

Staphylococcus aureus bacteraemia: England, Wales, and Northern Ireland: October to December 2003

Key points:

- Laboratories in England reported 3699 *Staphylococcus aureus* bacteraemia isolates between October and December 2003 through the voluntary reporting scheme*. More than 1000 additional *S. aureus* reports (4941) were made via the mandatory reporting scheme†. This equates to a discrepancy of 25%. The trends in mandatory and voluntary reporting of *S. aureus* are considered in the discussion.
- There were 164 and 140 voluntary reports of *S. aureus* bacteraemia isolates from laboratories in Wales and Northern Ireland respectively for the same time period.
- Ninety-three per cent of voluntary reports from England contained information on susceptibility to methicillin. Methicillin resistance in Wales and Northern Ireland (voluntary reporting) was noted in 51% and 41% of *S. aureus* bacteraemia reports respectively. In England, 41% of *S. aureus* bacteraemias were due to methicillin resistant *Staphylococcus aureus* (MRSA) under the voluntary scheme and 40% of *S. aureus* isolates reported under the English mandatory scheme were resistant to methicillin.
- No confirmed reports of vancomycin or linezolid resistance in *S. aureus* bacteraemias were received during this period and there was just one report of teicoplanin resistance.
- These data do not distinguish between hospital-acquired and community-acquired infections, nor in which healthcare setting they may have been acquired or whether they were acquired in the United Kingdom.

* Voluntary reporting: undertaken by most laboratories in England, Wales, and Northern Ireland for many years. Laboratories report individual clinically significant infections on a regular basis, usually weekly.

† Mandatory reporting: established in England in April 2001. Acute NHS Trusts send quarterly aggregate reports of total numbers of *S. aureus* bacteraemias, including MRSA.

Introduction

This report covers *Staphylococcus aureus* bacteraemias over the fourth quarter of 2003 (October to December) under the voluntary (routine communicable disease reporting by laboratories) and mandatory bacteraemia reporting schemes. These bacteria were isolated from blood cultures with or without cerebrospinal fluid, by laboratories across England, Wales, and Northern Ireland. Wales and Northern Ireland do not participate in the mandatory *S. aureus* surveillance scheme. Rates were calculated using 2002 mid-year resident population estimate denominators for each region. Regional analyses were performed using the English regional boundaries introduced in April 2002.

Staphylococcus aureus

In the three month period October to December 2003, 4003 reports of *S. aureus* bacteraemia were received through the voluntary reporting scheme in England (3699), Wales (164), and Northern Ireland (140) (table 1 and figure 1). Under the mandatory surveillance scheme, there were 4941 *S. aureus* bacteraemia reports from England. Wales and Northern Ireland do not participate in the mandatory MRSA surveillance scheme.

Among the English regions, Yorkshire and Humberside had the highest number of reports under the voluntary scheme (566) and London had the highest number of reports under the mandatory scheme (988).

The fewest number of reports were received from the North East (250 voluntary and 261 mandatory). London had the largest disparity (60%) in reports made under the voluntary and mandatory schemes, with 593 more reports under the mandatory scheme. The West Midlands and North East regions both had the smallest discrepancy between voluntary and mandatory reporting with just 4% more reports made under the mandatory scheme (table 1 and figure 1).

The overall reporting rate of *S. aureus* bacteraemia for England, Wales, and Northern Ireland was 7.4 per 100,000 population for this three month period, based on voluntary reporting (figure 2). Northern Ireland had the highest rate (8.3/100,000 population) followed by England (7.5/100,000 population), and Wales (5.6/100,000 population). Reporting rates within England ranged from 5.4/100,000 population in London to 11.4/100,000 population in Yorkshire and Humberside.

Antimicrobial susceptibility

All reports made under the mandatory surveillance scheme in England include methicillin susceptibility data, whereas 93% of voluntary reports in England included this information (table 1). Of the voluntary reports made from Wales and Northern Ireland, 88% and 89% respectively included methicillin susceptibility data. The proportion of *S. aureus* reports without methicillin susceptibility information was

Figure 1 Staphylococcus aureus bacteraemia reports and methicillin susceptibility data, England, Wales, and Northern Ireland: October to December 2003*

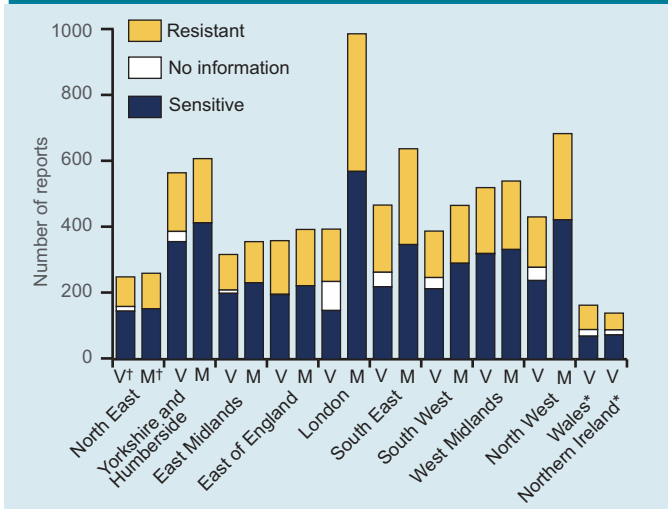
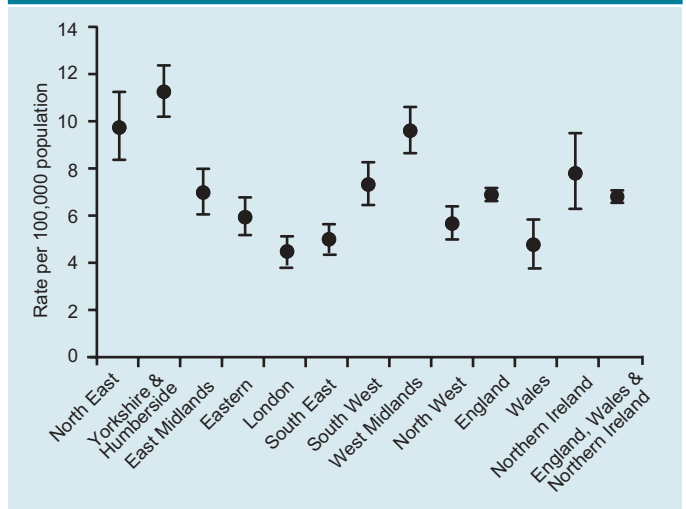


Figure 2 Staphylococcus aureus bacteraemia voluntary reporting rates* per 100,000 population (95% confidence intervals), England, Wales, and Northern Ireland: October to December 2003



*Wales & Northern Ireland do not take part in the English mandatory surveillance scheme; †V = Voluntary, M = Mandatory.

*rates calculated using 2002 mid-year resident population estimates.

Table 1 Staphylococcus aureus bacteraemia reports and methicillin susceptibility data*, England, Wales, and Northern Ireland: October to December 2003

Region	Reporting scheme	Resistant	Sensitive	No information	(%†)	Total	(% Difference‡)
North East	Voluntary	90	146	14	6	250	4
	Mandatory	108	153	–	–	261	
Yorkshire & Humberside	Voluntary	178	357	31	5	566	7
	Mandatory	195	414	–	–	609	
East Midlands	Voluntary	108	200	10	3	318	11
	Mandatory	125	232	–	–	357	
East of England	Voluntary	163	196	1	0.3	360	9
	Mandatory	171	223	–	–	394	
London	Voluntary	159	148	88	22	395	60
	Mandatory	418	570	–	–	988	
South East	Voluntary	204	220	44	9	468	27
	Mandatory	291	348	–	–	639	
South West	Voluntary	141	214	34	9	389	17
	Mandatory	176	291	–	–	467	
West Midlands	Voluntary	200	320	1	0.2	521	4
	Mandatory	208	333	–	–	541	
North West	Voluntary	153	239	40	9	432	37
	Mandatory	262	423	–	–	685	
England	Voluntary	1396	2040	263	7	3699	25
	Mandatory	1954	2987	–	–	4941	
Wales§	Voluntary	74	70	20	12	164	
Northern Ireland§	Voluntary	51	74	15	11	140	
England, Wales, & Northern Ireland	Voluntary	1521	2184	298	7	4003	

*provisional data; †No information as a percentage of total reports; ‡Percentage difference between voluntary and mandatory reporting schemes; § Wales and Northern Ireland do not take part in the English mandatory surveillance scheme.

was highest in reports from London (22%), the North West (9%), South West (9%), and South East regions (9%). The lowest proportion was in the West Midlands and East of England regions (<1% respectively).

Forty-one per cent of reports of isolates with methicillin susceptibility information (1396/3436) under the voluntary laboratory reporting scheme for England were resistant to methicillin. This compares to 51% of reports from Wales (74/144) and 41% of reports from Northern Ireland (51/125) (table 1 and figure 3). Of the 4941 reports made via the mandatory scheme in England, 1954 (40%) isolates were reported as resistant to methicillin.

London had the highest percentage of methicillin resistant *S. aureus* (MRSA) isolates reported under the voluntary scheme (52%) and the South East had the highest percentage of MRSA isolates reported under the mandatory scheme (46%) in England (figure 3). Yorkshire and Humberside had the lowest proportion of methicillin resistant isolates (33% voluntary and 32% mandatory).

There was little variation in the proportion of *S. aureus* bacteraemia isolates resistant to methicillin between the two schemes in the East Midlands (<1%), West Midlands (<1%), the North West (1%), and Yorkshire and Humberside (1%) (figure 3). In London, however, voluntary reporting indicated a 10% higher rate of methicillin resistance than mandatory reporting.

Of the reports that included susceptibility data for other antimicrobials, 56% of isolates were reported as resistant to ciprofloxacin, and 38% as resistant to erythromycin. Less than 10% resistance was reported

Table 2 *Staphylococcus aureus* bacteraemia reports (voluntary reporting*) and susceptibility data: England, Wales, and Northern Ireland: October to December 2003

	Resistant	(%)†	Sensitive	No information	(%)‡
Ciprofloxacin	728	56	561	2714	68
Erythromycin	1150	38	1848	1005	25
Fusidic acid	244	9	2420	1399	33
Gentamicin	130	5	2670	1203	30
Mupirocin	69	5	1339	2595	65
Rifampicin	41	2	1752	2210	55
Vancomycin	–	–	2551	1452	36
Teicoplanin	1	0.1	1332	2670	67
Linezolid	–	–	164	3839	96

*This information is not available under the mandatory surveillance scheme.

†R as a percentage of R+S.

‡No information as a percentage of total reports.

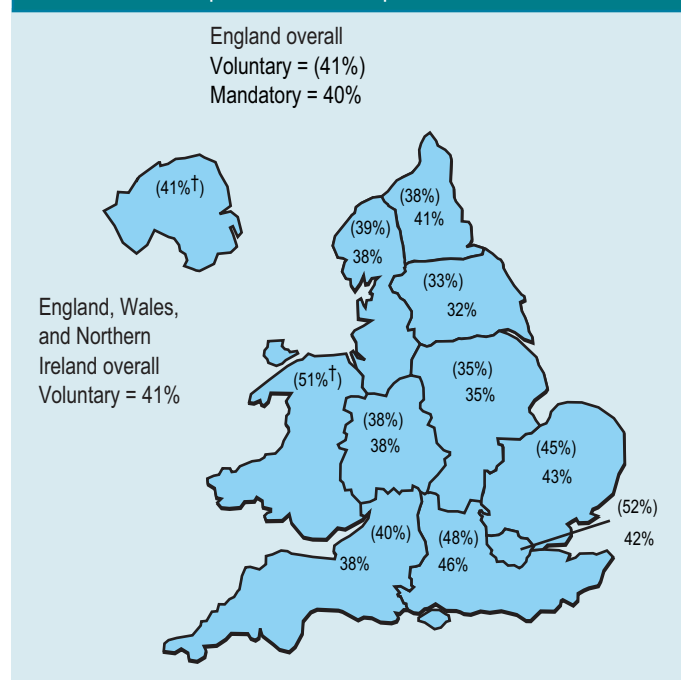
to the remaining antibiotics listed in table 2.

No confirmed reports of vancomycin or linezolid resistance in *S. aureus* bacteraemias were received during this period and there was just one report of teicoplanin resistance.

Age distribution

The age-specific rate of MRSA (figure 4) was highest in the over 75 years age group (16.8 per 100,000 population), followed by the 65 to 74 years age group (7.3 /100,000), and the under 1 year age group (3.0/100,000). This information is only obtainable from the voluntary reporting scheme and it is not included in the mandatory dataset. The proportion of

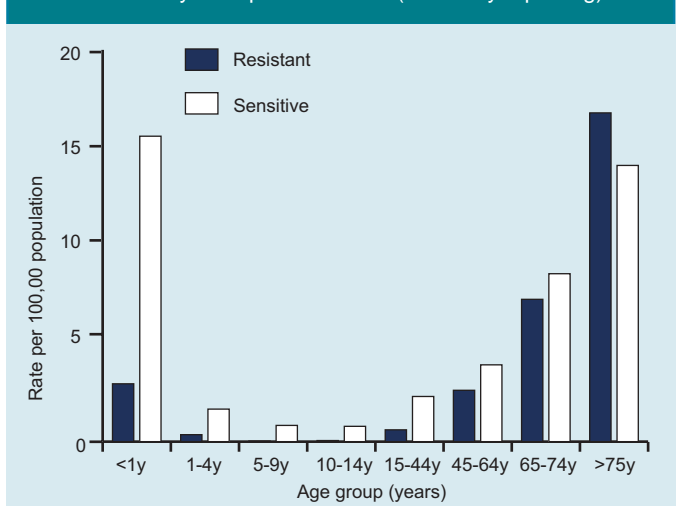
Figure 3 Methicillin resistance in *Staphylococcus aureus* bacteraemia reports*, England, Wales, and Northern Ireland: October to December 2003. MRSA as a percentage of isolates whose susceptibilities were reported



* provisional data.

† Wales and Northern Ireland have separate mandatory surveillance schemes.

Figure 4 Age-specific *Staphylococcus aureus* bacteraemia rates* and methicillin susceptibility per 100,000 population, England, Wales, and Northern Ireland: July to September 2003 (voluntary reporting)



*rates calculated using 2002 mid-year resident population.

methicillin sensitive *S. aureus* (MSSA) was higher than MRSA for all age groups except the over 75 years age group.

Discussion

S. aureus bacteraemia reports made from October to December 2003, from both the voluntary and mandatory reporting schemes, are presented here to allow comparison with earlier reports. Caution should be exercised when interpreting data from a short time period. The data obtained under both schemes (voluntary and mandatory) have been analysed here as the voluntary scheme includes additional information such as age and gender. No distinction is made between community and hospital-acquired bacteraemias in this analysis, nor is there data to identify the location where the infection was acquired.

Where voluntary and mandatory reporting from England are compared, there is a 25% disparity with 1242 less reports in the voluntary reporting. There was, however, little difference in the overall proportion of *S. aureus* bacteraemias due to MRSA in England under the two schemes, which was 41% under the voluntary scheme and 40% under the mandatory scheme. These figures were very similar when compared to data from the previous report (1), where 39% of reports made under both voluntary and mandatory schemes were reported with methicillin resistance. These results compare well with other surveys such as those produced by the British Society for Antimicrobial Chemotherapy (BSAC) (2) and the European Antimicrobial Resistance Surveillance System (EARSS) (3), and strengthens the observations made in the previous reports that the proportion of *S. aureus* due to MRSA appears to have stabilised at approximately 40% (1,4).

In England, Wales, and Northern Ireland, 93%, 88%, and 89% respectively of voluntary *S. aureus* reports included data on methicillin susceptibility. Ninety-three per cent of voluntary reports contained methicillin susceptibility information, which compares to 93% for the same period of 2002, and 92% for the preceding quarter of 2003 (1). All mandatory reports included methicillin susceptibility data.

There remains a wide range in the reporting rate per 100,000 population for the voluntary reporting scheme (5.4-11.4 per 100,000 population). This may be due to a number of factors, including regional differences in rates of MRSA and methodological differences in reporting such as the use of electronic data capture.

The rate of mandatory *S. aureus* reports is 10.0/100,000 population for England. This rate is considerably higher than the rate of voluntary reports (7.5/100,000 population), suggesting under-reporting of *S. aureus* bacteraemias under the voluntary scheme. In London the mandatory reporting rate is 13.4/100,000 compared to a voluntary reporting rate of 5.4/100,000 population.

Although 93% of voluntary *S. aureus* reports included data on methicillin susceptibility, only 32% of these reports included ciprofloxacin susceptibility data and 75% included susceptibility data for erythromycin.

Forty-one per cent of MRSA isolates were reported with concomitant resistance to ciprofloxacin, and 62% of such isolates were reported with concomitant resistance to erythromycin. This compares to 4.9% of MSSA reports with concomitant ciprofloxacin resistance and 8.4% with concomitant erythromycin resistance. The higher percentage of ciprofloxacin and erythromycin resistance in MRSA isolates compared to MSSA isolates is consistent with the MRSA isolates belonging to EMRSA15 and EMRSA 16, which account for the majority of MRSA isolates in England and which differ in their antimicrobial susceptibilities and treatment options (1,4,5).

Susceptibility data for other antimicrobials was weak and the incomplete information makes comparisons with previous data and analyses difficult. There were no confirmed reports of vancomycin or linezolid-resistant isolates from bacteraemias and only one report of teicoplanin resistant isolates.

Laboratories are asked to send any isolates suspected to have full or intermediate glycopeptide resistance, or resistance to newer anti-staphylococcal agents such as linezolid, to the Health Protection Agency's Antibiotic Resistance Monitoring Reference Laboratory (ARMRL), Colindale. Suspect isolates will also be typed at the Health Protection Agency's Laboratory of Healthcare Associated Infection (LHCAI) to explore the evolution and spread of new strains.

Acknowledgements

These reports would not be possible without the enduring weekly contributions from microbiology colleagues in laboratories across England and Wales, and Northern Ireland, without which there would be no surveillance data. This is your data, so please tell us what you would like done with it. We are always pleased to hear your views. Please send your comments/feedback to Andrew Pearson <andrew.pearson@hpa.org.uk> or Allison Lee <allison.lee@hpa.org.uk>. The support from colleagues within the HPA, Specialist and Reference Microbiology Division in particular, is valued in the preparation of the reports. These contributions are greatly appreciated.

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