Escherichia coli bacteraemia in England, Wales, and Northern Ireland, 2003 to 2007

Introduction

This report contains data voluntarily reported to the Health Protection Agency for *Escherichia coli* bacteraemia in England, Wales, and Northern Ireland from 2003 to 2007. These analyses are based on data extracted from our voluntary surveillance database on the 26th February 2008 for the period between 2003 and 2007. The data presented here differ in some instances from data in earlier publications due to the addition of late reports to the database.

- *E. coli* has overtaken *Staphylococcus aureus* as the most frequent cause of bacteraemia voluntarily reported by laboratories in England, Wales and Northern Ireland to the Health Protection Agency (1).
- There was a 9% increase in the total number of reports of *E. coli* bacteraemia via the voluntary surveillance scheme in 2007 (21,904 reports) compared to 2006 (20,007 reports) (figure 1).
- Since 2003 there has been a 32% increase in *E. coli* bacteraemia reports, greater than the 24% increase in reports for all bacteraemia (85,354 to 105,928) via the voluntary surveillance scheme during the same time period. The increase may be due to either increased incidence and/or increased ascertainment. Reports for 2007 are provisional as of 26 February, 2008 and are expected to increase due to late reporting.
- *E. coli* bacteraemia is significantly more frequent among men than women in those aged under one year, and those aged 65 years and over; however *E. coli* bacteraemia is significantly more frequent among women in the 15 to 44 year age group (figure 2).
- The overall reported incidence of *E. coli* bacteraemia for England, Wales, and Northern Ireland is 39.5 per 100,000 population.
- In contrast with analyses in previous years, there have been no significant increases in the rates of non-susceptibility for any key antimicrobials in the past year; however, rates are still 50 to 200% higher in 2007 than they were in 2003 (table 2).
- The percentage of isolates testing non-susceptibility to either ciprofloxacin or gentamicin remains unchanged from 2006 at 23% and 9%, respectively.
- While the percentage of isolates testing non-susceptible to the extended-spectrum cephalosporins ceftazidime and cefotaxime has not changed since 2006 (12%), this rate is still twice that reported in 2003 (4-5%). The increased non-susceptibility to cephalosporins since 2003 largely reflects the emergence and spread of strains of *E. coli* producing extended-spectrum β-lactamases (ESBLs) (2,3).
- All isolates tested for either imipenem or meropenem remained fully susceptible.

References

1. HPA. Surveillance of Healthcare Associated Infections Report 2007. London: Health Protection Agency, 2007.

2. HPA. Investigations into multi-drug resistant ESBL-producing Escherichia coli strains causing Infections in England. September 2005. London: Health Protection Agency, 2006.

3. Potz N, Hope R, Warner M, Johnson A, Livermore D. CTX-M-producing Escherichia coli now the dominant cephalosporin-resistant Enterobacteriaceae. *Clin Microbiol Infect* 2005; **11**(Suppl 2):48.

Acknowledgements

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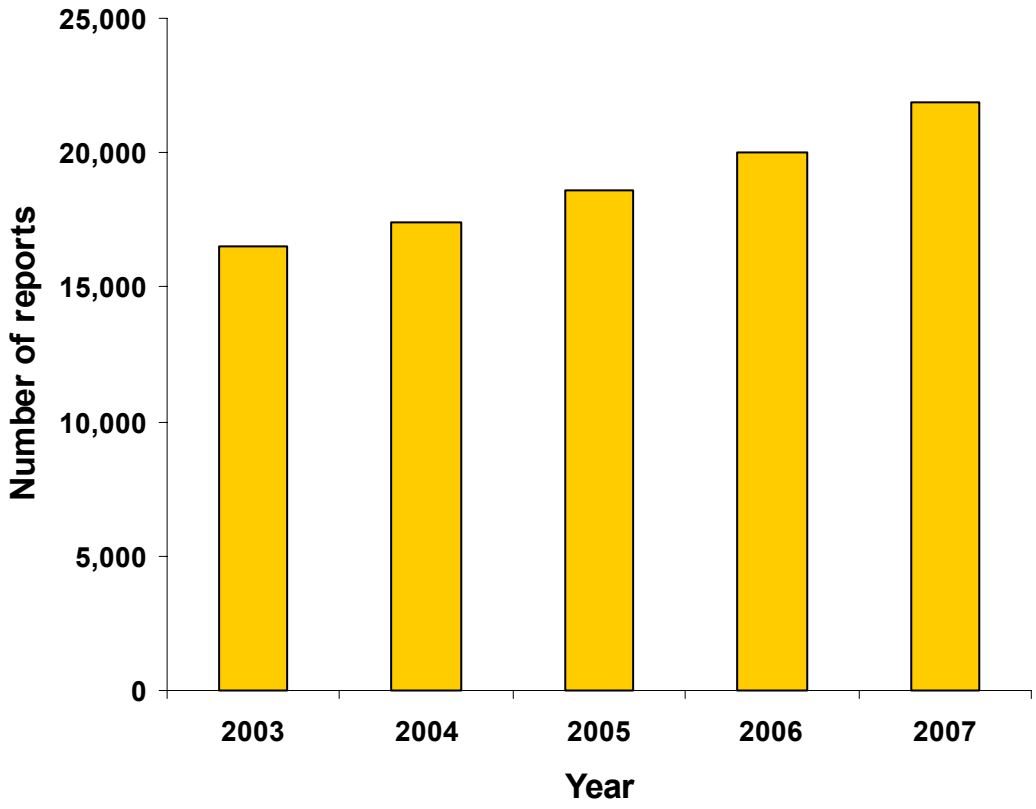
Trend in reports

E. coli is one of the two most common causes of bacteraemia (*S. aureus* being the other one) in England, Wales and Northern Ireland, with 21,904 voluntary reports to the Health Protection Agency in 2007 (Figure 1). This represents a 9% increase compared to 2006 (20,007 reports).

In the five years since 2003 (for which year 16,542 reports were received) there has been a 32% increase in *E. coli* bacteraemia reports. This increase is higher than the 24% increase in reports for all bacteraemia (85,354 to 105,928) via the voluntary surveillance scheme during the same time period. The increase in reports of *E. coli* bacteraemia may be due to either increased incidence and/or increased ascertainment. Reports for 2007 are provisional as of 26 February, 2008 and the number of reported cases of bacteraemia will almost certainly increase slightly as late reports are received.

Figure 1 *E. coli* bacteraemia reports, 2003 to 2007*



*** Data extracted 26th February, 2008**

Completeness of laboratory reports

The number of laboratories voluntarily reporting data for *E. coli* bacteraemia has decreased marginally from 200 in 2003 to 192 in 2007 (Table 1). The percentage of laboratories reporting drug susceptibility data increased from 90% in 2003 to 95% in 2007. The decreased number of reporting laboratories is probably due to consolidation of laboratories at trust level.

Table 1. Laboratories reporting *E. coli* bacteraemia: 2003 to 2007*

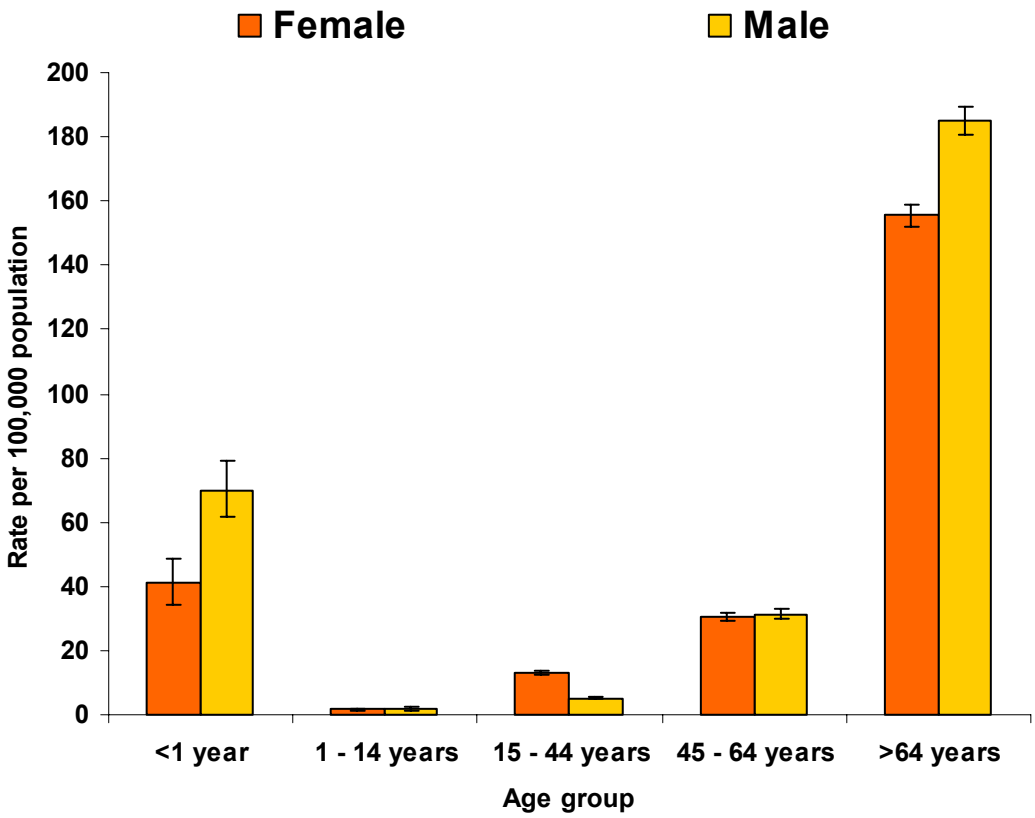
	2003	2004	2005	2006	2007
No. of *E. coli* bacteraemia reports	16,542	17,412	18,619	20,007	21,904
Number of reporting laboratories	200	196	200	200	192
Laboratories reporting susceptibility data	90%	90%	91%	95%	95%

*** Data extracted 26th February, 2008**

Age and sex distribution

Figure 2 shows the age and sex distribution (rate per 100,000 population) of *E. coli* bacteraemia reported to the Health Protection Agency in 2007. *E. coli* bacteraemia is significantly more frequent among men than women in those aged under one year, and those aged 65 years and over; however *E. coli* bacteraemia is significantly more frequent among women in the 15 to 44 year age group.

Figure 2 *E. coli* bacteraemia reports in 2007 by age and sex*



*** Data extracted 26th February, 2008**

Antimicrobial susceptibility

Trends in non-susceptibility to key antimicrobials are presented in Table 2. In contrast with recent years, there were no significant increases in non-susceptibility to any of these key antimicrobials in the past year; however, rates were still significantly higher in 2007 than they were in 2003. In comparison with 2006 data, the percentage of isolates testing non-susceptibility to the cephalosporins cefotaxime and ceftazidime remained unchanged at 12%, while rates for ciprofloxacin and gentamicin are 23% and 9%, respectively. All isolates tested for either imipenem or meropenem remained fully susceptible.

The increased resistance to cephalosporins most likely reflects the emergence and spread, since 2003, of strains of *E. coli* producing extended-spectrum β-lactamases (ESBLs), particularly CTX-M-15, which is now the dominant type (2, 3).

Table 2 Antibiotic susceptibility for *E. coli* bacteraemia reports, England, Wales and Northern Ireland, 2003-2007*

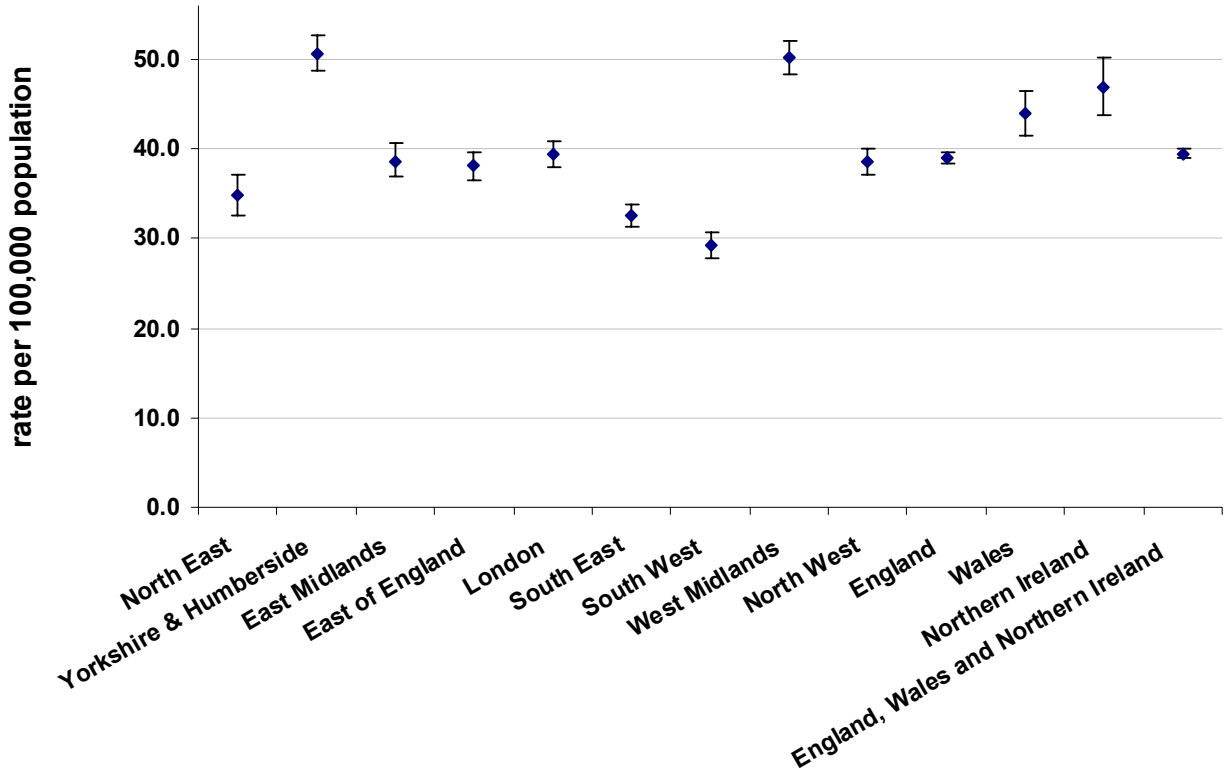
E. coli		2003	2004	2005	2006	2007
Total reports:		**16,542**	**17,412**	**18,619**	**20,007**	**21,904**
Cefotaxime	**% Non-susceptible**	**5%**	**6%**	**9%**	**11%**	**12%**
	Reports with susceptibility data	5,008	6,046	7,259	9,017	10,344
Ceftazidime	**% Non-susceptible**	**4%**	**6%**	**9%**	**12%**	**12%**
	Reports with susceptibility data	7,871	8,845	9,672	11,308	14,436
Ciprofloxacin	**% Non-susceptible**	**13%**	**16%**	**19%**	**23%**	**23%**
	Reports with susceptibility data	11,693	13,171	13,949	15,914	18,233
Gentamicin	**% Non-susceptible**	**6%**	**7%**	**8%**	**9%**	**9%**
	Reports with susceptibility data	12,583	14,166	14,651	16,095	18,985
Imipenem	**% Non-susceptible**	**1%**	**0%**	**0%**	**0%**	**0%**
	Reports with susceptibility data	4,155	4,276	4,783	5,482	7,100
Meropenem	**% Non-susceptible**	**0%**	**0%**	**0%**	**0%**	**0%**
	Reports with susceptibility data	3,293	4,018	4,690	5,976	9,030

*** Data extracted 26th February, 2008**

Distribution by region

Figure 3 shows regional distribution of *E. coli* bacteraemia in 2007. Regions/countries with high incidence include Yorkshire and Humberside (50.6 per 100,000 population), West Midlands (50.26/100,000), and Northern Ireland (46.8/100,000). Regions/countries with low incidence include South West (29.2/100,000), South East (32.5/100,000), and North East (34.7/100,000). The overall reported incidence for England, Wales, and Northern Ireland is 39.5 per 100,000 population. As data collection is based on a voluntary reporting system, it is important to note that regional incidence rates are affected by completeness of regional reporting.

Figure 3. Region-specific rates of *E. coli* bacteraemia: England, Wales, and Northern Ireland, 2007*



*** Data extracted 26th February, 2008; rates are calculated using 2006 mid-year resident population estimates based on the 2001 census for England, Wales, and Northern Ireland.**