Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

hpsc

Enhanced EARS-Net Surveillance
2017

Key Points

- **Nineteen microbiology laboratories provided enhanced data on 2,546 blood-culture isolates, representing 43% of all isolates reported to EARS-Net in Ireland in 2017. This is the same proportion as recorded for 2016. However, fewer laboratories contributed to the data compared to 2016 (n=21) reflecting a greater level of participation from larger hospitals and a decreased level from some smaller hospitals for 2017**
- **Factors related to *Staphylococcus aureus* bloodstream infections (BSI) such as demographics, length of stay, healthcare-association and primary source for 2017 remained in line with previous years. However, there was an increase in the proportion of MRSA BSI detected five days after admission from 29% in 2016 to 41% in 2017**
- **In 2017, 15% of *S. aureus*, 6% of enterococci, 4% of *Escherichia coli*, 6% of *Klebsiella pneumoniae* and 9% of *Pseudomonas aeruginosa* were reported as device-associated BSI**
- **Data quality has improved since 2014 overall and data consistency for 2017 was similar to 2016, however, availability of data for device-, implant- and procedure-related BSI decreased slightly in 2017. Completion of the antibiotic exposure field increased slightly in 2017 (16%) compared to 2016 (12%)**

In this report

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 Antibiotic Resistance, and integrated reports on hospital Antibiotic Consumption and Hand Hygiene

October 2018

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

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Introduction

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

The enhanced programme aims to guide local and national preventative strategies for antimicrobial resistant infections. Enhanced data demonstrates trends in the association of infection with specific factors over time: community or healthcare-associated, potentially preventable sources of bloodstream infection (e.g., intravenous catheters and urinary catheters). The ultimate aim is to improve overall patient safety.

In addition to the general analysis, this report includes a breakdown of bloodstream infections (BSI) that were categorised as device-associated.

Results

Data from 19 laboratories were available. Enhanced data records collected for 2017 (n = 2,546) represented 43% of all the isolates of the core EARS-Net dataset for the same time period.

Table 1. EARS-Net pathogen, antimicrobial resistance markers, patient age, gender and timing of BSI onset

	Total for 2017	Percent female	Mean age in years	Detected <48 hours after admission	Detected >5 days after admission
Staphylococcus aureus	612	35%	62.1	65%	24%
Meticillin Resistant (MRSA)	100 (16%)	34%	72.3	50%	41%
Meticillin Susceptible (MSSA)	512	35%	60.1	67%	21%
Streptococcus pneumoniae	161	48%	62.4	97%	3%
Penicillin non-Susceptible	19 (12%)	53%	64.0	79%	21%
Penicillin Susceptible	142	47%	62.2	99%	1%
Enterococci	270	39%	66.1	41%	51%
Vancomycin Resistant (VRE)	51 (19%)	39%	60.3	22%	73%
Vancomycin Sensitive (VSE)	219	39%	67.5	46%	47%
Escherichia coli	1221	39%	70.4	78%	18%
Fluoroquinolone Resistant (FQREC)	330 (27%)	43%	73.7	77%	20%
Fluoroquinolone Susceptible (FQSEC)	891	56%	69.2	79%	17%
Klebsiella pneumoniae	170	39%	65.8	61%	35%
Pseudomonas aeruginosa	112	34%	67.0	55%	41%

Main findings

Please see Appendix 1 for a complete breakdown for all organisms. See also table 2 for breakdown by device type. See page 1 for abbreviations.

1. ***S. aureus*** **(Appendix 1A)**
   - Of 612 *S. aureus* BSI reported to enhanced EARS-Net surveillance in 2017, 339 (55%) were categorised as healthcare-associated, and 306 (50%) were categorised as likely acquired in the reporting hospital. A higher percentage of healthcare-associated MRSA (56%) than MSSA (49%) BSI was classified as likely acquired in the reporting hospital. The proportion of *S. aureus* BSI noted as acquired greater than five days has remained stable over the last four years and was 24% for 2017
   - The most common reported primary source for *S. aureus* BSI was non-surgical wound (skin and soft tissue infection) at 21% for MRSA and 20% for MSSA

2. **Pneumococcal BSI (Appendix 1B)**
   - Enhanced surveillance for *Streptococcus pneumoniae* BSI has been discontinued, however, the data for 2017 and previous years are presented in appendix 1B

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

3. **Enterococcal BSI (Appendix 1C)**
   - Of 270 enterococcal BSI reported to enhanced EARS-Net surveillance in 2017 (*Enterococcus faecium* = 155, *E. faecalis* = 115), 194 (72%) were categorised as healthcare-associated; 69% were categorised as likely acquired in the reporting hospital. A higher percentage of healthcare-associated VRE (90%) than VSE (63%) BSI was classified as likely acquired in the reporting hospital

4. ***E. coli* BSI (Appendix 1D)**
   - Of 1,221 *E. coli* BSI reported to Enhanced EARS-Net surveillance in 2017, 474 (39%) were categorised as healthcare-associated. Of these, 374 (31%) were categorised as likely acquired in the reporting hospital. A slightly higher percentage of healthcare-associated fluoroquinolone resistant *E. coli* (38%) than fluoroquinolone susceptible (28%) BSI was classified as likely acquired in the reporting hospital
   - The most common reported primary source for *E. coli* BSI was the urinary tract 43% (47% of FQREC and 42% of FQSEC)

5. ***K. pneumoniae* BSI *(Appendix 1E)***
   - Of 170 *K. pneumoniae* BSI reported to enhanced EARS-Net surveillance in 2017, 92 (54%) were categorised as healthcare-associated. Of these, 81 (48%) were categorised as likely acquired in the reporting hospital. Devices accounted for 6% of *K. pneumoniae* BSI

6. ***P. aeruginosa* BSI *(Appendix 1F)***
   - Of 112 *P. aeruginosa* BSI reported to enhanced EARS-Net surveillance in the first half of 2017, 76 (68%) were categorised as healthcare-associated. Of those, 67 (60%) were categorised as likely acquired in the reporting hospital. Devices accounted for 9% of *P. aeruginosa* BSI

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

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

		S. aureus				MRSA				MSSA			
		2014	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**
Demographic	Gender Female	37%	40%	38%	35%	42%	36%	30%	34%	36%	40%	39%	35%
	Mean age in years	59.4	60.1	62.7	62.1	71.1	69.5	68.1	72.3	56.5	58.1	61.7	60.1
Length of Stay	Less than or equal to 2 days	61%	65%	67%	65%	58%	53%	64%	50%	62%	68%	68%	67%
	Greater than 5 days	26%	25%	22%	24%	32%	38%	29%	41%	25%	22%	21%	21%
Association	Community	34%	29%	39%	38%	25%	24%	25%	22%	36%	30%	41%	41%
	HCA: not in reporting hospital	7%	7%	6%	5%	13%	14%	10%	14%	5%	5%	5%	4%
	HCA: in reporting hospital	50%	47%	47%	50%	50%	57%	54%	56%	50%	45%	45%	49%
	Unknown	10%	17%	9%	7%	13%	5%	10%	8%	9%	20%	9%	7%
	Device	27%	19%	21%	15%	19%	26%	24%	11%	29%	17%	20%	16%
	Implant	4%	3%	1%	3%	4%	4%	0%	4%	4%	3%	1%	2%
	Procedure	3%	6%	3%	2%	2%	9%	2%	4%	4%	5%	4%	2%
	Device/Implnt/Proc Unkown	10%	28%	31%	46%	12%	25%	32%	50%	10%	28%	31%	46%
	Not Device/Implnt/Proc Assoc.	56%	45%	43%	34%	63%	36%	42%	31%	54%	47%	44%	34%
Primary source	Intra-abdominal / GI tract	1%	0%	0%	1%	0%	0%	0%	0%	1%	0%	1%	1%
	Respiratory tract	7%	7%	5%	7%	11%	8%	9%	13%	6%	6%	4%	6%
	Surgical wound	0%	2%	0%	0%	0%	1%	0%	0%	0%	2%	0%	0%
	Non-surg. wound / Skin tisue	26%	25%	20%	20%	22%	32%	25%	21%	27%	24%	20%	20%
	Urinary tract without catheter	3%	2%	2%	3%	6%	5%	1%	4%	2%	2%	2%	3%
	Other source	19%	18%	13%	17%	18%	13%	6%	15%	20%	19%	14%	17%
	Unknown	45%	46%	59%	52%	44%	40%	58%	47%	45%	47%	59%	53%
Antibiotic Exposure	Yes	25%	24%	18%	23%	27%	32%	20%	24%	25%	22%	18%	23%
	No	6%	2%	0%	0%	7%	2%	0%	0%	6%	2%	0%	0%
	Unknown	69%	74%	82%	77%	66%	66%	80%	76%	69%	76%	82%	77%
Total		**515**	**562**	**628**	**612**	**101**	**97**	**96**	**100**	**414**	**465**	**532**	**512**

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

		S. pneumoniae				PNSP				PSSP			
		2014	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**
Demographic	Gender Female	52%	47%	48%	48%	52%	38%	28%	53%	51%	49%	51%	47%
	Mean age in years	60.1	62.4	63.7	62.4	53.9	60.2	71.3	64.0	61.3	62.9	62.6	62.2
Length of Stay	Less than or equal to 2 days	94%	95%	92%	97%	90%	96%	89%	79%	95%	95%	92%	99%
	Greater than 5 days	2%	5%	6%	3%	5%	4%	6%	21%	2%	5%	6%	1%
Association	Community	64%	56%	65%	75%	48%	42%	50%	53%	67%	60%	67%	78%
	HCA: not in reporting hospital	2%	4%	7%	4%	5%	4%	17%	5%	1%	4%	5%	4%
	HCA: in reporting hospital	7%	5%	10%	6%	19%	4%	22%	21%	5%	5%	9%	4%
	Unknown	28%	35%	18%	16%	29%	50%	11%	21%	28%	31%	19%	15%
	Device	1%	0%	1%	0%	5%	0%	0%	0%	0%	0%	1%	0%
	Implant	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
	Procedure	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
	Device/Implnt/Proc Unkown	27%	52%	51%	60%	19%	75%	44%	63%	27%	47%	51%	59%
	Not Device/Implnt/Proc Assoc.	73%	48%	48%	40%	76%	25%	56%	37%	72%	53%	47%	41%
Primary source	Intra-abdominal / GI tract	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Respiratory tract	54%	59%	56%	68%	57%	46%	67%	53%	53%	62%	55%	70%
	Surgical wound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Non-surg. wound / Skin tisue	1%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
	Urinary tract without catheter	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
	Other source	13%	11%	6%	7%	10%	8%	6%	5%	14%	12%	6%	8%
	Unknown	33%	30%	37%	25%	29%	46%	28%	42%	33%	25%	39%	23%
Antibiotic Exposure	Yes	17%	7%	6%	12%	5%	4%	0%	26%	20%	8%	7%	10%
	No	9%	0%	1%	0%	19%	0%	6%	0%	7%	0%	1%	0%
	Unknown	73%	93%	93%	88%	76%	96%	94%	74%	73%	92%	92%	90%
Total		**132**	**124**	**147**	**161**	**21**	**24**	**18**	**19**	**111**	**100**	**129**	**142**

Appendix 1C. Breakdown for Enterococci, **VRE** – Vancomycin Resistant Enterococci and **VSE** – Vancomycin Sensitive Enterococci

		Enterococci				VRE				VSE			
		2014	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**
Demographic	Gender Female	44%	40%	39%	39%	41%	36%	39%	39%	46%	41%	40%	39%
	Mean age in years	66.5	65.2	65.6	66.1	65.6	62.0	65.7	60.3	66.8	66.5	65.6	67.5
Length of Stay	Less than or equal to 2 days	33%	35%	34%	41%	9%	16%	4%	22%	41%	43%	43%	46%
	Greater than 5 days	56%	55%	58%	51%	81%	75%	84%	73%	47%	47%	49%	47%
Association	Community	14%	12%	21%	18%	0%	3%	7%	4%	19%	16%	25%	21%
	HCA: not in reporting hospital	4%	4%	4%	3%	3%	3%	1%	4%	4%	5%	5%	3%
	HCA: in reporting hospital	70%	71%	68%	69%	92%	93%	91%	90%	62%	62%	61%	63%
	Unknown	12%	13%	7%	10%	5%	3%	0%	2%	14%	17%	9%	12%
	Device	23%	16%	21%	6%	38%	24%	30%	6%	18%	13%	18%	5%
	Implant	1%	3%	0%	0%	1%	1%	0%	0%	0%	3%	0%	0%
	Procedure	3%	2%	2%	1%	4%	1%	6%	4%	3%	2%	1%	1%
	Device/Implnt/Proc Unkown	28%	46%	42%	70%	21%	43%	27%	65%	31%	47%	48%	71%
	Not Device/Implnt/Proc Assoc.	45%	34%	34%	23%	36%	31%	37%	25%	48%	35%	33%	23%
Primary source	Intra-abdominal / GI tract	13%	15%	10%	10%	10%	23%	13%	14%	13%	12%	8%	9%
	Respiratory tract	1%	2%	1%	1%	1%	3%	0%	0%	1%	2%	1%	2%
	Surgical wound	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
	Non-surg. wound / Skin tisue	4%	3%	4%	4%	5%	5%	6%	8%	4%	3%	3%	3%
	Urinary tract without catheter	7%	8%	10%	7%	1%	4%	10%	2%	8%	9%	10%	8%
	Other source	11%	18%	15%	14%	10%	16%	15%	6%	11%	19%	15%	16%
	Unknown	65%	53%	61%	63%	72%	49%	55%	71%	63%	55%	62%	62%
Antibiotic Exposure	Yes	21%	15%	7%	9%	28%	20%	10%	8%	19%	13%	6%	9%
	No	5%	2%	0%	0%	4%	1%	0%	0%	5%	3%	0%	0%
	Unknown	74%	83%	93%	91%	68%	79%	90%	92%	76%	84%	94%	90%
Total		**304**	**275**	**271**	**270**	**78**	**80**	**67**	**51**	**226**	**195**	**204**	**219**

Appendix 1D. Breakdown for *Escherichia coli*, **FQREC** – Fluoroquinolone Resistant *E. coli* and **FQSEC** – Fluoroquinolone Sensitive *E. coli*

		Escherichia coli				FQREC				FQSEC			
		2014	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**
Demographic	Gender Female	54%	56%	54%	52%	45%	46%	47%	43%	57%	59%	56%	56%
	Mean age in years	70.4	68.6	69.0	70.4	76.2	73.5	73.4	73.7	68.4	67.0	67.6	69.2
Length of Stay	Less than or equal to 2 days	74%	77%	78%	78%	73%	76%	72%	77%	74%	78%	79%	79%
	Greater than 5 days	20%	17%	18%	18%	22%	19%	21%	20%	19%	17%	17%	17%
Association	Community	39%	39%	52%	48%	31%	29%	41%	35%	42%	42%	56%	53%
	HCA: not in reporting hospital	6%	7%	8%	8%	12%	12%	14%	15%	4%	5%	6%	5%
	HCA: in reporting hospital	33%	30%	29%	31%	39%	37%	36%	38%	31%	28%	27%	28%
	Unknown	22%	25%	10%	13%	19%	22%	8%	12%	23%	26%	11%	13%
	Device	9%	7%	8%	4%	16%	11%	11%	7%	6%	6%	7%	3%
	Implant	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
	Procedure	4%	3%	3%	2%	5%	5%	6%	4%	3%	2%	2%	2%
	Device/Implnt/Proc Unkown	19%	39%	37%	57%	19%	40%	30%	57%	19%	39%	39%	57%
	Not Device/Implnt/Proc Assoc.	68%	50%	52%	36%	60%	43%	53%	31%	71%	53%	52%	38%
Primary source	Intra-abdominal / GI tract	10%	8%	5%	5%	6%	5%	3%	3%	11%	9%	5%	5%
	Respiratory tract	2%	2%	1%	3%	1%	3%	2%	3%	2%	1%	1%	3%
	Surgical wound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Non-surg. wound / Skin tisue	1%	1%	0%	1%	1%	2%	0%	1%	0%	1%	0%	1%
	Urinary tract without catheter	44%	43%	45%	43%	49%	49%	48%	47%	43%	41%	44%	42%
	Other source	11%	13%	12%	12%	10%	11%	11%	13%	12%	13%	13%	12%
	Unknown	32%	34%	36%	36%	32%	30%	36%	33%	32%	35%	36%	37%
Antibiotic Exposure	Yes	23%	8%	9%	13%	27%	12%	16%	14%	21%	6%	7%	13%
	No	6%	3%	0%	0%	4%	3%	0%	0%	6%	3%	1%	0%
	Unknown	72%	89%	90%	87%	69%	85%	84%	86%	72%	91%	92%	87%
Total		**1088**	**1257**	**1267**	**1221**	**272**	**305**	**307**	**330**	**816**	**952**	**960**	**891**

Appendix 1E. Breakdown for **KPN** – *Klebsiella pneumonia*

		KPN			
		2014	**2015**	**2016**	**2017**
Demographic	Gender Female	44%	37%	38%	39%
	Mean age in years	65.9	67.7	67.0	65.8
Length of Stay	Less than or equal to 2 days	51%	60%	60%	61%
	Greater than 5 days	36%	33%	33%	35%
Association	Community	23%	25%	35%	36%
	HCA: not in reporting hospital	6%	5%	7%	6%
	HCA: in reporting hospital	54%	52%	48%	48%
	Unknown	17%	18%	10%	10%
	Device	19%	15%	15%	6%
	Implant	1%	1%	1%	0%
	Procedure	1%	4%	2%	1%
	Device/Implnt/Proc Unkown	15%	36%	40%	60%
	Not Device/Implnt/Proc Assoc.	65%	44%	42%	32%
Primary source	Intra-abdominal / GI tract	15%	12%	2%	5%
	Respiratory tract	6%	8%	8%	5%
	Surgical wound	0%	1%	0%	0%
	Non-surg. wound / Skin tisue	1%	2%	1%	1%
	Urinary tract without catheter	26%	22%	24%	28%
	Other source	18%	17%	18%	16%
	Unknown	35%	38%	47%	45%
Antibiotic Exposure	Yes	14%	6%	8%	17%
	No	4%	2%	0%	1%
	Unknown	82%	92%	92%	82%
Total		**142**	**179**	**168**	**170**

Appendix 1F. Breakdown for **PAE** – *Pseudomonas aeruginosa*

		PAE			
		2014	**2015**	**2016**	**2017**
Demographic	Gender Female	44%	41%	36%	34%
	Mean age in years	69.0	69.3	68.2	67.0
Length of Stay	Less than or equal to 2 days	68%	60%	59%	55%
	Greater than 5 days	23%	35%	32%	41%
Association	Community	34%	13%	23%	22%
	HCA: not in reporting hospital	4%	6%	4%	8%
	HCA: in reporting hospital	39%	61%	59%	60%
	Unknown	23%	20%	15%	10%
	Device	13%	22%	23%	9%
	Implant	0%	0%	1%	0%
	Procedure	4%	4%	2%	2%
	Device/Implnt/Proc Unkown	21%	41%	38%	64%
	Not Device/Implnt/Proc Assoc.	62%	32%	36%	25%
Primary source	Intra-abdominal / GI tract	13%	4%	5%	5%
	Respiratory tract	11%	9%	14%	12%
	Surgical wound	0%	0%	0%	1%
	Non-surg. wound / Skin tisue	6%	2%	9%	4%
	Urinary tract without catheter	27%	19%	18%	13%
	Other source	4%	7%	3%	5%
	Unknown	39%	59%	51%	60%
Antibiotic Exposure	Yes	23%	10%	8%	11%
	No	4%	0%	0%	0%
	Unknown	73%	90%	92%	89%
Total		**71**	**94**	**111**	**112**

Appendix 2. Data Quality Analysis

Nineteen microbiology laboratories provided enhanced data on 2,546 blood-culture isolates, representing 43% of all isolates reported to EARS-Net in Ireland for 2017, which is the same proportion as recorded for 2016, however, fewer laboratories have contributed to the data compared to 2016 (n = 21). This reflects a greater level of participation from larger hospitals and a decreased level from some smaller hospitals for 2017.

Data quality has improved since 2014 overall and data consistency for 2017 being similar to 2016, however, availability of data for device-, implant- and procedure-related BSI decreased slightly in 2017. Completion of the antibiotic exposure field increased slightly in 2017 (16%) compared to 2016 (12%).

2017 Full Year

Participation

Participation metric	Value	2016 data
Number of laboratories	19	21
Proportion of total EARS-Net	42.8%	42.8%

Consistency

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

Proportion of matched records	Number of participants	Number of participants
100%-95%	14	13
95%-90%	1	2
<90%	4	6

Data Completion

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

Field name	% records completed	% records completed
Date of admission	99%	99%
Probable contaminant	63%	68%
Healthcare-association	87%	89%
Device-related	61%	67%
Implant-related	47%	65%
Procedure-related	47%	65%
Source organ site	79%	76%
ICU-acquired	51%	47%
Outcome	98%	96%
Antibiotic exposure	16%	12%