

Statistical bulletin

Deaths involving *Clostridium difficile*: England and Wales: 2011

Deaths where *Clostridium difficile* infection was mentioned on the death certificate by sex, age group and whether the death occurred in hospital or elsewhere.



Contact:
Claudia Wells
mortality@ons.gsi.gov.uk

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1. Key points

- In 2011 there were 2,053 deaths involving *Clostridium difficile* (*C. difficile*) infection in England and Wales, 651 fewer than in 2010 (2,704)
- Mortality rates for deaths involving *C. difficile* fell for the fourth consecutive year and decreased significantly from 25.6 to 19.3 per million population between 2010 and 2011
- The number of deaths involving *C. difficile* increases with age. During 2009–11 the mortality rate for people aged over 85 years was 1,092 and 1,103 per million for males and females respectively in England and Wales
- During the period 2009–11 *C. difficile* was involved in 0.6 per cent of all deaths in England and Wales, a reduction from 1.4 per cent during the period 2006–08
- Deaths involving *C. difficile* represented 1 per cent of all hospital deaths in England and Wales during 2009–11 compared with 2.2 per cent during 2006–08

2. Summary

This bulletin presents the latest figures for deaths where *Clostridium difficile* (*C. difficile*) infection was mentioned on the death certificate by sex, age group and place of death, in England and Wales. Figures are presented for deaths registered in 2011, with previously released figures presented for 2001 to 2010 for comparison purposes. Information is also given about the context and use of the statistics, and the method used to produce them.

The 2011 mortality rates presented in Figures 1 and 2 and Tables 2 and 3 are provisional as they are based on population projections rather than population estimates. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin (see Background note 7).

The number of death certificates in England and Wales mentioning *C. difficile* fell for the fourth consecutive year in 2011, from 2,704 (25.6 per million population) in 2010 to 2,053 (19.3 per million population) in 2011 (Figure 1).

Of the deaths where *C. difficile* was mentioned on the death certificate in England and Wales in 2011, 42 per cent were deaths where *C. difficile* was the underlying cause (Table 1). This was unchanged from 2010.

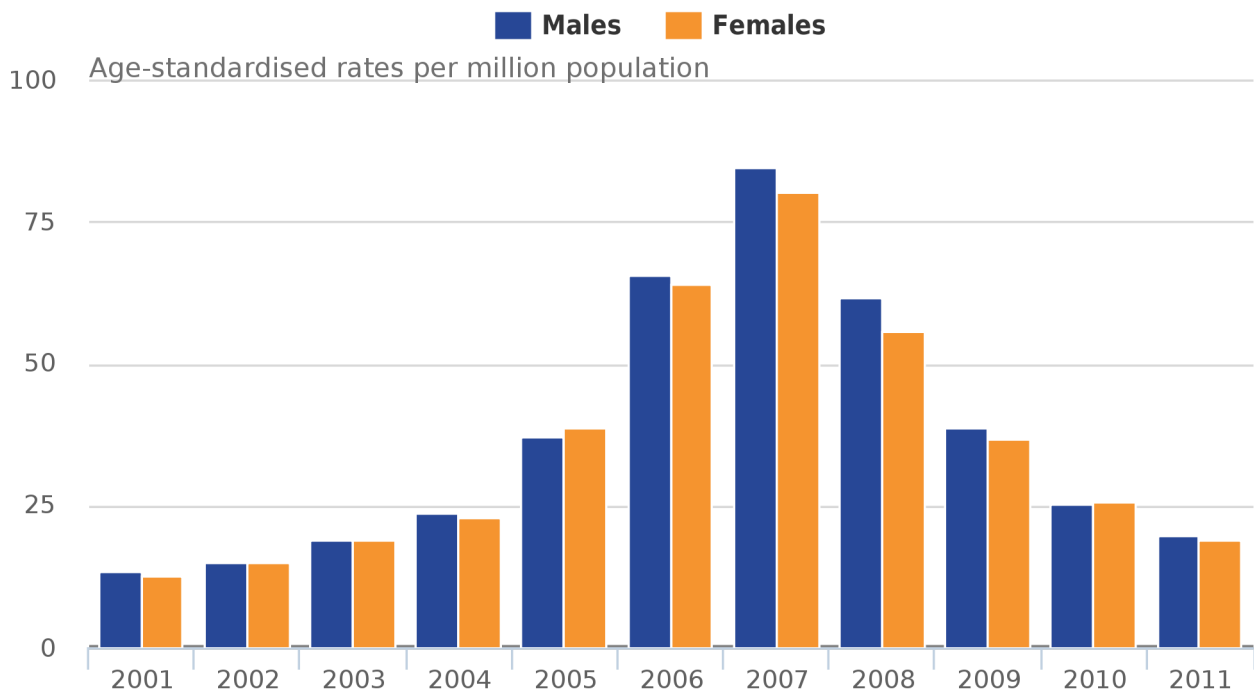
Most of the deaths involving *C. difficile* occur among older people. For both the 2006–08 and 2009–11 periods, mortality rates were highest in those aged 85 years and over at 2,839 and 1,099 per million population respectively in England and Wales (Table 2).

Age-standardised mortality rates for deaths involving *C. difficile* are similar for both sexes. In England and Wales rates were highest in 2007, at 84.7 and 80.4 per million for males and females respectively (Table 3). Rates have since fallen each year and in 2011 they decreased to 19.6 per million population for males and 19.0 per million population for females.

During the period 2009–11 deaths involving *C. difficile* accounted for 0.6 per cent of all deaths in England and Wales, a fall from 1.4 per cent of all deaths during 2006–08 (Reference Table 1).

Between 2006–08 and 2009–11, the proportion of deaths involving *C. difficile* occurring in NHS hospitals in England and Wales decreased from 93.1 to 91.1 per cent (Table 4). However, this decrease was offset by increases in the percentage of *C. difficile* deaths occurring at home, in hospices and in care homes where the proportion of deaths in these establishments rose by 0.4, 0.4 and 1.2 percentage points respectively.

Figure 1. Mortality rates for deaths involving *Clostridium difficile*: by sex, 2001-11



Source: Office for National Statistics

Notes:

1. Rates per million population, standardised to the European Standard Population.
2. Rates for 2001–2010 are based on population estimates and are final. Rates for 2011 are based on population projections, and are therefore provisional.
3. Figures for England and Wales include deaths of non-residents.
4. Figures are for deaths registered in each calendar year.

3. Background

C. difficile is a spore forming anaerobic bacterium that was first described in the 1930s (Hall and O'Toole, 1935). According to the [Health Protection Agency](#) (2012a), it is present in the gut of up to 3 per cent of healthy adults and 66 per cent of infants.

However, *C. difficile* rarely causes problems in children or healthy adults, as it is kept in check by the normal bacterial population of the intestine. When certain antibiotics disturb the balance of bacteria in the gut, *C. difficile* can multiply rapidly and produce toxins which cause illness.

C. difficile infection ranges from mild to severe diarrhoea to, more unusually, severe inflammation of the bowel (pseudomembranous colitis). People who have been treated with broad spectrum antibiotics (those that affect a wide range of bacteria), people with serious underlying illnesses and the elderly are at greatest risk. Over 80 per cent of *C. difficile* infections reported are in people aged over 65 years.

C. difficile infection is usually spread on the hands of healthcare staff and other people who come into contact with infected patients, or with environmental surfaces contaminated with the bacteria or its spores (for example floors, bedpans and toilets).

C. difficile produces spores when the bacteria encounter unfavourable conditions, such as being outside the body. These spores are very hardy and can survive on clothes and environmental surfaces for long periods.

Actions to reduce levels of healthcare associated infections have been detailed in various reports ([Department of Health 2003a](#), [Department of Health 2003b](#); [Department of Health and Health Protection Agency 2009](#)) and have been implemented in healthcare settings.

These include reducing the infection risk from medical instruments, better antibiotic prescribing, isolating infected patients, environmental cleaning and disinfection, and improved hand hygiene. Since April 2007, it has been mandatory for all NHS trusts to report all cases of C. difficile infection in persons aged two years and over to the Health Protection Agency.

This statistical bulletin presents figures for England and Wales. [Clostridium difficile Deaths in Scotland](#) are published by National Records of Scotland and [Deaths Registered with Clostridium difficile Mentioned on the Death Certificate](#) in Northern Ireland are published by the Northern Ireland Statistics and Research Agency (NISRA).

4. Use of the statistics

Figures on the number of deaths from C. difficile in England and Wales are used by various organisations, including the [Department of Health](#) (DH), the [Health Protection Agency](#) (HPA), and [Public Health Wales](#), for monitoring and evaluation purposes. They are also used by primary care organisations (PCOs), local health boards (LHBs) and individual healthcare establishments.

The [Operating Framework for the NHS in England 2012/13](#) (Department of Health, 2011a) states:

'Protecting the safety of our patients is of paramount importance. The zero tolerance approach to all avoidable healthcare associated infections will continue. All NHS commissioners and providers should identify and agree plans for reducing MRSA bloodstream and Clostridium difficile infections in line with the national objectives'.

The [NHS Outcomes Framework 2012/13](#) (Department of Health, 2011b) contains an indicator of C. difficile incidence. PCOs in England are required to reduce the number of C. difficile infections with organisations with higher baseline rates required to deliver larger reductions.

C. difficile infections occurring in England are monitored monthly using data collected by the HPA. The [latest figures](#) show that a total of 18,005 cases of C. difficile occurring in patients aged two years and over were reported in England between April 2011 and March 2012 (2011/12) (Health Protection Agency 2011b).

This represents a reduction of 17 per cent on the 21,707 cases of C. difficile reported in 2010/11 and a 30 per cent reduction on the 25,604 cases reported in 2009/10.

In Wales, surveillance of C. difficile is managed by the Welsh Healthcare Associated Infection Programme (WHAIP), which is part of Public Health Wales. The [latest figures](#) for April 2011 to March 2012 (2011/12) show that there were 2,143 cases of C. difficile reported (Public Health Wales 2011). This represents a reduction of 6 per cent on the 2,280 cases reported in 2010/11.

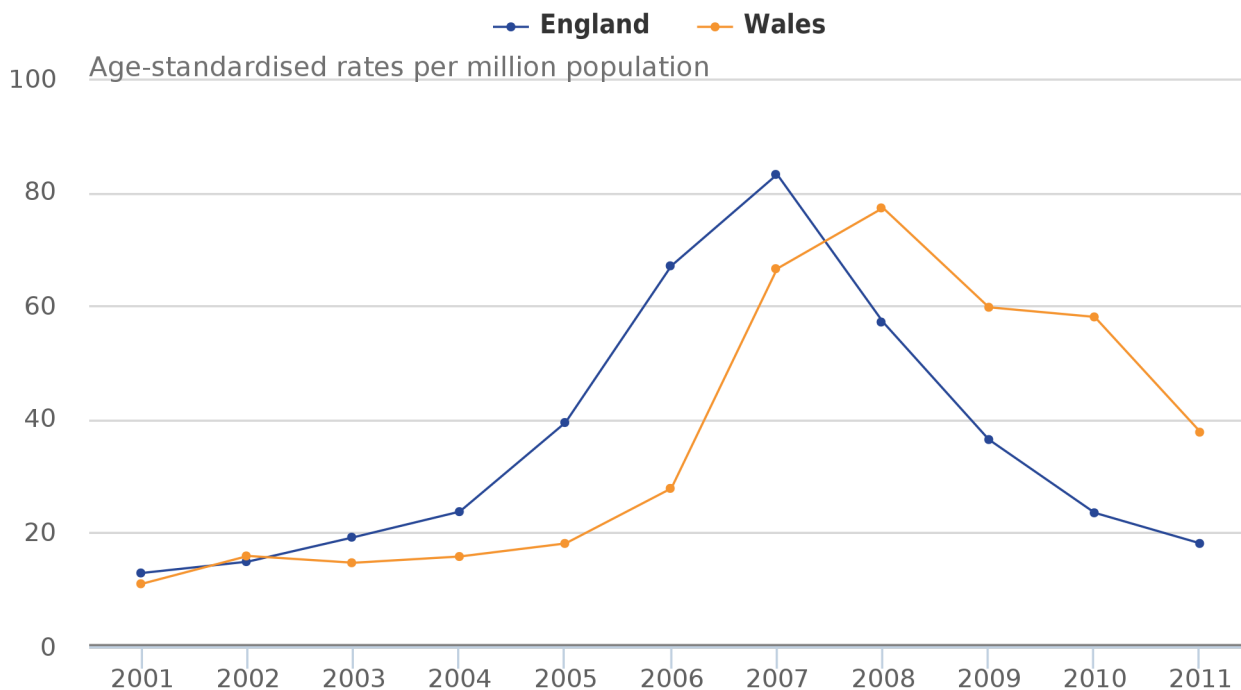
Deaths involving C. difficile statistics have been produced by the Office for National Statistics (ONS) for 1999 and from 2001 onwards (see 'Methods' below for more information). Figures for recent years show a large decrease in the number and rate of deaths, where C. difficile was the underlying cause of death or was mentioned anywhere on the death certificate among both males and females.

This finding is consistent with the incidence figures reported by the HPA and Public Health Wales. The decreases may be due to the actions taken to reduce healthcare associated infections described above.

5. Deaths involving *Clostridium difficile*

The number of death certificates in England and Wales mentioning *C. difficile* fell for the fourth consecutive year in 2011, from 2,704 (25.6 per million population) in 2010 to 2,053 (19.3 per million population) in 2011 (Figure 2).

Figure 2. Mortality rates for deaths mentioning *Clostridium difficile*, 2001-11



Source: England and Wales

Notes:

1. Rates per million population, standardised to the European Standard Population.
2. Rates for 2001–2010 are based on population estimates and are final. Rates for 2011 are based on population projections, and are therefore provisional.
3. Figures for England and Wales separately exclude deaths of non-residents.
4. Figures are for deaths registered in each calendar year.

The number of deaths involving *C. difficile* rose rapidly between 2004 and 2007 increasing from 2,238 (23.2 per million population) in 2004 to 8,324 (82.2 per million population) in 2007, an increase in the mortality rate of over 250 per cent.

Since their peak in 2007, the number of deaths involving *C. difficile* has fallen and the current mortality rate is similar to that observed in 2003, representing a reduction in the mortality rate of over 75 per cent since 2007.

This decline in the number of deaths involving *C. difficile* since 2007 may have been caused by a reduction in the number of infections that is attributed to improved hygiene in hospitals. A [recent study](#) (Stone et al. 2012) found an association between the amount of soap and alcohol hand rub purchased by hospitals and the number of *C. difficile* infections.

Of the deaths where *C. difficile* was mentioned on the death certificate in England and Wales in 2011, 42 per cent were deaths where *C. difficile* was the underlying cause (Table 1). This was unchanged from 2010. During the period 2001 to 2011, the proportion of deaths where *C. difficile* was the underlying cause has generally decreased, falling from 57 per cent in 2001.

In England, the number of deaths where *C. difficile* was mentioned on the death certificate was highest in 2007 at 7,916 (83.1 per million population). This figure fell to 1,815 (18.1 per million population) in 2011, a fall in mortality rate of 78 per cent. The percentage of deaths where *C. difficile* was recorded as the underlying cause tended to decrease between 2001 and 2011 falling from 58 per cent in 2001 to 41 per cent in 2011.

In Wales, the number of deaths involving *C. difficile* peaked a year later than in England at 461 (77.2 per million) in 2008. This figure fell to 236 (37.7 per million) in 2011, a fall in the mortality rate of 51 per cent. The percentage of cases where *C. difficile* was recorded as the underlying cause was lowest in 2007 and 2008 at 44 per cent. In 2011 the figure was 9 percentage points higher than in England at 50 per cent.

Table 1. Number of deaths where *Clostridium difficile* was mentioned on the death certificate, 2007-2011

	Numbers, %										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
England and Wales											
Certificates mentioning <i>C. difficile</i>	1,214	1,416	1,804	2,238	3,757	6,480	8,324	5,931	3,933	2,704	2,053
Certificates where <i>C. difficile</i> was the underlying cause of death	693	754	968	1,229	2,063	3,490	4,056	2,502	1,712	1,130	858
Percentage of mentions selected as underlying cause	57	53	54	55	55	54	49	42	44	42	42
England											
Certificates mentioning <i>C. difficile</i>	1,149	1,325	1,720	2,146	3,648	6,301	7,916	5,465	3,550	2,335	1,815
Certificates where <i>C. difficile</i> was the underlying cause of death	663	706	922	1,172	1,998	3,393	3,875	2,298	1,510	946	739
Percentage of mentions selected as underlying cause	58	53	54	55	55	54	49	42	43	41	41
Wales											
Certificates mentioning <i>C. difficile</i>	64	89	83	88	104	170	399	461	381	368	236
Certificates where <i>C. difficile</i> was the underlying cause of death	29	47	46	54	61	93	177	203	201	184	118
Percentage of mentions selected as underlying cause	45	53	55	61	59	55	44	44	53	50	50

Source: Office for National Statistics Notes: 1. Figures for England and Wales include deaths of non-residents. Data for England and Wales separately exclude deaths of non-residents. 2. Figures are for deaths registered in each calendar year.

Most of the deaths involving *C. difficile* occur among older people. For both the 2006–08 and 2009–11 periods, mortality rates were highest in those aged 85 years and over at 2,839 and 1,099 per million population respectively in England and Wales (Table 2).

Older people tend to be more susceptible to *C. difficile* infection as their immune response is likely to be weaker and they are more likely to be hospitalised, exposed to long-term care facilities or prescribed antibiotics thereby increasing their chance of infection ([Owens et al., 2008](#)).

Figures for persons aged 85 and over were similar for England at 2,875 and 1,034 per million population for 2006–08 and 2009–11 respectively. Figures were slightly lower for Wales during 2006–08, at 2,246 per million population, but higher for 2009–11 at 2,123 per million population.

This difference between Wales and England is mainly due to the fact that the number of *C. difficile* deaths peaked a year later in Wales.

In comparison with those aged 85 years and over, the rates for persons aged between 75 and 84 years in England and Wales during both 2006–08 and 2009–11 were much lower, at 830 and 326 per million population respectively.

Figures for persons aged 75 to 84 in England were similar, but figures for this age group in Wales were lower during 2006–08, at 705 per million population and higher during 2009–11, at 587 per million population. Rates were lowest in the under 45 age group with just one death per million population for both sexes in England and Wales.

Between 2006–08 and 2009–11 the mortality rate fell for all age groups and both sexes, for England and Wales combined. This trend is similar for England, but was not repeated for Wales, where the mortality rate increased during 2009–11 for both men and women aged 65 to 74 and for men aged 45 to 54 years.

Table 2. Mortality rates for deaths where Clostridium difficile was mentioned on the death certificate, by age and sex, 2006-10 and 2009-11

	Rates (per million population)					
	2006-08			2009-11		
	Males	Females	Persons	Males	Females	Persons
England and Wales						
Under 45	1	1	1	1	1	1
45-54	9	8	9	4	4	4
55-64	38	32	35	18	15	17
65-74	178	159	168	72	66	69
75-84	845	818	830	318	332	326
85 and over	2871	2825	2839	1092	1103	1099
England						
Under 45	1	1	1	1	1	1
45-54	9	8	8	4	4	4
55-64	38	32	35	18	14	16
65-74	180	160	170	66	61	64
75-84	855	824	837	299	317	309
85 and over	2904	2861	2875	1040	1031	1034
Wales						
Under 45	:	:	:	:	:	:
45-54	9	12	10	12	6	9
55-64	28	44	36	26	25	26
65-74	141	132	136	157	133	144
75-84	679	724	705	614	567	587
85 and over	2280	2231	2246	1905	2228	2123

Source: Office for National Statistics

Notes:

1. Rates per million population standardised to the European Standard Population.
2. Rates for 2001-2010 are based on population estimates and are final. Rates for 2011 are based on population projections, and are therefore provisional.
3. Rates were not calculated where there were fewer than 3 deaths in a cell, denoted by ':'
4. Rates calculated from fewer than 20 deaths are shown in italics.
5. Figures for England and Wales include deaths of non-residents. Data for England and Wales separately exclude deaths of non-residents.
6. Figures are for deaths registered in the calendar year.

Age-standardised mortality rates for deaths involving C. difficile are similar for both sexes. In England and Wales, rates were highest in 2007 at 84.7 and 80.4 per million for males and females respectively (Table 3). Rates have since fallen each year and in 2011 they decreased to 19.6 per million population for males and 19.0 per million population for females.

This trend is similar for England. However, rates have varied in Wales. Prior to 2004 mortality rates were similar in both Wales and England, but by 2005 the male and female rates for deaths involving *C. difficile* in Wales were less than half the rates recorded in England, at 16.2 and 19.8 per million population respectively.

Rates in Wales increased in 2006 and 2007 and peaked in 2008 at 80.9 per million population for males and 75.1 per million population for females. Mortality rates in Wales have since decreased, but have remained significantly higher than rates in England (see background note 9). In 2011 mortality rates in Wales were double the rates in England at 40.5 and 35.2 per million population for males and females respectively.

Table 3. Mortality rates for deaths where *Clostridium difficile* was mentioned on the death certificate: by sex, 2001-11

Year	Rates (per million population)					
	England and Wales		England		Wales	
	Males	Females	Males	Females	Males	Females
2001	13.3	12.7	13.4	12.8	12.2	10.4
2002	15.2	15.0	15.0	15.0	18.0	15.2
2003	18.8	19.0	19.1	19.2	13.8	15.8
2004	23.7	23.1	24.1	23.5	16.2	15.7
2005	37.0	38.6	38.3	39.8	16.2	19.8
2006	65.5	64.2	68.0	66.2	23.4	31.7
2007	84.7	80.4	86.0	81.0	63.2	68.8
2008	61.7	55.9	60.4	54.6	80.9	75.1
2009	38.8	36.9	37.4	35.5	60.8	57.4
2010	25.4	25.7	23.4	23.5	54.9	59.5
2011	19.6	19.0	18.3	17.9	40.5	35.2

Source: Office for National Statistics Notes: 1. Rates per million population standardised to the European Standard Population. 2. Rates for 2001-2010 are based on population estimates and are final. Rates for 2011 are based on population projections, and are therefore provisional. 3. Figures for England and Wales include deaths of non-residents. Data for England and Wales separately exclude deaths of non-residents. 4. Figures are for deaths registered in the calendar year.

6. Place of death

During the period 2009–11 deaths involving *C. difficile* accounted for 0.6 per cent of all deaths in England and Wales, a fall from 1.4 per cent of all deaths during 2006–08. Death certificates rarely specify the place where an infection was acquired, although the place of death is routinely recorded.

The majority of deaths in England and Wales occur in hospital. It is therefore expected that most deaths involving *C. difficile* infection will occur in hospital. ONS does not routinely produce figures by individual hospital establishment.

During the period 2009–11, 91.1 per cent of *C. difficile* deaths in England and Wales occurred in NHS hospitals. This represents 1.0 per cent of all deaths that occurred in NHS hospitals.

For England the percentage of deaths involving *C. difficile* that occurred in NHS hospitals during 2009–11 was 90.7 per cent in comparison with 94.6 per cent in Wales. These figures represent 1.0 and 1.7 per cent of all deaths in NHS hospitals in England and in Wales respectively.

In England and Wales, 6.1 per cent of deaths involving *C. difficile* occurred in care homes during 2009–11. This represents 0.2 per cent of all deaths which occurred in these establishments. The percentage of *C. difficile* deaths occurring in care homes in England was similar at 6.5 per cent, but lower in Wales at 2.7 per cent.

Between 2006–08 and 2009–11, the proportion of deaths involving *C. difficile* occurring in NHS hospitals in England and Wales decreased from 93.1 to 91.1 per cent (Table 4). However, this decrease was offset by increases in the percentage of *C. difficile* deaths occurring at home, in hospices and in care homes where the proportion of deaths in these establishments rose by 0.4, 0.4 and 1.2 percentage points respectively.

Table 4. Proportion of deaths involving *Clostridium difficile* occurring in selected communal establishments, 2006-08 and 2009-11

	%	
	2006-08	2009-11
Hospital (NHS)	93.1	91.1
Care home	4.8	6.0
Home	1.1	1.5
Hospice	0.7	1.1
Other	0.3	0.2

Source: Office for National Statistics

Notes:

1. Figures for England and Wales include deaths of non-residents.
2. Figures are for deaths registered in each calendar year.

7. Results

Data for deaths involving *C. difficile* can be found in [Reference Table 1 \(102.5 Kb Excel sheet\)](#) and [Reference Table 2 \(1.38 Mb Excel sheet\)](#).

The workbooks contain the following results for England and Wales:

- The number of death certificates with *Clostridium difficile* mentioned and as the underlying cause of death, by sex and country, 1999 and 2001 to 2011
- The number of death certificates with *Clostridium difficile* mentioned and as the underlying cause of death, by sex, country and annual registration quarters, 1999 and 2001 to 2011
- Age-standardised mortality rates (with 95 per cent confidence intervals) for deaths where *Clostridium difficile* was mentioned on the death certificate, by country and sex, 1999 and 2001 to 2011
- The number of deaths where *Clostridium difficile* was mentioned on the death certificate by place of death and country, 2006–08 and 2009–11

8. Methods

All deaths in England and Wales are coded by ONS according to the International Classification of Diseases (ICD) supplied by the World Health Organisation (WHO). In the Tenth Revision (ICD–10), used by ONS from 2001 onwards, there is a specific code (A04.7) for 'Enterocolitis due to *Clostridium difficile*'.

While this code identifies the vast majority of deaths involving *C. difficile*, a small number of *C. difficile*-related deaths are not captured by this code alone.

Since 1993 ONS has stored the text of death certificates on a database, in addition to all the ICD codes relating to causes identified on the death certificate. This means that it is possible to identify records where *C. difficile* is mentioned, but is not coded under the specific ICD–10 code.

In addition to extracting all deaths related to the specific A04.7 ICD–10 code, deaths mentioning a number of other ICD categories to which diseases including *C. difficile* could be coded were also extracted.

The text of these death certificates is searched manually for mentions of *Clostridium difficile*, *C. difficile* or pseudomembranous colitis. The ICD–10 codes used to select deaths in order to search manually are shown in Box 1.

Deaths registered in 1999 were coded to both ICD–9 and ICD–10 as part of a special study to compare the two ICD revisions, and have therefore been used to give an additional year of data on deaths involving *C. difficile*.

Box 1. Specific and non-specific ICD-10 codes related to *Clostridium difficile*

Specific codes ¹	Non-specific codes ¹
A04.7 (<i>Enterocolitis due to Clostridium difficile</i>)	A05.8 (<i>Other specified bacterial food borne intoxications</i>)
	A41.4 (<i>Septicaemia due to anaerobes, excludes gas gangrene</i>)
	A48.0 (<i>Gas gangrene: Clostridial; cellulites, myonecrosis</i>)
	A49.8 (<i>Other bacterial infections of unspecified site</i>)
	P36.5 (<i>Sepsis of newborn due to anaerobes</i>)

Notes:

1. Codes used to identify deaths where *C. difficile* was the underlying cause of death (on deaths where *C. difficile* was mentioned): A04.7, A09, A41.4 and A49.8.

Deaths with an underlying cause of *C. difficile* were identified by selecting those deaths with a mention of *C. difficile* that also had an underlying cause of one of the following ICD-10 codes: A04.7, A41.4 and A49.8.

As in previous *C. difficile* reports (Office for National Statistics 2010a), death certificates that mention *C. difficile* and record the code A09 (Diarrhoea and gastroenteritis of presumed infectious origin) as the underlying cause of death, are also taken to indicate that *C. difficile* was the underlying cause of death.

Since 1986, ONS has used the internationally recommended death certificate for neonatal deaths (infants aged under 28 days). This means that these deaths cannot be assigned an underlying cause of death. However, as the data were based on deaths where *C. difficile* or pseudomembranous colitis were mentioned on the death certificate, neonates have been included. Neonatal deaths were extracted in the same way as described above for post-neonatal deaths.

9. References

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[Department of Health \(2003b\) Winning Ways: Working together to reduce Healthcare Associated Infection in England: Report of the Chief Medical Officer, accessed 2 August 2012.](#)

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10. Background notes

1. Statistics on mortality are derived from the information provided when deaths are certified and registered. Further information about the methods and quality of these statistics can be found in the Quality and Methodology Information reports for [Mortality Statistics](#) and Deaths involving [Clostridium difficile](#) in England and Wales.
2. Information about the underlying mortality data, including details on how the data are collected and coded, are available in the [mortality metadata \(2.7 Mb Pdf\)](#).

3. The number of deaths due to *C. difficile* is difficult to estimate. Trends in mortality are normally monitored using the underlying cause of death (the disease which initiated the train of events leading directly to death). However, *C. difficile* (and other healthcare associated infections) are often not the underlying cause of death. Those who die with *C. difficile* are usually patients who were already very ill, and it may be their existing illness, rather than *C. difficile*, which is designated as the underlying cause of death. There is therefore an interest in the number of deaths where *C. difficile* contributed to the death – only conditions which contribute directly to the death should be recorded on the death certificate. Results presented in this bulletin identify deaths where the underlying cause was *C. difficile* and also where *C. difficile* was mentioned as the underlying cause or as a contributory factor in the death.
4. Although *C. difficile* is commonly referred to as a healthcare associated infection, it is not possible to state from the information on a death certificate where the infection was acquired, nor can assumptions be made about quality of care. People are often transferred between hospitals, care homes and other establishments, and may acquire infections in a different place from where they died.
5. Guidance on death certification, with specific reference to healthcare associated infections, was issued to doctors in May 2005 (revised in 2010) (Office for National Statistics 2010). This was followed by a [message from the Chief Medical Officer](#) to all doctors reminding them of their responsibilities with respect to death certification and drawing their attention to the guidance (Department of Health 2005). More recently, the Department of Health and Health Protection Agency (2009) released a [report detailing good practice and recommendations on completing death certificates](#) for deaths involving *C. difficile*.
6. Data presented in this bulletin are based on deaths registered in each year. Of the 2,053 deaths registered in 2011 mentioning *C. difficile*, 97 occurred in years prior to 2011.
7. This bulletin presents age-standardised (also known as 'directly-standardised') rates, standardised to the European Standard Population. These make allowances for differences in the age structure of the population, over time and between sexes. The age-standardised rate for a particular cause of death is that which would have occurred if the observed age-specific rates for that cause had applied in the given standard population. A [template \(63.5 Kb Excel sheet\)](#) showing how age-standardised rates are calculated is available on ONS's website.
8. Mortality rates based on population estimates are available for 2001 to 2010 and provisional rates based on population projections are available for 2011. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.
9. Rates were not calculated where there were fewer than three deaths in a cell, denoted by ':'. It is ONS practice not to calculate rates where there are fewer than three deaths in a cell, as rates based on such low numbers are susceptible to inaccurate interpretation. Rates which were calculated from less than 20 deaths are distinguished by italic type as a warning to the user that their reliability as a measure may be affected by the small number of events.
10. Within this bulletin, a difference which is described as 'significant' can be considered to be statistically significant and has been assessed using 95 per cent confidence intervals. Confidence intervals are a measure of the statistical precision of an estimate and show the range of uncertainty around the estimated figure. Calculations based on small numbers of events are often subject to random fluctuations. As a general rule, if the confidence interval around one figure overlaps with the interval around another, we cannot say with certainty that there is more than a chance difference between the two figures.
11. Special extracts and tabulations of deaths involving *C. difficile* data for England and Wales are available to order for a charge (subject to legal frameworks, disclosure control, resources and agreement of costs, where appropriate). Such requests or enquiries should be made to:

Mortality Analysis Team, Health and Life Events Division Office for National Statistics Government Buildings Cardiff Road Newport Gwent NP10 8XG

Tel: +44 (0) 1633 456736 E-mail: mortality@ons.gsi.gov.uk

The ONS charging policy is available on the ONS website.

12. As a valued user of our statistics, we would welcome feedback on this release. In particular, the content, format and structure. This is in line with the Health and Life Events user engagement strategy, available to download from the ONS website.

Please send feedback to the postal or e-mail address above.

13. A list of the names of those given pre-publication access to the statistics and written commentary is available in [Pre-release access list to Deaths involving Clostridium difficile \(29.6 Kb Pdf\)](#) . The rules and principles which govern pre-release access are featured within the [Pre-release Access to Official Statistics Order 2008](#).
14. National Statistics are produced to high professional standards set out in the Code of Practice for Official Statistics. They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference.
15. Follow ONS on [Twitter](#) and [Facebook](#).
16. Next publication: August 2013
17. Media contact:

Tel: Media Relations Office 0845 6041858 Emergency on-call 07867 906553 Email: media.relations@ons.gsi.gov.uk
18. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk