



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



In this report

- Main results for 2012
- Proposed changes to the enhanced programme

Abbreviations Used Here

BSI – Bloodstream Infections
CVC – Central Venous Catheter
EARS-Net – European Antimicrobial Resistance Surveillance Network
MRSA – Meticillin Resistant *Staphylococcus aureus*
MSSA – Meticillin Sensitive *Staphylococcus aureus*
PNSP – Penicillin Non-Susceptible *S. pneumoniae*
PSSP – Penicillin Susceptible *S. pneumoniae*
PVC – Peripheral Venous Catheter
VRE – Vancomycin Resistant Enterococci
VSE – Vancomycin Sensitive Enterococci

From the HPSC website click on “**Topics A-Z**”, then on “**Enhanced Bacteraemia Surveillance**” for the appropriate page.

Also visit the HPSC website for information on Care Bundles, Hand Hygiene, Antibiotic Resistance and Antibiotic Consumption

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On behalf of the Irish EARS-Net Steering Group with thanks to all the participating hospital-laboratories

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Enhanced EARS-Net Surveillance

REPORT FOR 2012 DATA

Key Points

- ⊙ **Enhanced data were collected on 1765 EARS-Net blood-culture isolates for 2012, from 9 laboratories**
- ⊙ **Results for 2012 are broadly in line with data from previous years:**
 - **Between 2010 and 2012, there has been an annual reduction in the proportion of *S. aureus* BSI due to CVC as source from 23% to 15%. However, there has been an increase in *S. aureus* BSI due to PVC as source from 6% to 11%**
 - **The most common primary sources of enterococcal BSI were CVC and intra-abdominal/GI tract infection**
 - **Majority of fluoroquinolone resistant *E. coli*, *K. pneumoniae* and *P. aeruginosa* BSI were healthcare-associated in contrast to fluoroquinolone susceptible *E. coli*. The most common source of *E. coli* BSI was urinary tract infection with 5% being associated with the presence of a urinary catheter**
 - **Increase in potentially hospital-acquired PNSP BSI**
- ⊙ **Changes to enhanced EARS-Net surveillance are proposed; pilot to take place in Q3 of 2013. All laboratories are encouraged to participate**

Introduction

The European Antimicrobial Resistance Surveillance Network (EARS-Net) collects information on antibiotic resistance of bacteria causing invasive infection. Since 2004, additional clinical information has been collected including risk factors and sources of infection and patient outcome. This report summarises information on patients with bloodstream infection (BSI) from 2006 to end of 2012.

Results

Data from 9 laboratories were available. Enhanced data records collected for 2012 (n = 1765) represent 35% of all the isolates of the core EARS-Net dataset.

Table 1. Overview of data including organism, antibiotic resistance, age, gender and onset of bloodstream infection.

		Total for 2012	Percent female	Mean age in years	Detected <48 hours after admission	Detected >5 days after admission
<i>Staphylococcus aureus</i>	Meticillin Resistant (MRSA)	75	32%	68.3	56%	36%
	Meticillin Susceptible	250	34%	58.7	66%	20%
<i>Streptococcus pneumoniae</i>	Penicillin non-Susceptible	31	35%	57.6	65%	26%
	Penicillin Susceptible	108	40%	63.2	79%	8%
Enterococci	Vancomycin Resistant	67	40%	67.4	19%	70%
	Vancomycin Sensitive	179	40%	66.1	34%	50%
<i>Escherichia coli</i>	Fluoroquinolone Resistant	225	43%	72.0	60%	28%
	Fluoroquinolone Susceptible	637	58%	68.3	68%	16%
<i>Klebsiella pneumoniae</i>		122	47%	63.9	45%	41%
<i>Pseudomonas aeruginosa</i>		71	45%	67.9	55%	32%

Main findings for 2012

Please see Appendix 1 for a complete breakdown for all organisms. The data for 2012 are broadly in line with previous years' results, however, the following highlights some of the key points for each organism.

1. *S. aureus* (Appendix 1A)

- 69% MRSA and 61% MSSA bloodstream infection were classified as healthcare-associated in 2012
- Between 2010 and 2012, there has been an annual reduction in the proportion of *S. aureus* bloodstream infection due to CVC as source from 23% to 15%. However, there has been an increase in *S. aureus* bloodstream infection due to PVC as source to from 6% to 11% in 2012
- The most common risk factors reported were recent surgery, malignancy and stay in an intensive care unit
- Endocarditis, abscess & septic arthritis were the most common clinical features noted in 2012

2. Enterococcal BSI (Appendix 1D)

- The majority of VRE (83%) and VSE (73%) bloodstream infection were healthcare-associated
- The most common primary sources of enterococcal bloodstream infection were CVC and intra-abdominal/GI tract infection
- Between 2010 and 2012, there has been an increase in VRE bloodstream infection due to CVC as source

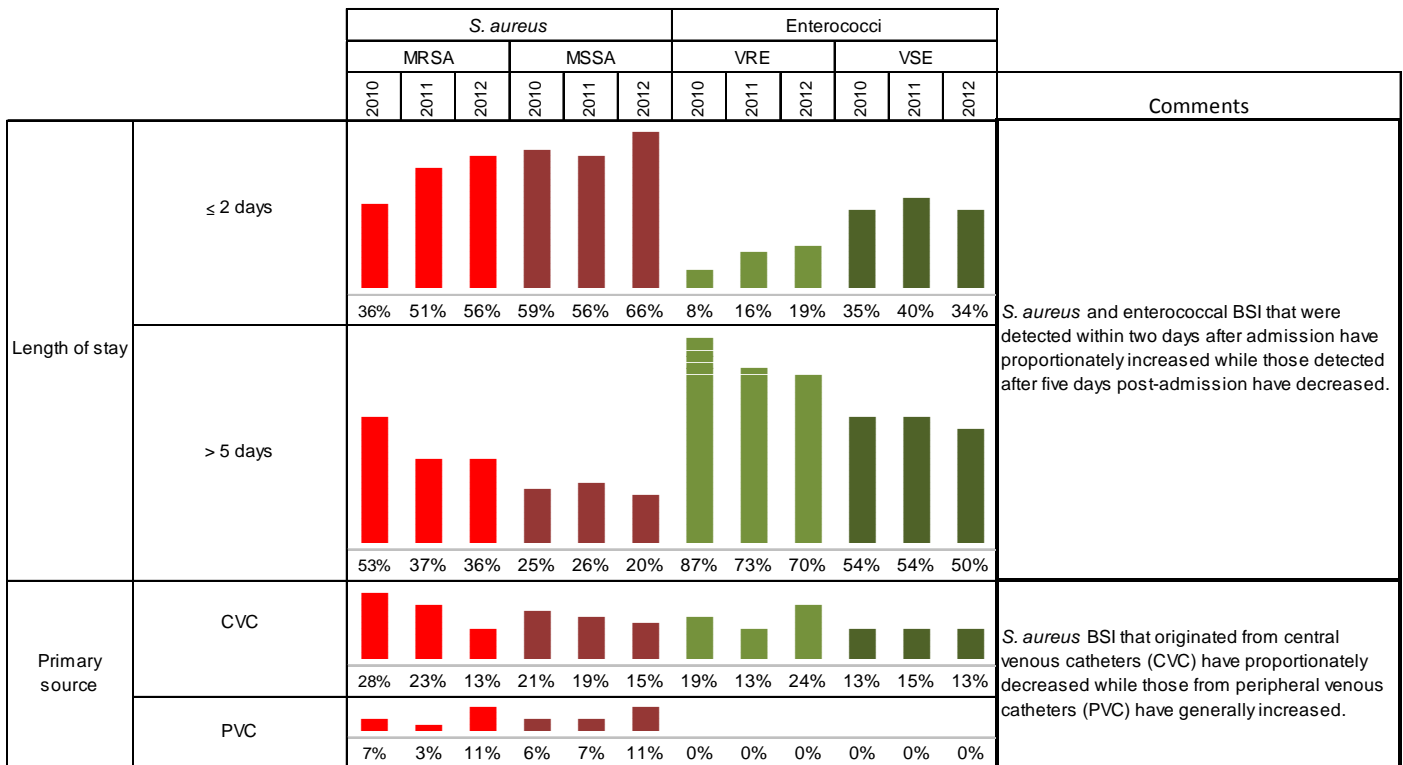


Figure 1. Selected changes for of the features for *S. aureus* and enterococcal BSI are shown. The bars represent proportion of isolates within each category over all isolates for Meticillin Resistant *S. aureus* (MRSA), Meticillin Susceptible *S. aureus* (MSSA), Vancomycin Resistant Enterococci (VRE) or Vancomycin Sensitive Enterococci (VSE).

3. Pneumococcal BSI (Appendix 1B)

- There was a shift in the way *S. pneumoniae* BSI are acquired. For Penicillin Non-Susceptible *S. pneumoniae* (PNSP), the proportion of isolates that were detected within two days after admission decreased from 95% in 2011 to 65% in 2012, and for Penicillin Susceptible *S. pneumoniae* (PSSP) this has decreased from 93% in 2011 to 79% in 2012. Between 2011 and 2012, the proportion of isolates that were detected after five days post-admission increased: 0% to 26% for PNSP and 5% to 8% for PSSP. These changes have resulted in PNSP BSI in particular, being classed as “acquired in the reporting hospital” from 5% in 2011 to 32% in 2012. The number of PNSP BSI isolates for which there is enhanced information is small, therefore, these results must be viewed with caution
- Respiratory tract infection remains the most common source of pneumococcal bloodstream infection
- 5% of pneumococcal bloodstream infection were associated with meningitis

Further information on Invasive Pneumococcal Disease can be found on the HPSC website:
<http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/EpidemiologicalData/>

4. *E. coli* (Appendix 1C), *K. pneumonia* & *P. aeruginosa* BSI (Appendix 1E)

- The majority of fluoroquinolone resistant *E. coli*, *K. pneumonia* and *P. aeruginosa* bloodstream infection were healthcare-associated in contrast to 43% fluoroquinolone susceptible *E. coli*.
- The most common source of *E. coli* bloodstream infection was urinary tract infection with 5% being associated with the presence of a urinary catheter
- The most common source of *K. pneumonia* bloodstream infection was intra-abdominal/GI source followed by urinary tract infection. In contrast, the most common source of *P. aeruginosa* bloodstream infection was respiratory tract infection

Further information on EARS-Net can be found on the HPSC website:
<http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/EuropeanAntimicrobialResistanceSurveillanceSystemEARSS/>

Proposed Changes to the Enhanced EARS-Net Surveillance System

The EARS-Net programme in Ireland is a valuable source of information on levels of antibiotic resistance among pathogens of public health importance and how these compare with levels in other countries. The purpose of the enhanced programme is to help guide local and national strategies for healthcare-associated infection and antimicrobial resistance prevention and control. Data from the enhanced EARS-net system can identify changes in the association of infection over time (e.g., community or healthcare-associated), identify potentially preventable sources of bloodstream infection (e.g., IV lines and urinary catheters) and enable this information to help track the progress of improvement programmes. The ultimate aim is to improve overall patient safety by providing standardised feedback in a timely fashion, for as many hospitals as possible. To that end HPSC is proposing the following changes to the enhanced system:

1. The variables will be split into two levels (see also Appendix 2):
 - a. Level 1 with a limited set of fields so the critical information such as the identification of potentially preventable sources of infection such as medical devices (e.g., IV lines/urinary catheters) or procedures can be identified. This will assist root-cause analysis by local clinical teams and provide data to help monitor the progress of improvement programmes
 - b. Level 2 with a wider range of fields should continue to increase our understanding of the epidemiology of the pathogens
2. The system will apply to all EARS-Net pathogens, except *S pneumoniae* and *Acinetobacter*. At a minimum, it is recommended that hospitals collect Level 1 dataset for *S. aureus*
3. The data collection will be via MS Excel sheets only in the first instance. The fields may be available via WHONET in due course. However, paper-only-based data collection will be discontinued
4. The data should be sent to HPSC with the core EARS-Net data. The core and enhanced data must be matched for each isolate for which there is enhanced data collected
5. The proposed system will be piloted for Q3 and Q4 of 2013

For further information please contact ajay.oza@hse.ie or robert.cunney@hse.ie

Appendix 1A. Breakdown for MRSA – Meticillin Resistant *Staphylococcus aureus* and MSSA – Meticillin Sensitive *Staphylococcus aureus*

		MRSA							MSSA						
		2006	2007	2008	2009	2010	2011	2012	2006	2007	2008	2009	2010	2011	2012
Demographic	Gender Female	39%	45%	43%	35%	35%	33%	32%	35%	32%	37%	35%	35%	33%	34%
	Mean age in years	68.3	65.8	68.5	68.5	66.5	66.7	68.3	55.0	55.2	55.8	60.3	57.5	57.8	58.7
Length of Stay	Less than or equal to 2 days	27%	31%	35%	44%	36%	51%	56%	52%	47%	51%	56%	59%	56%	66%
	Greater than 5 days	51%	48%	44%	47%	53%	37%	36%	25%	25%	26%	29%	25%	26%	20%
Association	Community	5%	7%	8%	10%	12%	16%	21%	24%	18%	24%	24%	23%	20%	25%
	HCA: not in reporting hospital	14%	18%	21%	24%	15%	19%	20%	12%	22%	18%	20%	20%	15%	16%
	HCA: in reporting hospital	74%	68%	67%	64%	71%	49%	49%	57%	51%	48%	52%	53%	46%	45%
	Unknown	7%	5%	3%	3%	1%	10%	8%	7%	8%	6%	4%	3%	12%	12%
Primary source	Central venous catheter	24%	27%	22%	18%	28%	23%	13%	27%	21%	17%	21%	21%	19%	15%
	Peripheral venous catheter	6%	4%	8%	9%	7%	3%	11%	7%	8%	9%	7%	6%	7%	11%
	Intra-abdominal / GI tract	2%	5%	1%	2%	1%	2%	0%	1%	3%	1%	1%	2%	1%	1%
	Respiratory tract	12%	13%	8%	11%	9%	9%	11%	5%	6%	5%	5%	3%	3%	4%
	Skin or Soft tissue	11%	11%	13%	14%	11%	13%	12%	11%	18%	13%	14%	13%	11%	16%
	Surgical wound	2%	3%	2%	3%	1%	1%	1%	2%	3%	3%	4%	3%	3%	3%
	Non-surgical wound	2%	3%	1%	3%	3%	2%	1%	1%	0%	1%	0%	1%	1%	1%
	Urinary tract without catheter	3%	4%	2%	2%	0%	1%	1%	1%	2%	1%	1%	1%	2%	2%
	Urinary catheter	4%	3%	4%	4%	2%	2%	1%	1%	1%	0%	1%	1%	1%	1%
	Other source	3%	2%	3%	3%	9%	5%	8%	5%	2%	5%	7%	14%	7%	6%
Unknown	32%	26%	37%	34%	29%	40%	40%	39%	36%	44%	40%	36%	46%	40%	
Risk factors	Diabetes	8%	7%	7%	8%	9%	11%	5%	7%	3%	6%	7%	8%	5%	8%
	Haemodialysis	9%	9%	11%	13%	11%	8%	3%	16%	4%	5%	9%	14%	12%	8%
	Stay in intensive care unit	13%	10%	9%	10%	11%	10%	11%	8%	8%	8%	4%	9%	8%	7%
	Immunosuppression	14%	7%	9%	10%	10%	10%	4%	16%	13%	14%	11%	12%	10%	9%
	Malignancy	16%	25%	25%	17%	21%	14%	8%	15%	21%	19%	18%	17%	14%	16%
	Recent surgery	15%	18%	13%	12%	17%	16%	20%	7%	10%	8%	8%	10%	8%	10%
	Other	21%	26%	18%	25%	28%	14%	12%	19%	22%	18%	19%	17%	18%	17%
Clinical feature	Abscess	1%	3%	2%	1%	4%	5%	3%	3%	1%	6%	4%	6%	4%	5%
	Endocarditis	2%	1%	2%	6%	5%	2%	4%	5%	4%	3%	4%	8%	5%	6%
	Meningitis	0%	1%	1%	0%	0%	0%	0%	1%	0%	1%	0%	1%	0%	0%
	Neutropaenia	0%	2%	1%	1%	0%	0%	0%	0%	0%	2%	2%	1%	0%	1%
	Osteomyelitis	1%	3%	2%	1%	2%	6%	0%	3%	4%	4%	3%	3%	2%	3%
	Septic Arthritis	0%	1%	1%	1%	1%	2%	4%	0%	2%	3%	3%	2%	3%	3%
	Other	1%	9%	11%	11%	13%	10%	8%	1%	6%	9%	11%	13%	12%	16%
Total		285	190	180	195	175	109	75	347	264	299	470	495	311	250

Appendix 1B. Breakdown for PNSP – Penicillin non-Susceptible *Streptococcus pneumoniae* and PSSP – Penicillin Susceptible *Streptococcus pneumoniae*

		PNSP							PSSP						
		2006	2007	2008	2009	2010	2011	2012	2006	2007	2008	2009	2010	2011	2012
Demographic	Gender Female	77%	44%	39%	48%	44%	33%	35%	41%	44%	40%	43%	48%	41%	40%
	Mean age in years	48.3	53.7	45.7	61.5	65.6	68.6	57.6	50.5	55.4	52.3	57.1	58.6	60.4	63.2
Length of Stay	Less than or equal to 2 days	52%	68%	69%	68%	91%	95%	65%	74%	63%	71%	65%	88%	93%	79%
	Greater than 5 days	10%	4%	6%	8%	6%	0%	26%	9%	11%	4%	12%	9%	5%	8%
Association	Community	42%	48%	56%	32%	56%	29%	32%	56%	46%	48%	43%	58%	50%	50%
	HCA: not in reporting hospital	10%	24%	17%	32%	24%	29%	13%	15%	20%	23%	23%	17%	13%	13%
	HCA: in reporting hospital	10%	4%	11%	8%	6%	5%	32%	12%	13%	6%	13%	9%	6%	11%
	Unknown	39%	24%	17%	28%	15%	38%	23%	17%	21%	23%	20%	15%	25%	26%
Primary source	Central venous catheter	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%
	Peripheral venous catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
	Intra-abdominal / GI tract	0%	0%	6%	0%	3%	5%	0%	1%	1%	0%	2%	1%	2%	0%
	Respiratory tract	48%	60%	50%	64%	62%	38%	65%	65%	66%	61%	64%	59%	62%	56%
	Skin or Soft tissue	0%	4%	0%	0%	0%	5%	0%	1%	0%	1%	1%	1%	1%	2%
	Surgical wound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
	Non-surgical wound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Urinary tract without catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
	Urinary catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Other source	6%	0%	0%	0%	9%	5%	3%	1%	2%	2%	1%	11%	0%	2%
Unknown	45%	36%	44%	36%	26%	48%	32%	32%	31%	36%	32%	28%	34%	40%	
Risk factors	Diabetes	0%	0%	0%	0%	0%	5%	0%	1%	3%	1%	2%	2%	0%	3%
	Haemodialysis	0%	0%	0%	0%	0%	5%	3%	3%	2%	0%	1%	1%	0%	1%
	Stay in intensive care unit	0%	4%	3%	0%	3%	10%	0%	3%	2%	1%	4%	3%	6%	6%
	Immunosuppression	3%	16%	8%	8%	9%	10%	23%	10%	13%	9%	12%	11%	13%	12%
	Malignancy	6%	20%	11%	20%	15%	24%	29%	8%	9%	13%	18%	12%	12%	14%
	Recent surgery	0%	0%	0%	0%	0%	0%	10%	1%	0%	1%	2%	1%	0%	1%
	Other	13%	12%	14%	4%	9%	5%	16%	18%	13%	20%	9%	15%	9%	15%
Clinical feature	Abscess	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	1%	1%	1%
	Endocarditis	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
	Meningitis	0%	0%	8%	0%	3%	10%	6%	3%	3%	3%	4%	5%	2%	3%
	Neutropaenia	0%	4%	6%	0%	0%	0%	3%	0%	3%	2%	0%	1%	1%	2%
	Osteomyelitis	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	1%	1%
	Septic Arthritis	0%	0%	0%	0%	0%	5%	0%	0%	2%	0%	0%	1%	0%	1%
	Other	0%	16%	0%	40%	12%	19%	29%	0%	8%	11%	17%	19%	21%	14%
Total		31	25	36	25	34	21	31	156	114	142	120	138	107	108

Appendix 1C. Breakdown for FQREC – Fluoroquinolone Resistant *Escherichia coli* and FQSEC – Fluoroquinolone Sensitive *Escherichia coli*

		FQREC							FQSEC						
		2006	2007	2008	2009	2010	2011	2012	2006	2007	2008	2009	2010	2011	2012
Demographic	Gender Female	47%	39%	42%	48%	49%	41%	43%	57%	58%	58%	58%	57%	59%	58%
	Mean age in years	69.3	69.2	70.0	70.9	70.4	71.8	72.0	62.4	66.7	64.7	67.1	67.6	66.2	68.3
Length of Stay	Less than or equal to 2 days	36%	37%	39%	56%	59%	63%	60%	49%	48%	52%	54%	68%	69%	68%
	Greater than 5 days	40%	35%	34%	20%	31%	30%	28%	24%	17%	19%	21%	23%	20%	16%
Association	Community	14%	11%	14%	23%	18%	17%	17%	34%	27%	31%	31%	38%	36%	38%
	HCA: not in reporting hospital	18%	20%	21%	30%	28%	16%	23%	12%	18%	20%	19%	20%	14%	18%
	HCA: in reporting hospital	49%	50%	44%	36%	41%	47%	38%	33%	28%	28%	30%	31%	28%	25%
	Unknown	19%	19%	21%	12%	12%	16%	22%	22%	27%	21%	19%	10%	17%	19%
Primary source	Central venous catheter	8%	9%	4%	3%	2%	2%	2%	6%	4%	3%	4%	2%	2%	3%
	Peripheral venous catheter	1%	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
	Intra-abdominal / GI tract	15%	16%	16%	22%	15%	19%	16%	12%	16%	16%	20%	18%	18%	17%
	Respiratory tract	4%	2%	2%	3%	4%	3%	2%	2%	2%	1%	4%	2%	2%	2%
	Skin or Soft tissue	0%	1%	1%	1%	2%	1%	1%	0%	1%	1%	0%	1%	0%	0%
	Surgical wound	1%	0%	1%	1%	1%	0%	2%	0%	0%	1%	0%	1%	0%	0%
	Non-surgical wound	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Urinary tract without catheter	31%	21%	24%	28%	28%	22%	23%	35%	30%	32%	32%	30%	34%	36%
	Urinary catheter	11%	13%	9%	9%	8%	20%	9%	3%	5%	4%	5%	5%	5%	4%
	Other source	0%	2%	2%	0%	8%	0%	0%	2%	1%	2%	1%	12%	1%	1%
Unknown	31%	36%	41%	31%	30%	33%	44%	38%	40%	40%	34%	29%	37%	37%	
Risk factors	Diabetes	1%	2%	6%	4%	3%	3%	3%	3%	4%	4%	3%	4%	3%	4%
	Haemodialysis	3%	2%	1%	3%	3%	1%	1%	2%	1%	1%	1%	1%	1%	1%
	Stay in intensive care unit	7%	8%	4%	6%	6%	3%	4%	6%	3%	4%	2%	5%	4%	3%
	Immunosuppression	20%	14%	7%	12%	16%	7%	11%	14%	7%	9%	10%	13%	14%	13%
	Malignancy	19%	29%	26%	29%	29%	17%	20%	14%	19%	20%	22%	21%	19%	16%
	Recent surgery	9%	12%	10%	14%	14%	10%	8%	9%	7%	7%	6%	8%	7%	3%
	Other	13%	27%	19%	17%	16%	18%	10%	14%	17%	12%	12%	16%	12%	12%
Clinical feature	Abscess	1%	1%	2%	1%	3%	1%	0%	0%	0%	1%	1%	2%	1%	1%
	Endocarditis	1%	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
	Meningitis	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
	Neutropaenia	0%	2%	3%	1%	1%	1%	2%	0%	3%	3%	3%	3%	3%	4%
	Osteomyelitis	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Septic Arthritis	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Other	0%	9%	8%	10%	11%	12%	11%	1%	4%	7%	10%	13%	13%	16%
Total		167	161	180	230	274	203	225	519	473	594	652	863	666	637

Appendix 1D. Breakdown for VRE – Vancomycin Resistant Enterococci and VSE – Vancomycin Sensitive Enterococci

		VRE							VSE						
		2006	2007	2008	2009	2010	2011	2012	2006	2007	2008	2009	2010	2011	2012
Demographic	Gender Female	23%	41%	47%	34%	45%	46%	40%	43%	43%	42%	44%	43%	38%	40%
	Mean age in years	62.9	59.6	64.8	62.4	59.6	61.2	67.4	61.5	64.1	63.4	65.4	62.9	65.9	66.1
Length of Stay	Less than or equal to 2 days	20%	9%	5%	9%	8%	16%	19%	29%	24%	25%	31%	35%	40%	34%
	Greater than 5 days	75%	76%	74%	78%	87%	73%	70%	48%	46%	49%	45%	54%	54%	50%
Association	Community	5%	0%	2%	1%	2%	10%	7%	13%	9%	9%	15%	13%	12%	13%
	HCA: not in reporting hospital	11%	4%	6%	9%	5%	5%	4%	10%	13%	14%	16%	13%	12%	12%
	HCA: in reporting hospital	80%	89%	85%	83%	92%	81%	79%	65%	60%	64%	56%	66%	60%	61%
	Unknown	5%	7%	8%	6%	1%	2%	7%	12%	19%	13%	13%	7%	9%	14%
Primary source	Central venous catheter	32%	35%	21%	29%	19%	13%	24%	24%	13%	13%	10%	13%	15%	13%
	Peripheral venous catheter	2%	0%	2%	1%	0%	0%	0%	0%	1%	0%	2%	0%	0%	0%
	Intra-abdominal / GI tract	7%	13%	26%	27%	30%	33%	27%	19%	25%	23%	28%	25%	24%	18%
	Respiratory tract	5%	2%	3%	1%	2%	0%	0%	3%	3%	1%	1%	2%	1%	1%
	Skin or Soft tissue	2%	2%	3%	1%	2%	2%	0%	3%	0%	4%	2%	1%	2%	2%
	Surgical wound	0%	0%	0%	0%	1%	0%	1%	2%	1%	1%	0%	1%	1%	0%
	Non-surgical wound	2%	0%	0%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	1%
	Urinary tract without catheter	2%	2%	2%	3%	2%	3%	4%	7%	4%	8%	6%	4%	5%	5%
	Urinary catheter	0%	2%	0%	1%	0%	0%	1%	2%	6%	5%	3%	5%	3%	8%
	Other source	5%	0%	0%	0%	0%	0%	0%	2%	2%	2%	3%	2%	1%	4%
Unknown	43%	43%	44%	36%	42%	49%	42%	37%	45%	43%	44%	46%	49%	48%	
Risk factors	Diabetes	0%	0%	5%	0%	5%	0%	1%	5%	1%	3%	6%	3%	5%	5%
	Haemodialysis	7%	9%	2%	9%	6%	0%	3%	7%	5%	2%	4%	4%	3%	1%
	Stay in intensive care unit	39%	30%	14%	27%	25%	17%	16%	25%	19%	16%	13%	15%	14%	8%
	Immunosuppression	27%	30%	21%	30%	24%	24%	37%	12%	16%	12%	12%	14%	18%	15%
	Malignancy	11%	33%	42%	49%	49%	37%	42%	20%	29%	26%	33%	28%	23%	26%
	Recent surgery	11%	15%	20%	21%	27%	11%	18%	24%	18%	15%	15%	20%	13%	14%
	Other	18%	24%	18%	13%	14%	22%	10%	22%	11%	21%	18%	18%	10%	9%
Clinical feature	Abscess	0%	2%	5%	4%	6%	3%	1%	1%	3%	4%	1%	3%	2%	3%
	Endocarditis	5%	4%	3%	0%	1%	0%	1%	2%	2%	4%	5%	3%	3%	2%
	Meningitis	0%	0%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%	0%	0%
	Neutropaenia	0%	9%	12%	8%	7%	8%	10%	2%	2%	4%	2%	1%	3%	3%
	Osteomyelitis	0%	0%	3%	0%	0%	0%	0%	1%	0%	1%	0%	0%	2%	0%
	Septic Arthritis	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%
	Other	0%	2%	6%	9%	7%	8%	7%	1%	4%	8%	9%	11%	9%	15%
Total		44	46	66	77	84	63	67	181	184	227	218	246	199	179

Appendix 1E. Breakdown for KPN – *Klebsiella pneumonia* and PAE – *Pseudomonas aeruginosa*

		KPN							PAE						
		2006	2007	2008	2009	2010	2011	2012	2006	2007	2008	2009	2010	2011	2012
Demographic	Gender Female	39%	36%	38%	43%	47%	39%	47%	47%	46%	30%	40%	36%	36%	45%
	Mean age in years	58.1	65.7	63.1	63.9	62.1	65.0	63.9	66.3	66.8	68.1	66.3	67.8	69.8	67.9
Length of Stay	Less than or equal to 2 days	28%	38%	36%	49%	45%	41%	45%	32%	26%	35%	35%	49%	55%	55%
	Greater than 5 days	48%	34%	42%	34%	43%	43%	41%	40%	41%	39%	39%	43%	35%	32%
Association	Community	16%	12%	18%	24%	17%	14%	19%	9%	14%	10%	10%	13%	17%	20%
	HCA: not in reporting hospital	12%	27%	18%	18%	14%	10%	16%	17%	13%	22%	22%	21%	14%	21%
	HCA: in reporting hospital	58%	46%	53%	44%	55%	54%	50%	53%	49%	53%	52%	61%	46%	42%
	Unknown	14%	15%	11%	14%	12%	18%	16%	21%	23%	15%	16%	5%	22%	17%
Primary source	Central venous catheter	16%	12%	12%	17%	10%	8%	15%	11%	7%	6%	14%	14%	4%	11%
	Peripheral venous catheter	0%	0%	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	0%	0%
	Intra-abdominal / GI tract	18%	24%	26%	29%	20%	25%	21%	4%	7%	11%	17%	7%	12%	6%
	Respiratory tract	11%	10%	9%	10%	5%	7%	5%	11%	10%	13%	11%	9%	4%	18%
	Skin or Soft tissue	0%	3%	0%	1%	1%	1%	0%	6%	3%	3%	2%	5%	7%	4%
	Surgical wound	5%	0%	1%	1%	2%	0%	1%	0%	3%	3%	1%	0%	4%	0%
	Non-surgical wound	0%	0%	0%	0%	1%	0%	0%	6%	1%	0%	1%	1%	0%	0%
	Urinary tract without catheter	10%	8%	13%	12%	10%	12%	11%	11%	9%	3%	8%	13%	6%	7%
	Urinary catheter	1%	5%	4%	1%	7%	9%	5%	2%	9%	19%	3%	11%	9%	4%
	Other source	0%	2%	2%	0%	1%	1%	1%	0%	3%	0%	1%	2%	1%	1%
Unknown	40%	36%	32%	29%	43%	39%	41%	49%	48%	42%	40%	38%	52%	48%	
Risk factors	Diabetes	1%	4%	4%	6%	3%	4%	4%	2%	6%	4%	5%	7%	1%	0%
	Haemodialysis	2%	1%	1%	1%	3%	0%	0%	0%	0%	0%	3%	1%	3%	1%
	Stay in intensive care unit	11%	11%	4%	6%	11%	7%	11%	11%	12%	14%	9%	10%	6%	15%
	Immunosuppression	20%	21%	17%	12%	24%	27%	23%	34%	16%	20%	21%	30%	7%	28%
	Malignancy	18%	36%	38%	44%	43%	34%	36%	19%	38%	37%	37%	45%	28%	30%
	Recent surgery	14%	13%	14%	11%	9%	12%	10%	11%	12%	13%	16%	14%	12%	10%
	Other	23%	17%	14%	14%	14%	11%	11%	6%	19%	9%	14%	18%	7%	20%
Clinical feature	Abscess	0%	3%	1%	1%	2%	1%	0%	0%	1%	1%	2%	0%	3%	1%
	Endocarditis	0%	0%	2%	0%	0%	1%	0%	0%	0%	0%	1%	1%	1%	0%
	Meningitis	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	Neutropaenia	0%	5%	4%	2%	5%	4%	6%	0%	9%	11%	5%	3%	3%	11%
	Osteomyelitis	0%	0%	0%	0%	0%	0%	1%	0%	1%	1%	0%	0%	0%	0%
	Septic Arthritis	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Other	0%	5%	11%	9%	10%	8%	15%	0%	6%	3%	8%	6%	13%	13%
Total	83	92	114	140	147	138	122	47	69	79	99	94	69	71	

Appendix 2. Proposed new data for enhanced EARS-Net surveillance

Level 1

Laboratory identifier	(exact match with core data)
Patient identifier	(exact match with core data)
Specimen identifier	(exact match with core data)
Organism code	(exact match with core data)
Date of admission	Date
Probable contaminant	Y/N
Healthcare-association	This Hosp/Other Hosp/Long Stay Facility/Other/Unknown
Device (catheter)-associated	Y/N
Type of device	PVC/CVC/CVC-PICC/Dialysis Catheter/Urinary Catheter/Other
Implant-associated	Y/N
Name of procedure	Free text
Procedure-associated	Y/N
Name of procedure	Free text
Any additional information	Free text

Level 2

All level 1 data fields, plus

Source organ site (one from list):

Respiratory

Gastrointestinal

Hepatobiliary

Bone and joint

Head and neck

Central nervous system

Urinary tract

Genital tract

Skin/Soft tissue – surgical wound

Skin/Soft tissue – other wound (e.g., pressure ulcer etc)

Cardiovascular

Other

Unknown

Further information on source Free text

Neutropaenia Y/N

Acquired in critical care Y/N

Outcome Discharged/Died/Still in Hosp/Unknown

Date of discharge or death Date