



Key Points for Q1 2006

- ◎ 127 (39.8%) of 319 *S. aureus* were MRSA compared with 41.8% in Q4 2005. Since 2002, the proportion of MRSA has been stable at approximately 42%
- ◎ 25% increase in *S. pneumoniae* isolates compared with the same period last year
 - 22 (15.2%) of 145 *S. pneumoniae* were PNSP compared with 13.5% in Q4 2005. Since 2002, the proportion of PNSP has been stable at 10-12%
 - 10 *S. pneumoniae* were resistant to penicillin and erythromycin compared with 12 in 2005
- ◎ 73 (20.5%) of 365 *E. coli* were FQREC, which continues to increase and compares with 19.1% in 2005 and 5.4% in 2002
 - 7.7% of *E. coli* were MDR compared with 7.6% in 2005 and 2.5% in 2002
- ◎ 18 (26.1%) of 69 *E. faecium* were VRE compared with 38.3% in Q4 2005. The proportion of VRE has increased from 11.1% in 2002 to 31.7% in 2005

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Abbreviations used

- 3GC** – 3rd-Generation Cephalosporin
CI – Confidence Interval
CLSI – Clinical and Laboratory Standards Institute
EARSS – European Antimicrobial Resistance Surveillance System
ESBL – Extended-Spectrum Beta-Lactamase
FQREC – Fluoroquinolone-Resistant *Escherichia coli*
h-GISA – Hetero-Glycopeptide-Intermediate *S. aureus*
HLG – High-Level Gentamicin
HLR – High-Level Resistant
MIC – Minimum Inhibitory Concentration
MDR – Multi-Drug Resistant
MRSA – Meticillin-Resistant *Staphylococcus aureus*
NMRSARL – National MRSA Reference Laboratory
PNSP – Penicillin-Non-Susceptible *Streptococcus pneumoniae*
PSSP – Penicillin-Susceptible *Streptococcus pneumoniae*
VRE – Vancomycin-Resistant Enterococci

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Background

The European Antimicrobial Resistance Surveillance System (EARSS) was established in 1999 in response to the growing threat of antimicrobial resistance in Europe. EARSS comprises a network of over 800 microbiological laboratories serving some 1200 hospitals in 30 countries that collects routinely-generated antimicrobial susceptibility testing data on invasive infections caused by seven important bacterial pathogens: *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Escherichia coli*, *Enterococcus faecalis*, *Enterococcus faecium*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. In 2005, 42 Irish laboratories serving 66 acute hospitals (public and private) participated in EARSS representing an estimated 98% coverage of the Irish population.

Results

A summary of the data submitted on all pathogens for Q1 2006 is shown in Table 1.

S. aureus

- 319 isolates from 32 of 42 laboratories
- 127 isolates (39.8%) were MRSA

Data from the National MRSA Reference Laboratory

- 105 MRSA isolates were referred to the NMRSARL at St James's Hospital in Dublin where oxacillin MICs were performed using Etests® and CLSI methodology. In addition, isolates were tested by the Etest® macromethod for the optimal detection of GISA and hGISA strains
- The majority (92%, n=97) exhibited oxacillin MICs of >256 mg/L
- No GISA or hGISA were detected

MRSA isolates (combining laboratory and NMRSARL data)

- Oxacillin and vancomycin MICs were available on 109 and 112 MRSA isolates, respectively, giving an overall adherence to the protocol for oxacillin and vancomycin MICs (required for MRSA isolates only) of 86% compared with 79% in Q4 2005
- 3 (2.6%) of 117 MRSA isolates tested were resistant to rifampicin
- No resistance to linezolid was detected among 113 MRSA isolates tested

S. aureus trends in resistance

- The annual trends indicate the proportion of MRSA in Ireland has levelled off at approximately 42% since 2002 (Figure 1).
- In Q1 2006, 39.8% of isolates were MRSA, which is slightly lower than in the previous quarter (41.8%). The 95% CIs overlap (not shown) indicating that this is not a significant difference

Table 1. Summary of EARSS data for Q1 2006 and Total 2006 (to end of Q1 2006) by pathogen (with total numbers of isolates reported and proportion resistance/non-susceptibility to the important antibiotics) compared to the data for the previous quarter, the equivalent quarter last year and the total for 2005

Pathogen	Previous Year		Previous Qtr	Current Year	
	Q1 2005	Total 2005	Q4 2005	Q1 2006	Total 2006 (to end of Q1)
No. laboratories	42	42	42	42	42
<i>S. aureus</i>					
No. isolates	324	1424	316	319	319
Meticillin-R	44.4%	41.6%	41.8%	39.8%	39.8%
<i>S. pneumoniae</i>					
No. isolates	116	402	104	145	145
Penicillin-NS	10.3%	11.7%	13.5%	15.2%	15.2%
Erythromycin-R*	11.7%	12.1%	9.2%	17.3%	17.3%
<i>E. faecalis</i>					
No. isolates	88	290	68	66	66
Vancomycin-R	2.3%	2.5%	4.4%	0.0%	0.0%
HLG-R*	44.0%	43.1%	39.3%	36.0%	36.0%
<i>E. faecium</i>					
No. isolates	53	224	60	69	69
Vancomycin-R	20.8%	31.7%	38.3%	26.1%	26.1%
HLG-R*	60.9%	50.5%	42.9%	50.0%	50.0%
<i>E. coli</i>					
No. isolates	323	1445	376	366	366
3GC-R	4.5%	4.1%	3.2%	4.6%	4.6%
Ciprofloxacin-R*	13.4%	17.4%	19.1%	20.5%	20.5%
Gentamicin-R*	6.9%	8.5%	8.0%	6.0%	6.0%
No. laboratories		18	18	34	34
<i>K. pneumoniae</i> [^]					
No. isolates		56	42	34	34
3GC-R		5.4%	7.1%	5.9%	5.9%
Ciprofloxacin-R*		1.9%	2.5%	24.2%	24.2%
Gentamicin-R		1.8%	2.4%	8.8%	8.8%
<i>P. aeruginosa</i> [^]					
No. isolates		41	29	26	26
Pip-tazobactam-R*		5.1%	7.4%	4.5%	4.5%
Ceftazidime-R*		7.3%	10.3%	4.0%	4.0%
Imipenem/meropenem*		10.3%	11.1%	13.6%	13.6%
Ciprofloxacin-R		12.2%	13.8%	12.0%	12.0%
Gentamicin-R*		10.0%	10.7%	15.4%	15.4%

R, Resistant

Penicillin-NS, Penicillin Non-susceptible (includes isolates with intermediate and high-level resistance)

* Not all isolates tested

[^] Data collection for the new pathogens, *K. pneumoniae* and *P. aeruginosa*, officially started on 1st October 2005 (5 laboratories provided data in Q3 2005)

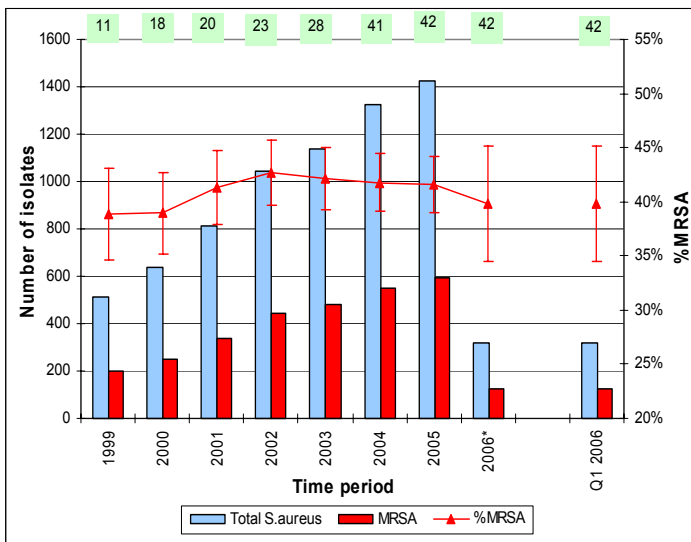


Figure 1. Trends for *S. aureus* – total numbers of *S. aureus*/MRSA and percentage MRSA with 95% confidence intervals.

Data for 2006 are provisional up to end of Q1; the numbers of participating laboratories by year-end are indicated above the bars

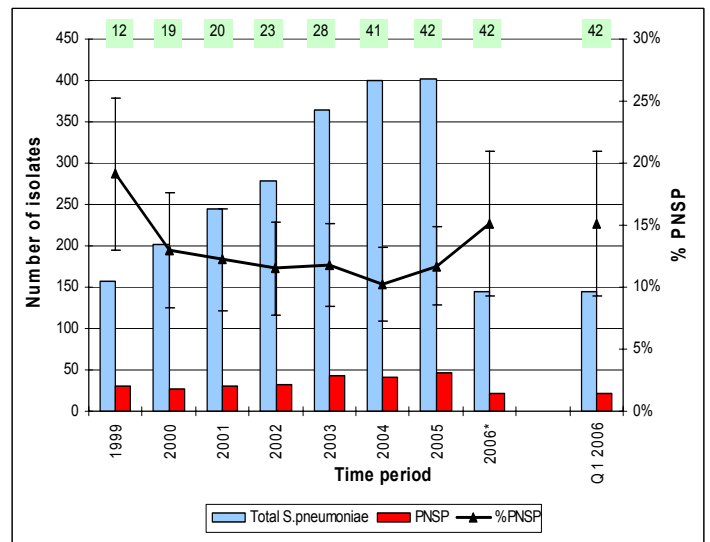


Figure 2. Trends for *S. pneumoniae* – total numbers of *S. pneumoniae*/PNSP and percentage PNSP with 95% confidence intervals.

Data for 2006 are provisional up to end of Q1; the numbers of participating laboratories by year-end are indicated above the bars

S. pneumoniae

- 145 isolates (142 from blood and 3 from CSF) from 27 of 42 laboratories representing an increase of 25% on Q1 2005 (Table 1). A seasonal variation is generally seen with pneumococci with an annual peak observed in Q1 corresponding with the winter period. When analysis was restricted to laboratories continuously reporting to EARSS, increases of 26-37% were observed when Q1 2006 was compared with the corresponding periods for 1999-2005. The higher than normal numbers this quarter when compared with previous years may reflect a difference in the prevalent strains circulating this season
- 22 of 145 isolates (15.2%) were PNSP and 24 of 139 isolates (17.3%) were resistant to erythromycin
- Penicillin and cefotaxime/ceftriaxone MICs were available on 21 and 17 PNSP isolates, respectively, giving an overall adherence to the protocol for PNSP isolates of 77% compared with 69% in Q4 2005
- 4 isolates were HLR to penicillin (MIC ≥ 2.0 mg/L) while 17 were intermediately resistant (MIC 0.12–1.0 mg/L)
- Intermediate-resistance to cefotaxime/ceftriaxone (using CLSI non-meningitis breakpoints) was detected in one penicillin-HLR isolate. The remaining 16 isolates were susceptible
- Erythromycin resistance was reported in 10 PNSP (including 2 with HLR and 7 with intermediate resistance) and 14 PSSP isolates. In 2005, only 12 isolates were co-resistant to penicillin and erythromycin
- Capsular serotyping data were available for 11 isolates: 3 PNSP (all with intermediate resistance) with 2 belonging to serotype 9V and one to serotype 14; and 8 PSSP with two belonging to serotype 1 and one each to serotypes 4, 7F, 10, 14, 18C and 23F

S. pneumoniae trends in resistance

- The annual trends indicate the proportion of PNSP has levelled off at 10-12% since 2002 (Figure 2).
- In Q1 2006, 15.2% of isolates were PNSP, which is slightly higher than in the previous quarter (13.5%). The 95%CIs overlap (not shown) indicating that this is not a significant difference

E. faecalis

- 66 isolates from 19 of 42 laboratories
- 17 (36.0%) of 50 isolates were resistant to HLG and none (of 66) were resistant to vancomycin
- One isolate was ampicillin-resistant. This may be due to misidentification as such isolates are rare
- Concordance with the protocol for all required antibiotic classes was 76% compared with 82% for Q4 2005

E. faecium

- 69 isolates from 20 of 42 laboratories
- 31 isolates (50.0%) of 62 were resistant to HLG and 18 (26.1%) of 69 were resistant to vancomycin
- 18 isolates were resistant to ampicillin and HLG but susceptible to vancomycin; 4 isolates were resistant to ampicillin and vancomycin but susceptible to HLG
- 13 MDR isolates (defined as resistant to ampicillin, HLG and vancomycin) reported from 5 laboratories
- Concordance with the protocol for all required antibiotic classes was 90% compared with 93% for Q4 2005

E. faecium Trends in resistance

- The annual trends indicate that proportion of VRE increased from 2002 to 2005. The 95%CIs overlap (due to the small number of isolates) showing that this increase is not statistically significant (Figure 3)
- In Q1 2006, 26.1% of *E. faecium* isolates were VRE, a decrease from 38.3% in Q4 2005 and 31.3% in 2005

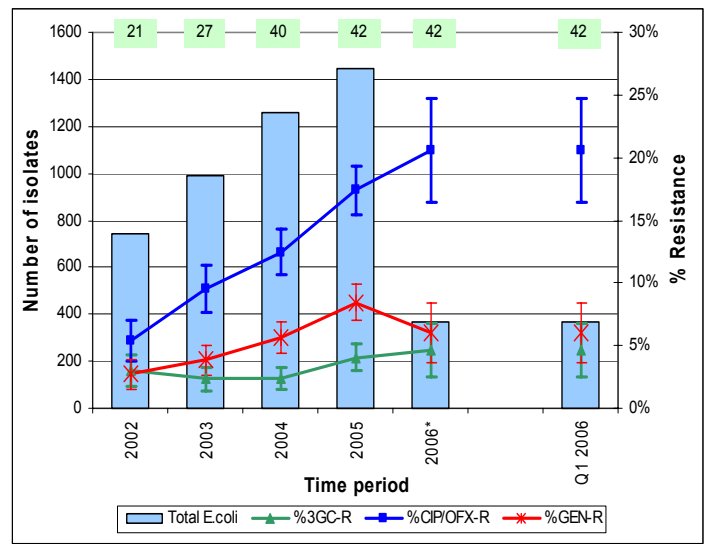
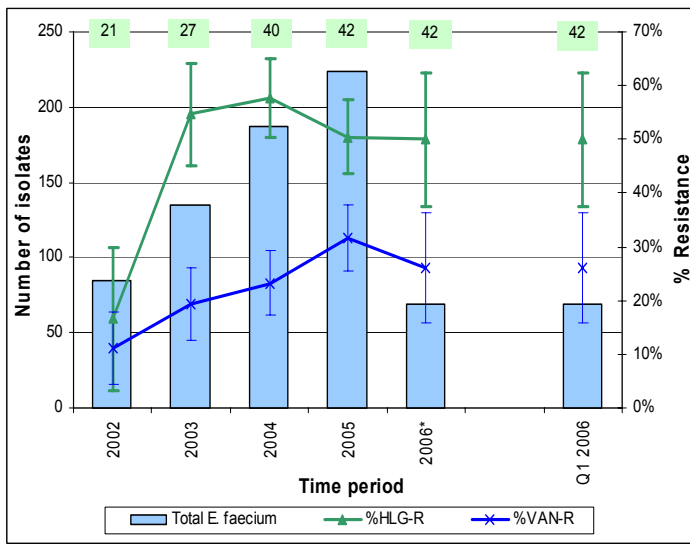


Figure 3. Trends for *E. faecium* – total numbers of *E. faecium* and percentage resistance to high-level gentamicin (HLG) and vancomycin (VAN) with 95% confidence intervals.

Data for 2006 are provisional up to end of Q1; the numbers of participating laboratories by year-end are indicated above the bars

Figure 4. Trends for *E. coli* – total numbers of *E. coli* and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN) with 95% confidence intervals.

Data for 2006 are provisional up to end of Q1; the numbers of participating laboratories by year-end are indicated above the bars

E. coli

- 366 isolates (364 from blood and 2 from CSF) from 33 of 42 laboratories
- 17 (4.6%) of 366 isolates were resistant to 3GCs, of which 9 were ESBL-positive and 8 were ESBL-negative; 75 (20.5%) of 365 were FQREC; and 22 (6.0%) of 365 were gentamicin-resistant
- 28 (7.7%) isolates from 11 laboratories were MDR, defined as resistant to 3 or more of the antibiotic classes required by the protocol [ampicillin, 3GCs (cefotaxime, ceftriaxone and/or ceftazidime), fluoroquinolones (ciprofloxacin or ofloxacin) and gentamicin]:
 - 3 isolates with resistance to ampicillin, 3GCs, ciprofloxacin and gentamicin (all ESBL-positive)
 - 8 isolates with resistance to ampicillin, 3GCs, ciprofloxacin (4 ESBL-positive)
 - 17 isolates with resistance to ampicillin, ciprofloxacin and gentamicin
- 9 (3.2%) of 279 isolates were ESBL-positive compared with 8 (2.7%) of 292 isolates in Q4 2005
- Concordance with the protocol was almost 100% for reporting on all required antibiotics and 76% for ESBLs

E. coli Trends in resistance

- The annual trends indicate that the proportion of *E. coli* isolates in Ireland that are FQREC has increased consistently over the past 4 years since surveillance began (Figure 4). This increase is statistically significant and the trend continues in Q1 2006. Resistance to gentamicin increased non-significantly from 2002 to 2004 but significantly from 2004 to 2005. In Q1 2006, the proportion of isolates that were gentamicin-resistant decreased. Since 2004, resistance to 3GCs has also increased but not significantly
- The proportion of isolates that are MDR has increased steadily from 2.5% in 2002 to 7.6% in 2005. In Q1 2006, 7.7% of isolates were MDR compared with 8.3% in Q4 2005

K. pneumoniae

- 34 isolates (all from blood) from 13 of 34 participating laboratories
- 5 MDR isolates were identified from 4 laboratories:
 - 2 with resistance to ampicillin, 3GCs and ciprofloxacin (ESBL-negative)
 - 3 with resistance to ampicillin, ciprofloxacin and gentamicin
- Of 22 isolates, none were found to produce ESBLs
- Concordance with the protocol was 94% for reporting on all mandatory antibiotics and 65% for ESBLs

P. aeruginosa

- 26 isolates (all from blood) from 14 of 34 participating laboratories
- 3 (13.6%) of 22 isolates tested were resistant to imipenem or meropenem
- One MDR isolate was identified with resistance to piperacillin/tazobactam, ceftazidime, ciprofloxacin and gentamicin
- Concordance with the protocol for all required antibiotic classes was 85% compared with 93% for Q4 2005