

Voluntary surveillance of *Clostridium difficile* in England, Wales and Northern Ireland, 2008

Key Points

- This update describes reports of *Clostridium difficile* (faecal) samples made to the HPA in 2008 from laboratories in England, Wales, and Northern Ireland.
- There were 37,134 reports in 2008, comprising 32,602 from England, 2,860 from Wales and 1,672 from N. Ireland. This was a 35.1% decrease in the number of *C. difficile* laboratory reports compared to 2007.
- The incidence rate of *C. difficile* per population has decreased in England and Wales from 104 to 63 and 97 to 96 samples per 100,000 population respectively, and increased in Northern Ireland from 79 to 94 samples per 100,000 population.
- Around 80% of all reported cases are in the 65 years and over age group.
- The number of labs across England, Wales and Northern Ireland reporting cases of *C. difficile* has decreased by 7% from 186 in 2007 to 173 in 2008.

Surveillance of *C. difficile* laboratory faecal samples in England and Wales was introduced in 1990 as part of the Public Health Laboratory Service's voluntary monitoring of infectious diseases. In 2001, this surveillance was extended to include Northern Ireland¹. Most of the information is received through electronic reporting to the HPA's database (LabBase) by NHS laboratories; the remainder are obtained from paper records. Additional information on reported cases may include patient details such as age and sex, and details of detection methods used.

Mandatory reporting of *C. difficile* in people aged 65 years and over was introduced in England in January 2004, and adapted to include people aged between 2 and 64 years in April 2007. This surveillance scheme brings in greater participation and reporting, but it has not replaced voluntary reporting of cases of *C. difficile* disease. Furthermore, voluntary surveillance allows comparison of trends over a longer time period as well as inter-country comparisons. The results of the two systems are not directly comparable for a number of reasons. For example, unlike the mandatory system, the voluntary system may include samples that are culture positive, or identified through means other than the detection of toxins. Furthermore, some laboratories may not report data to the voluntary scheme as they have difficulties sending laboratory data electronically which substantially hinders complete reporting.

This report covers voluntary reports of *C. difficile* faecal samples made to the HPA in 2008 for all ages from laboratories in England, Wales, and Northern Ireland. Age specific rates of *C. difficile* were calculated using Office of National Statistics 2008 mid-year resident population estimates as denominators. Data were analysed and displayed according to current regional HPA boundaries.

In 2008, the HPA received 37,134 reports of *C. difficile* laboratory samples, a 35.1% decrease on the 57,255 reports received during 2007 (Table 1, Figure 1). The 2008 total comprised 32,602 from England, 2,860 from Wales and 1,672 from N. Ireland. This reflected a decrease of 38.5% in England, a decrease of 0.8% in Wales, and an increase of 20.8% in Northern Ireland.

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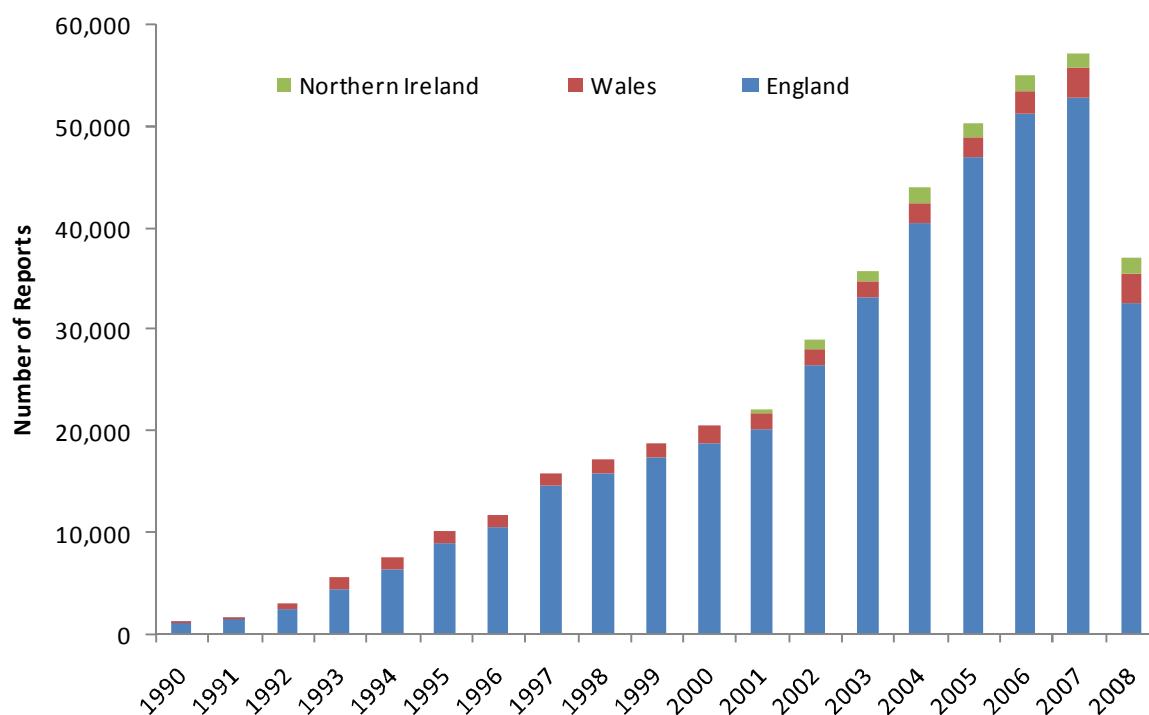
Table 1. Total voluntary reports of *C. difficile* in England, Wales and N.Ireland 1990-2008***

Earliest Specimen Year	England	Wales	Northern Ireland	Total
1990	1172	22	-	1194
1991	1591	70	-	1661
1992	2423	506	-	2929
1993	4439	993	-	5432
1994	6387	1083	-	7470
1995	8905	1134	-	10039
1996	10440	1290	-	11730
1997	14541	1331	-	15872
1998	15721	1397	-	17118
1999	17279	1438	-	18717
2000	18812	1744	-	20556
2001	20064	1599	345	22008
2002	26357	1710	930	28997
2003	33201	1587	1016	35804
2004	40414	2114	1388	43916
2005	47023	1957	1412	50392
2006	51284	2255	1429	54968
2007	52988	2883	1384	57255
2008	32602	2860	1672	37134

* Data for 2008 are provisional (data was extracted on 21st September 2009)

** Northern Ireland reports included from 2001

Figure 1. Trends in total voluntary reports of *C. difficile* isolated from faecal specimens under the voluntary reporting scheme: England, Wales and Northern Ireland 1990 - 2008***



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Laboratory reports received under the voluntary reporting scheme

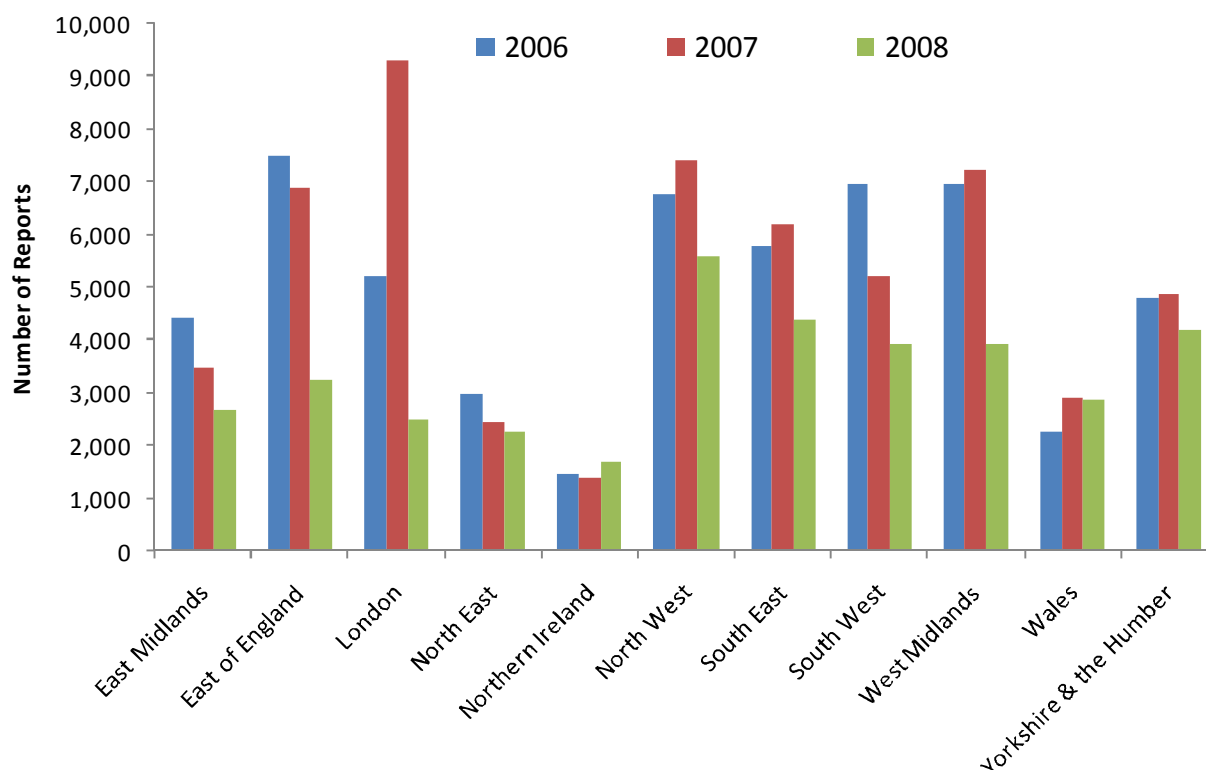
The overall rate for all of England, Wales and Northern Ireland was 66 *C. difficile* laboratory reports per 100,000 population in 2008. The rates of *C. difficile* laboratory reports for the overall population were 63 per 100,000 population in England, 96 samples per 100,000 in Wales and 94 samples per 100,000 in Northern Ireland.

Since 2007, the population rate has decreased from 104 to 63 *C. difficile* samples per 100,000 population in England, from 97 to 96 samples per 100,000 population in Wales and has increased from 79 to 94 samples per 100,000 in Northern Ireland.

The large increase observed for London between 2006 and 2007 is due to patient screening that was undertaken at an acute trust. Many of these reports for *C. difficile* had no detectable toxin. In 2008 there was a considerable decrease in London, and this reflects the fall in the number of reports of *C. difficile* where there was no detectable toxin

There has been an increase in the population rate in Northern Ireland. This is most likely to be due to the combination of an outbreak of *C. difficile* ribotype 027 in late 2007/early 2008², and two periods of increased incidence of *C. difficile* infection in hospital wards during the second half of 2008^{3,4}.

Figure 2. Laboratory reports of *C. difficile*: English health regions, Wales and Northern Ireland 2006 – 2008*



* Data from 2008 are provisional (data was extracted on 21st September 2009)

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Age and sex-specific rates of *C. difficile*

Across all age groups there has been an average decrease of 35.5% in the number of reports of *C. difficile* between 2007 and 2008, however the number of reports remains higher among the older age groups. Around 79.7% of all reported cases are in people aged 65 years and over. The proportion of total samples reported that were from people under 65 years has remained static at 20.1% to 19.9%.

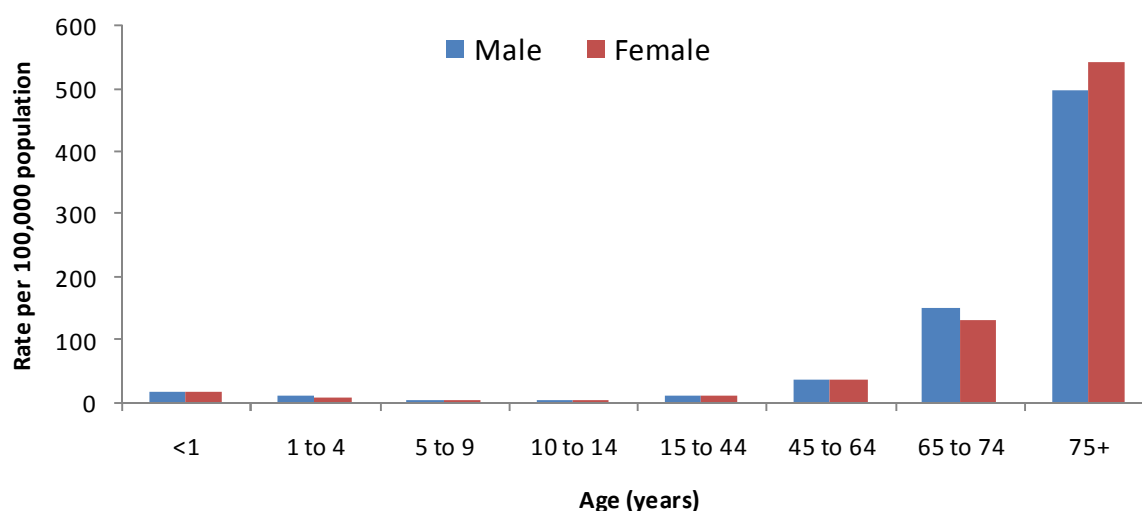
C. difficile rates are markedly higher in older age groups: age-specific rates of *C. difficile* reports were 34.5 per 100,000 population in people aged 45-64, 140.3 per 100,000 population in people aged 65-74 and 525 per 100,000 population in people aged 75 years and older.

Table 2. Age and sex distribution of laboratory reports of *C. difficile* in England, Wales, and Northern Ireland, 2008.

Age Group	Male	Female	Sex not specified	Total	Rate per 100,000		
					Male	Female	Total
<1 year	55	50	5	110	14.7	14.1	15.1
1 to 4 years	113	92	3	208	8.2	7.0	7.7
5 to 9 years	40	54	0	94	2.5	3.5	3.0
10 to 14 years	43	43	1	87	2.5	2.6	2.6
15 to 44 years	903	1158	10	2071	7.7	10.1	8.9
45 to 64 years	2424	2401	17	4842	35.0	33.7	34.5
65 to 74 years	3341	3221	19	6581	149.6	131.0	140.3
75+ years	8580	14367	57	23004	497.1	541.0	525.0
Age not specified	9	24	104	137			
All ages	15508	21410	216	37134	56.1	75.0	66.1

Compared to 2007, the number of *C. difficile* reports decreased by 35.6% in males, and 35% in females. Overall, there were 75 *C. difficile* laboratory reports per 100,000 population in females, and 56.1 per 100,000 population in males. In the group with the highest rates (people aged 75 years and over), rates were higher in women compared to men. In the 65-74 year age group, rates were higher in men.

Figure 3. Age specific rates[†] of *C. difficile* from laboratory reports under voluntary reporting scheme: England, Wales and Northern Ireland 2008*



* Data from 2008 are provisional (data was extracted on 21st September 2009)

[†] Rates are calculated using 2008 ONS mid-year population estimates

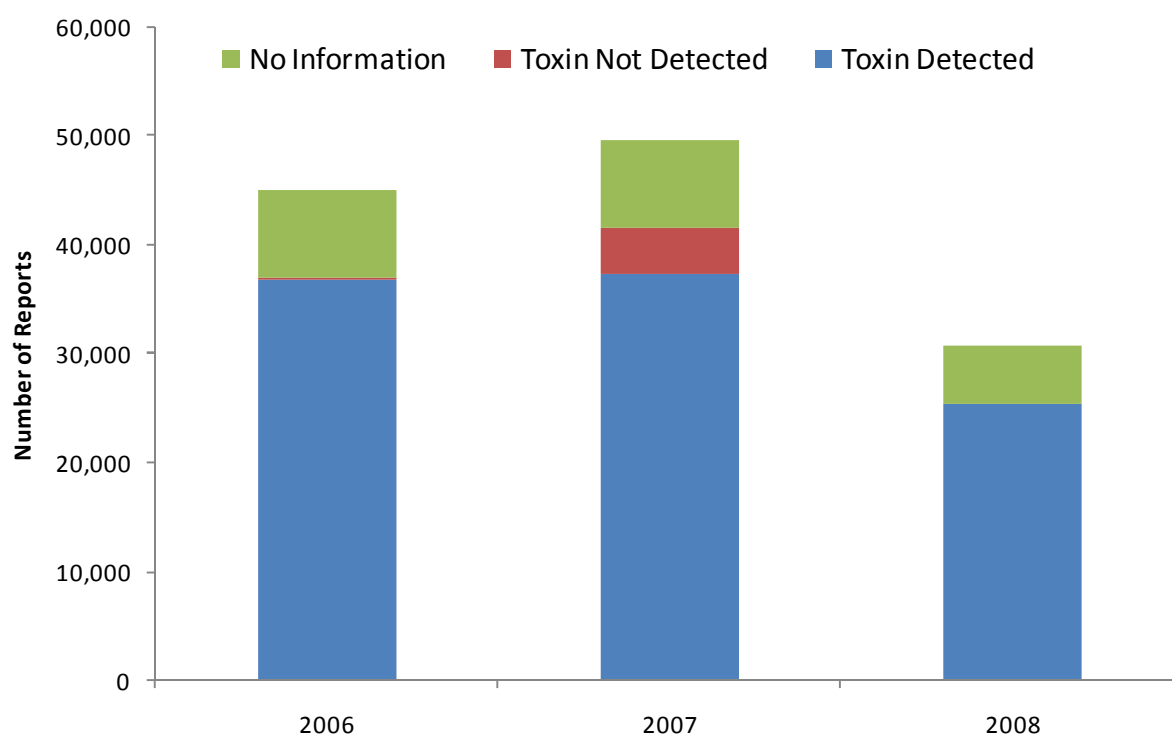
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Reports of toxin detection in *C. difficile*

The toxins produced during a *C. difficile* infection are the major virulence factors contributing to disease. They are also the primary markers for diagnosis through the detection of toxin via antibody based and cytotoxicity assays, although other methods such as microscopy, sequence based detection methods, and culture techniques are also used.

In 2008, 82.2% of reports received by LabBase indicated that toxin had been detected and 17.8% did not contain any information on toxin detection. There were no reports that specifically stated that toxin had not been detected in 2008. This was a decrease from 8.5% in 2007. The higher proportion of reports of 'toxin not detected' may reflect the method of diagnosis used; in 2007 in London patient screening programme saw an increase in the use of electron microscopy and culture as methods of diagnosis and these do not specifically screen for toxin production.

Figure 4. Reports of toxin detection in *C. difficile*: England, Wales and Northern Ireland 2006-2008*



* Data for 2008 is provisional (data was extracted on 21st September 2009)

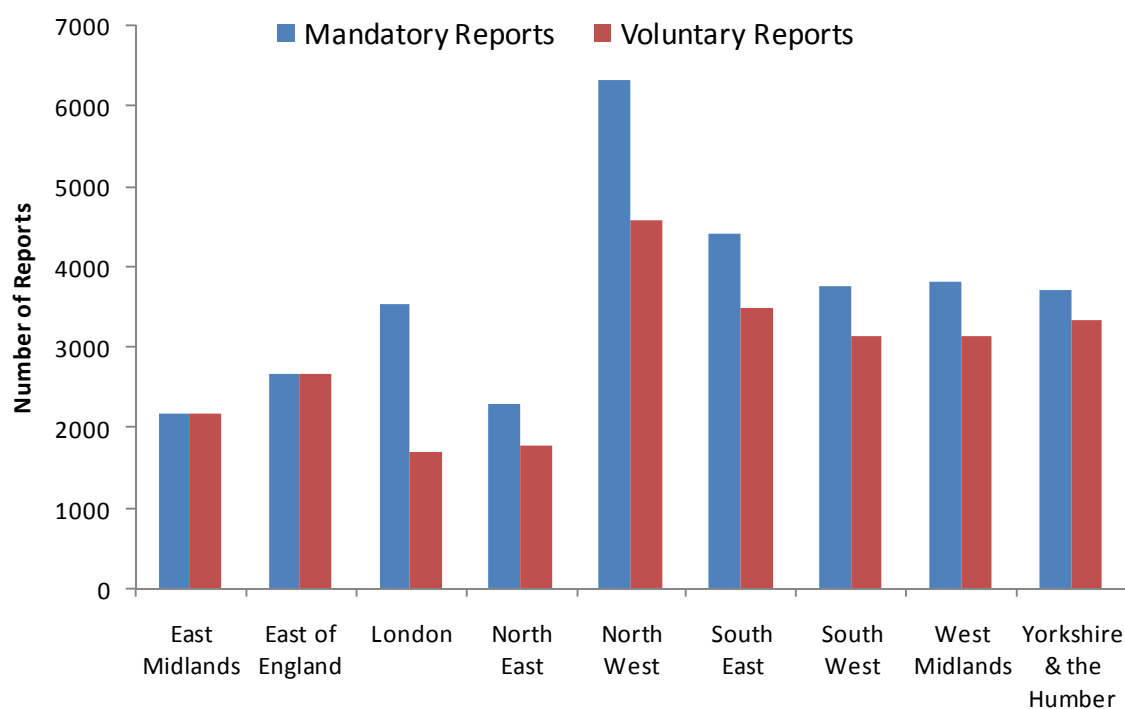
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Ascertainment of *C. difficile* data for the mandatory and voluntary reporting schemes

In 2007 186 laboratories submitted at least 1 report of *C. difficile* onto LabBase. In 2008 this decreased by 7% to 173 reporting laboratories. Comparing between the two years, there were 16 laboratories that had reported more than 1 case in 2007 but did not report any cases in 2008, this included a number of the London laboratories that undertook patient screening in 2007.

Since 2004, regional differences in ascertainment have been appraised by comparing numbers of laboratory reports under the voluntary and mandatory systems for people aged 65 years and over in each English region. As of April 2007 it became mandatory for English Acute Trusts to report in addition cases for patients between the ages of 2 and 64. Ascertainment of voluntary reports is greatest in the East of England region with 100%.

Figure 5: Ascertainment of *C. difficile* data for the mandatory and voluntary reporting schemes in England for patients aged 65 years and over in 2008*



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Conclusions

The data presented in this report show that prior to 2008 the number of laboratory reports of *C. difficile* in people of all ages has increased every year since 1990. Between 2007 and 2008, the overall number of *C. difficile* laboratory reports received annually decreased by 35.1%. This decrease could reflect improvements in infection control and/or changes in reporting.

Compared to 2007, the rate of *C. difficile* laboratory reports per 100,000 population has remained largely static in Wales (from 97/100,000), decreased dramatically in England (from 104/100,000) and increased in Northern Ireland (from 79/100,000). Differences are likely due, in large part, to increased hospital testing (e.g. screening), and enhanced electronic laboratory reporting. In Northern Ireland the increase in the rate of laboratory reports reflects an outbreak of *C. difficile* ribotype 027 in late 2007/early 2008². In the second half of 2008 there were two periods of increased incidence of *C. difficile* cases, one in Belfast Health and Social Care Trust during July³ and the second in Southern Health and Social Care Trust in one ward of a hospital during November and December 2008⁴.

Most *C. difficile* disease is concentrated in the over-65s (79.7%). In both the under-65s and in those aged 65 years and over there has been a 35% reduction in the number of cases, suggesting that the impact of any infection control interventions and/or increased awareness has not been age specific. The proportion of disease in either the over 65s or the under 65s has remained static at 80% and 20% respectively. The high proportion of infections among the older age group may reflect the risk factors other than age associated with *C. difficile* disease, namely duration of hospital stay, prior antibiotic use, and co-morbidity⁵.

Adherence to voluntary reporting of *C. difficile* disease varies across England. In three out of nine regions the reporting under the voluntary scheme comprised 90% or more of the total mandatory reports from the same region. Although the mandatory reporting scheme provides a more accurate estimate of national burden of *C. difficile* in England, the voluntary system allows the HPA to perform national trend analyses for data prior to 2007, when the mandatory reporting scheme included reports from patients aged under 65 years of age.

There has been a decrease in the number of laboratory reports across England, Wales and Northern Ireland, but the public health impact of *C. difficile* infection remains important. The voluntary scheme confirms the downward trend observed in the mandatory reporting scheme for *C. difficile* and this suggest that progress is being made in reducing infection, however it is vital that there be ongoing surveillance of this disease.

Acknowledgements

We are grateful to microbiology colleagues in NHS acute trusts for their contributions to this reporting scheme, as well as efforts from colleagues in the regional offices of the Health Protection Agency.

¹ HPA. *Clostridium difficile*: England, Wales and Northern Ireland, 2000 to 2002. *Commun Dis Rep CDR Wkly* 2003;13.

²

RQIA Independent Review - Review of the outbreak of *Clostridium difficile* in Northern Health and Social Care Trust, August 2008,
http://www.rqia.org.uk/cms_resources/Clostridium%20Difficile%20RQIA%20Independent%20Review%20of%20the%20outbreak%20in%20the%20NHSCT%20August%202008.pdf

³ <http://www.belfasttrust.hscni.net/news/Knock%20Out%20Blow%20to%20C%20Difficile%201.html>

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<http://www.southerntrust.hscni.net/corporate/services/Press%20releases/News/News%202008/December%202008/430%2018.12.08%20Clostridium%20difficile%20outbreak%20confirmed%20on%20a%20ward%20at%20Craigavon%20Area%20Hospital.html>

⁵ Calfee DP. [Clostridium difficile: a reemerging pathogen](#). *Geriatrics*. 2008 Sep 1;63(9):10-21