



Health Protection Report

weekly report

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Influenza B outbreaks in closed settings continue to be reported to the HPA's Centre for Infections

Influenza activity has returned to baseline levels in England. The overall influenza-like illness episode incidence rate was 8.6 per 100,000 persons in week 15/08 – below the baseline activity threshold of 30 per 100,000.

Prior to March 2008, only six outbreaks of influenza-like illness in closed settings had been reported to Centre for Infections (CfI) this winter, of which three were confirmed as due to influenza – one due to influenza A(H3) and two due to influenza B.

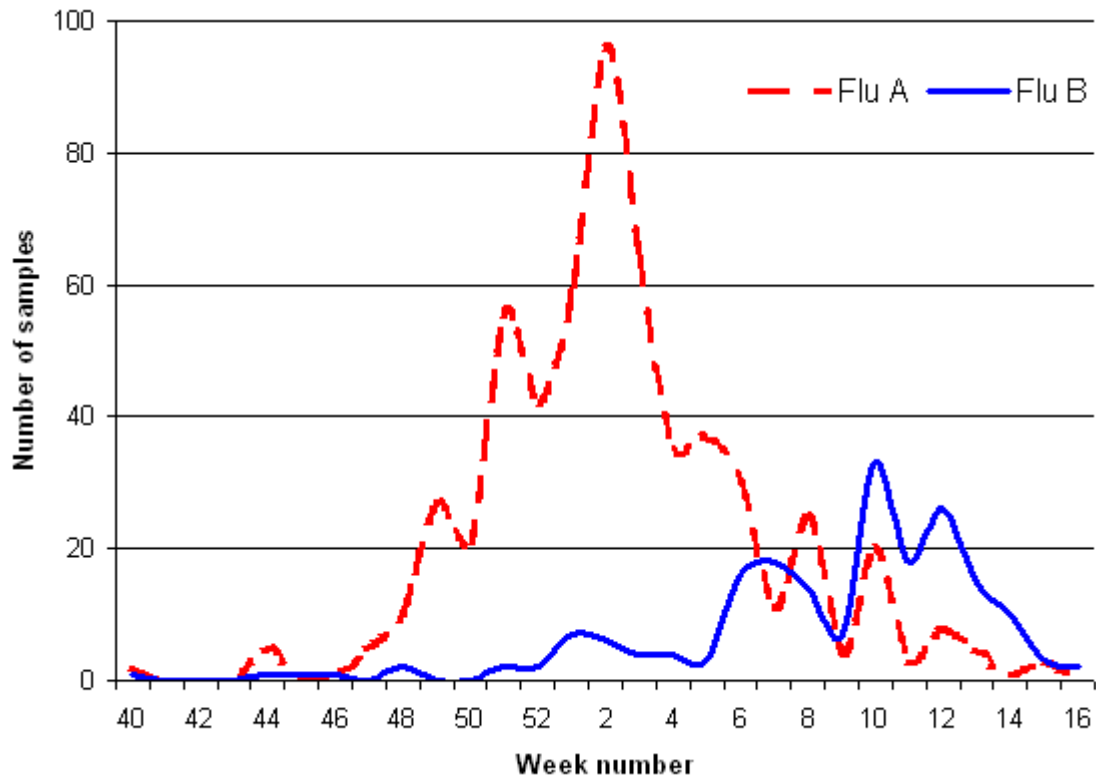
Since the beginning of March there have been 12 outbreaks of influenza-like illness reported from around the United Kingdom. A total of five reported in primary and secondary schools, one in a hospital ward and six in elderly care homes. Eight of the 12 outbreaks have been laboratory confirmed as due to influenza B. A total of six deaths have been associated with three of the outbreaks in residential care homes. While the number of reported outbreaks is still small and the voluntary nature of the reporting mechanism leads to bias in the data, they do indicate that influenza continues to circulate in the community.

Influenza A detections by the Respiratory Virus Unit at CfI peaked in week 02/08 while influenza B detections peaked in week 10/08 (Figure 1). This reflects the tendency of influenza B viruses to circulate later in the influenza season (October to mid-May).

All influenza B viruses analysed this season by the RVU belong to the B/Yamagata lineage (B/Florida/42006-like viruses). These viruses are distinct from the B/Victoria lineage (B/Malaysia-like virus) which is included in the 2007/08 influenza vaccine, although the vaccine will still provide some protection. Surveillance indicators suggest that the major impact of influenza B is in populations which are not targeted for vaccination. This season, the majority of influenza B isolates have been obtained from individuals less than five years of age or from young adults while less than 5% of influenza B isolates have been obtained from older adults over 65 years.

For reporting and advice on the management of influenza-like illness outbreaks in closed settings, please contact the local Health Protection Unit. Further advice on more complex situations can then be sought from the HPA Centre for Infections.

Figure 1. Total (hospital and community) influenza detection, United Kingdom, 2007- 2008



Health Protection Matters, Spring 2008

The latest edition of the HPA's quarterly magazine for non-specialists, *Health Protection Matters*, is devoted to identification, surveillance and containment of infectious diseases. Zoonotic (Q fever, rabies), waterborne (campylobacter), healthcare-associated and respiratory (influenza, legionellosis) infections are among the themes covered in the Spring 2008 issue.

Health Protection Matters can be viewed and downloaded from the Journals & Bulletins pages within the Publications section of the main HPA website.

Infection reports

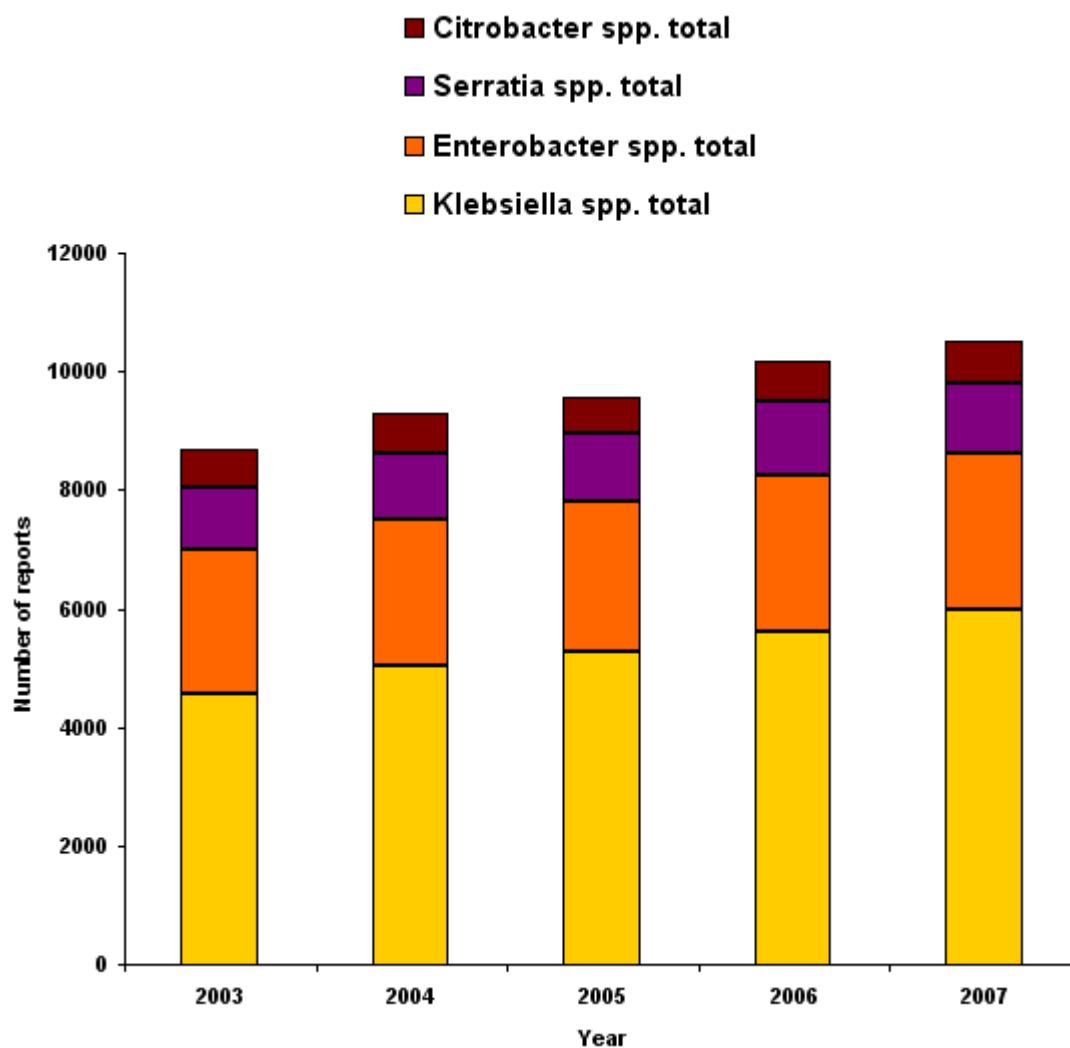
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Bacteraemia

▮ *Klebsiella*, *Enterobacter*, *Serratia* and *Citrobacter* spp. bacteraemia, England, Wales, and Northern Ireland: 2003-2007

There was a 3.3% increase in the total reports of *Klebsiella* spp., *Enterobacter* spp., *Serratia* spp., and *Citrobacter* spp. bacteraemia reported via the voluntary surveillance scheme in 2007 (10,518 reports), compared to 2006 (10,185 reports) (figure 1). Overall, from 2003 there has been a 21% increase in reports, which is comparable to the 24% increase in reports for all bacteraemia (85,354 to 105,928) via the voluntary surveillance scheme during the same time period. The increases may be due to either increased incidence and/or increased ascertainment. Reports for 2007 are provisional as of 14 April and are expected to increase due to late reporting.

Figure 1. *Klebsiella*, *Enterobacter*, *Serratia* and *Citrobacter* spp. bacteraemia reports, 2003-2007*



* Data extracted 14 April, 2008.

Between 2006 and 2007 decreased resistance to the antibiotic group cephalosporins (e.g. cefotaxime, ceftazidime) was reported for *Klebsiella* spp., *Enterobacter* spp., and *Serratia* spp. Cephalosporins are the antibiotic group to which the four main genera show the greatest level of resistance compared to all other antibiotics investigated.

Among reported specimens of *Klebsiella* spp., *Enterobacter* spp., and *Serratia* spp. resistance to ciprofloxacin and gentamicin have decreased significantly ($p < 0.005$ – $p < 0.0001$) from 2003. Resistance to the carbapenems (e.g. imipenem, meropenem) remains low and virtually unchanged at one percent or less for all four genera.

While these low rates are encouraging, it should be noted that for the carbapenem ertapenem (not included in these analyses owing to the small numbers tested by reporting laboratories) researchers have reported resistance rates of 40% among *Klebsiella* spp. and *Enterobacter* spp. isolates [1]. The resistance mechanism is thought to be mediated by a combination of increased cell permeability and Beta-Lactamase production (ESBL and/or AmpC), and while these mechanisms have activity against imipenem or meropenem, they do not entirely confer resistance.

Table 1. Antibiotic susceptibility data for reports of *Klebsiella* spp. bacteraemia, England, Wales and Northern Ireland: 2003 to 2007*

Year		2003	2004	2005	2006	2007
Total reports		4553	5046	5271	5628	5988
Piperacillin/ Tazobactam	% non-susceptible	13%	16%	14%	15%	14%
	Reports with susceptibility data	1806	2485	2747	3364	4032
Imipenem/ Meropenem	% non-susceptible	1%	0%	0%	0%	0%
	Reports with susceptibility data	2045	2554	2776	3362	4039
Cefotaxime	% non-susceptible	12%	17%	16%	15%	14%
	Reports with susceptibility data	1446	1839	2159	2761	2820
Ceftazidime	% non-susceptible	12%	17%	16%	17%	15%
	Reports with susceptibility data	2102	2563	2736	3282	3891
Ciprofloxacin	% non-susceptible	12%	17%	15%	18%	15%
	Reports with susceptibility data	3021	3654	3822	4457	4794
Gentamicin	% non-susceptible	9%	11%	9%	11%	10%
	Reports with susceptibility data	3248	3886	4040	4521	5159

* Data extracted 14 April, 2008.

For *Klebsiella* spp., there has been a significant increase in resistance to ciprofloxacin over all five years ($p < 0.005$). Between 2006 and 2007, however, ciprofloxacin resistance in *Klebsiella* spp. has decreased from 18% to 15%.

Table 2. Antibiotic susceptibility data for reports of *Enterobacter* spp. bacteraemia, England, Wales and Northern Ireland: 2003 to 2007*

Year		2003	2004	2005	2006	2007
Total reports		2452	2474	2522	2613	2630
Piperacillin/ Tazobactam	% non-susceptible	21%	23%	23%	24%	21%
	Reports with susceptibility data	999	1219	1368	1594	1848
Imipenem/ Meropenem	% non-susceptible	1%	1%	1%	1%	1%
	Reports with susceptibility data	1283	1386	1506	1732	1956
Cefotaxime	% non-susceptible	36%	38%	40%	42%	37%
	Reports with susceptibility data	803	932	1040	1213	1247
Ceftazidime	% non-susceptible	39%	41%	42%	41%	36%
	Reports with susceptibility data	1240	1328	1334	1519	1741
Ciprofloxacin	% non-susceptible	16%	14%	15%	14%	10%
	Reports with susceptibility data	1631	1804	1860	2092	2201
Gentamicin	% non-susceptible	13%	13%	12%	11%	9%
	Reports with susceptibility data	1763	1906	1988	2108	2297

* Data extracted 14 April, 2008.

For *Enterobacter* spp., there have been significant decreases ($p < 0.0001$) in resistance to ciprofloxacin (from 16% to 10%) and gentamicin (13% to 9%). No other significant changes in resistance were reported.

Table 3. Antibiotic susceptibility data for reports of *Serratia* spp. bacteraemia, England, Wales and Northern Ireland: 2003 to 2007*

Year		2003	2004	2005	2006	2007
Total reports		1027	1108	1159	1270	1196
Piperacillin/ Tazobactam	% non-susceptible	23%	18%	20%	20%	16%
	Reports with susceptibility data	436	570	604	774	818
Imipenem/ Meropenem	% non-susceptible	0%	0%	0%	1%	0%
	Reports with susceptibility data	498	612	642	807	877
Cefotaxime	% non-susceptible	28%	27%	27%	29%	28%
	Reports with susceptibility data	317	398	426	548	572
Ceftazidime	% non-susceptible	14%	23%	18%	16%	15%
	Reports with susceptibility data	508	598	549	681	731
Ciprofloxacin	% non-susceptible	30%	25%	26%	25%	20%
	Reports with susceptibility data	679	808	854	996	995
Gentamicin	% non-susceptible	4%	3%	3%	2%	1%
	Reports with susceptibility data	713	846	883	1002	1034

* Data extracted 14 April, 2008.

For *Serratia* spp., significant decreases in resistance have been observed for piperacillin/tazobactam, ciprofloxacin and gentamicin. Of the three antibiotic groups only gentamicin shows a steady decrease over the whole time period.

Table 4. Antibiotic susceptibility data for reports of *Citrobacter* spp. bacteraemia, England, Wales and Northern Ireland: 2003 to 2007*

Year		2003	2004	2005	2006	2007
Total reports		659	653	608	674	704
Piperacillin/ Tazobactam	% non-susceptible	13%	10%	6%	9%	9%
	Reports with susceptibility data	238	317	295	348	450
Imipenem/ Meropenem	% non-susceptible	0%	0%	0%	0%	0%
	Reports with susceptibility data	306	326	320	384	496
Cefotaxime	% non-susceptible	19%	21%	11%	15%	18%
	Reports with susceptibility data	205	253	245	327	351
Ceftazidime	% non-susceptible	20%	22%	15%	19%	16%
	Reports with susceptibility data	305	342	321	384	458
Ciprofloxacin	% non-susceptible	10%	6%	8%	8%	8%
	Reports with susceptibility data	418	469	448	519	571
Gentamicin	% non-susceptible	7%	5%	4%	6%	5%
	Reports with susceptibility data	478	506	451	509	606

* Data extracted 14 April, 2008.

For *Citrobacter* spp., there not have been any statistically significant changes in resistance patterns. Although slight decreases in resistance have been observed in cefotaxime, ceftazidime and gentamycin between 2006 and 2007. Although many isolates of *Citrobacter* spp. reported to HPA are not identified to species level (around 13%), it is known that cephalosporin resistance in *C. freundii* is mediated by mechanisms similar to those found amongst *Enterobacter* spp. (i.e. AmpC Beta-Lactamases and ESBLs), while in *C. koseri* cephalosporin resistance is mediated by a chromosomal class A Beta-Lactamase.

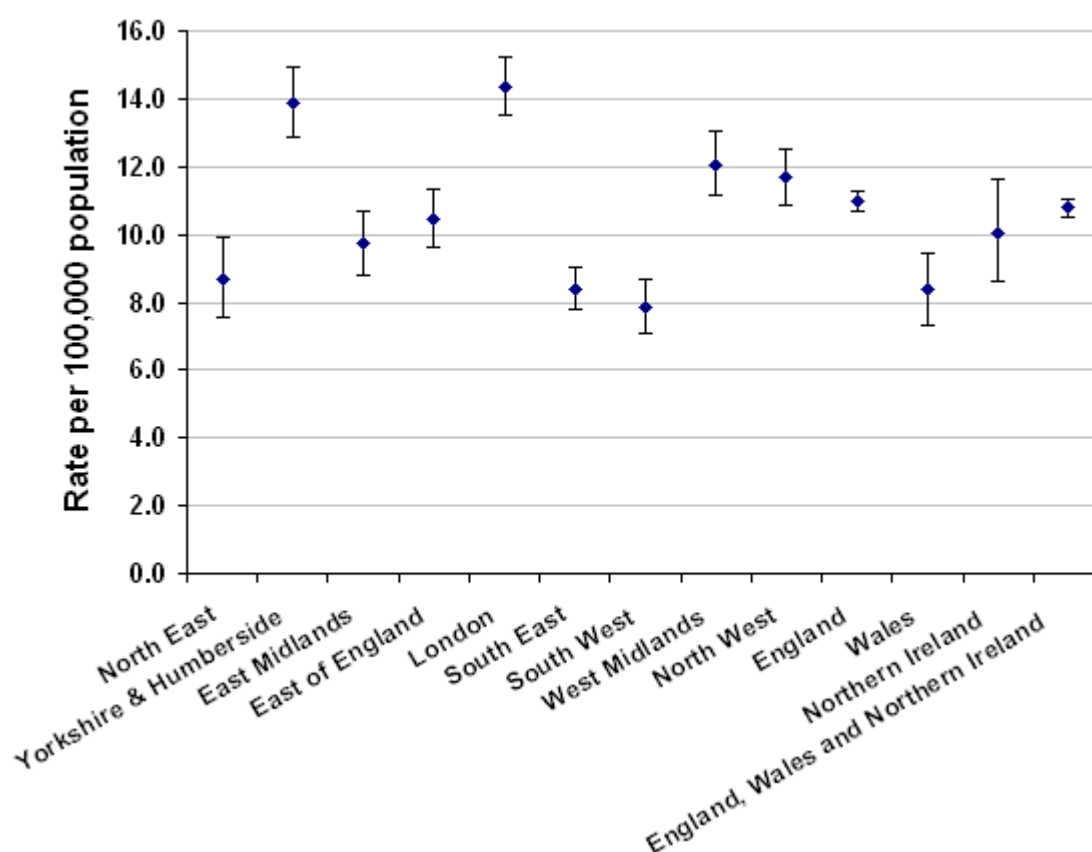
Summary

In comparison with previous years there was an increase in the proportion of specimens with susceptibility data for all antibiotics. Comparison with data collected in 2006 shows increased susceptibility reporting for all antibiotics in 2007. In 2007 for the four main genera:

- ▶ Gentamicin and ciprofloxacin susceptibility information was provided in approximately 95% of all reports (~90% in 2006).
- ▶ Ceftazidime, piperacillin/tazobactam, and imipenem/meropenem susceptibility information was provided in approximately 76% of all reports (~68% in 2006).
- ▶ Cefotaxime susceptibility information was provided in about 54% of all reports; this remains the same as 2006 data.

Figures 2 to 5, below, show regional distribution of bacteraemia reports for *Klebsiella*, *Enterobacter*, *Serratia* and *Citrobacter* spp. by region.

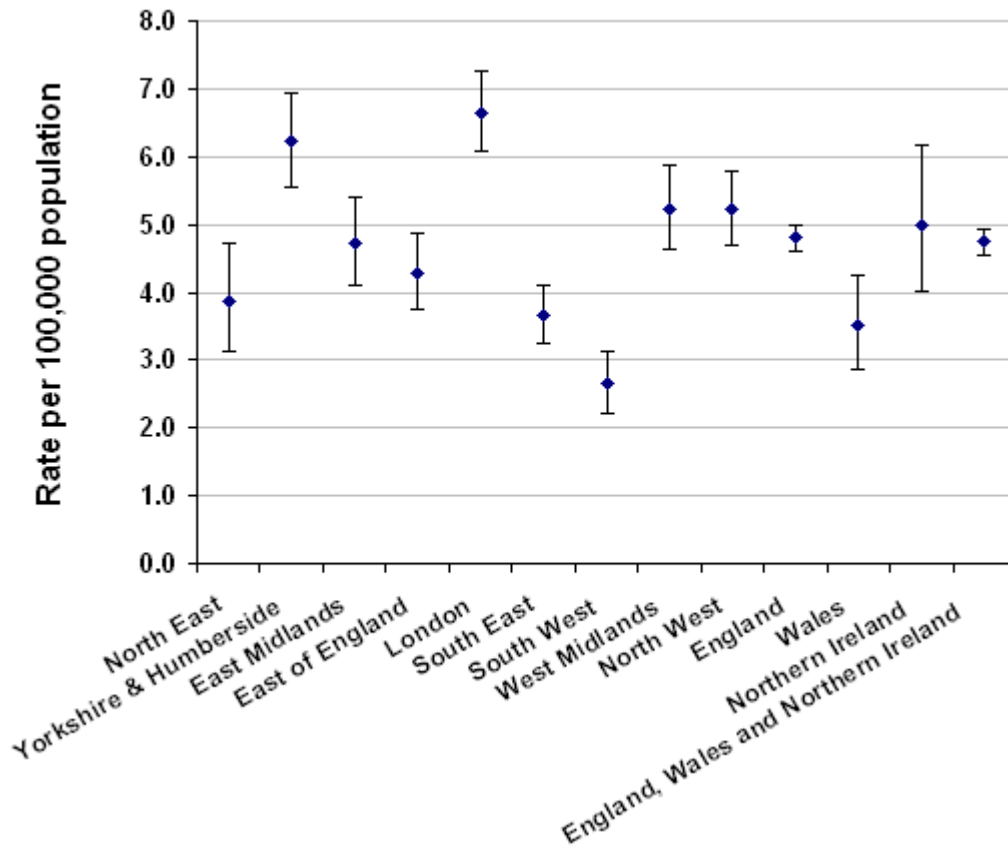
Figure 2. Region-specific rates* of *Klebsiella* spp. bacteraemia: England, Wales and Northern Ireland, 2007



* Data extracted 14 April, 2008.

Regions with high incidence of *Klebsiella* spp. bacteraemia include London (14.35 per 100,000 population) and Yorkshire and Humberside (13.85/100,000). Regions/countries with low incidence include South West (7.86/100,000) and Wales (8.36/100,000). The overall reported incidence for England, Wales and Northern Ireland is 10.79 per 100,000 population.

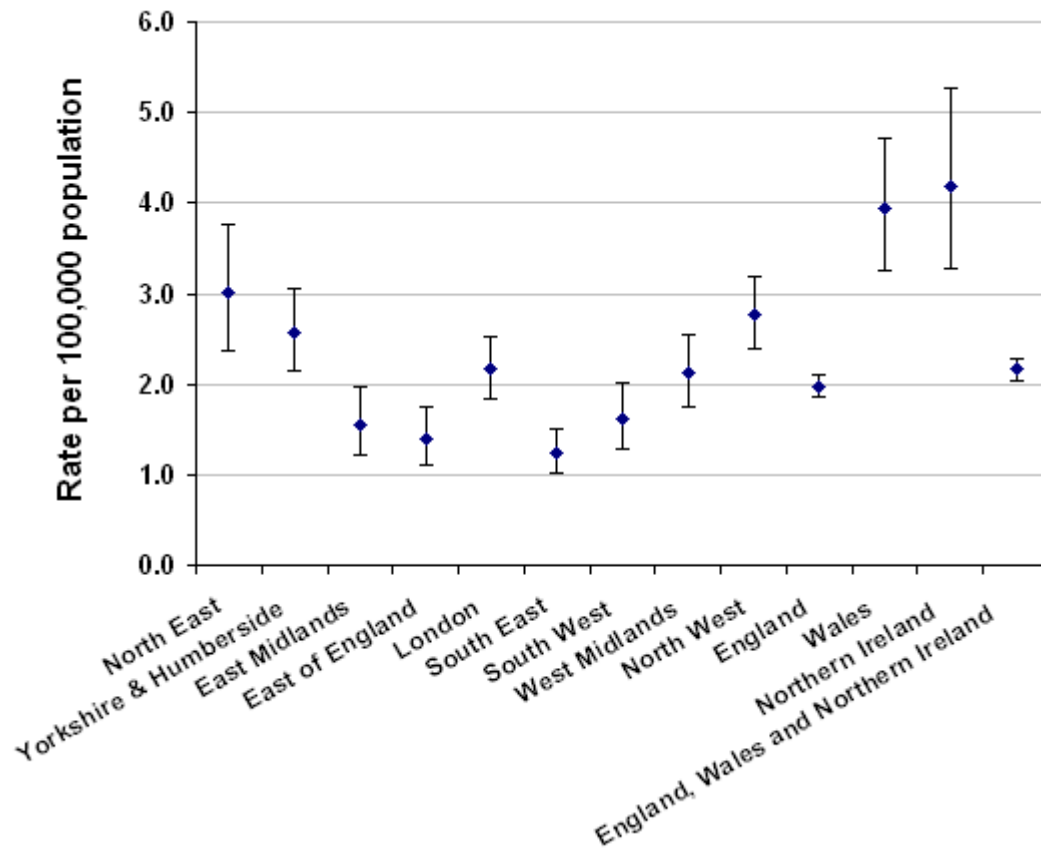
Figure 3. Region-specific rates* of *Enterobacter* spp. bacteraemia: England, Wales and Northern Ireland, 2007



* Data extracted 14 April, 2008.

The highest incidence of *Enterobacter* spp. bacteraemia were reported in London and Yorkshire and the Humber (6.64 and 6.22 per 100,000 population respectively). As with *Klebsiella* spp. reports, the lowest incidence of *Enterobacter* spp. bacteraemia occurs in the South West and Wales (2.65 and 3.51 per 100,000 population respectively). The overall reported incidence for England, Wales and Northern Ireland is 4.74 per 100,000 population.

Figure 4. Region-specific rates* of *Serratia* spp. bacteraemia: England, Wales and Northern Ireland, 2007

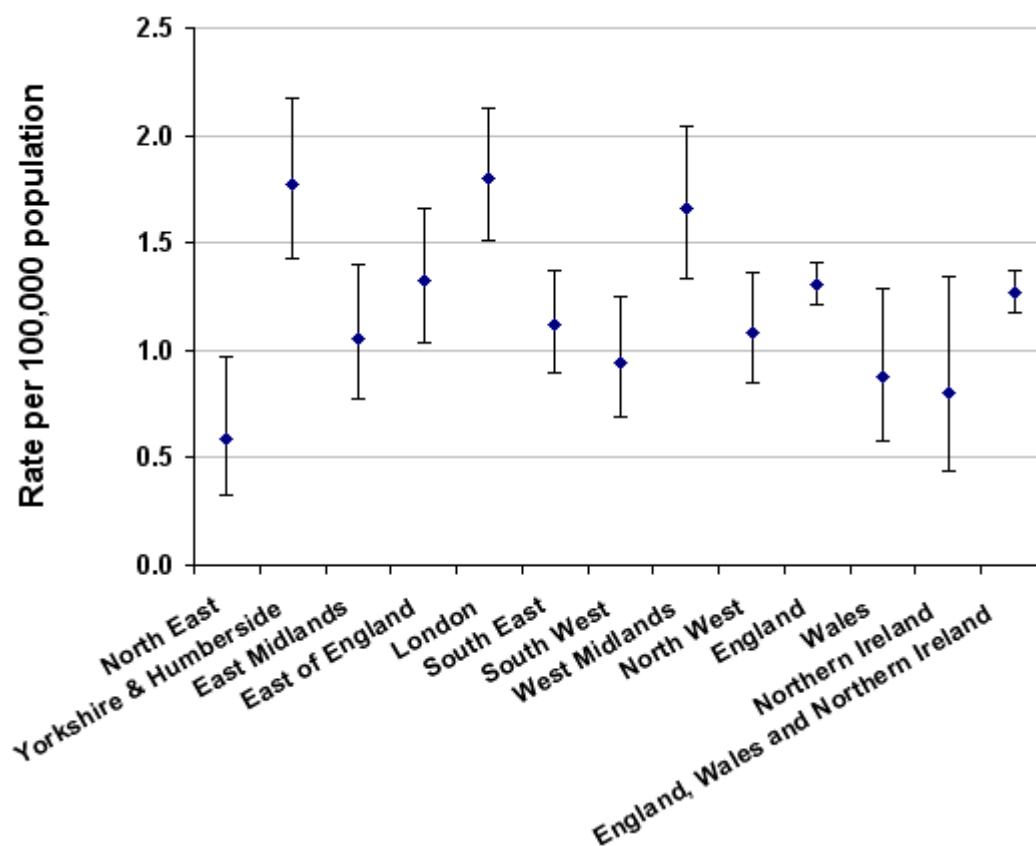


* Data extracted 14 April, 2008.

In contrast to regional patterns observed in *Klebsiella* and *Enterobacter* spp. bacteraemia regions with high incidence of *Serratia* spp. bacteraemia include the Wales (3.94 per 100,000 population) and Northern Ireland (4.19/100,000). The high incidence in Northern Ireland may be consistent with impressions that *Serratia* spp. infections are more prevalent in the Republic of Ireland. Historically there are reports of infection via blood and there is some evidence of a higher than average number of isolations associated with these incidents transfusion in the Republic of Ireland a decade ago. However, there have also been a number of outbreaks in Dublin Hospitals that are not linked to blood transfusion.

Regions/countries with low incidence include the South East (1.24 per 100,000 population) and East of England (1.39/100,000). The overall reported incidence for England, Wales and Northern Ireland is 0.13 per 100,000 population.

Figure 5. Region-specific rates* of *Citrobacter* spp. bacteraemia: England, Wales and Northern Ireland, 2007



* Data extracted 14 April, 2008.

The highest incidence of *Citrobacter* spp. bacteraemia were reported in London and Yorkshire and the Humber (1.80 and 1.77 per 100,000 population respectively). The lowest incidence of *Citrobacter* spp. bacteraemia occurs in the North East and Northern Ireland (0.80 and 0.88 per 100,000 population respectively). The overall reported incidence for England, Wales and Northern Ireland is 0.10 per 100,000 population.

It is important to note that regional incidence rates are affected by completeness of regional reporting as well as the regional distribution of specialist care units.

References

1. Woodford N, et al. *Int J Antimicrob. Agents* 2007; 29(4); 456-9.

Infection reports

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Enteric

 **Corrigendum: Common gastrointestinal infections, England and Wales, laboratory reports: weeks 09-13/08**

Laboratory reports for week 09/08 were omitted from the data published in *Health Protection Report* Volume 2, No 11 (11 April 2008) ("Common gastrointestinal infections, England and Wales, laboratory reports: weeks 10-13/08"). Updated data for the relevant period (extracted on 14 April 2008), including the missing week, is given in the following table.

Common gastrointestinal infections, England and Wales, laboratory reports: weeks 09-13/08 (updated 18 April 2008 with data extracted on 14 April 2008).

Laboratory reports	Number of reports received					Total reports 09-13/08	Cumulative total	
	09/08	10/08	11/08	12/08	13/08		01-13/08	01-13/07
<i>Campylobacter</i>	696	671	652	470	507	2141	7382	8426
<i>Escherichia coli</i> O157 *	12	8	10	5	7	42	94	68
<i>Salmonella</i> †	180	132	151	99	75	403	1550	2307
<i>Shigella sonnei</i>	10	5	4	2	5	13	79	182
Rotavirus	754	927	975	848	715	3290	6085	6193
Norovirus	184	174	165	161	135	584	2390	2368
Cryptosporidium	35	35	39	34	17	120	383	449
Giardia	68	59	46	35	30	158	609	615

*Vero cytotoxin-producing isolates (data from Health Protection Agency's Laboratory of Enteric Pathogens (LEP)).

† Data from Health Protection Agency's Laboratory of Enteric Pathogens.
