



Public Health
England

Protecting and improving the nation's health

Briefing for the Variation in Inpatient Activity: Diabetes (VIA) tool

Summary of results 2014/15 to 2017/18

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Contents

About Public Health England	2
Contents	3
Executive summary	4
Background	5
Methodology	5
Exclusions	7
Results	9
Variation in inpatient activity for patients with diabetes compared to patients without diabetes, 2017 to 2018	9
Conclusion	13
References	14

Executive summary

The Variation in Inpatient Activity: Diabetes (VIA) tool allows users to explore the variation in inpatient 'activity' (bed days in hospital, emergency readmissions and day case admissions) for patients with diabetes at a clinical commissioning group (CCG) level and compare this to the expected activity for a similarly aged population without diabetes admitted under the same Healthcare Resource Group (HRG) chapter. It also allows comparison to England's total population with diabetes. The tool was last published in 2012 and has now been updated using data from 2014/15 to 2017/18. This report provides an overview of the VIA tool and the data used, showing how diabetes inpatient activity differs from a similar population without diabetes, and how these differences vary between clinical commissioning groups (CCGs) and over time.

The tool highlights that from 2014/15 to 2017/18:

- patients with diabetes in England had significantly longer lengths of stay in hospital than expected
- patients with diabetes were significantly more likely to be readmitted as an emergency after a period of care than expected – this difference has reduced over time with fewer patients with diabetes being readmitted as an emergency
- patients with diabetes had a significantly lower number of day case admissions than expected. This difference has reduced over time with an increase in day case admissions for patients with diabetes
- there is significant variation in inpatient activity and care patterns for patients with diabetes between CCGs

Background

In 2017 to 2018, 6.8% of the English population aged 17 years and over had diabetes¹, with this figure predicted to rise over the next decade². Over double this proportion of hospital beds (17.8%) were occupied by a person with diabetes in England and Wales during 2017³, with diabetes estimated to directly cost the NHS around £10 billion annually⁴. These figures highlight the large potential impact and benefits that understanding and improving inpatient activity and care of patients with diabetes could have both for patients and society.

The Variation in Inpatient Activity: Diabetes (VIA) tool allows users to explore the variation in inpatient service usage by those with diabetes of all ages at a clinical commissioning group (CCG) level and compare this to the population without diabetes between 2014/15 to 2017/18. It also allows comparison to England's total population with diabetes. The tool uses inpatient activity data from Hospital Episode Statistics (HES).

More detailed local analysis or local knowledge of services related to diabetes care may help to explain a CCG's relative position and trends that are presented in the tool. The VIA tool can help stimulate conversation about the variation in inpatient activity in order to gain a better understanding of differing care patterns and explore opportunities to improve and minimise differences in care of patients with diabetes.

Methodology

The VIA tool presents the observed numbers of day cases, bed days (elective, emergency and total) and emergency readmissions, presented as spells of care for patients with diabetes at CCG level. These are compared to 2 expected values:

- if the CCG population with diabetes had the same rate/length of stay as the CCG population without diabetes
- if the CCG population with diabetes had the same rate/length of stay as England's total population with diabetes

The expected values have been indirectly standardised by 10-year age bands and Healthcare Resource Group (HRG) chapter. This process adjusts for the potential difference in the age and HRG chapter profiles of the populations with and without diabetes and between CCGs. For a list of the HRG chapters used in the tool please refer to the table below:

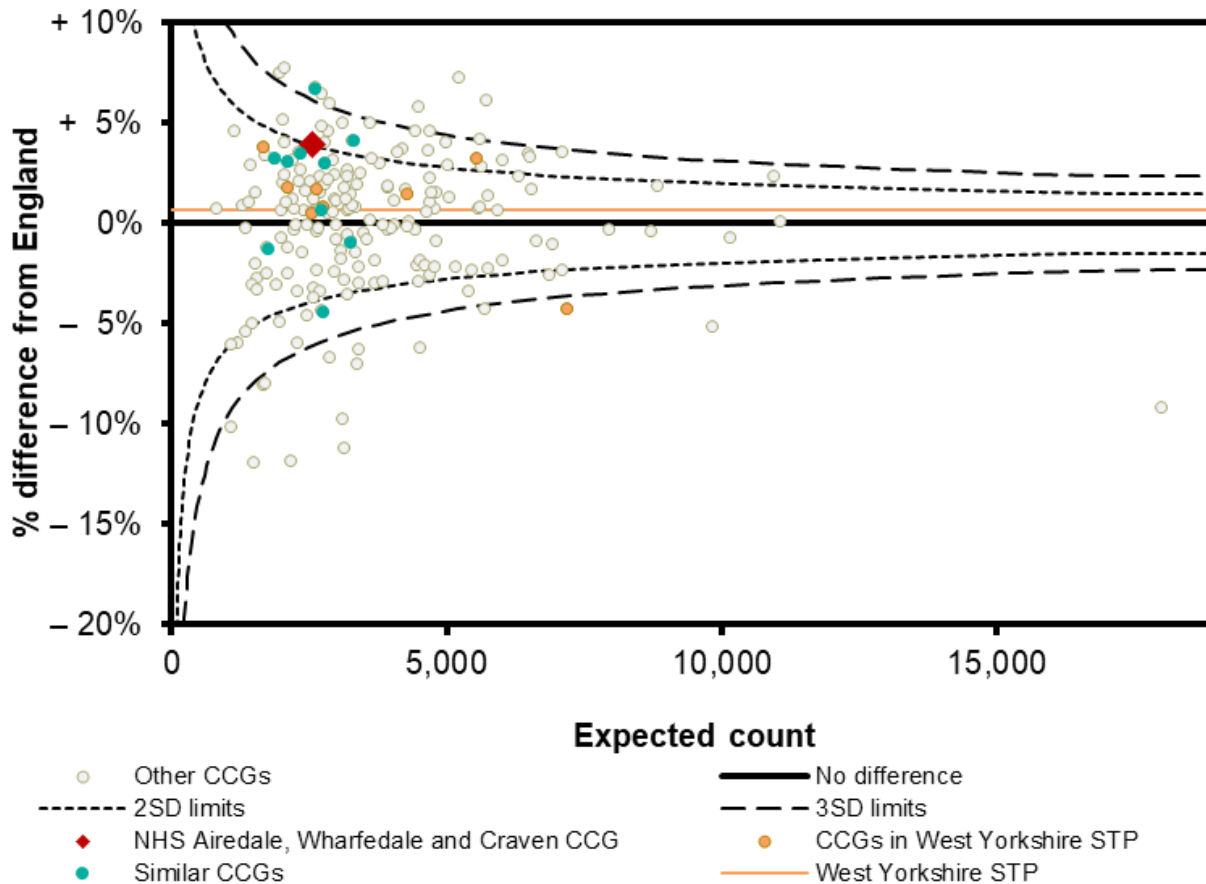
Table 1: Healthcare Resource Groups Presented in the VIA Tool

A	The Nervous System
B	Eyes and Periorbita
C	Mouth, Head, Neck & Ears
D	Respiratory System
E	Cardiac Surgery and Primary Cardiac Conditions
F	Digestive System
G	Hepato-biliary and Pancreatic System
H	Musculoskeletal System
J	Skin, Breast and Burns
K	Endocrine and Metabolic System
L	Urinary Tract and Male Reproductive System
M	Female Reproductive System and Assisted Reproduction
P	Diseases of Childhood and Neonates
Q	Vascular System
R	Diagnostic Imaging and Interventional Radiology
S	Haematology, Chemotherapy, Radiotherapy and Specialist Palliative Care
V	Multiple Trauma, Emergency and Urgent Care, and Rehabilitation
W	Immunology, Infectious Diseases and other contacts with health services
X	Critical Care, High-Cost Drugs and Devices
Y	Imaging

Percentage differences between the observed value and each expected value are provided.

The percentage differences are plotted on funnel plots (see example Figure 1) – where the ‘funnel’ (control limits) represents the bounds of statistical confidence around the average value, the average being 0% (no difference between CCG patients with and without diabetes or the average for England’s population with diabetes). Any observation plotted outside the funnel limits may indicate unexpected deviation and warrant further investigation, whereas values within the funnel limits are deemed to be expected. Data above the funnel indicates significantly more service usage for patients with diabetes in the CCG and data below the funnel indicates significantly less service usage for patients with diabetes (compared to that expected by those without diabetes in the CCG or the England average value).

Figure 1: An example of the VIA tool funnel plot, showing the percentage difference in the observed number of day cases for patients with diabetes compared to the expected number, 2017 to 2018.



The funnel plots enable CCGs to benchmark their inpatient activity of patients with diabetes against:

- 10 most similar CCGs⁵
- CCGs in their Sustainability and Transformation Partnership (STP)
- the rest of England

Note: Even within expected random variation, 2 out of every 1,000 observations are likely to lie outside the 3 standard deviation funnel and 5 out of every 100 observations are likely to lie outside the 2 standard deviation funnel and this should be taken into consideration when interpreting funnel plots

Exclusions

Patients were not included in the VIA tool if they met one or more of the following criteria:

- their CCG of responsibility was unknown or was a commissioning hub
- the patient did not have a valid age

- their HRG chapter was neonatal care, mental health, undefined groups or not known

Indicator specific exclusion criteria were:

- bed days -
 - the patient died during the spell of care
 - the patient underwent haemodialysis at Wirral University Teaching Hospital due to a coding issue
 - spells of care with a length of stay greater than 90 days were capped at 90 days to prevent skew, for example, a spell lasting 152 days would be included in the tool as lasting 90 days
- emergency readmissions -
 - the spell was coded as maternity or there was an inclusion of cancer or chemotherapy in any diagnosis field during the spell

Results

Variation in inpatient activity for patients with diabetes compared to patients without diabetes, 2017 to 2018

Bed days

Across England during 2017 to 2018, patients with diabetes spent 23% more nights in hospital than would be expected had those patients had the same average length of stay as patients without diabetes. This pattern remained when bed days were separated into elective (19% more bed days) and emergency (21% more bed days; Table 1). The percentage difference in bed days ranged from 0% to +38% across CCGs and was significant for 194 CCGs. For elective bed days, 182 CCGs showed a significant difference between patients with and without diabetes. Of these, 176 had more elective bed days while 6 had less. A similar pattern was observed for emergency bed days, with 193 CCGs showing significant differences between patients with and without diabetes, 193 CCGs more and 0 CCGs less.

Emergency readmissions

In 2017 to 2018, patients with diabetes were readmitted to hospital, as an emergency, within 28 days of a previous inpatient stay, 48% more than would be expected had those patients had the same emergency readmission rate as patients without diabetes. The percentage difference ranged from +15% to +95% across CCGs and was significant for all CCGs.

Day cases

In 2017 to 2018, patients with diabetes were admitted to hospital for elective treatment as a day case 3% fewer times than would be expected had those patients had the same proportion of elective day case admissions as patients without diabetes. This percentage difference ranged from -10% to +1% across CCGs and was significant for 76 CCGs.

Table 2: Variation in inpatient activity for patients attending hospital with diabetes compared to patients attending hospital without diabetes, 2017 to 2018, England

Indicator	Observed count	Expected count	Percentage difference	Range of CCG percentage difference
All bed days	6,894,171	5,607,761	+23%	0% to +38%
Elective bed days	646,677	542,455	+19%	-12% to +51%
Emergency bed days	5,956,297	4,928,108	+21%	0% to +37%
Emergency readmissions	183,692	124,235	+48%	+15% to +95%
Day cases	720,665	744,674	-3%	-10% to +1%

Note: Elective and emergency bed day counts do not sum to the all bed days count as additional categories are included, for example 'unknown'.

Variation in inpatient activity for patients with diabetes compared to the England average, 2017 to 2018

Across England during 2017 to 2018, there was significant variation by CCG in the percentage difference compared to the England average for all indicators.

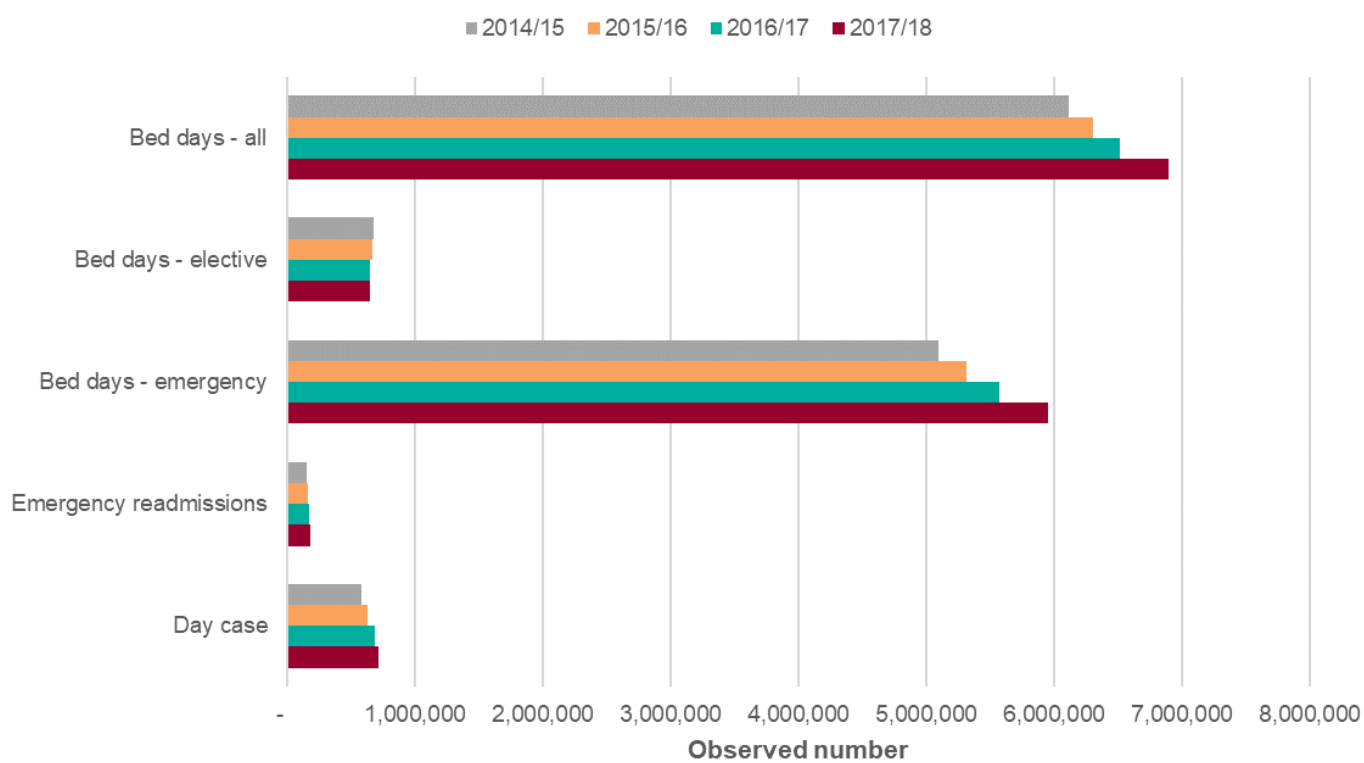
For bed days, the variation ranged from -28% to +39% (-30% to +57% for elective, -30% to +46% for emergency). For emergency readmissions, it ranged from -32% to +35% and for day cases, it ranged from -12% to +8%.

Trends in inpatient activity for patients with diabetes, 2014/15 to 2017/18

Between 2014/15 to 2017/18, there was a 13% increase in the total number of bed days occupied by patients with diabetes in England. A decrease was observed for elective bed days (-4%), whereas, a 17% increase was observed among emergency bed days. For emergency readmissions, there was a 22% increase during this period, and for day cases, a 24% increase (Figure 2).

The trends observed for people with diabetes are similar to that observed for people without, although with notable differences. A much smaller increase was observed in the numbers of bed days for patients without diabetes, with a 4% increase for all bed days, there was a -10% decrease for elective days and 7% increase for emergency bed days. The number of emergency readmissions and day case admissions for patients without diabetes increased by 9% and 7% respectively, significantly smaller increases than observed among patients with diabetes.

Figure 2: The observed number of bed days, emergency readmissions and day case admissions among patients with diabetes in England, 2014/15 to 2017/18.



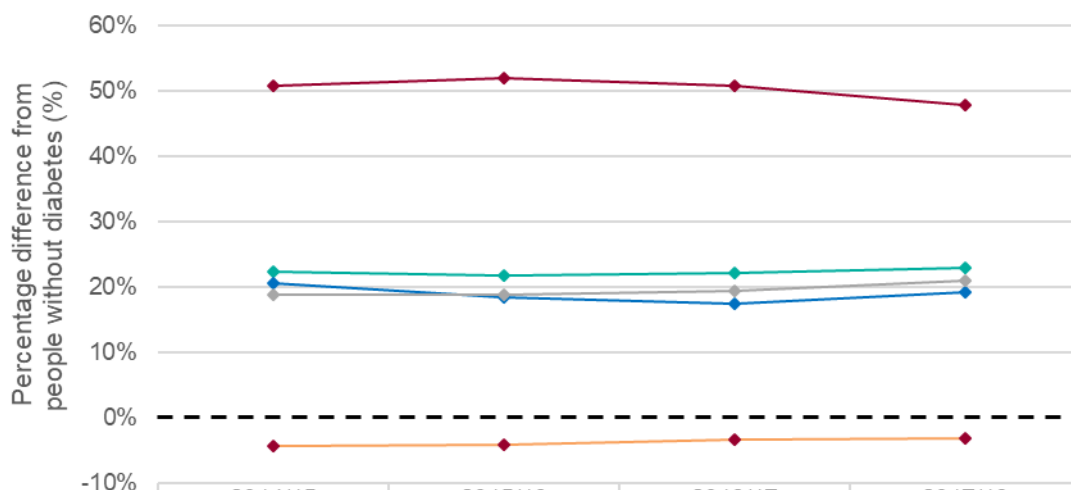
Change in percentage difference between patients with and without diabetes

Between 2014/15 and 2017/18, there was little change in the percentage difference in the observed number of total bed days among patients with diabetes than what would be expected had those patients had the same average length of stay as patients without diabetes. However, for elective admissions, it decreased from 21% in 2014 to 2015 to 19% in 2017 to 2018 and for emergency admissions the percentage difference increased from 19% to 21%.

For emergency readmissions, the percentage difference between observed and expected decreased from 51% in 2014 to 2015 to 48% in 2017 to 2018. While this is still higher than those without diabetes, there has been some narrowing of the gap.

In 2017 to 2018, patients with diabetes were admitted to hospital for elective treatment as a day case 3% fewer times than would be expected had those patients had the same proportion of elective day case admissions as patients without diabetes. This difference decreased from 4% fewer times in 2014 to 2015, also a narrowing of the gap with those without diabetes.

Figure 3: The percentage difference in the observed number of bed days, emergency readmissions and day cases of patients with diabetes compared to the expected number if England’s population with diabetes had the same rate as England’s population without diabetes (age group and HRG chapter matched), 2014/15 to 2017/18.



	2014/15	2015/16	2016/17	2017/18
Bed days - all	22.3%	21.7%	22.1%	22.9%
Bed days - elective	20.6%	18.4%	17.5%	19.2%
Bed days - emergency	18.9%	18.9%	19.5%	20.9%
Emergency readmissions	50.8%	51.9%	50.8%	47.9%
Day case	-4.3%	-4.1%	-3.4%	-3.2%

Conclusion

The VIA tool suggests there are significant differences in inpatient use of services for patients with diabetes compared to those without diabetes. During 2014/15 to 2017/18, patients with diabetes in England had significantly longer lengths of stay in hospital and were more likely to be readmitted as an emergency than would be expected had those patients had the same average length of stay as patients without diabetes. They also had a significantly lower number of day case admissions than would be expected for patients without diabetes.

The percentage differences in the observed number of day case admissions and emergency readmissions among patients with diabetes compared to the expected number without diabetes have reduced from 2014/15 to 2017/18, suggesting the gap in inpatient care is narrowing. However, this gap has remained consistent for the total number of bed days, widened slightly for emergency bed days but narrowed slightly for elective bed days.

The overall number of day case admissions and emergency readmissions has increased among patients with diabetes in England from 2014/15 to 2017/18, which corresponds with an increase in diagnosed diabetes prevalence during this period. The total number of bed days spent by patients with diabetes in England increased by 13% during this period due to an increase in the average length of stay of patients with diabetes.

The VIA tool demonstrates that inpatient activity and care patterns of patients with diabetes compared to patients without diabetes varies between CCGs. With local knowledge, analysis from the tool can be used to communicate and explore opportunities to reduce the differences in care of patients with diabetes and variation from the England average. Addressing these variations can help improve the quality and productivity of the inpatient care provided for patients with diabetes.

References

¹ NHS Digital. Quality and Outcomes Framework 2017/18. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/quality-and-outcomes-framework-achievement-prevalence-and-exceptions-data/2017-18>; 2018 [accessed 12.07.19].

² Public Health England. Diabetes prevalence estimates for local populations. Available at: www.gov.uk/government/publications/diabetes-prevalence-estimates-for-local-populations; 2015 [accessed 12.07.19].

³ NHS Digital. National Diabetes Inpatient Audit 2017. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-inpatient-audit/national-diabetes-inpatient-audit-nadia-2017>; 2018 [accessed 12.07.19].

⁴ Hex N, Bartlett C, Wright D, Taylor M, Varley D. Estimating the current and future costs of type 1 and type 2 diabetes in the UK, including direct health costs and indirect societal and productivity costs. *Diabet Med* 2012; 29: 855-62.

⁵ NHS RightCare. Similar 10 CCG Explorer Tool. Available at: www.england.nhs.uk/publication/similar-10-ccg-explorer-tool/; 2018 [accessed 12.07.19].