

# National Diabetes Audit, 2017-18

## Report 2a: Complications and Mortality (complications of diabetes)

England and Wales

# Introduction

- This report from the National Diabetes Audit (NDA) covers complications of diabetes. It does not include diabetic eye disease or hypoglycaemia because presently there are no reliable records that the NDA can access. Most other cardiovascular and diabetes specific complications are included.
- The accompanying Report 2b presents a new statistical analysis of person based demographic and diabetes related factors associated with adverse cardiovascular outcomes and diabetic complications. It culminates in case-mix adjusted analysis at Clinical Commissioning Group (CCG) and Local Health Board (LHB) level.

# Aims and Objectives

- To monitor progress towards reducing the prevalence of long term diabetes complications and additional mortality.
- To highlight variation in outcomes between health economies and stimulate service improvements.

The report has been divided into three main sections. Each section aims to address overall rates, time trends, geographical variation, hospital utilisation.

## 1. Cardiovascular Complications

- Angina,
- Myocardial Infarction (MI),
- Heart failure,
- Stroke.

## 2. Diabetes Specific Complications

- End Stage Kidney Disease (Renal Replacement Therapy, RRT),
- Amputations,
- Diabetic Ketoacidosis (DKA) is not considered in this report, but is investigated in more detail than previously in Report 2b: Complications and Mortality, that accompanies this report.

## 3. Mortality

- Causes of death compared to general population,
- Rates of death related to age and type of diabetes.



# Key Findings (1)

- Diabetes remains responsible for a large number of additional deaths, with the greatest relative risk in younger people.
- Deaths in people with diabetes under the age of 80 years are more often due to cardiovascular disease than in the general population.
- About 1 in 20 people have diabetes, yet people with diabetes account for one quarter to one third of hospital admissions for cardiovascular disease.

## Key Findings (2)

- The relative risk of cardiovascular disease in people with diabetes as compared to people without diabetes remains high.
- The variation in age and sex standardised rates over time is erratic, suggesting these factors alone do not adequately describe the differences seen in admissions.
- The factors influencing diabetes related admissions have been investigated and published in 'National Diabetes Audit, 2017-18, Report 2b', which accompanies this report.

# 1. Cardiovascular complications

# Cardiovascular prevalence

From the NDA 2016-17 audit, a total of 240,950 people with Type 1 diabetes, and 2,937,020 people with Type 2 and other diabetes, were alive on 31st March 2017 and were included in the analysis of diabetic complications.

Table 1 shows the prevalence of cardiovascular complications based on the number of people admitted to hospital between 1st April 2017 and 31st March 2018, as recorded in Hospital Episode statistics (HES) or Patient Episode Database for Wales (PEDW).

**Table 1: One year prevalence of cardiovascular complications of diabetes, England and Wales, 2016-17 audit, complications during 2017-18**

Complication	Type 1		Type 2 and Other	
	Number of people experiencing the complication	Prevalence percentage (not adjusted for the age and sex structure of the population)	Number of people experiencing the complication	Prevalence percentage (not adjusted for the age and sex structure of the population)
Angina	3,040	1.3	89,415	3.0
Myocardial Infarction	1,250	0.5	24,470	0.8
Heart failure	3,355	1.4	98,945	3.4
Stroke	1,270	0.5	32,540	1.1

# Complication ratios – methodology update

- The methodology for calculating complication ratios in this report is consistent with the NDA Complications and Mortality 2015-2016, July 2017 which was amended from that used previously in NDA Report 2, January 2015: Complications and Mortality for the 2012-13 audit period.
- When calculating complication ratios in people with diabetes, rates of conditions such as MI or Stroke are compared with rates of the same conditions in people without diabetes, the non-diabetic population. This non-diabetic population had previously been defined by excluding from HES and PEDW data, people with diabetes included in the specific audit period being reported. However, because NDA ascertainment is always less than 100%, this approach means that some people in the 'non-diabetic population' will actually have diabetes. Each year participation by practices and specialist services is slightly different so, to reduce this misclassification, the non-diabetic population in this report has been identified differently. People with diabetes **reported in any NDA period** and diagnosed before the start of the HES and PEDW collection periods have been excluded from HES and PEDW data.
- We believe that this provides a more accurate picture of relative complication risk in people with diabetes because those who appear in a previous audit, but not the audit period being reported, are correctly identified as having diabetes and not placed in the non-diabetic population. **This change in methodology means that complication ratios and additional risk figures in this report should not be compared directly with figures from NDA complication and Mortality Reports published before January 2017.**

# Cardiovascular complication ratios

These ratios compare the prevalence of complications during a one-year follow-up period for people in the 2016-17 NDA with the prevalence for people who have never appeared in the NDA.

**The risk of cardiovascular complication is approximately 3.5 to 4.5 times as great as that for people with Type 1 diabetes and 2 to 2.5 times as great as that for people with Type 2 and other diabetes.**

**Table 2: Standardised ratios for cardiovascular complications of diabetes, England and Wales, 2016-17 audit, complications during 2017-18**

Complication <sup>a</sup>	Type 1			Type 2 and Other		
	Total Expected <sup>b</sup>	Observed	Standardised ratio	Total Expected <sup>b</sup>	Observed	Standardised ratio
Angina	796	2,875	361	36,846	86,875	236
Myocardial Infarction	310	1,175	379	11,687	23,715	203
Heart failure	723	3,135	434	40,522	95,555	236
Stroke	375	1,205	322	18,002	31,500	175

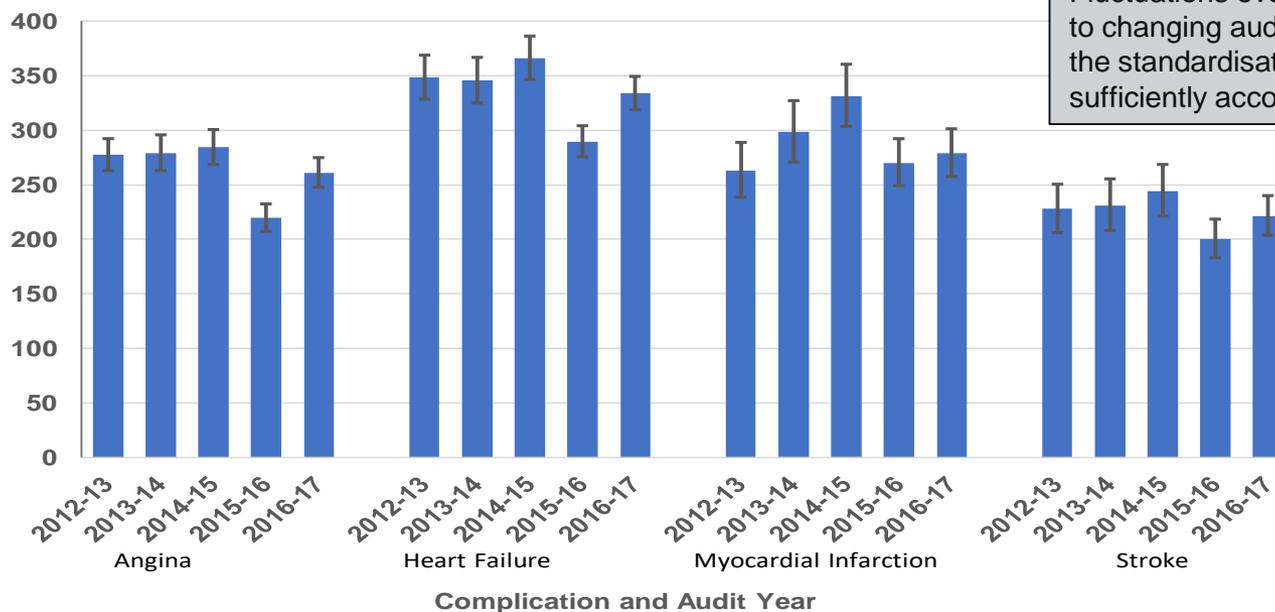
<sup>a</sup> Complications in the financial year following the audit period.

<sup>b</sup> Based on the prevalence in the population who have never appeared in the NDA. This may include people with diabetes who have never appeared in the NDA. Standardised by age, sex and locality. Expected values are calculated projections and are not suppressed. For definitions, see the [Glossary](#) section.

# Cardiovascular complication ratios, Type 1

The additional risk due to Type 1 diabetes appears to have fluctuated over the past five years. This may be caused by changing audit participation over these years (2012-13: 70.6%; 2013-14: 57.1%; 2014-15: 57.3%; 2015-16: 82.4%; 2016-17: 95.3%) having a greater impact than previously thought, or it may be due to the standardisation method not sufficiently accounting for variation.

**Figure 1: Additional risk<sup>a</sup> of cardiovascular complication among people with Type 1 diabetes, England and Wales, 2012-13 to 2016-17 audits, complications during the following year**



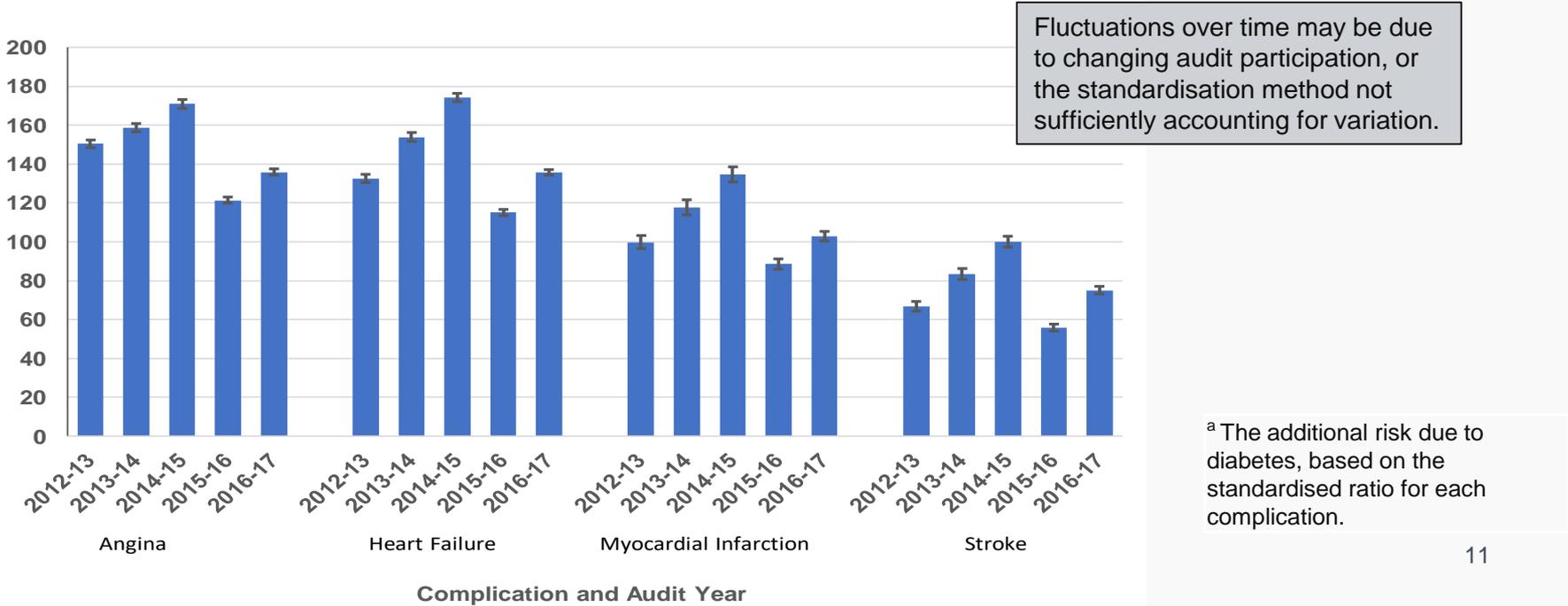
Fluctuations over time may be due to changing audit participation, or the standardisation method not sufficiently accounting for variation.

<sup>a</sup> The additional risk due to diabetes, based on the standardised ratio for each complication.

# Cardiovascular complication ratios, Type 2 and other

The additional risk due to Type 2 diabetes appears to have fluctuated over the past five years. This may be caused by changing audit participation over these years (2012-13: 70.6%; 2013-14: 57.1%; 2014-15: 57.3%; 2015-16: 82.4%; 2016-17: 95.3%) having a greater impact than previously thought, or it may be due to the standardisation method not sufficiently accounting for variation.

**Figure 2: Additional risk<sup>a</sup> of cardiovascular complication among people with Type 2 and other diabetes, England and Wales, 2012-13 to 2016-17 audits, complications during the following year**

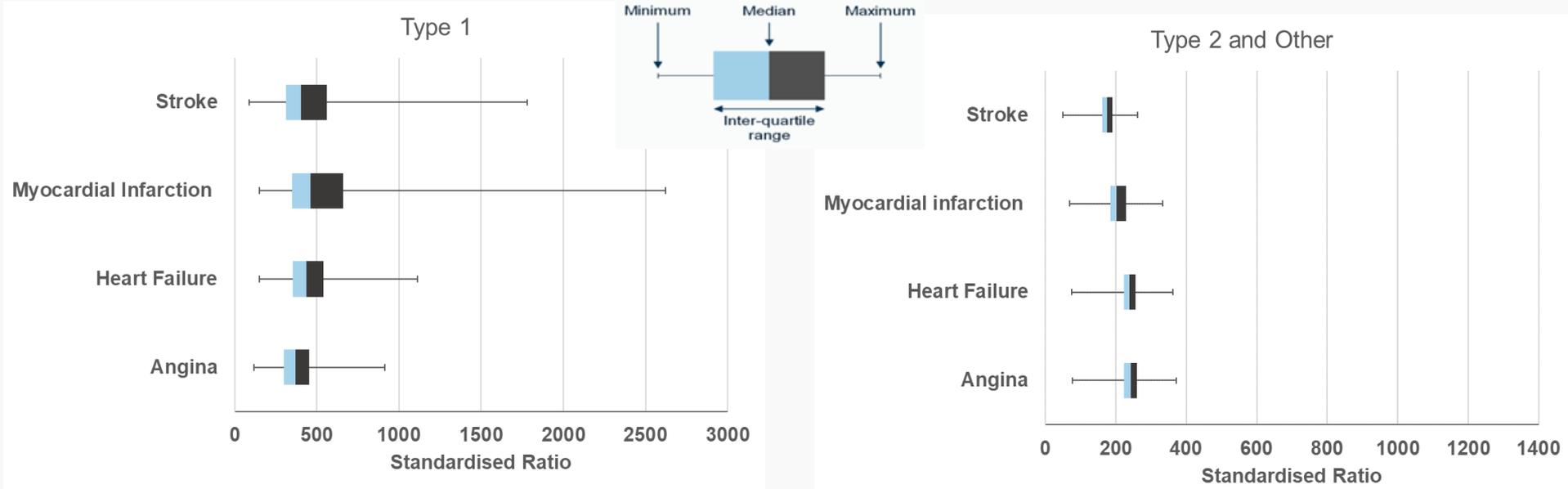


# Cardiovascular complication ratios – locality variation

Figure 3 shows the variation in the complication ratios among the CCGs and LHBs of England and Wales.

This may be due to the standardisation method not sufficiently accounting for key predictive characteristics outside the control of healthcare. Report 2b, accompanying this report, investigates this and provides an assessment of whether CCGs and LHBs are performing as expected.

**Figure 3: The range of CCG/LHB cardiovascular complication ratios for people with diabetes, England and Wales, 2016-17 audit, complications during 2017-18**



# Cardiovascular complications - hospital admissions

Table 3 shows the rate of admission to hospital between 1st April 2017 and 31st March 2018 for cardiovascular disease in people with diabetes – defined as individuals who have appeared in the 2016-17 audit.

**People with diabetes comprise about 5.5 per cent of the adult population yet account for around 25-30 per cent of admissions for cardiovascular complications.**

**Table 3: Number of hospital admissions and NDA related hospital admissions for cardiovascular complications, England and Wales, 2017-2018 HES/PEDW**

Complication <sup>a</sup>	Non-Emergency Admissions			Emergency Admissions		
	Number of all non emergency admissions	Number of non emergency admissions for NDA population	Percentage of non emergency admissions for NDA population	Number of all emergency admissions	Number of emergency admissions for NDA population	Percentage of emergency admissions for NDA population
Angina	228,135	65,845	28.9	263,345	81,780	31.1
Myocardial Infarction	15,305	3,870	25.3	93,675	23,010	24.6
Heart Failure	135,810	41,025	30.2	421,025	134,520	32.0
Stroke	37,615	8,520	22.7	134,895	30,670	22.7

# Cardiovascular hospital bed days

Table 4 shows hospital bed days between 1st April 2017 and 31st March 2018 for people admitted for cardiovascular disease, for all people, and those with diabetes – defined as individuals who have appeared in the NDA at any time up to the 2016-17. audit.

**People with diabetes account for a higher proportion of bed days for cardiovascular conditions than would be expected based on the general population.**

**Table 4: Percentage of hospital bed days and NDA related hospital bed days for cardiovascular complications, England and Wales, 2017-2018 HES/PEDW**

Complication <sup>a</sup>	Non-Emergency Admissions			Emergency Admissions		
	Total number of bed days	Number of bed days for NDA population	Percentage of bed days for NDA population	Total number of bed days	Number of bed days for NDA population	Percentage of bed days for NDA population
Angina	298,145	93,190	31.3	1,511,615	539,685	35.7
Myocardial Infarction	101,365	32,815	32.4	636,595	203,105	31.9
Heart Failure	441,975	141,740	32.1	3,818,620	1,354,795	35.5
Stroke	396,420	92,325	23.3	1,552,630	403,955	26.0

## **2. Diabetes specific complications**

# Diabetes specific complications prevalence, amputations and End Stage Kidney Disease (ESKD)

From the NDA 2016-17, a total of 240,950 people with Type 1 diabetes, and 2,937,020 people with Type 2 and other diabetes, were alive on 31st March 2017 and were included in the analysis of diabetic complications.

Table 5 shows the prevalence of the amputation and ESKD diabetes specific<sup>a</sup> complications recorded between 1<sup>st</sup> April 2017 and 31<sup>st</sup> March 2018 in HES and PEDW.

**Table 5: One year prevalence of diabetes specific complications, England and Wales, 2016-17 audit, complications during 2017-18**

Complication <sup>a</sup>	Type 1		Type 2 and Other	
	Number of people experiencing the complication	Prevalence percentage (not adjusted for the ethnicity, age and sex structure of the population)	Number of people experiencing the complication	Prevalence percentage (not adjusted for the ethnicity, age and sex structure of the population)
Major Amputation	305	0.1	2,005	0.1
Minor Amputation	770	0.3	4,600	0.2
Renal Replacement Therapy (ESKD) <sup>b</sup>	2,665	1.1	17,745	0.6

<sup>a</sup> Complications in the financial year following the audit period.

<sup>b</sup> Very small numbers of amputations and ESKD will be due to non-diabetic disease.

# RRT complication ratios

These complication ratios compare the prevalence of RRT during a one-year follow-up period for people in the 2016-17 NDA with the prevalence of RRT for people who have never appeared in the NDA.

**The risk of ESKD is 17 times as great for people with Type 1 diabetes and 3.6 times as great for people with Type 2 diabetes.**

**Table 6: Standardised ratios for RRT, England and Wales, 2016-2017 audit, complications during 2017-18**

Complication <sup>a</sup>	Type 1			Type 2 and Other		
	Total Expected <sup>b</sup>	Observed	Standardised Ratio <sup>b</sup>	Total Expected <sup>b</sup>	Observed	Standardised Ratio <sup>b</sup>
RRT (ESKD) <sup>c</sup>	144	2,490	1,724	4,656	16,870	362

<sup>a</sup> Complications in the financial year following the audit period.

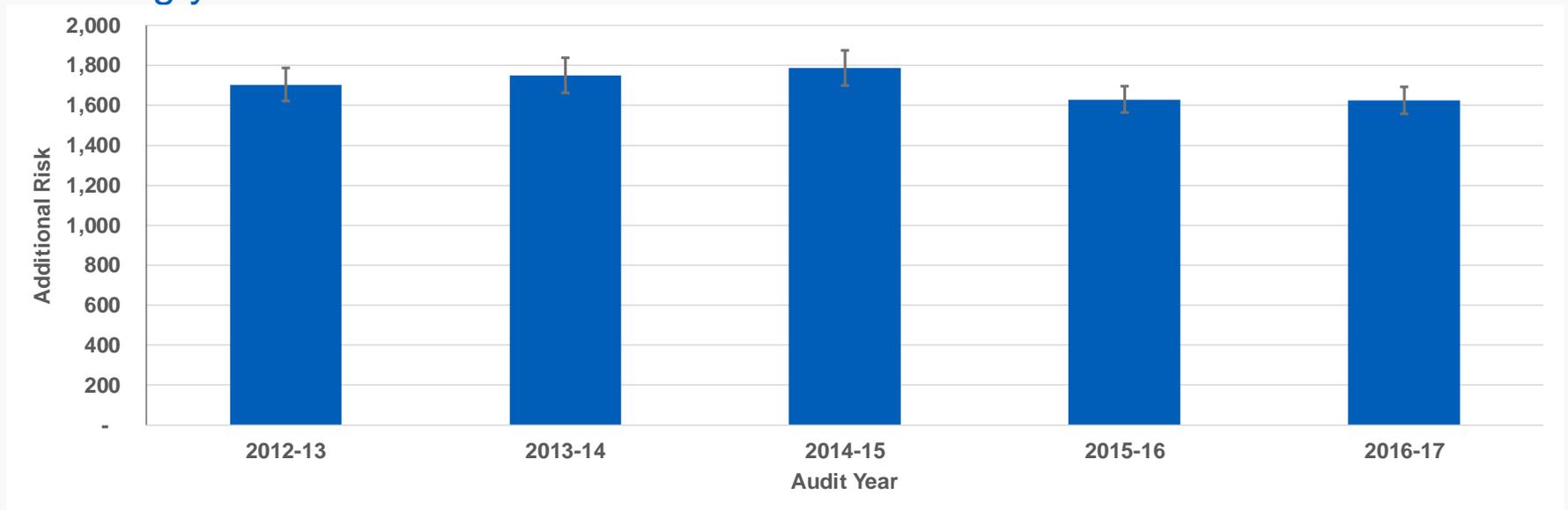
<sup>b</sup> Based on the prevalence in the population who have never appeared in the NDA. This may include people with diabetes who have never appeared in the NDA. Standardised by age, sex and locality. Expected values are calculated projections and are not suppressed. For definitions, see the [Glossary](#) section.

<sup>c</sup> The ICD-10 diagnosis and OPCS procedure codes used to identify the RRT complication have changed since the NDA 2012-13 Report 2 and are therefore not comparable.

# RRT complication ratios, Type 1

A 95% confidence interval is presented for the size of the additional risk.

**Figure 4: Additional risk<sup>a</sup> of RRT among people with Type 1 diabetes, England and Wales, 2012-13 to 2016-17 audits, complications during the following year**

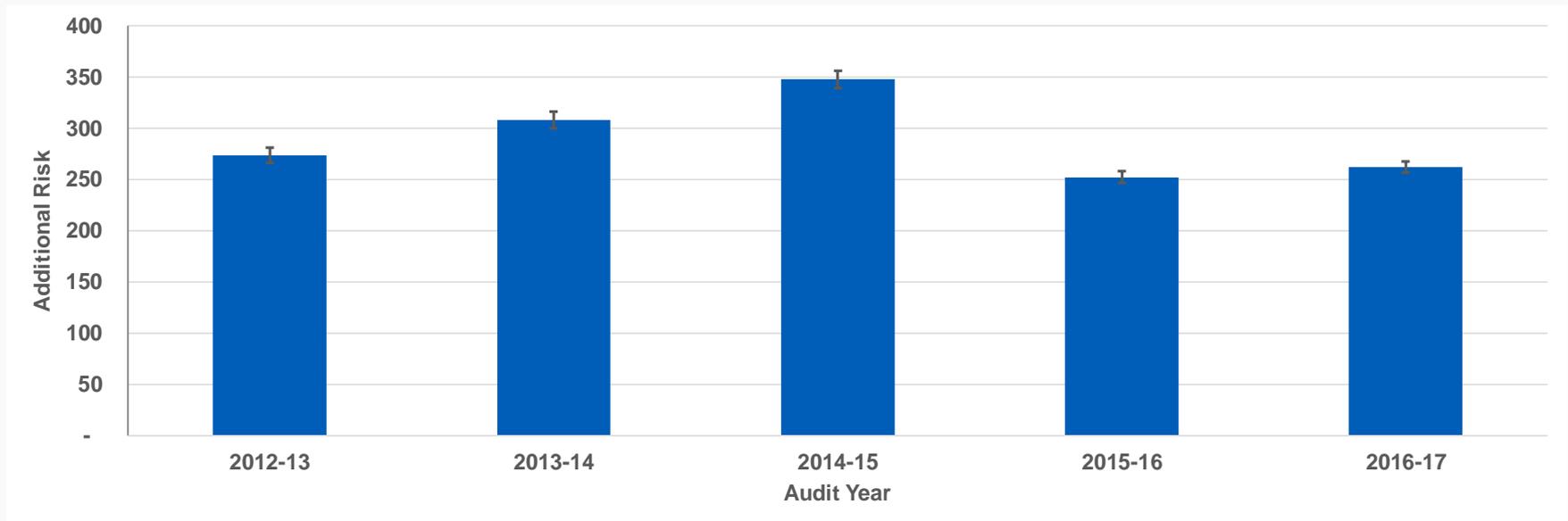


<sup>a</sup> The additional risk due to diabetes, based on the standardised ratio for each complication.

# RRT complication ratio, Type 2 and other

The additional risk due to Type 2 diabetes appears to have fluctuated over the past five years. This may be caused by changing audit participation over these years (2012-13: 70.6 per cent; 2013-14: 57.1; 2014-15: 57.3; 2015-16: 82.4; 2016-17: 95.3) having a greater impact than previously thought, or it may be due to the standardisation method not sufficiently accounting for variation.

**Figure 5: Age specific mortality rate ratios by type of diabetes and sex, 2015-16 audit, England and Wales, deaths in 2017**

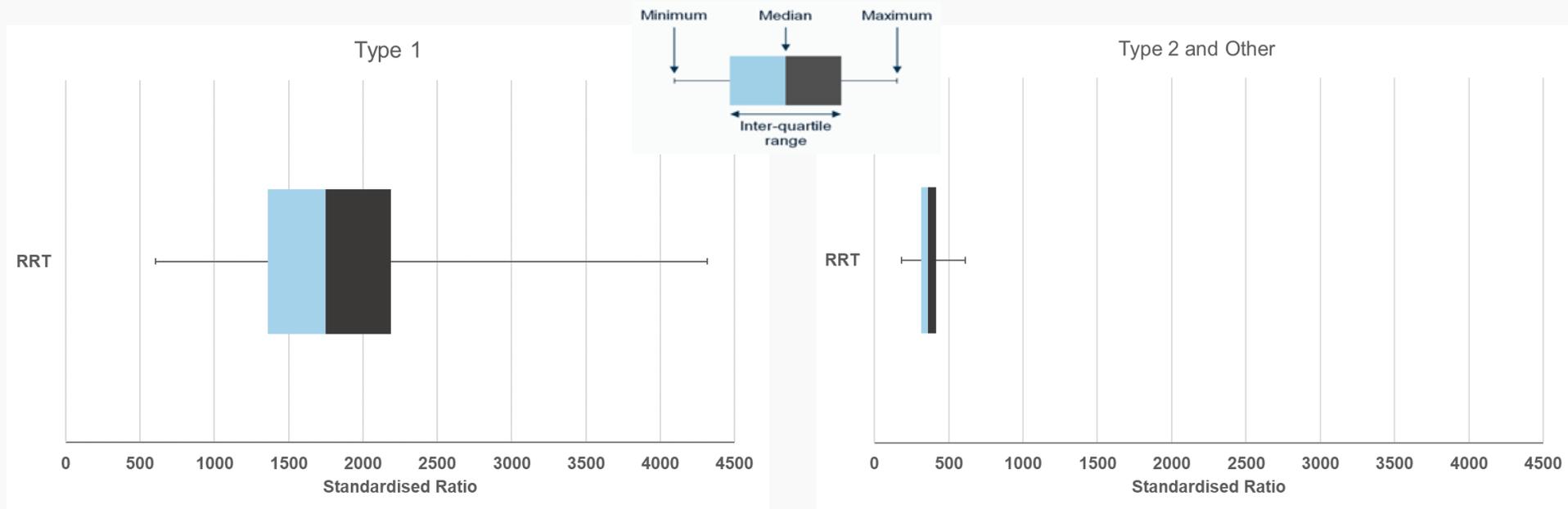


<sup>a</sup> The additional risk due to diabetes, based on the standardised ratio for each complication.

# RRT complication ratio – locality variation

Figure 6 shows the variation in the complication ratios among the CCGs and LHBs of England and Wales. This may be due to the standardisation method not sufficiently accounting for key predictive characteristics outside the control of healthcare. Report 2b, accompanying this report, investigates this and provides an assessment of whether CCGs and LHBs are performing as expected.

**Figure 6: The range of CCG/LHB RRT complication ratios for people with diabetes, England and Wales, 2016-17 audit, complications during 2017-18**



# Amputation prevalence in people with diabetes

- In the last NDA Complications report the association of duration of diabetes with amputation rates was considered in addition to age and sex. This showed that duration was a more dominant factor than age when considering all people with diabetes.
- This approach has been extended to consider other characteristics in Report 2b: Complications and Mortality, that accompanies this report.

# Hospital admissions for diabetes specific complications

People with diabetes comprise about 5% of the adult population yet account for 40-70% of admissions for amputations and RRT.

More than 4 out of 10 of all admissions for major amputations and almost 3 out of 4 of all emergency admissions for minor amputations are in people with diagnosed diabetes.

**Table 7: Number of hospital admissions and NDA related hospital admissions for diabetes specific complications, England and Wales, 2017-2018 HES/PEDW**

Complication <sup>a</sup>	Non-Emergency Admissions			Emergency Admissions		
	Number of all non emergency admissions	Number of non emergency admissions for NDA population	Percentage of non emergency admissions for NDA population	Number of all emergency admissions	Number of emergency admissions for NDA population	Percentage of emergency admissions for NDA population
Major Amputation	1,385	565	40.8	2,000	880	44.0
Minor Amputation	4,495	2,095	46.6	3,085	2,215	71.8
RRT	63,380	22,480	35.5	66,915	28,045	41.9

<sup>a</sup> The complication was not necessarily the primary reason for admission

# Diabetes specific hospital bed days

Table 12 shows hospital bed days for people admitted for amputations or RRT between 1st April 2017 and 31st March 2018 for the known diabetic population – defined as individuals who have appeared in the NDA at any time up to the 2016-17 audit – alongside the total number of bed days for these admissions in all people.

**People with diabetes represent about 5% of the adult population but account for more than 40% of bed days for amputation and RRT.**

**Table 8: Number of hospital bed days and NDA related hospital bed days, England and Wales, 2017-2018 HES/PEDW**

Complication <sup>a</sup>	Non-Emergency Admissions			Emergency Admissions		
	Total number of bed days	Number of bed days for NDA population	Percentage of bed days for NDA population	Total number of bed days	Number of bed days for NDA population	Percentage of bed days for NDA population
Major Amputation	26,890	13,385	49.8	57,930	29,260	50.5
Minor Amputation	18,960	13,080	69.0	52,685	40,980	77.8
RRT	174,355	70,455	40.4	557,785	264,430	47.4

<sup>a</sup> The complication was not necessarily the primary reason for admission

# 3. Mortality

# Causes of death – people in the NDA

Although deaths from vascular disease are declining year on year, there is still a higher percentage of deaths due to vascular disease in people with diabetes than cancer.

**Table 9: Causes of death for people in the NDA, England and Wales, 2007-2017**

Year of Death	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Number of Deaths</b>	36,980	54,320	65,145	75,085	78,795	88,675	94,725	97,525	105,065	111,750	117,465
<b>All Cancers</b>	23.8%	24.3%	24.7%	25.2%	26.0%	25.7%	25.4%	25.6%	24.5%	25.3%	25.2%
<b>All Vascular Outcomes</b>	38.8%	38.2%	37.8%	37.2%	35.3%	34.9%	34.4%	34.0%	33.3%	32.4%	32.1%
<b>All Non-Cancer, Non-Vascular Outcomes</b>	36.3%	36.5%	36.6%	36.7%	37.6%	38.4%	39.1%	39.2%	40.9%	41.0%	41.3%
<b>All Unknown Causes</b>	1.1%	1.0%	0.9%	1.0%	1.1%	1.1%	1.2%	1.2%	1.2%	1.3%	1.3%

**Table 10: Further breakdown of ‘All Vascular Outcomes’ cause of death for people in the NDA, England and Wales, 2007-2017**

Year of Death	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Coronary Heart Disease</b>	22.1%	21.1%	20.7%	19.7%	18.5%	18.2%	17.6%	16.9%	16.4%	15.6%	15.2%
<b>Cerebrovascular Disease</b>	8.9%	9.0%	8.6%	8.8%	9.0%	8.9%	8.7%	9.2%	9.1%	8.7%	8.6%
<b>Other Vascular Disease</b>	7.9%	8.1%	8.5%	8.7%	7.8%	7.8%	8.0%	7.9%	7.9%	8.0%	8.2%

# Causes of death – general population

Deaths due to vascular disease are also declining in the general population, however the percentage of deaths due to vascular disease is similar to the percentage due to cancer.

**Table 11: Causes of death in the General Population, England and Wales, 2007-2017**

Year of Death	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Number of Deaths</b>	505,325	508,725	490,130	493,960	483,895	502,685	505,315	502,465	527,295	529,005	527,380
<b>All Cancers</b>	27.7%	27.7%	28.6%	28.6%	29.6%	29.0%	28.7%	29.2%	28.0%	28.4%	28.3%
<b>All Vascular Outcomes</b>	33.9%	33.2%	32.8%	32.2%	30.4%	30.1%	29.6%	29.3%	28.5%	28.0%	27.8%
<b>All Non-Cancer, Non-Vascular Outcomes</b>	35.6%	36.3%	36.1%	36.5%	37.3%	38.2%	39.0%	38.8%	40.8%	40.9%	41.5%
<b>All Unknown Causes</b>	2.8%	2.8%	2.5%	2.6%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.4%

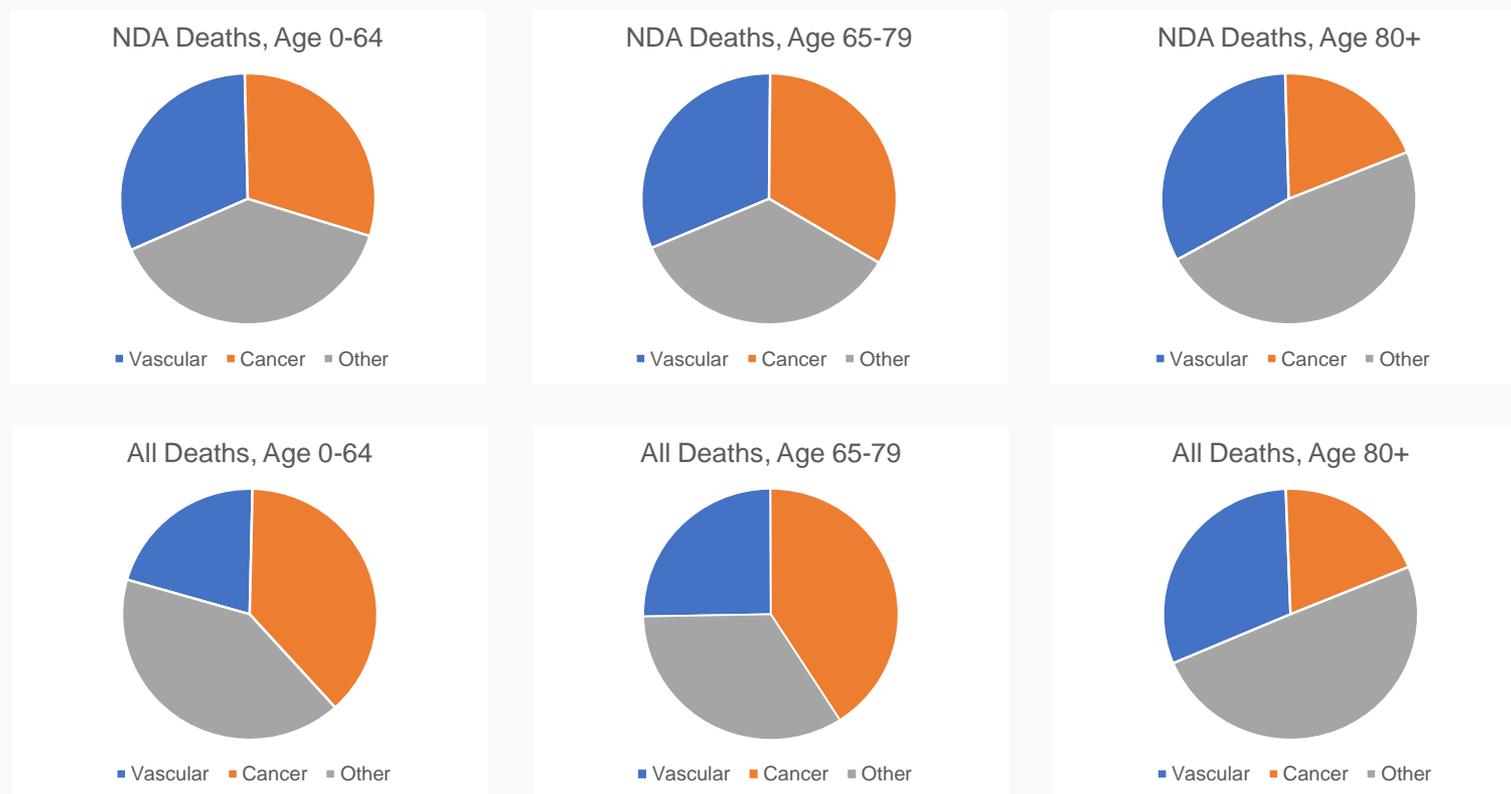
**Table 12: Further breakdown of ‘All Vascular Outcomes’ cause of death in the General Population, England and Wales, 2007-2017**

Year of Death	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Coronary Heart Disease</b>	15.8%	15.1%	14.7%	14.2%	13.3%	12.8%	12.6%	12.1%	11.5%	11.0%	10.9%
<b>Cerebrovascular Disease</b>	9.3%	9.2%	9.0%	8.9%	8.9%	8.9%	8.7%	8.9%	8.9%	8.6%	8.5%
<b>Other Vascular Disease</b>	8.8%	8.9%	9.1%	9.1%	8.2%	8.3%	8.3%	8.3%	8.2%	8.3%	8.3%

# Deaths by age and cause of death

The distribution of causes of death are similar in the two populations at the age of 80 and over. Below this age, vascular causes account for a greater proportion of deaths in people with diabetes.

**Figure 7: Deaths by broad cause and age, in the diabetic and general population, England and Wales, 2017**



# Mortality ratios

All diabetes is associated with additional deaths. Type 1 diabetes has a particularly large influence.

**Table 13: Mortality in people with diabetes, 2015-16 audit, England and Wales, deaths in 2017**

		PYaR <sup>a</sup>	Expected Deaths <sup>a</sup>	Observed Deaths	SMR <sup>a</sup>	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Additional risk of death among people with diabetes %
<b>All Diabetes Types<sup>b</sup></b>	Persons	2,613,810	61,814	94,520	153	152	154	52.9
	Male	1,454,318	34,164	51,790	152	150	153	51.6
	Female	1,156,775	27,649	42,615	154	153	156	54.1
<b>Type 1 Diabetes</b>	Persons	213,400	1,278	3,170	248	239	257	148.0
	Male	120,482	763	1,835	240	230	252	140.5
	Female	92,913	515	1,335	259	246	274	159.2
<b>Type 2 and Other Diabetes</b>	Persons	2,348,189	59,795	89,825	150	149	151	50.2
	Male	1,311,866	33,014	49,210	149	148	150	49.1
	Female	1,036,314	26,781	40,620	152	150	153	51.7

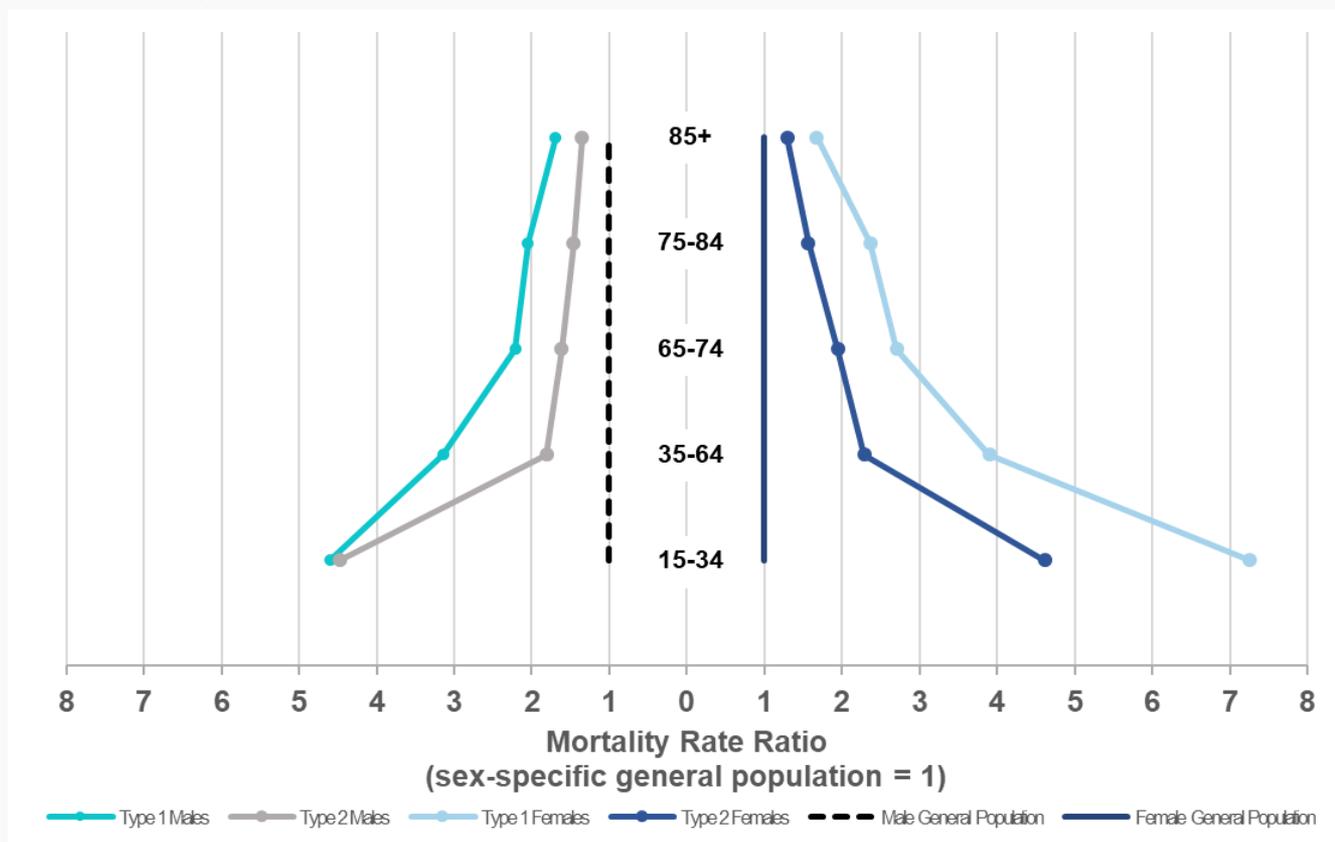
<sup>a</sup> Please refer to the [Glossary](#) section.

<sup>b</sup> All diabetes includes maturity onset diabetes of the young (MODY, other specified diabetes and not specified diabetes)

# Age specific mortality rate ratios

The relative risk of death is increased at all ages, in both men and women, in younger people more than older people<sup>a</sup>.

**Figure 8: Age specific mortality rate ratios by type of diabetes and sex, 2015-16 audit, England and Wales, deaths in 2017**



<sup>a</sup> Smaller numbers of deaths in the 15-34 year age group may affect ratios.

# **4. Definitions, glossary, data sources and additional information**

# Definitions (1)

## Diabetes

Diabetes is a condition where the amount of glucose in the blood is too high because the pancreas does not produce enough insulin. Insulin is a hormone produced by the pancreas that allows glucose to be used as a body fuel and other nutrients to be used as building blocks. There are two main types of diabetes: Type 1 diabetes (no insulin); Type 2 diabetes (insufficient insulin)

## Cardiovascular Complications

**Angina** is chest pain that occurs when the blood supply to the muscles of the heart is restricted. It usually happens because the arteries supplying the heart become hardened and narrowed.

**Myocardial Infarction (MI)**, commonly known as a heart attack, is a serious medical emergency in which the supply of blood to the heart is suddenly blocked, usually by a blood clot.

**Heart failure** means that the heart is unable to pump blood around the body properly. It usually occurs because the heart has become too weak or stiff.

A **stroke** is a serious life-threatening medical condition that occurs when the blood supply to part of the brain is cut off.

# Definitions (2)

## Diabetes Specific Complications

**Renal Replacement Therapy (RRT)** is therapy that replaces the normal blood-filtering function of the kidneys. RRT includes dialysis, hemofiltration and hemodiafiltration, which are various ways of filtration of blood with or without machine. It can also include kidney transplantation.

**Amputation** is the surgical removal of part of the body, such as an arm or leg.

**Diabetic Ketoacidosis (DKA)** is a serious problem that can occur in people with diabetes if their body starts to run out of insulin. This causes harmful substances called ketones to build up in the body, which can be life-threatening if not spotted and treated quickly.

# Glossary (1)

## Confidence Interval

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).

## Population Years at Risk (PYaR)

The population-years-at-risk is the total amount of time during which the population is exposed to a risk. For example, during the one-year mortality follow-up period a person who survives the whole year contributes one year to the total PYaR; a person who dies after three months contributes only 0.25 years to the total PYaR.

## Standardised Mortality Ratio (SMR)

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

# Glossary (2)

## Expected Deaths

The expected death count is that which would occur if the observed subject population experienced the standard population's age-specific mortality rates.

## 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 complication rates and for standard ratios below 100 that it was lower.

## Expected Complications

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

# National Diabetes Audit, 2017-18

Prepared in collaboration with:



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



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**Diabetes UK** is the charity leading the fight against the most devastating and fastest growing health crisis of our time, creating a world where diabetes can do no harm. They provide patient engagement and quality improvement services to the audit programme.

Supported by:



Public Health  
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**The National Cardiovascular Intelligence Network (NCVIN)** is a partnership of leading national cardiovascular organisations which analyses information and data and turns it into meaningful timely health intelligence for commissioners, policy makers, clinicians and health professionals to improve services and outcomes. Public Health England provide analytical and policy context expertise to the audit programme.



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