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

Key points:

- In 2003, 15,081 *Staphylococcus aureus* bacteraemia reports (12% increase on 2002) were received from England (13,770), Wales (742), and Northern Ireland (569) under the voluntary laboratory reporting scheme*.
- In 2003, 19,244 reports were received from England under the mandatory reporting scheme†. This represents a 6% increase on 2002.
- There were 28% more *S. aureus* isolates reported under the mandatory scheme than the voluntary scheme in England.
- Methicillin resistance as a proportion of *S. aureus* bacteraemias with susceptibility information was 41%, 47%, and 44% for England, Wales, and Northern Ireland respectively (voluntary reporting). Under the English mandatory scheme methicillin resistant *Staphylococcus aureus* (MRSA) accounted for 39% of the total susceptibility reports.
- Regional differences in the proportion of *S. aureus* bacteraemia reported as methicillin resistant between the voluntary and mandatory reporting schemes in England ranged from <1% to 6%.
- Numbers of reports of both MRSA and methicillin sensitive *S. aureus* (MSSA) bacteraemia increased again in 2003 over the previous year.
- There has been a continuing improvement in the reporting of methicillin susceptibility under the voluntary scheme, this information having been provided in 93% of reports in 2003.
- No confirmed vancomycin intermediate resistant *S. aureus* bacteraemia isolates (GISA) were reported in 2003.

*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. Data include information on the patients age and the antimicrobial susceptibilities of the reported pathogen.

†Mandatory reporting: established in England in April 2001. Acute NHS Trusts send quarterly aggregate reports of total numbers of *S. aureus* bacteraemias, including MRSA. No information on individual cases.

Introduction

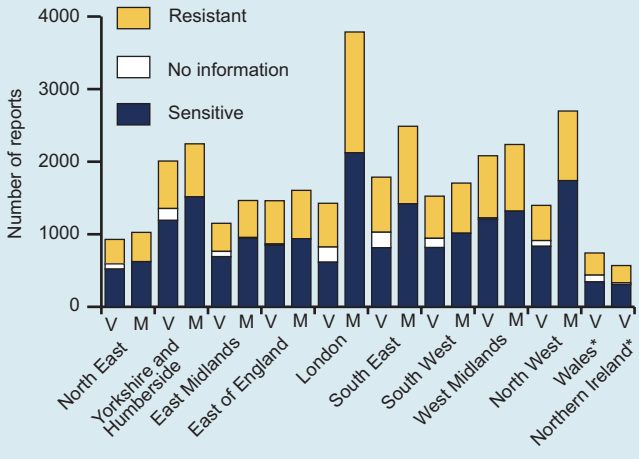
This report covers *Staphylococcus aureus* bacteraemias diagnosed between January and December 2003 under the voluntary laboratory reporting schemes in England, Wales, and Northern Ireland. These reports comprise bacteria isolated from blood cultures with or without cerebrospinal fluid. The data from the mandatory reporting scheme in England (established April 2001) are also included here. Northern Ireland (1) and Wales have their own mandatory methicillin resistant *Stapylococcus aureus* (MRSA) bacteraemia reporting schemes, which are not covered in this report.

Rates were calculated using 2002 resident population denominators. Regional analyses were performed using the English regional boundaries introduced in April 2002.

Reporting of *Staphylococcus aureus* bacteraemias

A total of 15,081 *S. aureus* bacteraemias were reported in England (13,770), Wales (742), and Northern Ireland (569) through the voluntary reporting scheme in 2003. This compares to 19,244 reports under the mandatory scheme in England, a 28% deficit (table 1 and figure 1). Among the English regions, the West Midlands region had the highest number of reports (2082) under the voluntary scheme, and London (3787) the highest number under the mandatory scheme. Fewest reports were received from the North East region under both schemes (929 for the voluntary and 1026 for the mandatory scheme). All regions reported higher

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

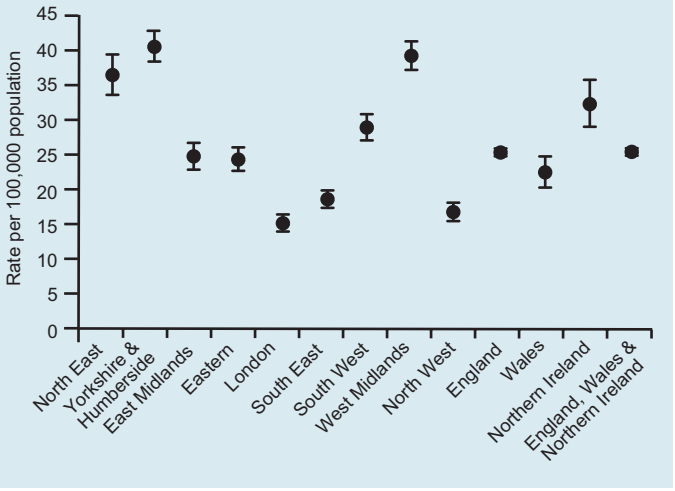


*Wales & Northern Ireland do not take part in the English mandatory surveillance scheme; V = Voluntary, M = Mandatory.

numbers of *S. aureus* bacteraemias under the mandatory than the voluntary scheme. The greatest discrepancy in reporting between the schemes was noted for London (62%) and the North West (48%), where 2360 and 1300 more reports, respectively, were reported under the mandatory scheme. The smallest discrepancy was in the West Midlands (7%).

The voluntary *S. aureus* bacteraemia reporting rate for England, Wales, and Northern Ireland overall was 27.8 per 100,000 population in 2003. This comprised rates of 27.8, 25.2, and 33.5/100,000 for England, Wales, and Northern Ireland respectively (figures 2 and 3). Within England, reporting rates ranged from 19.4/100,000 in London to 40.3/100,000 in the Yorkshire and Humberside region. Using the mandatory scheme data, the *S. aureus* bacteraemia reporting rate for England was 38.8/100,000 (figure 3). Under the mandatory scheme within England, reporting rates ranged from 29.6/100,000 in the East of England region to 51.5/100,000 in London.

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



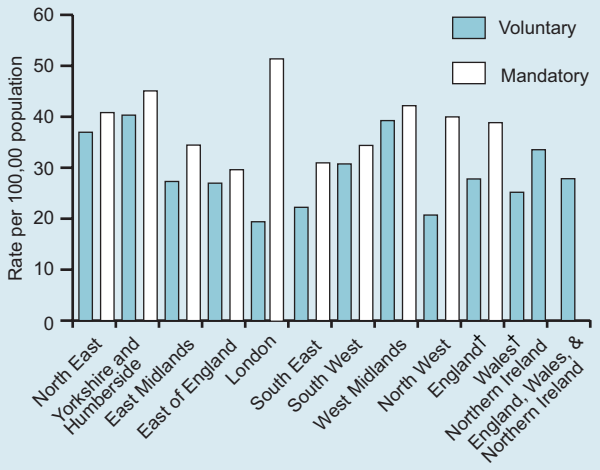
*rates calculated using 2002 mid-year resident population estimates.

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

Region	Reporting scheme	Resistant	Sensitive	No information	(%†)	Total	(% Difference‡)
North East	Voluntary	337	520	72	8	929	9
	Mandatory	403	623	–	–	1026	
Yorkshire & Humberside	Voluntary	654	1191	164	8	2009	11
	Mandatory	731	1515	–	–	2246	
East Midlands	Voluntary	387	692	72	6	1151	21
	Mandatory	507	945	–	–	1452	
East of England	Voluntary	596	850	16	1	1462	9
	Mandatory	667	938	–	–	1605	
London	Voluntary	603	615	209	15	1427	62
	Mandatory	1666	2121	–	–	3787	
South East	Voluntary	759	815	213	12	1787	28
	Mandatory	1069	1419	–	–	2488	
South West	Voluntary	581	817	127	8	1525	11
	Mandatory	692	1013	–	–	1705	
West Midlands	Voluntary	854	1208	20	1	2082	7
	Mandatory	920	1317	–	–	2237	
North West	Voluntary	485	834	79	6	1398	48
	Mandatory	959	1739	–	–	2698	
England	Voluntary	5256	7542	972	7	13,770	28
	Mandatory	7614	11,630	–	–	19,242	
Wales§	Voluntary	305	344	93	13	742	
Northern Ireland§	Voluntary	238	307	24	4	569	
England, Wales, & Northern Ireland	Voluntary	5799	8193	1089	7	15,081	

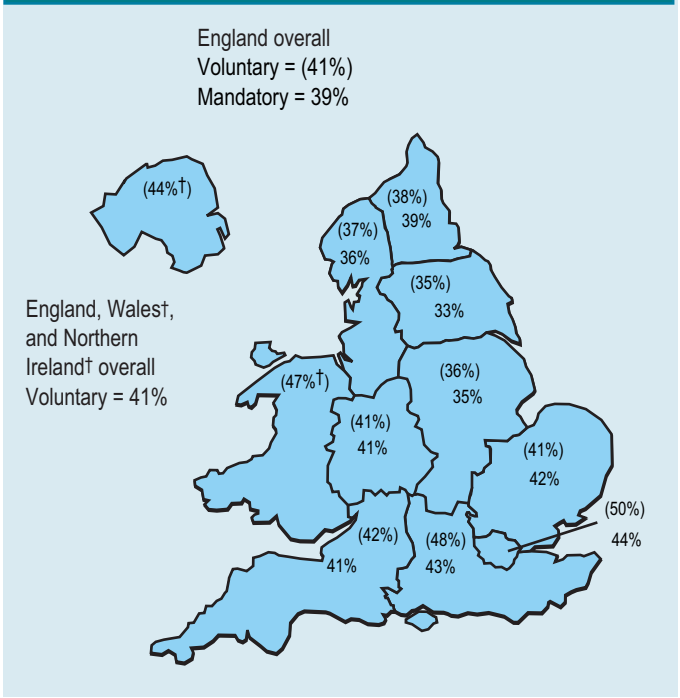
*provisional data; †No information as a percentage of total reports; ‡Percentage difference between voluntary and mandatory reporting schemes; § Wales and Northern Ireland do not take part in the English mandatory surveillance scheme.

Figure 3 *Staphylococcus aureus* bacteraemia reporting rates* per 100,000 population (95% confidence intervals): England, Wales, and Northern Ireland: January to December 2003



*rates calculated using 2002 mid-year resident population estimates.
†Wales and Northern Ireland do not take part in the English mandatory surveillance scheme.

Figure 4 Methicillin resistance in *Staphylococcus aureus* bacteraemia reports*: England, Wales, Northern Ireland: January to December 2003. MRSA as a percentage of isolates whose susceptibilities were reported



*Provisional data.
†Wales and Northern Ireland do not take part in the English mandatory surveillance scheme.

Antimicrobial susceptibility

Methicillin susceptibility data for *S. aureus* bacteraemia reports received under the voluntary and mandatory schemes in 2003 are shown in table 1 and figures 1 and 4. By definition, information on methicillin susceptibility is complete under the mandatory scheme. This information, however, is not always given under the voluntary laboratory reporting scheme. In England, Wales, and Northern Ireland, 93% of voluntary reports of *S. aureus* bacteraemias (13,992/15,081) included this information in 2003, an improvement of 1% on 2002 (2). Within England, there has been an increase in the total number of *S. aureus* reports: 10,338 in 2000 (4), 11,852 (13% increase) in 2001 (3), 12,284 (4% increase) in 2002 (2), and 13,770 (11% increase) in 2003. During this period, there has been an increase in the proportion of reports with susceptibility information to methicillin, 84% (2000), 90% (2001) 92% (2002), and 93% (2003). In Wales and Northern Ireland, 87% and 96% respectively of *S. aureus* bacteraemia voluntary reports included methicillin susceptibility information.

Under the voluntary scheme, the London region had the highest proportion of reports without methicillin susceptibility information (15%, 209 reports), followed by the South East (12%, 213 reports). Yorkshire and Humberside (164 reports), the South West (127 reports), and the North East (72 reports) all had 8% of reports lacking methicillin susceptibility information. Nearly all reports from the East of England and West Midlands regions (1% missing) included methicillin susceptibility information.

In England, methicillin resistance was reported in 41% (5256/12,798) of *S. aureus* bacteraemias with susceptibility information under the voluntary scheme, and in 39% (7614/19,244) of *S. aureus* bacteraemia isolates under the mandatory scheme. This compares to 42% and 39% respectively from these schemes for January to December 2002 (2). In Wales and Northern Ireland, methicillin resistance was reported in 47% (same as 2002 data)(2) and 44% (an increase of 6% on 2002 data) of *S. aureus* bacteraemia reports respectively. Within England, an increase in the number of both MRSA and MSSA was also seen during this period.

The highest proportion of *S. aureus* methicillin resistant bacteraemia reports in England were in London (50% voluntary and 44% mandatory) and the South East (48% voluntary and 43% mandatory) (table 1 and figures 1 and 4). Conversely, the lowest proportion of MRSA bacteraemia was seen in Yorkshire and Humberside (35% voluntary and 33% mandatory) (table 1 and figures 1 and 4). All regions with the exception of East of England reported slightly higher proportions of MRSA under the voluntary scheme than under the mandatory scheme. Within English regions, the difference in the proportions of *S. aureus* bacteraemias reported as methicillin resistant under the voluntary and mandatory schemes ranged from <1% to 2% for most regions. Exceptions to this were London (6%) and South East (5%).

Of the reports that included susceptibility data for other antimicrobials, 54% of isolates were reported as resistant to ciprofloxacin (53% were reported resistant in 2002), and 39% were reported as resistant to erythromycin (41% in 2002). Less than 10% resistance

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

	Resistant	(%)†	Sensitive	No information	(%)‡
Ciprofloxacin	2590	54	2241	10,250	68
Erythromycin	4338	39	6863	3880	26
Fusidic acid	925	9	9053	5103	34
Gentamicin	553	5	9892	4636	31
Mupirocin	308	6	5142	9631	64
Rifampicin	196	3	6483	8402	56
Vancomycin	–	–	9413	5668	38
Teicoplanin	7	0.1	4772	10,302	68
Linezolid	–	–	656	14,425	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.

was reported for the remaining antibiotics listed in table 2.

Although seven reports were initially made of vancomycin intermediate resistance in *S. aureus* bacteraemias in 2003 (glycopeptide-intermediate *S. aureus* [GISA]), five were confirmed to be sensitive and the others were unconfirmed. There were seven reports of teicoplanin resistance and no reports of linezolid resistance during 2003.

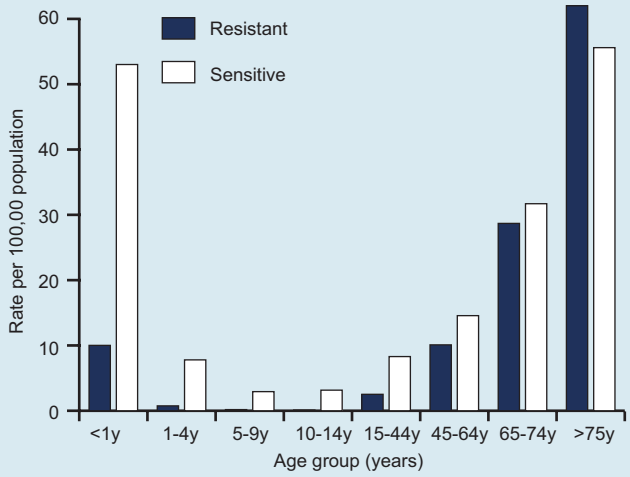
Age distribution

This information is only obtainable from the voluntary reporting scheme as it is not currently included in the mandatory dataset. For MSSA the highest age-specific rate was noted in those aged 75 years and over (55.6 per 100,000 population), followed by those aged under 1 year (53.0/100,000) (figure 5). The MSSA rates were higher than MRSA for all the age groups except the 75 years and over age group. The highest age-specific rate for MRSA was noted in those aged 75 years and over (62.0/100,000), followed by the 65 to 74 years age group (28.7/100,000).

Discussion

In 2003 the numbers of *S. aureus* bacteraemia reports increased under the voluntary reporting scheme in England compared to 2001(3) and 2002(2), with both MRSA and MSSA increasing during this period (2,3). Just under a third more reports of *S. aureus* bacteraemia were received under the mandatory scheme in England. Regional differences between the two schemes ranged from 7% to 62% in 2003. These differences will need to be addressed in light of the anticipated change in the method for reporting the mandatory *S. aureus* bacteraemia data from the quarterly aggregate

Figure 5 Age-specific *Staphylococcus aureus* bacteraemia voluntary reporting rates* and methicillin susceptibility per 100,000 population, England, Wales, and Northern Ireland:January to December 2003



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

reporting of total numbers of bacteraemias to regular reporting of individual bacteraemias. The voluntary scheme is also useful in allowing comparison with previous years and brings in additional information in terms of affected age groups and other antimicrobial susceptibilities, but has the drawback that information on methicillin susceptibility is not always complete. Last year (*ie*, 2003) marked another improvement in this, from 92% (2) to 93% of *S. aureus* bacteraemia reports having information on methicillin susceptibility compared to 2002.

Comparison with previous years under the voluntary scheme suggests that the proportion of *S. aureus* bacteraemias due to MRSA may be stabilising at around 40%. In Wales, the proportion of *S. aureus* bacteraemias due to MRSA appears to have stabilised at around 45% to 47% (2,3) whereas in Northern Ireland the proportion of *S. aureus* bacteraemias due to MRSA has increased from 38% in 2002 to 44% in 2003. The highest population rates of *S. aureus* bacteraemia reports in 2003 were in Northern Ireland (33.5/100,000) compared to England (27.8/100,000) and Wales (25.4/100,000). The rate for England under the mandatory scheme was 38.8/100,000. The reporting rate under the mandatory scheme probably now gives a reasonable idea of the true rate of *S. aureus* bacteraemias in the population.

Despite these general improvements in reporting, some regions still have large discrepancies in terms of numbers of bacteraemias reported under both the voluntary and mandatory schemes, and there is an urgent need to remedy this situation. It is notable, however, that despite these discrepancies, the proportion of *S. aureus* bacteraemias due to MRSA are remarkably similar in each region between the two schemes, there being only a 1% to 2% difference in all but two regions. For most regions, the proportion of MRSA is slightly lower under the mandatory scheme, indicating a slight bias towards reporting MRSA in the voluntary scheme.

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 HPA' 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, 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). In addition, the support from colleagues within the Health Protection Agency's Specialist and Reference Microbiology Division, in particular, is valued in the preparation of the reports. These contributions are greatly appreciated.

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