Key findings about the outcomes for people with diabetes in NHS Bolton CCG
The National Diabetes Audit is commissioned by

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

The National Diabetes Audit is delivered by

The Health and Social Care Information Centre (HSCIC) is England's central, authoritative source of essential data and statistical information for frontline decision makers in health and social care. The HSCIC managed the publication of the 2011-2012 reports.

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

The National Diabetes Audit is supported by

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

The National Diabetes Audit (NDA) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOPOP) following advice to the Department of Health from the National Advisory Group on Clinical Audit and Enquiries (NAGCAE), and managed by the Health and Social Care Information Centre (HSCIC) in partnership with Diabetes UK.

This report, from the ninth year of the audit, presents key findings on complications in 2010-2012 in NHS Bolton CCG. For further information, including NDA methodology and national summary reports, please visit the NDA website:

www.hscic.gov.uk/nda

Quality information is essential to any organisation responsible for implementing the many evidence based national diabetes policies such as the Diabetes National Service Framework (NSF), National Institute for Health and Care Excellence (NICE) Clinical Guidelines for diabetes and the NICE Diabetes in Adults Quality Standards. The NDA supports care quality improvement by enabling NHS organisations to:

- Compare the NICE specified processes and outcomes of care with similar NHS organisations.
- Provide a local health economy view of the care and outcomes delivered jointly by primary and secondary care organisations.
- Monitor progress towards delivering evidence based care standards (Diabetes NSF and NICE guidelines).
- Identify and share good practice.
- Identify gaps or shortfalls in commissioned services.
Complication Ratios in NHS Bolton CCG

This report contains the complications data from the 2011-2012 NDA for NHS Bolton CCG. It is important to act upon this information. No health economy can afford to be complacent about diabetes and diabetic complications because even in the best performing health economies the health burden of diabetes is enormous. It is recommended that every CCG and LHB use these reports to prioritise local improvement efforts across all General Practice and Specialist Care providers. Action plans should aim to better achieve the NICE guidance found at: www.nice.org.uk/cg87; www.nice.org.uk/cg15; www.nice.org.uk/cg108.

Data from people with diabetes submitted to the 2009-2010 NDA and still alive on 31 March 2010 were matched to Hospital Episode Statistics (HES), a record of every hospital admission in England, and Patient Episode Data for Wales (PEDW), a record of every hospital admission in Wales, for the period 1 April 2010 to 31 March 2012. The prevalence of each complication was calculated as the number of people alive of the 31 March 2010 who had one or more hospital admissions with a relevant complication between 1 April 2010 and 31 March 2012.

Many of the complications of diabetes are more common in males and older people. As a result, the age and sex structure of the population with diabetes will influence the number of people with complications. The impact of the age and sex structure of the population can be removed by standardisation, allowing robust comparisons between different CCGs and LHBs. Apart from diabetic ketoacidosis, which is unique to diabetes, the standardised ratios presented here report the excess risk of complications due to diabetes. The calculations compare the complication prevalence for people with diabetes with the prevalence in the general population in the same CCG or LHB after adjustment for age and sex.

All results in this report have been tested for statistical significance at the 95 per cent confidence interval; i.e. there is a 1 in 20 chance that the statements made in this report are untrue.

Therefore, in this report:

- **Lower than expected**: the result for people with diabetes in NHS Bolton CCG is statistically significantly lower ($p<0.05$) than in England and Wales.
- **As expected**: the result for people with diabetes in NHS Bolton CCG is not statistically significantly different than in England and Wales.
- **Higher than expected**: the result for people with diabetes in NHS Bolton CCG is statistically significantly higher ($p<0.05$) than in England and Wales.

The mortality analysis cannot presently be broken down by CCG/LHB because the Office for National Statistics (ONS) data for deaths registered in England and Wales is currently only available by Primary Care Trust (PCT); this data will be available by CCG/LHB for the 2012-2013 audit. Therefore, a mortality analysis breakdown by PCT/LHB is provided in the NDA 2011-2012 Report 2: Complications and Mortality supporting documents file, which is available on the NDA website: www.hscic.gov.uk/nda
The standardised diabetic complications ratios for NHS Bolton CCG and for England and Wales are shown in Table 1.

A red, amber, green scale has been used in Table 1 to illustrate whether NHS Bolton CCG is significantly above, below or within the expected range for each complication when compared to England and Wales.

### Table 1: Standardised ratios for diabetic complications for NHS Bolton CCG and England and Wales

<table>
<thead>
<tr>
<th>Condition</th>
<th>NHS Bolton CCG</th>
<th>England and Wales</th>
<th>Total expected</th>
<th>Observed</th>
<th>Standardised ratio</th>
<th>95% confidence interval limits</th>
<th>Additional risk of complication among people with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Angina</td>
<td>168</td>
<td>340</td>
<td>202</td>
<td></td>
<td>181</td>
<td>225</td>
<td>+102%</td>
</tr>
<tr>
<td></td>
<td>66,755</td>
<td>117,278</td>
<td>176</td>
<td></td>
<td>175</td>
<td>177</td>
<td>+75.7%</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>36</td>
<td>54</td>
<td>151</td>
<td></td>
<td>113</td>
<td>197</td>
<td>+51%</td>
</tr>
<tr>
<td></td>
<td>18,574</td>
<td>28,812</td>
<td>155</td>
<td></td>
<td>153</td>
<td>157</td>
<td>+55.1%</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>105</td>
<td>172</td>
<td>163</td>
<td></td>
<td>140</td>
<td>190</td>
<td>+63.5%</td>
</tr>
<tr>
<td></td>
<td>47,019</td>
<td>81,452</td>
<td>173</td>
<td></td>
<td>172</td>
<td>174</td>
<td>+73.2%</td>
</tr>
<tr>
<td>Stroke</td>
<td>56</td>
<td>68</td>
<td>121</td>
<td></td>
<td>94</td>
<td>154</td>
<td>+21.1%</td>
</tr>
<tr>
<td></td>
<td>26,184</td>
<td>35,120</td>
<td>134</td>
<td></td>
<td>133</td>
<td>136</td>
<td>+34.1%</td>
</tr>
<tr>
<td>Major Amputation</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>+221.4%</td>
</tr>
<tr>
<td>Minor Amputation</td>
<td>4</td>
<td>16</td>
<td>444</td>
<td></td>
<td>254</td>
<td>722</td>
<td>+344.5%</td>
</tr>
<tr>
<td>Renal Replacement Therapy</td>
<td>11</td>
<td>30</td>
<td>270</td>
<td></td>
<td>182</td>
<td>385</td>
<td>+169.9%</td>
</tr>
<tr>
<td></td>
<td>5,833</td>
<td>15,415</td>
<td>264</td>
<td></td>
<td>260</td>
<td>268</td>
<td>+164.3%</td>
</tr>
</tbody>
</table>

* For definitions, please refer to the glossary.

* Where values are shown as * (an asterisk), the data have been suppressed for reasons of statistical and information governance.
Angina

Figure 1 shows the spread of standardised ratios for angina for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are higher than expected when compared against the national level for people with diabetes.

**Figure 1: Chart showing the spread of standardised ratios for angina in people with diabetes in CCGs and LHBs**

![Chart showing the spread of standardised ratios for angina in people with diabetes in CCGs and LHBs](chart.png)

The additional risk of angina in people with diabetes in NHS Bolton CCG is 102.0 per cent higher than in the general population of NHS Bolton CCG. This risk of angina in people with diabetes is statistically significantly higher than in people with diabetes in England and Wales (p<0.05). It is recommended that NHS Bolton CCG makes a priority of reviewing the approach of its Diabetes Care Providers to angina risk reduction, including exercise, diet composition, weight management, smoking, glucose control, blood pressure control and cholesterol control ([www.nice.org.uk/cg87](http://www.nice.org.uk/cg87); [www.nice.org.uk/cg15](http://www.nice.org.uk/cg15)).
Myocardial Infarction

Due to low numbers of admissions to hospital for myocardial infarction, the random play of numbers means that the recorded ‘additional risk’ of myocardial infarction in people with diabetes can be zero or less. It is expected that when measured over a longer period the reported results will come closer to the national average.

Figure 2 shows the spread of standardised ratios for myocardial infarction for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are as expected when compared against the national level for people with diabetes.

Figure 2: Chart showing the spread of standardised ratios for myocardial infarction in people with diabetes in CCGs and LHBs

![Chart showing the spread of standardised ratios for myocardial infarction in people with diabetes in CCGs and LHBs](chart.png)

The additional risk of admission to hospital with myocardial infarction for England and Wales is 55.1 per cent higher for people with diabetes than in the general population so it is an area for health improvement that should be considered by all health economies. The additional risk of myocardial infarction in people with diabetes in NHS Bolton CCG is 51.0 per cent higher than in the general population of NHS Bolton CCG. It is recommended that NHS Bolton CCG reviews the approach of its Diabetes Care Providers to myocardial infarction risk reduction, including exercise, diet composition, weight management, smoking, glucose control, blood pressure control and cholesterol control ([www.nice.org.uk/cg87](http://www.nice.org.uk/cg87); [www.nice.org.uk/cg15](http://www.nice.org.uk/cg15)).
Heart Failure

Figure 3 shows the spread of standardised ratios for heart failure for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are as expected when compared against the national level for people with diabetes.

**Figure 3: Chart showing the spread of standardised ratios for heart failure in people with diabetes in CCGs and LHBs**

The additional risk of admission to hospital with heart failure for England and Wales is 73.2 per cent higher for people with diabetes than in the general population so it is an area for health improvement that should be considered by all health economies. The additional risk of heart failure in people with diabetes in NHS Bolton CCG is 63.5 per cent higher than in the general population of NHS Bolton CCG. It is recommended that NHS Bolton CCG reviews the approach of its Diabetes and Cardiology Care Providers to heart failure risk reduction, including exercise, diet composition, weight management, smoking, glucose control, blood pressure control and cholesterol control (www.nice.org.uk/cg87; www.nice.org.uk/cg15) and to the management of heart failure according to NICE guidance (www.nice.org.uk/cg108).
Stroke

Due to low numbers of admissions to hospital for stroke, the random play of numbers means that the recorded ‘additional risk’ of stroke in people with diabetes can be zero or less. It is expected that when measured over a longer period the reported results will come closer to the national average.

Figure 4 shows the spread of standardised ratios for stroke for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are as expected when compared against the national level for people with diabetes.

**Figure 4: Chart showing the spread of standardised ratios for stroke in people with diabetes in CCGs and LHBs**

The additional risk of stroke for England and Wales is 34.1 per cent higher for people with diabetes than in the general population so it is an area for health improvement that should be considered by all health economies. The additional risk of stroke in people with diabetes in NHS Bolton CCG is 21.1 per cent higher than in the general population of NHS Bolton CCG. It is recommended that NHS Bolton CCG reviews the approach of its Diabetes and Cardiology Care Providers to stroke risk reduction, including exercise, diet composition, weight management, smoking, glucose control, blood pressure control and cholesterol control (www.nice.org.uk/cg87; www.nice.org.uk/cg15).
Major Amputation

Figure 5 shows the spread of standardised ratios for major amputation for all CCGs/LHBs. Due to low numbers, the results for NHS Bolton CCG have been suppressed for reasons of statistical and information governance.

**Figure 5: Chart showing the spread of standardised ratios for major amputation\(^a\) in people with diabetes in CCGs and LHBs**

\(^a\) Due to low numbers, the results for a number of CCGs/LHBs have been suppressed for reasons of statistical and information governance. The results for these CCGs/LHBs appear as a zero value on this figure.

The additional risk of having a major amputation in people with diabetes is 221.4 per cent than in the general population so it is an area for health improvement that should be considered by all health economies. It is recommended that NHS Bolton CCG makes a priority of reviewing the approach of its Diabetes Care Providers to the following:

- Risk reduction of peripheral vascular disease and neuropathy using exercise, diet composition, weight management, smoking, glucose control, blood pressure control and cholesterol control.
- Early identification of people at increased risk of diabetic foot disease using annual foot surveillance of circulation, sensation and risk stratification.
- In those who are screen positive, intensive preventive management within a foot care protection programme; and to the prompt identification of new foot disease and its urgent referral to a multidisciplinary specialist diabetic foot team.
- See www.nice.org.uk/cg87; www.nice.org.uk/cg15; www.nice.org.uk/cg119
Minor Amputation

Figure 6 shows the spread of standardised ratios for minor amputation for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are as expected when compared against the national level for people with diabetes.

**Figure 6: Chart showing the spread of standardised ratios for minor amputation\(^a\) in people with diabetes in CCGs and LHBs**

Due to low numbers, the results for a number of CCGs/LHBs have been suppressed for reasons of statistical and information governance. The results for these CCGs/LHBs appear as a zero value on this figure.

The additional risk of having a minor amputation in people with diabetes is 336.9 per cent than in the general population so it is an area for health improvement that should be considered by all health economies. The additional risk of having a minor amputation in people with diabetes in NHS Bolton CCG is 344.5 per cent higher than in the general population of NHS Bolton CCG. It is recommended that NHS Bolton CCG makes a priority of reviewing the approach of its Diabetes Care Providers to the following:

- Risk reduction of peripheral vascular disease and neuropathy using exercise, diet composition, weight management, smoking, glucose control, blood pressure control and cholesterol control.

- Early identification of people at increased risk of diabetic foot disease using annual foot surveillance of circulation, sensation and risk stratification.

- In those who are screen positive, intensive preventive management within a foot care protection programme; and to the prompt identification of new foot disease and its urgent referral to a multidisciplinary specialist diabetic foot team.

- See [www.nice.org.uk/cg87](http://www.nice.org.uk/cg87); [www.nice.org.uk/cg15](http://www.nice.org.uk/cg15); [www.nice.org.uk/cg119](http://www.nice.org.uk/cg119)
Renal Replacement Therapy

Figure 7 shows the spread of standardised ratios for renal replacement therapy for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are as expected when compared against the national level for people with diabetes.

Figure 7: Chart showing the spread of standardised ratios for renal replacement therapy in people with diabetes in CCGs and LHBs

The additional risk of undergoing renal replacement therapy with dialysis or transplantation for England and Wales is 164.3 per cent higher for people with diabetes than in the general population so it is an area for health improvement that should be considered by all health economies. The additional risk of undergoing renal replacement therapy in people with diabetes in NHS Bolton CCG is 169.9 per cent higher than in the general population of NHS Bolton CCG. It is recommended that NHS Bolton CCG reviews the approach of its Diabetes Care Providers to the following:

- Glucose control and blood pressure control among all patients with diabetes.
- Early identification of people at increased risk of diabetic kidney disease using the annual Urine Albumin Creatinine Ratio test.
- Intensive risk reduction intervention in those who are screen positive.
- See www.nice.org.uk/cg87; www.nice.org.uk/cg15
Diabetic Ketoacidosis

Standardised ratios for the prevalence of hospital admissions for diabetic ketoacidosis have been calculated for all CCGs and LHBs. These adjust for the age and sex of the local populations with type 1 diabetes and assess the prevalence of diabetic ketoacidosis compared with all people with type 1 diabetes in England and Wales.

The standardised diabetic ketoacidosis ratios for NHS Bolton CCG and for England and Wales are shown in Table 2.

<table>
<thead>
<tr>
<th>RAG (Red-Amber-Green) Score Key</th>
<th>Higher than expected</th>
<th>As expected</th>
<th>Lower than expected</th>
<th>Data has been suppressed</th>
</tr>
</thead>
</table>

A red, amber, green scale has been used in Table 2 to illustrate whether NHS Bolton CCG is significantly above, below or within the expected range for diabetic ketoacidosis when compared to all people with type 1 diabetes in England and Wales.

Table 2: Standardised ratios for diabetic ketoacidosis for NHS Bolton CCG

<table>
<thead>
<tr>
<th>Diabetic Ketoacidosisb</th>
<th>Total expecteda</th>
<th>Observed</th>
<th>Standardised ratioa</th>
<th>95% confidence interval limitsa</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS Bolton CCG</td>
<td>17</td>
<td>23</td>
<td>134</td>
<td>85 201</td>
</tr>
<tr>
<td>People with type 1 diabetes in England and Wales</td>
<td>10,432</td>
<td>10,434</td>
<td>100</td>
<td>98 102</td>
</tr>
</tbody>
</table>

a For definitions, please refer to the glossary.
b Diabetic ketoacidosis values represent people with type 1 diabetes only.

* Where values are shown as * (an asterisk), the data have been suppressed for reasons of statistical and information governance.
Figure 8 shows the spread of standardised ratios for diabetic ketoacidosis for all CCGs/LHBs. The results for NHS Bolton CCG are highlighted in red and are as expected when compared against the national level for people with type 1 diabetes.

Figure 8: Chart showing the spread of standardised ratios for diabetic ketoacidosis in people with type 1 diabetes in CCGs and LHBs

Due to low numbers, the results for a number of CCGs/LHBs have been suppressed for reasons of statistical and information governance. The results for these CCGs/LHBs appear as a zero value on this figure.

The number of people with type 1 diabetes being admitted to hospital for diabetic ketoacidosis in NHS Bolton CCG is as expected when compared to people with type 1 diabetes in England and Wales. However, diabetic ketoacidosis has been increasing over the whole of England and Wales and there is an imperative to reduce the rate of this largely preventable cause of serious illness everywhere. Therefore, it is recommended that NHS Bolton CCG reviews the approach of its Diabetes Care Providers to the prevention of diabetic ketoacidosis, specifically focusing on the services and support for young people with type 1 diabetes.
Glossary

Confidence Interval (CI)

A confidence interval is a range of values that quantifies the imprecision in the estimate of a statistic. Specifically it quantifies the imprecision that results from random variation in the estimation of the value; it does not include imprecision resulting from systematic error (bias). In public health many indicators are based on what can be considered to be complete data sets and not samples, e.g. mortality rates based on death registers. In these instances the imprecision arises not as a result of sampling variation but of ‘natural’ variation. The indicator is considered to be the outcome of a stochastic process, i.e. one which can be influenced by the random occurrences that are inherent in the world around us. In such instances the value actually observed is only one of the set that could occur under the same circumstances. Generally in public health, it is the underlying circumstances or process that is of interest and the actual value observed gives only an imprecise estimate of this underlying risk.

The width of the confidence interval depends on three things:

- The sample or population size from which the estimate is derived.
- The degree of variability in the phenomenon being measured.
- The required level of confidence – this is an arbitrary value set to give the desired probability that the interval includes the true value. In medicine and public health the conventional practice is to use 95 per cent confidence.

For a given level of confidence, the wider the confidence interval, the greater the uncertainty in the estimate.

Standardised Ratio

The standardised ratio is a form of indirect standardisation. The age and sex specific rates for each complication of a chosen population (usually the relevant national or study aggregate population) are applied to the age and sex structure of the subject population to give an expected number of complications. The observed number of events is then compared to the expected and is usually expressed as ratio (observed/expected). For presentation purposes the standardised ratio is usually expressed per 100. By definition, the standard population will have a standardised ratio of 100. Standardised ratios above 100 indicate that the complication count observed was greater than that expected from the standardised complications rates and for standard ratios below 100 that it was lower.

Suppression

When the observed number of people with a particular complication in a CCG/LHB is between 1 and 5, the data for that particular complication for that CCG/LHB has been suppressed from publication for reasons of statistical and information governance.

Total Expected (Expected Complications)

The expected complication count is that which would occur if the observed subject population experienced the standard population’s age and sex specific complication rates.