with diabetes and feedback on patient experience from 7,796 inpatients that were capable and willing to complete questionnaires, representing a patient experience return rate of 54.9 per cent.

Characteristics of inpatients with diabetes

• 6.6 per cent had Type 1 diabetes and 34.4 per cent had insulin treated Type 2 diabetes.

• The median age of inpatients with diabetes was 75 years in both England and Wales, compared to 68 years for all hospital inpatients in England\(^1\), and 73 years for all hospital inpatients in Wales\(^2\).

Reason for admission

• In England 84.7 per cent of inpatients with diabetes had been admitted as an emergency, compared to 80.7 per cent of all patients in hospital\(^1\), while in Wales 86.5 per cent of inpatients with diabetes had been admitted as an emergency, compared to 75.9 per cent of all patients in hospital\(^3\).

• For 8.1 per cent of inpatients with diabetes, diabetes or a diabetic complication was the main reason for their admission to hospital, whereas 66.3 per cent of inpatients with diabetes were admitted for other medical reasons and 25.6 per cent were admitted for non-medical (i.e. surgical) reasons.

• Of inpatients admitted specifically for the management of their diabetes or a diabetic complication, 47.2 per cent were admitted for active diabetic foot disease.

Length of stay

• Inpatients with diabetes admitted to hospital as an emergency had a longer median length of stay in hospital (8 nights) than inpatients with diabetes admitted electively (6 nights).

Medication errors

• 37.0 per cent of inpatient drug charts reviewed in the 2013 audit had at least one diabetes medication error in the previous 7 days; this is a significant reduction from 39.9 per cent in 2011.

• 21.9 per cent of inpatient drug charts had at least one prescription error in the previous 7 days, a significant decrease from 25.2 per cent in 2011.

• 22.3 per cent of inpatient drug charts had at least one medication management error in the previous 7 days.

Insulin infusions

• At the time of the audit, 9.8 per cent of inpatients with diabetes had been on an insulin infusion in the last 7 days, of which 9.7 per cent had been on an infusion for 7 days or longer.

• 7.5 per cent of insulin infusions were deemed inappropriately long.

• 2.0 per cent of inpatients on an infusion for longer than 24 hours had only between one and three glucose measurements during the last 24 hours on infusion (equivalent to less than one reading every eight hours), and 0.9 per cent of inpatients on an infusion did not have any glucose monitoring in that 24 hour period.

---

\(^1\) Source: Hospital Episode Statistics (HES) 16-20 September 2012, Health and Social Care Information Centre, figures exclude day cases.

\(^2\) Source: Patient Episode Database for Wales (PEDW) 16-20 September 2013, NHS Wales Informatics Service, figures exclude day cases.
Hypoglycaemic episodes

• 22.0 per cent of inpatients had one or more hypoglycaemic episodes over the previous 7 days of their stay (blood glucose measurement of 3.9 mmol/L or less).

• 20.0 per cent of inpatients had one or more mild hypoglycaemic episodes (blood glucose measurement of 3.0 – 3.9 mmol/L), a significant reduction from 23.1 per cent in 2011.

• 9.3 per cent of inpatients had one or more severe hypoglycaemic episodes (blood glucose measurement of less than 3.0 mmol/L), a significant reduction from 10.6 per cent in 2011.

• Inpatients whose drug chart had at least one medication error were more than twice as likely to have one or more severe hypoglycaemic episodes (15.3 per cent) compared to inpatients whose drug chart had no medication errors (6.8 per cent).

• The highest proportion (30.3 per cent) of hypoglycaemic episodes took place in the early morning, between 05:00 and 08:59.

• Inpatients with Type 1 diabetes were most likely to experience one or more severe hypoglycaemic episodes (41.8 per cent) or severe hypoglycaemic episodes (30.0 per cent).

• 2.2 per cent of inpatients had at least one hypoglycaemic episode that required injectable treatment.

DKA after admission

• 63 patients (0.4 per cent) were reported to have developed diabetic ketoacidosis (DKA) after their admission to hospital.

Staffing

• 46.1 per cent of diabetes consultants’ time was spent on the care of people with diabetes; but only 13.9 per cent of diabetes consultants’ time was spent on inpatient care.

• 31.7 per cent of sites had no diabetes inpatient specialist nurses (DISNs) and 5.3 per cent of sites did not have any consultant time for diabetes inpatient care.

• 71.2 per cent of sites had no specialist inpatient dietetic staff time for people with diabetes.

• 28.2 per cent of sites did not have a multidisciplinary foot care team, a significant improvement from the 41.7 per cent of sites that did not have such a team in 2011.

Patient contact

• 34.7 per cent of inpatients with diabetes were seen by a member of the diabetes team, a significant increase from 30.5 per cent in 2011.

• 76.5 per cent of sites reported an increase in referrals/patient contacts since the 2012 NaDIA.
Foot disease and foot risk assessment

- 12.6 per cent of inpatients with diabetes had a history of previous diabetic foot disease.

- Although 3.8 per cent of all inpatients with diabetes had been admitted because of their foot disease, 9.2 per cent of inpatients included in the audit had active diabetic foot disease on admission.

- 42.4 per cent of inpatients included in the 2013 audit had a documented foot risk examination during their hospital stay, a significant increase from 25.8 per cent in 2011.

- Of the inpatients that were admitted with active diabetic foot disease, 61.1 per cent were seen by a member of the multidisciplinary foot care team within 24 hours of admission.

- 1.4 per cent of inpatients with diabetes developed a new foot lesion during their admission to hospital.

Patient satisfaction

- 23.4 per cent of inpatients who responded to the patient experience questionnaire in the 2013 audit said that they would have liked more involvement in the planning of their diabetes treatment; however, 12.0 per cent of inpatients stated that they would prefer to have been less involved in planning their treatment.

- 15.5 per cent of inpatients stated that they were not able to test their own blood glucose levels but would have liked to.

- 10.7 per cent of inpatients taking insulin for their diabetes reported that they were not permitted to self administer insulin while in hospital but would have liked to do so.

- 14.7 per cent of inpatients reported that the hospital did not provide the right type of food to manage their diabetes, and 15.1 per cent of inpatients reported that they needed food to be brought into the hospital to meet their dietary requirements and/or manage their diabetes.

- 86.0 per cent of inpatients were satisfied or very satisfied with the overall care of their diabetes while in hospital.
The National Diabetes Inpatient Audit (NaDIA) is part of the National Diabetes Audit programme (NDA) and is commissioned by The Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit Programme (NCA). The NDA is managed by the Health and Social Care Information Centre (HSCIC) in partnership with Diabetes UK and is supported by Public Health England (PHE).

The 2013 NaDIA was a snapshot audit of diabetes inpatient care in England and Wales. The audit set out to answer the following questions:

- Did diabetes management minimise the risk of avoidable complications?
- Did harm result from the inpatient stay?
- Was patient experience of the inpatient stay favourable?
- Has the quality of care and patient feedback changed since NaDIA 2010, 2011 and 2012?

The NaDIA has been developed to support organisations implementing the National Service Framework (NSF) for Diabetes, National Service Framework (NSF) for Diabetes in Wales and the National Institute for Health and Care Excellence (NICE) Quality Standards for Diabetes.

Participation in the NaDIA enables organisations to measure progress towards implementing national standards established in the NICE published Quality Standards for diabetes care for adults and measures for inpatient care which states:

“People with diabetes admitted to hospital are cared for by appropriately trained staff, provided with access to a specialist diabetes team, and given the choice of self-monitoring and managing their own insulin.”

This report provides the 2013 audit national findings for England and Wales, and where possible compares to the 2010, 2011 and 2012 audit findings. It is supported by the Hospital Level Analysis, which provides results at individual site level and can be downloaded from the audit website at:

www.hscic.gov.uk/diabetesinpatientaudit

Please note that the 2010 data in this report represents England only, as sites from Wales did not participate in the 2010 NaDIA.
Methodology

The National Diabetes Inpatient Audit 2013 was carried out by hospital teams in England and Wales on a nominated day between 16 and 20 September 2013. The audit collected data on characteristics of the hospital including staffing structures, patient clinical data and patient experience information, using paper questionnaires.

Each participating hospital identified all inpatients with diabetes and distributed questionnaires. A bedside audit form providing information on the patient’s medical treatment was completed, and where the patient was able and willing a patient experience form was also completed. The hospital team also completed a characteristics questionnaire providing information on the hospital’s resources and staffing structure. Copies of the 2013 questionnaires can be found on the website at: www.hscic.gov.uk/diabetesinpatientaudit

Patients were only included in the inpatient audit if they had been admitted to a bed for 24 hours or more. Patients on an Obstetric or Paediatric ward were excluded from this audit. Mental Health wards were also excluded due to the high prevalence of long stay patients. Other exclusions included:

- Patients who were hyperglycaemic but not yet formally diagnosed with diabetes
- Accident and Emergency
- Day case ward
- Day surgery unit patients
- Observation ward (if patients had been admitted for less than 24 hours)
- Surgical short stay unit (if patients had been admitted for less than 24 hours)
- Palliative care centres
- Community Hospitals.

Once all questionnaires were returned the data was collated and cleaned to provide the analysis for this report. Where at least one type of questionnaire (either patient experience, bedside audit or hospital characteristics) was returned, the hospital has been counted in the overall participation rate. Hospital characteristics questionnaires were completed either at hospital level or at site level (i.e. where a number of hospitals were aggregated together); therefore, prevalence rates are based on the number of participating sites rather than individual hospitals.

Hospital episode data were acquired from the Hospital Episode Statistics (HES) database within the HSCIC, alongside data from the Patient Episode Database for Wales (PEDW). Where possible, comparisons have been made between inpatients with diabetes and all inpatients within English and Welsh hospitals. At the time of preparing this analysis, HES data for September 2013 was not available; therefore, a comparison was made with HES data from September 2012. PEDW data for September 2013 was available and therefore a 2013 comparison was made.

All percentages, charts and tables in this report relate to all inpatients in England and Wales, unless otherwise stated. Where the data for inpatients has been compared to hospital episode data that was collected separately for England (HES) and Wales (PEDW), the inpatient data has been analysed at country level to allow these comparisons to be made.

This differs from previous NaDIA annual reports that presented separate analysis for England and for Wales. The comparatives for 2011 and 2012 in this report will therefore differ from the figures published previously for those periods. Hospitals from Wales did not participate in the 2010 NaDIA.

Summary data by country for England and Wales is included in the 2013 Hospital Level Analysis available from: www.hscic.gov.uk/diabetesinpatientaudit

Appendix 1 explains the testing mechanism used within this report.

Appendix 2 explains the ‘all recorded data’ method used within this report.
The 2013 audit had participation from 233 submitting organisations assessing the clinical care of 14,198 inpatients with diabetes, representing 142 Trusts in England and 6 Local Health Boards in Wales.

Map 1 shows the distribution of submitting organisations in England and Wales, with each submitting organisation highlighted in blue. A full participation list is available in Appendix 3.

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Characteristics of inpatients with diabetes

In England and Wales, 211 sites (representing 142 Trusts in England and 6 Local Health Boards in Wales) took part in the 2013 audit, which resulted in bedside data from 14,198 inpatients with diabetes (compared to 13,409 inpatients in 2012, 12,806 inpatients in 2011 and 12,191 inpatients in 2010).

Of those capable and willing, 7,796 inpatients with diabetes (compared to 7,301 inpatients in 2012, 6,666 inpatients in 2011 and 4,745 inpatients in 2010) each completed a patient experience questionnaire, which represented a patient experience return rate of 54.9 per cent (compared to 54.4 per cent in 2012, 52.1 per cent in 2011, and 38.9 per cent in 2010).

Of the 7,796 patient experience forms in 2013, 7,751 were matched to a corresponding bedside audit form. These were used in the patient experience analysis and the remaining 45 non-matching patient experience forms were excluded from the analysis.

In 2013, inpatients with diabetes represented 15.8 per cent of occupied beds at the time of the audit (compared to 15.3 per cent in 2012, 15.1 per cent in 2011 and 14.6 per cent in 2010). Chart 1 shows the prevalence of diabetes among inpatients by participating site.

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[The number of sites is less than the number of submitting organisations as some hospitals chose to have their data aggregated up to site/Trust level.]
Type and duration of diabetes

Of the inpatients with diabetes included in the audit, 91.9 per cent had Type 2 diabetes. Table 1 shows that the majority of inpatients had Type 2 diabetes not treated\(^{iv}\) with insulin.

<table>
<thead>
<tr>
<th>Diabetes type</th>
<th>Percentage of inpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010*</td>
</tr>
<tr>
<td>Type 1</td>
<td>7.0</td>
</tr>
<tr>
<td>Type 2 (insulin treated)</td>
<td>30.9</td>
</tr>
<tr>
<td>Type 2 (non insulin treated)</td>
<td>45.5</td>
</tr>
<tr>
<td>Type 2 (diet only)</td>
<td>16.7</td>
</tr>
<tr>
<td>Other(^{†})</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.
† 'Other' diabetes type group was added for the 2011 audit.

Differences in percentages between 2010 and later audit years may be a result of the addition of the "Other" group.

When looking at those inpatients whose duration of diabetes was known, 68.6 per cent of inpatients with Type 1 diabetes had been diagnosed for 15 years or longer, while 26.1 per cent of inpatients with Type 2 diabetes had been diagnosed for 15 years or longer. As would be expected, this differed amongst inpatients with Type 2 diabetes by treatment group: 40.1 per cent of inpatients with Type 2 (insulin treated) diabetes had the condition for 15 years or longer compared to 18.8 per cent of inpatients with Type 2 (non insulin treated) diabetes and 12.4 per cent of inpatients with Type 2 (diet only) diabetes.

\(^{iv}\) Type 2 diabetes not requiring insulin for day to day management

i.e. Type 2 (non insulin treated) or Type 2 (diet only).
Demographic characteristics of inpatients with diabetes

Over half of the inpatients included in the audit (52.6 per cent) were male. Chart 2 shows the age and sex distribution for inpatients with diabetes.

The majority of inpatients with diabetes between the ages of 35 to 84 years were male, but among those aged 85 years and over there were a greater proportion of female inpatients.

In England, the median age of inpatients with diabetes was 75 years, compared to 68 years for all inpatients in hospital. In Wales the median age of inpatients with diabetes was 75 years, compared to 73 years for all inpatients in hospital. Table 2 shows the proportion of inpatients with diabetes in older age groups, compared to the proportion of all hospital inpatients in those age groups in England and Wales. This suggests that inpatients with diabetes tend to be older when compared to the age distribution of all inpatients in hospital.

Inpatient diabetes and ethnicity

The majority of inpatients at the time of the audit (86.2 per cent) were in the White ethnic group, with the next most frequent being the Asian (6.7 per cent) and Black (3.5 per cent) ethnic groups.

Chart 2
Age and sex distribution of inpatients with diabetes, England, and Wales, 2013

Table 2
Ages of diabetes inpatients and all inpatients, England and Wales, 2013

Table 3
Ethnic group of inpatients with diabetes, England and Wales, 2013

---

* Source: Hospital Episode Statistics (HES) 16-20 September 2012, Health and Social Care Information Centre, figures exclude day cases.

* Source: Patient Episode Database for Wales (PEDW) 16-20 September 2013, NHS Wales Informatics Service, figures exclude day cases.

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Chart 3 illustrates the proportion of inpatients that had each type of diabetes within each ethnic group.

### Chart 3
Ethnic group of inpatients with diabetes, by diabetes type, England and Wales, 2013

#### Table 4
Percentage of inpatients by admission type and main reason for admission, England and Wales, 2013

<table>
<thead>
<tr>
<th>Admission</th>
<th>England</th>
<th>Wales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inpatients with diabetes</td>
<td>All inpatients&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Emergency*</td>
<td>84.7</td>
<td>80.7</td>
</tr>
<tr>
<td>Elective*</td>
<td>10.5</td>
<td>19.3</td>
</tr>
<tr>
<td>Medical</td>
<td>74.2</td>
<td>62.1</td>
</tr>
<tr>
<td>Surgical</td>
<td>25.8</td>
<td>37.9</td>
</tr>
</tbody>
</table>

*For diabetes inpatients, percentages for Emergency and Elective do not add up to 100 per cent because the audit question includes a “transfer from another hospital” response not included in this table.

---

**Reason for and type of admission**

Table 4 shows that 84.7 per cent of inpatients with diabetes in England were admitted to hospital as an emergency compared to 80.7 per cent of all patients in hospital<sup>vii</sup>. In Wales, 86.5 per cent of inpatients with diabetes were admitted to hospital as an emergency compared to 75.9 per cent of all patients in hospital<sup>viii</sup>. This suggests that people with diabetes are more likely to be admitted as an emergency compared to all inpatients in hospital.

In England, 74.2 per cent of inpatients with diabetes, compared to 62.1 per cent of all inpatients in hospital, were admitted for medical reasons, whereas 25.8 per cent of inpatients with diabetes, compared to 37.9 per cent of all inpatients in hospital, were admitted for non-medical (i.e. surgical) reasons.

In England, 10.5 per cent of patients with diabetes were admitted electively compared with 19.3 per cent of all patients. In Wales, 8.8 per cent with diabetes were admitted electively compared with 24.1 per cent of all inpatients.

In Wales, 77.2 per cent of inpatients with diabetes, compared to 62.5 per cent of all patients in hospital, were admitted for medical reasons, whereas 22.8 per cent of inpatients with diabetes, compared to 37.5 per cent of all inpatients in hospital, were admitted for non-medical (i.e. surgical) reasons.

---

<sup>vii</sup> Source: Hospital Episode Statistics (HES) 16-20 September 2012, Health and Social Care Information Centre, figures exclude day cases.

<sup>viii</sup> Source: Patient Episode Database for Wales (PEDW) 16-20 September 2013, NHS Wales Informatics Service, figures exclude day cases.
Chart 4 shows a time series comparison of the main reason for admission to hospital. 8.1 per cent of inpatients were admitted to hospital specifically for the management of diabetes or a diabetes complication. A further 66.3 per cent were admitted for other medical reasons (e.g. respiratory, Care of the Elderly, gastroenterology) and 25.6 per cent were admitted for non-medical (i.e. surgical) reasons.

Looking at the main reason for admission by diabetes type (Chart 5), inpatients with Type 1 diabetes (30.1 per cent) were significantly more likely to be admitted for the management of their diabetes or diabetes complication than inpatients with Type 2 diabetes treated with insulin (11.4 per cent).
Of the inpatients that were admitted specifically for the management of diabetes or a diabetes complication, the highest proportion (47.2 per cent) were admitted for active foot disease; this equates to 3.8 per cent of all inpatients included in the audit.

A breakdown by diabetes type is shown in Chart 6. It is important to note that active diabetic foot disease was the most common reason for admission overall, but diabetic ketoacidosis (DKA) predominated for patients with Type 1 diabetes (48.0 per cent).

At the time of the audit, 72.5 per cent of all inpatients with diabetes were cared for on a medical ward, and 73.9 per cent of inpatients with diabetes were treated by a medical consultant.

Only 6.2 per cent of all inpatients with diabetes were on a diabetes and endocrinology ward and only 8.9 per cent of inpatients were under the care of a diabetes and endocrinology consultant. A breakdown by consultant specialty is shown in Chart 7.
Length of inpatient stay at time of audit

The audit highlights a general trend that diabetes patients admitted to hospital as an emergency had a longer median length of stay in hospital (8 nights) than patients admitted electively (6 nights). Chart 8 shows a time series comparison of the median length of inpatient stay.

At the time of the audit, 30.7 per cent of inpatients had been in hospital for more than 14 nights (compared to 30.5 per cent in 2012, 30.9 per cent in 2011 and 32.0 per cent in 2010) and 13.6 per cent of inpatients had been in hospital for more than 28 nights at the time of the audit (compared to 13.5 per cent in 2012, 14.4 per cent in 2011 and 15.0 per cent in 2010).

Chart 8
Median length of inpatient stay (number of nights), England and Wales, 2010 – 2013

* Sites from Wales did not participate in the 2010 NaDIA.
Renal replacement therapy and diabetic foot disease

Good management of diabetes is essential to reduce the risk of associated long term complications. Kidney problems are a particular risk for people with diabetes, as are diabetic foot complications, which are the most common cause of lower amputation in the UK.

The 2013 audit shows that 4.1 per cent of inpatients with diabetes were receiving renal replacement therapy (haemodialysis, peritoneal dialysis or renal transplant). When broken down by diabetes type (Chart 9), renal replacement therapy was most common in diabetes inpatients that were treated with insulin (11.6 per cent of inpatients with Type 1 diabetes and 6.1 per cent of inpatients with Type 2 insulin treated diabetes).

12.6 per cent of inpatients with diabetes had a history of foot disease (previous or current ulcer, amputation or Charcot’s arthropathy). As for renal replacement therapy, foot disease was most frequent amongst inpatients that had Type 1 diabetes (25.4 per cent) and Type 2 insulin treated diabetes (18.5 per cent).

Chart 9
Prevalence of renal replacement therapy, England and Wales, 2010 - 2013

<table>
<thead>
<tr>
<th>Diabetes type</th>
<th>Percentage of inpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010*</td>
<td>7.8 10.5 9.9 11.6</td>
</tr>
<tr>
<td>2011</td>
<td>5.3 5.4 5.4 6.1</td>
</tr>
<tr>
<td>2012</td>
<td>1.5 1.6 1.4 1.4</td>
</tr>
<tr>
<td>2013</td>
<td>2.6 1.7 2.9 3.6</td>
</tr>
<tr>
<td>Grand total</td>
<td>3.4 3.2 3.7 4.1</td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.

Chart 10 shows a time series comparison of the percentage of inpatients that had a history of foot disease.

<table>
<thead>
<tr>
<th>Diabetes type</th>
<th>Percentage of inpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010*</td>
<td>21.5 29.0 27.0 25.4</td>
</tr>
<tr>
<td>2011</td>
<td>19.9 18.3 18.8 18.3</td>
</tr>
<tr>
<td>2012</td>
<td>8.4 7.4 8.4 7.9</td>
</tr>
<tr>
<td>2013</td>
<td>5.3 5.8 6.2 7.7</td>
</tr>
<tr>
<td>Grand total</td>
<td>12.3 12.2 12.8 12.6</td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.

** Figures relate to patients receiving renal therapy who were admitted as inpatients for one or more nights. Daycase renal dialysis units are not included.
Enteral feeding

The bedside audit questionnaire for 2013 included a new question, relating to enteral feeding.

At the time of the audit, 7.3 per cent of inpatients were having enteral feeding. Breaking this down by diabetes type, 8.1 per cent of inpatients with Type 1 diabetes were having enteral feeding, as were the same proportion of inpatients with Type 2 diabetes treated with insulin. 6.5 per cent of inpatients with Type 2 non insulin treated diabetes and 5.7 per cent of inpatients with Type 2 (diet only) diabetes were having enteral feeding.

Cognitive impairment

Also in 2013, a question was added to the audit regarding cognitive impairment.

Hospital staff reported that 30.5 per cent of inpatients were cognitively impaired at the time of the audit. When analysed by diabetes type, cognitive impairment was most frequent among inpatients with Type 2 (diet only) diabetes (38.9 per cent) and least common among inpatients with Type 1 diabetes (22.2 per cent).

Of the inpatients that were reported to be cognitively impaired, 76.4 per cent did not complete a patient experience questionnaire; these inpatients make up 48.4 per cent of all inpatients for whom no patient experience data was returned.
This section of the report provides evidence against the National Service Framework (NSF) for Diabetes Standard 8, and the National Service Framework (NSF) for Diabetes (Wales) Standard 8, which outline the requirement for all patients with diabetes admitted to hospital to receive effective care for their diabetes and be involved in decisions on the management of their diabetes. It also provides information for NSF Standards 10, 11 and 12 which aim to “minimise the impact of long term complications of diabetes by early detection and effective treatment”.

The NICE Quality Standards for diabetes are also supported by the audit, in particular Quality Statement 12 which states:

“People with diabetes admitted to hospital are cared for by appropriately trained staff, provided with access to a specialist diabetes team, and given the choice of self-monitoring and managing their own insulin.”

Initiatives introduced to improve quality of care

Hospital staff were asked to provide information on whether particular initiatives in diabetes care had been introduced in their hospital since the NaDIA began. Chart 11 shows the percentage of sites that had introduced each initiative listed. The most frequently introduced initiatives were the Hypoglycaemia guideline and Insulin Passport or local equivalent.

It must be noted that a number of hospitals that stated that initiatives had been introduced provided additional information suggesting that some initiatives were established prior to the first year of the audit in 2009 using a continuous improvement process of review and evaluation.
Hospital staff were asked for the first time in 2013 whether their hospital had electronic patient records, electronic prescribing and remote glucose monitoring. Table 5 shows the proportion of hospitals that responded to these new questions that had introduced each of these technologies.

Table 5  
Percentage of sites with electronic records and monitoring, England and Wales, 2013

<table>
<thead>
<tr>
<th>Percentage of sites with:</th>
<th>Yes</th>
<th>No</th>
<th>Partial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic patient record</td>
<td>25.1</td>
<td>44.8</td>
<td>30.0</td>
</tr>
<tr>
<td>Electronic prescribing</td>
<td>16.1</td>
<td>71.7</td>
<td>12.2</td>
</tr>
<tr>
<td>Remote blood glucose monitoring</td>
<td>33.0</td>
<td>56.2</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Did diabetes management minimise the risk of avoidable complications?

Structure of care (staffing)

The audit collected information on the structure of staff available to provide care for people with diabetes while in hospital.

Diabetes specialist team

The audit shows that 46.1 per cent of diabetes consultants’ working time was spent on the care of people with diabetes, with 13.9 per cent of the consultants’ total working time being spent on inpatient care.

Table 6  
Average staffing for care of people with diabetes, England and Wales, 2010 - 2013

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes inpatient specialist nurse (DISN)</td>
<td>6.3</td>
<td>7.7</td>
<td>7.0</td>
<td>7.6</td>
<td>26.0</td>
<td>30.6</td>
<td>27.4</td>
<td>28.6</td>
<td>31.5</td>
<td>31.9</td>
<td>33.3</td>
<td>31.7</td>
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<tr>
<td>Outpatient</td>
<td>1.9</td>
<td>3.0</td>
<td>0.9</td>
<td>1.2</td>
<td>7.8</td>
<td>12.0</td>
<td>3.8</td>
<td>4.7</td>
<td>51.8</td>
<td>46.9</td>
<td>68.1</td>
<td>64.4</td>
</tr>
<tr>
<td>Diabetes specialist nurse (DSN)</td>
<td>2.5</td>
<td>2.6</td>
<td>2.9</td>
<td>2.8</td>
<td>10.3</td>
<td>10.5</td>
<td>11.2</td>
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<td>45.2</td>
<td>52.2</td>
<td>50.0</td>
<td>48.6</td>
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<tr>
<td>Inpatient</td>
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<td>15.1</td>
<td>15.4</td>
<td>14.6</td>
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<td>59.9</td>
<td>60.1</td>
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<td>24.8</td>
<td>13.9</td>
<td>14.9</td>
</tr>
<tr>
<td>Outpatient</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any diabetes specialist nurse (DISN and DSN)</td>
<td>8.8</td>
<td>10.4</td>
<td>9.9</td>
<td>10.3</td>
<td>36.3</td>
<td>41.1</td>
<td>38.6</td>
<td>39.1</td>
<td>2.4</td>
<td>4.4</td>
<td>3.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Inpatient</td>
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<td>18.1</td>
<td>16.3</td>
<td>15.9</td>
<td>68.7</td>
<td>71.9</td>
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<td>60.1</td>
<td>5.4</td>
<td>7.5</td>
<td>6.9</td>
<td>4.3</td>
</tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Consultant</td>
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<td>3.0</td>
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<td>5.3</td>
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<td>8.5</td>
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<td>31.7</td>
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<td>7.5</td>
<td>3.7</td>
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<td>1.3</td>
<td>1.4</td>
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<td>6.9</td>
<td>5.1</td>
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<td>33.6</td>
<td>32.4</td>
<td>34.1</td>
</tr>
<tr>
<td>Podiatrist</td>
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<td>7.9</td>
<td>6.5</td>
<td>6.3</td>
<td>26.2</td>
<td>31.2</td>
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<td>7.7</td>
<td>17.3</td>
<td>17.1</td>
<td>16.3</td>
</tr>
<tr>
<td>Inpatient</td>
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<td>0.5</td>
<td>0.4</td>
<td>0.4</td>
<td>1.9</td>
<td>1.8</td>
<td>1.4</td>
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<td>67.3</td>
<td>70.8</td>
<td>72.3</td>
<td>71.2</td>
</tr>
<tr>
<td>Outpatient</td>
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<td>5.7</td>
<td>5.1</td>
<td>5.3</td>
<td>19.6</td>
<td>22.6</td>
<td>20.0</td>
<td>20.2</td>
<td>25.6</td>
<td>20.4</td>
<td>20.4</td>
<td>12.5</td>
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<tr>
<td>Non-specialist dietitian</td>
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<td>0.8</td>
<td>1.4</td>
<td>1.1</td>
<td>2.9</td>
<td>3.1</td>
<td>5.5</td>
<td>4.0</td>
<td>58.9</td>
<td>55.8</td>
<td>50.9</td>
<td>53.8</td>
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<tr>
<td>Inpatient</td>
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<td>0.7</td>
<td>0.7</td>
<td>0.6</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>2.4</td>
<td>65.5</td>
<td>67.3</td>
<td>67.6</td>
<td>66.8</td>
</tr>
<tr>
<td>Outpatient</td>
<td>1.2</td>
<td>1.3</td>
<td>1.8</td>
<td>1.5</td>
<td>4.8</td>
<td>5.0</td>
<td>7.2</td>
<td>5.7</td>
<td>38.1</td>
<td>39.8</td>
<td>42.1</td>
<td>39.4</td>
</tr>
<tr>
<td>Any dietitian</td>
<td>5.5</td>
<td>6.4</td>
<td>5.9</td>
<td>6.0</td>
<td>22.5</td>
<td>25.5</td>
<td>22.9</td>
<td>22.6</td>
<td>10.7</td>
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<td>8.7</td>
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<tr>
<td>Outpatient</td>
<td>0.1</td>
<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
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</tr>
<tr>
<td>Specialist pharmacist†</td>
<td>0.4</td>
<td>1.5</td>
<td>87.0</td>
<td>87.0</td>
<td>96.2</td>
<td>96.2</td>
<td>96.2</td>
<td>96.2</td>
<td>96.2</td>
<td>96.2</td>
<td>96.2</td>
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</tr>
<tr>
<td>Inpatient</td>
<td></td>
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<tr>
<td>Outpatient</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.
† Data on specialist pharmacist staffing was collected for the first time in the 2013 audit.
Visits by Diabetes specialist teams

The audit shows that 34.7 per cent of inpatients were seen by a member of the diabetes team (compared to 31.9 per cent in 2012, 30.5 per cent in 2011 and 31.0 per cent in 2010)*.

Breaking this down by diabetes type, inpatients with Type 1 diabetes (65.7 per cent) and Type 2 insulin treated diabetes (47.6 per cent) were significantly more likely to be seen by the diabetes team than inpatients with Type 2 non insulin treated diabetes (25.7 per cent) and Type 2 (diet only) diabetes (16.9 per cent). Chart 12 shows a time series comparison of the percentage of inpatients that were seen by the diabetes team for each diabetes type.

* Sites from Wales did not participate in the 2010 NaDIA.

* The increase from 30.5 per cent in 2011 to 34.7 per cent in 2013 is statistically significant (p < 0.05).
The 2013 audit included a new question asking whether there had been an increase in referrals/patient contacts. Of the 200 sites that responded to this question, 76.5 per cent of sites reported that there had been an increase. Based on the ‘Think Glucose Criteria’, 43.3 per cent of inpatients should have been referred to the diabetes team, of which 62.5 per cent were actually seen by a member of the diabetes team (Chart 13).

Of the inpatients that were able to answer the audit questions, 43.4 per cent (compared to 43.8 per cent in 2012, 51.4 per cent in 2011 and 50.7 per cent in 2010) were aware that the diabetes team was available to provide support to inpatients with diabetes and advice to ward staff. Of those that were aware of the diabetes team, over half (53.2 per cent) stated that they would like the team to be involved in the management of their diabetes while in hospital.

Multidisciplinary foot care teams

NICE recommends that a multidisciplinary foot care team should manage the care pathway of patients with diabetic foot problems who require inpatient care. The multidisciplinary foot care team should normally include a diabetologist, a surgeon with the relevant expertise in managing diabetic foot problems, a diabetes nurse specialist, a podiatrist and a tissue viability nurse.

Of the 206 sites that provided hospital characteristics information regarding the multidisciplinary team as defined above, 58 sites (28.2 per cent) did not have a multidisciplinary team, a continuing improvement on previous years (31.9 per cent in 2012, 41.7 per cent in 2011 and 38.7 per cent of sites in 2010).

* Sites from Wales did not participate in the 2010 NaDIA.
All sites reported having at least some access to a diabetologist, while 4.4 per cent of sites reported having no access to a specialist podiatrist, and 9.5 per cent of sites reported having no access to an interventional radiologist (Table 7).

### Table 7
Composition of multidisciplinary foot care teams, England and Wales, 2010 - 2013

<table>
<thead>
<tr>
<th>Foot Team Member</th>
<th>Percentage of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular surgeon</td>
<td></td>
</tr>
<tr>
<td>Diabetologist</td>
<td></td>
</tr>
<tr>
<td>Specialist podiatrist</td>
<td></td>
</tr>
<tr>
<td>Diabetes specialist nurse</td>
<td></td>
</tr>
<tr>
<td>Interventional radiologist</td>
<td></td>
</tr>
<tr>
<td>Orthopaedic surgeon</td>
<td></td>
</tr>
<tr>
<td>Tissue viability nurse</td>
<td></td>
</tr>
<tr>
<td>Microbiologist</td>
<td></td>
</tr>
<tr>
<td>Orthotist</td>
<td></td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.

### Foot risk assessment and management

Of the inpatients included in the audit, 42.4 per cent had a documented foot risk examination during their hospital stay, compared to 34.1 per cent in 2012, 25.8 per cent in 2011 and 28.2 per cent in 2010. 9.2 per cent of inpatients were admitted with active diabetic foot disease. Of these inpatients, 61.1 per cent were seen by a member of the multidisciplinary foot care team within 24 hours of admission to hospital, and 69.3 per cent had input from the multidisciplinary foot care team within the last 7 days.

41.6 per cent of inpatients with Type 1 diabetes received a documented foot risk examination within the first 24 hours of admission to hospital (Chart 14). Inpatients with Type 2 diabetes treated with insulin were significantly more likely to have had their feet examined within the first 24 hours of admission to hospital (39.5 per cent) than patients with Type 2 diabetes non insulin treated (33.7 per cent) and patients with Type 2 diet only diabetes (34.3 per cent).

### Chart 14
Percentage of inpatients receiving foot risk examinations, by diabetes type, England and Wales, 2010 - 2013

* Sites from Wales did not participate in the 2010 NaDIA.

**The increase from 25.8 per cent in 2011 to 42.4 per cent in 2013 is statistically significant (p <0.05).
**Development of foot lesions during admission**

Chart 15 shows that the overall percentage of inpatients that developed a foot lesion during admission to hospital fell significantly from 2.2 per cent (257 patients) in 2010 to 1.4 per cent (196 patients) in 2013.

This reduction is present both when comparing 2010, England only, to either 2013, England only or 2013, England and Wales.

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**Foot care programmes**

The hospital characteristics data collected in the audit included information on whether each site had introduced ‘Putting Feet First’, NICE inpatient foot guidance or a foot screening programme for those with diabetes admitted to hospital since the audit began in 2009.

Table 8 compares the percentage of inpatients receiving foot risk assessments and input from the multidisciplinary foot care team between sites that had introduced these initiatives and sites that had not.

---

**Table 8**

Comparison of foot care input for inpatients where foot care initiatives have been introduced, England and Wales, 2013

<table>
<thead>
<tr>
<th>Percentage of inpatients that*:</th>
<th>Sites with feet first/ screening programme</th>
<th>Sites without feet first/ screening programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received documented foot risk assessment within 24 hours of admission</td>
<td>40.8</td>
<td>23.5</td>
</tr>
<tr>
<td>Received documented foot risk assessment after 24 hours of admission</td>
<td>36.9</td>
<td>18.6</td>
</tr>
<tr>
<td>Were seen by a member of the MDFT within 24 hours</td>
<td>64.3</td>
<td>46.8</td>
</tr>
<tr>
<td>Received input from the MDFT in the last 7 days</td>
<td>73.7</td>
<td>54.6</td>
</tr>
<tr>
<td>Had a foot lesion arise during admission</td>
<td>1.6</td>
<td>1.1</td>
</tr>
</tbody>
</table>

*Where the values in a line in the table are bolded, the difference between the two percentages is statistically significant (p <0.05).
Inpatients were significantly more likely to receive a documented foot risk assessment at sites where the initiatives had been introduced, both within the first 24 hours of admission, and after 24 hours of admission.

Inpatients at these sites were also significantly more likely to be seen by a member of the multidisciplinary foot care team within 24 hours, and to have received input from this team in the last 7 days.

At sites that had introduced these initiatives, inpatients were significantly more likely to be reported as having a foot lesion arise during their admission to hospital. This may be because the greater likelihood of foot risk assessments and visits by the multidisciplinary foot care team where these initiatives are in place means that foot problems are more likely to be detected during the inpatient stay.

**Blood glucose control**

Information was collected on inpatients’ blood glucose control, looking at the previous 7 days of their hospital stay, excluding inpatients in diabetic ketoacidosis (DKA) or hyperglycaemic hyperosmolar state (HHS) at the time of the audit. The following guidelines were used to establish the appropriateness of blood glucose testing:

<table>
<thead>
<tr>
<th>Patient status</th>
<th>Blood glucose testing frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin or diet alone</td>
<td>1 or more/day</td>
</tr>
<tr>
<td>Long stay patient on diet and metformin with stable control</td>
<td>Once weekly or more</td>
</tr>
<tr>
<td>Insulin, Exenatide, SU or &gt;1 oral agent including DPP4 inhibitors and glitazones</td>
<td>2 or more/day</td>
</tr>
<tr>
<td>Unwell, unstable diabetes or basal bolus</td>
<td>4 or more/day</td>
</tr>
</tbody>
</table>

A ‘good diabetes day’ was defined as a day on which the frequency of blood glucose monitoring was appropriate, using the guidelines above, and there was no more than one blood glucose measurement greater than 11 mmol/L and no blood glucose measurements less than 4 mmol/L.
Appropriate blood glucose testing and good diabetes days

When adjusted for length of stay, glucose monitoring was undertaken on an average of 6.7 days out of the previous 7 days, equating to 96.3 per cent of the time. This monitoring was appropriate (see guidelines table) on an average of 6.4 days or 91.8 per cent of the time (Chart 16).

Chart 16
Blood glucose monitoring and appropriate blood glucose testing by diabetes type, England and Wales, 2013

The average number of ‘good diabetes days’ in the previous 7 days was 4.2 days, or 60.4 per cent of the time, after adjusting for length of stay.

Chart 17 indicates that the adjusted number of ‘good diabetes days’ was lower for inpatients with Type 1 diabetes (2.3 days) and Type 2 insulin treated diabetes (3.4 days) than for inpatients with Type 2 non insulin treated diabetes (4.7 days) and Type 2 diet only diabetes (5.6 days)xiv.

Chart 17
‘Good diabetes days’ by diabetes type, England and Wales, 2010 - 2013

The difference between 3.4 days for inpatients with Type 2 insulin treated diabetes and 4.7 days for inpatients with Type 2 non insulin treated diabetes is statistically significant (p <0.05).
Use of insulin infusions

Insulin infusions are used over a short period of time, generally seven days or less, as an alternative or supplement to subcutaneous injections of insulin or tablets with the aim of achieving safe insulin management during fasting/nil by mouth or to maintain glucose control during severe illness. The NHS Diabetes commissioned report written by the Joint British Diabetes Societies Inpatient Care Group “Management of adults with diabetes undergoing surgery and elective procedures: Improving Standards” states that “insulin must be infused at a variable rate to keep the blood glucose 6-10 mmol/L (acceptable range 4 – 12 mmol/L)”\textsuperscript{9}. At the time of the audit, 9.8 per cent of inpatients with diabetes had been on an insulin infusion in the last 7 days (compared to 10.3 per cent in 2012, 11.2 per cent in 2011 and 12.5 per cent in 2010\textsuperscript{10}). The healthcare professionals collecting the data suggested that the use of insulin infusions was not appropriate for 6.5 per cent of these inpatients (compared to 6.4 per cent in 2012, 7.0 per cent in 2011 and 7.4 per cent in 2010).

Of inpatients with diabetes that were on an insulin infusion during the last 7 days, 28.8 per cent were on an insulin infusion for less than 1 day, while 9.7 per cent of inpatients were on an insulin infusion for 7 days or longer.

Chart 18 shows the duration (days) of insulin infusion use by the main reason for admission to hospital.

The duration of insulin infusions was deemed inappropriate by the healthcare professionals collecting the data for 7.5 per cent of inpatients who received an infusion (compared to 7.6 per cent in 2012, 8.3 per cent in 2011 and 12.0 per cent in 2010).

** The reduction from 11.2 per cent in 2011 to 9.8 per cent in 2013 is statistically significant (p <0.05).

Chart 18
Duration (days) of insulin infusion use by main reason for admission, England and Wales, 2013

<table>
<thead>
<tr>
<th>Percentage of inpatients</th>
<th>&lt; 1 day</th>
<th>1 to &lt; 2 days</th>
<th>2 to &lt; 4 days</th>
<th>4 to &lt; 7 days</th>
<th>&gt; 7 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of diabetes</td>
<td>31.2</td>
<td>23.8</td>
<td>26.0</td>
<td>25.8</td>
<td>9.7</td>
</tr>
<tr>
<td>Other medical conditions</td>
<td>30.2</td>
<td>25.8</td>
<td>22.6</td>
<td>42.7-42.9</td>
<td>9.2</td>
</tr>
<tr>
<td>Non-medical/surgical</td>
<td>30.8</td>
<td>22.0</td>
<td>22.9</td>
<td>12.1</td>
<td>11.9</td>
</tr>
<tr>
<td>Grand total</td>
<td>28.8</td>
<td>26.7</td>
<td>22.9</td>
<td>9.7</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Reason for admission
Of the inpatients that had received an insulin infusion that lasted longer than 24 hours in the last 7 days (Chart 19):

- 0.9 per cent did not have any glucose monitoring in the last 24 hours on infusion
- 2.0 per cent had between one and three blood glucose measurements in the last 24 hours on infusion (equivalent to less than one reading every eight hours)
- 37.7 per cent had between four and eleven measurements in the last 24 hours on infusion (equivalent to less than one reading every two hours)
- 49.6 per cent had between 12 and 23 measurements in the last 24 hours on infusion
- 9.7 per cent had over 23 measurements in the last 24 hours on infusion.

* Sites from Wales did not participate in the 2010 NaDIA.
Did harm result from the inpatient stay?

Medication errors

The healthcare professionals collecting the information for the audit reviewed each inpatient’s drug chart and recorded whether specified medication errors (prescription errors and/or management errors, see the list in Table 9 below) occurred in the previous 7 days.

In 2013, over one third (37.0 per cent) of inpatient drug charts that were available and reviewed by the healthcare professionals collecting the data had at least one medication error (i.e. prescription error and/or management error) in the previous 7 days, compared to 39.6 per cent in 2012, 39.9 per cent in 2011 and 44.5 per cent in 2010\textsuperscript{xvi}. 21.9 per cent of inpatient drug charts reviewed by the healthcare professionals had at least one prescription error in the previous 7 days (compared to 24.0 per cent in 2012, 25.2 per cent in 2011 and 30.7 per cent in 2010\textsuperscript{vii}) and 22.3 per cent of inpatient drug charts had at least one medication management error (23.9 per cent in 2012, 22.9 per cent in 2011 and 24.1 per cent in 2010).

The most common insulin prescription error was where insulin was not signed as given, and the most common oral hypoglycaemic agent (OHA) prescription error was where OHA was given/prescribed at the wrong time (Table 9). The most frequent insulin management error was failure to increase insulin when the patient’s blood glucose was persistently greater than 11 mmol/L and better blood glucose control would have been appropriate (Table 9). The most frequent OHA management error was where no action was taken when the patient’s blood glucose was persistently greater than 11 mmol/L and better blood glucose control would have been appropriate (Table 9).

The frequency of errors has reduced for most of the listed errors, with marked improvements in the Unit abbreviated to ‘u’ or written unclearly (down from 6.3 per cent of drug charts in 2010, 3.4 per cent in 2011 and 2.5 per cent in 2012 to 1.9 per cent in 2013) and Name of insulin incorrect (down from 5.0 per cent of inpatient drug charts in 2010, 2.9 per cent in 2011 and 2.5 per cent in 2012 to 2.1 per cent in 2013).

### Table 9

<table>
<thead>
<tr>
<th></th>
<th>2010*</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>% of inpatient drug charts</td>
<td>Number</td>
<td>% of inpatient drug charts</td>
</tr>
<tr>
<td><strong>Insulin prescription errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin not written up\textsuperscript{†}</td>
<td>243</td>
<td>2.7</td>
<td>186</td>
<td>2.1</td>
</tr>
<tr>
<td>Name of insulin incorrect\textsuperscript{†}</td>
<td>444</td>
<td>5.0</td>
<td>266</td>
<td>2.9</td>
</tr>
<tr>
<td>Number (dose) unclear</td>
<td>307</td>
<td>3.5</td>
<td>209</td>
<td>2.3</td>
</tr>
<tr>
<td>Unit abbreviated to ‘u’ or written unclear\textsuperscript{†}</td>
<td>557</td>
<td>6.3</td>
<td>311</td>
<td>3.4</td>
</tr>
<tr>
<td>Insulin or prescription chart not signed\textsuperscript{†}</td>
<td>244</td>
<td>2.8</td>
<td>218</td>
<td>2.4</td>
</tr>
<tr>
<td>Insulin not signed as given</td>
<td>528</td>
<td>6.0</td>
<td>462</td>
<td>5.1</td>
</tr>
<tr>
<td>Insulin given/ prescribed at wrong time</td>
<td>345</td>
<td>3.9</td>
<td>280</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Oral hypoglycaemic agent (OHA) prescription errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OHA not signed as given</td>
<td>493</td>
<td>5.6</td>
<td>459</td>
<td>5.1</td>
</tr>
<tr>
<td>OHA given/ prescribed at wrong time</td>
<td>529</td>
<td>6.0</td>
<td>479</td>
<td>5.3</td>
</tr>
<tr>
<td>Wrong dose</td>
<td>133</td>
<td>1.5</td>
<td>101</td>
<td>1.1</td>
</tr>
<tr>
<td>OHA not written up</td>
<td>227</td>
<td>2.6</td>
<td>206</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Insulin management errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin not increased when persistent blood glucose greater than 11 mmol/L and better glycaemic control appropriate</td>
<td>884</td>
<td>10.0</td>
<td>858</td>
<td>9.5</td>
</tr>
<tr>
<td>Insulin not reduced if unexplained blood glucose less than 4 mmol/L\textsuperscript{†}</td>
<td>338</td>
<td>3.8</td>
<td>357</td>
<td>4.0</td>
</tr>
<tr>
<td>Inappropriate omission of insulin after episode of hypoglycaemia</td>
<td>214</td>
<td>2.4</td>
<td>189</td>
<td>2.1</td>
</tr>
<tr>
<td><strong>OHA management errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No action taken when persistent blood glucose greater than 11 mmol/L and better glycaemic control appropriate</td>
<td>814</td>
<td>9.2</td>
<td>811</td>
<td>9.0</td>
</tr>
<tr>
<td>OHA not reduced if unexplained blood glucose less than 4 mmol/L\textsuperscript{†}</td>
<td>280</td>
<td>3.2</td>
<td>259</td>
<td>2.9</td>
</tr>
<tr>
<td>Inappropriate omission of OHA after episode of hypoglycaemia</td>
<td>94</td>
<td>1.1</td>
<td>89</td>
<td>1.0</td>
</tr>
</tbody>
</table>

\* Sites from Wales did not participate in the 2010 NaDIA.

\† Where the 2011 and 2013 values are bolded, the difference between the two percentages is statistically significant (p < 0.05).

\textsuperscript{xvi} The decrease from 39.9 per cent in 2011 to 37.0 per cent in 2013 is statistically significant (p < 0.05).

\textsuperscript{vii} The decrease from 25.2 per cent in 2011 to 21.9 per cent in 2013 is statistically significant (p < 0.05).
Chart 20 shows that medication errors on drug charts were significantly more frequent for inpatients with Type 1 diabetes (44.3 per cent) and Type 2 insulin treated diabetes (44.8 per cent) than for inpatients with Type 2 non insulin treated diabetes (29.7 per cent) and Type 2 diet only diabetes (19.4 per cent). This chart also shows that there was a significant decrease in medication errors on drug charts from 2011 to 2013.

Similarly, prescription errors (Chart 21) and medication management errors (Chart 22) on drug charts were significantly more common for inpatients treated with insulin (i.e. Type 1 and Type 2 insulin treated diabetes types) than for inpatients with Type 2 non insulin treated diabetes and Type 2 diet only diabetes. Prescription errors decreased significantly from 2011 to 2013.
At the 16.1 per cent of sites with electronic prescribing (see Table 5), the frequency of prescription errors on drug charts was significantly lower (19.3 per cent) than at the 71.7 per cent of sites with no electronic prescribing, where there was at least one prescription error on 23.2 per cent of drug charts.

When looking specifically at insulin errors (i.e. prescription errors and/or management errors) illustrated in Chart 23, the drug charts for inpatients with Type 1 diabetes had a significantly higher percentage of insulin errors (42.9 per cent) than the drug charts for inpatients with Type 2 insulin treated diabetes (37.5 per cent). Overall, 20.6 per cent of inpatient drug charts had one or more insulin errors.
Hypoglycaemic episodes

For this audit, mild hypoglycaemia was defined as a capillary blood glucose of 3.0 – 3.9 mmol/L and severe hypoglycaemia was defined as a capillary blood glucose of less than 3.0 mmol/L, whether or not the patient was symptomatic.

Information was collected on hypoglycaemic episodes over the previous 7 days of the inpatient’s stay in hospital.

Charts 24 to 26 show the proportion of inpatients that had one or more hypoglycaemic episodes (any, mild and severe hypoglycaemic episodes) by diabetes type. Inpatients with Type 1 diabetes (47.9 per cent) were significantly more likely to experience one or more hypoglycaemic episodes than inpatients with Type 2 insulin treated diabetes (31.2 per cent), Type 2 non insulin treated diabetes (15.8 per cent) and Type 2 diet only diabetes (8.0 per cent).

Charts 24 to 26 show the proportion of inpatients that had one or more hypoglycaemic episodes (any, mild and severe hypoglycaemic episodes) by diabetes type. Inpatients with Type 1 diabetes (47.9 per cent) were significantly more likely to experience one or more hypoglycaemic episodes than inpatients with Type 2 insulin treated diabetes (31.2 per cent), Type 2 non insulin treated diabetes (15.8 per cent) and Type 2 diet only diabetes (8.0 per cent).

Chart 24
Percentage of inpatients that experienced one or more hypoglycaemic episodes in last 7 days by diabetes type, England and Wales, 2010 - 2013

<table>
<thead>
<tr>
<th>Diabetes type</th>
<th>2010*</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>45.4</td>
<td>48.5</td>
<td>45.5</td>
<td>47.9</td>
</tr>
<tr>
<td>Type 2 (insulin)</td>
<td>37.2</td>
<td>34.8</td>
<td>32.0</td>
<td>31.2</td>
</tr>
<tr>
<td>Type 2 (non insulin)</td>
<td>20.3</td>
<td>20.5</td>
<td>15.3</td>
<td>15.8</td>
</tr>
<tr>
<td>Type 2 (diet only)</td>
<td>13.0</td>
<td>10.2</td>
<td>9.1</td>
<td>8.0</td>
</tr>
<tr>
<td>Grand total</td>
<td>26.1</td>
<td>25.7</td>
<td>22.4</td>
<td>22.0</td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.

Chart 25
Percentage of inpatients that experienced one or more mild hypoglycaemic episodes in last 7 days by diabetes type, England and Wales, 2010 - 2013

<table>
<thead>
<tr>
<th>Diabetes type</th>
<th>2010*</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>38.3</td>
<td>41.2</td>
<td>40.9</td>
<td>41.8</td>
</tr>
<tr>
<td>Type 2 (insulin)</td>
<td>32.3</td>
<td>31.3</td>
<td>28.9</td>
<td>28.2</td>
</tr>
<tr>
<td>Type 2 (non insulin)</td>
<td>18.1</td>
<td>16.9</td>
<td>14.1</td>
<td>14.6</td>
</tr>
<tr>
<td>Type 2 (diet only)</td>
<td>11.5</td>
<td>9.4</td>
<td>8.6</td>
<td>7.6</td>
</tr>
<tr>
<td>Grand total</td>
<td>22.8</td>
<td>23.1</td>
<td>20.4</td>
<td>20.0</td>
</tr>
</tbody>
</table>

* Sites from Wales did not participate in the 2010 NaDIA.
One fifth (20.0 per cent) of inpatients with diabetes had at least one mild hypoglycaemic episode, compared to 20.4 per cent in 2012, 23.1 per cent in 2011 and 22.8 per cent in 2010\textsuperscript{xviii}.

Just under 1 in 10 inpatients with diabetes (9.3 per cent) had at least one severe hypoglycaemic episode, compared to 10.5 per cent in 2012, 10.6 per cent in 2011 and 11.8 per cent in 2010\textsuperscript{xxix}.

The audit shows that the percentage of inpatients that had each type of hypoglycaemic episode varied by diabetes type, with inpatients with Type 1 diabetes having the highest frequency of both mild hypoglycaemic episodes (41.8 per cent, Chart 25) and severe hypoglycaemic episodes (30.0 per cent, Chart 26).

Inpatients whose drug charts had one or more medication errors were more than twice as likely to experience a severe hypoglycaemic episode (15.3 per cent) compared to inpatients whose drug charts had no medication errors (6.8 per cent).

The audit also collected details of the number of hypoglycaemic episodes that inpatients experienced in various time intervals within the last 7 days. The highest proportion of hypoglycaemic episodes for each diabetes type took place in the early morning, between 05:00 and 08:59 (30.3 per cent overall, Chart 27). For inpatients with Type 2 (non insulin treated) diabetes, 38.3 per cent of hypoglycaemic episodes occurred in this time interval, as did 39.5 per cent of episodes for inpatients with Type 2 (diet only) diabetes.

\textsuperscript{xviii} The decrease from 23.1 per cent in 2011 to 20.0 per cent in 2013 is statistically significant (p < 0.05).

\textsuperscript{xxix} The decrease from 10.6 per cent in 2011 to 9.3 per cent in 2013 is statistically significant (p < 0.05).

*Sites from Wales did not participate in the 2010 NaDIA.
For the first time the 2013 audit asked whether inpatients were being treated with sulfonylurea: 25.4 per cent of all inpatients were receiving this medication, and 18.9 per cent of inpatients were receiving sulfonylurea and had non insulin treated diabetes (i.e. Type 2 (non insulin treated), Type 2 (diet only) or Other (non insulin treated) diabetes).

Table 10 shows that the percentage of inpatients receiving sulfonylurea with non insulin treated diabetes that had one or more hypoglycaemic episode (23.2 per cent) was significantly lower than the percentage of inpatients with insulin treated diabetes not receiving sulfonylurea that had such an episode (34.1 per cent). The differences in incidence of both minor and severe hypoglycaemic episodes were similarly significant.

Table 10 Percentage of inpatients that experienced one or more hypoglycaemic episodes in the last 7 days by diabetes treatment type, England and Wales, 2013

<table>
<thead>
<tr>
<th>Percentage of episodes</th>
<th>Treated with sulfonylurea only</th>
<th>Treated with insulin only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild hypoglycaemic episode (0.3-3.9 mmol/L)</td>
<td>21.7</td>
<td>30.4</td>
</tr>
<tr>
<td>Severe hypoglycaemic episode (&lt;0.3 mmol/L)</td>
<td>6.9</td>
<td>17.3</td>
</tr>
<tr>
<td>Any hypoglycaemic episode (≥3.9 mmol/L)</td>
<td>23.2</td>
<td>34.1</td>
</tr>
</tbody>
</table>

*Where the values in a line in the table are bolded, the difference between the two percentages is statistically significant (p <0.05).

†Patients treated with sulfonylurea only comprised Type 2 (non insulin treated), Type 2 (diet only) and Other (non insulin treated) patients treated with sulfonylurea.

Patients treated with insulin only comprised Type 1, Type 2 (insulin treated) and Other (insulin treated) patients not treated with sulfonylurea.

Injectable treatment and diabetic ketoacidosis

A total of 218 inpatients (2.2 per cent) had at least one hypoglycaemic episode that required injectable treatment, which was similar to the number of patients that had an episode requiring injectable treatment in 2012 (232 patients or 2.3 per cent), 2011 (250 patients or 2.2 per cent) and 2010 (257 patients or 2.4 per cent). Of the 218 inpatients who had at least one hypoglycaemic episode that required injectable treatment, 26.6 per cent had Type 1 diabetes and 47.2 per cent had Type 2 (insulin treated) diabetes. Inpatients admitted specifically for the management of diabetes and diabetes complications were significantly more likely to have had a hypoglycaemic episode requiring injectable treatment (6.1 per cent) than inpatients admitted for other medical reasons (1.7 per cent) and non-medical (i.e. surgical) reasons (1.8 per cent).

A significantly higher percentage of inpatients on a medical ward (2.3 per cent) than on a surgical ward (1.5 per cent) had one or more hypoglycaemic episode requiring injectable treatment.

63 patients (0.4 per cent) were reported to have developed diabetic ketoacidosis (DKA) after their admission to hospital, which was similar to the number of patients that developed DKA in 2012 (61 patients or 0.5 per cent), 2011 (68 patients or 0.5 per cent) and 2010 (44 patients or 0.4 per cent). The development of DKA after admission suggests that the inpatient’s insulin treatment was omitted for an appreciable time.
Was patient experience of the inpatient stay favourable?

Inpatients that were able and willing were asked to provide information on their experience of diabetes management while in hospital. 7,796 inpatients responded to questionnaires on their inpatient experience, of which 7,751 were matched to a corresponding bedside audit form. These responses have been weighted in the following analysis to reflect differing response rates by age, ethnic group, type of admission, type and duration of diabetes, ward specialty and length of hospital stay at the time of the audit.

Care planning

Of the inpatients who responded to the patient experience questionnaires, 23.4 per cent said that they would have liked more involvement in the planning of their diabetes treatment, while 12.0 per cent of inpatients stated that they would prefer to have been less involved in planning their treatment.

50.3 per cent of inpatients reported that hospital staff definitely took their treatment preferences into account, while 31.2 per cent of inpatients reported that hospital staff took their treatment preferences into account to some degree.

Patient involvement in the management of diabetes

Of the inpatients who responded to the patient experience questionnaire, 32.9 per cent stated that they had not been able to take control of their own diabetes care while in hospital to the extent they would have liked to, compared to 31.6 per cent in 2012, 30.3 per cent in 2011 and 33.7 per cent in 2010.

15.7 per cent of inpatients reported they were able to test their own blood glucose levels while in hospital (compared to 17.1 per cent in 2012, 17.2 per cent in 2011 and 18.9 per cent in 2010). 15.5 per cent of inpatients stated that they were not able to test their own blood glucose levels but would have liked to (compared to 14.3 per cent in 2012, 13.3 per cent in 2011, and 17.1 per cent in 2010).

Of those inpatients who were able to test their own glucose, 28.5 per cent had one or more hypoglycaemic episodes in the previous seven days. This was significantly higher than the 20.5 per cent of inpatients who were not able to test their own glucose that had one or more hypoglycaemic episode.

Over half of inpatients (57.2 per cent) taking insulin for their diabetes had been permitted to self administer insulin while in hospital (compared to 58.5 per cent in 2012, 59.2 per cent in 2011 and 62.4 per cent in 2010). 10.7 per cent of inpatients taking insulin for their diabetes reported that they were not permitted to self administer insulin while in hospital but would have liked to do so (compared to 9.2 per cent in 2012, 8.9 per cent in 2011 and 9.7 per cent in 2010). 29.3 per cent of inpatients taking insulin stated that they did not want to self administer while in hospital (similar to 29.2 per cent in 2012, 28.3 per cent in 2011 and 25.1 per cent in 2010).

The percentage of inpatients that were able to self administer insulin who had one or more hypoglycaemic episodes (35.5 per cent) was the same as among inpatients that were not able to self administer insulin.
Appropriate content and timing of meals

An essential aspect of the management of diabetes is the timely provision of suitable food.

In the 2013 audit, 14.7 per cent of inpatients (compared with 14.5 per cent in 2012, 13.6 per cent in 2011 and 13.2 per cent in 2010) reported that the hospital did not provide the right type of food to manage their diabetes. 15.1 per cent of inpatients stated that they needed food to be brought into the hospital to meet their dietary requirements and/or manage their diabetes (a similar proportion to previous years: 15.4 per cent in 2012, 15.1 per cent in 2011 and 16.3 per cent in 2010).

The choice of meals was reported to be always or almost always suitable by the majority of inpatients (63.4 per cent); however, 19.5 per cent of inpatients reported that the meal choice was sometimes suitable and 4.8 per cent stated that it was rarely or never suitable for their diabetes. A time series comparison for meal choice suitability is shown in Chart 28.

Of the inpatients that reported that the choice of meals was rarely or never suitable for the management of their diabetes, 23.3 per cent (compared to 24.7 per cent in 2012, 29.1 per cent in 2011 and 26.5 per cent in 2010) had one or more hypoglycaemic episodes (blood glucose measurement of 3.9 mmol/L or less).

The majority of inpatients (69.8 per cent) stated that the timing of meals was always or almost always suitable for their diabetes; however, 15.0 per cent reported that it was only sometimes suitable, with 3.7 per cent stating that the timing was rarely or never suitable for their diabetes. A time series comparison of inpatients’ views on meal timing suitability is shown in Chart 29.
Of the inpatients that reported that the timing of meals was rarely or never suitable for the management of their diabetes, 29.4 per cent (compared with 26.8 per cent in 2012, 30.3 per cent in 2011 and 31.9 per cent in 2010) had one or more hypoglycaemic episodes (blood glucose measurement of 3.9 mmol/L or less).

Table 11

<table>
<thead>
<tr>
<th>Inpatients' views on food in hospital, by diabetes treatment type, England and Wales, 2013</th>
<th>Insulin treated</th>
<th>Non insulin treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of inpatients that reported that*:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food needed to be brought into hospital to meet their needs</td>
<td>19.2</td>
<td>12.1</td>
</tr>
<tr>
<td>The hospital did not provide the right type of food to manage their diabetes</td>
<td>15.5</td>
<td>13.9</td>
</tr>
<tr>
<td>The choice of meals was sometimes, rarely or never suitable</td>
<td>26.6</td>
<td>22.4</td>
</tr>
<tr>
<td>The timing of meals was sometimes, rarely or never suitable</td>
<td>21.9</td>
<td>16.4</td>
</tr>
</tbody>
</table>

* Where the values in a line in the table are bolded, the difference between the two percentages is statistically significant (p <0.05).

† Insulin treated inpatients comprised inpatients with Type 1 diabetes, Type 2 (insulin treated) diabetes and Other (insulin treated) diabetes. Non insulin treated inpatients comprised inpatients with Type 2 (non insulin treated) diabetes, Type 2 (diet only) diabetes and Other (non insulin treated) diabetes.

Table 11 compares the views on the food in hospital of patients that were insulin treated and non insulin treated.

Significantly more of the inpatients who had insulin treated diabetes (19.2 per cent) reported that they needed food to be brought in to hospital to meet their dietary requirements and/or manage their diabetes than inpatients who had non insulin treated types of diabetes (12.1 per cent).

Inpatients who had insulin treated diabetes were significantly more likely to report that the meal choice was sometimes, rarely or never suitable (26.6 per cent) than those with non insulin treated types of diabetes (22.4 per cent).

Inpatients who had insulin treated diabetes were also significantly more likely to report that the timing of meals was sometimes, rarely or never suitable (21.9 per cent) than inpatients who had non insulin treated types of diabetes (16.4 per cent).

Staff knowledge and communications

Inpatients were asked whether they felt that the hospital staff looking after them had enough knowledge about diabetes to meet their needs while in hospital. The majority of inpatients (67.5 per cent) stated that all or most staff knew enough to meet their needs while they were in hospital (compared to 69.1 per cent in 2012, 66.8 per cent in 2011 and 64.7 per cent in 2010). However, 7.2 per cent of inpatients stated that staff did not have sufficient knowledge of diabetes to meet their needs while in hospital (compared to 5.9 per cent in 2012, 6.9 per cent in 2011 and 7.2 per cent in 2010).

8.0 per cent of inpatients who had questions about their diabetes (compared to 8.9 per cent in 2012, 10.7 per cent in 2011 and 9.3 per cent in 2010**) reported that hospital staff were not able to answer these questions in a way that they could understand.

Inpatients were also asked about the provision of emotional support from staff while in hospital, with 15.8 per cent of inpatients (compared to 14.9 per cent in 2012, 15.4 per cent in 2011 and 26.8 per cent in 2010) stating that they did not receive enough emotional support from staff to manage their diabetes but would have liked to receive some support.

Overall 44.0 per cent of inpatients (compared to 44.9 per cent in 2012, 44.2 per cent in 2011 and 41.6 per cent in 2010) thought that the staff were very good at working together as a team in managing their diabetes; however, 0.7 per cent of inpatients (compared to 0.8 per cent in 2012, 1.0 per cent in 2011 and 1.0 per cent in 2010) thought that the staff were very poor at working together as a team.

Overall inpatient satisfaction with diabetes care

The majority of inpatients (86.0 per cent) stated that they were satisfied or very satisfied with the overall care of their diabetes while in hospital (compared to 85.6 per cent in 2012, 84.8 per cent in 2011 and 80.8 per cent in 2010).

** The decrease from 10.7 per cent in 2011 to 8.0 per cent in 2013 is statistically significant (p <0.05).
Discussion

NaDIA was developed as a measurement tool to support improvement in the care of people with diabetes in hospital. Its purpose is to identify areas of concern both locally and nationally, allowing teams to prioritise areas for change and to measure their effect; the goal is comprehensive implementation of the National Service Framework (NSF) for Diabetes, National Service Framework (NSF) for Diabetes in Wales and the National Institute for Health and Care Excellence (NICE) Quality Standards for Diabetes. Despite the considerable organisation and time commitment involved, the impressive number of trusts who participate in successive audits shows that diabetes teams continue to place great value in the information provided. That the measurements are being used is demonstrated by the numerous service improvements reported by these teams and their widespread adoption of up-to-date national guidelines. Importantly NaDIA has demonstrated consistent improvements in diabetes inpatient care over successive years resulting in significantly reduced harm to patients.

The questions included in the 2013 audit were essentially the same as those in the previous audits with a few additions. This allows the impact of NaDIA and other initiatives to be tracked through changes in bed occupancy, staffing levels, activity of diabetes teams, patient outcomes and patients’ satisfaction with the care received in hospital.

In England the first official audit occurred in 2010, after an extensive pilot in 2009. Wales joined in 2011. The statistical analysis in this report refers to the combined England and Wales data and is thus limited to the three years, 2011, 2012 and 2013. For completeness, the report also includes the 2010 English data.

Statistics such as the median age of inpatients with diabetes, the percentage of inpatients treated with insulin and the percentage admitted for a specific diabetes complication would not be expected to change given the relatively short period between the audits. Indeed the 2013 demographic data is similar to that of the previous audits, confirming the robustness of the audit process. The exception is the percentage of all acute beds occupied by patients with diabetes. It is clear that this is increasing annually, reflecting increasing prevalence of diabetes in the general population as well as the increasing life expectancy of people with diabetes.

As in the previous years of NaDIA, the most important and interlinking issues relate to:

- staffing and who is looking after the person with diabetes in hospital
- the impact of medication errors, in particular hypoglycaemia
- patient harms, including diabetic ketoacidosis (DKA) following admission to hospital
- deficiencies in foot care.

Staffing levels

The vast majority of patients in hospital with diabetes are admitted for other conditions but also happen to have diabetes. Therefore the majority of these patients are not under a diabetes consultant. Nevertheless, many of these non-specialist teams and their patients will need the support of the diabetes team, particularly for newly diagnosed patients, those with unstable glucose control and those with coexisting or newly developing foot lesions. Since the first NaDIA most diabetes teams have put in place systems to identify patients needing referral such as the ‘Think Glucose Criteria’ traffic light system. The 2013 audit shows that such systems are having an impact, as more patients are being referred to and seen by the inpatient diabetes team including the diabetes foot team; 76 per cent of teams reported an increase in referrals since the previous year. This increased burden is being borne with no significant change in inpatient staffing levels. The number of sites with no diabetes inpatient specialist nurses remains at just over 30 per cent. Over 70 per cent of sites have no diabetes specialist dietician for inpatients and over 30 per cent have no inpatient podiatrist. Furthermore the time available to each of these various disciplines to deliver inpatient diabetes care has not changed. It is therefore not surprising that only 62.5 per cent of the 43.3 per cent of patients who should have been referred to the diabetes team according to the ‘Think Glucose Criteria’ were seen by the team. Nevertheless, this is an improvement from 2011 when only 57.8 per cent of such patients were seen. With no increase in staffing levels, this implies that these teams are working harder and/or are more organised. Similarly diabetes consultants spend less than 50 per cent of their working time providing care for people with diabetes and just under 14 per cent of their time is spent on diabetes inpatient care.
Medication errors and their consequences

Medication errors comprise both prescription and management errors for insulin and oral hypoglycaemic agents. In 2013, 37.0 per cent of drug charts had at least one medication error. This is an improvement from 39.9 per cent in 2011, the major change being a reduction in prescription errors from 25.2 per cent of charts in 2011, and 24.0 per cent in 2012 to 21.9 per cent in 2013. The most impressive change was in insulin prescribing errors where there was a significant reduction in four of the seven types of error recorded in NaDIA. Once again the frequency of the potentially fatal error of writing ‘u’ for units with the possibility for this to be misread as ‘0’ has further reduced. In contrast to prescription errors, management errors showed little change suggesting that clinical teams are still not proactive enough in addressing poor glycaemic control and in reducing insulin or oral hypoglycaemic drug doses to prevent recurrence of hypoglycaemia. Improved training in blood glucose management is required to help non-specialists caring for patients with diabetes to manage the glycaemic instability that is common during illness in the absence of specialist advice.

Medication errors were associated with an increased risk of hypoglycaemia. Reducing errors by redesigning insulin/glucose charts or introducing electronic prescribing may help reduce the frequency of hypoglycaemia.

Intravenous insulin infusions (IVII) are key components to managing the glycaemic control of many inpatients with diabetes in whom subcutaneous insulin therapy presents difficulties. However, the use of IVII has mushroomed and in many situations their use is unwarranted and indeed potentially dangerous. These infusions should only be used in clearly defined circumstances and their duration should be limited. It is pleasing to see that there has been a significant reduction in the use of these infusions.

Patient harms

Although there were significant improvements in many aspects of diabetes care and reduced overall hypoglycaemic episodes it is very disappointing that episodes of severe hypoglycaemia requiring injectable treatment (218 cases) and diabetic ketoacidosis developing during hospital admission (63 cases) were almost identical to the previous year. These life-threatening events are severe harms which are entirely preventable and strenuous efforts must be taken to avoid them. That there has been no improvement is shocking given the increased level of awareness following previous NaDIA reports and particularly following the recent media attention that both complications have attracted following a number of deaths. Markedly increased attention to glucose monitoring, safe use of insulin and other hypoglycaemic agents and identifying and addressing deteriorating glucose control at an early stage need to become priorities within the harm reduction strategies of all hospitals.

The NaDIA data highlights some important relationships which may help direct efforts to reduce harm. NaDIA found that patients dissatisfied with the meal timing and choice in hospital were more likely to have a hypoglycaemic episode, suggesting improvements in meal timing and content may be effective in reducing hypoglycaemic rates. It also found that hypoglycaemia was most frequent overnight and in the early morning. The prolonged fast between the early evening meal and breakfast may be a factor. Ensuring adequate content of the evening meal and provision of an evening snack may be effective in reducing overnight hypoglycaemia.
Foot care

The 2013 audit shows significant improvements in foot care. NICE CG 119 ‘Diabetic Foot Problems: Inpatient management’ recommends that there should be a ‘Multidisciplinary Foot Team’ (MDFT) in every acute trust. In 2011 NaDIA found that 41.7 per cent of sites had no MDFT. As part of Diabetes UK’s ‘Putting Feet First’ campaign, trusts reporting in their NaDIA audit to have no MDFT were made known in the local media. This negative reporting may account for the fall in sites without a MDFT to 28.2 per cent. NICE CG 119 also recommends that everyone with diabetes admitted to hospital should have a foot examination within 24 hours and all those found to be at high risk of developing a foot lesion in hospital should be referred to the MDFT. Although still less than half of inpatients with diabetes received a foot assessment in 2013 (42.4 per cent) this is a significant increase from 25.8 per cent of patients that were assessed in 2011. 61.1 per cent of inpatients admitted with active foot disease were seen by a member of the MDFT within 24 hours of admission. The most important change has been in the patients developing foot and heel lesions whilst in hospital. These have fallen significantly from 257 (2.2 per cent) in 2010 to 196 (1.4 per cent) in 2013. Preventing sixty patients each week from suffering this catastrophic and potentially life changing event would translate to several thousand prevented lesions per year; this is an important achievement but there is room for further improvement.

Conclusion

NaDIA is an invaluable tool for diabetes teams to reflect on the care they provide, to address areas of weakness and to take pride in areas in which they excel. From its introduction NaDIA has demonstrated small but important year upon year improvements in inpatient care. In 2013, and now with several years of data, we can see that these cumulative changes are having a very significant impact. We can expect this to continue as the awareness of the problems faced by people with diabetes in hospital increases and diabetes teams become more innovative. This improvement could be considerably accelerated if NHS Trusts recognised the importance of investing in diabetes inpatient teams, an investment which would reap rewards in reduced bed days and reduced harms to patients.

Recommendations

Although there have been improvements in many aspects of inpatient diabetes care there is still much to be done.

1. We would recommend that sites/hospitals and inpatient diabetes teams examine their own sites’ NaDIA results in the Hospital Level Analysis (at http://www.hscic.gov.uk/diabetesinpatientaudit) and focus on improving in areas identified to be deficient either through their own innovation or by adopting best practice from other organisations.

2. We would recommend Trusts determine whether their diabetes team and MDFT are adequately resourced and whether they receive the support required from enabling bodies such as IT and audit departments in order to drive change.

3. Hospital Trusts should work with commissioners to improve pathways for both admissions and discharges from hospital.
This National Report presents the key findings from the National Diabetes Inpatient Audit (NaDIA) 2013. This summary is supported by the NaDIA Hospital Level Analysis containing national and local results for the 2013 audit 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 NaDIA Hospital Level Analysis.

For more information on the NaDIA or access to the Hospital Level Analysis please visit the NaDIA webpage at: http://www.hscic.gov.uk/diabetesinpatientaudit

For further information about this report, please contact The Health and Social Care Information Centre’s Contact Centre on 0845 300 6016 or email enquiries@hscic.gov.uk
References

1. NHS Diabetes. National Diabetes Inpatient Audit 2010

   http://www.hscic.gov.uk/searchcatalogue?productid=7285&q=%22National+Diabetes+Inpatient+Audit%22&sort=Most+recent&size=10&page=1#top

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7. Diabetes UK. Putting feet first
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8. NHS Institute for Innovation and Improvement. THINKGLUCOSE inpatient care for people with diabetes
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10. NHS Diabetes. Management of adults with diabetes undergoing surgery and elective procedures: Improving Standards
Glossary

**Confidence Intervals**

Surveys produce statistics that are estimates of the real figure for the whole population which would only be known if the entire population was surveyed. Therefore, estimates from sample surveys are always surrounded by a confidence interval which assesses the level of uncertainty caused by only surveying a sample of service users. The 95 per cent confidence interval gives the range in which you would expect the true value to fall 95 times if 100 samples were selected.

**Calculating Confidence Intervals**

We have used the following calculation of a 95 per cent confidence interval (CI) for the estimate of a proportion $p$ from a sample survey:

\[
\left[p_{\text{lower}} = \frac{2O + z^2 - z \sqrt{z^2 + 4Oq}}{2(n+z^2)}\right]
\]

\[
\left[p_{\text{upper}} = \frac{2O + z^2 + z \sqrt{z^2 + 4Oq}}{2(n+z^2)}\right]
\]

Where:

- $O$ is the observed number of individuals in the sample having the specified characteristic
- $n$ is the sample size achieved (number of useable responses)
- $q = (1-p)$ is the proportion without the specified characteristic
- $z$ is the 100(1-$\alpha$)/2$^{th}$ percentile value from the Standard Normal distribution. For example for a 95 per cent confidence interval $\alpha = 0.05$ and $z = 1.96$

**Significance testing**

All significance testing of differences over time in this report compares NaDIA values from the 2011 and 2013 audits, as 2011 was the first audit year for which inpatient data was collected for both England and Wales. The only exception is for the prevalence of foot lesions (page 27) – as this question was not included in the 2011 audit, the comparison is between the 2010 and 2013 values.

**Response rates**

A patient is classed as a respondent if they responded to one or more questions, allowing them to express their views on areas they feel strongly about without having to complete the entire questionnaire.

7,796 inpatients responded to the Patient Experience element of the audit out of the total responses to the audit (14,198 patients), a response rate of 54.9 per cent.

**Weighting**

When conducting sample surveys it is important to consider weighting the data to allow for any survey design effects as well as potential bias caused by non-response.

The patient experience survey results have been weighted to reflect the differing response rates by age, ethnic group, type of admission, type and duration of diabetes, ward speciality and length of hospital stay at the time of the audit. The weights are calculated using the relative proportions of the eligible population, the Bedside Audit respondents.
Appendix 2

How did we calculate the values in the 2013 audit?

The information in the National Diabetes Inpatient Audit is collected by medical and audit professionals across England and Wales using three questionnaires. We appreciate all their hard work.

The audit forms are divided into sections. When we receive audit forms most are filled in completely but some have gaps. Some sections will have an answer in some boxes but other boxes will be blank.

When we analyse the data we have to make a decision. Do we only include results for patients where every box in a section has been completed (i.e. only include complete records)? Or do we include results from all boxes that have been completed, even if there is missing information elsewhere in that section (i.e. use all the recorded data)? Both methods of analysis are valid (see the examples below).

Example - Insulin prescription errors:

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<td>Insulin not written up</td>
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<td>Name of insulin incorrect (e.g. Humalog)</td>
</tr>
<tr>
<td>Number (dose) unclear</td>
</tr>
<tr>
<td>Unit abbreviated to ‘u’ or written unclearly</td>
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<tr>
<td>Insulin or prescription chart not signed by prescriber</td>
</tr>
<tr>
<td>Insulin not signed as given</td>
</tr>
<tr>
<td>Insulin given/prescribed at the wrong time</td>
</tr>
</tbody>
</table>

| Table 12 Bedford Audit Questionnaire, Question 33, Insulin prescription errors |
|--------------------------------|---|
| Insulin                     | Form 1 | Form 2 | Form 3 | Form 4 | Form 5 | Form 6 | Form 7 | Form 8 | Form 9 | Form 10 |
| Insulin not written up       | Y   | N   | N   | N   | N   | N   | N   | N   | N   | N   |
| Name of insulin incorrect (e.g. Humalog) | N   | N   | N   | N   | Y   | N   | N   | N   | N   | N   |
| Number (dose) unclear       | N   | N   | N   | N   | N   | N   | N   | N   | N   | N   |
| Unit abbreviated to ‘u’ or written unclearly | N   | N   | N   | N   | N   | N   | N   | N   | N   | N   |
| Insulin or prescription chart not signed by prescriber | N   | N   | N   | Y   | N   | N   | N   | N   | N   | N   |
| Insulin not signed as given  | N   | N   | N   | N   | N   | N   | N   | N   | N   | Y   |
| Insulin given/prescribed at the wrong time | N   | N   | N   | N   | N   | N   | N   | N   | N   | N   |

Y = did occur, N = did not occur

It has been decided that the audit should be using as much of the data as possible (all recorded data). The audit report was prepared using the ‘all recorded data’ method for the first time in 2012.

For more detail or any questions please contact NaDIA@hscic.gov.uk

‘Completed records method’ using only forms in which every box was completed (grey columns): 2 Y in 8 forms = 25% had a prescription error.

‘All recorded data method’ using all completed boxes: 4 Y in 10 forms = 40% had a prescription error.

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### 2013 Participation

#### England

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**Wales**

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