



Feidhmeannacht na Seirbhíse Sláinte  
Health Service Executive



# EARS-Net Report for Quarter 4 2010

## Key Points for Q4 2010

- 23.2% of *S. aureus* were MRSA (64 of 276) compared with 21.4% (64 of 300) in Q3 2010. MRSA decreased from 41.9% in 2006 to 27.1% in 2009 and 24.3% in 2010\*.

This is the lowest annual proportion since surveillance began in 1999

Between 2009 (n=355) and 2010 (n=304), there was a 14% reduction in the overall numbers of MRSA reported

- 18.2% of *S. pneumoniae*<sup>†</sup> (n=90) were PNSP compared with 31.6% in Q3 2010. PNSP has decreased from 23.1% in 2008 to 18.2% in 2010\*

Between Q1-4 2009 and Q1-4 2010, there was a 12% decrease in the overall numbers of pneumococcal isolates and a 21% reduction in the numbers of PNSP isolates reported, which follows the introduction of the PCV7 vaccine into the childhood immunisation schedule in September 2008

- 49.0% of *E. faecium*<sup>†</sup> (n=97) were VRE compared with 35.6% in Q3 2010. VRE increased from 38.3% in 2009 to 39.2% in 2010\*. These are the highest quarterly and annual proportions since surveillance began in 2002

- 26.2% of *E. coli* (n=539) were resistant to ciprofloxacin (Q3 2010, 20.5%)

In 2010\*, resistance to ciprofloxacin increased to 23.6% (2009, 22.3%) and to aminoglycosides to 11.7% (2009, 9.3%). Resistance to 3GCs and ESBL-production also increased to 8.3% (2009, 7.5%) and 6.1% (2009, 5.8%), respectively. These are all the highest annual proportions since surveillance began in 2002

- No Carbapenem-Resistant Enterobacteriaceae (CRE), including KPCs, have been reported to date among invasive isolates of *E. coli* and *K. pneumoniae*

\* 2010 data provisional to the end of Q4; † Exercise caution with interpretation: low numbers

## Contents

- Key points; Background; *S. aureus* results - page 1
- Table with summary of Q4 2010 EARS-Net data - page 2
- S. aureus* and *S. pneumoniae* trends; *S. pneumoniae* results - page 3
- E. faecium* trends; *E. faecium* and *E. coli* results - page 4
- E. coli*, *K. pneumoniae* and *P. aeruginosa* trends - page 5
- K. pneumoniae* and *P. aeruginosa* results - page 6

## Abbreviations used

- 3GC – 3<sup>rd</sup>-Generation Cephalosporin
- CI – Confidence Interval
- CLSI – Clinical and Laboratory Standards Institute
- ESBL – Extended-Spectrum Beta-Lactamase
- 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
- PCV7 – Pneumococcal Conjugate Vaccine (7-valent)
- PPV23 – Pneumococcal Polysaccharide Vaccine (23-valent)
- PNSP – Penicillin-Non-Susceptible *Streptococcus pneumoniae*
- PSSP – Penicillin-Susceptible *Streptococcus pneumoniae*
- RCSI – Royal College of Surgeons in Ireland
- VISA – Vancomycin-intermediate *S. aureus*
- VRE – Vancomycin-Resistant Enterococci

## March 2011

### Data correct as of 01/03/2011

Report produced by the Irish EARS-Net Steering Group with special thanks to all the participating laboratories for their continued support and commitment to this surveillance system

Health Services Executive (HSE) –  
Health Protection Surveillance Centre (HPSC)  
25-27 Middle Gardiner Street  
Dublin 1, Ireland  
+353 876 5300  
[www.hpsc.ie](http://www.hpsc.ie)

## 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 900 microbiological laboratories serving some 1500 hospitals in 33 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 January 2010, EARSS was taken over by ECDC becoming the **European Antimicrobial Resistance Surveillance Network (EARS-Net)**. As of Q3 2010, 40 Irish laboratories serving 60 acute hospitals (public and private) participate in EARS-Net representing 100% coverage of the Irish population.

## Results

A summary of the data submitted on all pathogens for Q4 2010 is shown in Table 1

### *S. aureus*

- 276 isolates from 36 of 40 laboratories, of which 64 (23.2%) were MRSA
- 24 (43%) of 56 MRSA isolates were fusidic acid-resistant compared with 30 (17%) of 174 MSSA isolates
- No resistance was detected to linezolid (n=63) or rifampicin (n=57) among MRSA isolates

### Data from the National MRSA Reference Laboratory

- 49 MRSA isolates were referred to the NMRSARL at St James's Hospital, Dublin, where oxacillin MICs were performed using Etests® and CLSI interpretive criteria. In addition, isolates were tested by the Etest® macromethod for the optimal detection of VISA strains
- 23 isolates (47%) exhibited oxacillin MICs of >256 mg/L
- No VISA isolates were detected
- 29 isolates (59%) were fusidic acid-resistant

**Table 1.** Summary of EARSS data for Q4 2010 and Total 2010 (provisional to the end of Q4 2010) by pathogen (with total numbers of isolates reported and proportion resistance/non-susceptibility to the important antibiotics) compared with the data for the previous quarter (Q3 2010), the equivalent quarter last year (Q4 2009) and the total for 2009

Pathogen	Previous Year		Current Year		
	Q4 2009	Total 2009	Q3 2010	Q4 2010	Total 2010 <sup>‡</sup>
<b>No. laboratories</b>	<b>44</b>	<b>43</b>	<b>40</b>	<b>40</b>	<b>40</b>
<i>S. aureus</i>					
No. isolates	302	1,309	<b>300</b>	276	1,252
No. Meticillin-R (or MRSA)	73	355	64	64	304
Meticillin-R (or MRSA)	24.2%	27.1%	21.4%	23.2%	24.3%
No. VISA (MRSA isolates only)*	0	0	0	0	0
VISA (MRSA isolates only)*	0.0%	0.0%	0.0%	0.0%	0.0%
<b>No. laboratories</b>	<b>43</b>	<b>43</b>	<b>40</b>	<b>40</b>	<b>40</b>
<i>S. pneumoniae</i>					
No. isolates	87	356	38	90	314 <sup>1</sup>
Penicillin-NS*	11.5%	20.2%	31.6%	16.7%	18.2%
of which: HLR	3.4%	5.6%	10.5%	4.4%	4.8%
Int	6.9%	13.8%	18.4%	12.2%	12.8%
Erythromycin-R*	11.3%	17.3%	27.3%	14.1%	15.6%
<i>E. faecalis</i>					
No. isolates	94	289	74	67	298 <sup>2</sup>
Ampicillin-R*	2.1%	2.1%	1.4%	3.0%	2.0%
Vancomycin-R	2.2%	0.7%	0.0%	0.0%	0.3%
HLG-R*	36.8%	36.7%	28.4%	23.1%	29.5%
<i>E. faecium</i>					
No. isolates	94	397	101	97	392
Ampicillin-R*	94.4%	92.9%	93.1%	97.9%	95.4%
Vancomycin-R*	43.6%	38.3%	35.6%	49.0%	39.2%
HLG-R*	48.9%	39.1%	30.5%	40.0%	39.5%
MDR*	36.8%	26.7%	21.3%	28.1%	24.5%
<i>E. coli</i>					
No. isolates	517	2,064	587	539	2170 <sup>2</sup>
Ampicillin-R*	69.4%	68.7%	69.2%	67.9%	68.4%
3GC-R*	7.6%	7.5%	7.0%	10.2%	8.3%
ESBL-producers*	6.0%	5.8%	4.8%	7.2%	6.1%
Ciprofloxacin-R*	22.0%	22.3%	20.5%	26.2%	23.6%
Gentamicin-R*	7.9%	7.7%	8.5%	10.1%	9.4%
Aminoglycoside-R*	9.3%	9.3%	11.3%	11.6%	11.7%
Imipenem/meropenem-R*	0.0%	0.0%	0.0%	0.0%	0.0%
MDR*	11.4%	10.4%	10.3%	13.1%	11.7%
<b>No. laboratories</b>	<b>43</b>	<b>42</b>	<b>40</b>	<b>40</b>	<b>40</b>
<i>K. pneumoniae</i>					
No. isolates	90	323	<b>98</b>	91	326 <sup>1</sup>
Ampicillin-R*	100.0%	99.7%	96.9%	100.0%	99.1%
3GC-R*	13.3%	11.2%	<b>11.2%</b>	7.7%	10.5%
ESBL-producers*	9.8%	8.2%	<b>4.6%</b>	3.4%	5.2%
Ciprofloxacin-R*	12.4%	13.0%	<b>7.1%</b>	12.1%	10.5%
Gentamicin-R*	12.2%	11.1%	4.1%	7.8%	6.8%
Imipenem/meropenem-R*	0.0%	0.0%	0.0%	0.0%	0.0%
MDR*	12.4%	11.9%	<b>8.3%</b>	9.9%	8.0%
<i>P. aeruginosa</i>					
No. isolates	80	248	79	42	222 <sup>1</sup>
Piperacillin/tazobactam-R*	12.7%	8.9%	7.7%	9.5%	10.0%
Ceftazidime-R*	20.3%	11.8%	3.8%	9.5%	9.2%
Imipenem/meropenem-R*	13.5%	9.7%	5.1%	7.3%	8.3%
Ciprofloxacin-R*	15.0%	12.1%	8.9%	16.7%	13.2%
Gentamicin-R*	8.9%	7.7%	6.3%	9.5%	8.7%
MDR*	10.7%	6.4%	2.6%	4.8%	6.5%

<sup>‡</sup> 2010 data are provisional (to end Q4)

**R**, Resistant; **NS**, Non-Susceptible [includes isolates with intermediate (**Int**) and high-level resistance (**HLR**)]

**MRSA**, Meticillin-Resistant *S. aureus*; **VISA**, Vancomycin-Intermediate *S. aureus*

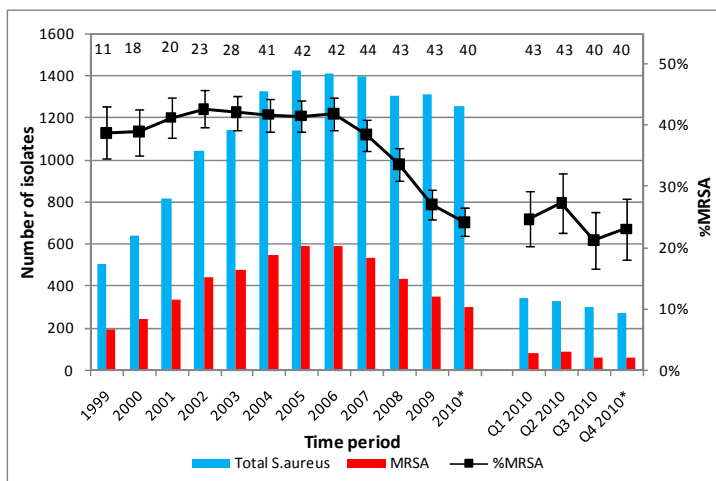
**HLG**, High-Level Gentamicin; **3GC**, 3rd-Generation Cephalosporin (includes cefotaxime, ceftriaxone, ceftazidime and cefpodoxime); **ESBL**, Extended-Spectrum Beta-Lactamase; **MDR**, Multi-Drug Resistant

\* Not all isolates tested

<sup>1</sup> Includes one isolate for which no susceptibility results were provided

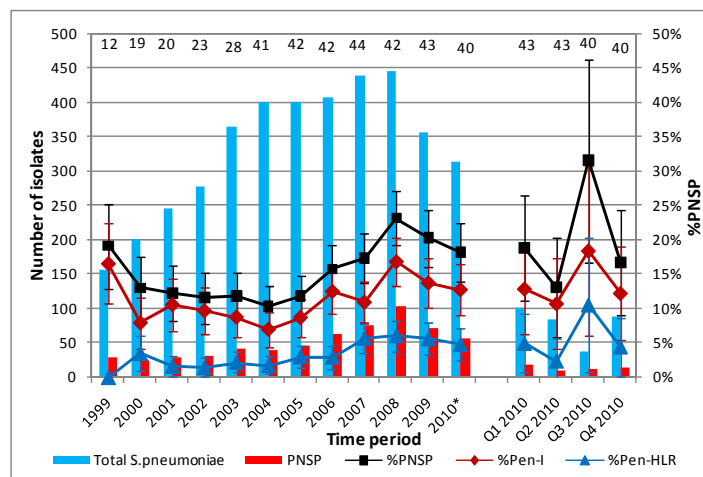
<sup>2</sup> Includes 2 isolates for which no susceptibility results were provided

Changes to the data presented in previous reports are highlighted in red



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

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars



**Figure 2.** Trends for *S. pneumoniae* – total numbers of *S. pneumoniae*/PNSP and percentage PNSP [penicillin-intermediate (Pen-I) and high-level resistant (Pen-HLR)] with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars

### *S. aureus* trends in resistance

- In Q4 2010, 23.2% of isolates were MRSA, which is higher than in Q3 2010 (21.4%, or 64 of 300).
- The annual trends indicate the proportion of MRSA in Ireland decreased from approximately 42% in 2006 (Figure 1) to 38.5% in 2007, 33.7% in 2008 and 27.1% in 2009. In 2010 (to the end of Q4), the proportion of MRSA is 24.3%, which is the lowest annual proportion since surveillance began in 1999
- Comparing 2010 with 2009, there was a 14% reduction in the numbers of MRSA reported (304 vs. 355), while the numbers of MSSA remained stable (948 vs. 954)

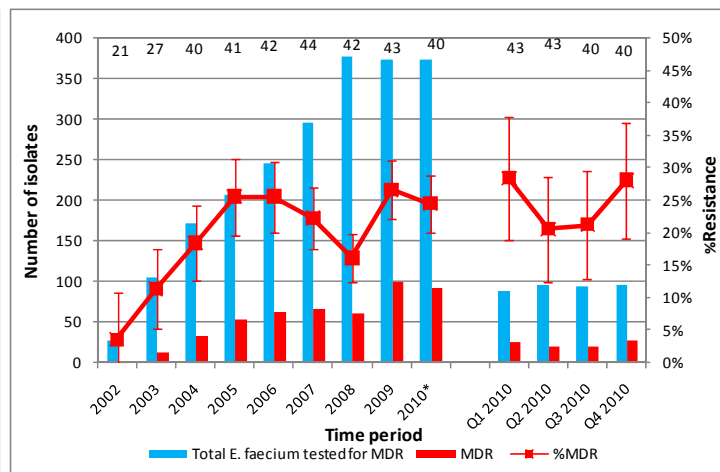
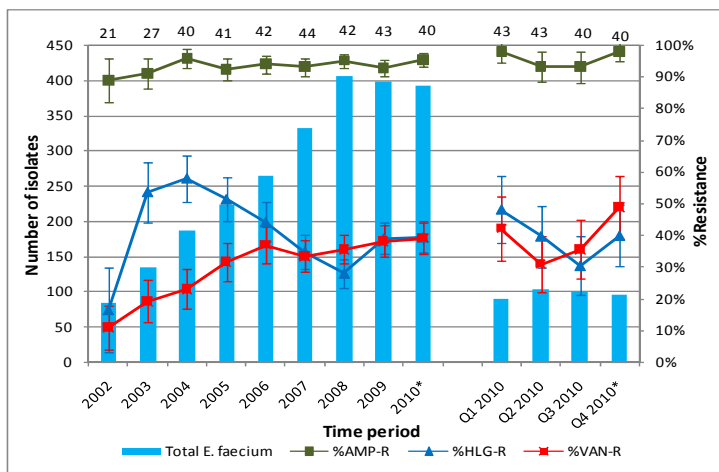
### *S. pneumoniae*

- 90 isolates (86 from blood and 4 from CSF) from 26 of 40 laboratories
- The latest CLSI guidelines (2008) distinguish between non-meningitis [Susceptible (S)  $\leq 2$  mg/L, Intermediate (I) 4 mg/L, Resistant (R)  $\geq 8$  mg/L] and meningitis breakpoints (S  $\leq 0.06$  mg/L, R  $\geq 0.12$  mg/L) for iv/parenteral penicillin and recommend that blood isolates should be reported using both sets of breakpoints. EARSS recommends using the old breakpoints (S  $\leq 0.06$  mg/L, I 0.12-1.0 mg/L, R  $\geq 2$  mg/L), corresponding to the new oral breakpoints, for surveillance purposes and to avoid confusion with interpretation of historic data
- **\*\*\*Penicillin and cefotaxime/ceftriaxone MICs should be submitted on all pneumococcal isolates\*\*\***
- 15 (16.7%) of 90 isolates were PNSP (defined as having a penicillin MIC of  $\geq 0.12$  mg/L) and 12 (14.1%) of 85 isolates were resistant to erythromycin
- Penicillin and cefotaxime/ceftriaxone MICs were available for all 15 PNSP isolates
- 4 isolates (4.4% of total) were HLR to penicillin and 11 (12.2% of total) were intermediately resistant. No isolates with resistance to cefotaxime were reported
- Erythromycin resistance was reported in 12 PNSP (3 with HLR to penicillin and 9 intermediately resistant) and one PSSP isolate
- The 4 CSF isolates were susceptible to both penicillin and cefotaxime
- In Q4 2010, 83 (92%) of 90 pneumococcal isolates reported were referred to RCSI/Temple St for capsular serotyping (using a combination of multiplex PCR and conventional serological methods). Serotype coverage among the target population for each vaccine, <2 years for PCV7 and  $\geq 65$  years for PPV23, was 22% (2 of 9 isolates) and 83% (30 of 36 isolates), respectively. The most common serotypes identified were 7F and 19A (n=9 each), 8 and 22F (n=7 each), 4 (n=5) and 3, 6A, 11A, 14, 15A and 19F (n=4 each), representing 73% of all isolates typed

### *S. pneumoniae* trends in resistance

#### **Exercise caution with interpretation: low numbers**

- In Q4 2010, 16.7% of isolates were PNSP, which is lower than in Q3 2010 (31.6%). Compared with the equivalent quarter in 2009 (11.5% PNSP), the overall number of isolates is comparable (Q4 2009, n=87), while the number of PNSP isolates is 50% higher (Q4 2009, n=10)
- The annual trends indicate that the proportion of PNSP increased from 10.3% in 2004 to 23.1% in 2008 (Figure 2), which was the highest annual proportion since surveillance began in 1999. The proportion of PNSP decreased to 20.2% in 2009 and to 18.2% in 2010 (to the end of Q4)
- For the 4 quarters of 2010, there was a 12% decrease in the overall numbers of pneumococcal isolates and a 21% reduction in the numbers of PNSP isolates reported compared to the equivalent period in 2009. This follows the introduction of the PCV7 vaccine into the childhood immunisation schedule in September 2008



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

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars

**Figure 4.** Trends for Multi-Drug Resistant (MDR) *E. faecium* – total numbers of MDR *E. faecium* and percentage MDR with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars

### *E. faecium*

- 97 isolates from 20 of 40 laboratories
- 47 (49.0%) of 96 were resistant to vancomycin and 38 (40.0%) of 95 isolates were resistant to HLG
- 27 (28.1%) of 96 isolates from 9 hospitals were MDR, defined as resistant to ampicillin, HLG and vancomycin

#### *E. faecium* trends in resistance

##### Exercise caution with interpretation: low numbers

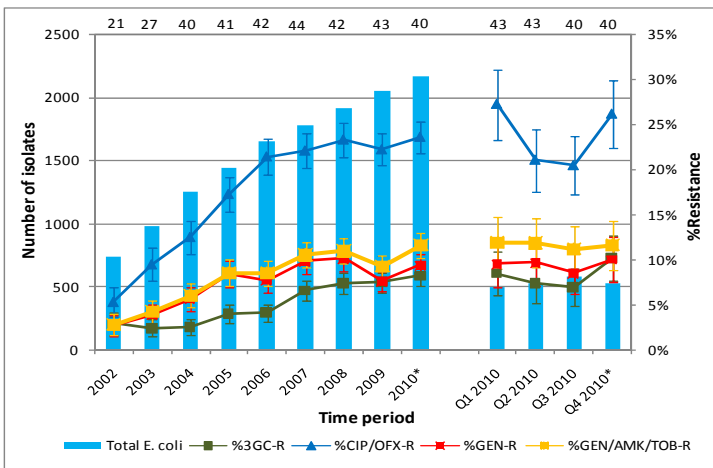
- In Q4 2010, 49.0% of isolates were VRE, an increase from 35.6% in Q3 2010
- The annual trends indicate that the proportion of VRE increased from 11.1% in 2002 to 37.1% in 2006 (Figure 3). The VRE proportion has increased from 33.5% in 2007 and 39.2% in 2010 (to the end of Q4), which is the highest annual proportion reported to date
- In Q4 2010, 28.1% of isolates were MDR, an increase from 21.3% in Q3 2010
- MDR *E. faecium* increased steadily from 3.6% in 2002 to 25.6% in 2006 but subsequently decreased to 22.3% in 2007 and 16.2% in 2008 (between 2006 and 2008, the total number of *E. faecium* isolates reported increased by over 50% while the corresponding number of MDR isolates remained constant at 60-65) (Figure 4). The proportion of MDR isolates increased again to 26.7% in 2009 but subsequently decreased to 24.5% in 2010 (to the end of Q4)

### *E. coli*

- 539 isolates (538 from blood and one from CSF) from 36 of 40 laboratories
- 55 (10.2%) of 537 isolates were resistant to 3GCs, of which 38 were ESBL-positive and 17 were ESBL-negative; 141 (26.2%) of 539 were ciprofloxacin-resistant; and 54 (10.1%) of 537 were gentamicin-resistant [66 (11.6%) of 538 were aminoglycoside-resistant (i.e. resistant to amikacin, gentamicin or tobramycin)]
- 70 (13.1%) of 536 isolates from 27 hospitals were MDR, i.e. resistant to 3 or more of the required antibiotic classes [ampicillin, 3GCs (e.g. cefotaxime, ceftazidime), fluoroquinolones (e.g. ciprofloxacin) and aminoglycosides (as above)]
  - 23 with resistance to ampicillin, 3GCs, ciprofloxacin and aminoglycosides (18 ESBL-positive, 5 -negative)
  - 18 with resistance to ampicillin, 3GCs and ciprofloxacin (15 ESBL-positive, 3 -negative)
  - 3 with resistance to ampicillin, 3GCs and aminoglycosides (one ESBL-positive, 2 -negative)
  - 26 with resistance to ampicillin, ciprofloxacin and aminoglycosides
- 38 (7.2%) of 530 isolates were ESBL-positive
- No isolates were resistant to carbapenems (imipenem or meropenem) (n=499)

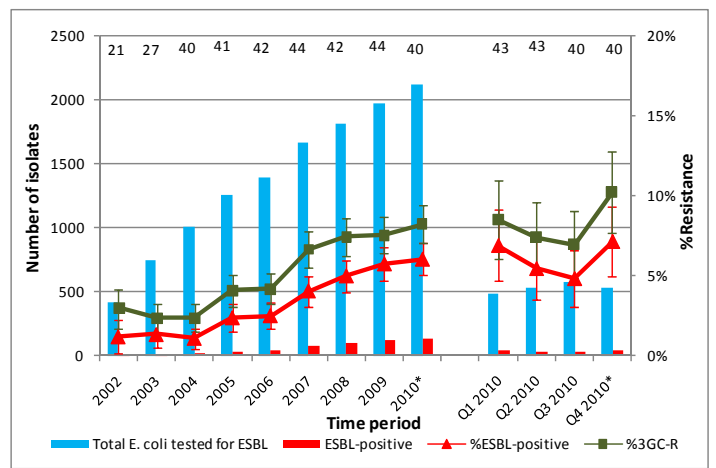
#### *E. coli* trends in resistance

- In Q4 2010, 26.2% of isolates were ciprofloxacin-resistant, an increase from 20.5% in Q3 2010. Over the same period, resistance to 3GCs also increased from 7.0% to 10.2%, while ESBL producers increased from 4.8% to 7.2%; and resistance to gentamicin increased from 8.5% to 10.1% [resistance to aminoglycosides increased marginally from 11.3% to 11.6%]
- Between 2002 and 2008, the overall trend for all 3 indicator antibiotics was upwards. Between 2008 and 2009, resistance to ciprofloxacin decreased slightly from 23.3% to 22.3% and resistance to gentamicin decreased from 10.2% to 7.7% [resistance to aminoglycosides decreased from 11.0% to 9.3%] (Figure 5). Resistance to 3GCs levelled off at 7.5% (2008, 7.5%) while the proportion of ESBL producers increased slightly from 5.0% to 5.8% (Figure 6)



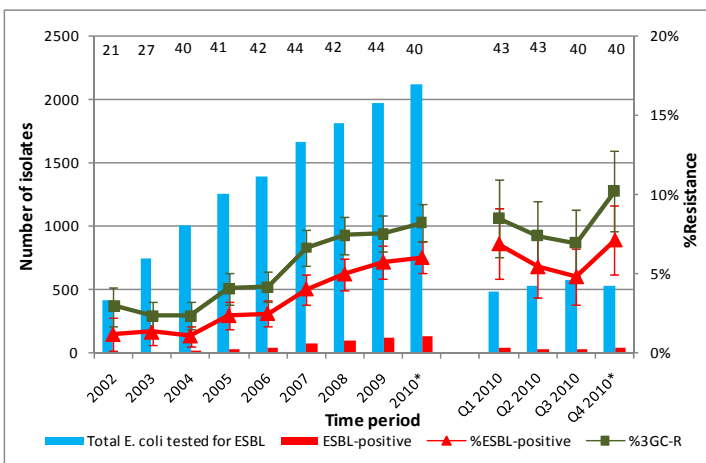
**Figure 5.** Trends for *E. coli* – total numbers of *E. coli* and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX), gentamicin (GEN) and gentamicin/ amikacin/ tobramycin (GEN/AMK/TOB) with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars



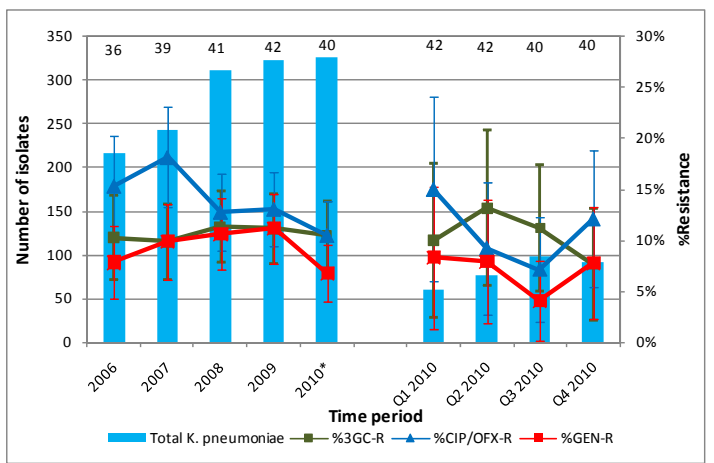
**Figure 6.** Trends for ESBL-producing *E. coli* – total numbers of ESBL producers and percentage positivity (with percentage 3GC-resistance for comparison) with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars



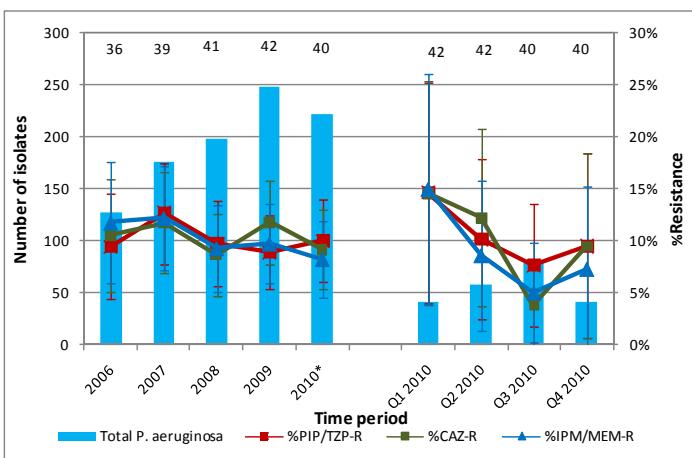
**Figure 7.** Trends for Multi-Drug Resistant (MDR) *E. coli* – total numbers of MDR *E. coli* and percentage MDR with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars



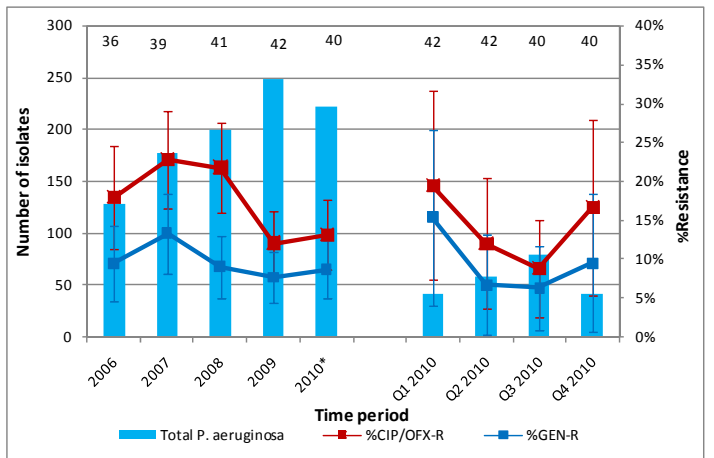
**Figure 8.** Trends for *K. pneumoniae* – total numbers of *K. pneumoniae* and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN) with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars



**Figure 9.** Trends for *P. aeruginosa* – total numbers of *P. aeruginosa* and percentage resistance to piperacillin-tazobactam (PIP/TZP), ceftazidime (CAZ) and imipenem/meropenem (IPM/MEM) with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars



**Figure 10.** Trends for *P. aeruginosa* – total numbers of *P. aeruginosa* and percentage resistance to ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN) with 95% CIs

\* Data for 2010 are provisional; the numbers of participating laboratories by year-end and by quarter are indicated above the bars

### E. coli trends in resistance (continued)

In 2010 (to the end of Q4), resistance to ciprofloxacin increased to 23.6%; while resistance to gentamicin increased to 9.4% (aminoglycosides, 11.7%); 3GC-resistance increased slightly to 8.3% while ESBL producers increased marginally to 6.1%. The proportions of isolates that are resistant to 3GCs, ciprofloxacin and aminoglycosides and ESBL producers are the highest reported to date

- In Q4 2010, 13.1% of isolates were MDR, an increase from 10.3% in Q3 2010
- The trend in the proportion of MDR isolates was upwards from 2002 to 2008. MDR *E. coli* decreased from 12.1% in 2008 to 10.4% in 2009 but increased marginally to 10.7% in 2010 (to the end of Q4) (Figure 7)
- In 2010, no isolates were resistant to carbapenems (n=1,984)
- Comparing Q1-4 2010 with Q1-4 2009, there was a 5% increase in the numbers of *E. coli* reported (2,170 vs. 2,064)

### **K. pneumoniae**

- 91 isolates (all from blood) from 28 of 40 laboratories
- 7 (7.7%) of 91 isolates were resistant to 3GCs, of which 3 were ESBL-positive and 4 were ESBL-negative; 11 (12.1%) of 91 were ciprofloxacin-resistant; and 7 (7.8%) of 90 were gentamicin-resistant [8 (8.8%) of 91 were aminoglycoside-resistant (i.e. resistant to amikacin, gentamicin or tobramycin)]
- 9 (9.9%) of 91 isolates from 7 hospitals were MDR:
  - 2 with resistance to ampicillin, 3GCs, ciprofloxacin and aminoglycosides (one ESBL-positive, one -negative)
  - one with resistance to ampicillin, 3GCs and ciprofloxacin (ESBL-negative)
  - one with resistance to ampicillin, 3GCs and aminoglycosides (ESBL-positive)
  - 5 with resistance to ampicillin, ciprofloxacin and aminoglycosides (all ESBL-negative)
- Of 87 isolates, 3 (3.5%) were found to produce ESBLs
- No resistance to carbapenems (imipenem/meropenem) was reported from 85 isolates, i.e. none were Carbapenem-Resistant Enterobacteriaceae (CRE), which includes KPCs

### K. pneumoniae trends in resistance

#### **Exercise caution with interpretation: low numbers**

- Between Q3 2010 and Q4 2010, resistance to ciprofloxacin and gentamicin increased while resistance to 3GCs decreased (Figure 6). ESBL production also decreased over this period
- Between 2009 and 2010 (to the end of Q4), resistance to all required antibiotics decreased, most notably from 11.1% to 6.8% for gentamicin, while ESBL production also decreased from 8.2% to 5.2%
- Only one isolate with reduced susceptibility to carbapenem (intermediately-resistant to meropenem) has been reported to date (Q2 2007), however this was not confirmed by a reference laboratory  
In 2010, no isolates (n=326) were Carbapenem-Resistant Enterobacteriaceae (CRE), which includes KPCs
- In Q4 2010, 9.9% of isolates were MDR compared with 8.3% in Q3 2010
- The proportion of MDR decreased from 11.9% in 2009 to 8.0% in 2010 (to the end of Q4)

### **P. aeruginosa**

- 42 isolates (all from blood) from 20 of 40 laboratories
- 4 (9.5%) of 42 isolates were resistant to piperacillin-tazobactam; 4 (9.5%) of 42 were resistant to ceftazidime; 3 (7.3%) of 41 were resistant to imipenem or meropenem; 7 (16.7%) of 42 were resistant to ciprofloxacin; and 4 (9.5%) of 42 were resistant to gentamicin [no additional isolates were resistant to the other aminoglycosides (amikacin or tobramycin)]
- 2 (4.8%) of 42 isolates from 2 hospitals were MDR:
  - one with resistance to all 5 required antibiotics classes
  - one with resistance to 3 of the 5 required antibiotics classes:
    - piperacillin-tazobactam, ceftazidime and meropenem

### P. aeruginosa trends in resistance

#### **Exercise caution with interpretation: low numbers**

- Between Q3 2010 and Q4 2010, resistance to all required antibiotics increased (Figures 7 and 8)
- Between 2009 and 2010 (to the end of Q4), resistance to piperacillin-tazobactam, ciprofloxacin and gentamicin increased while resistance to ceftazidime and meropenem decreased
- In Q4 2010, 4.8% of isolates were MDR compared with 2.6% in Q3 2010
- The proportion of MDR remained stable between 2009 (6.4%) and 2010 (to the end of Q4) (6.5%)
- Comparing 2010 with 2009, there was a 12% reduction in the numbers of *P. aeruginosa* isolates reported (222 vs. 248)