



Infection report

Volume 9 Number 14 Published on: 17 April 2015

Bacteraemia

Voluntary surveillance of *Enterococcus* spp. bacteraemia, England, Wales and Northern Ireland: 2014

These analyses are based on data extracted from the Public Health England (PHE) voluntary surveillance database, the Second Generation Surveillance System (SGSS), on the 2nd March 2015 for the five-year period 2010-2014. To put these analyses in context, the longitudinal trend for the incidence of bacteraemia caused by *Enterococcus* spp. incorporates data for the seven-year period 2008-2014, extracted on the same date. The data presented here may differ in some instances from data in earlier publications due to the change in surveillance systems and the inclusion of late reports.

Rates were calculated using 2013 mid-year resident population estimates based on the 2011 census for England, Wales, and Northern Ireland.[1, 2] Geographical analyses were made based on the residential location of the patient with reference PHE Centres.

The report includes analyses on the trends, age and sex distribution, geographical distribution of and the antimicrobial susceptibility data in cases of bacteraemia caused by *Enterococcus* species.

Key points

- The incidence rate of bacteraemia caused by *Enterococcus* spp. declined between 2008 and 2010, but thereafter remained stable at approximately 9.2 reports per 100,000 population per year.
- The two most frequently isolated species within the genus in 2014 were *Enterococcus faecalis*, with 2323 reports (43%) and *Enterococcus faecium* with 2090 reports (39%).
- The incidence rate of *Enterococcus* spp. bacteraemia was highest among older adults (≥75 years) and infants (<1 year old) and higher among males than females in 2014.
- The incidence rate was higher in Northern Ireland (10.2 reports per 100,000 population, per year in 2014) than in England (9.2 reports per 100,000 population, per year in 2014).
- Within England, incidence rates were consistently high in Greater Manchester (12.1

reports per 100,000 population, per year in 2014) and West Midlands (12.0 reports per 100,000 population, per year in 2014). Incidence rates were consistently low in Thames Valley (5.8 reports per 100,000 population, per year in 2014).

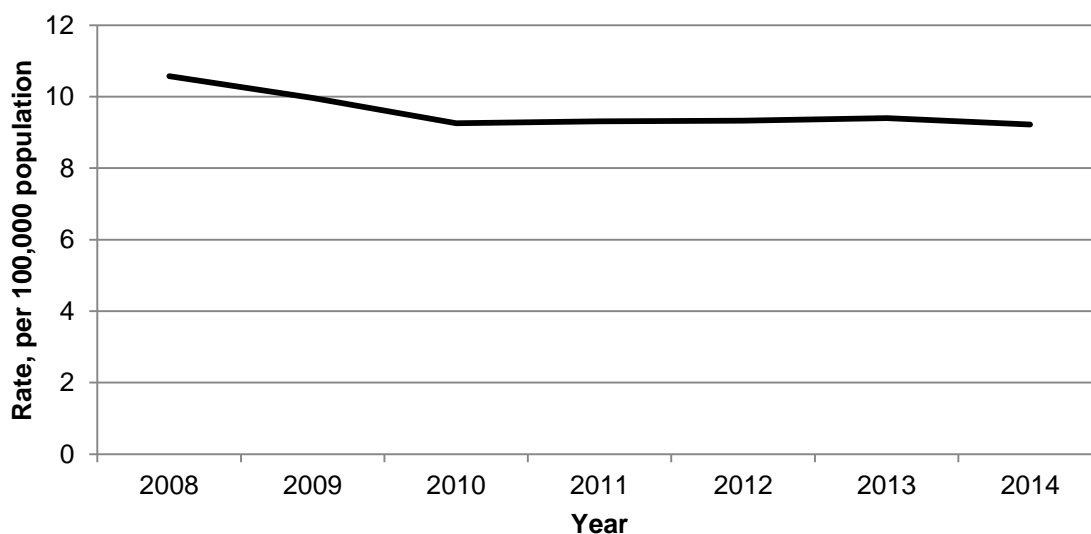
- Among *E. faecalis* and *E. faecium* isolates, the proportions resistant to glycopeptides in 2014 were $\approx 24\%$ and $\approx 2\%$ respectively.

Trends in episode numbers and rates

Between 2008 and 2010 the incidence rate of bacteraemia caused by *Enterococcus* spp. fell from 10.6 reports per 100,000 population per year to 9.2 per 100,000 population per year. Since 2010, the incidence rate has remained stable between 9.4 and 9.2 reports per 100,000 population per year (figure 1).

The number of *Enterococcus* spp. reports increased by 1.8% from 5324 in 2010 to 5420 in 2014. The total number of bacteraemias (any genus) reported to SGSS increased by 4.1% between 2009 and 2013 (101,484 to 105,686 reports).[3] *Enterococcus* spp. accounted for 4.3% of all monomicrobial bacteraemia reports in 2013, making it the 7th most frequently reported monomicrobial bloodstream infection-causing genus.

Figure 1. *Enterococcus* spp. bacteraemia rates per 100,000 population (England, Wales and Northern Ireland): 2008-2014



In 2014, 86% of *Enterococcus* spp. isolates were identified to species level (table 1). This continues an upward trend since 2010, when 78% of *Enterococcus* spp. isolates were identified to species level, probably reflecting increasing deployment of MALDI-ToF for identification. Over the past five years, the proportion of *Enterococcus* spp. bacteraemias caused by *E. faecium* has increased from 29% in 2010 to 39% in 2014. In contrast, the number of *Enterococcus* spp. bacteraemias caused by *E. faecalis* has fallen slightly from 45% to 43% over the same five year period.

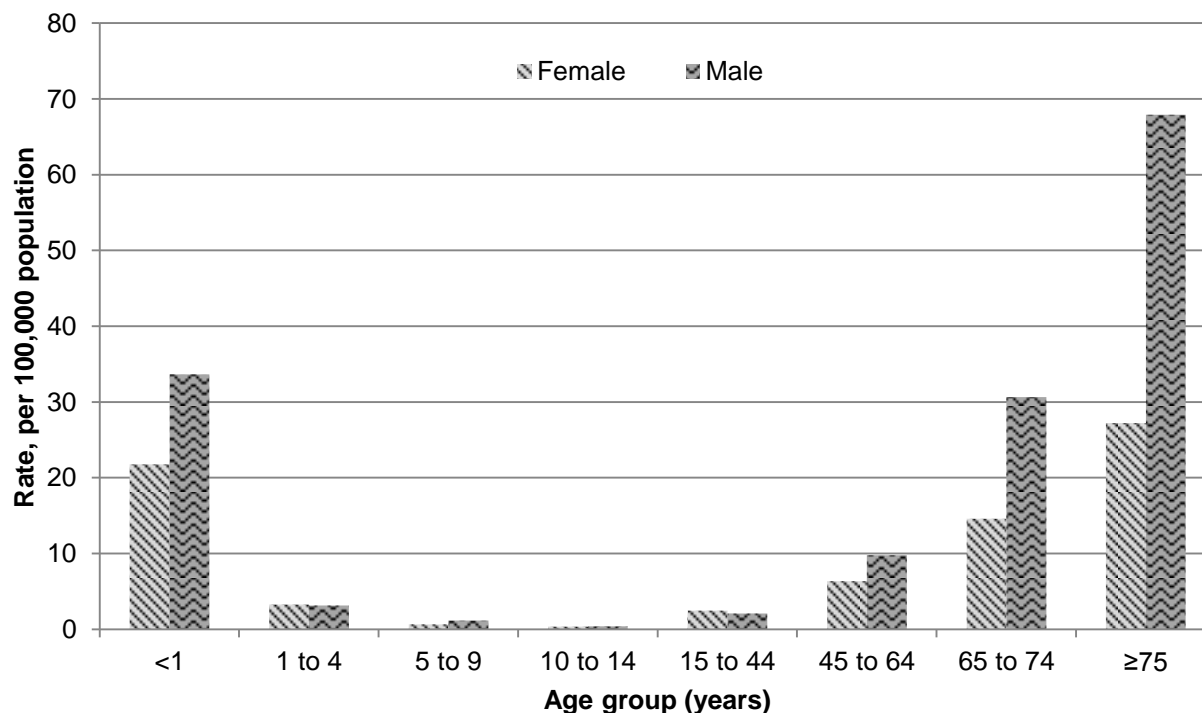
Table 1. Reports of *Enterococcus* spp. bacteraemia by species (England, Wales and Northern Ireland): 2010-2014

Organism	2010		2011		2012		2013		2014	
	Count	%	Count	%	Count	%	Count	%	Count	%
<i>E. avium</i>	41	1	53	1	56	1	47	1	47	1
<i>E. casseliflavus</i>	36	1	38	1	33	1	40	1	55	1
<i>E. durans</i>	25	<1	30	1	25	<1	23	<1	19	<1
<i>E. faecalis</i>	2378	45	2352	44	2367	43	2389	43	2323	43
<i>E. faecium</i>	1529	29	1662	31	1941	36	2024	37	2090	39
<i>E. gallinarum</i>	115	2	131	2	130	2	113	2	85	2
<i>E. hirae</i>	9	<1	4	<1	4	<1	0	<1	4	<1
<i>E. raffinosus</i>	11	<1	15	<1	22	<1	40	1	32	1
<i>Enterococcus</i> spp., species not recorded	1180	22	1115	21	869	16	850	15	765	14
<i>Enterococcus</i> spp.	5324	1	5400	1	5447	1	5526	1	5420	1

Age and sex distribution

The incidence rate of *Enterococcus* spp. bacteraemia was higher among males than females for most age groups in 2014. The highest rate was among males over 75 years old (67.9 reports per 100,000 population per year, figure 2). For females in the same age group, the rate was 27.3 reports per 100,000 population per year.

Figure 2. *Enterococcus* spp. bacteraemia age and sex rates per 100,000 population (England, Wales and Northern Ireland): 2014



Geographic distribution

The overall incidence rate of *Enterococcus* spp. bacteraemia in England, Wales and Northern Ireland was 9.2 per 100,000 population per year in 2014 (table 2). Northern Ireland had the highest reported incidence rate (10.2 per 100,000 population per year).

Within England, incidence rates of *Enterococcus* spp. bacteraemia have been consistently high in Greater Manchester and the West Midlands. Rates were high in East Midlands in 2010 (11.9 per 100,000 population per year), but fell consistently each year to 9.8 per 100,000 population per year in 2014.

Incidence rates of *Enterococcus* spp. bacteraemia were consistently low in Thames Valley between 2010 and 2014 (between 4.9 and 5.8 per 100,000 population per year).

Figure 3. Geographic distribution of *Enterococcus* spp. bacteraemia rates per 100,000 population (England, Wales and Northern Ireland): 2014

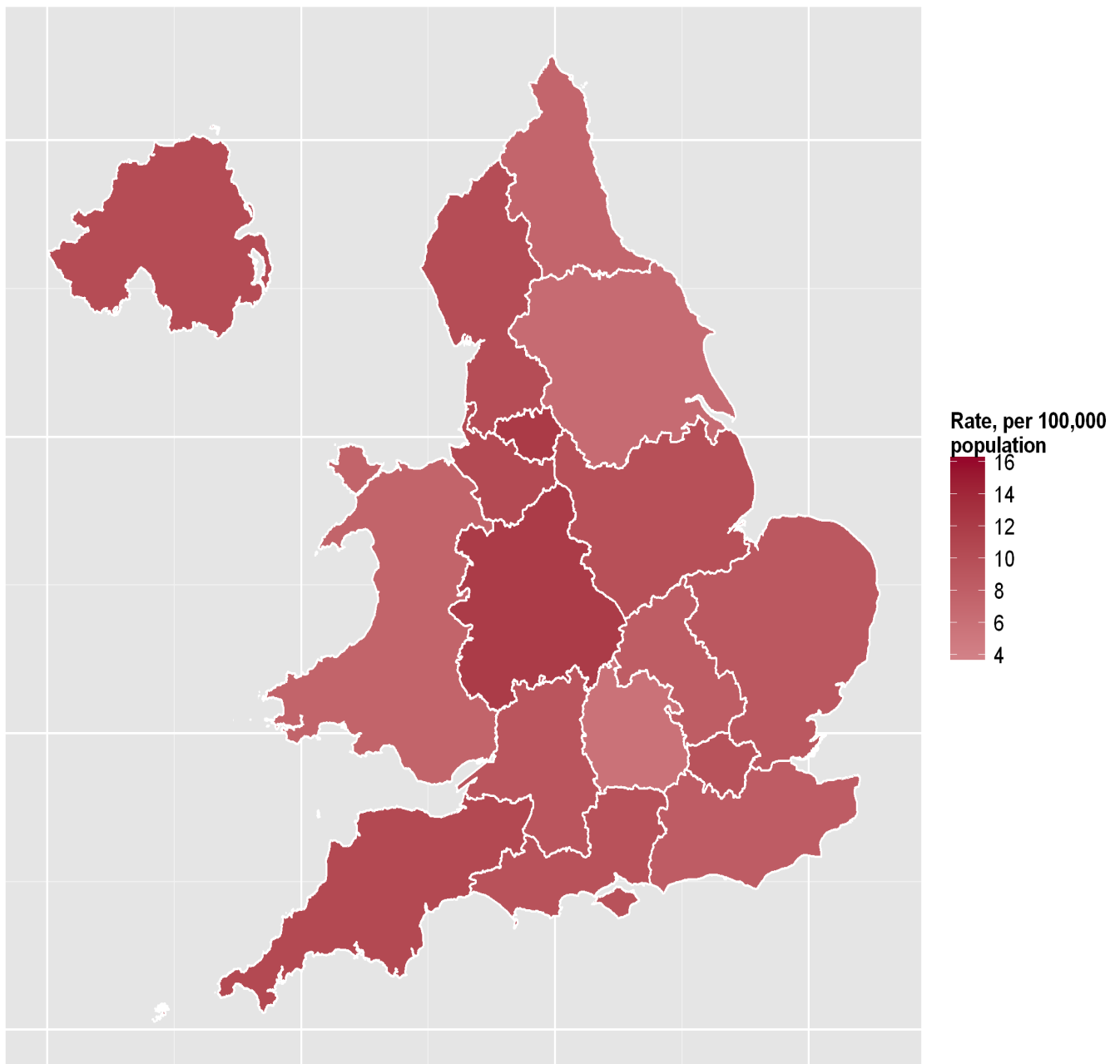


Table 2. Rate per 100,000 population *Enterococcus* spp. bacteraemia reports by PHE Centre (England, Wales and Northern Ireland): 2010-2014

Region	PHE Centre	Rate, per 100,000 population				
		2010	2011	2012	2013	2014
North of England	Cheshire and Merseyside	9.5	9.8	10.3	11.7	10.5
	Cumbria and Lancashire	8.1	8.4	8.6	9.4	10.1
	Greater Manchester	12.9	11.4	13.0	12.8	12.1
	North East	8.0	7.9	6.1	8.5	7.4
	Yorkshire and Humber	9.8	7.8	7.4	6.2	6.6
Midlands and East of England	South Midlands and Hertfordshire	6.6	8.1	7.1	7.9	8.3
	East Midlands	11.9	11.3	10.3	10.2	9.8
	Anglia and Essex	8.5	10.3	10.3	8.5	8.9
	West Midlands	9.6	10.0	9.8	11.7	12.0
London	London	9.8	9.4	9.5	9.0	9.5
South of England	Avon Gloucestershire and Wiltshire	6.7	6.5	7.8	7.6	9.2
	Devon Cornwall and Somerset	9.9	9.8	10.9	9.9	10.6
	Wessex	8.0	8.2	8.8	10.0	9.6
	Kent Surrey and Sussex	8.5	9.1	9.3	9.0	8.4
	Thames Valley	4.9	5.6	5.4	4.4	5.8
England		9.1	9.1	9.1	9.2	9.3
Northern Ireland		12.6	12.6	13.5	14.2	10.2
Wales		9.5	10.9	10.9	10.9	7.5
England, Wales and Northern Ireland		9.3	9.3	9.3	9.4	9.2

Antimicrobial susceptibility data

For both *E. faecalis* and *E. faecium*, the proportion of isolates for which antimicrobial susceptibility data were reported fell in 2014. For *E. faecalis*, data for at least one key antimicrobial was provided for 74.6% of isolates in 2010; in 2014, this figure was 59.4%. For *E. faecium*, data for at least one key antimicrobial was provided for 77.4% of isolates in 2010, compared to 58.1% in 2014.

As the surveillance system does not currently differentiate between high-level gentamicin resistance and the intrinsic level of resistance characteristic of Enterococci these data are not reported.

Reported resistance (defined as reduced susceptibility or non-susceptible) among *E. faecalis* isolates was low (<3% for ampicillin/amoxicillin, vancomycin and teicoplanin in 2014, table 3).

Table 3. Antimicrobial susceptibility for *E. faecalis* bacteraemia (England, Wales and Northern Ireland): 2010 to 2014

	2010		2011		2012		2013		2014	
	Tested	% resistant	Tested	% resistant	Tested	% resistant	Tested	% resistant	Tested	% resistant
Vancomycin/Teicoplanin	1774	2	1760	4	1826	2	1771	2	1381	2
Ampicillin/Amoxycillin	1746	6	1763	5	1809	4	1770	3	1353	3
Teicoplanin	1335	3	1338	3	1388	2	1386	1	1096	2
Vancomycin	1748	1	1748	1	1748	1	1748	1	1353	2
Linezolid	809	<1	809	<1	809	<1	809	<1	914	<1
Total	2378		2352		2367		2389		2323	

Table 4. Antimicrobial susceptibility for *E. faecium* bacteraemia (England, Wales and Northern Ireland): 2010 to 2014

	2010		2011		2012		2013		2014	
	Tested	% resistant	Tested	% resistant	Tested	% resistant	Tested	% resistant	Tested	% resistant
Vancomycin/Teicoplanin	1183	16	1316	17	1506	20	1567	22	1214	24
Ampicillin/Amoxycillin	1122	89	1282	89	1440	92	1505	91	1141	89
Teicoplanin	934	14	1056	16	1245	18	1275	22	1002	24
Vancomycin	1160	16	1160	16	1160	16	1160	16	1205	23
Linezolid	640	<1	640	<1	640	<1	640	<1	863	1
Total	1529		1662		1941		2024		2090	

Resistance to ampicillin/amoxicillin was high among *E. faecium* isolates (89% of tested isolates in 2014, table 4). There was a consistent increase in the proportion of isolates resistant to glycopeptides between 2010 and 2014. In 2014, the proportion of *E. faecium* isolates resistant to glycopeptides was about 24%. The most prevalent glycopeptide resistance mechanisms (*VanA* and *VanB*) confer resistance to vancomycin and teicoplanin (*VanA*) or to vancomycin without resistance to teicoplanin (*VanB*).^[4] The apparently higher proportion of isolates resistant to teicoplanin (table 4) may reflect differential reporting of one or other glycopeptide

Acknowledgements

These reports would not be possible without the weekly contributions from microbiology colleagues in laboratories across England, Wales, and Northern Ireland, without whom there would be no surveillance data. The support from colleagues within Public Health England, and the Antimicrobial Resistance and Healthcare Associated Infections (ARMHAI) Reference Unit, in particular, is valued in the preparation of the report. Feedback and specific queries about this report are welcome and can be sent to hcai.amrdepartment@phe.gov.uk.

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