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**Topic Archives:** 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001

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▣ ***Escherichia coli* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

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***Escherichia coli* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Introduction and Summary

This report covers voluntary reports of bacteraemia due to *Escherichia coli* (*E. coli*) made to the Health Protection Agency between 2004 and 2008 from participating laboratories in England, Wales and Northern Ireland. Data were extracted on 24 July 2009 and are provisional; reports for 2008 may increase due to late reporting.

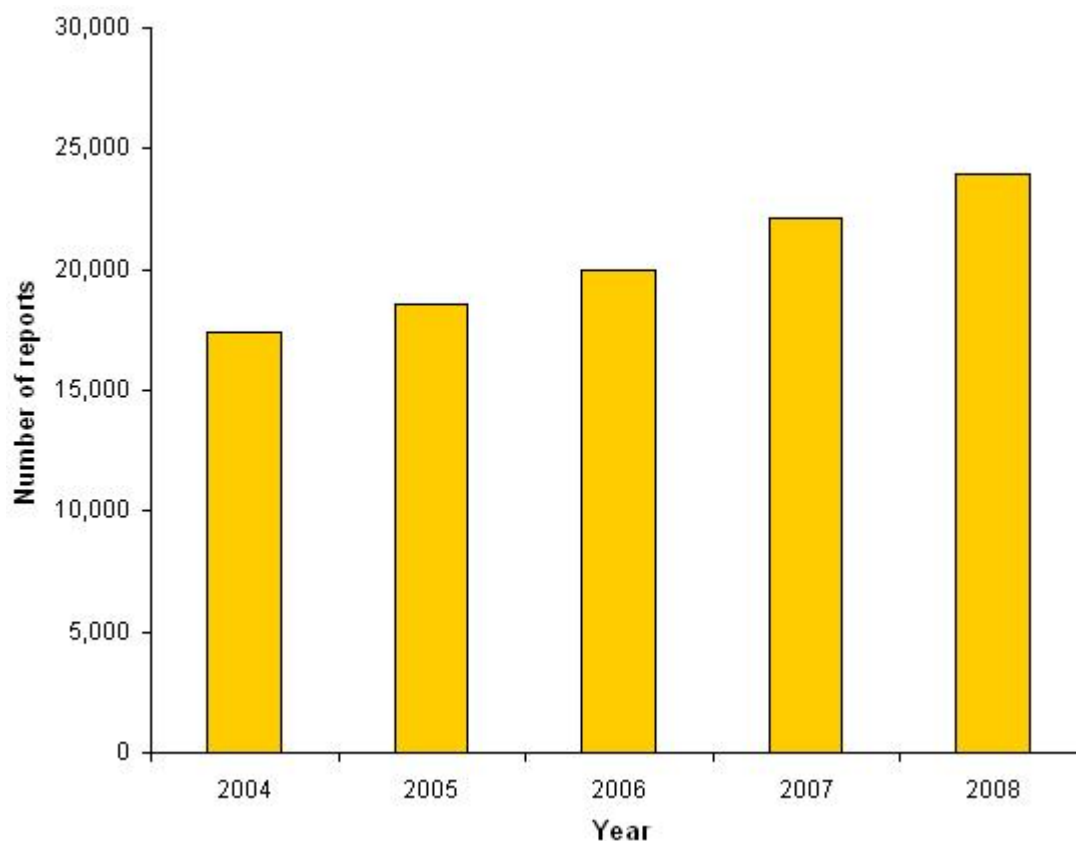
- ▣ There was an 8% increase in the total number of reports of *E. coli* bacteraemia via the voluntary surveillance scheme in 2008 (23,974 reports) compared to 2007 (22,132 reports) (figure 1).
- ▣ Since 2004 there has been a 38% increase in *E. coli* bacteraemia reports, greater than the 16% increase in reports for all bacteraemias (80,890 to 94,093) via the voluntary surveillance scheme for the same time period (data extracted 17 June 2009).
- ▣ *E. coli* bacteraemia is more frequent among males than females among those aged under one year, and among those aged 65 years and over; however *E. coli* bacteraemia is 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 in 2008 is 42.9 per 100,000 population (figure 3).
- ▣ Although there has been little change in the rates of non susceptibility to key antimicrobials (cephalosporins, quinolones, and gentamicin) from 2006-2008, rates are still higher in 2008 than in 2004 (table 1)
- ▣ The percentage of isolates testing non-susceptible to either ciprofloxacin or gentamicin remains very similar to 2007 at 21% and 8%, respectively.
- ▣ While the percentage of isolates testing non-susceptible to the extended-spectrum cephalosporins ceftazidime and cefotaxime remains similar to 2007 at 11-12% this rate is still twice that reported in 2004 (6%).
- ▣ All isolates tested for either imipenem or meropenem remained fully susceptible.

**Trends in reports**

*E. coli* is one of the two most common causes of bacteraemia in England, Wales and Northern Ireland, having recently overtaken *Staphylococcus aureus* as the most frequently reported cause [1]. In 2008 there were 23,974 voluntary reports of *E. coli* made to the Health Protection Agency (figure 1). This represents an 8% increase compared to 2007 (22,132 reports). In the five years since 2004 (17,411 reports were received in 2004) there has been a greater increase (38%) in *E. coli* bacteraemia reports than for all bacteraemias (16%; 80,890 to 94,093 [data extracted 17 June 2009]). The increase in reports of *E. coli* bacteraemia may be due to either increased incidence and/or increased ascertainment. Furthermore reports for

2008 are provisional as of 24 July 2009 and the number of reported cases of bacteraemia may increase slightly as late reports are received.

**Figure 1. *E. coli* bacteraemia reports, England, Wales and Northern Ireland: 2004 to 2008\***



\* Data extracted 24 July 2009

### Completeness of laboratory reports

The number of laboratories voluntarily reporting data for *E. coli* bacteraemia has decreased marginally from 196 in 2004 to 183 in 2008 (table 1). The percentage of laboratories reporting drug susceptibility data increased from 90% in 2004 to 95% in 2008. The decreased number of reporting laboratories is probably due to consolidation of laboratories at trust level.

**Table 1. Laboratories reporting *E. coli* bacteraemia, England, Wales and Northern Ireland: 2004 to 2008\***

	2004	2005	2006	2007	2008
Number of <i>E. coli</i> bacteraemia reports	17,411	18,597	19,989	22,132	23,974
Number of reporting laboratories	196	199	200	193	183
Laboratories reporting susceptibility data	90%	91%	95%	95%	95%

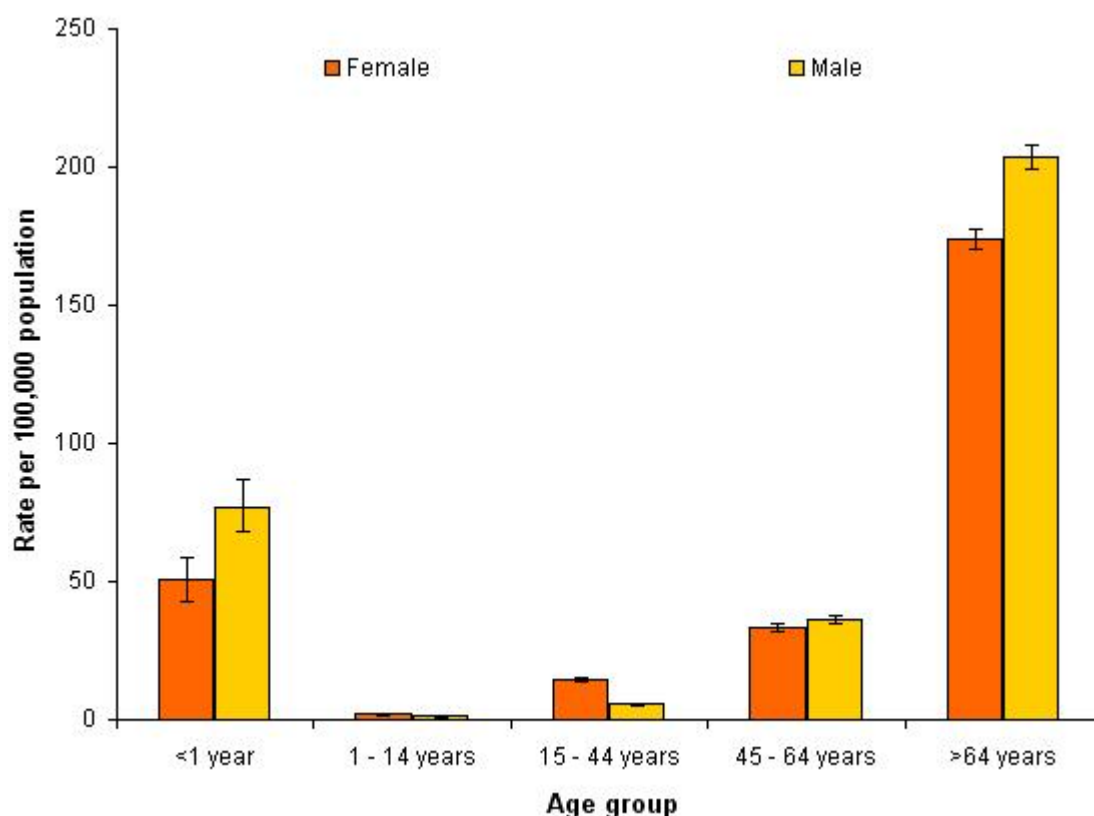
\* Data extracted 24 July 2009



## 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 2008. The distribution among the sexes differs by age group; *E. coli* bacteraemia is more frequent among males than females in those aged under one year, and those aged 65 years and over; whilst it is more frequent among women in the 15 to 44 year age group.

**Figure 2. *E. coli* bacteraemia reports in 2008, England, Wales and Northern Ireland, by age and sex\***



\* Data extracted 24 July 2009

## Antimicrobial susceptibility

Trends in non-susceptibility to key antimicrobials are presented in table 2. The trend for no increase in non-susceptibility to any of the key antimicrobials (cephalosporins, quinolones, and gentamicin) has been sustained since 2006 however, rates were still significantly higher in 2008 than they were in 2004. In comparison with 2007 data, the percentage of isolates testing non-susceptible to the cephalosporins cefotaxime and ceftazidime remained very similar at 11-12%, and rates for ciprofloxacin and gentamicin also remain similar at 21% and 8%, respectively. The increased resistance to cephalosporins most likely reflects the emergence and spread, since 2002/03, of strains producing extended-spectrum  $\beta$ -lactamases (ESBLs), particularly CTXM-15, which is now the dominant type [2,3]. All isolates tested for either imipenem or meropenem remained fully susceptible. Nevertheless a few *E. coli* samples (and rather more *Klebsiella pneumoniae*) with acquired carbapenemases are now being received by the HPA reference lab, which UK microbiologists should be aware of. Most have an enzyme called NDM-1, which is epidemiologically linked to India and Pakistan [4].

**Table 2. Antibiotic susceptibility data for reports of *E. coli* bacteraemia, England, Wales and Northern Ireland: 2004 to 2008\***

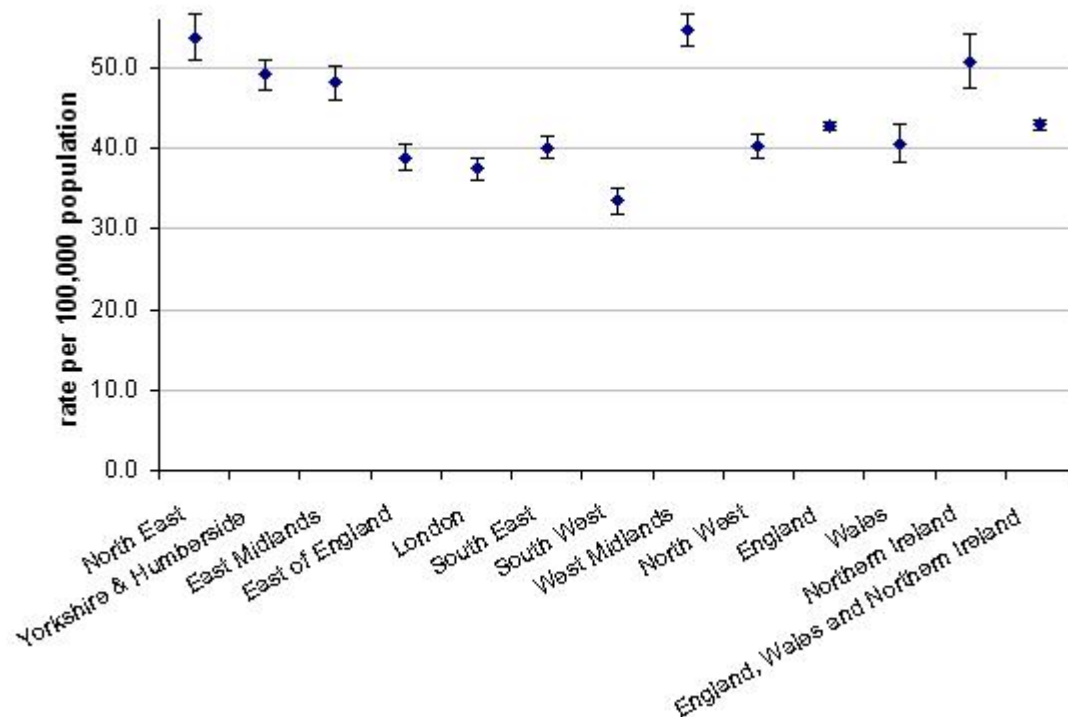
<i>E. coli</i>		2004	2005	2006	2007	2008
Total reports		17,411	18,597	19,989	22,132	23,974
Cefotaxime	% non-susceptible	6%	9%	11%	12%	11%
	Reports with susceptibility data	6045	7259	9015	10,465	11,727
Ceftazidime	% non-susceptible	6%	9%	12%	12%	11%
	Reports with susceptibility data	8844	9672	11,306	14,595	15,980
Ciprofloxacin	% non-susceptible	16%	19%	23%	23%	21%
	Reports with susceptibility data	13,170	13,949	15,912	18,421	19,535
Gentamicin	% non-susceptible	7%	8%	9%	9%	8%
	Reports with susceptibility data	14,165	14,651	16,094	19,190	21,128
Imipenem	% non-susceptible	0%	0%	0%	0%	0%
	Reports with susceptibility data	4275	4783	5481	7225	7362
Meropenem	% non-susceptible	0%	0%	0%	0%	0%
	Reports with susceptibility data	4018	4690	5975	9141	11,732

\* Data extracted 24 July 2009

### Distribution by region

Figure 3 shows regional distribution of *E. coli* bacteraemia in 2008. Regions/countries with high incidence include West Midlands (54.8/100,000), North East (53.8 per 100,000 population), and Northern Ireland (50.8/100,000). Regions/countries with lower incidence include London (37.5/100,000) and South West (33.5/100,000). The overall reported incidence for England, Wales and Northern Ireland is 42.9 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, 2008\***



\* Data extracted 24 July 2009

## 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.
4. HPA. *Multi-resistant hospital bacteria linked to India and Pakistan*. *Health Protection Report*, 2009; **3**(26).

## Acknowledgements

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