

National Diabetes Inpatient Audit England and Wales, 2016

England and Wales

8 March 2017

Full report

Introduction

- The National Diabetes Inpatient Audit (NaDIA) measures the quality of diabetes care provided to people with diabetes while they are admitted to hospital whatever the cause, and aims to support quality improvement.
- Data is collected and submitted by hospital staff in England and Wales.
- The audit is part of the National Diabetes Audit (NDA) portfolio within the National Clinical Audit Programme, commissioned by the Healthcare Quality Improvement Partnership (HQIP).

This is the **full report**. Short reports are available for individual chapters.

Buttons – *available on some slides*



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= Further info
(glossary)

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Introduction – Audit questions

The audit sets out to measure the quality of diabetes care provided to people with diabetes while they are admitted to hospital, by answering 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, 2012, 2013 and 2015¹?



The report will be of interest to the public, especially to people with diabetes. Health planners and policy makers, as well as acute trusts, Clinical Commissioning Groups (CCGs), Local Health Boards (LHBs), Clinical Networks (CNs; formerly Strategic Clinical Networks or SCNs) and other providers and commissioners of specialist diabetes services will also make use of the information in this report.



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Key messages summary:

Improvements in diabetes inpatient care



209 hospital sites in England and Wales took part in NaDIA 2016¹. The **commitment** and **hard work** by hospital teams to collect data and their dedication to using the analysed results to alter their practice has delivered some very encouraging **improvements**. This has been achieved without any observable increase in staffing levels² since NaDIA 2015 and despite a 15 per cent increase in the proportion of people in hospital who have diabetes – from 15 per cent in NaDIA 2011 to 17 per cent in NaDIA 2016.

NaDIA team

In the face of this increasing workload teams have:

- ✓ Delivered more personal care to inpatients with diabetes – 69 per cent overall being seen by the Diabetes Team where appropriate compared to only 58 per cent in 2011. 82 per cent of patients with Type 1 diabetes were seen where appropriate in 2016 compared to only 70 per cent in 2011.
- ✓ Reduced use of intravenous insulin infusions (IVII), such that only 8 per cent of inpatients with diabetes were on an IVII in 2016 compared with 11 per cent in 2011.
- ✓ Reduced all hypoglycaemia episodes from 26 to 20 per cent³.
- ✓ Reduced the need for rescue treatment of severe hypoglycaemia – from 2.2 to 1.7 per cent³.
- ✓ Reduced patients developing foot ulcers during hospital stay – from 2.2 to 1.3 per cent⁴.



Key messages summary:

Areas where further improvement is needed



Despite the significant and important improvements documented in the previous [slide](#), NaDIA also demonstrates that there is still **considerable scope for further improvements**.

Since 2011, NaDIA findings have shown consistently high levels of:

- **Medication errors** – nearly two in five inpatients (38 per cent in 2016¹) and more frequently on surgical wards (41 per cent in 2016²).
- **Insulin errors** – nearly half of those treated with insulin (46 per cent in 2016³).
- **Medication management errors** in those treated with insulin – nearly a third (29 per cent with Type 1 diabetes² and 33 per cent with Type 2 diabetes in 2016³).
- **Diabetic ketoacidosis** (DKA) developing in hospital; in 2016 around 1 in 25 people with Type 1 diabetes developed in-hospital DKA due to under-treatment with insulin (4 per cent²).

All of these findings clearly demonstrate the benefit of NaDIA in identifying areas on which to focus service improvements, and in driving and tracking change.

NaDIA team

Notes: 1. A significant reduction of 2.2 percentage points since NaDIA 2011, but still too high.

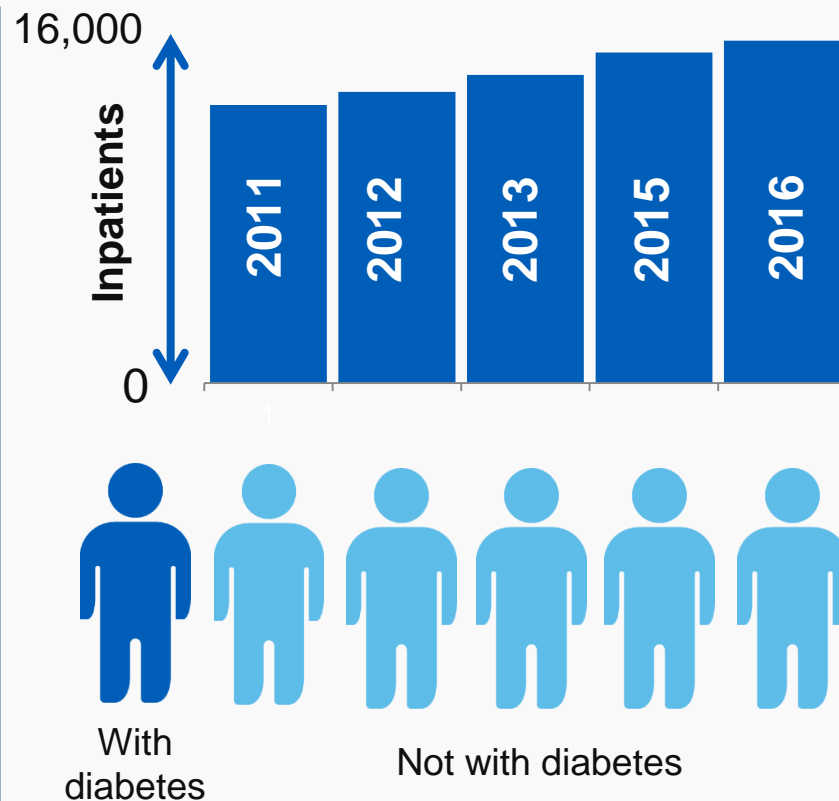
2. Consistent with NaDIA 2011. 3. An increase since NaDIA 2011.



Key messages: Participation and prevalence

Key findings

- 209 sites took part in the 2016 audit.
- Bedside data on 15,774 inpatients was submitted, 500 more than NaDIA 2015.
- Over half of inpatients returned a Patient Experience questionnaire (54 per cent).
- Around **1 in 6** hospitals beds are occupied by a person with diabetes (17 per cent). 1 in 15 of the total population have diabetes (7 per cent).
- In a few hospital sites over **one third** of inpatients have diabetes.



Recommendations:

Healthcare professionals: Continue to contribute to this unique and valuable insight into the inpatient care of people with diabetes.

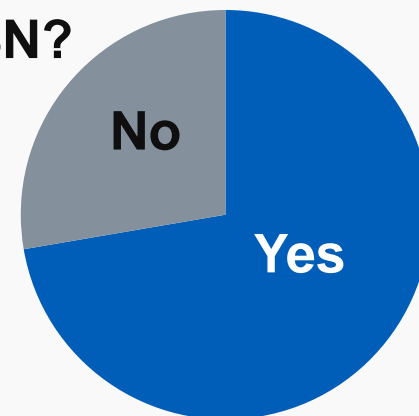


Key messages: Staffing levels

Key findings

- There has been **no observable** change in staffing hours per inpatient since 2015.
- More than a **quarter** of hospital sites have no diabetes inpatient specialist nurses (DISNs) (28 per cent)¹.

DISN?



Recommendations:

Care providers: In the face of increasing numbers of inpatients with diabetes, ensure that Diabetes Teams are adequately staffed to support other healthcare professionals and patients in the delivery of safe diabetes care¹.

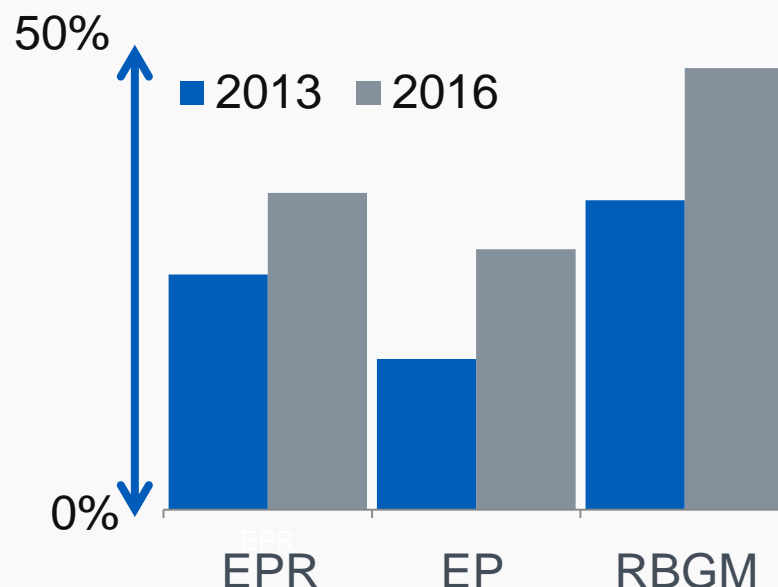
NHS Trusts: Review staffing levels and use the NaDIA staffing figures to apply for funding – provisionally available for 2018-19 – from NHS England's Transformation fund².



Key messages: Care improvement initiatives

Key findings

- An **increasing** proportion of hospital sites are now fully-utilising an Electronic Patient Record, Electronic Prescribing and remote blood glucose monitoring¹.
- Over **half** of sites hold diabetes Mortality and Morbidity meetings (53 per cent).



Recommendations:

Healthcare professionals:

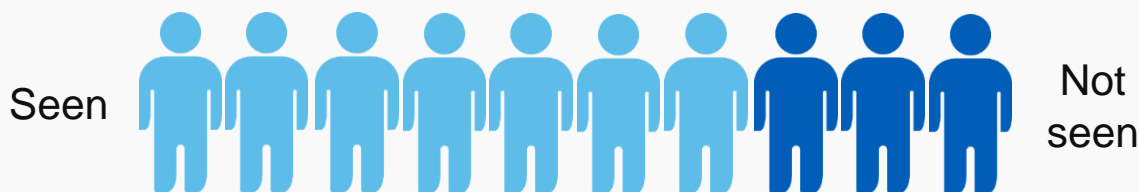
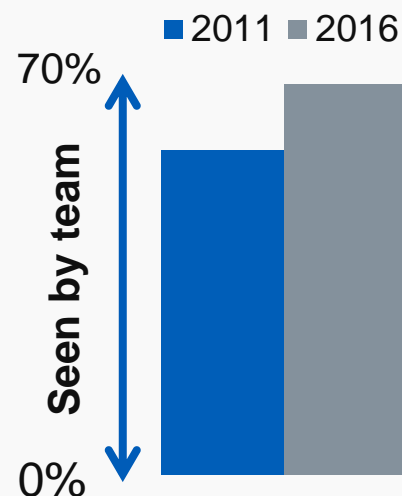
- Learn from NHS Trusts and Local Health Boards where Electronic Prescribing and Electronic Patient Records work well and encourage others to adopt similar systems.
- Continue to highlight diabetes at Morbidity and Mortality meetings.



Key messages: Seen by the Diabetes Team

Key findings

- The proportion of people with diabetes seen by the Diabetes Team where appropriate¹ has **increased** since 2011 (from 58 to 69 per cent).
- However **3 out of 10** people are not seen by the Diabetes Team where appropriate¹ (31 per cent).
- A **higher** proportion are seen by the Diabetes Team where appropriate¹ when 7-day DISN² cover is provided (73 per cent compared to 69 per cent).



Notes: 1. Based on the 'Think Glucose Criteria'. See [NHS Institute for Innovation Think Glucose](#)
2. DISN = Diabetes inpatient specialist nurse.

Recommendations:

Care providers:

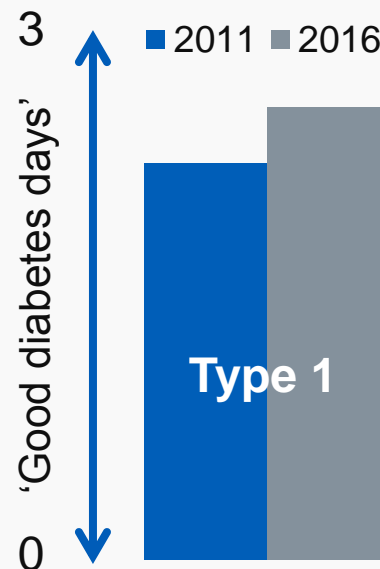
- The impressive work undertaken by Diabetes Teams should be recognised and acknowledged by NHS Trusts and Local Health Boards.
- Ward referral systems should be in place to ensure that all appropriate patients¹ are promptly referred and promptly seen by the Diabetes Team.
- Every NHS Trust and Local Health Board should have 7 Day DISN provision².



Key messages: Blood glucose monitoring

Blood glucose monitoring

- Since 2011 the average number of 'good diabetes days' per week has **improved** by one third of a day for inpatients with Type 1 diabetes (from 2.3 to 2.6 days)¹.
- **Less than half** of the days of a typical hospital stay for inpatients with insulin-treated diabetes meet the definition of a 'good diabetes day'.



Recommendations:

Healthcare professionals:

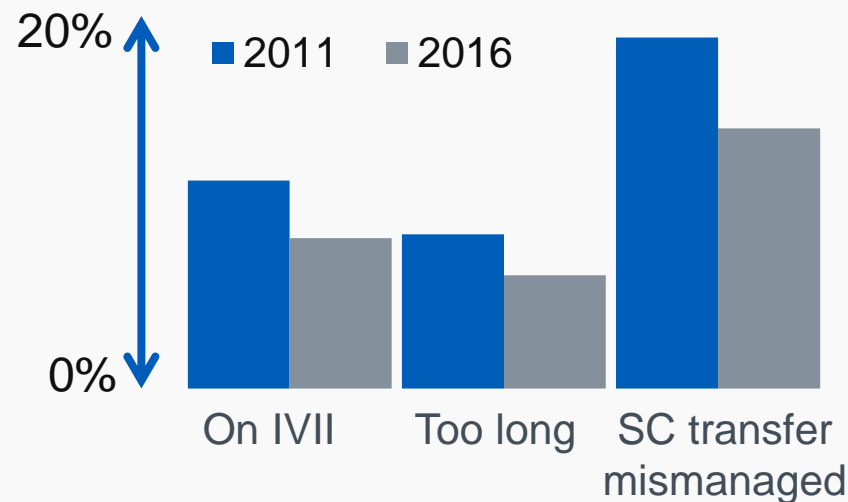
Continue to innovate and improve systems of blood glucose monitoring, including consideration of remote blood glucose monitoring where practical and appropriate. Higher rates of 'good diabetes days' will translate into fewer harms and quicker recovery¹.



Key messages: Use of insulin infusions

Use of insulin infusions

- The proportion of patients on insulin infusions (IVII) has **decreased** since 2011 (from 11 to 8 per cent).
- The proportion of insulin infusions that were too long and transfers to subcutaneous (SC) insulin that were mismanaged have both **decreased** since 2011 (from 8 to 6 per cent and 19 to 14 per cent).



Recommendations:

Diabetes Teams:

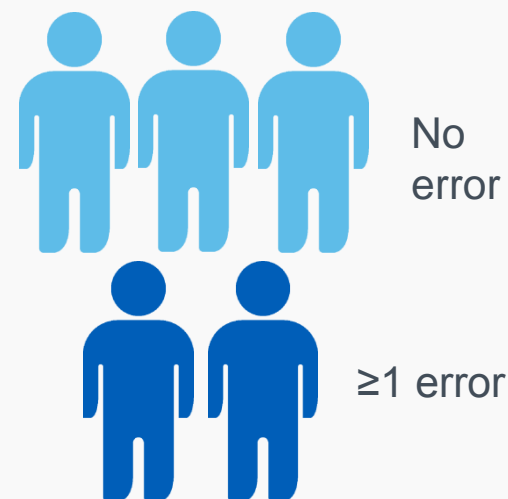
- Continue to focus on surveillance of inappropriate use and duration of use of insulin infusions.
- Consider how to improve safe transfer back to SC insulin, with processes to ensure prompt intervention if hypoglycaemic emergencies develop.



Key messages: Medication errors

Key findings

- Almost **2 out of 5** inpatients with diabetes have a medication error during their hospital stay (38 per cent).
- Whilst the proportion of patients having prescription errors has **decreased** since 2011, medication management errors have **increased** over the same period.
- Inpatients with diabetes are **more likely** to have prescription and medication management errors if treated on a surgical ward and **less likely** to have prescription errors if an Electronic Patient Record or Electronic Prescribing are used.



Recommendations:

Care providers: Learn from NHS Trusts and Local Health Boards that have most effectively utilised Electronic Prescribing and implemented other new technologies and systems that help reduce errors.

Diabetes Teams:

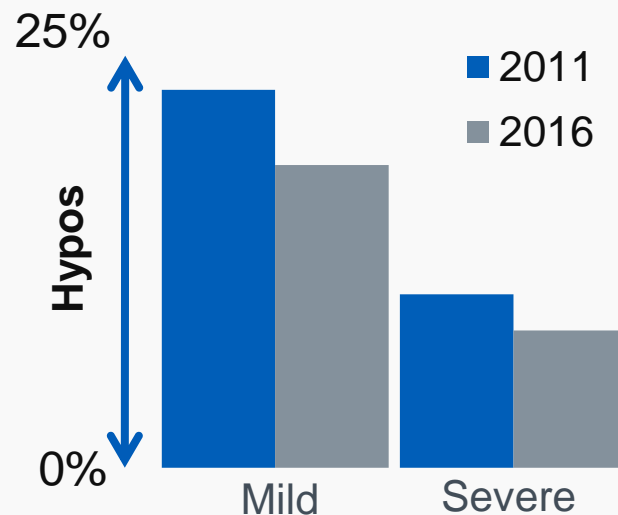
- Continue to educate and support junior doctors and nursing staff, while also developing and testing new systems to reduce prescribing and medication management errors. Junior doctors and nursing staff should be made aware that hyperglycaemia should not be left untreated, especially in people with Type 1 diabetes.
- Work with surgical colleagues to ensure diabetes safety levels are at least equivalent to those on medical units.



Key messages: Hypoglycaemic episodes

Key findings

- The prevalence of hypoglycaemic episodes has **decreased** since 2011 (from 26 to 20 per cent), though **1 in 5** inpatients with diabetes still have a hypo during their hospital stay.
- Over **one quarter** of inpatients with Type 1 diabetes had a severe hypoglycaemic episode during their hospital stay (27 per cent).
- The highest proportion of severe hypoglycaemic episodes took place between 05:00 and 08:59am (30 per cent), which is suggestive of **nocturnal hypoglycaemia**.
- Inpatients that self-test their glucose are **more likely** to report severe hypoglycaemic episodes than those that do not self-test (15 versus 8 per cent)¹.



Recommendations:

Care providers:

- Benchmark their outcomes against the national reduction in hypoglycaemia.

Healthcare professionals:

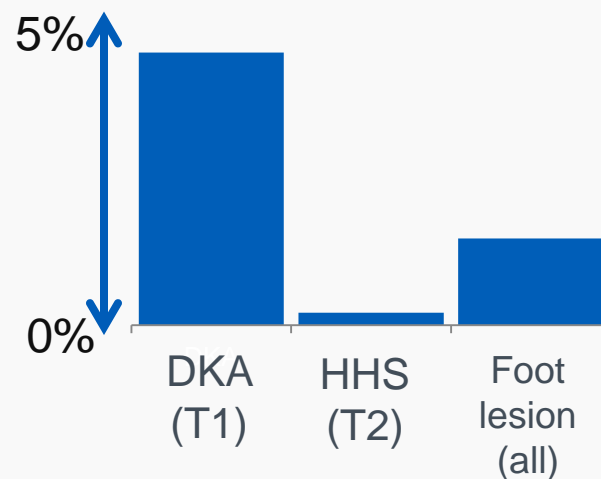
- Measures should be taken to prevent nocturnal hypoglycaemia, including the introduction of bed time snacks.



Key messages: DKA, HHS and foot lesions

Key findings

- Around **1 in 25** inpatients with Type 1 diabetes develop DKA¹ during their hospital stay (4.4 per cent).
- Around **1 in 500** inpatients with Type 2 diabetes develop HHS¹ during their hospital stay (0.2 per cent).
- Around **1 in 75** inpatients with diabetes develop a foot lesion during their hospital stay (1.4 per cent).
- The proportion of inpatients in England developing a foot lesion has **decreased** since 2010 from 2.2 to 1.3 per cent.



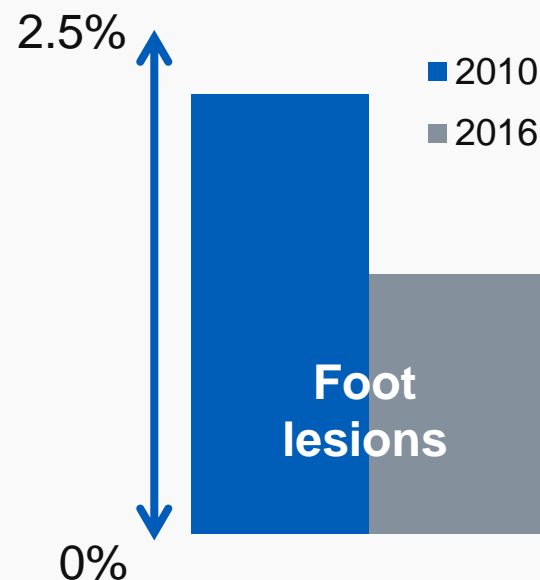
Recommendations:

Diabetes Teams:

- Record all hospital-acquired DKA¹ and HHS¹ as Serious Incidents and undertake Root Cause Analysis.
- Continue to promote screening of diabetes admissions for risk of hospital-acquired foot lesions and introduce preventative measures in those found to be at risk, using National Institute for Health and Care Excellence² guidance [[NG19](#)] as a framework.

Care providers:

- Hospitals should report all hospital-acquired foot lesions occurring in people with diabetes separately from 'NHS Safety Thermometer' reports of hospital-acquired pressure ulcers.
- Hospitals should include these reports in regular diabetes Mortality and Morbidity meetings and annual audits.



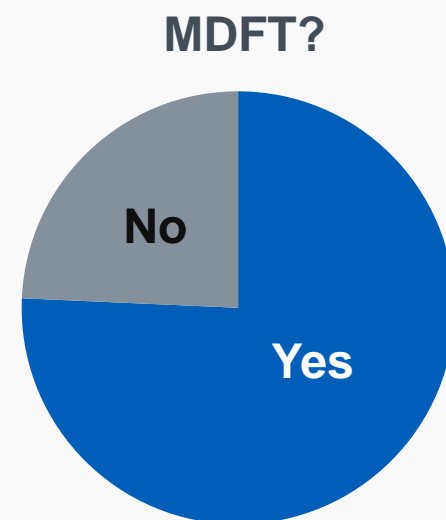
Notes: 1. DKA = Diabetic Ketoacidosis. HHS = Hyperosmolar Hyperglycaemic State. 2. NICE



Key messages: Foot disease management

Key findings

- Almost **one quarter** of hospital sites do not have a Multi-disciplinary Foot Care Team (24 per cent), though this proportion has reduced from 42 per cent in 2011.
- Less than **one third** of inpatients with diabetes have a specific diabetic foot risk examination within 24 hours (30 per cent).
- Inpatients with diabetes that attend a hospital that uses 'Putting Feet First' or NICE¹ inpatient foot guidance are **more likely** to have a diabetic foot risk examination and to be seen by the MDFT².



Recommendations:

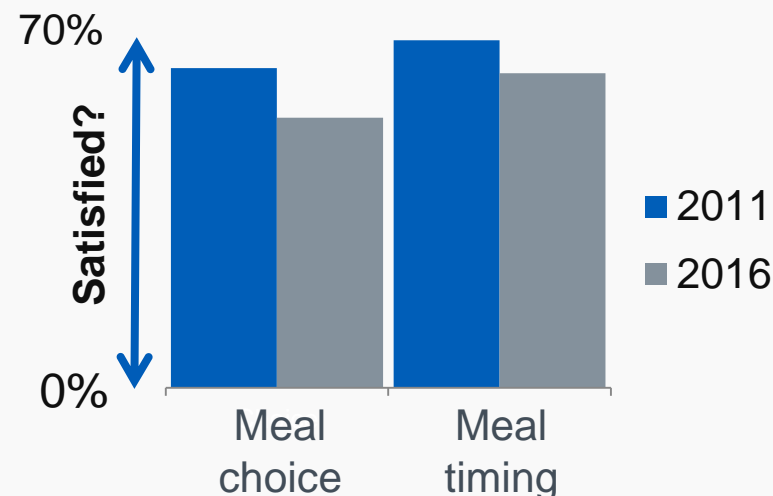
Care providers: Implementation of initiatives to improve foot examination on admissions and NICE guidance¹ are associated with better processes and should be implemented in all NHS Trusts and Local Health Boards.



Key messages: Patient Experience

Key findings

- Inpatient perception of meal choice and timing has **declined** since 2011.
- **5 out of 6** patients were satisfied or very satisfied with their diabetes care during their hospital stay (84 per cent).
- Patients thought it was more important to **improve staff knowledge** of diabetes than any other area for potential improvement (26 per cent).



Recommendations:

Care providers:

- Patient surveys may be needed to address the issue of hospital food.
- Variation in the apparent need for better staff knowledge requires further exploration.

Healthcare professionals: Encourage Diabetes Teams to involve patients in their care planning.



National Diabetes Inpatient Audit 2016

1. Participation and prevalence



Participation: Overview



Audit question:

How many hospital sites participated in the audit?

Why is this important?

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 care¹ 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.”

How is data collected?

On a nominated day between 26 and 30 September 2016 participating hospital teams identified all inpatients with diabetes. Where the patient was able and willing a **Patient Experience** form was completed, as well as a **Bedside Audit** form which provided information on the patient's medical treatment taken from the patient's notes. The hospital team also completed a **Hospital Characteristics** questionnaire providing information on the hospital's resources and staffing structure.

Key Findings

- 209 sites took part in the 2016 audit.
- Bedside data on 15,774 inpatients was submitted, 500 more than NaDIA 2015.
- Over half of inpatients returned a Patient Experience questionnaire (54 per cent).

“We 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 seventh 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.”

Gerry Rayman

National Clinical Lead for Inpatient Diabetes



Participation: Submissions



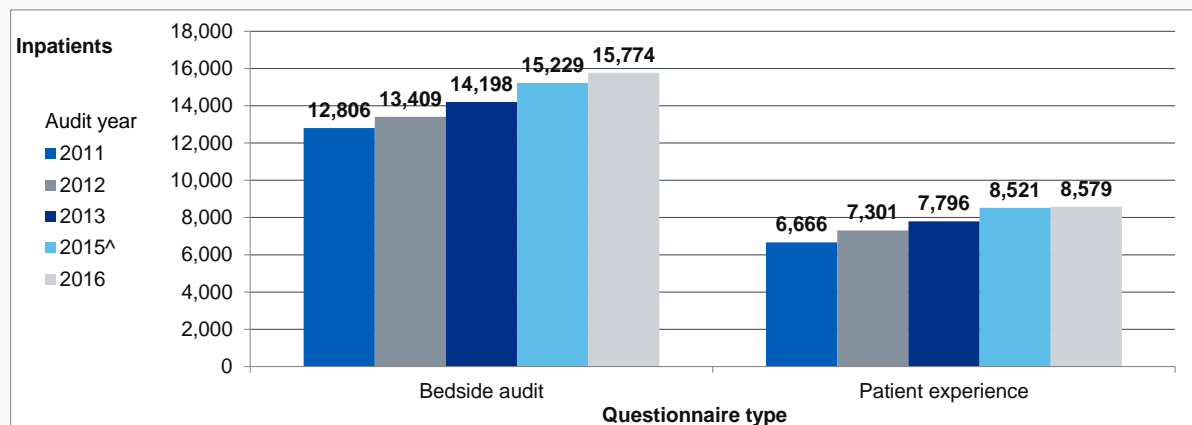
Table 1.1: NaDIA organisational participation, England and Wales, 2011-16

Audit year	Number of sites ¹	NHS Trusts/ LHBs
2016 England	192	136
2016 Wales	17	6
2016 Total	209	142
2015^	206	
2013	211	
2012	216	
2011	206	

Findings

- 209 sites (representing 136 NHS Trusts in England and 6 Local Health Boards in Wales) took part in the 2016 audit.
- Bedside data on 15,774 inpatients with diabetes was submitted to the 2016 audit, an **increase** of over 500 compared to 2015.
- Over **half** of inpatients returned a Patient Experience questionnaire (54 per cent).

Figure 1.1: Number of NaDIA questionnaires returned, England and Wales, 2011-16



Notes: ^ There was no audit collection or report in 2014, so 2014 data is not available.

1. A NaDIA 'site' may represent a single hospital, multiple hospitals or an entire NHS Trust /Local Health Board. Because NaDIA site aggregations vary over time, year-on-year changes in number may not represent real changes in participation. Only 3 of the hospital sites known to be eligible for NaDIA declined to take part in the 2016 audit.

Notes:

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Prevalence of diabetes: Overview



Audit question:

What proportion of people admitted to hospital have diabetes?

Why is this important?

Hospitals need to know how many patients need additional care for issues related to their diabetes. This includes people admitted for their diabetes and those admitted for unrelated conditions.

How is this measured?

As part of the NaDIA Hospital Characteristics form, hospital staff submit the total number of hospitals beds in applicable wards. The prevalence of diabetes is then calculated using the number of returned Bedside Audit forms for inpatients with diabetes.

Key Findings

- Around **1 in 6** hospitals beds are occupied by a person with diabetes (17 per cent). 1 in 15 of the total population have diabetes¹ (7 per cent).
- In a few hospital sites over **one third** of inpatients have diabetes.

Notes:

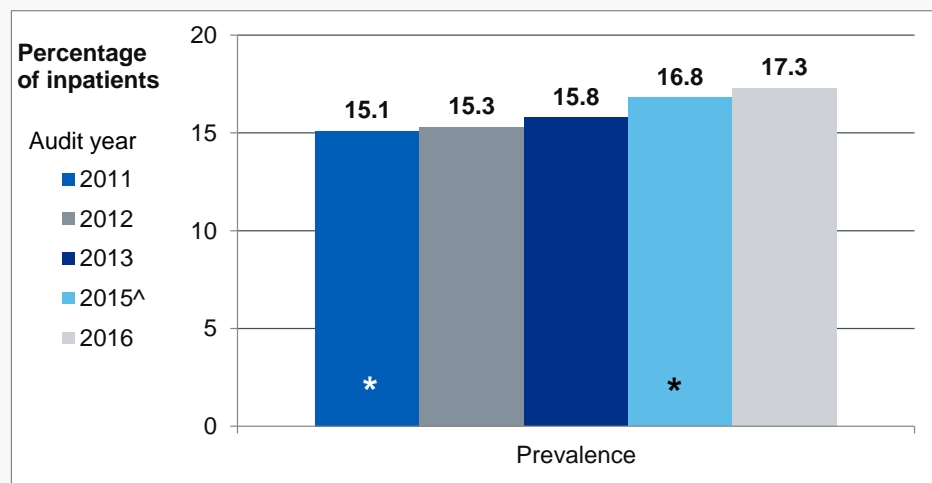
1. NHS Digital: Quality and Outcomes Framework (QOF) – [2015-16](#).

Welsh Government: General medical services contract: Quality and outcomes framework, [2015-16](#)



Prevalence of diabetes: Findings

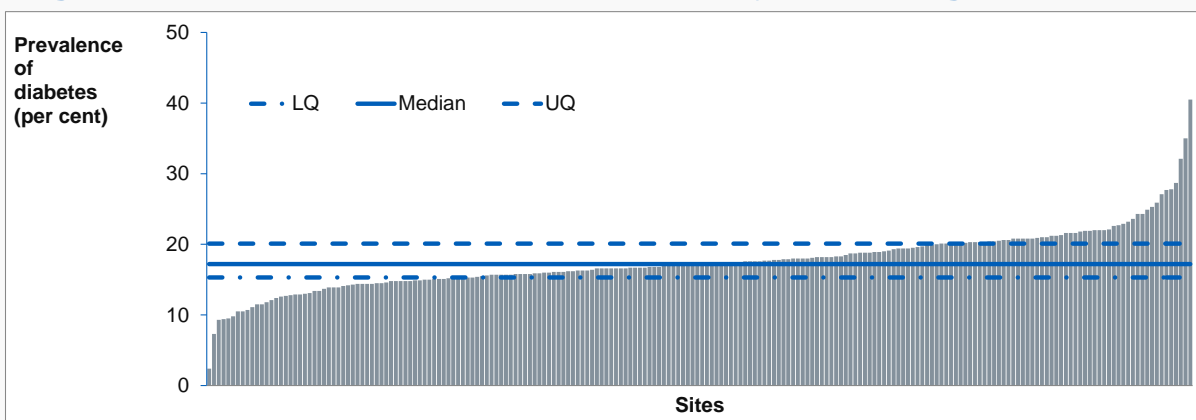
Figure 1.2: National prevalence of diabetes in inpatients, England and Wales, 2011-16



Findings

- People with diabetes occupied **17** per cent of acute hospital beds, an **increase** since the previous audit in 2015. 1 in 15 of the total population have diabetes¹ (7 per cent).
- In a few hospital sites over **one third** of inpatients have diabetes.

Figure 1.3: Prevalence of diabetes: by site, England and Wales, 2016



Measure	Per cent
Minimum	2.4
Lower quartile (LQ)	15.3
Median	17.2
Upper quartile (UQ)	20.1
Max	40.5
Mean	17.6

Notes: 1. NHS Digital: Quality and Outcomes Framework (QOF) – [2015-16](#). Welsh Government: General medical services contract: Quality and outcomes framework, [2015-16](#). ^ There was no audit collection or report in 2014, so 2014 data is not available. * = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).



Prevalence of diabetes:

Clinical comment and recommendations

i

Despite the hard work involved, with each Diabetes Team giving a whole day to audit activity, participation remains remarkably high. This reflects the importance given to the audit by Diabetes Teams.

As predicted, the year-on-year increase in the proportion of patients who have diabetes continues. **NaDIA team**

Recommendations:

Care providers: In the face of increasing numbers of inpatients with diabetes, ensure that inpatient Diabetes Teams are adequately staffed to support other healthcare professionals and patients in the delivery of safe diabetes care.



National Diabetes Inpatient Audit 2016

2. Staffing levels



Staffing levels: Overview



Audit question:

What specialist staff are available to look after people with diabetes when they are admitted to hospital?

Why is this important?

Caring for people with diabetes in hospital requires specialist knowledge about treatments and medication, and an understanding of how a patient's care may be affected by their diabetes.

It is important that hospitals have enough specialist staff with this knowledge to help to look after patients with diabetes.

How is this measured?

Hospitals were asked to estimate the number of staffing hours spent each week on care related to people with diabetes. Stated hours were compared to the numbers of admitted people with diabetes by each hospital.

The NaDIA team acknowledge the difficulty of estimating staff hours. Caution is therefore advised when interpreting staffing levels, particularly at site level.

Key Findings

- There has been **no observable** change in staffing hours per inpatient since 2015.
- More than a **quarter** of hospital sites have no diabetes inpatient specialist nurses (28 per cent).

"I was surprised to see that over a quarter of hospitals still have no diabetes inpatient specialist nurses. I'd feel more confident going into hospital if I knew that both I and the team caring for me would have the support of a nurse with that specialist knowledge. I'd feel safer in a hospital where if I'm struggling to manage my condition, there's someone on hand who can help."

Sarah, aged 32, who has Type 1 diabetes



Staffing levels

Table 2.1: Average staffing for care of inpatients with diabetes¹, England and Wales, 2015-16

Profession	Hours per week of inpatient care per inpatient with diabetes	
	2015	2016
• Diabetes inpatient specialist nurse (DISN)	0.50	0.49
• Diabetes specialist nurse (DSN)	0.17	0.17
• Any diabetes specialist nurse (DISN and DSN)	0.67	0.66
• Diabetes consultant	0.19	0.19
• Podiatrist	0.11	0.11
• Specialist diabetes dietitian	0.03	0.03
• Non-specialist dietitian	0.06	0.05
• Any dietitian	0.09	0.08
• Diabetes specialist pharmacist	0.03	0.04

Findings

- At national level there has been **little change** in the staffing levels for inpatients with diabetes between 2015 and 2016.

Notes:

1. The stated figures are derived from the total number of Bedside Audit forms divided by the total number of hours of inpatient care per week. The NaDIA team acknowledge the difficulty of estimating staff hours. Caution is therefore advised when interpreting staffing levels, particularly at site level.



Delivery of diabetes care

Table 2.2: Percentage of sites with staff deficiencies, England and Wales, 2011-16

Percentage of sites with:	2011	2012	2013	2015^	2016
• no inpatient DISNs ¹	31.9	33.3	31.7	31.1	27.5
• no specialist inpatient dietetic provision for people with diabetes	70.8	77.3	71.2	71.4	73.4
• no inpatient podiatry service for people with diabetes	33.6	32.4	34.1	26.2	27.7

Table 2.3: Percentage of inpatients under a diabetes consultant, England and Wales, 2011-16

Percentage of patients:	2011	2012	2013	2015^	2016
• under a diabetes consultant	9.2 n	8.7	8.9	8.9 n	8.7

Findings

- More than a **quarter** of hospital sites have no diabetes inpatient specialist nurses (28 per cent).
- Less than **1 in 10** inpatients with diabetes are under the care of a diabetes consultant. This has remained **constant** since 2011 (9 per cent).

Notes:

1. DISN = Diabetes inpatient specialist nurse.

^ There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year).

n = not statistically significant (vs. current audit year).



Staffing levels:

Clinical comment and recommendations



NaDIA has now highlighted staffing issues for six years but there has been no change in dedicated inpatient diabetes staffing levels. 28 per cent of hospitals report no diabetes inpatient specialist nurses (DISNs)¹.

NaDIA team

Recommendations:

Care providers: In the face of increasing numbers of inpatients with diabetes, ensure that inpatient Diabetes Teams are adequately staffed to support other healthcare professionals and patients in the delivery of safe diabetes care¹.

NHS Trusts: Review staffing levels and use the NaDIA staffing figures to apply for funding – provisionally available for 2018-19 – from the NHS England's Transformation fund².

Notes:

1. DISNs are an important component of most Diabetes Teams. The centrality of DISNs to good patient care and outcomes is affirmed in the [2014 Diabetes UK Position Statement](#). 2. NHS England: [Transformation Fund Call To Bid](#).



National Diabetes Inpatient Audit 2016

3. Care improvement initiatives



Care improvement initiatives: Overview

Audit question:

Which initiatives have hospitals introduced in order to improve the care of people with diabetes?

Why is this important?

The introduction of initiatives to improve the care received by inpatients with diabetes may help improve the overall patient experience and reduce the harms experienced during admission.

For example, NaDIA has found that inpatients with diabetes are less likely to have prescription errors if an Electronic Patient Record is used (although causation cannot be confirmed).

How is this measured?

Hospital staff were asked to provide information on:

- Whether particular initiatives in diabetes care had been introduced;
- Their use of technologies such as Electronic Patient Record, Electronic Prescribing and remote blood glucose monitoring;
- Whether diabetes Mortality and Morbidity meetings are undertaken.

Key Findings

- An **increasing** proportion of hospital sites are now fully-utilising an Electronic Patient Record, Electronic Prescribing and remote blood glucose monitoring.
- Over **half** of sites hold diabetes Mortality and Morbidity meetings (53 per cent).

Care improvement initiatives (1)

Figure 3.1: Percentage of sites using an Electronic Patient Record (EPR)¹, England and Wales, 2013-16

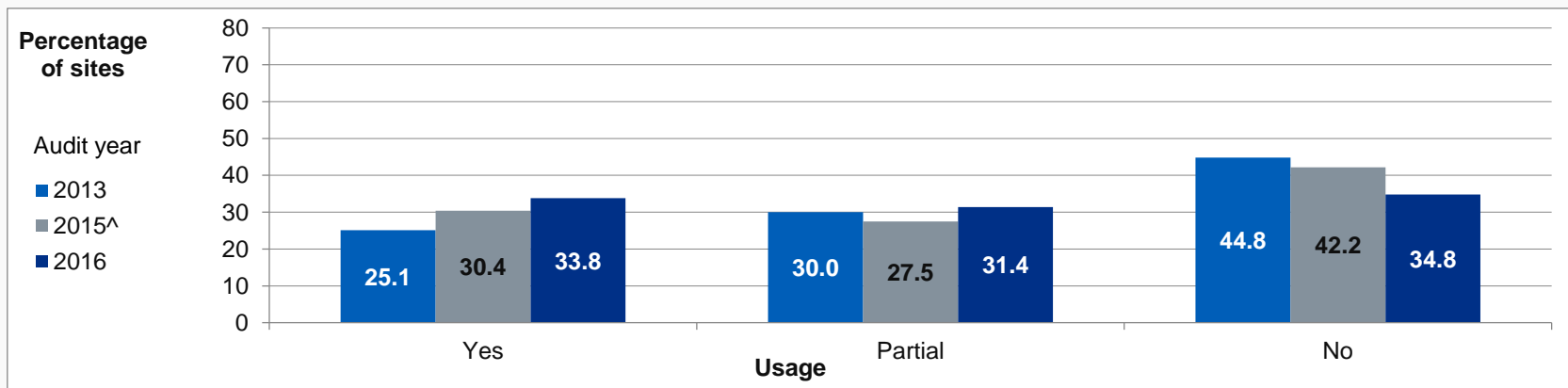
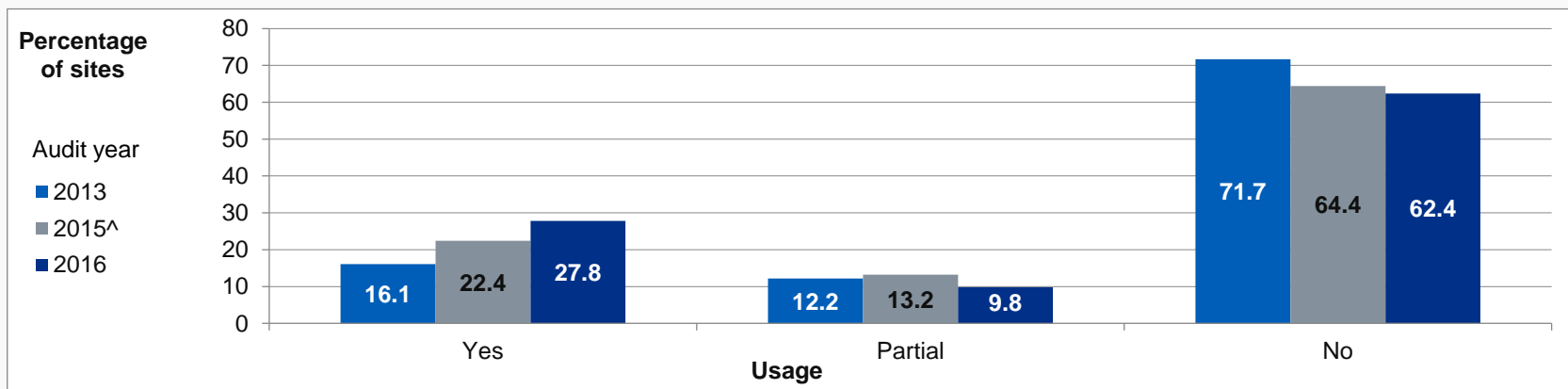


Figure 3.2: Percentage of sites using Electronic Prescribing (EP)¹, England and Wales, 2013-16



Notes: 1. Data for all comparable years is shown.

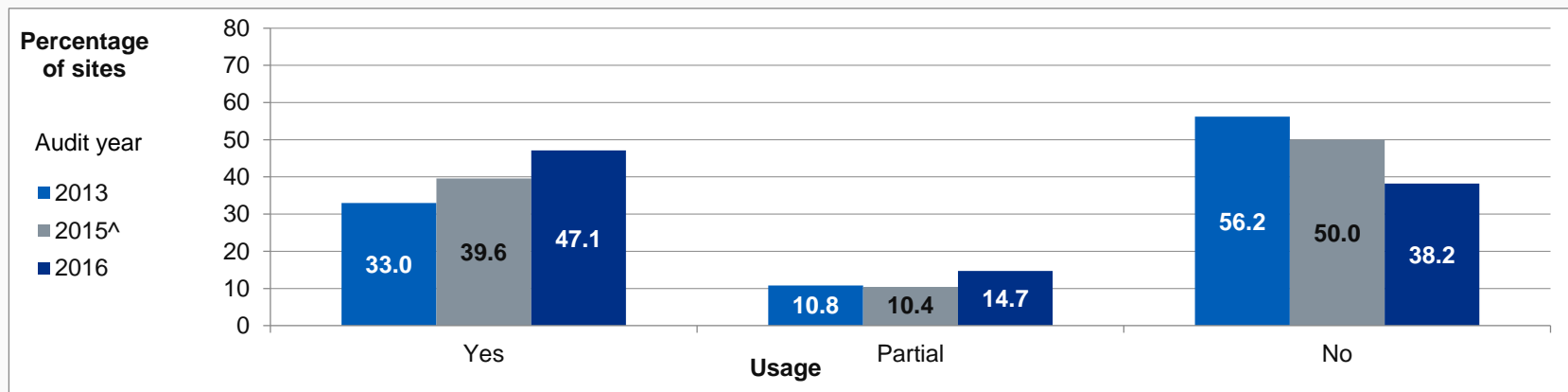
[^] There was no audit collection or report in 2014, so 2014 data is not available.



Care improvement initiatives (2)

i

Figure 3.3: Percentage of sites using remote blood glucose monitoring¹, England and Wales, 2013-16



Findings

- Just **17 per cent** of sites fully utilise both an Electronic Patient Record and Electronic Prescribing.
- The proportion of sites fully-utilising the Electronic Patient Record, Electronic Prescribing and remote blood glucose monitoring is **increasing**.

Initiative	2013 to 2016	2015 to 2016
• Electronic patient record	Up	Up
• Electronic prescribing	Up	Up
• Remote blood glucose monitoring	Up	Up

Notes: 1. Data for all comparable years is shown.

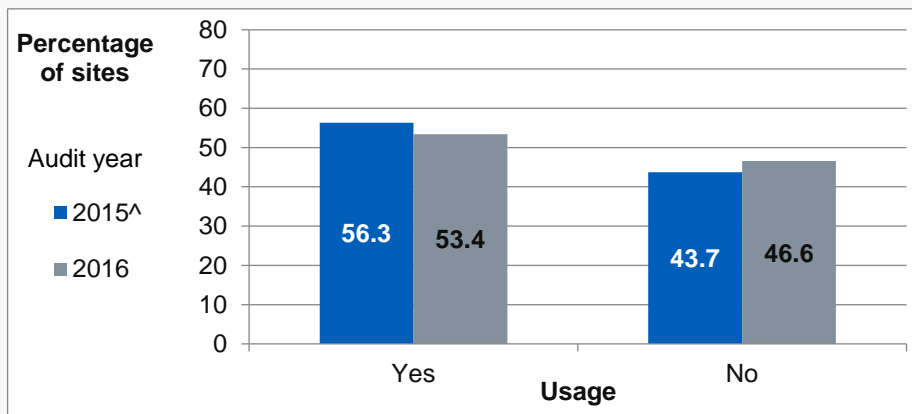
[^] There was no audit collection or report in 2014, so 2014 data is not available.

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Care improvement initiatives (3)

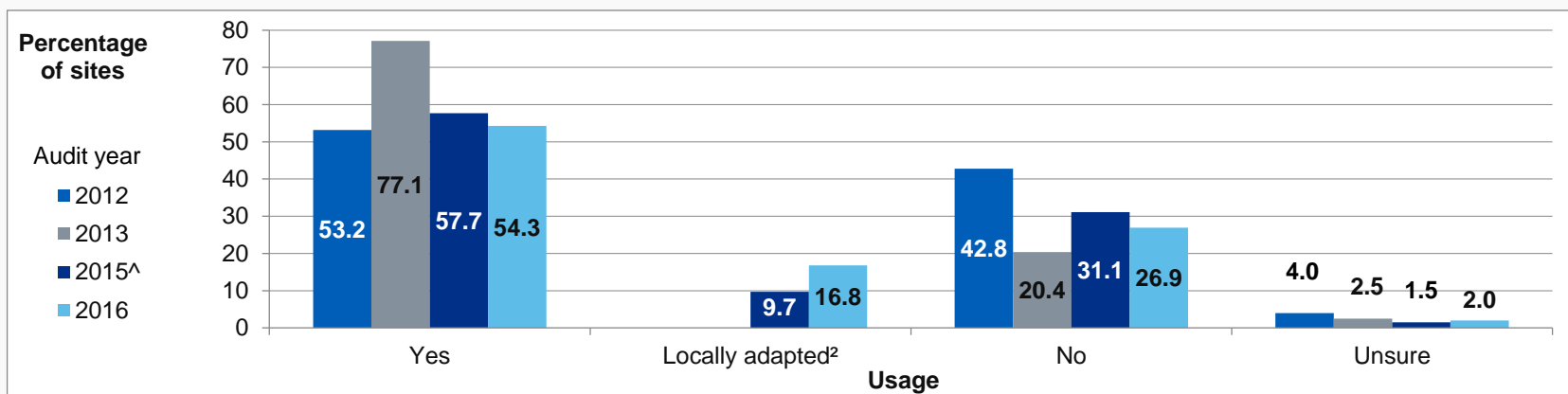
Figure 3.4: Percentage of sites holding diabetes Mortality and Morbidity meetings¹, England and Wales, 2015-16



Findings

- Over **half** of sites hold diabetes Mortality and Morbidity meetings (53 per cent).
- The proportion of sites using NHS Diabetes e-learning on safe insulin use has **not increased** since 2015.

Figure 3.5: Percentage of sites using NHS Diabetes e-learning on safe insulin use¹, England and Wales, 2012-16



Notes: 1. Data for all comparable years is shown. 2. The option 'Locally adapted' was not available for 2012 and 2013 NaDIA.

[^] There was no audit collection or report in 2014, so 2014 data is not available.



Care improvement initiatives:

Clinical comment and recommendations

i

- Although there has been a year-on-year increase in Electronic Prescribing and the use of an Electronic Patient Record, two thirds of sites have not completely transitioned to these technologies.
- Although the proportion of sites holding diabetes Morbidity and Mortality meetings has not increased, that 53 per cent of trusts discuss diabetes in their meetings is commendable.
- The use of e-learning may not be fully captured, as there are new e-learning programmes other than those mentioned in the questionnaire.

NaDIA team

Recommendations:

Health Professionals:

- Learn from NHS Trusts and Local Health Boards where Electronic Prescribing and Electronic Patient Records work well and encourage others to adopt similar systems.
- Continue to highlight diabetes at Morbidity and Mortality meetings.



National Diabetes Inpatient Audit 2016

4. Seen by the Diabetes Team



Seen by the Diabetes Team: Overview



Audit question: Were inpatients seen by the Diabetes Team where it was deemed appropriate¹?

Why is this important?

The Diabetes Team support people with diabetes during their hospital stay. Members of the Diabetes Team have been specially trained in the problems that may affect people with diabetes while they are in hospital.

They may be able to identify and alleviate potential concerns before these result in harm to the patient, improve the patient's experience of their care and can offer more specialised advice and support to the patient and the general ward staff caring for them.

How is this measured?

For each patient with a Bedside Audit completed it was recorded whether or not they were seen by the Diabetes Team, and whether or not they should have been seen by the Diabetes Team.

Results were compared by different diabetes types and by whether specialist diabetes nursing was available in the hospital each day.

Key Finding

- The proportion of people with diabetes seen by the Diabetes Team where appropriate¹ has **increased** since 2011 (from 58 to 69 per cent).
- However **3 out of 10** people are not seen by the Diabetes Team where appropriate¹ (31 per cent).
- A higher proportion are seen by the Diabetes Team where appropriate¹ when 7-day DISN² cover is provided (73 per cent compared to 69 per cent).

‘Outcomes for people with diabetes following admission to hospital can be improved by better liaison between the Diabetes Team and ward staff.’

National Service Framework for Diabetes, December 2001

Notes: 1. Based on the ‘Think Glucose Criteria’. See [NHS Institute for Innovation Think Glucose](#)

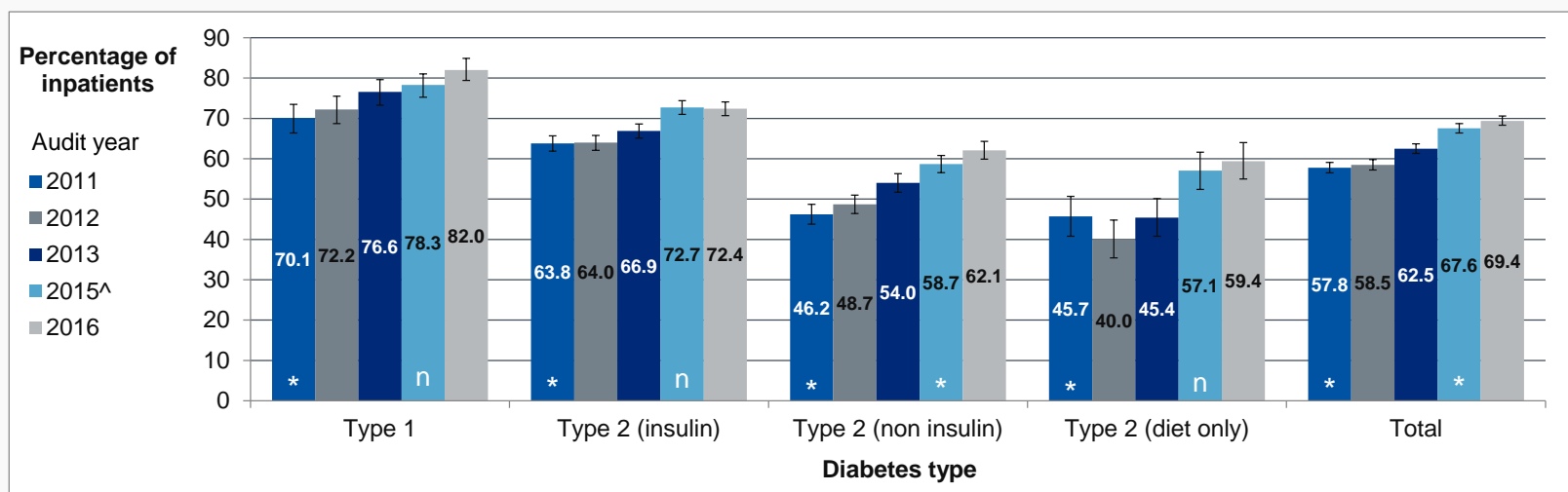
2. DISN = Diabetes inpatient specialist nurse. **Green** text = trend broadly ‘good’. **Red** text = trend broadly ‘bad’.



Seen by the Diabetes Team

Based on the 'Think Glucose Criteria'¹, it was appropriate for 42 per cent of inpatients with diabetes to be referred to the Diabetes Team, a decrease of 2 per cent since 2013.

Figure 4.1: Percentage of inpatients seen by the Diabetes Team where it was deemed appropriate¹: by diabetes type, England and Wales, 2011-16



Comparison	Significant Difference (p <0.05)				
	Type 1	Type 2 (insulin)	Type 2 (non insulin)	Type 2 (diet only)	Total
2011 to 2016	Up	Up	Up	Up	Up
2015 to 2016	No change	No change	Up	No change	Up

Notes: 1. Based on the 'Think Glucose Criteria'. See [NHS Institute for Innovation Think Glucose](#). [^] There was no audit collection or report in 2014, so 2014 data is not available. * = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year). **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Seen by the Diabetes Team and 7 day DISN provision

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Table 4.1: Percentage of sites with 7 day DISN provision¹, England and Wales, 2015-16

Percentage of sites with:	2015	2016
• 7 day DISN provision	6.4	7.7

Initiative	2015 to 2016
• 7 day DISN provision	Up

Table 4.2: Percentage of inpatients seen by the Diabetes Team where it was deemed appropriate²: by 7 day DISN provision¹, England and Wales, 2016

Percentage of patients:	7 day DISN provision?			
	Yes		No	
• seen by the Diabetes Team where appropriate	73.3	*	69.1	*

Percentage of patients:	Significant Difference (p < 0.05)	
	7-day DISN	No 7-day DISN
• seen by Diabetes Team where appropriate	Higher	Lower

Findings

- Since 2015 there has been a small **increase** in the proportion of hospital sites providing 7 day DISN provision¹ (from 6 to 8 per cent).
- A **higher** proportion of inpatients are seen by the Diabetes Team where appropriate when 7-day DISN cover is provided¹ (73 per cent compared to 69 per cent).

Notes: 1. DISN = Diabetes inpatient specialist nurse. 2. Based on the 'Think Glucose Criteria'. See [NHS Institute for Innovation Think Glucose](#). * = statistically significant at the 0.05 level ('Yes' vs. 'No' in audit year). n = not statistically significant ('Yes' vs. 'No' in audit year). **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Seen by the Diabetes Team:

Clinical comment and recommendations

i

- The increase in the percentage of patients who should be seen¹ by the Diabetes Team who were actually seen is impressive; there has been no increase in staffing since 2011 so this improvement must reflect greater efficiency and effectiveness.
- Whilst it is encouraging to see that the vast majority of people with Type 1 diabetes who should be seen are reviewed, it is equally important to note that the improvement is across all diabetes groups.

NaDIA team

Recommendations:

Care providers:

- The impressive work undertaken by Diabetes Teams should be recognised and acknowledged by NHS Trusts and Local Health Boards.
- Ward referral systems should be in place to ensure that all appropriate patients¹ are promptly referred and promptly seen by the Diabetes Team.
- Every NHS Trust and Local Health Board should have 7 Day DISN provision².



Staffing levels and services:

Patient comment



A blue square icon with a white lowercase letter 'i' inside, representing information.

*“As a potential patient I am very concerned about the **lack of specialist diabetes trained staff in hospitals**. About 1 in 6 hospital beds are occupied by patients with diabetes. However, 28 per cent of hospital sites have no diabetes inpatient specialist nurse (DISN), almost 24 per cent of hospitals have no Multi-disciplinary Foot Care Team (MDFT) and 28 per cent have no inpatient podiatry.*

*These **staffing deficiencies** mean that many inpatients with diabetes will not have access to staff adequately informed about all clinical aspects of their condition and care. Indeed, only 69 per cent of inpatients with diabetes are even seen by the Diabetes Team where it was deemed appropriate¹, and only 30 per cent have a specific diabetic foot risk examination for ulceration in the first 24 hour of admittance.*

*This is **not good enough**.”*

David, aged 66, who has Type 2 diabetes



National Diabetes Inpatient Audit 2016

5. Blood glucose monitoring



Blood glucose monitoring: Overview



Audit question:

Was inpatient blood glucose monitoring appropriate?

Why is this important?

Regular monitoring of a patient's blood glucose whilst in hospital is essential to avoid the onset of hypoglycaemic episodes, hyperglycaemia and other potential harms to the patient.

Monitoring is particularly important in hospital because a patient's blood glucose level may vary more than usual due to illness, treatment or changes to diet and diabetes care routines. It may also be more difficult for the person with diabetes to recognise changes to their blood glucose level.

How is this measured?

Data was collected on inpatients' blood glucose monitoring in the previous 7 days of their hospital stay.

What about patients who have been in hospital for less than 7 days? Results are adjusted for length of stay. For example, a patient who has been admitted for 2 days and been monitored on 1 day would be counted as having been monitored on 3.5 days out of 7.

Key Findings

- The average number of days per week that monitoring occurred has remained **consistent** since 2011.
- Since 2011 the average number of 'good diabetes days' per week has **improved** by one third of a day for inpatients with Type 1 diabetes (from 2.3 to 2.6 days).
- **Less than half** of the days of a typical hospital stay for inpatients with insulin-treated diabetes meet the definition of a 'good diabetes day'¹.



Blood glucose monitoring: Definitions



Appropriate blood glucose monitoring

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:

Patient status	Blood glucose testing frequency
Metformin or diet alone	1 or more/day
Long stay patient on diet and metformin with stable control	Once weekly or more
Insulin, Exenatide, SU or >1 oral agent including DPP-4 inhibitors and glitazones	2 or more/day
Unwell, unstable diabetes or basal bolus	4 or more/day

'Good diabetes days'

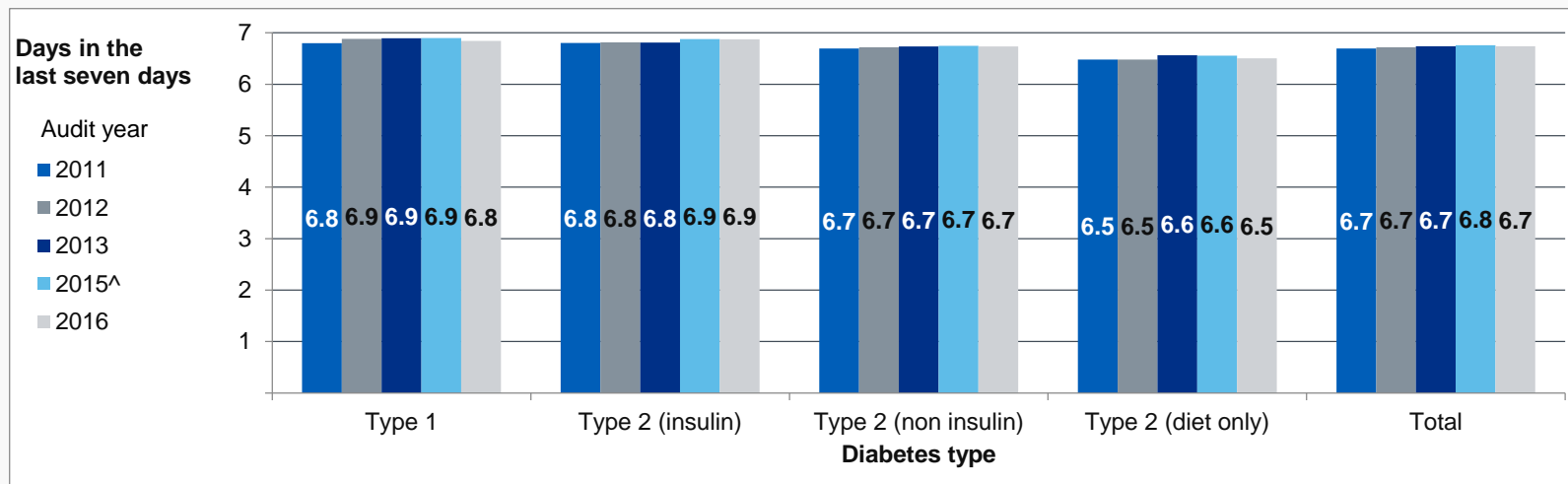
A 'good diabetes day' was defined as a day on which the frequency of blood glucose monitoring was appropriate, using the guidelines in the table above, and there was no more than one blood glucose measurement greater than 11 mmol/L and no blood glucose measurements less than 4 mmol/L.

Further information on blood glucose monitoring is provided in the [Glossary: Blood glucose control](#).



Blood glucose monitoring

Figure 5.1: Blood glucose monitoring in last 7 days: by diabetes type, England and Wales, 2011-16



Methodology

Data was collected on inpatients' blood glucose monitoring in the previous 7 days of their hospital stay. Results were adjusted for length of stay. For example, a patient who has been admitted for 2 days and been monitored on 1 day would be counted as having been monitored on 3.5 days out of 7.

Findings

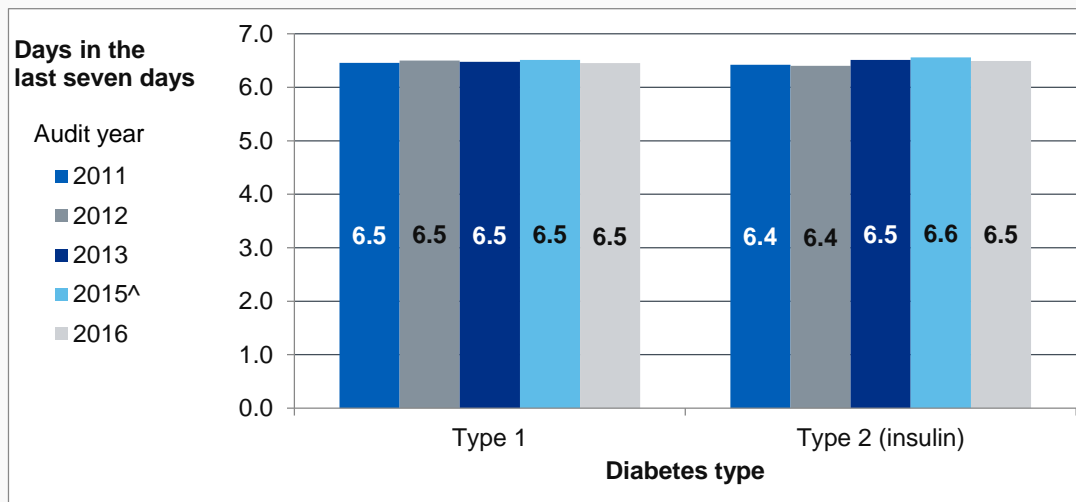
- The average number of days per week that monitoring occurred has remained **consistent** since 2011.



Appropriate blood glucose monitoring



Figure 5.2: Appropriate blood glucose monitoring in last 7 days¹: by diabetes type, England and Wales, 2011-16



Due to a problem with the wording of one of the audit questions (Bedside Audit, Q19), 2016 results for inpatients with non-insulin treated diabetes are not comparable to previous years¹.

Findings

- The average number of days per week that appropriate monitoring occurred has remained **consistent** since 2011.
- Inpatients with insulin-treated diabetes typically experience **half a day** per week when appropriate monitoring is not undertaken.

Methodology

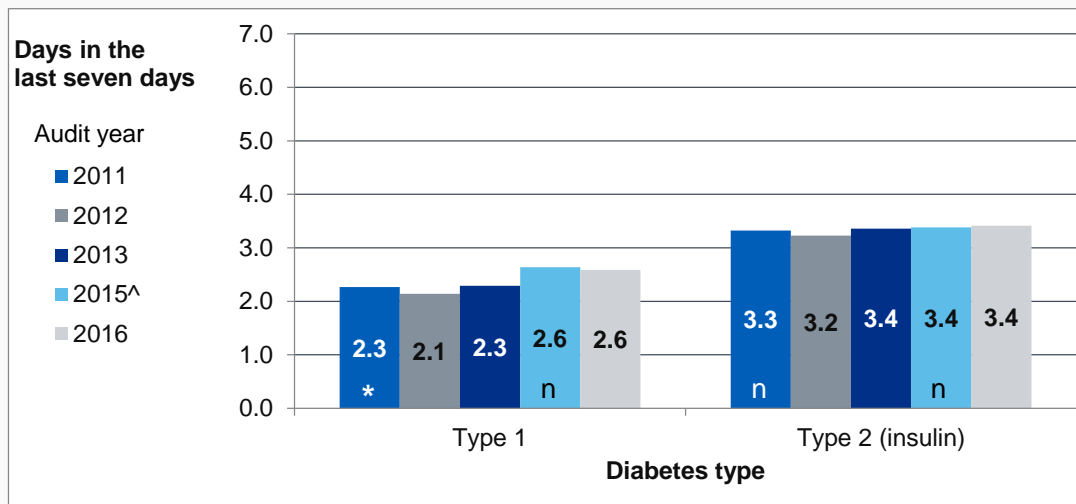
Data was collected on inpatients' appropriate blood glucose monitoring in the previous 7 days of their hospital stay. Results were adjusted for length of stay. For example, a patient who has been admitted for 2 days and been monitored appropriately on 1 day would be counted as having been monitored on 3.5 days out of 7. The **definition** of appropriate blood glucose monitoring is in [Blood glucose monitoring: Definitions](#) (above).

Notes: 1. Wording for the 2016 Bedside Audit questionnaire (Q19) wrongly specified that data was required for patients on subcutaneous insulin **only**. Consequently 2016 results for non-insulin treated inpatients are not robust. It is also likely that some 2016 inpatients that receive insulin through non-subcutaneous means did not have data submitted. [^] There was no audit collection or report in 2014, so 2014 data is not available.



‘Good diabetes days’

Figure 5.3: ‘Good diabetes days’¹ in last 7 days²: by diabetes type, England and Wales, 2011-16



Methodology

Data was collected on inpatients’ ‘good diabetes days’¹ in the previous 7 days of their hospital stay. Results were adjusted for length of stay. For example, a patient who has been admitted for 2 days and been monitored on 1 day would be counted as having been monitored on 3.5 days out of 7. **Definitions** are provided in [Blood glucose monitoring: Definitions](#) (above).

Due to a problem with the wording of one of the audit questions (Bedside Audit, Q19), 2016 results for inpatients with non-insulin treated diabetes are not comparable to previous years².

Findings

- Since 2011, the average number of ‘good diabetes days’ per week has **improved** by one third of a day for inpatients with Type 1 diabetes (from 2.3 to 2.6 days).
- **Less than half** of the typical hospital stay for inpatients with insulin-treated diabetes meet the definition of a ‘good diabetes day’.

Notes: 1. The definition of ‘good diabetes days’ is provided in [Blood glucose monitoring: Definitions](#). 2. Wording for the 2016 Bedside Audit questionnaire (Q19) wrongly specified that data was required for patients on subcutaneous insulin **only**. Consequently 2016 results for non-insulin treated inpatients are not robust. It is also likely that some 2016 inpatients that receive insulin through non-subcutaneous means did not have data submitted. [^] There was no audit collection or report in 2014, so 2014 data is not available. * = statistically significant at the 0.05 level (vs. current audit year). ⁿ = not statistically significant (vs. current audit year). **Green** text = trend broadly ‘good’. **Red** text = trend broadly ‘bad’.



Blood glucose monitoring:

Clinical comment and recommendations

i

The frequency of blood glucose monitoring has always been appropriate for each treatment group and remains so.

NaDIA team



Recommendations:

Healthcare professionals:

Continue to innovate and improve systems of blood glucose monitoring, including consideration of remote blood glucose monitoring where practical and appropriate. Higher rates of 'good diabetes days'¹ will translate into fewer harms and quicker recovery.



National Diabetes Inpatient Audit 2016

6. Use of insulin infusions



Use of insulin infusions: Overview



Audit question:

Were intravenous insulin infusions (IVI) used appropriately and safely?

Why is this important?

Insulin infusions should be used in hospital for short time periods only, e.g. around the time of an operative procedure when the patient isn't eating.

If a patient is on an insulin infusion when they don't need to be, or for too long, this increases the risk of them undergoing a hypoglycaemic episode or experiencing a medication error.

It is important patients are only on an infusion when necessary and that they are appropriately monitored throughout, including while the patient is transferred between infusions and other insulin delivery methods.

'Capillary blood glucose (CBG) levels should be monitored and recorded at least hourly during the procedure and in the immediate postoperative period.'

**Management of adults with diabetes undergoing surgery and elective procedures:
Improving standards, Joint British Diabetes Societies for Inpatient Care, March 2016**

Key Findings

- The proportion of patients on insulin infusions has **decreased** since 2011 (from 11 per cent to 8 per cent).
- The proportion of insulin infusions that were too long, and transfers to injectable insulin that were mismanaged, have both **decreased** since 2011 (from 8 to 6 per cent and 19 to 14 per cent).

How is this measured?

The Bedside Audit recorded whether the inpatient had been on an insulin infusion in the last 7 days, along with information on the duration and appropriateness of the infusion, the transfer to subcutaneous insulin and the frequency of blood glucose monitoring.



Use of insulin infusions (1)

Table 6.1: Use of insulin infusions, England and Wales, 2011-16

Percentage of patients:	2011		2012	2013	2015 [^]		2016	Trend
• Been on an infusion in the last 7 days	11.2	*	10.3	9.8	9.0	*	8.1	
• Infusions considered inappropriate	7.0	n	6.4	6.5	6.3	n	7.1	
• Infusions considered inappropriately long	8.3	*	7.6	7.5	6.2	n	6.1	
• Infusions that were 7 days or longer	8.0	n	7.6	9.7	8.3	n	8.1	
• Transfer to s.c. insulin ¹ not managed appropriately	18.9	*	15.8	16.3	14.2	n	14.0	

Percentage of patients:	Significant Difference (p < 0.05)	
	2011 to 2016	2015 to 2016
• Been on an infusion in the last 7 days	Down	Down
• Infusions considered inappropriate	No change	No change
• Infusions considered inappropriately long	Down	No change
• Infusions that were 7 days or longer	No change	No change
• Transfer to s.c. insulin ¹ not managed appropriately	Down	No change

Findings

- The proportion of patients on insulin infusions has **decreased** since 2015 (from 11 to 8 per cent).
- The proportion of insulin infusions that were too long and transfers to injectable insulin that were mismanaged have both **decreased** since 2011.

Notes: [^] There was no audit collection or report in 2014, so 2014 data is not available.

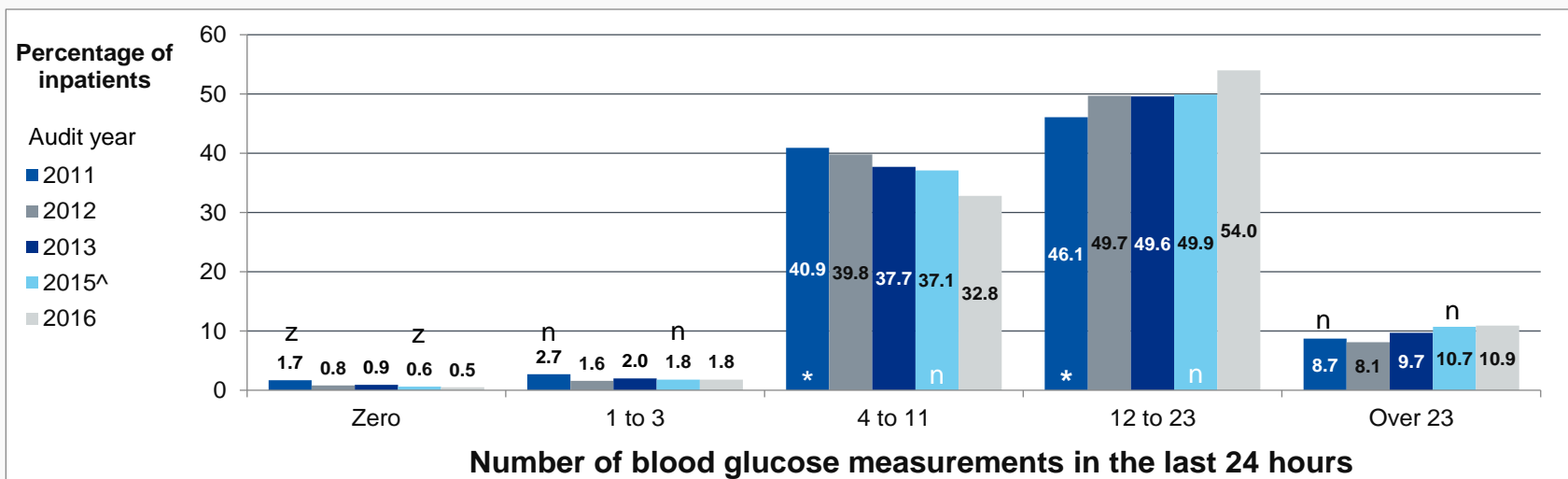
* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

1. s.c. insulin = subcutaneous insulin (i.e. insulin received via injection). **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Use of insulin infusions (2)

Figure 6.1: Number of blood glucose measurements in the last 24 hours on infusion¹, England and Wales, 2011-16



Blood glucose measurements	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Zero	N/A	N/A
• 1 to 3	No change	No change
• 4 to 11	Down	No change
• 12 to 23	Up	No change
• Over 23	No change	No change

Findings

- The proportion of patients on insulin infusions having 12 to 23 blood glucose measurements within 24 hours has **increased** since 2011 (from 46 to 54 per cent).

Notes: 1. For insulin infusions that lasted longer than 24 hours.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year).

n = not statistically significant (vs. current audit year). z = not applicable. Too few events to assess.

Green text = trend broadly 'good'. Red text = trend broadly 'bad'.



Use of insulin infusions:

Clinical comment and recommendations

i

- The important findings are that the percentage of patients on an insulin infusion has declined year-on-year and that since 2011 the proportion of insulin infusions defined as being inappropriately long has decreased.
- The frequency of glucose monitoring whilst on an infusion has increased but there are a percentage of patients in whom the frequency is dangerously infrequent.
- A very important finding is that there has been a year-on-year improvement in the safe transfer back to subcutaneous insulin, however there appears to be room for further improvement.

NaDIA team

Recommendations:

Diabetes Teams:

- Continue to focus on surveillance of inappropriate use and duration of use of insulin infusions.
- Consider how to improve safe transfer back to subcutaneous insulin, with processes to ensure that there is no deterioration in glucose control¹.

Notes:

1. This covers both hypoglycaemia and the development of Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycaemic State (HHS).



National Diabetes Inpatient Audit 2016

7. Medication errors



Medication errors: Overview



Audit questions: What were the rates of medication errors in the last seven days?

Why is this important?

A patient that receives medication inappropriately can experience harm, such as a hypoglycaemic episode or even more serious complications.

Control of a person's diabetes is often dependent on precisely managing the medication that they receive. This is particularly important where they are in hospital, and their usual routine may be disrupted.

How is this measured?

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 medication management errors, see [Glossary: Medication errors](#)) had occurred in the previous 7 days. The audit does not collect how many of each error type occurred to each patient during their stay.

Comparisons in error rates have been made to earlier audits.

Key Findings

- Almost **2 out of 5** inpatients with diabetes have a medication error during their hospital stay (38 per cent).
- Whilst the proportion of patients having prescription errors has **decreased** since 2011, medication management errors have **increased** over the same period.
- Inpatients with diabetes are **more likely** to have prescription and medication management errors if treated on a surgical ward.
- Inpatients with diabetes are **less likely** to have prescription errors if an Electronic Patient Record or Electronic Prescribing are used.

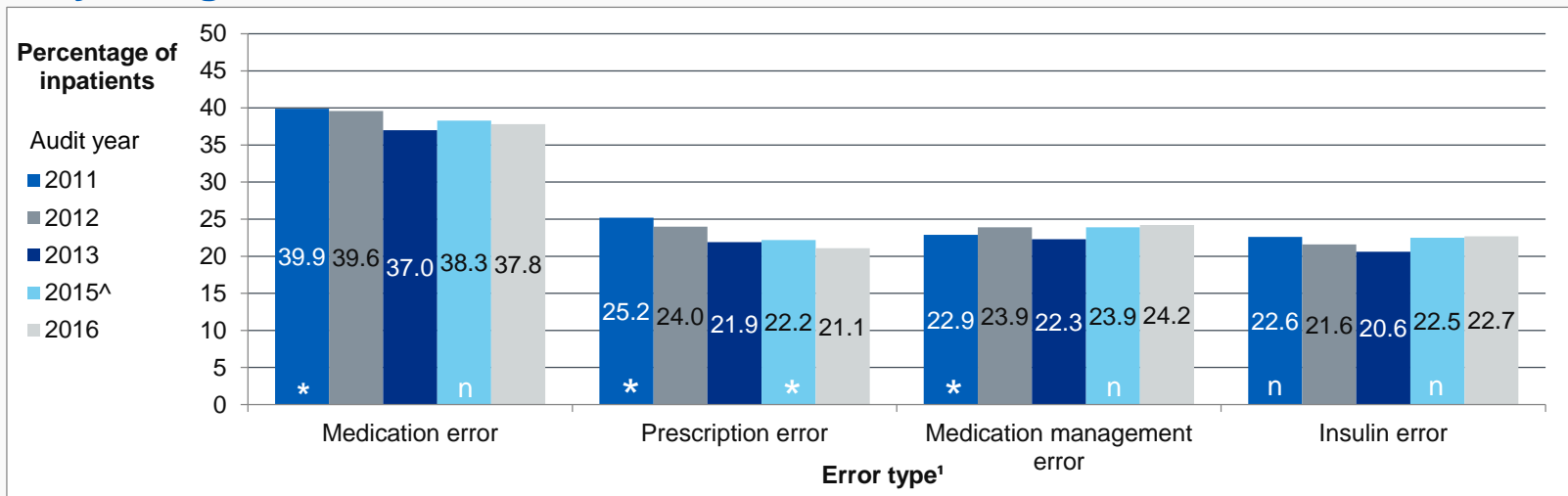
‘Clinicians should work with pharmacists to create safer prescribing systems, especially for insulin. Clinical pharmacist input for diabetic inpatients should be increased in order to reduce medication errors.’

NaDIA 2015



Medication errors: Error type

Figure 7.1: Inpatient drug charts having one or more medication error¹ in last 7 days, England and Wales, 2011-16



Error type ¹	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Medication error	Down	No change
• Prescription error	Down	Down
• Medication management error	Up	No change
• Insulin error	No change	No change

Findings

- Almost **2 out of 5** inpatients with diabetes have a medication error during their hospital stay (38 per cent).
- The proportion of patients having prescription errors has **decreased** since 2011 and 2015 NaDIA (from 25 to 21 per cent).
- The proportion of patients having medication management errors has **increased** since 2011 from 23 to 24 per cent.

Notes: 1. See [Glossary: Medication errors](#) for explanation of error types.

- *Medication error* = any prescription or medication management error.
- *Prescription error* = any prescription error.
- *Medication management error* = any medication management error.
- *Insulin error* = any prescription or medication management error relating to insulin.

* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'. [^] There was no audit collection or report in 2014, so 2014 data is not available.



Medication errors: Individual errors

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Table 7.1: Inpatient drug charts having one or more medication error in last 7 days: by individual error, England and Wales, 2011-16

Error type ¹	Error description ¹	2011	2012	2013	2015 [^]	2016	Significant difference ²	
							2011 to 2016	2015 to 2016
Insulin prescription error	• Insulin not written up	2.1 n	1.7	1.7	2.2 n	1.9	No change	No change
	• Name of insulin incorrect	2.9 *	2.5	2.1	1.8 n	1.8	Down	No change
	• Number (dose) unclear	2.3 *	2.1	1.9	1.7 n	1.6	Down	No change
	• Unit abbreviated to 'u' or written unclearly	3.4 *	2.5	1.9	1.5 *	1.2	Down	Down
	• Insulin or prescription chart not signed	2.4 *	2.1	1.9	2.1 n	2.0	Down	No change
	• Insulin not signed as given	5.1 n	5.0	4.8	4.9 n	4.7	No change	No change
	• Insulin given/prescribed at the wrong time	3.1 *	3.0	3.1	3.7 n	4.2	Up	No change
OHA prescription error	• OHA not signed as given	5.1 n	5.2	4.6	5.2 n	4.8	No change	No change
	• OHA given/prescribed at the wrong time	5.3 *	5.5	4.8	4.6 n	4.2	Down	No change
	• Wrong dose	1.1 n	1.2	1.0	1.0 n	0.9	No change	No change
	• OHA not written up	2.3 *	2.4	2.0	1.8 n	1.8	Down	No change
Insulin management error	• Insulin not increased when persistent BG >11 mmol/L and better glycaemic control appropriate	9.5 *	10.3	9.8	11.5 n	12.1	Up	No change
	• Insulin not reduced if unexplained BG <4 mmol/L	4.0 n	3.5	3.3	4.0 n	3.8	No change	No change
	• Inappropriate omission of insulin after episode of hypoglycaemia	2.1 *	1.9	1.8	1.8 n	1.4	Down	No change
OHA management error	• No action taken when persistent BG >11 mmol/L and better glycaemic control appropriate	9.0 n	10.5	9.5	8.8 n	9.2	No change	No change
	• OHA not reduced if unexplained BG <4 mmol/L	2.9 *	2.8	2.6	2.3 n	2.2	Down	No change
	• Inappropriate omission of OHA after episode of hypoglycaemia	1.0 *	0.9	0.8	0.6 n	0.6	Down	No change

Notes: 1. OHA = Oral hypoglycaemic agents: drugs used for the treatment of people with Type 2 diabetes. BG = blood glucose.
 2. p <0.05 ^ There was no audit collection or report in 2014, so 2014 data is not available. * = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year). **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Medication errors: Findings

Insulin errors

OHA errors¹

Prescription errors

Insulin prescription errors

- 4 of the 7 insulin prescription errors have **decreased** in frequency since 2011.
- The frequency of 'Insulin given/prescribed at wrong time' errors has **increased** since 2011 (from 3 to 4 per cent).

OHA prescription errors¹

- 2 of the 4 OHA prescription errors have **decreased** in frequency since 2011¹.
- There has been **no significant change** in the frequency of OHA prescription errors since 2015¹.

Medication management errors

Insulin management errors

- The prevalence of 'inappropriate omissions of insulin after a hypoglycaemic episode' has **decreased** since 2011 (from 2 to 1 per cent).
- The prevalence of 'Insulin not increased when persistent BG >11 mmol/L and better glycaemic control appropriate' errors has **increased** since 2011¹ (from 9 to 12 per cent).

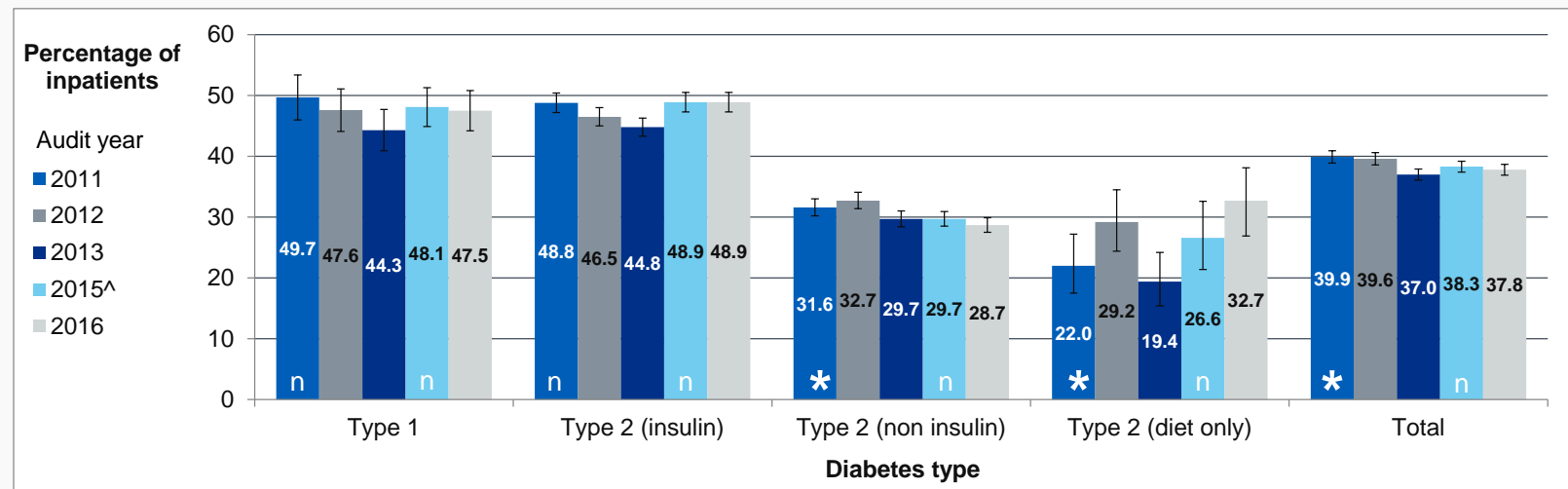
OHA management errors¹

- The prevalence of 2 of the 3 OHA management errors episode have **decreased** since 2011¹.
- There has been **no significant change** in the frequency of OHA management errors since 2015¹.



Medication errors by diabetes type

Figure 7.2: Inpatient drug charts having one or more medication error¹ in last 7 days: by diabetes type, England and Wales, 2011-16



Diabetes type	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Type 1	No change	No change
• Type 2 (insulin)	No change	No change
• Type 2 (non insulin)	Down	No change
• Type 2 (diet only)	Up	No change
• Total	Down	No change

Findings

- Almost **half** of insulin-treated inpatients with diabetes have a medication error during their hospital stay (47 per cent).
- The proportion of Type 2 non-insulin treated inpatients having a medication error has **decreased** since 2011 (from 32 to 29 per cent).
- The proportion of diet-controlled inpatients having a medication error has **increased** since 2011 (from 22 to 33 per cent)

Notes: 1. Medication error = any prescription or medication management error.

See [Glossary: Medication errors](#) for explanation of error types.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

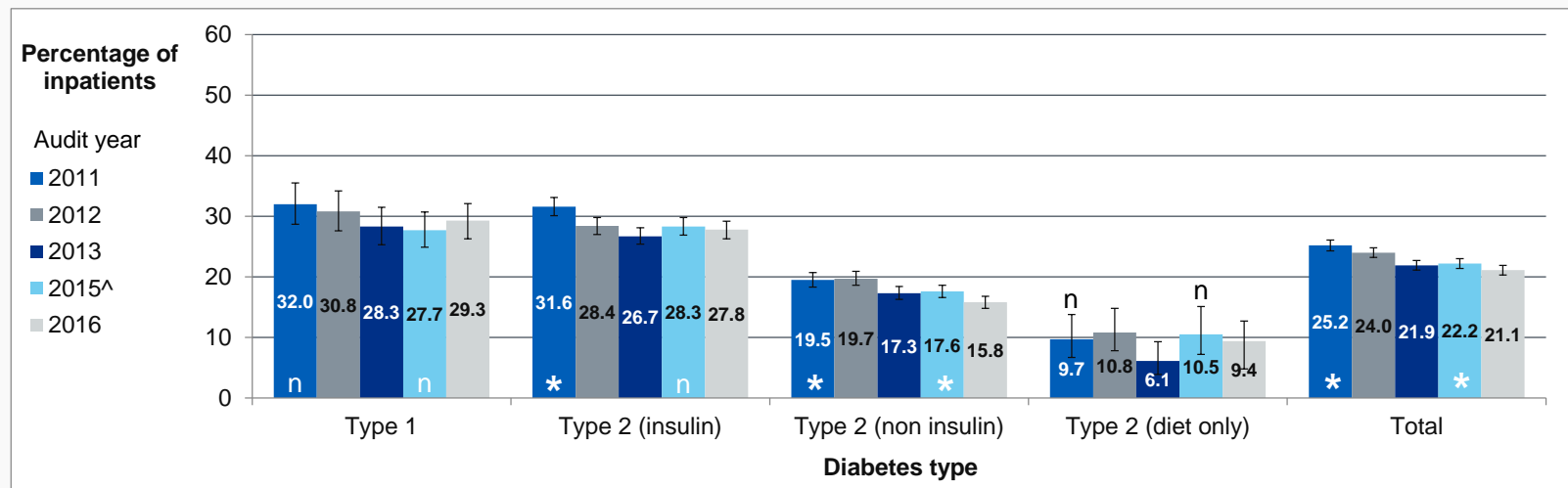
* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Prescription errors by diabetes type

Figure 7.3: Inpatient drug charts having one or more prescription error¹ in last 7 days: by diabetes type, England and Wales, 2011-16



Diabetes type	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Type 1	No change	No change
• Type 2 (insulin)	Down	No change
• Type 2 (non insulin)	Down	Down
• Type 2 (diet only)	No change	No change
• Total	Down	Down

Findings

- Almost **3 in 10** insulin-treated inpatients with diabetes have a prescription error during their hospital stay (29 per cent with Type 1 diabetes and 28 per cent with Type 2 diabetes).
- The proportion of inpatients with non-insulin treated Type 2 diabetes having a prescription error has **decreased** since 2011 (from 19 to 16 per cent).

Notes: 1. *Prescription error* = any prescription error.

See [Glossary: Medication errors](#) for explanation of error types.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

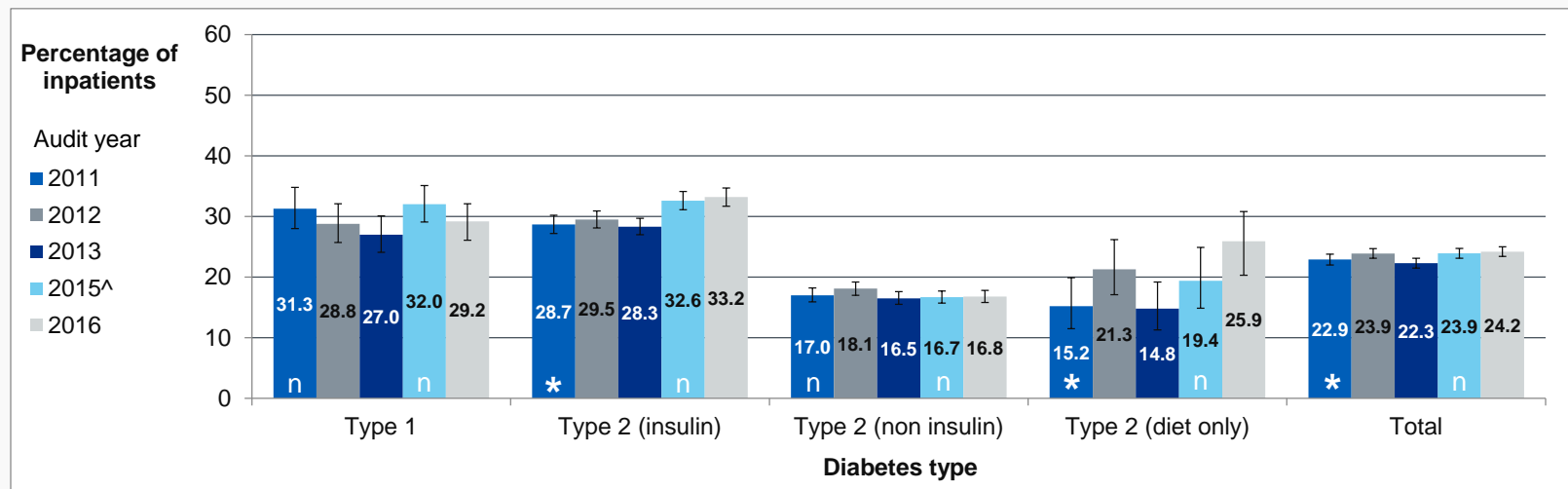
* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Medication management errors by diabetes type

Figure 7.4: Inpatient drug charts having one or more medication management error¹ in last 7 days: by diabetes type, England and Wales, 2011-16



Diabetes type	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Type 1	No change	No change
• Type 2 (insulin)	Up	No change
• Type 2 (non insulin)	No change	No change
• Type 2 (diet only)	Up	No change
• Total	Up	No change

Findings

- Almost **one third** of insulin-treated inpatients with diabetes have a medication management error during their hospital stay (29 per cent with Type 1 diabetes and 33 per cent with Type 2 diabetes).
- The proportions of inpatients with insulin-treated and diet-controlled Type 2 diabetes having a medication management error has **increased** since 2011.

Notes: 1. Medication management error = any medication management error.

See [Glossary: Medication errors](#) for explanation of error types.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

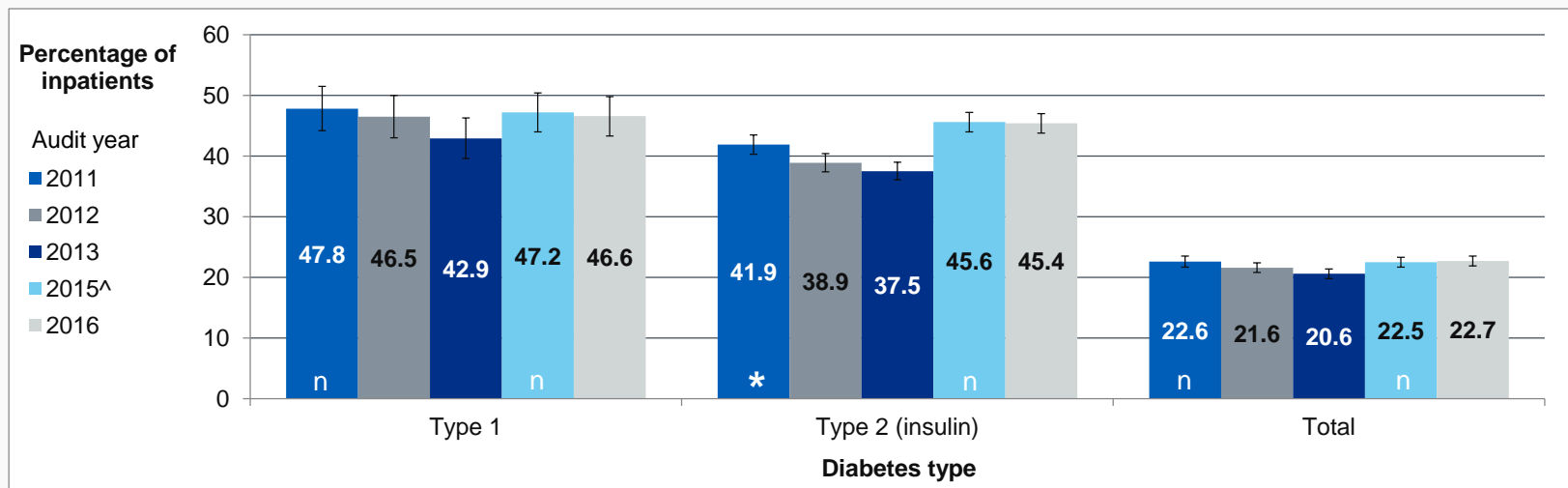
* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. Red text = trend broadly 'bad'.



Insulin errors by diabetes type

Figure 7.5: Inpatient drug charts having one or more insulin error¹ in last 7 days: by diabetes type, England and Wales, 2011-16



Diabetes type	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Type 1	No change	No change
• Type 2 (insulin)	Up	No change
• Total	No change	No change

Findings

- **46 per cent** of insulin-treated inpatients with diabetes have an insulin error during their hospital stay.
- The proportion of insulin-treated inpatients Type 2 diabetes having an insulin error has **increased** since 2011 (from 42 to 45 per cent).

Notes: 1. *Insulin error* = any prescription or medication management error relating to insulin.

See [Glossary: Medication errors](#) for explanation of error types.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Medication errors by ward type

Table 7.2: Frequency of medication errors¹ in last 7 days: by ward type, England and Wales, 2016

Inpatient drug charts that had one or more:	Medical	Surgical
• Medication error	36.6 *	41.1 *
• Prescription error	19.6 *	25.2 *
• Medication management error	23.6 *	25.5 *
• Insulin error	22.7 n	22.5 n

Error type ¹	Significant Difference (p <0.05)	
	Medical	Surgical
• Medication error	Less likely	More likely
• Prescription error	Less likely	More likely
• Medication management error	Less likely	More likely
• Insulin error	No difference	No difference

Finding

- Inpatients with diabetes are **more likely** to have prescription and medication management errors if treated on a surgical ward.

Notes: 1. See [Glossary: Medication errors](#) for explanation of error types.

- *Medication error* = any prescription or medication management error.
- *Prescription error* = any prescription error.
- *Medication management error* = any medication management error.
- *Insulin error* = any prescription or medication management error relating to insulin.

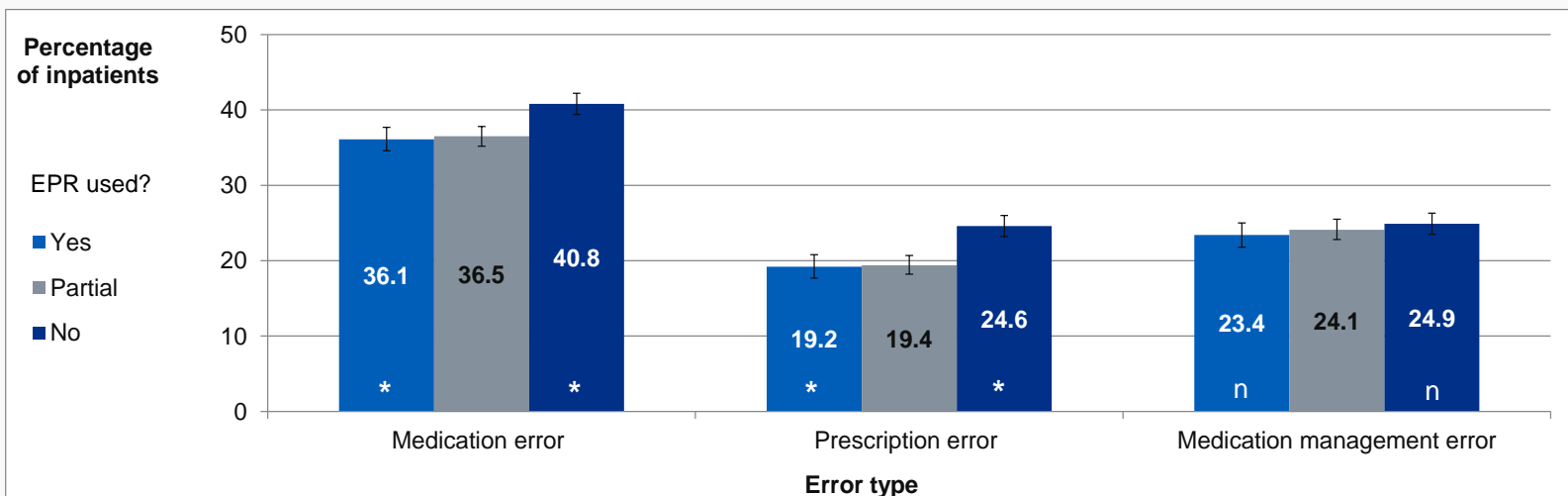
* = statistically significant at the 0.05 level (medical vs. surgical in audit year). n = not statistically significant (medical vs. surgical in audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Medication errors and use of an Electronic Patient Record

Figure 7.6: Inpatient drug charts having one or more medication error¹ in last 7 days: by Electronic Patient Record (EPR) usage, England and Wales, 2016



Error type ¹	Significant Difference (p < 0.05)	
	EPR used	EPR not used
• Medication error	Less likely	More likely
• Prescription error	Less likely	More likely
• Medication management error	No difference	No difference

Finding

- Inpatients with diabetes are **less likely** to have prescription errors if EPR is used.

Notes: 1. See [Glossary: Medication errors](#) for explanation of error types.

- Medication error* = any prescription or medication management error.
- Prescription error* = any prescription error.
- Medication management error* = any medication management error.

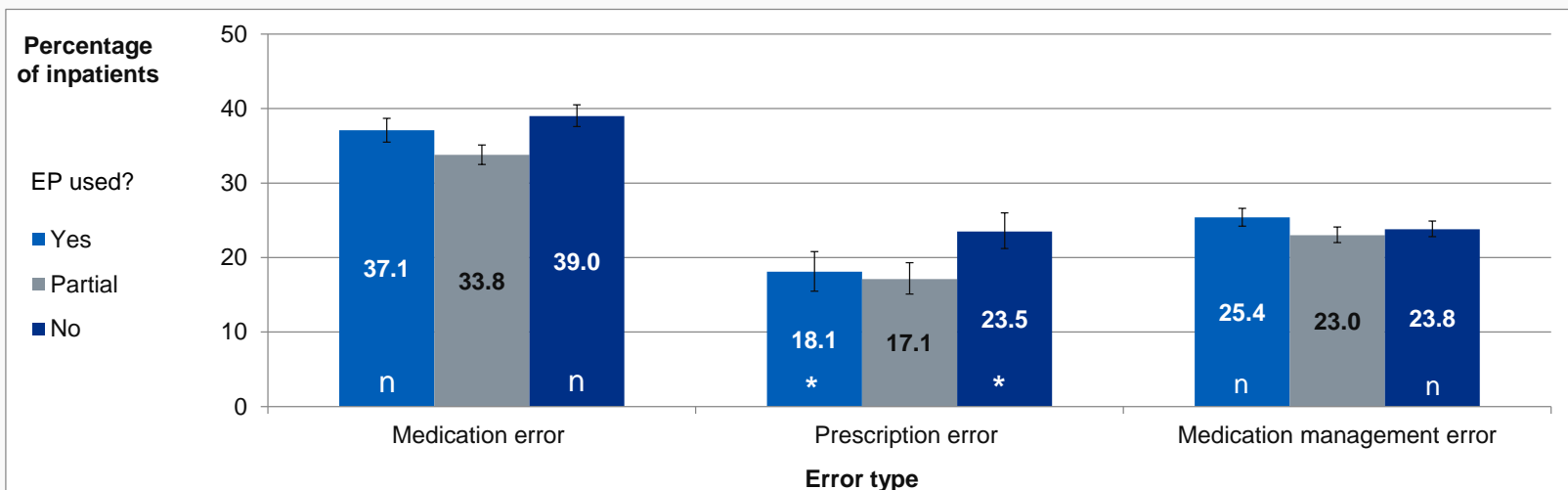
* = statistically significant at the 0.05 level (EPR used vs. EPR not used). n = not statistically significant (EPR used vs. EPR not used).

Green text = trend broadly 'good'. Red text = trend broadly 'bad'.



Medication errors and use of Electronic Prescribing

Figure 7.7: Inpatient drug charts having one or more medication error¹ in last 7 days: by Electronic Prescribing (EP) usage, England and Wales, 2016



Error type ¹	Significant Difference (p < 0.05)	
	EP used	EP not used
• Medication error	No difference	No difference
• Prescription error	Less likely	More likely
• Medication management error	No difference	No difference

Finding

- Inpatients with diabetes are **less likely** to have prescription errors if EP is used.

Notes: 1. See [Glossary: Medication errors](#) for explanation of error types.

- Medication error* = any prescription or medication management error.
- Prescription error* = any prescription error.
- Medication management error* = any medication management error.

* = statistically significant at the 0.05 level (EP used vs. EP not used). n = not statistically significant (EP used vs. EP not used).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Medication errors: Clinical comment

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- Although medication errors have generally reduced since 2011, this is largely due to improvements in prescribing and not in medication management, which has worsened.
- Incorrect timing of insulin administration and failing to address hyperglycaemia in insulin-treated patients have worsened; these errors increase the risk of DKA/HHS¹.
- There has also been an increase in medication management errors in patients with Type 2 diabetes, especially those on diet only, who may be given drugs or insulin temporarily during hospital admission.
- Use of OHA¹ has generally improved, which is reassuring because in the last few years consensus opinion has advised that a number of these medications are now contraindicated² in acute illness and should be stopped during the inpatient stay.
- It is notable that the proportion of medication, prescription and medication management errors is significantly worse on surgical wards.
- Although Electronic Prescribing has not reduced medication management errors, it may have resulted in a relatively small but significant reduction in prescription errors.

NaDIA team

Notes:

1. DKA = Diabetic Ketoacidosis. HHS = Hyperosmolar Hyperglycaemic State. OHA = Oral hypoglycaemic agents: drugs used for the treatment of people with Type 2 diabetes.

2. Contraindicated = medical advice that suggests a particular drug or treatment should not be used in some circumstances.



Recommendations:

Care providers: Learn from NHS Trusts and Local Health Boards that have most effectively utilised Electronic Prescribing and implemented other new technologies and systems that help reduce errors.

Diabetes Teams:

- Continue to educate and support junior doctors and nursing staff, while also developing and testing new systems to reduce prescribing and medication management errors. Junior doctors and nursing staff should be made aware that hyperglycaemia should not be left untreated, especially in people with Type 1 diabetes.
- Work with surgical colleagues to ensure diabetes safety levels are at least equivalent to those on medical units.

National Diabetes Inpatient Audit 2016

8. Hypoglycaemic episodes



Hypoglycaemic episodes: Overview



Audit questions:

What were the rates of hypoglycaemic episodes during the patient's admission?

What factors were associated with increased rates of hypoglycaemia?

Why is this important?

A hypoglycaemic episode (a hypo) is a potentially dangerous drop in a patient's blood glucose to below 4.0 mmol/L. To prevent hypos a patient's blood glucose level should remain under control as much as is possible during their hospital stay.

By identifying the extent of the problem of hypoglycaemia and associated patient and hospital characteristics, hospitals can focus their efforts on reducing the harmful occurrences of this complication.

How is this measured?

For each patient with a Bedside Audit, it was recorded whether the patient experienced any mild or severe hypoglycaemic episodes over the last 7 days. The audit collects how many of each episode occurred and at what time of day.

Key Findings

- The prevalence of hypoglycaemic episodes has **decreased** since 2011, though **1 in 5** inpatients with diabetes still have a hypo during their hospital stay (20 per cent).
- Over **one quarter** of inpatients with Type 1 diabetes had a severe hypoglycaemic episode during their hospital stay (27 per cent).
- The highest proportion of severe hypoglycaemic episodes took place between 05:00am and 08:59am (30 per cent), which is suggestive of **nocturnal hypoglycaemia**.
- Inpatients that self-test their glucose are **more likely** to have a severe hypoglycaemic episode than those that do not self-test (15 versus 8 per cent)¹.

A 'mild' hypoglycaemic episode involves a blood glucose level of between 3.0 and 3.9 mmol/L.

A 'severe' hypoglycaemic episode involves a blood glucose level of less than 3.0 mmol/L.

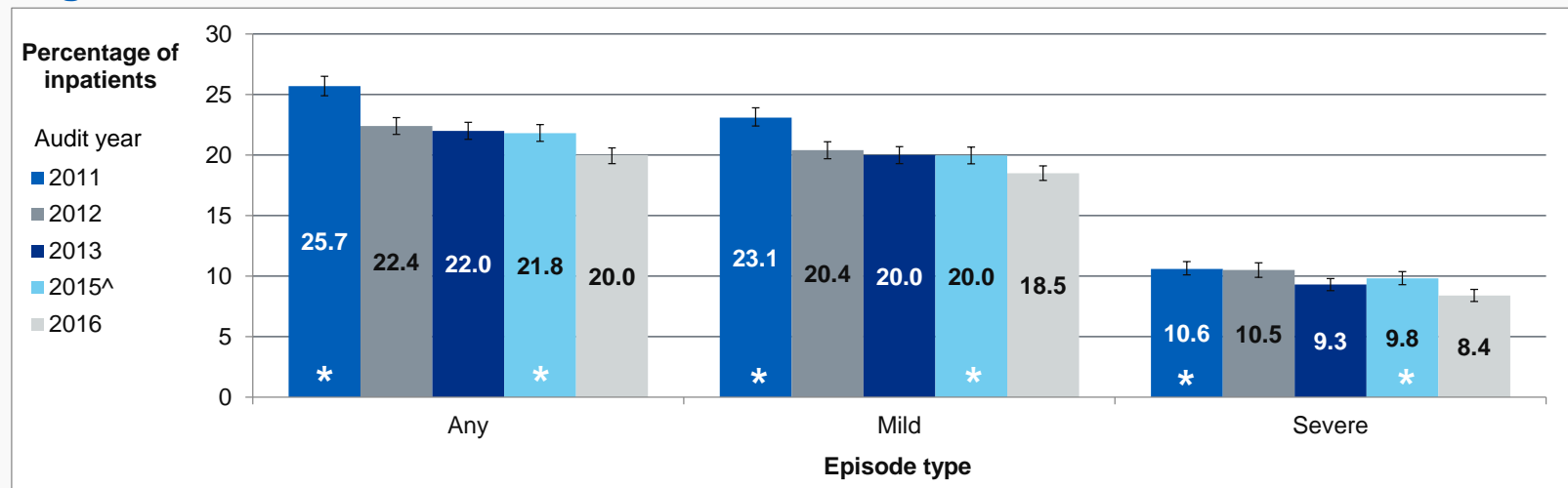
Notes: 1. This may be because these patients can self-test when symptom arise. Other patients might just eat or drink something without a confirmatory test.

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



All hypoglycaemic episodes

Figure 8.1: Inpatients having one or more hypoglycaemic episode¹ in last 7 days, England and Wales, 2011-16



Comparison	Significant Difference (p <0.05) in hypos		
	Any	Mild	Severe
2011 to 2016	Down	Down	Down
2015 to 2016	Down	Down	Down

Findings

- The prevalence of all hypoglycaemic episode types has **decreased** since NaDIA 2015.
- However **1 in 5** inpatients with diabetes still have a hypoglycaemic episode during their hospital stay (20 per cent). **1 in 12** have a severe episode (8 per cent).

Notes:

1. Any hypoglycaemic episode = blood glucose measurement of ≤ 3.9 mmol/L. Mild hypoglycaemic episode = 3.0-3.9mmol/L. Severe hypoglycaemic episode = < 3.0 mmol/L.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year).

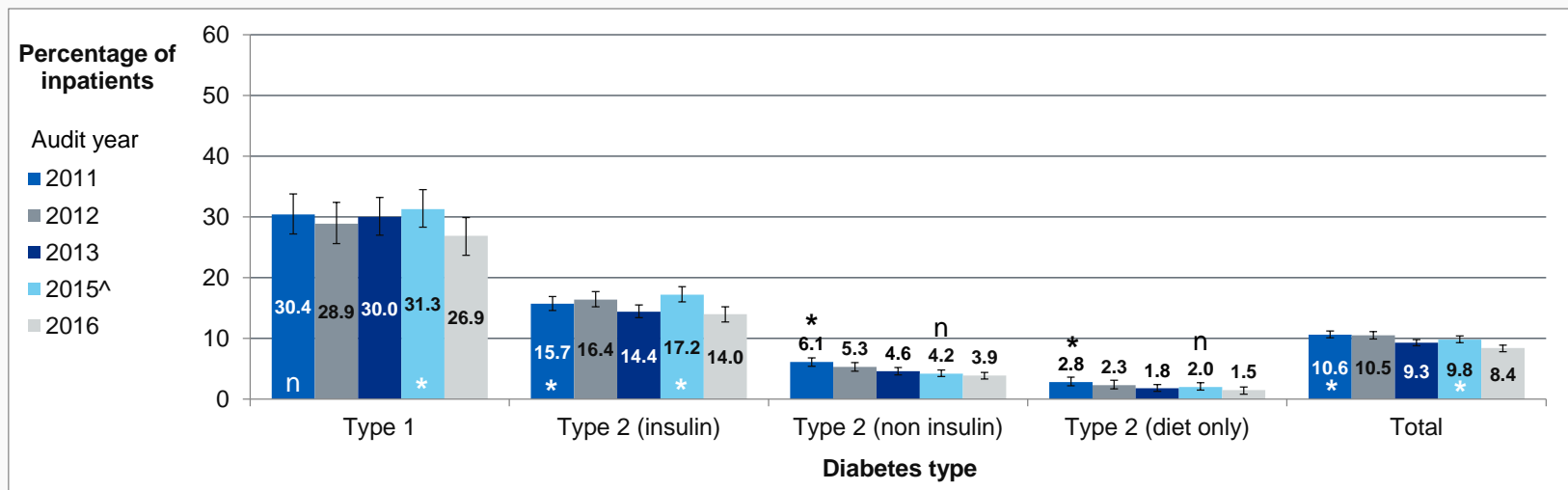
n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Severe hypoglycaemic episodes by diabetes type

Figure 8.2: Inpatients having one or more severe hypoglycaemic episode¹ in last 7 days: by diabetes type, England and Wales, 2011-16



Diabetes type	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Type 1	No change	Down
• Type 2 (insulin)	Down	Down
• Type 2 (non insulin)	Down	No change
• Type 2 (diet only)	Down	No change
• Total	Down	Down

Findings

- Over **one quarter** of inpatients with Type 1 diabetes have a severe hypoglycaemic episode during their hospital stay (27 per cent), compared to less than 2 per cent of inpatients with diet-controlled Type 2 diabetes.
- Prevalence has **decreased** amongst inpatients with Type 2 diabetes since 2011.
- Further **decreases** are evident amongst inpatients with insulin-treated diabetes since NaDIA 2015.

Notes:

1. Severe hypoglycaemic episode = blood glucose measurement of <3.0mmol/L.

^ There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year).

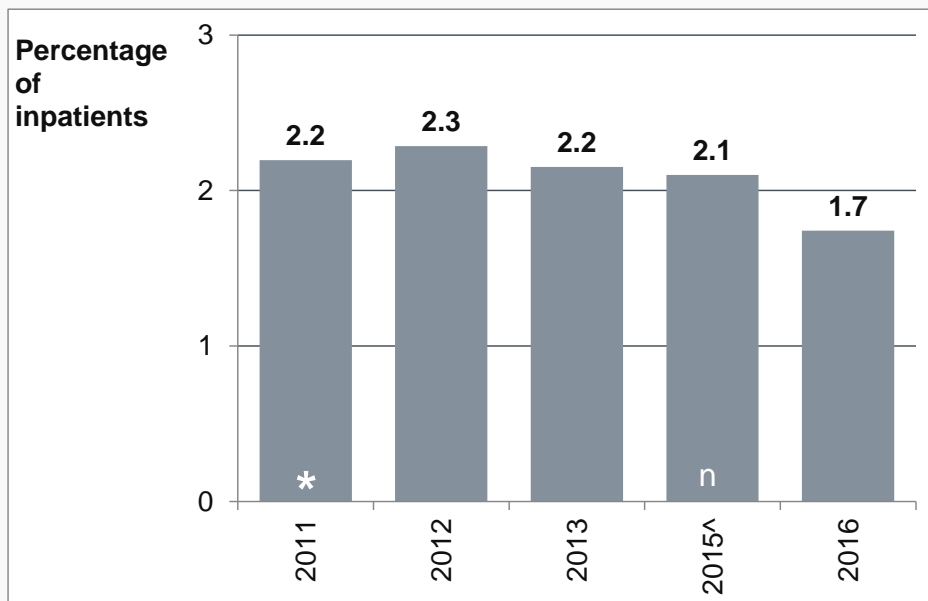
n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. Red text = trend broadly 'bad'.



Hypoglycaemic episodes requiring injectable treatment

Figure 8.3: Inpatients having one or more hypoglycaemic episode that required injectable treatment in the last 7 days, England and Wales, 2016



Comparison	Significant Difference (p <0.05)
2011 to 2016	Down
2015 to 2016	No change

Findings

- Around **1 in 60** inpatients with diabetes have a hypoglycaemic episode requiring injectable treatment during their hospital stay (1.7 per cent).
- The prevalence has **decreased** since 2011 (from 2.2 to 1.7 per cent)

Audit year	Number of episodes
2011	250
2012	232
2013	218
2015 [^]	213
2016	181

Notes: [^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

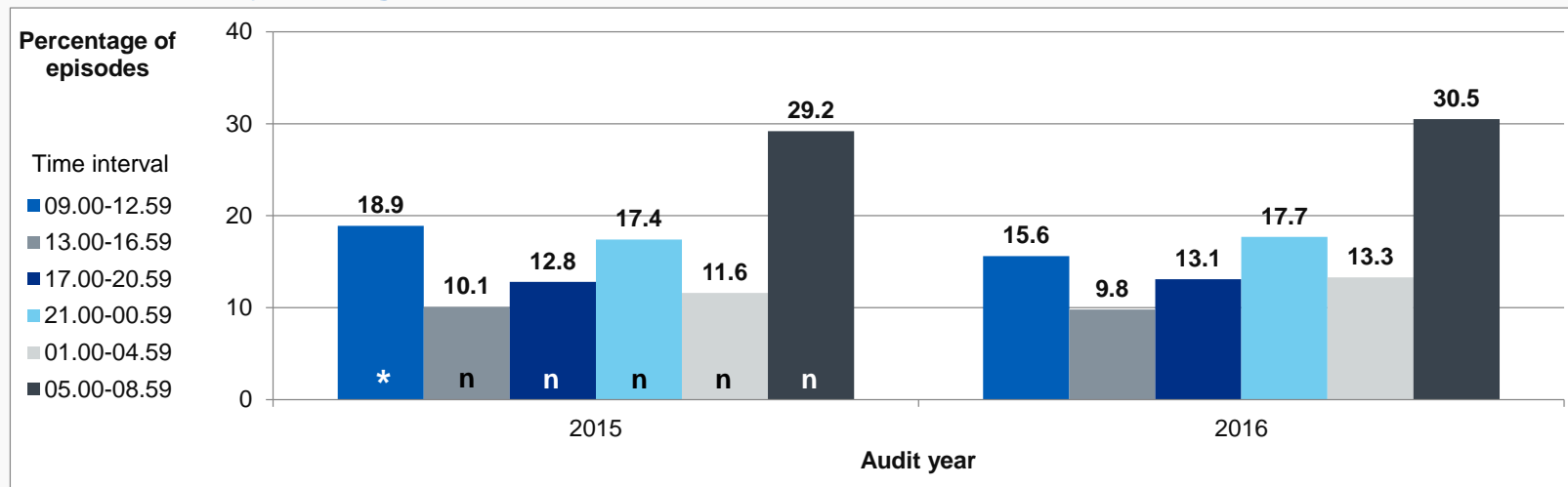
Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Frequency of severe hypoglycaemia by time of day

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Figure 8.4: Percentage of severe hypoglycaemic episodes¹ during time intervals in the last 7 days, England and Wales, 2015-16



Time interval	Significant Difference (p <0.05) 2015 to 2016
• 09:00-12:59	Down
• 13:00-16:59	No change
• 17:00-20:59	No change
• 21:00-00:59	No change
• 01:00-04:59	No change
• 05:00-08:59	No change

Findings

- The highest proportion of severe hypoglycaemic episodes took place between 05:00am and 08:59am (30 per cent), which is suggestive of **nocturnal hypoglycaemia**.
- Since 2015 there has been a small **decrease** in the proportion of severe hypoglycaemic episodes taking place between 09:00am and 12:59am.

Notes:

1. Severe hypoglycaemic episode = blood glucose measurement of <3.0mmol/L.

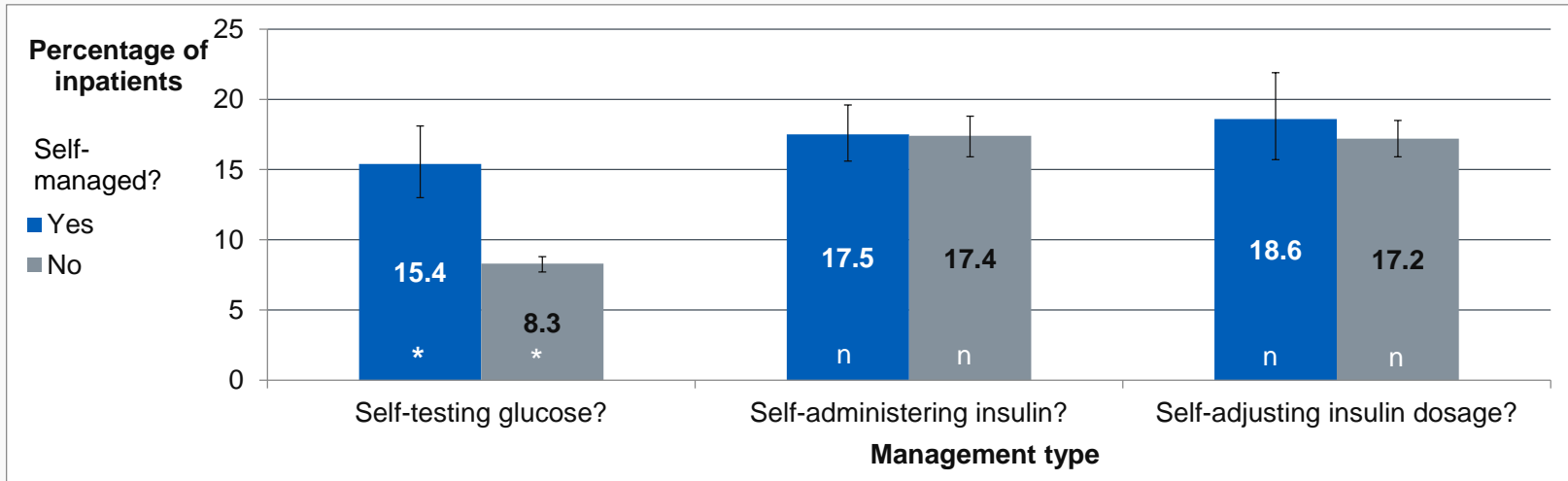
[^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).



Hypoglycaemic episodes and self-management

Figure 8.5: Inpatients having one or more severe hypoglycaemic episode¹ in last 7 days: by type of blood glucose management, England and Wales, 2016



Likelihood of severe hypo (p <0.05)		
Self-testing glucose	Self-administering insulin	Self-adjusting insulin dosage
More likely	No difference	No difference

- Inpatients that self-administer and those that self-adjust their insulin are **no more likely** to have a severe hypoglycaemic episode.

Findings

- Inpatients that self-test their glucose are **more likely** to report severe hypoglycaemic episodes. This may be because they can self-test when symptoms arise. Other patients might just eat or drink something without a confirmatory test.

Notes:

1. Severe hypoglycaemic episode = blood glucose measurement of <3.0mmol/L. * = statistically significant at the 0.05 level ('Yes' vs. 'No'). n = not statistically significant ('Yes' vs. 'No'). **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Hypoglycaemic episodes:

Clinical comment and recommendations

i

- The progressive reduction in total, mild and severe hypoglycaemic episodes overall and for all groups combined demonstrates how NaDIA tracks and drives change.
- It is noteworthy to see that severe hypoglycaemia has reduced, particularly in patients with Type 1 diabetes.
- The need for rescue treatment with injectable treatment has for the first time fallen this year compared with the first year covering England and Wales (NaDIA 2011).
- Although the reduction in the numbers of people having hypoglycaemic episodes is welcome, the substantial proportion of people still experiencing severe hypos indicates that more work needs to be done.

NaDIA team

Recommendations:

Care providers:

- Benchmark their outcomes against the national reduction in hypoglycaemia.

Healthcare professionals:

- Measures should be taken to prevent nocturnal hypoglycaemia, including the introduction of bed time snacks.



9. Inpatient-onset hyperglycaemic emergency

Inpatient-onset hyperglycaemic emergency: Overview



Audit question:

What proportion of people with diabetes develop diabetic ketoacidosis (DKA) or hyperosmolar hyperglycaemic state (HHS) after their admission to hospital?

Why is this important?

DKA and HHS are serious conditions which can have very serious consequences for the patient. They are generally preventable and should not arise during a hospital admission.

DKA mainly occurs in people with Type 1 diabetes when a severe lack of insulin means the body cannot use glucose for energy, and the body starts to break down other body tissue as an alternative energy source¹. The development of DKA after admission suggests that the inpatient's insulin treatment was omitted for an appreciable time.

HHS mainly occurs in people with Type 2 diabetes who experience very high blood glucose levels (often over 40mmol/l). It can develop over a course of weeks through a combination of illness (e.g. infection) and dehydration. HHS is a potentially life-threatening emergency² and should not develop in hospital.

Key Findings

- Around **1 in 25** inpatients with Type 1 diabetes develop DKA during their hospital stay (4.4 per cent).
- Around **1 in 500** inpatients with Type 2 diabetes develop HHS during their hospital stay (0.2 per cent).

Notes:

1. Diabetes UK: https://www.diabetes.org.uk/Guide-to-diabetes/complications/Diabetic_Ketoacidosis/

2. Diabetes UK: https://www.diabetes.org.uk/Guide-to-diabetes/complications/Hyperosmolar_Hyperglycaemic_State_HHS/



Inpatient-onset hyperglycaemic emergency

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Figure 9.1: Proportion of inpatients with Type 1 diabetes that develop DKA during their hospital stay¹, England and Wales, 2011-16

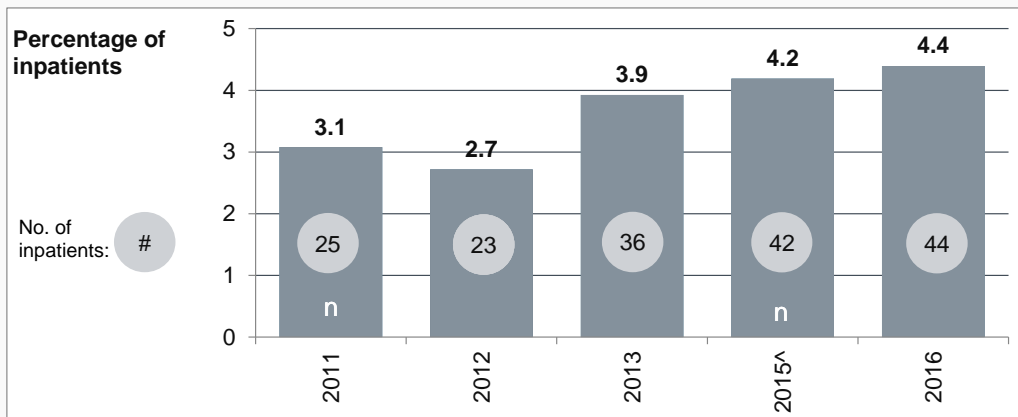
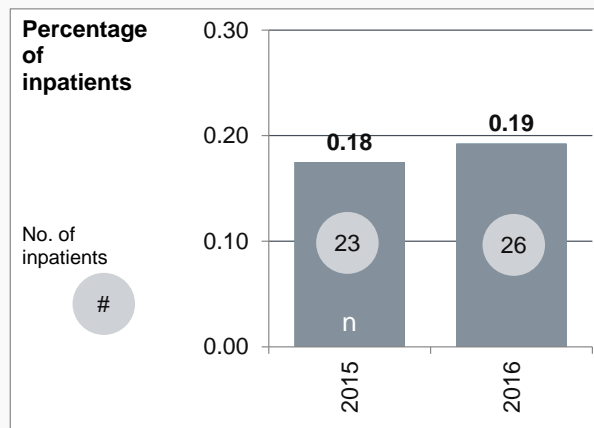


Figure 9.2: Proportion of inpatients with Type 2 diabetes that develop HHS during their hospital stay¹, England and Wales, 2015-16



Findings

- Around **1 in 25** inpatients with Type 1 diabetes develop DKA during their hospital stay (4.4 per cent).
- Around **1 in 500** inpatients with Type 2 diabetes develop HHS during their hospital stay (0.2 per cent).
- There has been **no change** in the incidence of DKA or HHS since data collection began.

Comparison	Significant Difference (p < 0.05)	
	DKA	HHS
2011 to 2016	No change	Not collected
2015 to 2016	No change	No change

Notes: 1. DKA = Diabetic Ketoacidosis. HHS = Hyperosmolar Hyperglycaemic State.

[^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).



Inpatient-onset hyperglycaemic emergency: Clinical comment and recommendations

i

Since 2011 there has been no significant change in hospital-acquired DKA and HHS¹, two serious inpatient diabetes harms.

NaDIA team



Recommendations:

Diabetes Teams:

- Record all hospital-acquired DKA and HHS¹ as Serious Incidents and undertake Root Cause Analysis².

Notes:

1. DKA = Diabetic Ketoacidosis. HHS = Hyperosmolar Hyperglycaemic State.

Diabetes UK: https://www.diabetes.org.uk/Guide-to-diabetes/complications/Diabetic_Ketoacidosis/

Diabetes UK: https://www.diabetes.org.uk/Guide-to-diabetes/complications/Hyperosmolar_Hyperglycaemic_State_HHS/

2. NHS England: [Serious Incidents Framework](#).



10. Inpatient-onset of diabetic foot lesions

Inpatient-onset of diabetic foot lesions: Overview



Audit question:

What proportion of people with diabetes develop diabetic foot lesions after their admission to hospital?

Why is this important?

Patients with diabetes are at a higher risk of developing foot lesions because of associated blood flow and nerve problems. If a foot lesion develops it can quickly result in severe problems for the patient, particularly when they are already not well and have been admitted to hospital for another reason.

No patient should deteriorate enough, while under a hospital's care, that they develop a new instance of a foot lesion.

How is this measured?

For each patient with a Bedside Audit, it was recorded whether they had developed a foot lesion during their admission.

These proportions were considered by comparing between patients with different types of diabetes.

Key Findings

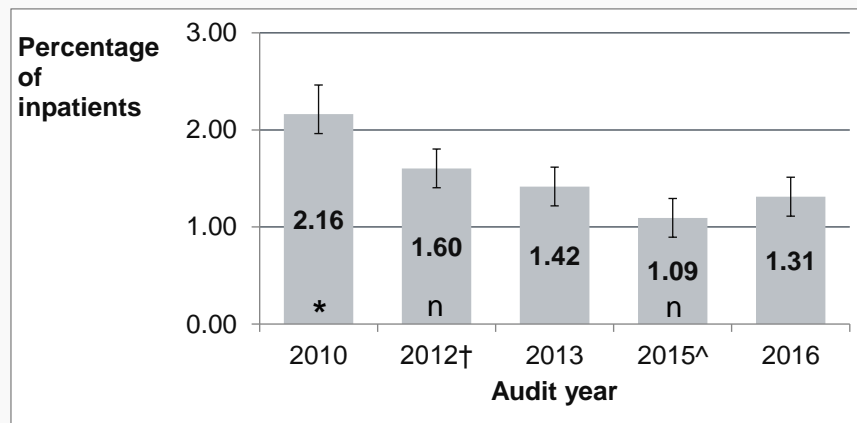
- Around **1 in 75** inpatients with diabetes develop a foot lesion during their hospital stay (1.4 per cent).
- The proportion developing a foot lesion has **decreased** since 2010 from 2.2 per cent to 1.3 per cent (England only).
- However, foot lesion development has **increased** slightly since 2015 from 1.1 per cent to 1.4 per cent – largely amongst people with non-insulin treated Type 2 diabetes.



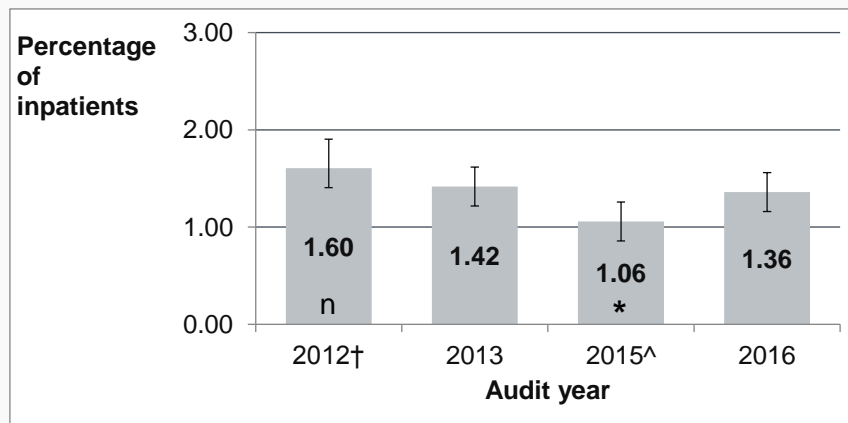
Inpatient-onset of diabetic foot lesions (1)

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Figure 10.1: Percentage of inpatients who developed a foot lesion during admission: England only, 2010-16



England and Wales combined, 2012-16



Cohort	Number of inpatients				
	2010	2012†	2013	2015^	2016
England and Wales	-	210	196	153	203
England only	257	195	183	147	183

Cohort	Significant Difference (p <0.05)		
	2010 to 2016	2012 to 2016	2015 to 2016
England and Wales	Not available	No change	Up
England only	Down	No change	No change

Findings

- **1 in 75** inpatients with diabetes develop a foot lesion during their hospital stay (1.4 per cent).
- The proportion of English inpatients with diabetes developing a foot lesion in their admission has **decreased** since 2010 (from 2.2 to 1.3 per cent).
- However, the proportion developing a foot lesion has **increased** across England and Wales since 2015 NaDIA (from 1.1 to 1.4 per cent).

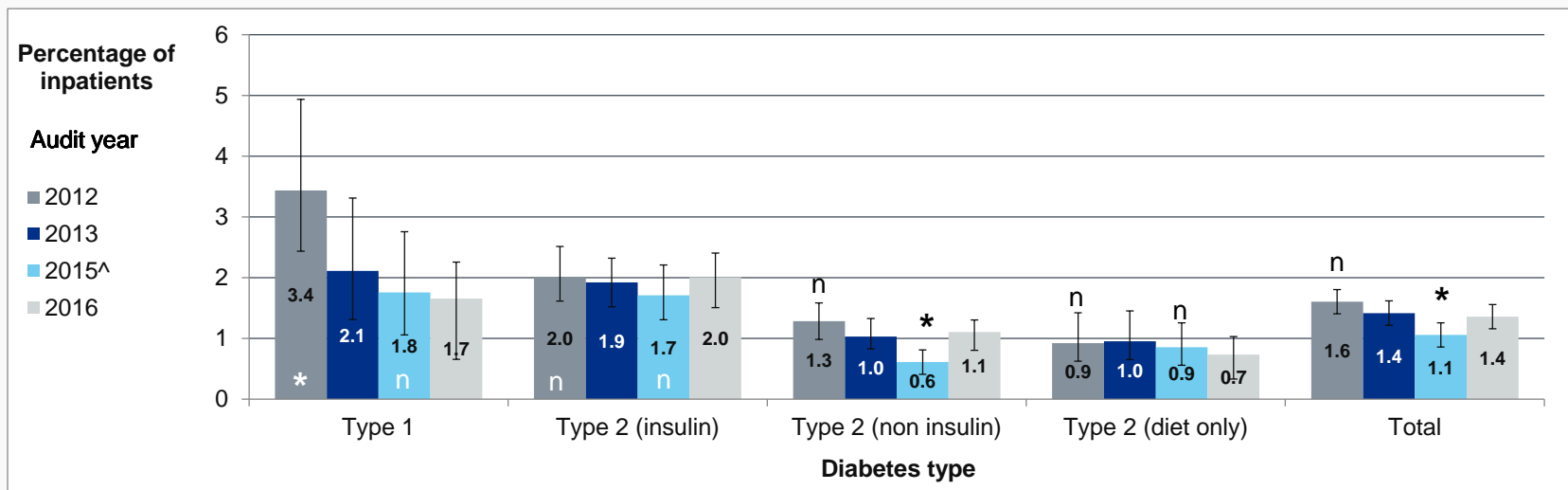
Notes: † Data not collected in 2011. ^ There was no audit collection or report in 2014, so 2014 data is not available.
 * = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).
 Green text = trend broadly 'good'. Red text = trend broadly 'bad'.



Inpatient-onset of diabetic foot lesions (2)

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Figure 10.2: Percentage of inpatients who developed a foot lesion during their admission: by diabetes type, England and Wales, 2012-16



Diabetes type	Significant Difference (p <0.05)	
	2012 to 2016	2015 to 2016
• Type 1	Down	No change
• Type 2 (insulin)	No change	No change
• Type 2 (non insulin)	No change	Up
• Type 2 (diet only)	No change	No change
• Total	No change	Up

Findings

- Inpatient-onset of foot lesions amongst people with Type 1 diabetes has **halved** since 2012 (from 3.4 to 1.7 per cent).
- Foot lesion development has **increased** amongst inpatients with non-insulin treated Type 2 diabetes since 2015 (from 0.6 to 1.1 per cent).

Notes: [^] There was no audit collection or report in 2014, so 2014 data is not available.

* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Inpatient-onset of diabetic foot lesions: Clinical comment and recommendations

i

2015 saw a significant reduction in hospital-acquired foot lesions which was not sustained in 2016. This was largely due to a rise in lesions occurring in patients with Type 2 diabetes, perhaps reflecting the increasing age of the Type 2 inpatient population, with age being an important risk factor.

NaDIA team

Recommendations:

Diabetes Teams:

- Continue to highlight screening of diabetes admissions for risk of hospital-acquired foot lesions and introduce preventative measures in those found to be at risk, using NICE guidance [[NG19](#)] as a framework.

Care providers:

- Hospitals should report all hospital-acquired foot lesions occurring in people with diabetes separately from 'NHS Safety Thermometer' reports of hospital-acquired pressure ulcers.
- Hospitals should include these reports in regular diabetes Mortality and Morbidity meetings and annual audits.



11. Inpatient diabetic foot assessment and management

Foot disease management: Overview



Audit questions: Does the hospital have a Multi-disciplinary Foot Care Team (MDFT)?

Do people with diabetes receive timely foot risk examinations?

Why is this important? Foot problems and the development of foot ulcers are relatively common in people with diabetes. It is important that hospitals have the expertise to quickly identify and treat foot problems amongst people with diabetes to prevent serious harms developing whilst the patient is in hospital.

How is this measured? Hospitals reported whether they had an MDFT on site, and whether they had initiatives to promote diabetic foot examinations. Details of the patients admission, including whether and when they had a foot risk assessment, were recorded in the Bedside Audit.

The proportion of people receiving foot examinations, those being seen by the MDFT and those developing foot lesions, were compared between groups of patients and hospital characteristics.

Key Findings

- Almost **one quarter** of hospital sites do not have a Multi-disciplinary Foot Care Team (24 per cent).
- Less than **one third** of inpatients with diabetes have a specific diabetic foot risk examination within 24 hours (30 per cent).
- Inpatients with diabetes that attend a hospital that uses 'Putting Feet First' or NICE¹ inpatient foot guidance are **more likely** to have a diabetic foot risk examination and to be seen by the MDFT.

'Each hospital should have a care pathway for people with diabetic foot problems who need inpatient care ... [and] ... refer the person to the multidisciplinary foot care service within 24 hours of the initial examination of the person's feet'

NICE guidelines, NG19, January 2016



Admissions for and with foot disease

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Table 11.1: Proportion of inpatients with diabetic foot disease, England and Wales, 2011-16

Percentage of patients who:	2011	2012	2013	2015^	2016
• Had a history of foot disease on admission	12.2 n	12.8	12.6	12.8 n	12.1
• Had active foot disease on admission	9.1 n	9.3	9.2	8.9 n	9.0
• Were admitted for active foot disease	4.3 n	3.8	3.8	4.5 n	4.3

Foot disease	Significant Difference (p < 0.05)	
	2011 to 2016	2015 to 2016
History of	No change	No change
<u>With</u> active	No change	No change
<u>For</u> active	No change	No change

Findings

- Almost **1 in 10** inpatients with diabetes had active foot disease on admission (9 per cent). Almost **1 in 20** were admitted for active foot disease (4 per cent).
- There has been **no change** in the proportion of inpatients affected by diabetic foot disease since audit inception (12 to 13 per cent).

Notes: ^ There was no audit collection or report in 2014, so 2014 data is not available.

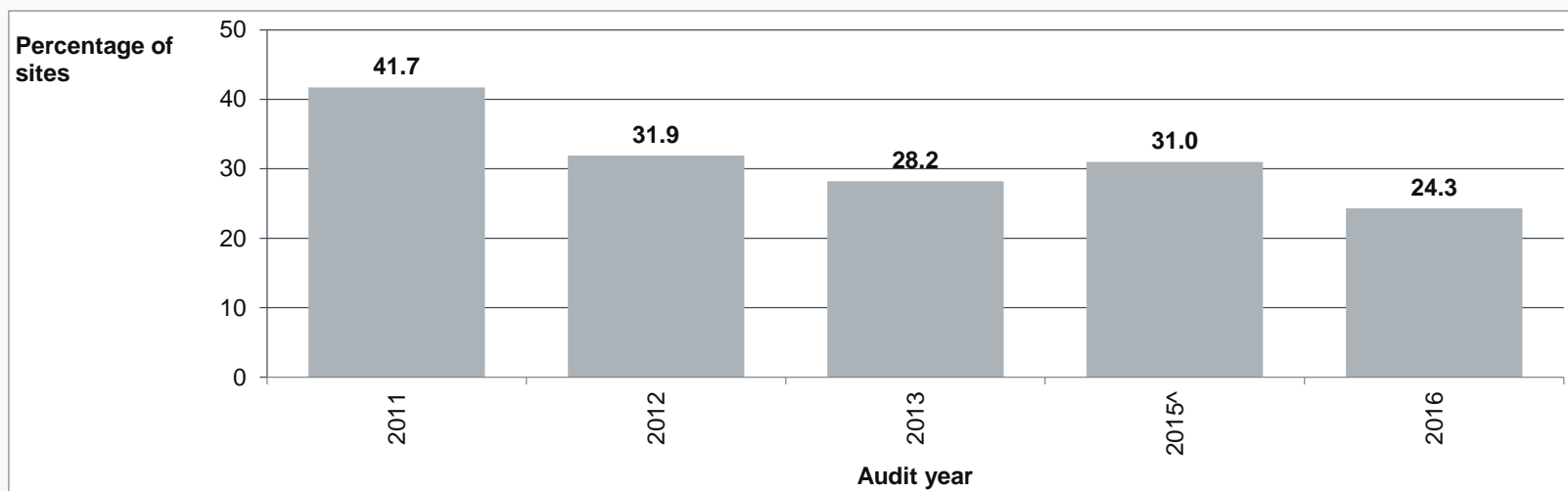
* = statistically significant at the 0.05 level (vs. current audit year). n = not statistically significant (vs. current audit year).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Multi-disciplinary Foot Care Team

Figure 11.1: Percentage of sites not having a Multi-disciplinary Foot Care Team, England and Wales, 2011-16



Findings

- Almost **one quarter** of hospital sites do not have a Multi-disciplinary Foot Care Team (24 per cent).
- The proportion of hospital sites not having a Multi-disciplinary Foot Care Team has **decreased** by 17 percentage points since 2011.

Notes:

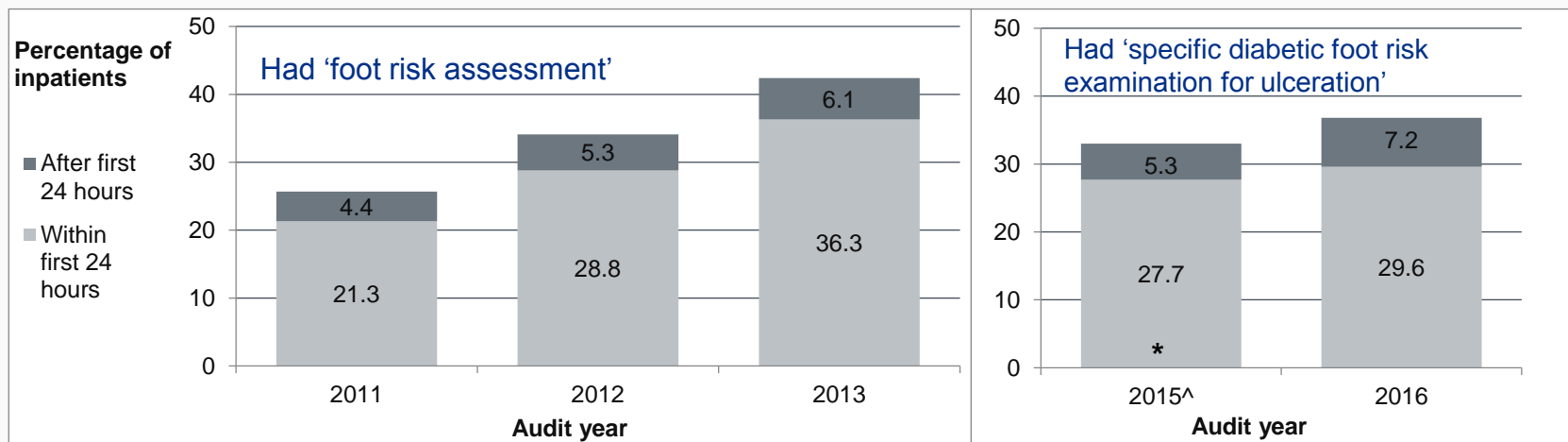
^ There was no audit collection or report in 2014, so 2014 data is not available.

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Diabetic foot risk assessment

Figure 11.2: Percentage of inpatients having a specific diabetic foot risk examination for ulceration¹ during their hospital stay, England and Wales, 2011-16



Significant Difference (p < 0.05)	
2011 to 2016	2015 to 2016
Not comparable	Up

Findings

- Less than **one third** of inpatients with diabetes have a specific diabetic foot risk examination within 24 hours (30 per cent).
- The proportion of inpatients having an assessment within 24 hours has **increased** by 2 percentage points since 2015 NaDIA.
- The proportion of inpatients having an assessment at any time has **increased** by 4 percentage points since 2015 NaDIA.

Notes: 1. Note that there were definitional changes for the 2015 NaDIA. The 2013 Bedside Audit form asked whether the inpatient had undergone a "foot risk assessment" only. The version from 2015 onwards adds more detail, specifying that a "specific diabetic foot risk (for ulceration) examination" took place, with an additional caveat excluding "Waterlow score, Norton score and similar general pressure sore checks".

* = 'Within first 24 hours' statistically significant at the 0.05 level (vs. current audit year).

n = 'Within first 24 hours' not statistically significant (vs. current audit year). **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Impact of 'Putting Feet First'

Table 11.2: Diabetic foot assessment and foot lesion development during admission: by usage of 'Putting Feet First' or NICE guidance, England and Wales, 2016

Percentage of inpatients that:	Using 'Putting Feet First' or NICE inpatient foot guidance	Not using 'Putting Feet First' or NICE inpatient foot guidance
• Had diabetic foot risk examination <24hr after admission	35.8 *	22.2 *
• Had diabetic foot risk examination at any time after admission (including <24hr)	44.2 *	27.1 *
• Were admitted for foot disease and seen by a member of the MDFT <24hr after admission ²	58.6 *	42.2 *
• Were admitted for foot disease and seen by member of MDFT in the last 7 days ²	63.5 *	50.9 *
• Developed new foot lesion during admission	1.3 n	1.1 n

Event	Significant Difference (p <0.05)	
	'PFF'/NICE used	'PFF'/NICE not used
• Foot risk exam <24hr	More likely	Less likely
• Foot risk exam (any time)	More likely	Less likely
• Seen by MDFT <24hr ²	More likely	Less likely
• Seen by MDFT 7 days ²	More likely	Less likely
• Foot lesion developed	No difference	No difference

Findings

- Inpatients with diabetes that attend a hospital that uses 'Putting Feet First' or NICE inpatient foot guidance are **more likely** to have a diabetic foot risk examination and to be seen by the MDFT.
- There is **no difference** in the proportion of inpatients that develop a foot lesion during their hospital stay.

Notes: 1. Diabetes UK: [Putting Feet First](#); NICE (2015) NG19: [Diabetic foot problems: prevention and management](#)

Last updated: January 2016. **Green** text = trend broadly 'good'. 2. MDFT = Multi-disciplinary Foot Care Team.

* = statistically significant at the 0.05 level (Using vs. not using...). n = not statistically significant (Using vs. not using...).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Impact of systems to increase foot examinations

Table 11.3: Diabetic foot assessment and foot lesion development during admission: by usage of systems to increase foot examinations, England and Wales, 2016

Percentage of inpatients that:	With tools/systems to increase foot examinations	Without tools/systems to increase foot examinations
• Had diabetic foot risk examination <24hr after admission	34.7 *	21.8 *
• Had diabetic foot risk examination at any time after admission (including <24hr)	43.3 *	26.9 *
• Were admitted for foot disease and seen by a member of the MDFT <24hr after admission ¹	55.5 n	56.4 n
• Were admitted for foot disease and seen by member of MDFT in the last 7 days ¹	60.5 n	65.2 n
• Developed new foot lesion during admission	1.4 n	1.3 n

Event	Significant Difference (p < 0.05)	
	Systems used	Systems not used
• Foot risk exam <24hr	More likely	Less likely
• Foot risk exam (any time)	More likely	Less likely
• Seen by MDFT <24hr ¹	No difference	No difference
• Seen by MDFT 7 days ¹	No difference	No difference
• Foot lesion developed	No difference	No difference

Findings

- Inpatients with diabetes that attend a hospital that uses tools or systems to increase the number of foot examinations are **more likely** to have a diabetic foot risk examination.
- There is **no difference** in the proportion of inpatients that were seen by an MDFT or develop a foot lesion during their hospital stay.

Notes: 1. MDFT = Multi-disciplinary Foot Care Team.

* = statistically significant at the 0.05 level (Using vs. not using...). n = not statistically significant (Using vs. not using...).

Green text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Foot disease management:

Clinical comment and recommendations

i

- Since 2011 there has been an increase in the proportion of sites with a Multi-disciplinary Foot Care Team (MDFT) but 24 per cent still do not comply with NICE guidance.
- Although there has been an improvement in the percentage of patients receiving a specific diabetic foot risk examination for ulceration, this remains less than 40 per cent.
- The percentage of hospital-acquired foot ulceration between sites that use 'Putting Feet First'/NICE guidance¹ and/or systems to increase foot examinations is not lower. However, this may reflect better ulcer identification and reporting at these sites.

NaDIA team

Recommendations:

- Implementation initiatives to improve foot examination on admissions and NICE guidance¹ are associated with better processes and should be implemented in all NHS Trusts and Local Health Boards.



National Diabetes Inpatient Audit 2016

12. Patient experience



Patient experience: Overview

Audit questions: Did patients have a favourable experience of their inpatient stay?
Has this changed in comparison to earlier audits?

How is this measured?

Patients were asked to complete a questionnaire on their experience during their hospital stay, with particular reference to their diabetes care. The responses were weighted to account for patients that were more or less likely to complete a questionnaire.

Patients answered questions on care management, their opportunity to participate in their own care, the appropriateness of their meals, the staff who had looked after them, their overall satisfaction and what aspects of their care could be improved.

Why is this important?

Clinical staff should work with the patient to ensure their hospital stay is as satisfactory as possible, empowering them to take control and become involved in their care planning wherever possible. The patient's expertise related to the effective management of their condition should be considered wherever possible and integrated into their care plan.

The timely provision of suitable food is integral to good diabetes management.

Key Findings

- Inpatient perception of meal choice and timing has **declined** since 2011.
- **5 out of 6** inpatients were satisfied or very satisfied with their diabetes care during their hospital stay (84 per cent).
- Patients thought it was more important to improve staff knowledge of diabetes than any other area for potential improvement (26 per cent).

“Even though we know the importance of suitability and timing of meals for people with diabetes, I am disappointed to see that more patients have reported the unsuitability of meal choices and many are unhappy about the timing of meals. I would like to understand why this is the case and what can be done about it?”

Maureen, who has Type 1 diabetes

Notes:

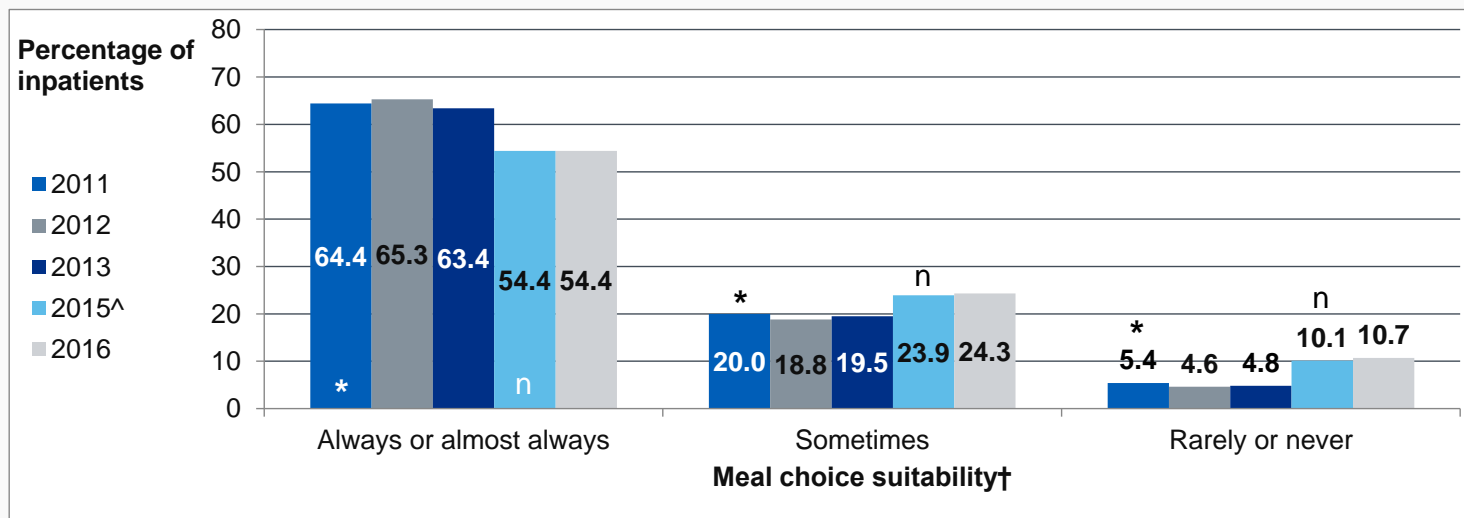
Green text = trend broadly 'good'.

Red text = trend broadly 'bad'.



Patient experience: Meal choice

Figure 12.1: Inpatients' views on how often the meal choice was suitable for their diabetes, England and Wales, 2011-16



Meals choice suitable?	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Always or almost always	Down	No change
• Sometimes	Up	No change
• Rarely or never	Up	No change

Findings

- **1 in 9** inpatients were rarely or never satisfied with their meal choice (11 per cent).
- Patient perception of the suitability of hospital meal choice has **declined** since 2011 (from 64 to 54 per cent).

Notes: ^ There was no audit collection or report in 2014, so 2014 data is not available.

† The values for each year do not add up to 100 per cent as "Don't know/Can't remember" responses have not been included.

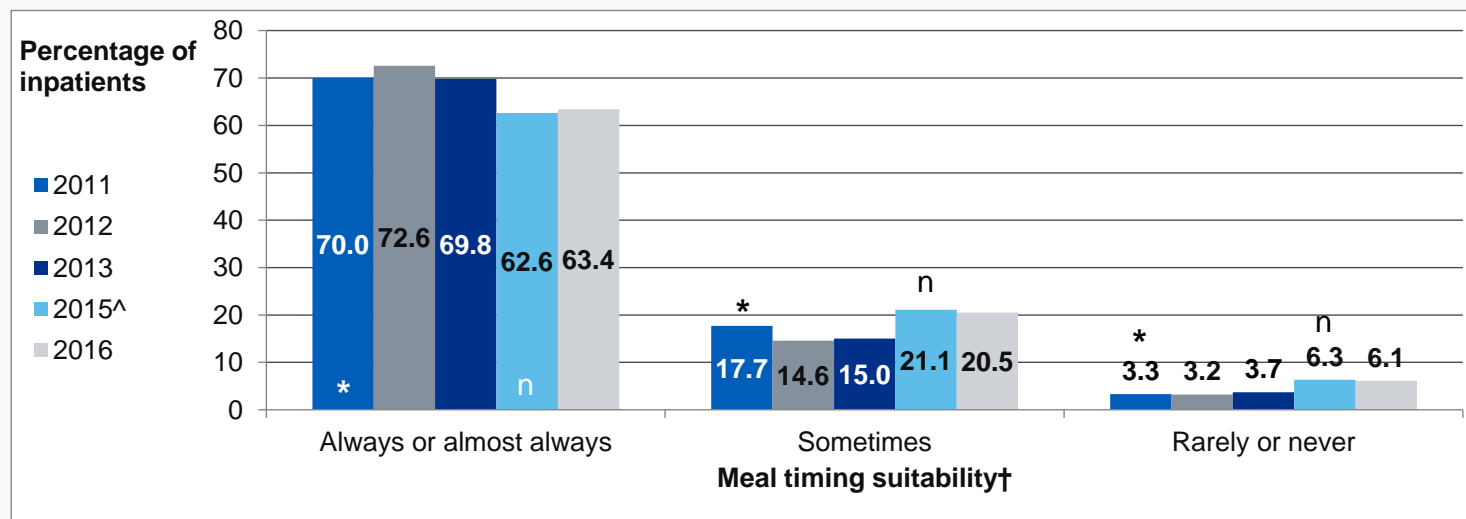
* = statistically significant at the 0.05 level (vs. current audit year), deft = 2.

n = not statistically significant (vs. current audit year), deft = 2. **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Patient experience: Meal timing

Figure 12.2: Inpatients' views on how often the meal timing was suitable for their diabetes, England and Wales, 2011-16



Meals timing suitable?	Significant Difference (p <0.05)	
	2011 to 2016	2015 to 2016
• Always or almost always	Down	No change
• Sometimes	Up	No change
• Rarely or never	Up	No change

Finding

- Patient perception of the suitability of hospital meal timing has **declined** since 2011 (from 70 to 63 per cent).

Notes: ^ There was no audit collection or report in 2014, so 2014 data is not available.

† The values for each year do not add up to 100 per cent as "Don't know/Can't remember" responses have not been included.

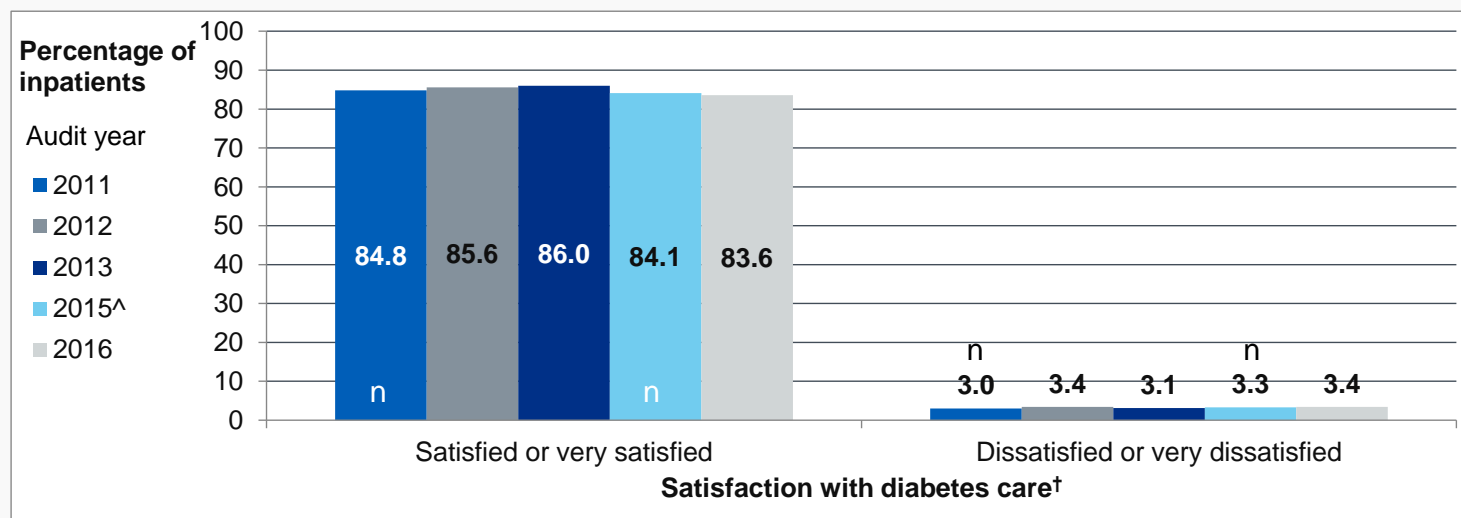
* = statistically significant at the 0.05 level (vs. current audit year), df = 2.

n = not statistically significant (vs. current audit year), df = 2. **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Patient experience: Overall satisfaction i

Figure 12.3: Inpatients' views of their overall satisfaction with their diabetes care while in hospital, England and Wales, 2011-16



Overall satisfaction	Significant Difference (p < 0.05)	
	2011 to 2016	2015 to 2016
• Satisfied or very satisfied	No change	No change
• Dissatisfied or very dissatisfied	No change	No change

Findings

- **5 out of 6** inpatients are satisfied with their inpatient stay (84 per cent).
- There has been **no change** in overall satisfaction since 2011.

Notes: [^] There was no audit collection or report in 2014, so 2014 data is not available.

[†] The values for each year do not add up to 100 per cent as "Neither satisfied or dissatisfied" responses have not been included.

* = statistically significant at the 0.05 level (vs. current audit year), deft = 2.

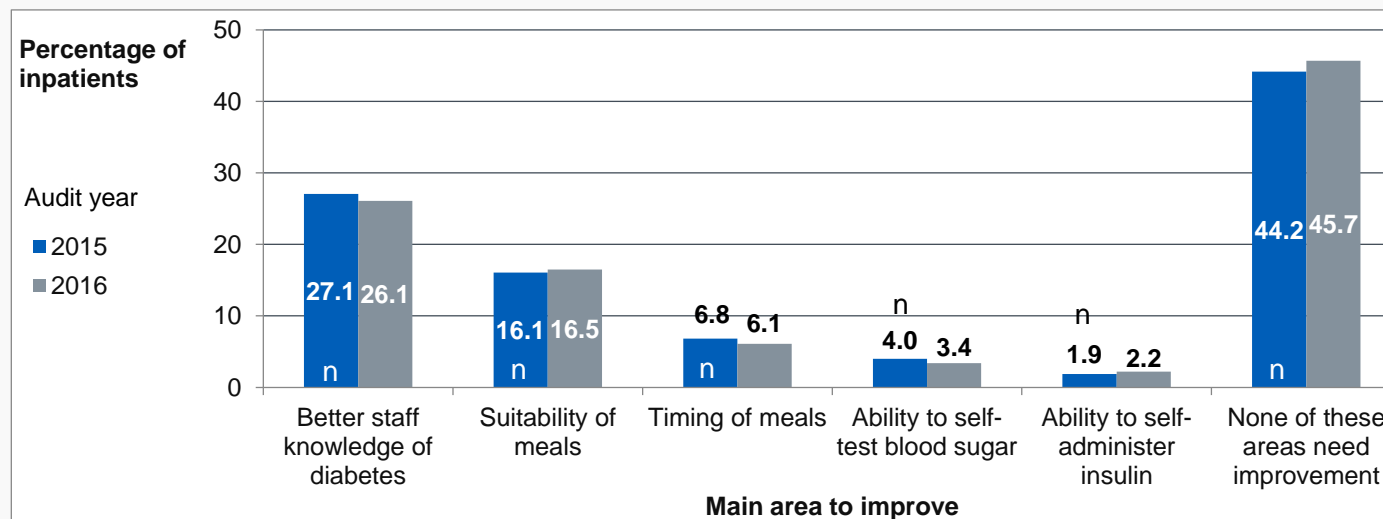
n = not statistically significant (vs. current audit year), deft = 2. **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Patient experience:

Main area for improvement (1)

Figure 12.4: Inpatients' views of the areas of diabetes care they feel is most important for the hospital to improve, England and Wales, 2015-16



Main area for improvement	Significant Difference (p <0.05)
	2015 to 2016
Better staff knowledge of diabetes	No change
Suitability of meals	No change
Timing of meals	No change
Ability to self-test blood sugar	No change
Ability to self-administer insulin	No change
None of these areas need improvement	No change

Findings

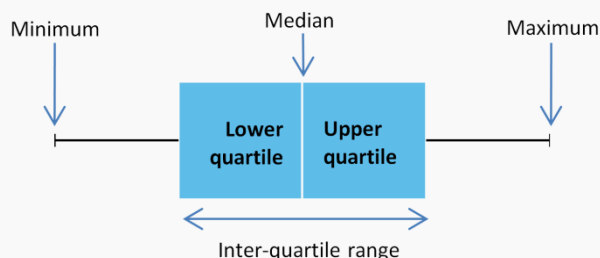
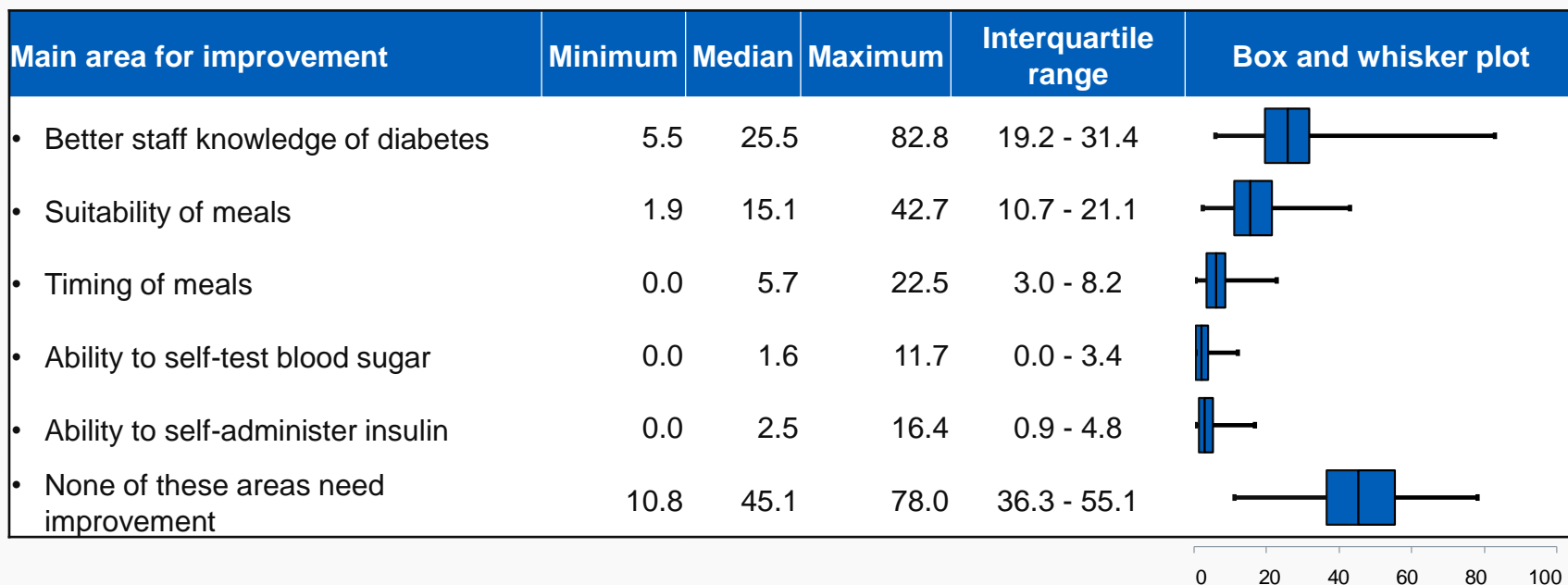
- **46 per cent** of inpatients thought that **none** of the specified areas required improvement.
- Over **1 in 4** inpatients identified better staff knowledge as the main area for improvement (26 per cent).
- There has been **no change** in the proportions since NaDIA 2015.



Patient experience:

Main area for improvement (2)

Table 12.1: Variation in inpatients' views of the areas of diabetes care they feel is most important for the hospital to improve across hospital sites¹, England and Wales, 2016



Findings

- There is wide variation in the proportion of inpatients identifying staff knowledge as the main area for improvement.
- There is wide variation in the proportion of inpatients identifying no areas for improvement.



Patient experience: Summary



Table 12.2: Trends in inpatients' views of their hospital stay, England and Wales, 2011-16

Inpatients with mainly positive views of...	2011	2012	2013	2015^	2016	Significant difference (p <0.05)	
						2011 to 2016	2015 to 2016
• Involvement in care planning ¹	-	-	43.1	44.7 n	45.4	-	No change
• Ability to take control of their diabetes	56.6 *	55.5	54.7	59.2 n	59.9	Up	No change
• Extent that preferences for diabetes treatment taken into account	93.3 *	93.7	81.5	85.9 n	85.8	Down	No change
• Ability to self-administer insulin	59.2 n	58.5	57.2	56.5 n	55.3	No change	No change
• Ability to test own blood sugar ²	17.2 n	17.1	15.7	17.1 n	16.1	No change	No change
• Meal choice	64.4 *	65.3	63.4	54.4 n	54.4	Down	No change
• Meal timing	70.0 *	72.6	69.8	62.6 n	63.4	Down	No change
• Staff awareness of patient's diabetes	84.6 n	81.7	81.7	84.4 n	83.7	No change	No change
• Staff knowledge of diabetes	66.8 n	69.1	67.5	65.7 n	64.7	No change	No change
• Staff ability to answer questions on diabetes	77.9 n	79.4	78.8	81.6 n	81.0	No change	No change
• Overall care for diabetes	84.8 n	85.6	86.0	84.1 n	83.6	No change	No change

Findings

- Inpatient perception of meal choice, meal timing and the extent their preferences were taken into account have all **worsened** since 2011.
- There has been **no change** in inpatients' views of their hospital stay since NaDIA 2015.

Notes: 1. Changes to the questionnaire structure in 2013 mean that pre-2013 results are not comparable.

2. The denominator includes the category 'I do not need to test my blood sugar.' ^ There was no audit collection or report in 2014, so 2014 data is not available. * = statistically significant at the 0.05 level (vs. current audit year), deft = 2. n = not statistically significant (vs. current audit year), deft = 2. **Green** text = trend broadly 'good'. **Red** text = trend broadly 'bad'.



Patient experience: Variation between sites

Table 12.3: Variation in inpatients' views on their hospital stay across hospital sites¹, England and Wales, 2016

Inpatients with mainly positive views of...	Minimum	Median	Maximum	Interquartile range	Box and whisker plot
• Involvement in care planning	11.0	44.4	72.0	37.1 - 52.3	
• Ability to take control of their diabetes	29.0	60.5	81.4	52.9 - 66.5	
• Extent that preferences for diabetes treatment taken into account	62.0	86.3	100.0	80.6 - 91.1	
• Ability to test own blood sugar ²	1.9	15.1	47.9	10.6 - 20.3	
• Meal choice	20.9	54.7	88.0	45.5 - 62.0	
• Meal timing	26.8	64.6	87.3	56.3 - 69.6	
• Staff awareness of patient's diabetes	59.3	84.7	100.0	79.8 - 88.9	
• Staff knowledge of diabetes	28.5	65.6	92.5	58.1 - 71.6	
• Staff ability to answer questions on diabetes	47.1	80.5	97.8	74.3 - 88.1	
• Overall care for diabetes	51.5	83.6	96.8	78.7 - 88.8	

Finding Variation is found in all patient experience measures at hospital site level.

0 20 40 60 80 100
100

Notes: 1. Sites with 20 or more applicable Patient Experience questionnaires (weighted to reflect inpatient profile). 2. See note 2 on previous [slide](#).



Patient experience:

Clinical comment and recommendations

i

- Patients' views on meal choice and meal timing remains less favourable than in 2011, 2012 and 2013. It is unclear as to why this has changed.
- On the positive side, patients report being more able to take control of their diabetes.

NaDIA team

Recommendations:

Care providers:

- Patient surveys may be needed to address the issue of hospital food.
- Variation in the apparent need for better staff knowledge requires further exploration.

Healthcare professionals: Encourage Diabetes Teams to involve patients in their care planning.



National Diabetes Inpatient Audit 2016

Glossary



Glossary – Diabetes type

Diabetes is a serious life-long health condition that causes a person's blood glucose (sugar) level to become too high. This occurs when there is not enough of the hormone insulin to manage blood glucose (BG) levels effectively. If untreated, diabetes leads to serious illness and death.

There are two main diabetes types:

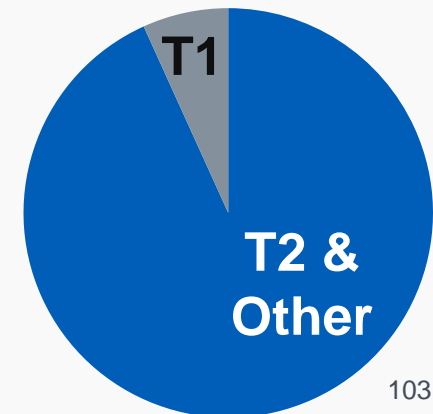
- **Type 1 diabetes** develops when the insulin-producing cells in the body have been destroyed and the body is unable to produce any insulin.

Type 1 diabetes accounts for about 10 per cent of all adults with diabetes (7 per cent of inpatients with diabetes) and is treated by daily insulin doses. Type 1 diabetes can develop at any age but usually appears before the age of 40, and especially in childhood¹.

- **Type 2 diabetes** develops when the insulin-producing cells in the body are unable to produce enough insulin, or when the insulin that is produced does not work properly (known as insulin resistance).

Type 2 diabetes usually appears in people over the age of 40, though it may appear at any age. Type 2 diabetes accounts for around 90 per cent of adults with diabetes (around 93 per cent of inpatients with diabetes)².

Inpatients with diabetes



Glossary – Diabetes treatments

There are a number of treatments available to help manage and control diabetes. All patients are different, so treatment will vary depending on individual needs¹.

- ❑ **Insulin:** Everyone with Type 1 diabetes, and some people with Type 2 diabetes, need to take insulin to control blood glucose (BG) levels¹.
- ❑ **Tablets:** Some people with Type 2 diabetes (and a minority with Type 1 diabetes) use tablets to help control their BG levels¹. Common tablet treatments include Biguanide (Metformin) and Sulphonylureas.
- ❑ **Lifestyle:** Type 2 diabetes can sometimes be controlled through healthy eating and increased exercise. However Type 2 diabetes is a progressive condition, and over time people with Type 2 diabetes may need medication (insulin or tablets) to help manage their BG levels.

For NaDIA analysis, inpatients with Type 2 diabetes are grouped into three sub-categories based on their treatment type:

- **Type 2 (insulin)**
- **Type 2 (non insulin)**
- **Type 2 (diet only)**

Inpatients with Type 1 diabetes are reported as a single group.



Glossary – NaDIA data collection

Data collection

Each participating hospital site identified all inpatients with diabetes and distributed questionnaires accordingly. Where the patient was able and willing a **Patient Experience** (PE) form was completed, as well as a **Bedside Audit** (BA) form which provided information on the patient's medical treatment taken from the patient's notes. The hospital team also completed a **Hospital Characteristics** (HC) questionnaire providing information on the hospital's resources and staffing structure.

Which patients are included in the audit?

A patient was included in the inpatient audit (NaDIA) if they had been admitted to a hospital 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.



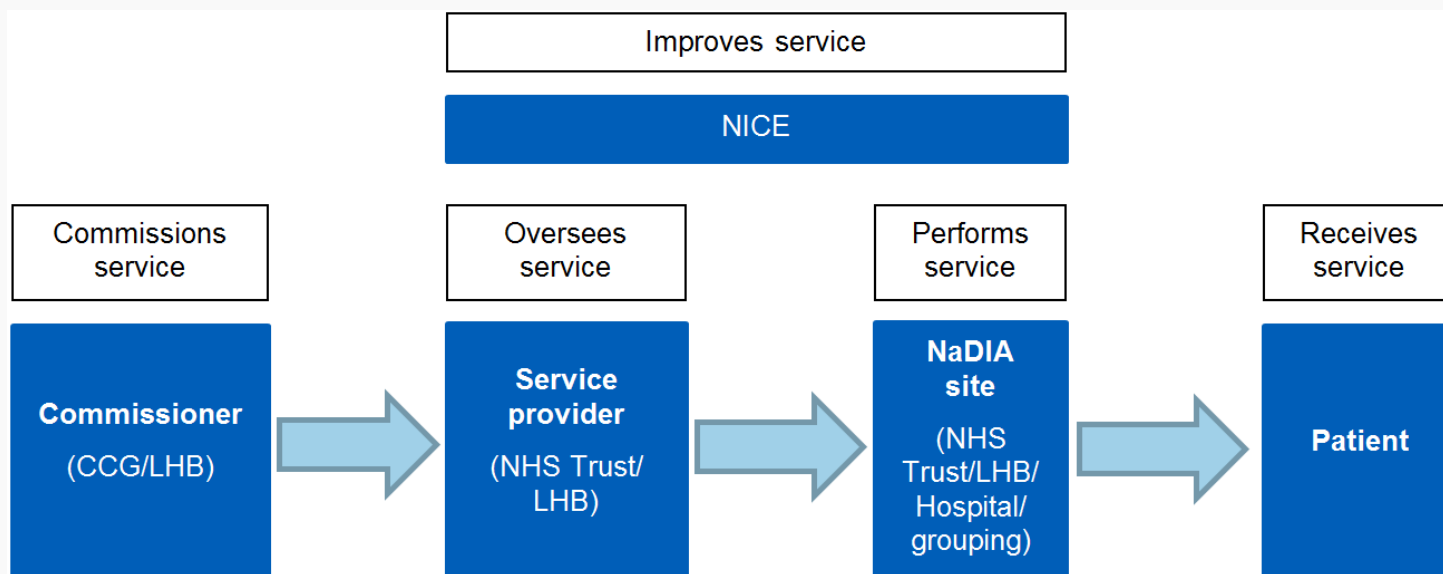
Glossary – Healthcare providers

NaDIA data is collected and submitted by [healthcare professionals](#) that work on applicable hospital wards in England and Wales.

For NaDIA Hospital Level Analysis, data is aggregated by NaDIA **site**, which may be an **NHS Trust**, Welsh **Local Health Board** (LHB), an individual hospital or a grouping of hospitals that have chosen to have their results aggregated together.

Commissioners decide what health services are needed and ensure that they are provided. Clinical Commissioning Groups (CCGs) in England and LHBs in Wales are responsible for commissioning healthcare services.

The National Institute for Health and Care Excellence (**NICE**) produces guidelines for the treatment of diabetic foot problems. All diabetes foot care services should follow these guidelines, so that people with diabetes receive the best possible foot care.



Glossary – Healthcare professionals

A wide variety of healthcare professionals are involved in the care of inpatients with diabetes, including (but not restricted to) the following professions:

- ❑ **Diabetes consultants** are senior hospital physicians who diagnose and treat patients with diabetes. Diabetes consultants are specialists in diabetology and endocrinology (the glands and hormones).
- ❑ **Diabetes specialist nurses** (DSN) work to meet the needs of people with diabetes and provide experience and expertise as part of dedicated Diabetes Teams. DSNs work wholly in diabetes care. A **diabetes specialist inpatient nurse** (DISN) provides hospital inpatient care¹.
- ❑ A **dietitian** is a healthcare professional with expertise in diet and nutrition. A **specialist diabetes dietitian** advises people with diabetes on the most suitable diet to control and manage their diabetes.
- ❑ **Podiatrists** are healthcare professionals that specialise in conditions of the feet and lower limbs. This includes the prevention, management and treatment of foot complications commonly experienced by people with diabetes (e.g. diabetic foot disease).
- ❑ **Diabetes specialist pharmacists** are healthcare professionals that specialise in the safe and effective management of medication for controlling and treating diabetes.



Glossary – Healthcare initiatives

Hospitals follow a variety of healthcare initiatives, which provide guidance and education on the provision of diabetes care:

Initiative type	Initiative name	Percentage of sites
JBDS ¹ guidelines	• DKA and hypoglycaemia guidance (2013)	65.5
	• Hypoglycaemia management in hospital (2013)	57.7
	• Management of adults with diabetes undergoing surgery (2011)	46.3
	• Self-management of diabetes in hospital (2012)	25.9
	• Hyperosmolar Hyperglycaemia State (2012)	44.6
	• Glycaemic management of enteral-fed stroke patients (2012)	25.7
	• Admission Avoidance (front door/AMU protocols) (2013)	9.3
	• Steroid use for inpatients with diabetes (2014)	20.6
	• Discharge planning (2014)	11.5
	• Variable rate insulin infusion (VRIII) for medical inpatients (2014)	44.1
Staff education	• Regular ward nurse diabetes training	68.4
	• NHS Diabetes e-learning on safe insulin use	54.3
	• NHS Diabetes e-learning on other diabetes topics	36.5
National initiatives	• NHS Institute for Innovation Think Glucose	50.3
	• End of Life Care Clinical Care Recommendations	34.7
	• NICE inpatient foot guidance	40.3
	• ‘Putting Feet First’	33.9
	• Best Practice Tariff for DKA	41.6
Safety initiatives	• Hypoglycaemia boxes	82.8
	• Insulin passport	77.9
	• Combined glucose monitoring/diabetes drug charts	44.6
	• Combined glucose monitoring/insulin infusion chart	65.8



Glossary – Healthcare technologies

Hospitals may use some or all of the following healthcare technologies which support inpatient care:

- ❑ An **Electronic Patient Record (EPR)** is a computer system designed to collect and store patients' clinical and health information in one place, replacing paper-based health records and multi-platform data collection. Hospital staff involved in patient care can access and update the EPR system at different points in the patient's care. A variety of EPR systems are used. About one third of hospitals use an EPR system.
- ❑ Hospital **electronic prescribing (EP)** is a computer system designed to allow prescriptions to be sent to pharmacies through IT systems, rather than through paper prescriptions. Almost one third of hospitals use EP.
- ❑ **Remote blood glucose monitoring (RBGM)** tools allow remote access to the measurement of patient blood glucose (BG) levels. Results can be transmitted to patients and caregivers in real time, providing an early warning if BG levels are outside the expected levels. Almost one half of hospitals use RBGM.



Glossary – Healthcare teams

“Specialists involved in the delivery of diabetes care must work in multidisciplinary teams for care to be truly effective. They should have received extensive training accredited at a national level¹.”

Diabetes UK

Healthcare professionals form multi-disciplinary specialist teams in hospitals to co-ordinate diabetes care, including (but not restricted to):

- ❑ Inpatient specialist **Diabetes Teams** co-ordinate diabetes care in hospitals. *Diabetes Teams usually consist of diabetes consultants, Diabetes Specialist (Inpatient) Nurses (DSN/DISN), podiatrists and dietitians, who will also work with other specialists who might also form part of the team (e.g. pharmacists and clinical psychologists).*
- ❑ Inpatient **Multi-disciplinary Foot Care Teams** (MDFT) co-ordinate diabetes footcare in hospitals. *MDFTs meet weekly and consist of a diabetes consultant (diabetologist), a podiatrist with skills in managing the diabetic foot and a surgeon (general, orthopaedic or vascular surgeon). MDFTs will also work with other specialists who might be incorporated into the team (e.g. DSN/DISNs, podiatrists, interventional radiologists, microbiologists, tissue viability nurses). About three quarters of hospitals have MDFTs.*

About half of hospitals host regular diabetes **Mortality and Morbidity meetings** (M&M) for healthcare professionals to discuss patient deaths and adverse incidents relating to diabetes. *At M&M meetings staff can discuss incidents in detail, report problems and share lessons to prevent the recurrence of adverse incidents. There may be separate diabetes M&M meetings or diabetes cases may be part of a general M&M meeting.*



Glossary – Blood glucose control

Blood glucose control is one of the main challenges faced by people with diabetes. Blood glucose (BG) levels should be as near to 'normal' as possible (based on a person who does not have diabetes):

- 6–8 mmol/L before meals; and less than 4–11 mmol/L after meals.

Individual target levels are agreed between the person and their diabetes team¹.

Blood glucose monitoring is required to ensure that BG levels remain in a safe range, thereby avoiding the onset of hypoglycaemic episodes, hyperglycaemia and other harms. Tools such as blood glucose meters can be used to check BG levels. Monitoring is particularly important in hospital because a patient's BG level may vary more than usual due to illness, treatment or changes to diet and diabetes care routines. It may also be more difficult for the person with diabetes to recognise changes to their BG level.

NaDIA collects information on inpatients' BG monitoring, 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 define **appropriate blood glucose monitoring**:

Patient status	Blood glucose testing frequency
Metformin or diet alone	1 or more/day
Long stay patient on diet and metformin with stable control	Once weekly or more
Insulin, SU, DPP-4 inhibitors, glitazones, SGLT-2 inhibitors and GLP-1 analogues	2 or more/day
Unwell, unstable diabetes or basal bolus insulin	4 or more/day

A '**good diabetes day**' is defined as a day on which the frequency of BG monitoring was appropriate, using the guidelines in the table above, and there was no more than one BG measurement greater than 11 mmol/L and no BG measurements less than 4 mmol/L.

BG **self-management** is where a person manages their own BG levels. This may involve **self-testing** their BG levels, **self-administering** insulin and/or **self-adjusting** their insulin dosage.



Glossary – Insulin infusion

An intravenous **insulin infusion** (IVII) is where insulin is directly administered into the inpatient's veins using a drip. IVII is used over a short period of time, generally seven days or less, as an alternative or supplement to subcutaneous (SC) injections of insulin or tablets. The purpose of IVII is to achieve safe insulin management during fasting/nil by mouth or to maintain blood glucose (BG) control during severe illness.

The safe and effective use of IVII is dependent on the diligence and expertise of healthcare professionals, who must:

- Take regular BG measurements and adjust the insulin dosage accordingly;
- Correctly manage the difficult transition from IVII back to SC insulin.

Mismanagement of either of these areas is dangerous and can lead to hypoglycaemia, hyperosmolar hyperglycaemic state (HHS) and even diabetic ketoacidosis (DKA).

NaDIA measure	Rationale
• Been on an infusion in the last 7 days	High rates of IVII may suggest that IVII is being used inappropriately
• Infusions considered inappropriate	Inappropriate use of IVII increases the risk of patient harms occurring.
• Infusions considered inappropriately long	To reduce the risk of patient harms, IVII should be used in hospital for short time periods only.
• Infusions that were 7 days or longer	
• Transfer to SC insulin not managed appropriately	The transition from IVII to SC insulin must be carefully managed to avoid the risk of patient harms occurring.
• Number of blood glucose measurements in the last 24 hours on infusion	BG levels should be monitored hourly to ensure the IVII dosage is appropriate.

Notes:

Joint British Diabetes Societies for Inpatient Care (2014) [The use of variable rate intravenous insulin infusion \(VRIII\) in medical inpatients.](#)



Glossary – Medication errors

Hospital inpatients have **drug charts** to record their prescribed medication. Some entries contain **medication errors**, which have the potential to cause or contribute towards patient harms (see [Glossary: Patient Harms](#)). Medication errors can be categorised by incident type (**prescription** or **medication management**) and medication type (**insulin** or OHA¹). A summary is shown in the table below:

Error description ¹	Error type			
• Insulin not written up	Insulin prescription error	Insulin error	Prescription error	Medication error
• Name of insulin incorrect				
• Number (dose) unclear				
• Unit abbreviated to 'u' or written unclearly				
• Insulin or prescription chart not signed by prescriber				
• Insulin not signed as given				
• Insulin given/prescribed at the wrong time	OHA prescription error	OHA error		
• OHA not signed as given				
• OHA given/prescribed at the wrong time				
• Wrong dose				
• OHA not written up	Insulin management error	Insulin error		
• Insulin not increased when persistent BG >11 mmol/L and better glycaemic control appropriate for this patient				
• Insulin not reduced if unexplained BG <4 mmol/L				
• Inappropriate omission of insulin after episode of hypoglycaemia	OHA management error	OHA error		
• No action taken when persistent BG >11 mmol/L and better glycaemic control appropriate				
• OHA not reduced if unexplained BG <4 mmol/L				
• Inappropriate omission of OHA after episode of hypoglycaemia				



Glossary – Patient harms

There are a variety of patient harms that people with diabetes may develop in hospital. These potentially life-threatening events are entirely preventable and strenuous efforts must be taken to avoid them.

NaDIA Team

A **hypoglycaemic episode** (a hypo) is a potentially dangerous drop in a patient's blood glucose (BG) to below 4.0 mmol/L. 'Normal' BG (normoglycemia) is typically between 4.0 and 8.0 mmol/L.

- A 'mild' hypo involves a BG level of between 3.0 and 3.9 mmol/L.
- A 'severe' hypo involves a BG level of less than 3.0 mmol/L.

A **hypoglycaemic episode requiring injectable treatment** (rescue treatment) occurs in severe cases of hypoglycaemia when the patient is unconscious and cannot take sugar by mouth. Rescue treatment is applied using an injection of glucose or Glucagon.

A patient whose BG levels are properly managed should never experience a severe hypoglycaemic episode or require rescue treatment during their hospital stay.

Diabetic ketoacidosis (DKA) mainly occurs in people with Type 1 diabetes when a severe lack of insulin means the body cannot use glucose for energy and the body starts to break down other body tissue, releasing ketones as an alternative energy source. This can lead to ketoacidosis if the levels are too high. *The development of DKA after admission suggests that the inpatient's insulin treatment was omitted, or insufficient levels of insulin were provided, for an appreciable time. DKA is a potentially life-threatening emergency which should not develop in hospital.*

Hyperosmolar hyperglycaemic state (HHS) mainly occurs in people with Type 2 diabetes who experience very high blood glucose levels (often over 40mmol/l). It can develop over a course of weeks through a combination of illness (e.g. infection) and dehydration. *HHS is a potentially life-threatening emergency which should not develop in hospital.*

Patients with diabetes are at a higher risk of developing **foot lesions** (ulcers) because of associated blood flow (ischaemia) and nerve problems (neuropathy). *No patient should deteriorate enough while under a hospital's care that they develop a new foot lesion.*



Glossary – Inpatient diabetic foot care

People with diabetes are at much greater risk of developing problems with their feet (**diabetic foot disease**), due to the damage raised blood sugars can cause to sensation (neuropathy) and circulation (ischaemia). If left untreated, these problems can cause foot lesions (ulcers) and infections and, at worst, may lead to amputations¹.

About 9 per cent of inpatients with diabetes are admitted to hospital with active diabetic foot disease, around half of which are admitted for diabetic foot disease.

On admission to hospital, inpatients with diabetes may undergo a **specific diabetic foot risk examination** for ulceration, in addition to general pressure sore checks such as the Waterlow score.

Hospitals may follow foot care examination initiatives such as '**Putting Feet First**'² or **NICE inpatient foot guidance**³ and may also have **tools or systems** in place to increase the number of inpatients with diabetes that have a specific diabetic foot risk examination.

Inpatients with active diabetic foot disease or at a high risk of developing foot problems should be assessed by the **Multi-disciplinary Foot Care Team** (MDFT – see [Glossary: Healthcare Teams](#)) as soon as possible following admission. About three quarters of hospitals have MDFTs.

If inpatient foot care is not effective, hospital-acquired **foot lesions** can arise. Foot lesions are associated with great patient distress, risk of amputation, increased mortality and high cost. *Whilst under a hospital's care, no patient should deteriorate enough so that they develop a new instance of a foot lesion.*



Glossary – Patient experience

To find out whether the **patient experience** was favourable, the audit collects patient feedback on the following measures:

NaDIA Measure	Rationale
<ul style="list-style-type: none"> • Involvement in care planning 	Inpatients should be empowered to become involved in their care planning as much as possible. Patient expertise in their diabetes care should be harnessed.
<ul style="list-style-type: none"> • Extent that preferences for diabetes treatment taken into account 	Patient preferences for their diabetes treatment should be accommodated where possible.
<ul style="list-style-type: none"> • Ability to take control of their diabetes • Ability to self-administer insulin • Ability to test own blood sugar 	Inpatients should be empowered to take control of their diabetes as much as possible. Patient expertise in their diabetes care should be harnessed.
<ul style="list-style-type: none"> • Meal choice • Meal timing 	The timely provision of suitable food is integral to good diabetes management.
<ul style="list-style-type: none"> • Staff awareness of diabetes 	Staff need to know which patients have diabetes to ensure the appropriate treatment is given.
<ul style="list-style-type: none"> • Staff knowledge of diabetes • Staff ability to answer questions on diabetes 	Staff expertise in diabetes is essential to ensure the appropriate treatment is given and patient questions can be addressed.
<ul style="list-style-type: none"> • Overall care for diabetes 	Patients overall perception of their diabetes care during their hospital stay is a useful measure of the patient experience as a whole.



Glossary – Acronyms

BA form = NaDIA Bedside Audit form

BG = Blood glucose

CCG = Clinical Commissioning Group

DISN = Diabetes inpatient specialist nurse

DKA = Diabetic Ketoacidosis

DSN = Diabetes specialist nurse

EP = Electronic Prescribing

EPR = Electronic Patient Records

HC form = NaDIA Hospital Characteristics form

HHS = Hyperosmolar Hyperglycaemic State

HQIP = The Healthcare Quality Improvement Partnership

IVII = Intravenous Insulin Infusion

JBDS = Joint British Diabetes Societies for Inpatient Care

LHB = Welsh Local Health Board

M&M meeting = Mortality and Morbidity meeting

MDFT = Multi-disciplinary foot team

mmol/L = millimole (one thousandth of a mole) per litre

NaDIA = National Diabetes Inpatient Audit

NCAPOP = National Clinical Audit Patient Outcomes Programme

NCVIN = National Cardiovascular Intelligence Network

NDA = National Diabetes Audit

NICE = National Institute for Health and Care Excellence

OHA = Oral hypoglycaemic agent

PE form = NaDIA Patient Experience form

QOF = Quality and Outcomes Framework

RBGM = Remote blood glucose monitoring

SC = Subcutaneous



National Diabetes Inpatient Audit 2016

Additional information



Additional information

The following documents are available from
<http://content.digital.nhs.uk/pubs/nadia2016>

- A one page executive summary of this report.
- A PowerPoint version of the this report.
- Individual report chapters as standalone publications (pdf and PowerPoint)
- Hospital site level 2010-2016 charts and data
- Supporting data in Excel format
- Data Quality Statement
- Methodology



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Diabetes UK: Putting Feet First: <https://www.diabetes.org.uk/putting-feet-first>

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Joint British Diabetes Societies for Inpatient Care: The use of variable rate intravenous insulin infusion (VRIII) in medical inpatients: http://www.diabetologists-abcd.org.uk/JBDS/JBDS_IP_VRIII.pdf

NHS Digital: National Diabetes Inpatient Audit (NaDIA) 2015: <http://content.digital.nhs.uk/catalogue/PUB20206>

NHS Digital: Quality and Outcomes Framework (QOF) (2015-16):
<http://content.digital.nhs.uk/catalogue/PUB22266>

NHS England; Serious Incidents Framework: <https://www.england.nhs.uk/patientsafety/serious-incident/>

NICE: Diabetic foot problems: Prevention and management: <https://www.nice.org.uk/Guidance/NG19>

NICE: Diabetes in adults: <https://www.nice.org.uk/Guidance/QS6>

NICE: Type 1 diabetes in adults: diagnosis and management: <https://www.nice.org.uk/Guidance/NG17>

NICE: Type 2 diabetes in adults: management: <https://www.nice.org.uk/Guidance/NG28>

Welsh Government: General medical services contract: Quality and outcomes framework:
<http://gov.wales/statistics-and-research/general-medical-services-contract/?lang=en>



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