



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



In this report

- Main results for 2014
- Breakdown of factors by organism and resistance subtype
- Data quality assessment

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 2014 DATA

Key Points

- ⊙ **Enhanced data were collected on 2,202 EARS-Net blood-culture isolates for 2014, from 21 laboratories**
- ⊙ **A new, simplified, version of the data collection form was used and where comparable, the results are broadly in line with past years**
- ⊙ **Device, procedure and implant association was collected in a systematic way: 18% of MRSA, 26% of MSSA and 31% of VRE were device-related**
- ⊙ **Antibiotic exposure data were collected with the new field completed and for 64% of all records. 27% of MRSA, 29% of VRE and 27% of FQREC bloodstream infections were noted as having exposure**

Introduction

The Enhanced data have been collected on European Antimicrobial Resistance Surveillance Network (EARS-Net) isolates since 2004 in Ireland.

The purpose of the enhanced programme is to help guide local and national strategies for antibiotic resistant infections. Data from the enhanced EARS-Net system can identify changes in the association of infection with specific factors 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 intervention programmes. The ultimate aim is to improve overall patient safety.

A new simplified data collection protocol was used since the start of 2014. This report includes a breakdown of the most recent findings.

Results

Data from 21 laboratories were available. Enhanced data records collected for 2014 (n = 2,202) which represents 40% of all the isolates of the core EARS-Net dataset for the same time period.

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

		Total for 2014	Percent female	Mean age in years	Detected <48 hours after admission	Detected >5 days after admission
<i>Staphylococcus aureus</i>	Meticillin Resistant (MRSA)	92	42%	71.5	57%	32%
	Meticillin Susceptible	378	35%	56.5	62%	25%
<i>Streptococcus pneumoniae</i>	Penicillin non-Susceptible	21	52%	53.9	90%	5%
	Penicillin Susceptible	111	51%	61.2	95%	2%
Enterococci	Vancomycin Resistant	77	40%	65.5	9%	81%
	Vancomycin Sensitive	221	46%	67.3	40%	48%
<i>Escherichia coli</i>	Fluoroquinolone Resistant	273	45%	76.2	73%	22%
	Fluoroquinolone Susceptible	819	56%	68.5	74%	19%
<i>Klebsiella pneumoniae</i>		139	45%	66.7	51%	35%
<i>Pseudomonas aeruginosa</i>		71	44%	69.0	68%	23%

Main findings for 2014

Please see Appendix 1 for a complete breakdown for all organisms.

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

- 51% MRSA and 51% MSSA bloodstream infection were classified as healthcare-associated that were likely acquired in the reporting hospital, whilst 13% of MRSA and 5% MSSA were classed as otherwise healthcare-associated
- 18% of MRSA infections were device associated: 10% CVC/CVC-PICC, 3% PVC
- 26% of MSSA infections were device associated: 11% CVC/CVC-PICC, 7% PVC and 5% dialysis catheter
- Owing to the changes in the definition for primary source to source organ site and the inclusion of device/procedure/implant information, the proportion of “unknown” and “other” sources has increased
- 27% of MRSA and 21% of MSSA isolates were noted as having recent exposure to antibiotics

2. Enterococcal BSI (Appendix 1D)

- All of the VRE and 67% of the VSE infections were classed as healthcare-associated
- 31% of VRE were device associated: 6% CVC, 18% CVC-PICC
- 17% of VSE were device associated: 9% CVC, 2% CVC-PICC
- 29% of VRE and 19% of VSE isolates were noted as exposed to antibiotics

3. Pneumococcal BSI (Appendix 1B)

- Respiratory tract infection remains the most common source of pneumococcal BSI

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)

- 52% of FQREC and 36% of FQSEC were classified as healthcare-associated
- 14% of FQREC were device associated, 11% associated with urinary catheter
- Urinary tract remains the most common source site
- Recent antibiotic exposure was noted in 23% of *E. coli* BSI

5. *K. pneumonia* & *P. aeruginosa* BSI (Appendix 1E)

- Similar findings in line with *E. coli* BSI, although respiratory tract was also indicated as source organ site

Further information on EARS-Net can be found on the HPSC website:

<http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/EuropeanAntimicrobialResistanceSurveillanceSystemEARSS/>

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

		MRSA										MSSA									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Demographic	Gender Female	39%	46%	44%	35%	35%	33%	32%	25%	42%	36%	32%	37%	35%	35%	33%	36%	37%	35%		
	Mean age in years	68.2	65.8	68.6	68.5	66.4	67.1	69.0	69.0	71.5	54.9	55.5	55.8	60.5	57.6	57.8	58.8	57.7	56.5		
Length of Stay	Less than or equal to 2 days	27%	31%	35%	45%	36%	51%	54%	59%	57%	51%	48%	51%	56%	59%	56%	66%	66%	62%		
	Greater than 5 days	52%	48%	43%	46%	54%	37%	37%	34%	32%	25%	25%	26%	29%	26%	26%	21%	23%	25%		
Association	Community	5%	7%	8%	11%	12%	19%	21%	19%	23%	23%	18%	24%	24%	23%	22%	25%	24%	35%		
	HCA: not in reporting hospital	14%	19%	22%	23%	15%	19%	19%	21%	12%	12%	23%	19%	21%	20%	16%	16%	16%	4%		
	HCA: in reporting hospital	74%	68%	67%	64%	72%	51%	51%	48%	49%	58%	51%	51%	52%	54%	50%	47%	47%	50%		
	Unknown	7%	5%	3%	3%	1%	10%	9%	12%	14%	7%	8%	6%	4%	2%	12%	12%	13%	9%		
	Device									18%									26%		
	Implant									4%									4%		
	Procedure									1%									3%		
	Device/Implnt/Proc Unknown									17%									18%		
	Not Device/Implnt/Proc Assoc.									59%									49%		
Primary source	Central venous catheter	24%	27%	22%	18%	28%	23%	14%	23%	0%	27%	21%	17%	21%	21%	19%	17%	20%	0%		
	Peripheral venous catheter	6%	4%	8%	9%	7%	3%	10%	3%	0%	7%	8%	9%	7%	6%	7%	11%	8%	0%		
	Intra-abdominal / GI tract	2%	5%	1%	2%	1%	2%	0%	0%	2%	1%	3%	1%	1%	2%	1%	1%	1%	1%		
	Respiratory tract	12%	13%	8%	11%	9%	9%	10%	10%	11%	5%	6%	5%	5%	3%	3%	4%	4%	7%		
	Skin or Soft tissue	11%	11%	13%	14%	11%	13%	12%	23%	3%	11%	18%	13%	14%	13%	11%	15%	19%	2%		
	Surgical wound	2%	3%	2%	3%	1%	1%	1%	5%	3%	2%	3%	3%	4%	3%	3%	3%	3%	2%		
	Non-surgical wound	2%	3%	1%	3%	3%	2%	1%	3%	15%	1%	0%	1%	0%	1%	1%	1%	3%	21%		
	Urinary tract without catheter	3%	4%	2%	2%	0%	1%	1%	3%	5%	1%	2%	1%	1%	1%	2%	2%	2%	2%		
	Urinary catheter	4%	3%	4%	4%	2%	2%	1%	4%	0%	1%	1%	0%	1%	1%	1%	1%	1%	0%		
	Other source	3%	2%	3%	3%	10%	5%	8%	3%	15%	5%	2%	5%	7%	14%	7%	6%	7%	21%		
Unknown	32%	26%	37%	34%	28%	40%	41%	23%	45%	39%	36%	44%	40%	36%	46%	39%	34%	44%			
Risk factors	Diabetes	8%	7%	7%	8%	9%	11%	5%	11%	7%	3%	6%	7%	8%	6%	9%	6%				
	Haemodialysis	9%	9%	11%	13%	11%	8%	3%	3%	16%	4%	5%	9%	14%	12%	9%	8%				
	Stay in intensive care unit	13%	10%	9%	10%	11%	10%	10%	15%	8%	8%	8%	4%	9%	8%	7%	5%				
	Immunosuppression	14%	7%	9%	10%	10%	10%	4%	7%	16%	13%	14%	11%	12%	10%	9%	11%				
	Malignancy	16%	25%	25%	17%	21%	14%	9%	13%	15%	21%	19%	18%	17%	15%	17%	16%				
	Recent surgery	15%	18%	13%	12%	17%	16%	21%	19%	7%	10%	8%	8%	10%	8%	10%	9%				
	Other	21%	26%	18%	25%	28%	14%	12%	10%	19%	22%	18%	19%	17%	18%	17%	15%				
Clinical feature	Abscess	1%	3%	2%	1%	4%	5%	3%	5%	3%	1%	6%	4%	6%	4%	5%	6%				
	Endocarditis	2%	1%	2%	6%	5%	2%	4%	2%	5%	4%	3%	4%	8%	5%	6%	4%				
	Meningitis	0%	1%	1%	0%	0%	0%	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%				
	Neutropaenia	0%	2%	1%	1%	0%	0%	0%	1%	2%	0%	0%	2%	2%	1%	0%	1%	2%	3%		
	Osteomyelitis	1%	3%	2%	1%	2%	6%	0%	6%	3%	4%	4%	3%	3%	2%	3%	2%				
	Septic Arthritis	0%	1%	1%	1%	1%	2%	4%	1%	0%	2%	3%	3%	2%	3%	3%	3%				
	Other	1%	9%	11%	11%	13%	10%	8%	11%	1%	6%	9%	11%	13%	12%	15%	10%				
Antibiotic Exposure	Yes								29%									24%			
	No								8%									10%			
	Unknown								63%									65%			
Total		285	190	180	195	175	109	78	97	92	347	264	299	470	495	313	261	328	378		

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	2013	2014	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Demographic	Gender Female	74%	48%	44%	48%	44%	33%	39%	29%	52%	40%	43%	41%	43%	48%	40%	41%	52%	51%		
	Mean age in years	48.3	53.7	44.5	61.5	65.6	68.6	57.8	59.3	53.9	50.4	54.8	52.3	57.1	58.6	60.1	63.5	61.5	61.3		
Length of Stay	Less than or equal to 2 days	52%	68%	69%	68%	91%	95%	65%	67%	90%	74%	63%	70%	65%	89%	92%	77%	90%	95%		
	Greater than 5 days	10%	4%	8%	8%	6%	0%	26%	19%	5%	9%	11%	4%	12%	8%	5%	8%	4%	2%		
Association	Community	42%	48%	56%	32%	56%	29%	32%	43%	43%	56%	46%	46%	45%	58%	55%	50%	48%	60%		
	HCA: not in reporting hospital	10%	24%	17%	32%	24%	29%	13%	24%	5%	15%	20%	23%	23%	18%	13%	13%	20%	1%		
	HCA: in reporting hospital	10%	4%	11%	8%	6%	5%	32%	19%	14%	12%	13%	7%	13%	9%	7%	11%	10%	5%		
	Unknown	39%	24%	17%	28%	15%	38%	23%	14%	33%	17%	21%	23%	20%	15%	25%	27%	21%	32%		
	Device									5%									0%		
	Implant									0%									0%		
	Procedure									0%									1%		
	Device/Implnt/Proc Unknown									19%									30%		
Not Device/Implnt/Proc Assoc.									76%									69%			
Primary source	Central venous catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%		
	Peripheral venous catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%		
	Intra-abdominal / GI tract	0%	0%	6%	0%	3%	5%	0%	5%	0%	1%	1%	0%	2%	1%	2%	0%	0%	0%		
	Respiratory tract	48%	60%	50%	64%	62%	38%	65%	67%	57%	65%	66%	61%	64%	59%	62%	57%	67%	53%		
	Skin or Soft tissue	0%	4%	0%	0%	0%	5%	0%	5%	0%	1%	0%	1%	1%	1%	1%	2%	0%	0%		
	Surgical wound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%		
	Non-surgical wound	0%	0%	0%	0%	0%	0%	0%	0%	5%	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%	0%	0%	1%	0%	1%	0%		
	Urinary catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	Other source	6%	0%	0%	0%	9%	5%	3%	0%	10%	1%	2%	2%	1%	11%	0%	2%	1%	13%		
Unknown	45%	36%	44%	36%	26%	48%	32%	24%	29%	32%	31%	36%	32%	28%	34%	40%	30%	34%			
Risk factors	Diabetes	0%	0%	0%	0%	0%	5%	0%	5%	1%	3%	1%	2%	2%	0%	3%	2%				
	Haemodialysis	0%	0%	0%	0%	0%	5%	3%	0%	3%	2%	0%	1%	1%	0%	1%	2%				
	Stay in intensive care unit	0%	4%	3%	0%	3%	10%	0%	5%	3%	2%	1%	4%	3%	6%	6%	4%				
	Immunosuppression	3%	16%	8%	8%	9%	10%	23%	5%	10%	13%	9%	12%	11%	13%	12%	10%				
	Malignancy	6%	20%	11%	20%	15%	24%	29%	29%	8%	9%	13%	18%	12%	12%	14%	10%				
	Recent surgery	0%	0%	0%	0%	0%	0%	10%	0%	1%	0%	1%	2%	1%	0%	1%	2%				
	Other	13%	12%	14%	4%	9%	5%	16%	5%	18%	13%	20%	9%	15%	9%	14%	3%				
Clinical feature	Abscess	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	1%	1%	1%	1%				
	Endocarditis	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%				
	Meningitis	0%	0%	8%	0%	3%	10%	6%	0%	3%	3%	3%	4%	5%	2%	3%	2%				
	Neutropaenia	0%	4%	6%	0%	0%	0%	3%	0%	5%	0%	3%	2%	0%	1%	1%	2%	0%	3%		
	Osteomyelitis	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	1%	1%	0%				
	Septic Arthritis	0%	0%	0%	0%	0%	5%	0%	0%	0%	2%	0%	0%	1%	0%	1%	0%				
	Other	0%	16%	0%	40%	12%	19%	29%	10%	0%	8%	11%	17%	19%	21%	14%	18%				
Antibiotic Exposure	Yes								5%									20%			
	No								24%									22%			
	Unknown								71%									59%			
Total		31	25	36	25	34	21	31	21	21	156	114	142	120	138	107	111	89	111		

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

		FQREC										FQSEC									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Demographic	Gender Female	48%	39%	43%	48%	50%	41%	42%	46%	45%	58%	60%	58%	58%	58%	59%	58%	56%	56%		
	Mean age in years	69.2	69.2	70.0	71.0	70.3	71.8	71.6	72.1	76.2	62.2	66.8	64.7	67.1	67.4	66.3	68.6	67.7	68.5		
Length of Stay	Less than or equal to 2 days	38%	37%	38%	55%	60%	63%	58%	73%	73%	49%	49%	52%	54%	69%	69%	68%	77%	74%		
	Greater than 5 days	40%	34%	34%	20%	31%	30%	28%	22%	22%	24%	17%	19%	21%	23%	21%	17%	16%	19%		
Association	Community	15%	11%	15%	23%	18%	18%	17%	20%	30%	33%	28%	31%	32%	38%	38%	38%	38%	40%		
	HCA: not in reporting hospital	18%	20%	20%	29%	28%	17%	23%	25%	11%	11%	18%	20%	19%	20%	15%	18%	20%	5%		
	HCA: in reporting hospital	48%	50%	44%	37%	42%	49%	39%	30%	37%	34%	27%	28%	31%	32%	30%	25%	25%	29%		
	Unknown	19%	19%	21%	12%	12%	16%	21%	25%	19%	22%	27%	21%	19%	10%	17%	19%	18%	24%		
	Device									14%									5%		
	Implant									0%									0%		
	Procedure									5%									3%		
	Device/Implnt/Proc Unknown									26%									26%		
Not Device/Implnt/Proc Assoc.									55%									65%			
Primary source	Central venous catheter	8%	9%	4%	3%	2%	2%	2%	1%	0%	6%	4%	3%	4%	2%	2%	2%	1%	0%		
	Peripheral venous catheter	1%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%		
	Intra-abdominal / GI tract	15%	16%	16%	22%	15%	19%	17%	17%	8%	12%	16%	16%	20%	18%	18%	18%	18%	12%		
	Respiratory tract	4%	2%	2%	3%	4%	3%	2%	2%	1%	2%	2%	1%	4%	3%	2%	2%	1%	2%		
	Skin or Soft tissue	0%	1%	1%	1%	2%	1%	1%	0%	0%	0%	1%	1%	0%	1%	0%	0%	1%	0%		
	Surgical wound	1%	0%	1%	1%	1%	0%	2%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%		
	Non-surgical wound	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	Urinary tract without catheter	31%	21%	24%	28%	28%	22%	23%	28%	49%	35%	30%	32%	32%	30%	34%	36%	43%	43%		
	Urinary catheter	11%	13%	9%	9%	8%	20%	9%	6%	0%	3%	5%	4%	5%	5%	5%	3%	5%	0%		
	Other source	0%	2%	2%	0%	8%	0%	0%	2%	8%	2%	1%	2%	1%	12%	1%	1%	1%	10%		
Unknown	31%	36%	41%	31%	30%	33%	44%	42%	32%	38%	40%	40%	34%	29%	37%	37%	30%	32%			
Risk factors	Diabetes	1%	2%	6%	4%	3%	3%	3%	2%		3%	4%	4%	3%	4%	3%	4%	2%			
	Haemodialysis	3%	2%	1%	3%	3%	1%	1%	2%		2%	1%	1%	1%	1%	1%	1%	1%			
	Stay in intensive care unit	7%	8%	4%	6%	6%	3%	5%	3%		6%	3%	4%	2%	5%	4%	3%	4%			
	Immunosuppression	20%	14%	7%	12%	16%	7%	11%	11%		14%	7%	9%	10%	13%	14%	12%	8%			
	Malignancy	19%	29%	26%	29%	29%	17%	22%	18%		14%	19%	20%	22%	21%	19%	16%	13%			
	Recent surgery	9%	12%	10%	14%	14%	10%	8%	7%		9%	7%	7%	6%	8%	7%	3%	5%			
	Other	13%	27%	19%	17%	16%	18%	12%	17%		14%	17%	12%	12%	17%	12%	12%	11%			
Clinical feature	Abscess	1%	1%	2%	1%	3%	1%	0%	1%		0%	0%	1%	1%	2%	1%	1%	1%			
	Endocarditis	1%	0%	1%	0%	0%	0%	0%	0%		1%	0%	0%	0%	0%	0%	0%	0%			
	Meningitis	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	1%	0%	0%	0%	0%	0%			
	Neutropaenia	0%	2%	3%	1%	1%	1%	2%	1%	1%	0%	3%	3%	3%	3%	3%	3%	2%	3%		
	Osteomyelitis	1%	0%	0%	0%	0%	0%	0%	1%		0%	0%	0%	0%	0%	0%	0%	0%			
	Septic Arthritis	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%			
	Other	0%	9%	8%	10%	11%	12%	10%	12%		1%	4%	7%	10%	13%	13%	15%	11%			
Antibiotic Exposure	Yes									27%									22%		
	No									9%									15%		
	Unknown									64%									63%		
Total		167	161	180	230	274	203	241	234	273	519	473	594	652	866	668	662	674	819		

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

		VRE										VSE									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Demographic	Gender Female	23%	41%	48%	34%	45%	49%	40%	45%	40%	42%	45%	42%	44%	43%	38%	39%	40%	46%		
	Mean age in years	62.9	59.6	64.8	62.6	59.5	61.2	66.6	66.2	65.5	61.6	64.0	63.5	65.4	62.8	65.9	66.2	65.2	67.3		
Length of Stay	Less than or equal to 2 days	18%	9%	5%	10%	8%	16%	18%	18%	9%	29%	23%	25%	31%	32%	39%	33%	41%	40%		
	Greater than 5 days	75%	76%	76%	77%	87%	73%	70%	76%	81%	48%	46%	48%	45%	56%	54%	52%	47%	48%		
Association	Community	5%	0%	2%	1%	2%	10%	8%	4%	0%	14%	9%	9%	15%	12%	16%	11%	14%	19%		
	HCA: not in reporting hospital	11%	4%	6%	9%	5%	8%	4%	6%	3%	9%	12%	15%	15%	12%	13%	13%	16%	4%		
	HCA: in reporting hospital	80%	89%	85%	83%	92%	81%	82%	86%	87%	65%	61%	64%	56%	70%	63%	62%	58%	62%		
	Unknown	5%	7%	8%	6%	1%	2%	6%	5%	5%	12%	18%	13%	13%	7%	9%	13%	12%	14%		
	Device									31%									16%		
	Implant									1%									0%		
	Procedure									4%									2%		
	Device/Implnt/Proc Unkown									31%									34%		
Not Device/Implnt/Proc Assoc.									32%									47%			
Primary source	Central venous catheter	32%	35%	21%	29%	19%	13%	23%	19%	0%	24%	13%	13%	10%	13%	15%	13%	11%	0%		
	Peripheral venous catheter	2%	0%	2%	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%	0%		
	Intra-abdominal / GI tract	7%	13%	26%	27%	30%	33%	30%	31%	10%	19%	25%	23%	28%	25%	24%	19%	21%	14%		
	Respiratory tract	5%	2%	3%	1%	2%	0%	0%	1%	1%	3%	3%	1%	1%	2%	1%	1%	2%	1%		
	Skin or Soft tissue	2%	2%	3%	1%	2%	2%	0%	2%	0%	3%	0%	4%	2%	1%	2%	2%	2%	0%		
	Surgical wound	0%	0%	0%	0%	1%	0%	1%	1%	4%	2%	1%	1%	0%	1%	1%	0%	1%	1%		
	Non-surgical wound	2%	0%	0%	0%	1%	0%	0%	1%	1%	1%	1%	0%	0%	0%	0%	1%	1%	2%		
	Urinary tract without catheter	2%	2%	2%	3%	2%	3%	4%	4%	1%	7%	4%	8%	6%	4%	5%	6%	7%	7%		
	Urinary catheter	0%	2%	0%	1%	0%	0%	1%	2%	0%	2%	6%	5%	3%	5%	3%	8%	4%	0%		
	Other source	5%	0%	0%	0%	0%	0%	0%	0%	12%	2%	2%	2%	3%	2%	1%	4%	3%	10%		
Unknown	43%	43%	44%	36%	42%	49%	40%	38%	70%	37%	45%	43%	44%	46%	49%	47%	50%	64%			
Risk factors	Diabetes	0%	0%	5%	0%	5%	0%	3%	2%		5%	1%	3%	6%	3%	5%	6%	3%			
	Haemodialysis	7%	9%	2%	9%	6%	0%	4%	4%		7%	5%	2%	4%	4%	3%	2%	2%			
	Stay in intensive care unit	39%	30%	14%	27%	25%	17%	17%	20%		25%	19%	16%	13%	15%	14%	9%	15%			
	Immunosuppression	27%	30%	21%	30%	24%	24%	36%	20%		12%	16%	12%	12%	14%	18%	14%	10%			
	Malignancy	11%	33%	42%	49%	49%	37%	36%	31%		20%	29%	26%	33%	28%	23%	26%	17%			
	Recent surgery	11%	15%	20%	21%	27%	11%	23%	26%		24%	18%	15%	15%	20%	13%	16%	12%			
	Other	18%	24%	18%	13%	14%	22%	17%	14%		22%	11%	21%	18%	18%	10%	13%	19%			
Clinical feature	Abscess	0%	2%	5%	4%	6%	3%	1%	2%		1%	3%	4%	1%	3%	2%	3%	1%			
	Endocarditis	5%	4%	3%	0%	1%	0%	1%	2%		2%	2%	4%	5%	3%	3%	2%	3%			
	Meningitis	0%	0%	0%	0%	1%	2%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%			
	Neutropaenia	0%	9%	12%	8%	7%	8%	9%	1%	13%	2%	2%	4%	2%	1%	3%	3%	4%	3%		
	Osteomyelitis	0%	0%	3%	0%	0%	0%	1%	0%		1%	0%	1%	0%	0%	2%	0%	0%			
	Septic Arthritis	0%	0%	0%	0%	0%	0%	0%	0%		0%	1%	0%	0%	0%	1%	0%	0%			
	Other	0%	2%	6%	9%	7%	8%	8%	4%		1%	4%	8%	9%	11%	9%	13%	9%			
Antibiotic Exposure	Yes								30%									19%			
	No								4%									10%			
	Unknown								66%									72%			
Total		44	46	66	77	84	63	77	84	77	181	184	227	218	245	199	196	198	221		

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

		KPN										PAE									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Demographic	Gender Female	37%	36%	39%	41%	48%	39%	47%	37%	45%	47%	46%	30%	40%	38%	36%	47%	44%	44%		
	Mean age in years	58.3	65.8	63.1	64.0	62.1	64.0	64.1	65.8	66.7	66.3	66.8	68.3	66.2	67.8	69.8	68.9	67.5	69.0		
Length of Stay	Less than or equal to 2 days	28%	39%	35%	49%	45%	42%	44%	49%	51%	32%	25%	34%	34%	48%	54%	53%	54%	68%		
	Greater than 5 days	48%	35%	44%	34%	43%	45%	42%	41%	35%	40%	42%	43%	41%	44%	35%	33%	34%	23%		
Association	Community	16%	12%	18%	25%	18%	15%	20%	16%	24%	9%	14%	8%	9%	13%	16%	19%	21%	32%		
	HCA: not in reporting hospital	12%	26%	18%	16%	15%	10%	14%	18%	6%	17%	12%	22%	22%	21%	14%	21%	17%	3%		
	HCA: in reporting hospital	58%	47%	53%	44%	56%	57%	52%	56%	48%	53%	51%	56%	53%	61%	48%	44%	46%	37%		
	Unknown	14%	15%	11%	14%	11%	18%	14%	10%	17%	21%	23%	15%	16%	5%	22%	16%	15%	23%		
	Device									14%									10%		
	Implant									1%									0%		
	Procedure									1%									4%		
	Device/Implnt/Proc Unknown									27%									31%		
	Not Device/Implnt/Proc Assoc.									57%									55%		
Primary source	Central venous catheter	16%	12%	12%	17%	9%	8%	14%	9%	0%	11%	7%	6%	14%	14%	4%	12%	7%	0%		
	Peripheral venous catheter	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%		
	Intra-abdominal / GI tract	18%	24%	26%	29%	20%	25%	21%	26%	16%	4%	7%	11%	17%	7%	12%	5%	10%	13%		
	Respiratory tract	11%	10%	9%	10%	5%	7%	6%	6%	6%	11%	10%	13%	11%	9%	4%	18%	6%	11%		
	Skin or Soft tissue	0%	3%	0%	1%	1%	1%	0%	0%	0%	6%	3%	3%	2%	5%	7%	4%	6%	0%		
	Surgical wound	5%	0%	1%	1%	2%	0%	1%	0%	0%	0%	3%	3%	1%	0%	4%	0%	0%	1%		
	Non-surgical wound	0%	0%	0%	0%	1%	0%	0%	0%	1%	6%	1%	0%	1%	1%	0%	0%	0%	3%		
	Urinary tract without catheter	10%	8%	13%	12%	9%	12%	14%	13%	26%	11%	9%	3%	8%	13%	6%	7%	15%	27%		
	Urinary catheter	1%	5%	4%	1%	7%	9%	6%	11%	0%	2%	9%	19%	3%	11%	9%	4%	4%	0%		
	Other source	0%	2%	2%	0%	1%	1%	1%	1%	15%	0%	3%	0%	1%	2%	1%	1%	1%	4%		
Unknown	40%	36%	32%	29%	43%	39%	38%	34%	36%	49%	48%	42%	40%	38%	52%	48%	51%	41%			
Risk factors	Diabetes	1%	4%	4%	6%	3%	4%	4%	4%		2%	6%	4%	5%	7%	1%	0%	3%			
	Haemodialysis	2%	1%	1%	1%	3%	0%	0%	3%		0%	0%	0%	3%	1%	3%	3%	3%			
	Stay in intensive care unit	11%	11%	4%	6%	11%	7%	11%	9%		11%	12%	14%	9%	10%	6%	16%	14%			
	Immunosuppression	20%	21%	17%	12%	24%	27%	23%	16%		34%	16%	20%	21%	30%	7%	29%	13%			
	Malignancy	18%	36%	38%	44%	43%	34%	35%	31%		19%	38%	37%	37%	45%	28%	29%	15%			
	Recent surgery	14%	13%	14%	11%	9%	12%	11%	7%		11%	12%	13%	16%	14%	12%	11%	14%			
	Other	23%	17%	14%	14%	14%	11%	12%	9%		6%	19%	9%	14%	18%	7%	22%	17%			
Clinical feature	Abscess	0%	3%	1%	1%	2%	1%	0%	2%		0%	1%	1%	2%	0%	3%	1%	1%			
	Endocarditis	0%	0%	2%	0%	0%	1%	0%	0%		0%	0%	0%	1%	1%	1%	0%	1%			
	Meningitis	0%	0%	0%	0%	0%	1%	0%	1%		0%	0%	0%	0%	0%	0%	0%	0%			
	Neutropaenia	0%	5%	4%	2%	5%	4%	5%	4%	6%	0%	9%	11%	5%	3%	3%	11%	3%	6%		
	Osteomyelitis	0%	0%	0%	0%	0%	0%	1%	0%		0%	1%	1%	0%	0%	0%	0%	0%			
	Septic Arthritis	0%	1%	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%			
	Other	0%	5%	11%	9%	10%	8%	14%	11%		0%	6%	3%	8%	6%	13%	12%	11%			
Antibiotic Exposure	Yes								14%									23%			
	No								12%									8%			
	Unknown								73%									69%			
Total		83	92	114	140	148	137	133	118	139	47	69	79	99	94	69	73	71	71		

Appendix 2. Data Quality Analysis

For 2014

Current version of form: Jan-2014, MS Excel

Participation

21 laboratories in total representing 40% of all EARS-Net isolates
(2 laboratories provided data using an older version of the form)

Consistency

Proportion of records in the core dataset with enhanced data from participants

Proportion of matched records	Number of participants
100%-95%	10
95%-90%	4
<90%	7

Data Completion

Availability of data (usually Y or N, or dates) for key fields

Field name	% records completed
Date of admission	97%
Probable contaminant	88%
Healthcare-association	81%
Device-related	87%
Implant-related	86%
Procedure-related	85%
Source organ site	77%
ICU-acquired	85%
Outcome	96%
Antibiotic exposure	64%