

# Voluntary Surveillance of *Clostridium difficile* Associated Disease in England, Wales and Northern Ireland, 2005

## 1. Key Points

- This update describes reports of *Clostridium difficile* positive faecal samples made to the HPA in 2005 from laboratories in England, Wales, and Northern Ireland.
- There were 49,850 reports in 2005, comprising 46,501 from England, 1,939 from Wales and 1,410 from N. Ireland. This was a 13.5% increase in the number of *C. difficile* laboratory reports compared to 2004.
- The population rate of *C. difficile* has increased in England from 81 to 93 positive samples per 100,000 population, remained stable in N. Ireland at 81 positive samples per 100,000 population, and decreased in Wales from 72 to 66 positive samples per 100,000 samples per 100,000 population.
- Over 83% of all reported cases are in the over 65 years and over age group. The number of people under 65 years with *C. difficile* has increased but the proportion they form of the total number reported has decreased slightly – 15.8% in 2005 compared to 16.4% in 2004.
- *C. difficile* is more common in women than men, though rates are higher in men aged 65-74 years than women aged 65-74 years.
- *C. difficile* reports have increased at the same rate in people aged 45-64 years and 65-74 years.
- The results of this surveillance are not directly comparable to those from the mandatory surveillance, as voluntary surveillance includes data on all age groups and from Wales and N. Ireland. Its value lies in showing trends over a longer time period, comparisons between the three countries and information on the antimicrobial susceptibility of the isolate and age and sex of affected patients.
- Comparison of the results of the voluntary and mandatory surveillance systems in the over 65s in England allows ascertainment of the variation in reporting under the two schemes by health regions. The variation is greatest in London and the South East regions, where reporting in cases in people aged 65 years and over under the voluntary scheme is 32% and 48% of that under the mandatory scheme, respectively. In all other regions reporting through voluntary surveillance is at least 75% of that in mandatory surveillance.
- Less than 0.001% of reports contained information on antimicrobial susceptibility, probably reflecting that most diagnoses are made by toxin detection, culture now being relatively unusual.

## 2. Introduction and Methods

Surveillance of positive *C. difficile* laboratory samples in England and Wales was introduced in 1990 as part of the Public Health Laboratory Service's voluntary monitoring of infectious diseases caused by the main human pathogens. In 2001, this surveillance was extended to include Northern Ireland<sup>1-3</sup>. 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, details of detection methods used, and some antibiotic susceptibility results.

Mandatory reporting of *C. difficile* in people aged 65 years and over was introduced in England in January 2004<sup>4</sup>. Although this surveillance scheme brings in greater participation and consistency of detection and reporting, it has not replaced voluntary reporting of cases of *Clostridium difficile* disease, as the latter contains additional

valuable information, such as age and sex of affected patients, as well as the antimicrobial susceptibility of the *Clostridium difficile* strain. Furthermore, voluntary surveillance allows comparison of trends over a longer time period and inter-country comparisons. The results of the two systems are not directly comparable as unlike mandatory surveillance, voluntary surveillance results are obtained on all age groups and testing and reporting for these are not mandatory.

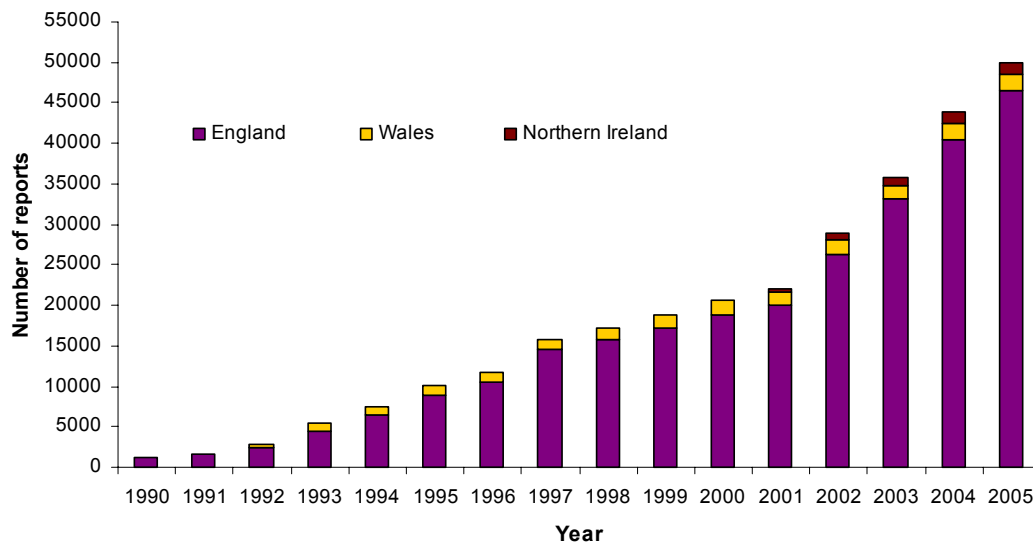
This report covers voluntary reports of *Clostridium difficile* positive faecal samples made to the HPA in 2005 from laboratories in England, Wales, and Northern Ireland. Age or geographical rates of *C. difficile* rates were calculated using Office of National Statistics 2004 mid-year resident population estimates as denominators. Data were analysed and displayed according to current regional boundaries.

### 3. Results

#### 3.1 Trend in total reports

In 2005, the HPA received 49,850 reports of positive *C. difficile* laboratory samples, a 13.5% increase on reports received during 2004. This comprised 46,501 positive samples from England, 1,939 from Wales and 1,410 from N. Ireland. This reflected an increase of 15% in England, a decrease of 9% in Wales, and an increase of less than 1% in N. Ireland. Aggregated data for England, Wales and Northern Ireland for each year since 1990, and separate data by country of origin, are shown in Figures 1 and Table 1, respectively. Of note, figures from Northern Ireland are only available from 2000 onwards.

Figure 1: Reports of *Clostridium difficile* isolated from faecal specimens under the voluntary reporting scheme. England, Wales and Northern Ireland\* 1990-2005



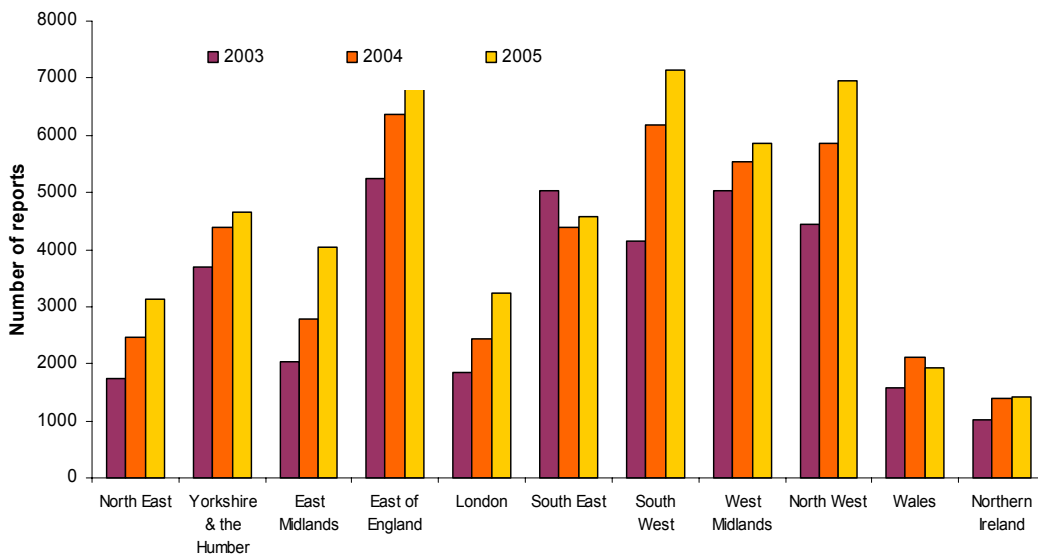
\*Northern Ireland reports included from 2001 only.

Table 1: Annual reports of *C. difficile* in England, Wales and N. Ireland 1990-2005

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	40401	2114	1388	43903
2005	46501	1939	1410	49850

The overall rate for all of England, Wales, and Northern Ireland was 91.0 positive *C. difficile* laboratory reports per 100,000 population in 2005. The rates of *C. difficile* positive laboratory reports for the overall population were 93 per 100,000 in England, 66 positive samples per 100,000 population in Wales and 82 positive samples per 100,000 in N. Ireland. Since 2004, the population rate has increased from 81 to 93 positive *C. difficile* samples per 100,000 population in England, remained stable at 81 samples per 100,000 in N. Ireland, and decreased in Wales from 72 to 66 positive samples per 100,000 population. Figure 2 illustrates changes in total annual reports of *C. difficile* in English health regions, Wales and Northern Ireland from 2003-2005.

Figure 2: Laboratory reports of *Clostridium difficile*: English health regions, Wales and Northern Ireland



### 3.2 Distribution of *C. difficile* according to age and sex

Over 83% of all reported cases are in people aged 65 years and over. Of particular note, given that the mandatory surveillance system does not include the under-65s, there has been 9% increase in the number of positive samples in people under 65 years since 2004 from 7,211 to 7,899. Nevertheless, the proportion of total samples reported which were from people under 65 years has decreased since 2004 (from 15.8% to 16.4%). This is because increases have been greater in the oldest age group, which account for most cases of *C. difficile*. Thus, although from 2004-2005 the increase in people aged 45-64 years was similar to that for people aged 65-74 years (11%), this was lower than that seen in the 75 years and over age group (15%). Table 2 shows the numbers and proportions of total reports in different age groups in 2004 and 2005, and the proportion change in numbers of reports for each age group from 2004-2005.

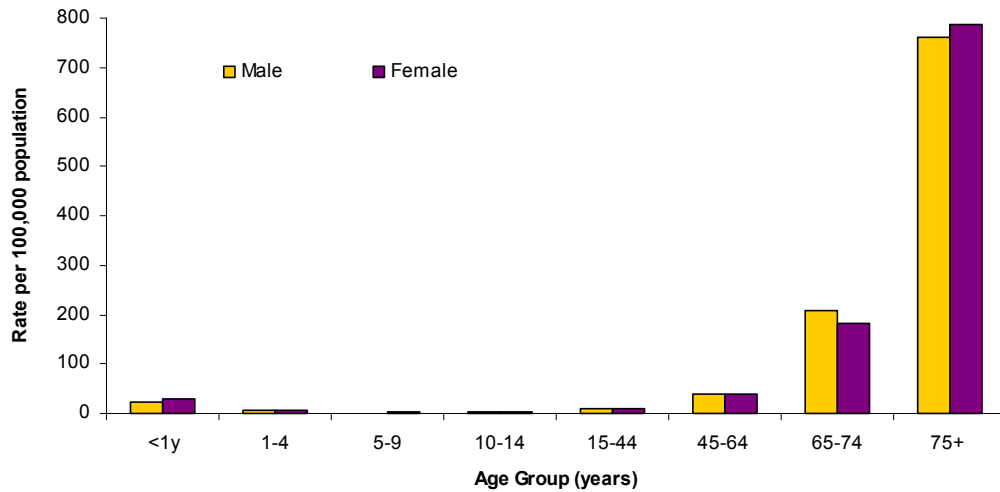
Table 2: Numbers and proportions of total voluntary reports of *C. difficile* in different age groups in England, Wales and N. Ireland 2004-2005

Age group	Number reports 2004 (% of total reports)	Number reports 2005 (% of total reports)	Percent change in numbers of reports 2004-2005*
<1 year	191 (0.4%)	168 (0.3%)	-12%
1-4 years	172 (0.4%)	150 (0.3%)	-13%
5-9 years	54 (0.1%)	63 (0.1%)	+17%
10-14 years	63 (0.1%)	88 (0.2%)	+40%
15-44 years	1980 (4.5%)	2160 (4.3%)	+9%
45-64 years	4751 (10.8%)	5260 (10.6%)	+11%
65-74 years	8047 (18.3%)	8941 (17.9%)	+11%
75+ years	28,363 (64.6%)	32,572 (65.3%)	+15%
Unspecified	282 (0.6%)	448 (0.9%)	+59%
<b>Grand total</b>	<b>43,903 (100%)</b>	<b>49,850 (100%)</b>	<b>+14%</b>

\*negative figure indicates a decreasing proportion, positive figure an increasing proportion

Figure 3 shows rates of *C. difficile* according to age group in 2005. *C. difficile* rates are markedly higher in older age groups: age-specific rates of *C. difficile* reports were 40 per 100,000 population in people aged 45-64, 195 per 100,000 population in people aged 65-74 and 780 per 100,000 population in people aged 75 years and older.

Figure 3: Age specific rates of *Clostridium difficile* from laboratory reports under voluntary reporting scheme: England, Wales and Northern Ireland 2005



Compared to 2004, the number of *C. difficile* reports increased by 14% in males, and 12% in females. Overall, there were 104 *C. difficile* positive laboratory reports per 100,000 population in females, and 76 per 100,000 population in males. In the group with the highest rates (people 75 years and over), rates were higher in women compared to men: in the 65-75 year age group, rates were higher in men.

#### Ascertainment data

Between 1990 and 2005, the number of reports of *C. difficile* disease increased from 1194 to 49,850 per year. 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. Figure 4 and Table 3 demonstrate that there is a substantial regional variation in ascertainment. The number of cases reported through voluntary surveillance in London and the South East is fewer than 50% of cases reported through mandatory surveillance. The variation is much smaller in the other English health regions – less than 25%. There were 82 more voluntary than mandatory reports of *C. difficile* disease in the people aged 65 and over in the North West region. Although the explanation for this excess is not clear, possibilities include reporting of several positive faecal samples, or of both positive faecal and culture results, on the same patient in the voluntary scheme (in mandatory surveillance cases should only be reported if they have not been positive for *C. difficile* within the previous 28 days and only toxin and culture – not both – results should be reported on individual patients), as well as under-reporting of cases through mandatory surveillance.

Figure 4: Ascertainment of *Clostridium difficile* data for the mandatory and voluntary reporting schemes in England for patients aged 65 years and under in 2005.

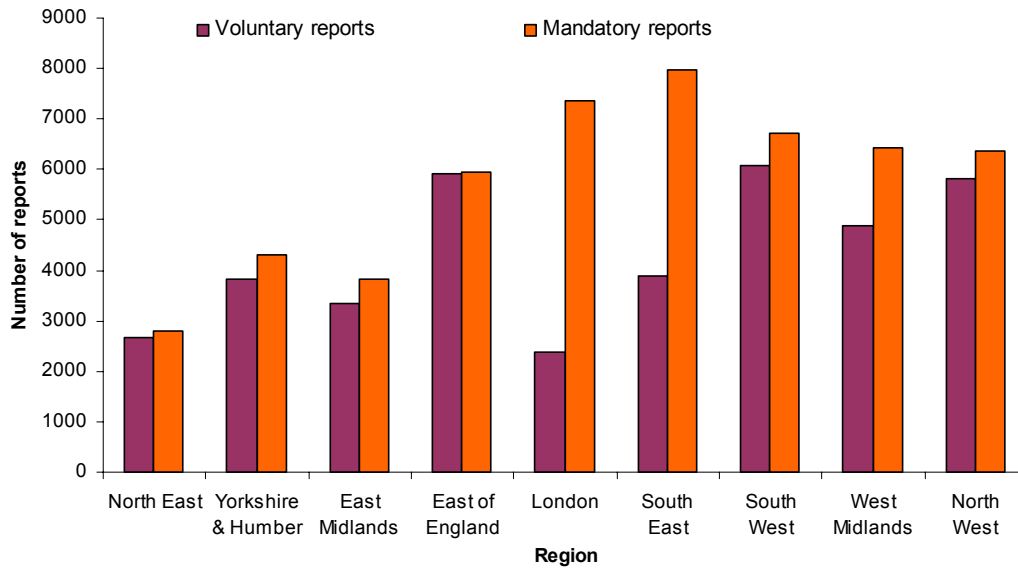


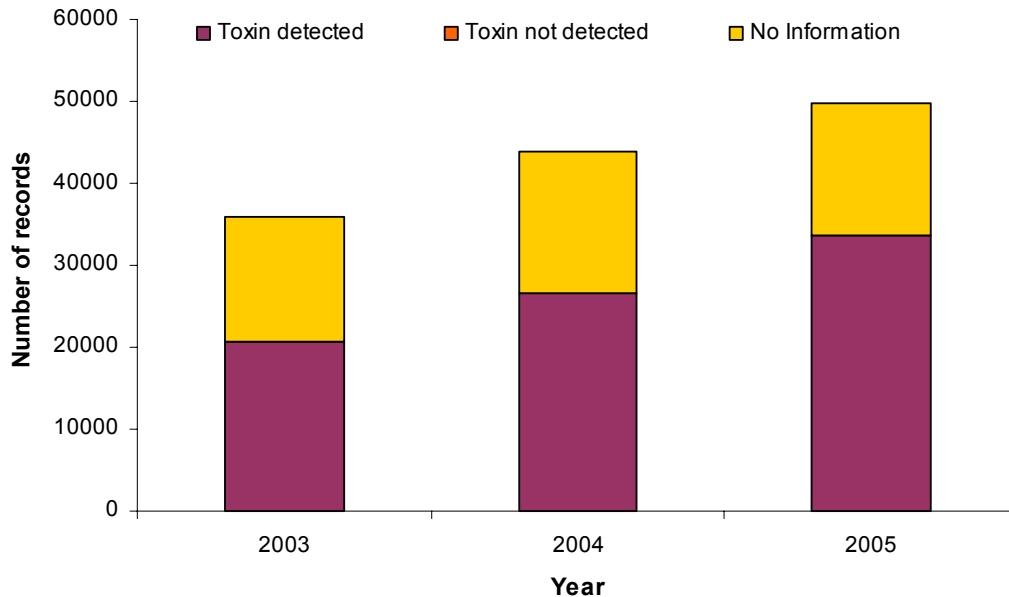
Table 3: Comparison of numbers of *C. difficile* reports in people aged 65 years and over under voluntary and mandatory surveillance schemes in English health regions

Region Name	Number of voluntary reports	Number of mandatory reports
North East	2673	2800
Yorkshire & Humber	3834	4307
East Midlands	3348	3812
East of England	5928	5953
London	2371	7458
South East	3901	7969
South West	6078	6718
West Midlands	4870	6414
North West	5814	6359
<b>Grand Total</b>	<b>38817</b>	<b>51690</b>

### Toxin detection data

In 2005, 67% of reports received by LabBase indicated that toxin had been detected, less than 1% of reports stated that toxin had not been detected, and 33% did not contain any information on toxin detection. This confirms ongoing increases in the proportion of reports indicating toxin detection from 57% in 2003, and 60% in 2004 (Figure 5).

Figure 5: Reports of toxin detection in *Clostridium difficile*: England, Wales and Northern Ireland 2003-2005



#### Antimicrobial sensitivity

In 2005, thirty reports contained information on antimicrobial sensitivity. This marks a slight increase on 2004 (25 reports). Twenty-nine reports contained information on vancomycin sensitivity and one report on metronidazole sensitivity. No reports of vancomycin or metronidazole resistant isolates were received. The small number of reports with susceptibility information probably reflects the infrequency of *C. difficile* culture now that toxin tests are so widely used for diagnosis.

#### 4. Conclusions

The data presented in this report show that the number of laboratory reports of *C. difficile* in people of all ages has increased every year since 1990. Between 2004 and 2005, the overall number of *C. difficile* laboratory reports received annually increased by 13.5%, and since 2001 *C. difficile* reports have increased by 127%. Some of this increase will reflect the inclusion of N. Ireland data from 2000. There are also indications from a recent review of *C. difficile* in England that this increase reflects further improvements in reporting and possibly some increase in disease incidence.

Compared to 2004, the rate of *C. difficile* laboratory reports per 100,000 population has increased in England (from 81/100,000), remained largely static in Northern Ireland (from 81/100,000) and decreased in Wales (from 72/100,000). Differences may be due to increasing laboratory diagnosis and/or reporting of cases in England as the mandatory case reporting scheme (introduced in January 2004) has become more established; there may also be an element of natural variation involved, given the relatively small total populations of Wales and Northern Ireland.

Most *C. difficile* disease is concentrated in the over-65s. However, this report shows that reports of disease in the under-65s are increasing. This has important implications for the mandatory surveillance scheme, which has to date focused on the over-65s. Data showing that rates of *C. difficile* are higher in men in the 65-74

year ago group, but higher in women in people 75 years and over, replicates findings from 2004. The reasons behind this are as yet unclear.

Adherence to voluntary reporting of *C. difficile* disease varies across England. In six out of nine regions the reporting under the voluntary scheme comprised 90% or more of the total mandatory reports from the same region. The bigger variation in reporting under the two schemes in the other regions, particularly London and the South East, is likely to reflect considerable under-reporting under the voluntary scheme.

Increases in the proportion of reports indicating toxin detection are likely to reflect wider use of recommended diagnostic tests for *C. difficile* (either an immunoassay detecting both toxin A and toxin B or a neutralised cytotoxicity assay). Information obtained through the *C. difficile* survey of Directors of Infection Prevention and Control (DIPCs) showed that almost all laboratories in England are now using one of these tests<sup>5</sup>. Laboratory reports which stated that toxin had not been detected (less than 1% of the total) probably reflect the small number of diagnoses made by culturing the bacteria. Although this is not recommended for diagnosis (as positive culture by itself does not necessarily mean an infection is present), culture is necessary if further investigations are to be undertaken on the specimen, for instance, identification of its epidemiological type and antimicrobial susceptibilities.

The number of reports on antimicrobial sensitivity remains low and has increased only marginally since 2004. This number may well rise in 2006 as a by-product of the increasing awareness of different *C. difficile* strains, particularly hypotoxin producers, which has led to growing use of culture to identify strains. This means that the organism is then available for antimicrobial sensitivity testing.

Although the relative impact of increased ascertainment and increased number of cases remains difficult to evaluate, the increase in laboratory reports strongly suggests that the public health impact of *C. difficile* infection remains important and may be increasing. This has also been highlighted by figures from the DH's mandatory surveillance of *C. difficile* in England, which were published recently<sup>6</sup>. It is vital that there be ongoing surveillance of this disease. The recent review of *C. difficile* epidemiology and the results of a survey of DIPCs discusses current *C. difficile* surveillance and recommends consideration be given to amalgamating the strengths of the two existing *C. difficile* incidence surveillance systems<sup>5</sup>.

## 5. References

1. HPA. *Clostridium difficile*: England, Wales and Northern Ireland, 2000 to 2002. *Commun Dis Rep CDR Wkly* 2003;13 .
2. HPA. *Clostridium difficile*, England, Wales, and Northern Ireland: 2003. *Commun Dis Rep CDR Wkly* 2005;15.
3. HPA. *Clostridium difficile*, England, Wales, and Northern Ireland: 2004. *Commun Dis Rep CDR Wkly* 2005;15:bacteraemia.
4. National Clostridium difficile Standards Group: Report to the Department of Health. *J Hosp Infect* 2004;56 Suppl 1:1-38.
5. HPA. *Clostridium difficile*: Findings and recommendations from a review of the epidemiology and a survey of Directors of Infection Prevention and Control in England. 24-7-2006. Health Protection Agency. [http://www.hpa.org.uk/infections/topics\\_az/clostridium\\_difficile/documents/Clostridium\\_difficile\\_survey\\_findings\\_recommendations.pdf](http://www.hpa.org.uk/infections/topics_az/clostridium_difficile/documents/Clostridium_difficile_survey_findings_recommendations.pdf)

6. HPA. Mandatory Surveillance of Healthcare Associated Infection Report, 2006 .  
24-7-2006. Health Protection Agency.  
[http://www.hpa.org.uk/infections/topics\\_az/hai/mandatory\\_report\\_2006.htm](http://www.hpa.org.uk/infections/topics_az/hai/mandatory_report_2006.htm)