9.3 Enhanced EARSS Surveillance

The European Antimicrobial Resistance Surveillance System (EARSS) in Ireland has been enhanced to collect demographic, risk factor and clinical data since 2004. The enhanced programme involves voluntary participation by hospitals that provide data on invasive pathogens causing bloodstream infections (BSI).

There were 1618 individual records (cases or isolates under the EARSS definition) submitted from 13 laboratories. This figure is up from the 2007 finalised figure of 1395 due to an increase in participation. The total number of records thus far for 2008 represents 33% of the total core EARSS dataset.

Demographic and other basic data for the major resistance profiles of EARSS pathogens are shown in table 1. These and clinical features of the BSI are detailed in the rest of this chapter. Note that each patient may have more than one risk factor reported. Malignancies were noted in 27% and immunosuppression in 13% of all BSI, and these two risk factors are not mentioned again in relation to specific pathogens here.

Staphylococcus aureus

There were 409 records for *Staphylococcus aureus*, 160 (39%) of which were meticillin-resistance *S. aureus* (MRSA) and 249 were meticillin-sensitive *S. aureus* (MSSA). The majority of MRSA isolates (72%) were in those aged 65 or older. Common sources of MRSA BSI were central venous catheter (CVC, 24%), skin/soft tissue (13%) and respiratory tract infections (8%). Recent surgery (13%) and stay in intensive care unit (ICU stay, 9%) were risk factors specific to MRSA. The common origins of MSSA BSI were CVC (19%), and skin/soft tissue infections (15%). The most common risk factor specific to MSSA was recent surgery (8%).

Results for *S. aureus* and MRSA BSI for hospitals with consistent data

Four of the participating hospitals provided good quality consistent data for every quarter since 2006. This section is an analysis of the Enhanced EARSS data from these hospitals to determine the possible reasons for changes in MRSA and MSSA BSI rates taking place over time.

The rate of MRSA infections acquired in the reporting hospital decreased from 0.145 in 2006 to 0.097 per 1000 bed-days used in 2008 (33% reduction), with a smaller reduction in the corresponding rate for MSSA (7% reduction). This implies a greater impact from control measures targeted towards MRSA specifically (e.g. improvements in laboratory methods, screening and isolation), compared to more general control measures (e.g. hand and environmental hygiene).

There was a decrease in patients with MRSA BSI who had no known risk factors. This decrease was not seen in those patients with one or more known risk factors to the same extent. This implies that strategies targeted at MRSA BSI rate reduction, had a particular benefit

Table 1. Age and gender breakdown by organisms with their major resistance profiles. Proportion of isolates detected <48 hours and >5 days post-admission is also shown. See text for abbreviations.

	Total for 2008	Percent female	Mean age in years	Percent <5 years	Percent 65 years or older	Detected <48 hours after admission	Detected >5 days after admission
MRSA	**160**	45%	68.3	4%	72%	34%	47%
MSSA	**249**	37%	55.6	8%	43%	51%	27%
PNSP	**30**	40%	47.1	27%	33%	83%	7%
PSSP	**114**	39%	51.6	13%	38%	89%	4%
FQREC	**144**	44%	68.7	0%	58%	49%	42%
FQSEC	**490**	57%	64.1	3%	58%	63%	23%
VRE	**61**	51%	64.8	0%	56%	8%	77%
VSE	**199**	41%	63.5	1%	51%	28%	56%
KPN	**103**	40%	63.3	0%	51%	40%	46%
PAE	**68**	31%	70.7	0%	71%	41%	46%

for low-risk patients. Reduction in hospital antibiotic usage, particularly fluoroquinolones, which is known to have occurred, is also likely to have had an effect on the reduction of MRSA infections.

Reductions in MRSA in patients with risk factors such as stay in ICU and recent surgery, as well more general targeted reduction of CVC use, took effect in the final year of this dataset, 2008, implying that different approaches were effective during the three years.

Other organisms

Of the 144 records for *Streptococcus pneumoniae* BSI, 88% were isolated <48 hours after admission showing that these infections were mainly community-acquired. They tended to occur in younger patients (mean age 51 years, compared to a mean age of 63 years for all of the pathogens), reflecting the bimodal age distribution of *S. pneumoniae* BSI (see table 1). The majority (72%) originated from respiratory tract infections. Thirty records (21%) were for penicillin non-susceptible *S. pneumoniae* (PNSP) BSI as compared to 114 for penicillin susceptible *S. pneumoniae* (PSSP).

There were 634 records for *Escherichia coli*, 144 (23%) of which were fluoroquinolone-resistant *E. coli* (FQREC) and 490 were fluoroquinolone-sensitive *E. coli* (FQSEC). Over half of the patients (58%) were 65 years or over. Urinary tract infections (31% FQREC and 39% FQSEC) and gastrointestinal tract infections (19% FQREC and 20% FQSEC) were common sources for these BSI. Urinary catheter was also a common source for FQREC BSI (11%), but only in 5% of FQSEC BSI.

There were 260 enterococcal BSI records, 111 *Enterococcus faecalis* and 149 *E. faecium*. Of the enterococci BSI, 61 (23%) were vancomycin-resistant enterococci (VRE) and 199 vancomycin-sensitive enterococci (VSE). VRE BSI were associated with longer stay in hospital (77% detected >5 days after admission). CVC were a common source for these BSI (23% VRE and 15% VSE), as well as gastro-intestinal tract (28% VRE and 27% VSE). Common pathogen-specific risk factors were ICU stay (15% VRE and 19% VSE) and recent surgery (21% VRE and 18% VSE).

There were 103 records for *Klebsiella pneumoniae* (KPN) BSI, originating mainly from gastro-intestinal tract sources (29%), CVC (14%), respiratory tract (10%) and urinary tract infections (15%). Common risk factors specific for KPN BSI were recent surgery (16%) and ICU stay (5%).

There were 68 records for *Pseudomonas aeruginosa* (PNE) BSI, originating mainly from respiratory tract (15%) urinary tract catheter (22%), CVC (7%) and gastro-intestinal (13%). Common risk factors specific for PNE BSI were recent surgery (15%) and ICU stay (16%).

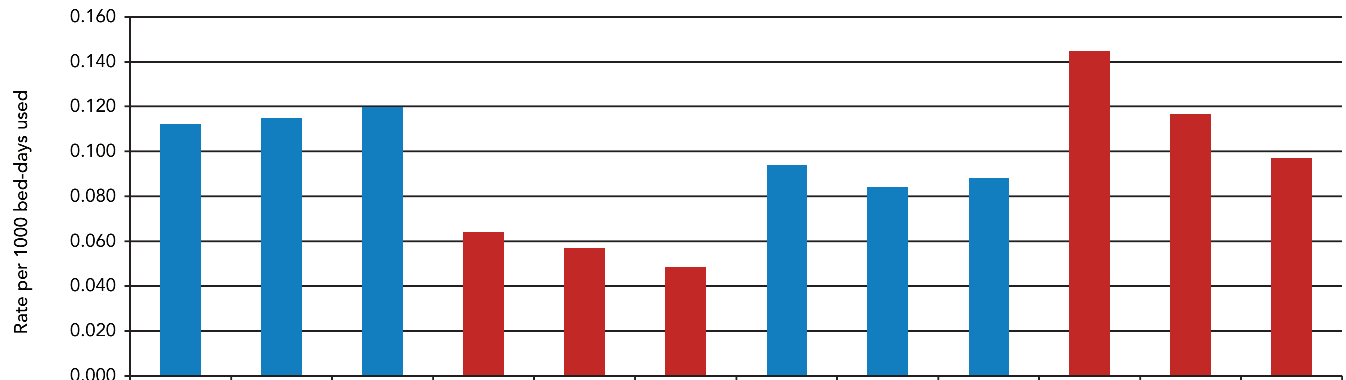
Conclusion

Analysis of enhanced data for MRSA and MSSA BSI from consistent sources has helped to explain changes seen in the epidemiology of *S. aureus* BSI in recent years. Increased hospital participation in enhanced EARSS surveillance would help to improve our understanding of these changes. Improvements to the reporting and analysis of enhanced EARSS data are planned, which should allow participating hospitals to analyse and act on their own data in a timely fashion.

CVCs remain a common, and potentially preventable, source of BSI for many of the EARSS pathogens. This underlines the importance of the national guidelines on prevention of intravascular catheter-associated infections, which have been developed by the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI).

Further analyses of other organisms, particularly for FQREC and FQSEC, are planned.

More information can be found at www.hpsc.ie/hpsc/A-Z/Microbiology AntimicrobialResistance/European Antimicrobial ResistanceSurveillanceSystemEARSS/Enhanced BacteraemiaSurveillance/MainBody,1889,en.html



	Not acquired in reporting hospital*						Acquired in reporting hospital					
	MSSA			MRSA			MSSA			MRSA		
	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008
Rate/1000BDU**	0.112	0.115	0.120	0.064	0.057	0.049	0.094	0.084	0.088	0.145	0.116	0.097

*Figure 1 shows rates of MRSA and MSSA BSI most likely to have acquired compared with rates not likely to have acquired in the reporting hospital. * Based on length of stay <48hrs, although infections may be healthcare-associated. ** These are true rates and thus only appropriate for infections acquired in the reporting hospital.*