

Austria

National institutions/organisations participating in EARS-Net
 Federal Ministry of Health and Women's Affairs, www.bmgf.gv.at
 Medical University Vienna, www.meduniwien.ac.at
 Ordensklinikum Linz, Elisabethinen, www.ordensklinikum.at

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Austria 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	90	90	Unknown	Unknown	Unknown
Geographical representativeness	High	High	Unknown	High	High
Hospital representativeness	Unknown	Unknown	Unknown	High	High
Blood culture sets/1000 patient days	15.7	16.2	Unknown	24.2	Unknown
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Austria 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	95	100	100	97	95
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

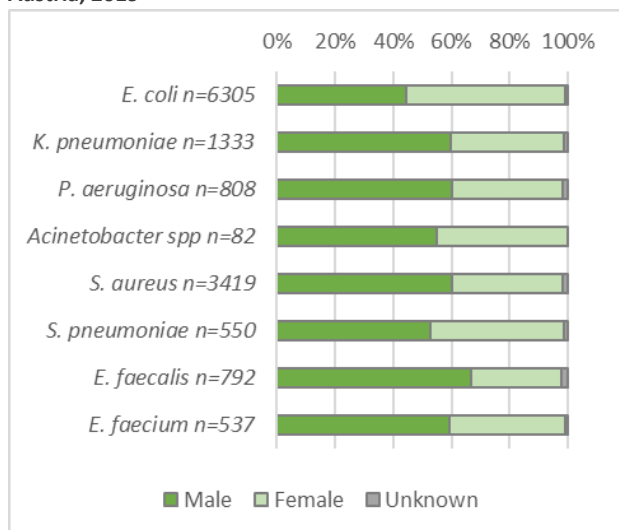
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Austria 2015-2019

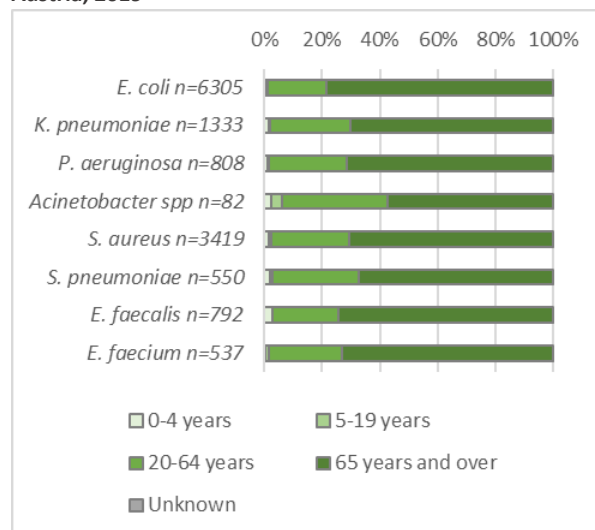
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	39	4919	9	39	5285	9	39	5381	9	38	5686	9	38	6305	8
<i>K. pneumoniae</i>	39	1065	14	38	1247	14	39	1152	14	38	1228	14	38	1333	14
<i>P. aeruginosa</i>	39	680	17	39	697	17	39	725	16	38	737	16	38	808	13
<i>Acinetobacter</i> spp.	21	64	17	24	81	17	25	75	11	28	95	12	23	82	13
<i>S. aureus</i>	39	2815	13	39	3057	14	39	3162	14	38	3310	13	38	3419	12
<i>S. pneumoniae</i>	38	450	21	39	457	24	39	513	19	38	567	18	37	550	18
<i>E. faecalis</i>	39	685	16	38	677	17	38	769	19	38	837	17	37	792	16
<i>E. faecium</i>	38	485	31	38	535	28	38	573	31	35	524	28	34	537	33

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Austria, 2019



Proportion of isolates by patient age group, by microorganism, Austria, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Austria 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	4880	49.9	5094	50.5	5188	49.5	5456	50.7	6042	46.3	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	4900	9.7	5267	10.0	5129	9.6	5672	10.2	6106	9.3	
	Carbapenem (imipenem/meropenem) resistance	4760	0.0	5134	0.0	5227	0.0	5564	0.1	5935	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	4808	20.0	5278	19.8	5367	20.5	5679	21.9	6111	18.2	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	4884	7.0	5248	7.8	5318	7.7	5616	8.2	6102	6.9	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	4785	2.9	5235	3.5	5071	3.3	5598	3.6	6072	2.7	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1050	8.4	1245	9.6	1072	8.6	1221	8.4	1326	10.3	
	Carbapenem (imipenem/meropenem) resistance	1022	0.8	1198	0.7	1109	1.0	1184	1.0	1296	1.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1029	11.7	1246	9.8	1147	14.2	1221	13.2	1327	15.7	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	959	4.8	1157	4.8	1141	4.8	1214	4.8	1319	5.5	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	936	3.3	1156	3.5	1062	3.0	1203	3.1	1312	3.0	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	659	10.5	674	11.4	628	10.4	650	10.6	665	9.5	
	Ceftazidime resistance	577	9.9	628	11.3	620	8.7	729	10.3	781	8.5	
	Carbapenem (imipenem/meropenem) resistance	680	12.2	696	12.9	725	13.9	736	12.8	786	13.4	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	659	10.3	694	7.2	721	12.3	736	14.0	805	10.7	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	678	6.3	692	6.1	717	5.0	729	6.3	784	3.8	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	680	6.6	697	6.5	724	6.1	736	6.7	787	5.5	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	64	9.4	81	12.3	75	6.7	91	4.4	81	7.4	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	61	16.4	81	16.0	74	9.5	91	7.7	82	9.8	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	63	6.3	81	16.0	75	9.3	92	8.7	82	7.3	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	61	4.9	81	8.6	74	6.8	88	4.5	81	6.2	
<i>S. aureus</i>	MRSA	2785	7.5	3053	7.1	3158	5.9	3307	6.4	3323	5.6	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	444	5.6	440	3.4	463	6.0	523	6.3	458	6.8	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	439	8.4	455	8.6	507	10.8	562	11.6	547	12.4	>
	Combined penicillin non-wild-type and resistance to macrolides	433	2.5	438	1.4	457	3.3	519	3.3	455	3.5	
<i>E. faecalis</i>	High-level gentamicin resistance	501	33.7	447	33.3	474	33.1	417	28.3	285	22.8	<
<i>E. faecium</i>	Vancomycin resistance	483	3.1	533	4.3	570	3.2	524	2.1	537	3.2	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Belgium

National institutions/organisations participating in EARS-Net:
 Sciensano, www.sciensano.be

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Belgium 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	24	29	30		
Laboratories collecting <i>S. pneumoniae</i>				86	87
Laboratories collecting others species				30	26
Geographical representativeness	High	High	High		
Laboratories collecting <i>S. pneumoniae</i>				High	High
Laboratories collecting others species				Medium	Medium
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	99.1*	87.5*
Patient and isolate representativeness	High	High	High	High	High

*Not including *S. pneumoniae* network

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Belgium 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	87	100	90	82	91
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	67	65	68	91	100*

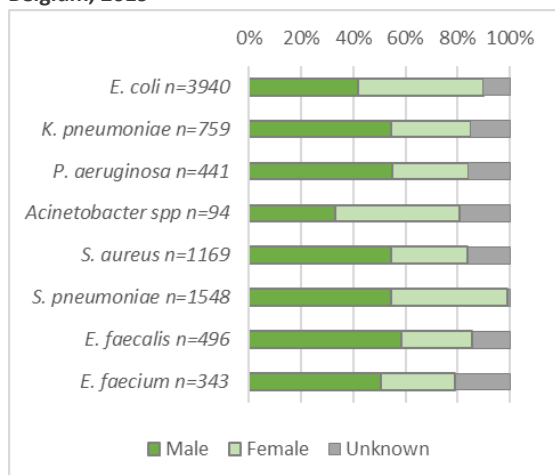
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Belgium 2015-2019

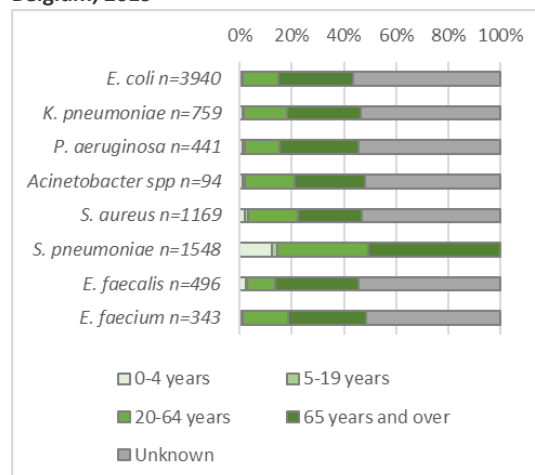
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	25	2685	Unknown	31	3856	Unknown	32	4676	Unknown	32	4675	Unknown	27	3940	Unknown
<i>K. pneumoniae</i>	24	406	Unknown	28	669	Unknown	31	803	Unknown	31	956	Unknown	26	759	Unknown
<i>P. aeruginosa</i>	25	263	Unknown	31	366	Unknown	31	474	Unknown	30	490	Unknown	27	441	Unknown
<i>Acinetobacter</i> spp.	8	26	Unknown	18	79	Unknown	21	131	Unknown	26	134	Unknown	23	94	Unknown
<i>S. aureus</i>	25	994	Unknown	31	1368	Unknown	31	1531	Unknown	31	1750	Unknown	27	1169	Unknown
<i>S. pneumoniae</i>	1	1361	Unknown	97	1327	Unknown	91	1472	23	88	1526	Unknown	89	1548	Unknown
<i>E. faecalis</i>	25	386	Unknown	30	465	Unknown	31	551	Unknown	31	615	Unknown	26	496	Unknown
<i>E. faecium</i>	23	164	Unknown	27	289	Unknown	30	418	Unknown	30	441	Unknown	25	343	Unknown

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Belgium, 2019



Proportion of isolates by patient age group, by microorganism, Belgium, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Belgium 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	2674	58.0	3736	58.0	4669	57.5	4445	55.8	3601	56.5	<#
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	2593	9.7	3737	10.5	4672	9.7	4644	9.0	3937	10.0	
	Carbapenem (imipenem/meropenem) resistance	2588	0.0	3845	0.1	4672	0.0	4641	0.1	3926	0.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	2565	26.6	3854	24.5	4382	23.8	4211	21.8	3925	19.1	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	2286	8.4	3499	8.4	3769	8.1	3822	7.4	3922	6.9	<#
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	2285	3.5	3496	3.8	3765	3.5	3809	3.1	3920	3.0	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	406	19.7	669	22.9	803	19.3	935	21.4	759	19.5	
	Carbapenem (imipenem/meropenem) resistance	389	0.5	669	2.4	791	1.1	935	1.4	757	1.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	379	22.7	669	23.6	803	23.7	932	22.6	757	19.8	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	354	11.6	637	13.8	633	12.5	747	12.4	755	11.4	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	353	9.3	637	9.3	633	8.5	742	9.8	755	8.7	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	244	8.2	318	9.7	438	10.5	430	10.0	439	12.1	
	Ceftazidime resistance	226	6.2	320	7.8	431	7.2	441	7.5	427	8.2	
	Carbapenem (imipenem/meropenem) resistance	256	3.9	365	9.6	474	8.2	487	7.4	440	10.7	>#
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	261	11.1	366	14.5	430	10.5	451	14.0	440	14.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	218	6.0	327	11.0	377	7.7	406	8.4	438	7.1	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	260	4.6	366	6.3	439	6.6	454	5.3	440	5.9	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	24	0.0	78	2.6	131	6.9	132	3.8	94	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	26	0.0	78	7.7	130	10.8	134	12.7	93	8.6	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	15	0.0	66	1.5	99	13.1	122	7.4	85	3.5	N/A
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	13	0.0	64	0.0	98	7.1	120	3.3	84	0.0	N/A
<i>S. aureus</i>	MRSA	913	12.3	1364	12.2	1511	8.5	1735	9.1	1168	6.7	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	1361	0.6	1327	0.4	1472	0.2	1526	0.1	1548	9.7	***
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	1361	18.6	1327	15.7	1472	15.1	1526	15.2	1548	15.7	***
	Combined penicillin non-wild-type and resistance to macrolides	1361	0.4	1327	0.3	1472	0.1	1526	0.1	1548	5.7	***
<i>E. faecalis</i>	High-level gentamicin resistance	249	13.3	328	19.8	304	16.4	390	12.3	363	16.8	
<i>E. faecium</i>	Vancomycin resistance	163	0.6	289	1.7	417	5.5	436	1.8	343	0.6	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. Prior to 2019, Belgium reported isolates with MICs between 0.06 and 2 mg/L as S and not I. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

*** Due to changes over time in the applied breakpoints trend analyses have not been carried out.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Bulgaria

National institutions/organisations participating in EARS-Net:
National Center of Infectious and Parasitic Diseases

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Bulgaria 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	30	30	30	46	45
Geographical representativeness	Medium	Medium	Medium	Medium	Medium
Hospital representativeness	Poor	Poor	Poor	Poor	Medium
Blood culture sets/1000 patient days	8.2	7.2	8.3	8.5	8.6
Patient and isolate representativeness	High	High	High	Medium	Medium

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Bulgaria 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	91	95	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	5	100	95	100	100*

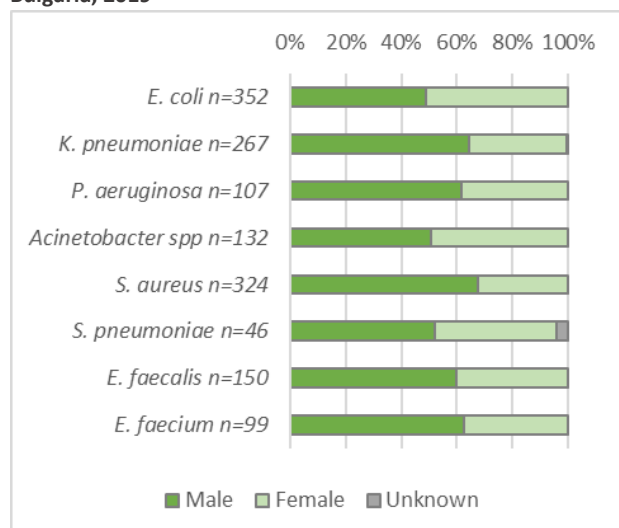
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Bulgaria 2015-2019

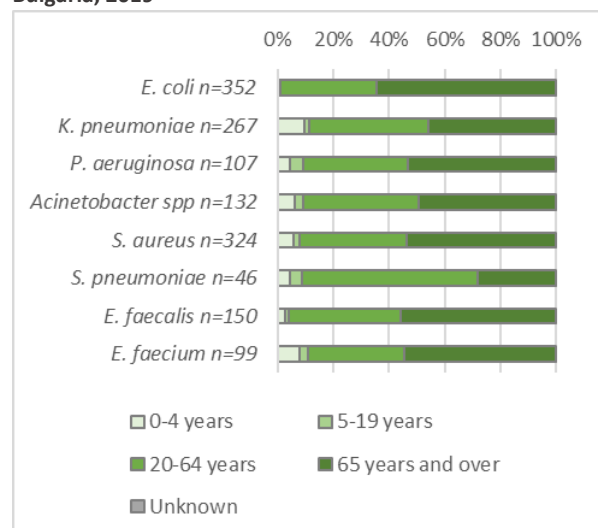
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	19	205	20	20	241	15	20	247	20	22	292	22	23	352	23
<i>K. pneumoniae</i>	16	96	34	17	161	41	18	169	41	21	193	47	20	267	53
<i>P. aeruginosa</i>	13	55	24	12	56	41	16	71	28	18	90	36	16	107	40
<i>Acinetobacter</i> spp.	18	133	65	15	106	52	15	92	64	19	110	66	15	132	60
<i>S. aureus</i>	20	222	22	18	231	22	18	227	25	22	313	29	23	324	23
<i>S. pneumoniae</i>	10	36	28	13	33	18	12	29	38	14	42	17	14	46	35
<i>E. faecalis</i>	19	113	37	17	114	26	17	133	28	20	150	34	20	150	35
<i>E. faecium</i>	13	43	42	12	45	53	17	84	42	20	91	49	17	99	31

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Bulgaria, 2019



Proportion of isolates by patient age group, by microorganism, Bulgaria, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Bulgaria 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	143	66.4	186	78.0	203	73.9	287	66.6	352	63.4	<#
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	205	38.5	238	41.6	247	41.3	292	38.7	352	38.6	
	Carbapenem (imipenem/meropenem) resistance	182	0.0	224	0.9	247	0.0	292	1.4	352	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	204	35.3	237	42.2	247	42.1	292	41.8	352	38.6	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	182	19.8	210	34.8	229	36.2	275	28.4	352	24.4	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	182	12.6	204	22.1	229	24.9	275	19.6	352	19.0	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	96	75.0	160	72.5	169	76.3	193	77.7	267	75.7	
	Carbapenem (imipenem/meropenem) resistance	95	3.2	159	4.4	169	12.4	193	21.2	267	27.0	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	96	37.5	160	55.6	169	59.8	193	62.7	267	60.7	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	84	59.5	135	64.4	168	63.1	191	59.2	267	57.3	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	84	28.6	133	45.9	168	50.0	191	47.6	267	44.9	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	50	28.0	55	40.0	69	33.3	89	32.6	107	31.8	
	Ceftazidime resistance	52	26.9	54	38.9	71	38.0	90	20.0	107	30.8	
	Carbapenem (imipenem/meropenem) resistance	55	25.5	56	30.4	71	25.4	90	25.6	107	25.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	55	36.4	56	35.7	71	28.2	90	30.0	107	29.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	47	27.7	39	48.7	71	28.2	90	24.4	107	31.8	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	55	29.1	56	35.7	71	26.8	90	25.6	107	30.8	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	130	73.8	103	74.8	92	80.4	110	74.5	132	72.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	131	78.6	106	67.9	92	95.7	110	78.2	132	74.2	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	116	74.1	79	81.0	92	89.1	110	73.6	132	78.0	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	112	66.1	76	72.4	92	78.3	110	66.4	132	69.7	
<i>S. aureus</i>	MRSA	222	13.1	231	14.3	227	13.7	313	17.6	324	14.8	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	35	22.9	33	27.3	29	27.6	42	9.5	46	8.7	<
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	33	18.2	32	21.9	29	27.6	42	16.7	46	30.4	
	Combined penicillin non-wild-type and resistance to macrolides	32	12.5	32	9.4	29	17.2	42	2.4	46	8.7	
<i>E. faecalis</i>	High-level gentamicin resistance	100	42.0	98	46.9	133	43.6	150	39.3	150	37.3	
<i>E. faecium</i>	Vancomycin resistance	41	14.6	44	18.2	84	19.0	91	9.9	99	12.1	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Croatia

National institutions/organisations participating in EARS-Net:
 Reference Center for Antimicrobial Resistance Surveillance
 Ministry of Health Zagreb University Hospital for Infectious Diseases (Dr. Fran Mihaljević)

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Croatia 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	78	78	80	80	Unknown
Geographical representativeness	High	High	High	High	Unknown
Hospital representativeness	Unknown	Unknown	Unknown	High	Unknown
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	Unknown	Unknown
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	Unknown

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Croatia 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	91	94	94	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

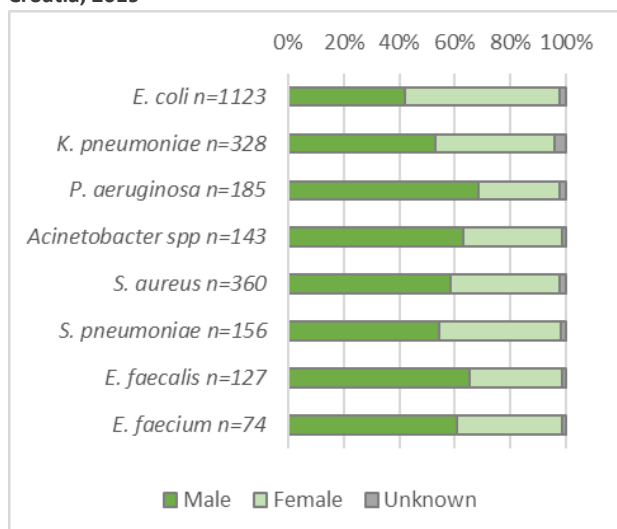
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Croatia 2015-2019

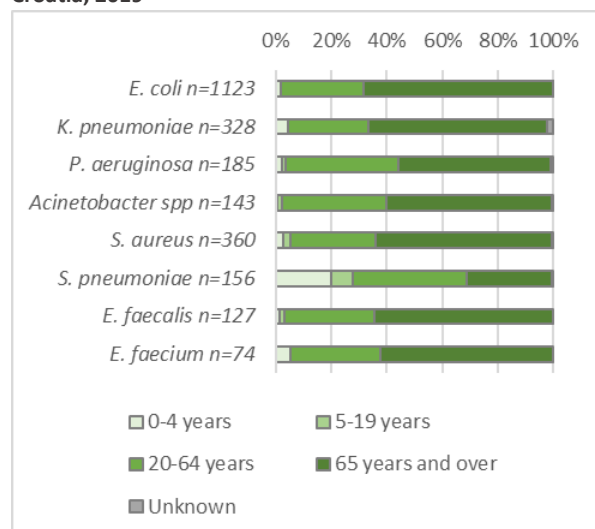
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	18	1046	5	18	1045	6	19	1160	6	19	1216	5	19	1123	8
<i>K. pneumoniae</i>	17	380	17	17	323	19	19	313	18	19	332	14	17	328	14
<i>P. aeruginosa</i>	17	257	11	16	260	23	17	238	17	17	200	16	15	185	15
<i>Acinetobacter spp.</i>	17	200	27	14	182	41	17	208	42	14	155	26	16	143	31
<i>S. aureus</i>	16	488	12	18	458	12	18	520	16	18	458	11	15	360	11
<i>S. pneumoniae</i>	15	126	7	17	155	22	16	130	13	17	146	9	16	156	20
<i>E. faecalis</i>	13	205	13	15	179	12	17	171	11	16	145	12	14	127	16
<i>E. faecium</i>	14	93	18	15	104	17	12	89	12	11	71	13	11	74	19

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Croatia, 2019



Proportion of isolates by patient age group, by microorganism, Croatia, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Croatia 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	1042	55.3	1043	57.3	1135	58.8	1214	57.7	1108	57.1	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1046	12.5	1045	14.7	1148	16.5	1168	14.8	1085	15.9	>
	Carbapenem (imipenem/meropenem) resistance	1046	0.0	1045	0.0	1132	0.0	1190	0.0	1090	0.2	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1038	24.0	1041	27.9	1150	28.2	1199	30.0	1108	27.3	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1008	12.7	1027	15.7	1154	16.6	1210	14.9	1112	14.8	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1000	6.9	1023	9.4	1133	9.4	1150	9.2	1064	9.2	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	380	46.8	321	48.6	309	41.7	318	44.3	317	53.0	
	Carbapenem (imipenem/meropenem) resistance	380	2.4	323	0.0	302	0.0	325	2.2	325	12.0	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	380	48.7	318	43.4	309	40.8	327	48.6	318	57.9	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	380	43.2	316	36.1	311	30.9	330	36.4	325	42.8	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	380	32.4	309	27.5	305	23.0	312	28.2	312	38.1	
	<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	249	24.5	252	18.7	234	16.2	196	11.2	182	14.3
Ceftazidime resistance		248	18.5	240	20.8	231	19.5	195	17.9	173	20.2	
Carbapenem (imipenem/meropenem) resistance		257	38.5	260	42.3	238	30.7	199	27.6	183	26.2	<
Fluoroquinolone (ciprofloxacin/levofloxacin) resistance		256	35.2	259	37.5	237	32.9	200	29.0	181	29.8	
Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance		256	34.0	260	33.5	237	26.6	199	21.6	183	20.2	<
Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)		257	28.0	260	31.9	238	21.4	200	19.0	184	17.4	<
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	200	89.0	181	94.5	208	96.2	155	95.5	143	92.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	196	92.3	176	94.9	204	98.0	155	96.1	142	93.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	197	88.3	182	83.0	206	84.0	153	91.5	140	92.1	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	193	87.0	175	81.1	203	83.7	153	90.8	139	91.4	>#
<i>S. aureus</i>	MRSA	486	24.5	458	25.3	520	28.5	458	26.4	358	24.9	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	126	19.0	155	21.9	129	22.5	144	18.1	154	20.1	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	126	19.0	154	33.8	127	36.2	143	32.2	154	29.9	
	Combined penicillin non-wild-type and resistance to macrolides	126	7.9	154	14.9	126	15.9	141	11.3	152	13.8	
<i>E. faecalis</i>	High-level gentamicin resistance	203	35.5	179	33.0	171	33.3	143	33.6	125	24.0	
<i>E. faecium</i>	Vancomycin resistance	93	25.8	104	22.1	89	19.1	71	25.4	74	25.7	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Cyprus

National institutions/organisations participating in EARS-Net:
Microbiology Department, Nicosia General Hospital

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Cyprus 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	85	85	85	85	35
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	41.4	46.2	44.9	51.1	56.9
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Cyprus 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	80	100	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	0	0	20	20	100*

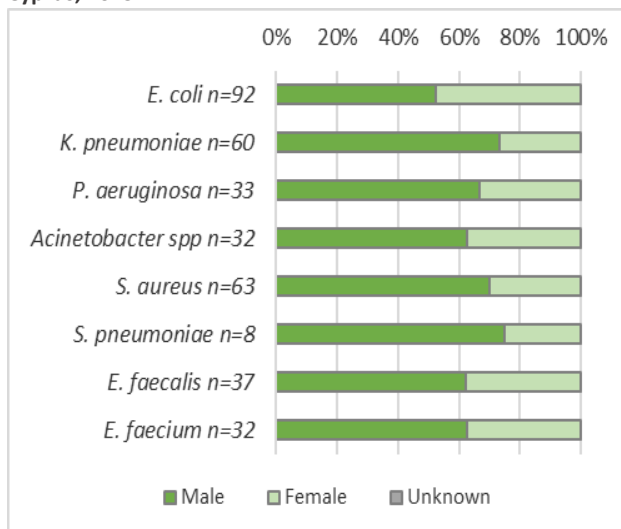
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Cyprus 2015-2019

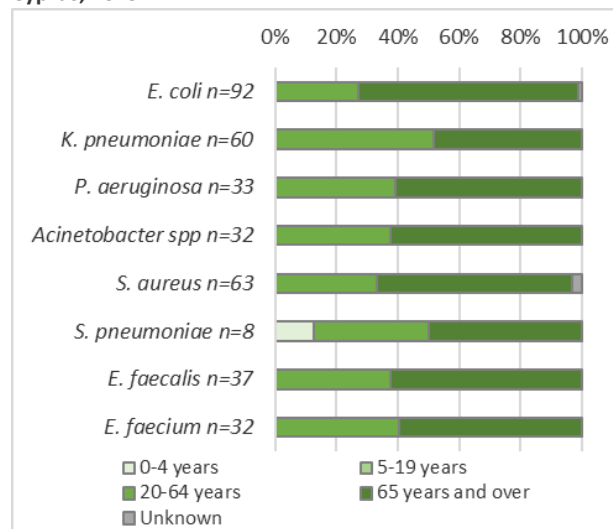
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	5	123	12	5	149	16	5	156	15	4	151	19	1	92	16
<i>K. pneumoniae</i>	5	62	43	5	75	30	5	71	33	4	87	33	1	60	39
<i>P. aeruginosa</i>	5	43	47	5	64	40	4	53	33	4	55	39	1	33	25
<i>Acinetobacter spp.</i>	5	61	66	5	29	69	5	50	46	3	57	53	1	32	69
<i>S. pneumoniae</i>	4	7	14	4	10	11	4	19	37	3	16	8	1	8	0
<i>S. aureus</i>	5	145	22	5	141	21	5	129	26	4	117	17	1	63	23
<i>E. faecalis</i>	5	58	49	5	39	45	5	70	30	4	87	34	1	37	20
<i>E. faecium</i>	5	28	50	4	41	28	5	41	26	4	45	37	1	32	38

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Cyprus, 2019



Proportion of isolates by patient age group, by microorganism, Cyprus, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Cyprus 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	123	68.3	149	69.1	156	65.4	151	64.9	92	71.7	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	123	28.5	149	30.2	156	30.8	151	37.1	92	20.7	
	Carbapenem (imipenem/meropenem) resistance	123	0.0	149	0.0	156	1.3	150	2.0	92	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	123	45.5	149	47.0	156	42.9	151	42.4	92	43.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	123	13.8	149	16.1	156	21.8	151	19.9	92	10.9	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	123	9.8	149	11.4	156	15.4	151	14.6	92	6.5	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	62	43.5	75	30.7	71	46.5	87	48.3	60	48.3	
	Carbapenem (imipenem/meropenem) resistance	62	12.9	75	10.7	71	15.5	87	21.8	60	13.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	62	37.1	75	32.0	71	35.2	87	49.4	60	31.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	62	37.1	75	22.7	71	26.8	87	36.8	58	24.1	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	62	17.7	75	18.7	71	25.4	87	32.2	58	20.7	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	43	4.7	64	10.9	53	15.1	55	21.8	33	21.2	>
	Ceftazidime resistance	43	4.7	64	10.9	53	13.2	55	16.4	33	18.2	>#
	Carbapenem (imipenem/meropenem) resistance	43	20.9	64	18.8	53	17.0	55	12.7	33	21.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	43	11.6	64	20.3	53	5.7	55	25.5	33	12.1	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	43	0.0	64	4.7	53	1.9	55	7.3	33	3.0	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	43	2.3	64	4.7	53	9.4	55	16.4	33	12.1	>
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	59	83.1	28	71.4	50	76.0	57	84.2	32	87.5	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	60	83.3	28	71.4	50	76.0	55	89.1	32	90.6	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	59	74.6	28	57.1	50	76.0	57	75.4	32	84.4	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	59	72.9	28	57.1	50	76.0	55	78.2	32	81.3	
<i>S. aureus</i>	MRSA	143	43.4	139	38.8	125	31.2	117	40.2	58	36.2	
<i>S. pneumoniae</i>	Penicillin non-wild-type ***	7	**	10	40.0	11	45.5	16	6.3	2	**	N/A
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	7	**	10	60.0	19	26.3	14	7.1	8	**	N/A
	Combined penicillin non-wild-type and resistance to macrolides	7	**	10	40.0	11	45.5	14	7.1	2	**	N/A
<i>E. faecalis</i>	High-level gentamicin resistance	58	8.6	39	20.5	70	8.6	87	12.6	37	0.0	
<i>E. faecium</i>	Vancomycin resistance	28	28.6	41	46.3	41	43.9	44	59.1	32	50.0	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** Less than 10 isolates reported, no percentage calculated

*** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the quantitative susceptibility categories S, I and R as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Czechia

National institutions/organisations participating in EARS-Net:

National Institute of Public Health, www.szu.cz

National Reference Laboratory for Antibiotics

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Czechia 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	85	85	85	81	81
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	18.6	18	18	17	16.8
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Czechia 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	94	96	100	98	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	98	98	100	100	100*

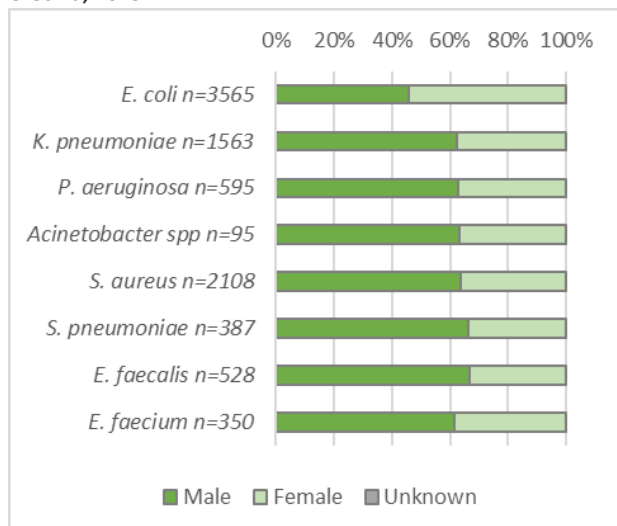
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Czechia 2015-2019

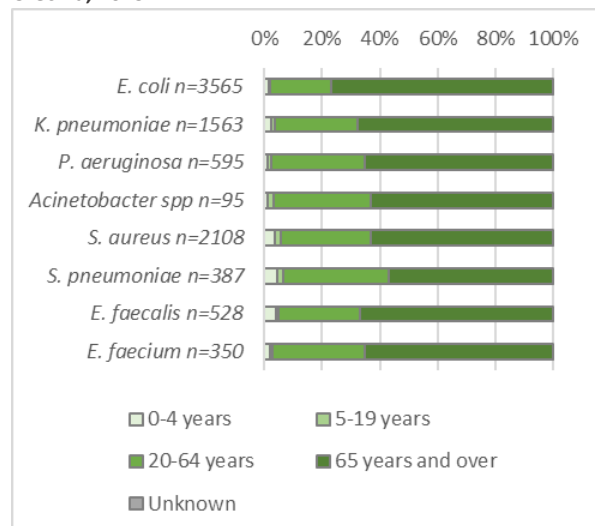
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	45	3174	18	44	3075	18	43	3201	18	48	3650	19	47	3565	16
<i>K. pneumoniae</i>	46	1418	36	45	1385	32	46	1330	29	48	1485	31	48	1563	27
<i>P. aeruginosa</i>	44	464	37	43	465	38	44	411	37	47	539	36	47	595	32
<i>Acinetobacter</i> spp.	15	60	33	15	57	26	17	55	31	21	91	32	20	95	48
<i>S. aureus</i>	46	1806	27	45	1887	25	47	1944	24	48	2244	24	49	2108	23
<i>S. pneumoniae</i>	44	284	34	42	267	35	46	366	26	47	378	26	49	387	27
<i>E. faecalis</i>	43	547	37	42	515	35	41	529	33	44	594	35	43	528	30
<i>E. faecium</i>	36	322	40	38	259	39	39	264	38	41	358	37	39	350	38

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Czechia, 2019



Proportion of isolates by patient age group, by microorganism, Czechia, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Czechia 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	3172	54.3	3055	55.1	3198	53.0	3640	54.2	3556	54.6	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	3172	14.5	3061	15.1	3199	14.2	3641	15.2	3557	15.9	
	Carbapenem (imipenem/meropenem) resistance	1471	0.0	1483	0.0	1431	0.0	1752	0.1	1689	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	3165	22.6	3061	27.6	3199	24.5	3638	24.3	3554	23.0	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	3172	11.3	3061	12.2	3199	10.7	3643	9.5	3559	11.4	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	3165	6.9	3061	7.9	3199	6.3	3638	6.3	3554	6.6	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1417	54.1	1384	51.8	1329	53.2	1482	50.1	1563	50.7	<
	Carbapenem (imipenem/meropenem) resistance	1100	0.3	1096	0.0	1051	0.4	1194	0.3	1314	0.6	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1416	48.9	1384	50.5	1329	49.2	1482	47.2	1562	48.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1417	51.9	1385	47.1	1330	49.6	1483	48.6	1563	47.7	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1416	41.5	1384	40.8	1329	41.8	1482	38.7	1562	39.3	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	445	22.0	446	23.3	405	20.7	531	22.6	584	23.6	
	Ceftazidime resistance	464	19.6	464	19.2	411	13.4	539	20.4	594	22.7	
	Carbapenem (imipenem/meropenem) resistance	464	10.6	464	8.8	411	14.8	539	18.0	595	14.5	>
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	464	30.0	464	34.7	411	30.2	539	33.4	594	33.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	464	21.3	464	18.8	411	14.4	539	19.3	594	21.7	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	464	18.3	464	18.5	411	16.5	539	21.3	594	18.7	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	60	6.7	57	1.8	55	12.7	91	19.8	95	30.5	>
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	60	18.3	57	17.5	55	20.0	91	24.2	95	32.6	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	60	15.0	57	8.8	55	12.7	91	22.0	95	33.7	>
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	60	5.0	57	0.0	55	5.5	91	18.7	95	29.5	>
<i>S. aureus</i>	MRSA	1806	13.7	1887	13.9	1944	13.2	2243	13.6	2108	12.5	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	284	3.2	266	4.5	366	4.9	378	5.0	387	4.9	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	284	6.7	263	7.2	366	9.0	378	10.1	387	10.3	>
	Combined penicillin non-wild-type and resistance to macrolides	284	1.8	263	1.1	366	3.0	378	2.6	387	2.3	
<i>E. faecalis</i>	High-level gentamicin resistance	544	38.8	515	37.1	526	34.0	594	33.7	527	31.5	<
<i>E. faecium</i>	Vancomycin resistance	322	9.6	258	7.8	264	13.3	358	20.7	349	19.8	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Denmark

National institutions/organisations participating in EARS-Net:

Statens Serum Institut

Danish Study Group for Antimicrobial Resistance Surveillance (DANRES), www.danmap.org

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Denmark 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	100	100	100	100	100
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	117.2	121.9	138.5	142.9	160.9
Patient and isolate sample representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Denmark 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	92	91	82	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

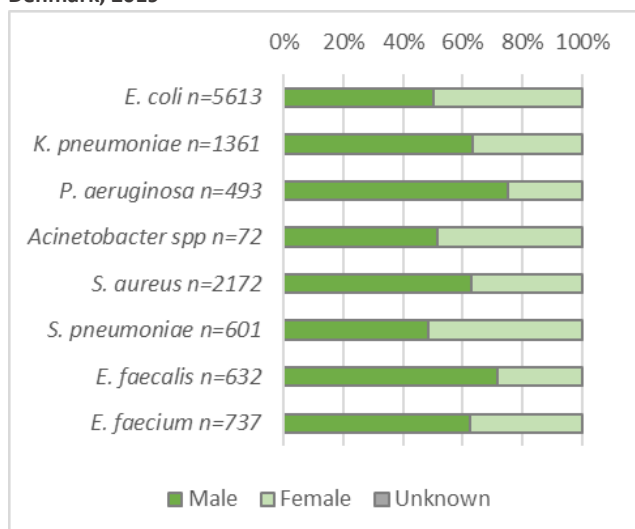
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Denmark 2015-2019

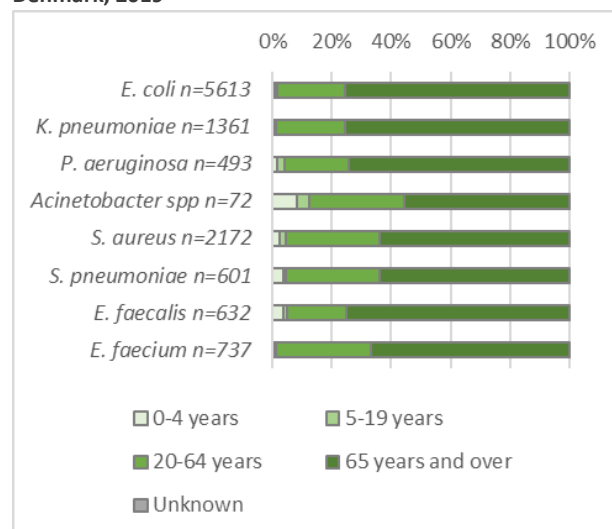
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	11	4597	3	11	4847	2	10	5123	2	10	5398	8	10	5613	2
<i>K. pneumoniae</i>	11	939	5	11	1156	4	10	1186	3	10	1280	7	10	1361	3
<i>P. aeruginosa</i>	11	442	4	11	460	6	10	484	6	10	489	9	10	493	5
<i>Acinetobacter spp.</i>	10	68	0	11	72	8	9	68	5	8	55	8	9	72	6
<i>S. aureus</i>	11	1876	Unknown	10	1963	Unknown	10	1996	Unknown	10	2181	Unknown	10	2172	Unknown
<i>S. pneumoniae</i>	11	747	Unknown	10	707	Unknown	10	727	Unknown	10	760	Unknown	10	601	2
<i>E. faecalis</i>	11	610	8	11	600	9	10	674	6	10	606	8	10	632	5
<i>E. faecium</i>	11	693	35	11	685	31	10	786	30	10	782	28	10	737	23

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Denmark, 2019



Proportion of isolates by patient age group, by microorganism, Denmark, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Denmark 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	4594	45.3	4698	45.0	4885	45.6	5383	46.0	5593	46.3	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	4561	7.5	4659	6.6	4883	6.9	4833	7.7	5091	7.5	
	Carbapenem (imipenem/meropenem) resistance	4046	0.0	4671	0.0	5117	0.0	4640	0.0	5577	0.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	4570	11.9	4827	11.0	5123	12.8	5386	13.3	5605	11.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	4591	6.8	4846	6.1	5122	6.0	5393	5.7	5599	5.5	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	4531	2.5	4640	1.8	4883	1.8	4829	2.0	5084	1.9	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	929	7.8	1118	7.5	1125	7.3	1159	6.5	1248	6.7	
	Carbapenem (imipenem/meropenem) resistance	846	0.0	1119	0.3	1185	0.3	1109	0.5	1356	0.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	935	5.3	1152	5.3	1183	9.1	1279	8.5	1361	9.6	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	938	2.6	1154	3.2	1186	3.2	1278	3.3	1358	3.5	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	924	1.1	1112	1.4	1122	2.4	1159	1.9	1245	2.3	>
	<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	441	4.1	460	3.5	484	2.9	489	2.9	493	4.1
Ceftazidime resistance		439	3.6	447	4.5	461	3.5	458	3.3	471	4.0	
Carbapenem (imipenem/meropenem) resistance		437	4.6	458	2.4	484	2.5	422	5.2	491	3.3	
Fluoroquinolone (ciprofloxacin/levofloxacin) resistance		420	5.0	460	3.7	484	5.0	489	4.3	493	5.5	
Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance		441	2.3	460	1.7	484	1.0	489	0.6	490	2.7	
Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)		441	2.3	460	1.3	484	0.4	489	1.2	493	1.6	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	65	4.6	69	0.0	66	0.0	47	6.4	72	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	68	5.9	72	2.8	68	1.5	55	9.1	72	6.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	63	4.8	70	0.0	68	0.0	53	7.5	72	2.8	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	60	3.3	67	0.0	66	0.0	46	4.3	72	0.0	
<i>S. aureus</i>	MRSA	1876	1.6	1963	2.0	1996	2.5	2181	1.7	2172	2.2	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	747	4.7	707	6.1	727	3.9	760	5.5	601	5.0	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	747	5.2	707	4.8	727	3.6	760	2.5	601	3.5	<
	Combined penicillin non-wild-type and resistance to macrolides	747	2.4	707	2.3	727	1.8	760	1.3	601	1.3	
<i>E. faecalis</i>	High-level gentamicin resistance	63	25.4	56	19.6	56	7.1	171	12.3	47	8.5	<
<i>E. faecium</i>	Vancomycin resistance	690	3.2	679	7.5	785	7.0	779	12.5	734	9.8	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Estonia

National institutions/organisations participating in EARS-Net:

- Estonian Health Board
- East-Tallinn Central Hospital
- Tartu University Hospital

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Estonia 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	100	100	100	100	100
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	23.2	26.6	34.1	31.9	33.4
Patient and isolate sample representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Estonia 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	91	100	100	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

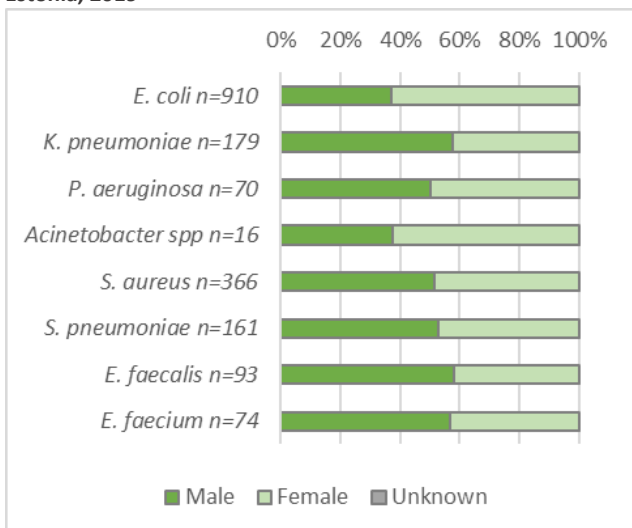
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Estonia 2015-2019

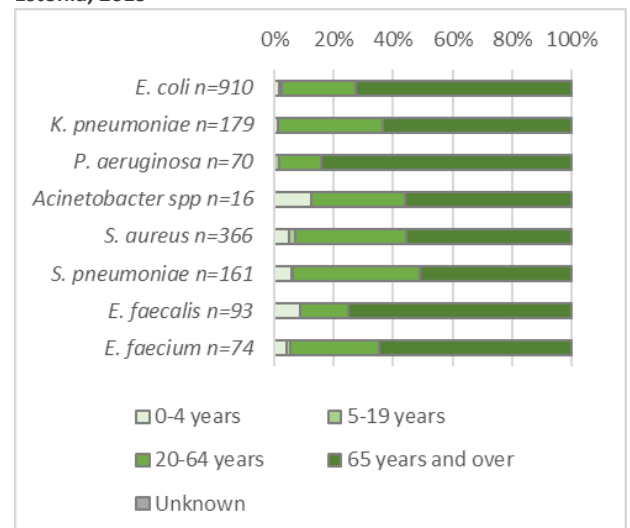
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	11	513	13	11	702	10	10	788	9	10	850	7	9	910	8
<i>K. pneumoniae</i>	9	133	28	10	183	20	10	161	20	9	206	17	9	179	18
<i>P. aeruginosa</i>	7	38	37	8	56	33	9	57	39	7	48	19	8	70	13
<i>Acinetobacter spp.</i>	5	8	25	3	8	13	9	16	19	7	14	21	5	16	19
<i>S. aureus</i>	11	231	15	11	314	12	10	290	8	9	360	8	9	366	11
<i>S. pneumoniae</i>	10	102	19	11	112	16	11	141	10	9	142	10	9	161	8
<i>E. faecalis</i>	10	59	34	9	56	25	10	71	23	8	88	20	9	93	18
<i>E. faecium</i>	7	44	34	8	64	38	10	52	37	7	64	36	7	74	43

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Estonia, 2019



Proportion of isolates by patient age group, by microorganism, Estonia, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Estonia 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	196	47.4	471	46.7	439	47.8	457	43.5	499	42.1	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	246	11.4	701	9.0	788	8.8	850	9.8	910	11.5	
	Carbapenem (imipenem/meropenem) resistance	219	0.0	602	0.0	687	0.0	758	0.0	800	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	256	15.2	699	13.9	781	17.4	829	17.6	897	17.1	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	257	9.3	702	7.4	786	5.7	849	6.2	907	5.3	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	233	5.2	698	4.0	780	3.7	828	3.0	894	2.1	<
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	93	23.7	183	32.8	161	21.1	206	13.6	179	10.6	<
	Carbapenem (imipenem/meropenem) resistance	56	0.0	168	0.0	143	0.0	179	0.6	152	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	62	33.9	183	29.5	161	24.8	205	21.0	179	16.2	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	61	21.3	183	21.3	161	12.4	205	10.2	179	6.1	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	36	22.2	183	16.9	161	11.8	204	8.8	179	5.6	<
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	16	6.3	53	17.0	55	14.5	48	8.3	70	7.1	N/A
	Ceftazidime resistance	7	**	17	17.6	47	8.5	47	4.3	66	4.5	N/A
	Carbapenem (imipenem/meropenem) resistance	16	12.5	54	20.4	55	9.1	48	16.7	69	5.8	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	18	0.0	56	3.6	56	12.5	45	13.3	68	5.9	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	17	5.9	54	7.4	56	5.4	48	4.2	67	3.0	N/A
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	15	0.0	56	3.6	57	8.8	48	6.3	70	2.9	N/A
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	3	**	8	**	15	33.3	14	28.6	16	50.0	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	4	**	5	**	11	36.4	11	45.5	10	80.0	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	2	**	5	**	9	**	11	45.5	8	**	N/A
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	1	**	5	**	9	**	11	36.4	8	**	N/A
<i>S. aureus</i>	MRSA	151	4.0	314	3.5	290	2.1	359	3.3	366	3.0	
<i>S. pneumoniae</i>	Penicillin non-wild-type ***	72	2.8	112	3.6	141	2.1	142	2.8	161	4.3	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	54	7.4	100	7.0	127	3.9	136	7.4	158	7.0	
	Combined penicillin non-wild-type and resistance to macrolides	27	3.7	100	1.0	127	1.6	136	2.2	158	2.5	
<i>E. faecalis</i>	High-level gentamicin resistance	26	26.9	56	32.1	71	19.7	87	25.3	93	12.9	<
<i>E. faecium</i>	Vancomycin resistance	27	0.0	64	0.0	52	5.8	64	6.3	74	4.1	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** Less than 10 isolates reported, no percentage calculated

*** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Finland

National institutions/organisations participating in EARS-Net:

Finnish Institute for Health and Welfare, www.thl.fi, Department of Health Security

Finnish Study Group for Antimicrobial Resistance (FiRe), www.finres.fi

Finnish Hospital Infection Program (SIRO), thl.fi/en/web/infectious-diseases/surveillance/healthcare-associated-infections

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Finland 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	100	98	100	100	96
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	Unknown	High	High	High
Blood culture sets/1000 patient days	104.7	Unknown	154.9	150.1	160.4
Patient and isolate representativeness	High	Unknown	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Finland 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	94	100	94	94	89
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

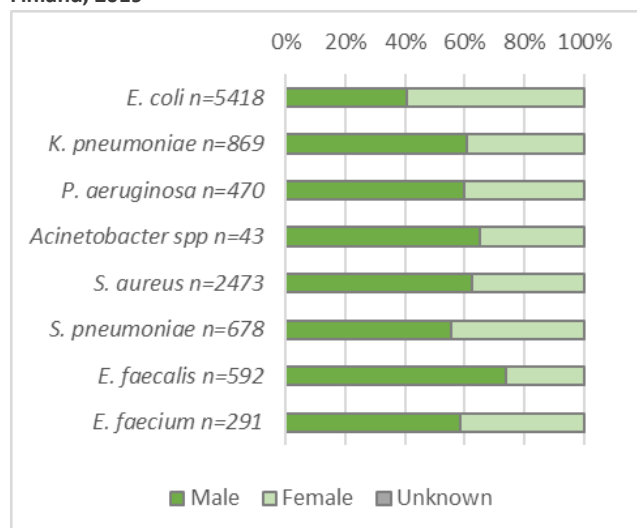
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Finland 2015-2019

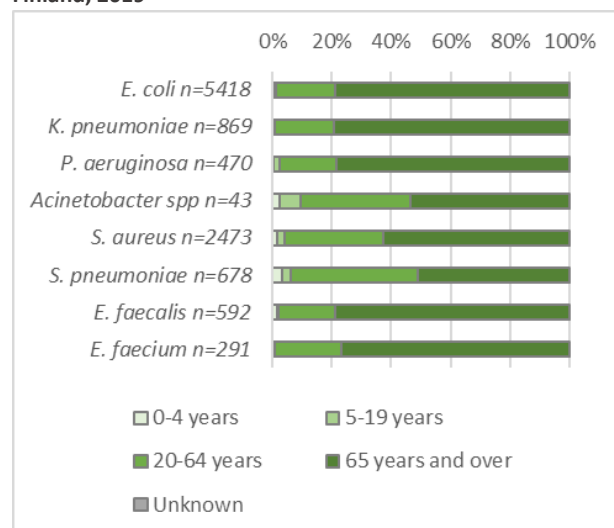
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	20	4425	1	20	4833	Unknown	20	5315	Unknown	19	5057	Unknown	19	5418	Unknown
<i>K. pneumoniae</i>	20	658	3	20	770	Unknown	20	758	Unknown	19	810	Unknown	18	869	Unknown
<i>P. aeruginosa</i>	20	341	Unknown	20	352	Unknown	20	378	Unknown	19	391	Unknown	19	470	Unknown
<i>Acinetobacter spp.</i>	16	43	4	12	28	0	11	37	Unknown	14	28	Unknown	16	43	Unknown
<i>S. aureus</i>	20	2070	3	18	1890	3	20	2439	Unknown	18	2105	Unknown	19	2473	Unknown
<i>S. pneumoniae</i>	20	788	2	20	810	1	20	835	Unknown	19	662	0	18	678	Unknown
<i>E. faecalis</i>	20	478	Unknown	20	499	Unknown	20	549	Unknown	19	528	Unknown	19	592	Unknown
<i>E. faecium</i>	20	299	Unknown	20	295	Unknown	20	301	Unknown	19	290	Unknown	19	291	7

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Finland, 2019



Proportion of isolates by patient age group, by microorganism, Finland, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Finland 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	2472	36.0	2690	35.8	2874	35.2	3129	35.3	3000	35.5	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	4342	6.1	4742	6.9	5223	6.9	5020	7.6	5413	7.8	>
	Carbapenem (imipenem/meropenem) resistance	4425	0.0	4832	0.0	5315	0.0	5057	0.0	5331	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	4404	11.2	4808	11.5	5305	12.0	5043	11.4	5410	11.4	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	4135	5.4	4519	4.9	4982	5.0	4815	4.3	5159	4.8	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	4103	2.6	4492	2.4	4971	2.4	4798	2.0	5151	2.3	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	644	3.0	760	4.1	744	4.6	805	4.5	868	6.3	>
	Carbapenem (imipenem/meropenem) resistance	658	0.0	770	0.3	758	0.3	810	0.6	850	0.4	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	658	3.3	769	2.7	756	7.9	808	6.3	865	7.3	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	625	1.9	727	2.3	721	2.9	774	2.6	831	4.2	>
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	623	1.1	726	1.2	716	2.4	771	1.6	827	3.1	>
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	333	7.2	351	9.4	377	6.4	391	6.6	457	6.6	
	Ceftazidime resistance	334	6.9	352	5.4	378	6.1	390	4.4	463	4.5	
	Carbapenem (imipenem/meropenem) resistance	341	4.7	352	6.0	377	6.1	391	4.9	462	6.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	302	8.9	292	7.9	356	11.2	376	12.8	468	8.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	341	1.8	352	2.3	378	1.9	391	1.0	458	0.7	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	341	4.7	352	3.4	378	3.4	391	1.8	462	2.4	<
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	43	2.3	28	0.0	37	2.7	28	0.0	43	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	43	2.3	28	0.0	37	2.7	28	0.0	43	0.0	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	42	2.4	28	3.6	36	0.0	27	7.4	42	0.0	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	42	2.4	28	0.0	36	0.0	27	0.0	42	0.0	
<i>S. aureus</i>	MRSA	2070	1.9	1890	2.2	2439	2.0	2105	2.0	2473	2.1	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	677	12.7	706	10.3	698	10.5	600	11.5	594	12.0	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	765	14.0	791	11.4	808	15.0	653	12.1	655	10.5	
	Combined penicillin non-wild-type and resistance to macrolides	654	6.7	687	6.1	671	6.7	591	5.8	571	6.3	
<i>E. faecalis</i>	High-level gentamicin resistance											
<i>E. faecium</i>	Vancomycin resistance	298	0.3	294	0.0	301	0.7	289	1.7	291	0.0	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

France

National institutions/organisations participating in EARS-Net:

Santé Publique France, www.santepubliquefrance.fr

French National Observatory for the Epidemiology of Bacterial Resistance to Antimicrobials (ONERBA) through 3 participating networks: Azay-Résistance, Île-de-France, Réussir networks, www.onerba.org

National Reference Centre for Pneumococci, www.cnr-pneumo.com

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, France 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%) *					
Laboratories collecting <i>S. pneumoniae</i> (CNRP)	67	51	58**	61	56
Laboratories collecting other species (Onerba)	19	20	22	21	20
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days***	79.9	77.1	88.1	105.2	112.2
Patient and isolate sample representativeness	High	High	High	High	High

* Calculation based on proportion hospital days in participating hospitals out of total hospital days in the country

** Restricted to first half of the year

*** Calculated only for ONERBA Network

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, France 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	95	86	87	71	86
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

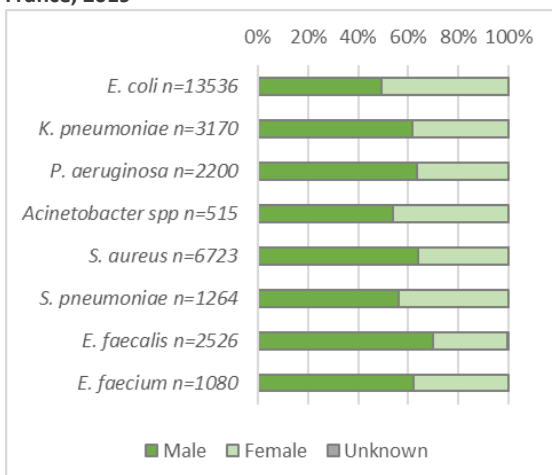
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), France 2015-2019

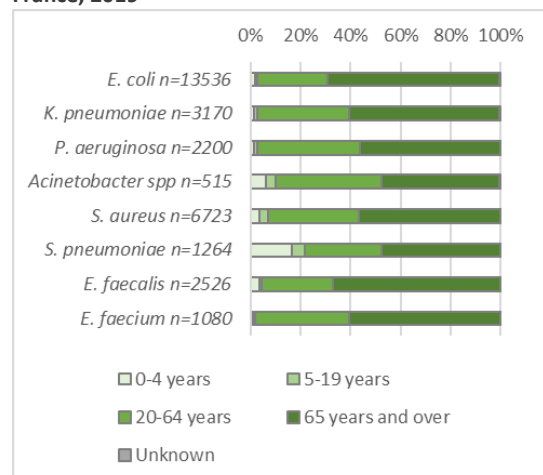
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	54	11067	8	49	11337	9	54	13392	8	49	12645	8	46	13536	8
<i>K. pneumoniae</i>	53	2350	18	49	2608	17	54	2904	16	49	3043	17	46	3170	15
<i>P. aeruginosa</i>	53	1956	25	49	1988	24	36	1721	22	34	1902	25	45	2200	21
<i>Acinetobacter</i> spp.	48	434	14	48	454	19	52	475	17	47	498	11	45	515	17
<i>S. aureus</i>	54	5597	16	50	5699	15	54	6668	16	49	7097	15	46	6723	14
<i>S. pneumoniae</i>	198	1068	Unknown	175	1046	Unknown	169	614	Unknown	143	1045	Unknown	193	1264	Unknown
<i>E. faecalis</i>	53	1999	22	49	2022	20	53	2259	20	48	2300	20	46	2526	19
<i>E. faecium</i>	53	853	29	48	819	29	53	1000	27	49	1001	27	46	1080	24

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, France, 2019



Proportion of isolates by patient age group, by microorganism, France, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, France 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	10946	57.0	11248	57.2	13293	55.6	12553	55.6	13415	54.5	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	11051	11.0	11313	11.2	13352	10.2	12614	9.6	13019	8.8	<
	Carbapenem (imipenem/meropenem) resistance	10481	0.0	10929	0.0	12843	0.0	12399	0.0	12636	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	10998	17.7	11251	16.7	13328	15.0	12443	16.3	13431	16.0	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	11055	8.2	11135	7.9	13103	7.0	12283	7.4	13133	7.0	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	10988	3.9	11082	3.8	13038	3.0	12107	3.5	12639	3.0	<
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	2338	30.5	2597	28.9	2892	28.8	3033	30.8	3075	30.2	
	Carbapenem (imipenem/meropenem) resistance	2244	0.5	2528	0.4	2807	0.7	2998	0.5	3003	1.0	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	2332	30.7	2589	27.7	2886	26.8	2997	30.4	3143	30.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	2337	26.3	2569	26.2	2857	23.8	2990	24.8	3103	23.4	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	2324	22.5	2556	21.3	2844	19.4	2948	21.5	3004	19.8	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	1904	14.1	1949	16.0	1684	16.7	1850	17.4	1879	16.7	>
	Ceftazidime resistance	1919	11.6	1956	11.3	1568	12.2	1892	13.0	1999	11.5	
	Carbapenem (imipenem/meropenem) resistance	1925	16.4	1968	15.6	1710	13.9	1896	16.0	2076	12.7	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	1939	19.1	1971	13.6	1709	15.1	1893	15.1	2074	13.7	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1950	14.1	1976	10.7	1713	10.9	1898	9.3	2086	7.8	<
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	1940	11.4	1972	10.3	1709	10.1	1894	10.5	2073	8.0	<
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	428	5.6	450	7.1	469	6.2	490	6.5	487	9.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	430	13.5	452	15.0	473	12.3	491	12.0	481	13.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	431	11.1	449	12.2	474	9.1	482	8.9	473	14.6	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	424	5.2	447	6.7	468	5.3	470	5.5	458	8.5	
<i>S. aureus</i>	MRSA	5535	15.7	5578	13.8	6472	12.9	6903	12.1	6467	11.6	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	1068	22.9	1046	25.3	614	25.9	1045	29.1	1264	25.3	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	1068	24.4	1046	22.9	614	23.1	1045	23.9	1264	19.4	<
	Combined penicillin non-wild-type and resistance to macrolides	1068	17.4	1046	18.0	614	17.6	1045	20.4	1264	16.1	
<i>E. faecalis</i>	High-level gentamicin resistance	1097	12.2	1057	15.0	795	12.7	1568	9.8	1346	12.0	<#
<i>E. faecium</i>	Vancomycin resistance	849	0.8	808	0.6	986	0.8	987	0.6	1062	0.7	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Germany

National institutions/organisations participating in EARS-Net:
Robert Koch Institute, www.rki.de

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Germany 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	22	26	30	27	27
Geographical representativeness	High	High	High	High	High
Hospital representativeness	Medium	Medium	Medium	Medium	Medium
Blood culture sets/1000 patient days	24.9	26.2	27.2	30.8	37.9
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Germany 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	92	93	91	91	95
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	94	83	81	86	100*

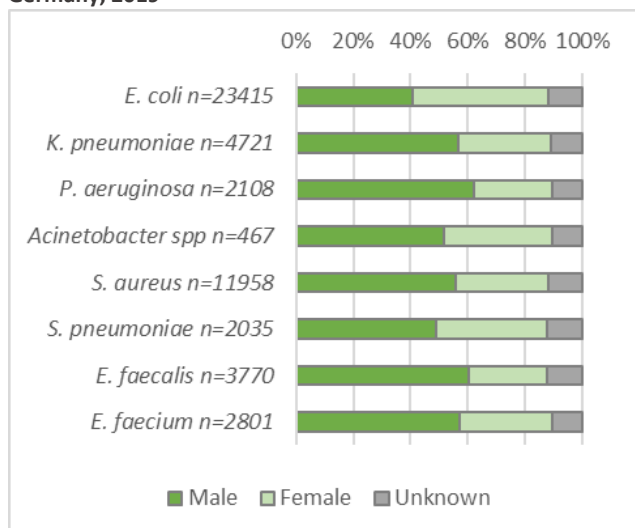
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Germany 2015-2019

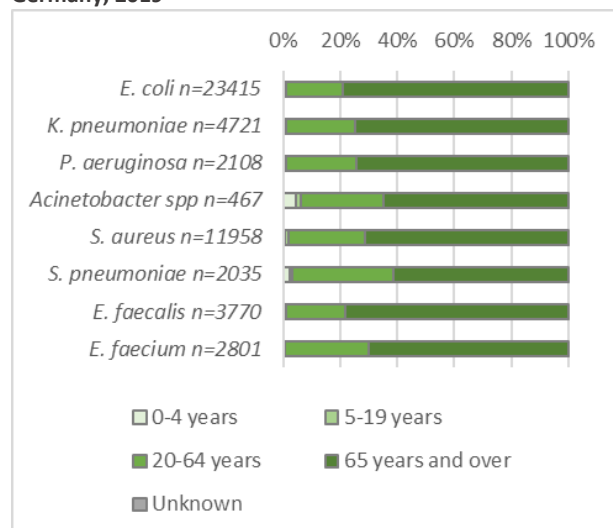
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	30	9036	15	41	17199	14	56	22945	14	48	21994	15	47	23415	15
<i>K. pneumoniae</i>	29	1584	21	40	3070	23	55	3857	21	48	3974	22	47	4721	24
<i>P. aeruginosa</i>	29	972	27	39	1423	27	55	1896	26	47	1792	26	46	2108	27
<i>Acinetobacter</i> spp.	25	340	19	38	463	19	50	543	17	45	529	15	46	467	15
<i>S. aureus</i>	30	5026	21	41	9870	20	56	13141	21	48	11924	21	47	11958	23
<i>S. pneumoniae</i>	29	772	21	40	1403	23	54	2049	22	48	1916	24	46	2035	24
<i>E. faecalis</i>	30	1725	24	41	2959	24	56	4002	24	48	3638	23	47	3770	25
<i>E. faecium</i>	29	1348	42	41	2049	40	56	2648	40	47	2464	43	47	2801	48

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Germany, 2019



Proportion of isolates by patient age group, by microorganism, Germany, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Germany 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	8358	49.4	15957	49.0	21646	48.9	20841	49.2	23324	48.7	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	9031	10.3	17190	11.1	22929	12.3	21989	12.2	23413	11.5	>#
	Carbapenem (imipenem/meropenem) resistance	9032	0.0	17196	0.0	22940	0.0	21957	0.0	23391	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	9019	19.4	17196	19.4	22940	20.7	21958	19.8	23374	17.5	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	9029	7.1	17023	7.0	22478	7.0	21634	6.9	22990	8.3	>#
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	9013	3.0	17013	3.4	22464	3.7	21630	3.4	22971	3.1	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1581	10.2	3068	13.6	3854	14.6	3973	12.9	4719	12.2	
	Carbapenem (imipenem/meropenem) resistance	1583	0.1	3068	0.5	3857	0.5	3968	0.4	4718	0.9	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1580	9.6	3068	12.6	3857	15.3	3970	13.4	4715	13.1	>#
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1582	5.6	3042	7.7	3776	8.2	3918	6.2	4654	7.3	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1578	3.2	3038	5.3	3774	6.3	3918	4.7	4649	4.8	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	970	16.0	1410	15.0	1856	12.6	1765	12.4	2077	11.7	<
	Ceftazidime resistance	968	8.9	1421	10.1	1883	9.8	1784	9.1	2104	10.0	
	Carbapenem (imipenem/meropenem) resistance	971	14.7	1422	14.5	1892	12.6	1790	12.1	2108	12.9	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	970	14.3	1423	12.4	1895	13.9	1789	12.4	2108	13.4	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	966	7.1	1421	6.8	1869	4.8	1788	3.5	2107	4.1	<
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	971	7.6	1423	7.3	1894	6.6	1790	5.8	2108	6.3	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	337	6.5	452	4.9	540	4.1	527	4.4	462	2.2	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	339	8.6	460	5.7	536	6.5	520	6.7	443	5.0	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	331	5.4	436	3.0	498	3.4	498	3.4	430	4.2	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	328	3.7	435	2.3	495	1.2	498	2.2	425	1.4	
<i>S. aureus</i>	MRSA	5020	11.3	9866	10.2	13128	9.1	11918	7.7	11950	6.7	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	761	6.2	1359	4.6	1989	4.5	1867	5.2	1962	5.7	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	758	8.2	1386	8.0	2029	6.9	1883	7.1	1970	7.7	
	Combined penicillin non-wild-type and resistance to macrolides	748	2.7	1342	2.2	1969	2.2	1839	2.5	1903	3.0	
<i>E. faecalis</i>	High-level gentamicin resistance	1295	30.7	2341	25.2	2930	25.3	2273	22.9	1561	18.0	<
<i>E. faecium</i>	Vancomycin resistance	1347	10.5	2043	11.9	2642	16.5	2458	23.7	2797	26.3	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Greece

National institutions/organisations participating in EARS-Net:

National Public Health Organization, Central Public Health Laboratory

University of West Attica, Department of Public Health Policy, School of Public Health

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Greece 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	55	55	Unknown	68	Unknown
Geographical representativeness	Unknown	Unknown	Unknown	High	Unknown
Hospital representativeness	Unknown	Unknown	Unknown	High	Unknown
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	Unknown	Unknown
Patient and isolate representativeness	Unknown	Unknown	Unknown	Medium	Unknown

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Greece 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	89	96	89	96	95
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	7	12	13	21	100*

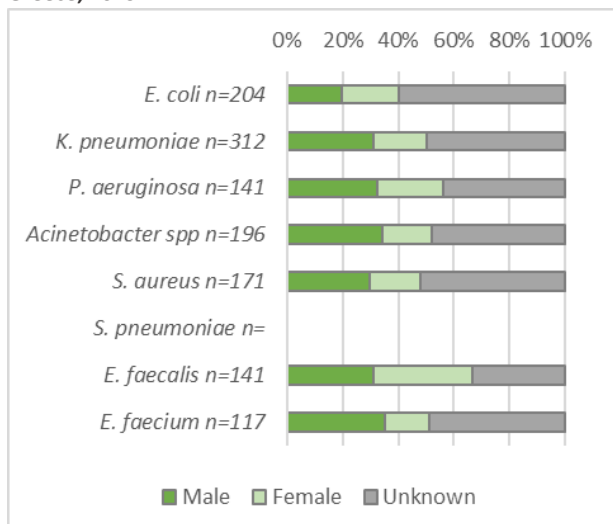
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Greece 2015-2019

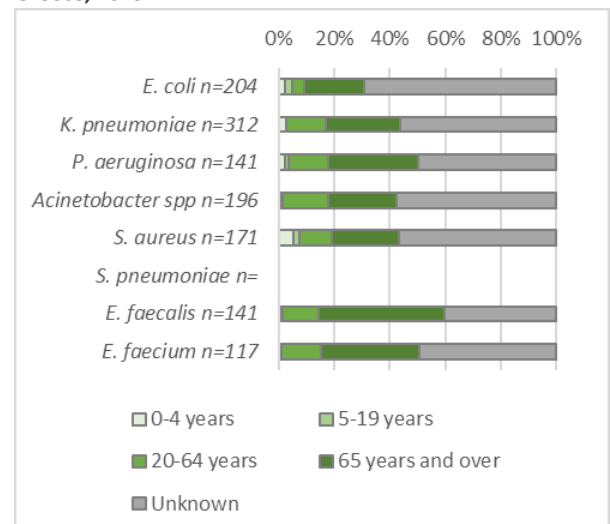
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	29	1218	4	31	1306	4	32	1472	5	37	1642	5	6	204	6
<i>K. pneumoniae</i>	28	1187	39	30	1183	41	33	1363	38	36	1500	37	6	312	37
<i>P. aeruginosa</i>	28	680	36	31	705	42	31	821	37	37	859	37	6	141	45
<i>Acinetobacter</i> spp.	29	1001	52	29	903	57	32	1096	50	34	1015	48	5	196	45
<i>S. aureus</i>	29	635	9	31	682	10	33	833	11	36	889	7	5	171	8
<i>S. pneumoniae</i>															
<i>E. faecalis</i>	28	506	27	28	576	35	33	638	25	36	682	28	6	141	26
<i>E. faecium</i>	26	320	31	28	358	31	31	412	26	35	529	25	5	117	32

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Greece, 2019



Proportion of isolates by patient age group, by microorganism, Greece, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Greece 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	1079	56.1	1170	56.9	1306	57.5	1444	57.5	154	57.1	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1215	19.8	1304	17.6	1470	18.3	1640	19.3	190	18.9	
	Carbapenem (imipenem/meropenem) resistance	1215	1.2	1303	0.9	1467	1.6	1640	1.0	203	1.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1191	30.6	1304	32.1	1464	32.9	1631	30.8	203	29.6	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1200	16.1	1301	16.8	1467	17.0	1633	15.5	201	12.9	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1187	10.7	1300	10.4	1463	9.8	1628	9.8	186	8.6	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1185	69.5	1181	72.5	1362	69.2	1500	70.7	310	66.5	
	Carbapenem (imipenem/meropenem) resistance	1185	61.9	1180	66.9	1363	64.7	1498	63.9	312	58.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1161	66.4	1180	68.6	1346	66.9	1488	68.1	311	66.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1170	50.7	1171	52.9	1348	53.2	1487	54.4	310	55.2	>
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1160	46.7	1171	48.4	1345	47.9	1487	50.4	307	53.1	>#
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	553	18.8	644	23.3	771	23.7	815	21.5	109	34.9	>#
	Ceftazidime resistance	660	19.4	696	33.6	814	24.9	853	22.3	136	39.7	
	Carbapenem (imipenem/meropenem) resistance	675	40.4	699	42.1	821	39.3	856	37.5	141	48.9	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	662	34.1	702	34.6	816	35.3	856	33.1	141	46.8	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	667	26.4	701	28.0	815	30.2	856	26.5	141	42.6	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	666	27.8	701	31.5	816	32.0	855	28.7	141	44.7	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	983	93.5	861	95.4	1095	94.8	1013	92.4	196	92.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	946	94.9	862	94.9	1060	96.0	998	93.5	189	95.8	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	945	83.7	878	85.0	1064	85.6	1003	81.6	194	88.7	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	943	82.2	838	84.0	1059	84.3	995	81.3	187	91.4	
<i>S. aureus</i>	MRSA	612	39.4	639	38.8	822	38.4	888	36.4	170	37.6	
<i>S. pneumoniae</i>	Penicillin non-wild-type **											
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance											
	Combined penicillin non-wild-type and resistance to macrolides											
<i>E. faecalis</i>	High-level gentamicin resistance	460	13.3	540	15.9	621	12.2	668	12.0	128	7.8	
<i>E. faecium</i>	Vancomycin resistance	315	19.7	358	27.9	412	30.8	527	28.1	117	47.0	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Hungary

National institutions/organisations participating in EARS-Net:
National Public Health Center, www.oek.hu

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Hungary 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	90	90	Unknown	90	90
Geographical representativeness	High	High	Unknown	High	High
Hospital representativeness	Unknown	Unknown	Unknown	High	High
Blood culture sets/1000 patient days	10.4	9.8	11.5	12.2	12.3
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	High

Table 2. Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Hungary 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	97	93	97
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

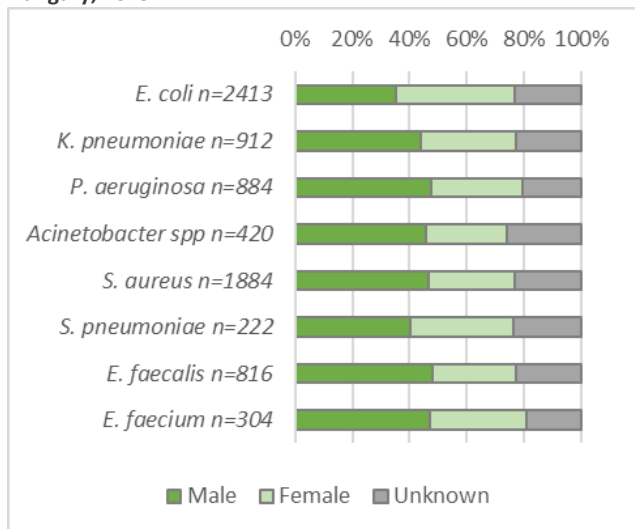
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Hungary 2015-2019

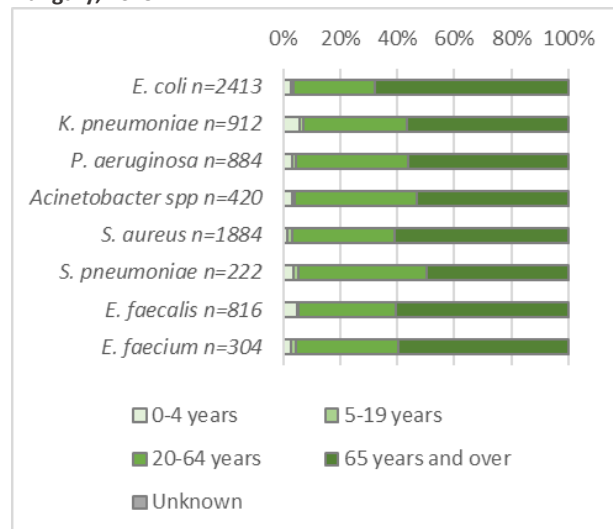
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	30	2026	16	29	1995	14	31	2061	13	29	2373	11	30	2413	12
<i>K. pneumoniae</i>	27	706	35	29	723	29	29	693	28	28	850	24	29	912	26
<i>P. aeruginosa</i>	29	770	48	29	740	45	30	735	49	29	807	40	30	884	42
<i>Acinetobacter spp.</i>	25	467	53	26	401	57	31	358	51	26	358	54	27	420	56
<i>S. aureus</i>	27	1517	21	28	1668	20	28	1566	19	27	1721	17	28	1884	16
<i>S. pneumoniae</i>	27	181	28	27	174	24	27	204	16	25	207	20	27	222	19
<i>E. faecalis</i>	27	730	38	28	786	38	30	769	38	29	750	36	30	816	37
<i>E. faecium</i>	23	240	45	25	272	46	27	315	46	29	303	42	27	304	42

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Hungary, 2019



Proportion of isolates by patient age group, by microorganism, Hungary, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Hungary 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	1970	60.6	1969	57.4	2021	60.3	2312	62.7	2363	59.3	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	2026	16.7	1993	16.7	2058	20.1	2370	22.6	2413	20.6	>
	Carbapenem (imipenem/meropenem) resistance	1922	0.0	1905	0.0	1987	0.1	2279	0.0	2326	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	2021	29.0	1986	26.8	2051	30.6	2364	33.2	2398	30.3	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	2020	13.6	1992	13.3	2060	15.1	2264	17.4	2411	15.7	>
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	2015	6.7	1981	6.4	2047	8.2	2254	11.4	2397	10.4	>
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	704	37.2	722	37.5	693	41.1	848	40.2	911	36.7	
	Carbapenem (imipenem/meropenem) resistance	687	0.1	703	0.4	681	0.1	827	0.2	890	0.9	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	700	36.7	713	35.2	685	41.5	842	38.0	909	36.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	706	34.6	720	34.7	693	37.8	845	32.7	912	30.8	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	698	30.2	711	30.1	685	33.1	837	28.9	908	26.4	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	747	26.9	720	23.6	721	24.3	791	24.3	860	19.7	<
	Ceftazidime resistance	763	24.2	735	20.7	729	23.9	804	22.5	882	18.4	<
	Carbapenem (imipenem/meropenem) resistance	769	35.8	739	33.2	733	36.6	807	37.3	883	33.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	769	24.7	736	24.3	732	23.4	805	26.0	879	20.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	766	20.5	740	17.6	734	14.6	784	17.9	883	16.9	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	770	20.9	740	19.1	735	18.1	807	20.2	883	17.3	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	467	53.7	401	57.1	358	52.0	357	55.2	418	51.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	464	68.1	397	68.0	352	67.0	356	66.0	412	63.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	465	60.6	401	59.1	358	56.1	343	48.7	419	50.6	<
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	462	50.2	397	51.4	352	48.6	341	41.3	410	45.6	<
<i>S. aureus</i>	MRSA	1517	24.7	1668	25.2	1566	23.6	1721	23.1	1884	19.4	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	181	7.2	174	15.5	204	6.9	207	10.1	222	6.3	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	170	10.6	166	13.3	187	11.8	190	14.7	215	12.1	
	Combined penicillin non-wild-type and resistance to macrolides	170	1.8	166	7.8	187	6.4	190	7.9	215	5.1	
<i>E. faecalis</i>	High-level gentamicin resistance	730	45.5	786	42.2	769	41.5	750	38.0	816	33.7	<
<i>E. faecium</i>	Vancomycin resistance	240	16.7	272	22.4	315	28.3	301	39.5	304	35.9	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Iceland

National institutions/organisations participating in EARS-Net:

National University Hospital of Iceland

Centre for Health Security and Infectious Disease Control

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Iceland 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	100	100	Unknown	100	100
Geographical representativeness	High	High	Unknown	High	High
Hospital representativeness	Unknown	Unknown	Unknown	High	High
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	50.6	61.6
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Iceland 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	50	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	50	50	50	100	100*

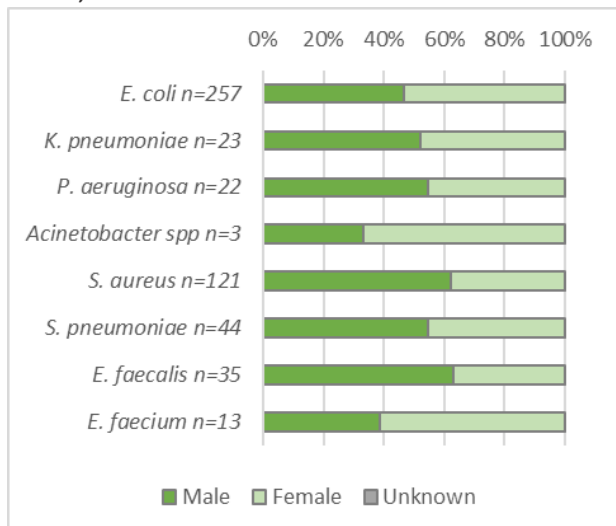
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Iceland 2015-2019

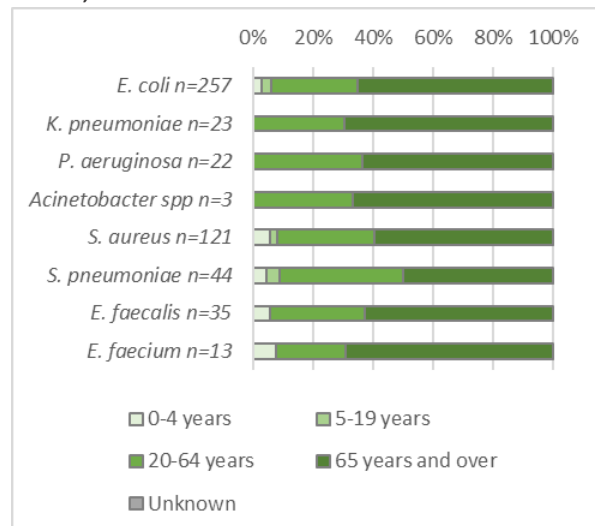
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	2	173	1	2	192	1	2	213	1	2	198	2	2	257	2
<i>K. pneumoniae</i>	2	36	3	2	25	4	2	17	0	2	16	7	2	23	0
<i>P. aeruginosa</i>	2	12	0	2	17	13	1	17	24	2	12	0	2	22	14
<i>Acinetobacter spp.</i>	1	6	33	1	3	0	1	6	0	1	2	0	1	3	0
<i>S. aureus</i>	2	88	4	2	76	4	2	69	10	2	82	9	2	121	4
<i>S. pneumoniae</i>	1	25	0	2	19	5	2	27	4	2	31	3	2	44	0
<i>E. faecalis</i>	2	21	0	2	24	10	2	33	9	2	30	7	2	35	9
<i>E. faecium</i>	1	20	16	1	16	13	1	17	12	2	16	21	2	13	31

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Iceland, 2019



Proportion of isolates by patient age group, by microorganism, Iceland, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Iceland 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	173	44.5	192	43.8	213	41.3	198	49.0	257	52.5	>
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	173	1.7	192	4.2	213	6.1	198	8.1	257	7.0	>
	Carbapenem (imipenem/meropenem) resistance ‡	162	0.0	176	0.0	198	0.0	190	0.0	252	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	162	6.8	178	9.6	199	11.6	192	17.2	252	13.1	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	173	2.9	192	3.6	213	5.6	197	6.1	256	4.7	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	162	0.0	178	1.1	199	1.5	191	2.1	251	0.4	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	36	0.0	25	0.0	17	5.9	16	0.0	23	4.3	N/A
	Carbapenem (imipenem/meropenem) resistance ‡	35	0.0	21	0.0	16	0.0	16	0.0	23	0.0	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	35	2.9	21	0.0	16	6.3	16	0.0	23	4.3	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	36	0.0	25	0.0	17	11.8	16	0.0	23	8.7	N/A
		Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	35	0.0	21	0.0	16	0.0	16	0.0	23	0.0	N/A
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance		**		**		**		**	2	**	N/A
	Ceftazidime resistance	11	0.0	17	0.0	17	0.0	12	0.0	22	13.6	N/A
	Carbapenem (imipenem/meropenem) resistance	12	0.0	17	5.9	17	0.0	12	0.0	22	0.0	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	12	8.3	17	17.6	17	11.8	12	8.3	22	4.5	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	12	0.0	17	0.0	17	0.0	12	0.0	22	4.5	N/A
		Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	12	0.0	17	0.0	17	0.0	12	0.0	22	4.5	N/A
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	6	**	3	**	6	**	2	**	3	**	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	6	**	3	**	6	**	2	**	3	**	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	6	**	3	**	6	**	2	**	3	**	N/A
		Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	6	**	3	**	6	**	2	**	3	**	N/A
<i>S. aureus</i>	MRSA	88	0.0	76	1.3	69	1.4	82	0.0	121	6.6	>
<i>S. pneumoniae</i>	Penicillin non-wild-type ***	25	24.0	19	10.5	27	18.5	31	9.7	44	15.9	N/A
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	25	12.0	19	0.0	27	18.5	31	12.9	44	15.9	N/A
		Combined penicillin non-wild-type and resistance to macrolides	25	8.0	19	0.0	27	14.8	31	9.7	44	11.4	N/A
<i>E. faecalis</i>	High-level gentamicin resistance	21	14.3	24	16.7	33	18.2	30	16.7	35	11.4	
<i>E. faecium</i>	Vancomycin resistance	20	0.0	16	0.0	17	0.0	16	0.0	13	0.0	N/A

‡ Ertapenem resistance data used as imipenem or meropenem are not routinely tested for

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** Less than 10 isolates reported, no percentage calculated

*** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Ireland

National institutions/organisations participating in EARS-Net:
Health Protection Surveillance Centre, www.hpsc.ie

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Ireland 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	97	99	100	100	96
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	53.0	57.5	58.0	57.3	58.9
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Ireland 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	92	90	85	87	84
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	92	91	94	97	100*

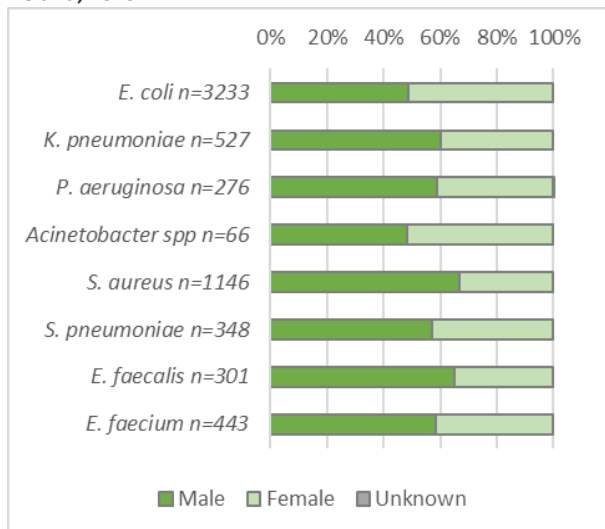
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Ireland 2015-2019

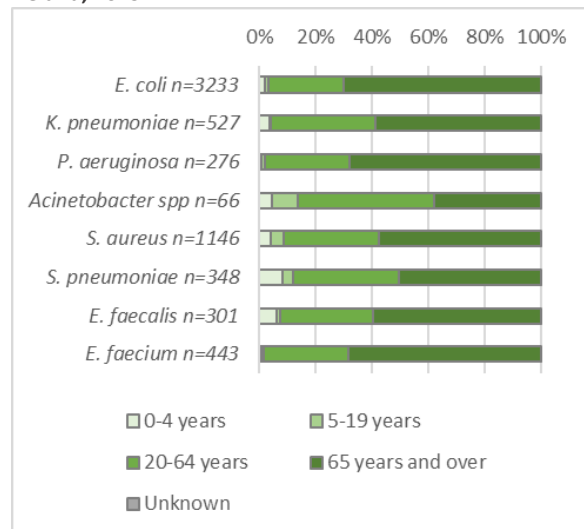
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	39	2649	Unknown	39	2991	Unknown	39	3125	Unknown	38	3239	Unknown	34	3233	Unknown
<i>K. pneumoniae</i>	30	389	Unknown	32	453	Unknown	35	479	Unknown	34	483	Unknown	30	527	Unknown
<i>P. aeruginosa</i>	29	195	Unknown	30	243	Unknown	33	288	Unknown	29	273	Unknown	27	276	Unknown
<i>Acinetobacter</i> spp.	21	86	Unknown	25	68	Unknown	23	66	Unknown	17	62	Unknown	21	66	Unknown
<i>S. aureus</i>	37	1057	Unknown	37	1143	Unknown	37	1144	Unknown	37	1188	Unknown	32	1146	Unknown
<i>S. pneumoniae</i>	30	303	Unknown	31	363	Unknown	31	412	Unknown	32	455	Unknown	27	348	Unknown
<i>E. faecalis</i>	35	292	Unknown	34	290	Unknown	33	340	Unknown	36	332	Unknown	30	301	Unknown
<i>E. faecium</i>	29	405	Unknown	31	423	Unknown	33	442	Unknown	30	419	Unknown	27	443	Unknown

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Ireland, 2019



Proportion of isolates by patient age group, by microorganism, Ireland, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Ireland 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	2646	66.2	2990	68.1	2991	69.8	3237	67.6	3201	67.5	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	2638	11.4	2985	11.4	3121	12.0	3237	12.9	3231	12.1	
	Carbapenem (imipenem/meropenem) resistance	2615	0.0	2989	0.0	3116	0.0	3237	0.0	3229	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	2631	23.1	2990	22.9	3119	23.6	3238	23.9	3223	20.4	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	2646	11.8	2991	11.2	3123	11.9	3238	11.7	3232	11.8	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	2621	5.4	2984	5.3	3116	5.7	3235	6.1	3222	5.6	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	387	14.7	452	13.5	478	14.6	483	14.5	527	17.6	
	Carbapenem (imipenem/meropenem) resistance	389	0.5	453	0.7	478	0.2	482	0.6	527	0.9	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	388	17.0	453	11.3	478	14.9	483	18.0	526	17.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	389	15.9	453	11.5	479	11.9	483	13.0	526	11.0	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	387	7.2	452	5.8	477	5.9	483	8.1	525	5.3	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	194	8.8	242	12.4	286	14.0	270	8.1	276	10.9	
	Ceftazidime resistance	195	7.2	243	10.7	272	9.6	261	8.4	272	9.2	
	Carbapenem (imipenem/meropenem) resistance	195	9.2	243	6.2	288	9.0	273	6.6	275	6.5	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	194	9.8	243	11.9	287	13.9	272	8.8	276	9.4	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	195	4.1	243	10.3	288	8.7	273	5.5	276	6.5	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	195	5.1	243	8.6	288	7.6	273	3.3	276	5.1	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	84	6.0	65	0.0	63	6.3	60	1.7	63	1.6	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	83	4.8	68	1.5	66	7.6	61	0.0	64	7.8	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	80	3.8	63	1.6	62	3.2	56	3.6	57	1.8	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	75	1.3	61	0.0	59	1.7	55	0.0	53	0.0	
<i>S. aureus</i>	MRSA	1057	18.1	1143	14.3	1140	16.3	1188	12.4	1146	12.6	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	303	17.5	363	16.5	412	15.8	455	20.7	348	14.4	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	296	13.9	354	13.3	396	12.9	419	13.6	340	12.6	
	Combined penicillin non-wild-type and resistance to macrolides	296	10.8	354	9.6	396	9.3	419	10.0	340	8.2	
<i>E. faecalis</i>	High-level gentamicin resistance	261	28.0	265	29.4	302	30.8	292	23.6	243	23.0	
<i>E. faecium</i>	Vancomycin resistance	404	45.8	422	44.1	442	38.2	418	40.2	443	38.4	<

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Italy

National institutions/organisations participating in EARS-Net:
National Institute of Health, www.iss.it

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Italy 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	15	17	21	36	41
Geographical representativeness	Unknown	Unknown	Medium	High	High
Hospital representativeness	Unknown	Unknown	Unknown	High	High
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	55.4	Unknown
Patient and isolate sample representativeness	Unknown	Unknown	Unknown	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Italy 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	95	92	97	95	95
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

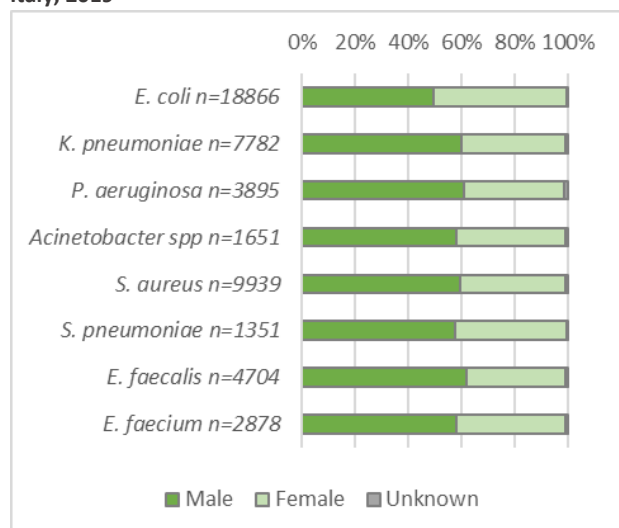
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Italy 2015-2019

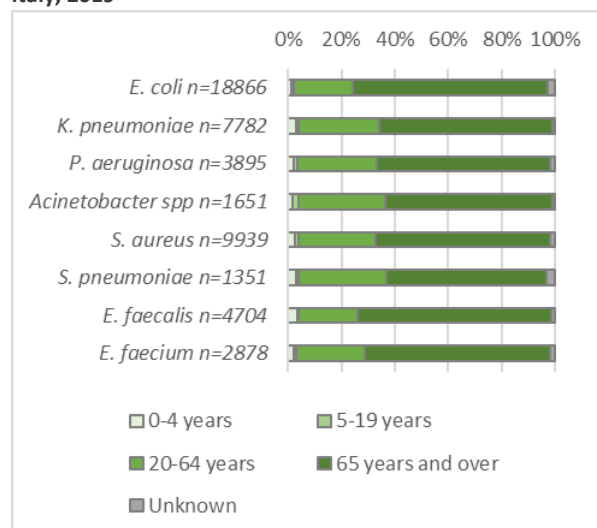
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	45	5605	9	46	6110	8	54	7478	7	97	16539	7	128	18866	6
<i>K. pneumoniae</i>	43	2015	29	47	2314	28	55	2720	27	98	5913	23	123	7782	22
<i>P. aeruginosa</i>	41	1083	30	43	1207	25	54	1455	25	95	3050	23	124	3895	23
<i>Acinetobacter</i> spp.	40	667	56	41	708	46	48	878	42	92	1392	42	100	1651	38
<i>S. aureus</i>	46	3300	17	46	3309	15	55	4213	16	97	8581	12	125	9939	11
<i>S. pneumoniae</i>	39	479	10	43	515	11	52	673	9	80	1160	9	100	1351	10
<i>E. faecalis</i>	45	1622	29	47	1617	24	55	2004	26	94	4153	19	122	4704	18
<i>E. faecium</i>	45	771	28	47	958	23	54	1085	22	92	2304	19	118	2878	19

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Italy, 2019



Proportion of isolates by patient age group, by microorganism, Italy, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Italy 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	3385	67.4	3114	66.9	4078	67.1	7533	64.5	4456	68.1	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	5592	30.1	5938	29.8	7077	29.5	16253	28.7	18405	30.9	
	Carbapenem (imipenem/meropenem) resistance	5592	0.2	6106	0.3	7280	0.3	15452	0.4	17083	0.4	>#
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	5590	44.4	5950	43.3	6945	44.9	16043	41.7	18417	40.6	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	5408	20.2	6079	19.0	7134	18.4	15901	16.0	18383	15.9	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	5389	14.6	5763	12.9	6454	13.7	15622	11.4	17961	11.6	<
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1999	55.9	2246	55.8	2546	54.6	5832	53.6	7692	57.6	
	Carbapenem (imipenem/meropenem) resistance	1999	33.2	2303	33.8	2633	29.5	5660	26.8	7327	28.5	<
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	2000	53.6	2248	56.0	2562	55.7	5752	52.7	7691	54.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1956	34.0	2300	36.1	2571	34.5	5693	27.0	7679	32.6	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1940	29.7	2174	32.7	2352	31.6	5587	24.8	7559	30.3	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	1074	28.7	1146	29.8	1309	23.2	2938	23.9	3768	24.1	<
	Ceftazidime resistance	1068	21.7	1160	23.0	1332	20.0	2974	19.9	3798	19.1	<
	Carbapenem (imipenem/meropenem) resistance	1082	22.8	1206	23.3	1433	19.6	3014	15.8	3793	13.7	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	1080	24.6	1166	24.7	1390	25.1	2994	22.9	3874	21.7	<#
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1050	17.2	1203	19.1	1428	18.0	2983	12.8	3859	11.4	<
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	1082	19.8	1205	19.8	1434	17.2	3006	14.9	3882	13.1	<
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	664	78.2	702	78.5	868	78.7	1383	79.2	1588	79.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	664	81.6	697	79.9	804	79.2	1368	81.1	1636	82.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	656	74.7	704	76.4	836	76.1	1369	77.0	1636	78.8	>#
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	650	72.5	692	74.7	763	72.6	1351	75.7	1569	76.5	>#
<i>S. aureus</i>	MRSA	3000	34.1	2981	33.6	3591	33.9	8263	34.0	9108	35.6	>#
<i>S. pneumoniae</i>	Penicillin non-wild-type **	389	12.3	399	6.5	522	10.5	928	9.2	1017	11.9	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	428	23.4	464	22.4	599	22.7	1095	20.3	1299	22.2	
	Combined penicillin non-wild-type and resistance to macrolides	347	5.5	361	4.4	474	5.3	879	4.7	989	6.7	
<i>E. faecalis</i>	High-level gentamicin resistance	1249	47.8	1441	45.3	1630	45.9	2927	39.9	2211	35.2	<
<i>E. faecium</i>	Vancomycin resistance	756	11.2	941	13.4	1049	14.6	2273	18.9	2839	21.3	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Latvia

National institutions/organisations participating in EARS-Net:
Disease Prevention and Control Center of Latvia, www.spkc.gov.lv

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Latvia 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	90	90	90	90	90
Geographical representativeness	Medium	High	High	High	High
Hospital representativeness	Medium	Medium	Medium	Medium	Medium
Blood culture sets/1000 patient days	6.7	6.6	6.1	8	9.5
Patient and isolate representativeness	Medium	Medium	Medium	Medium	Medium

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Latvia 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	94	88	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	13	27	21	53	100*

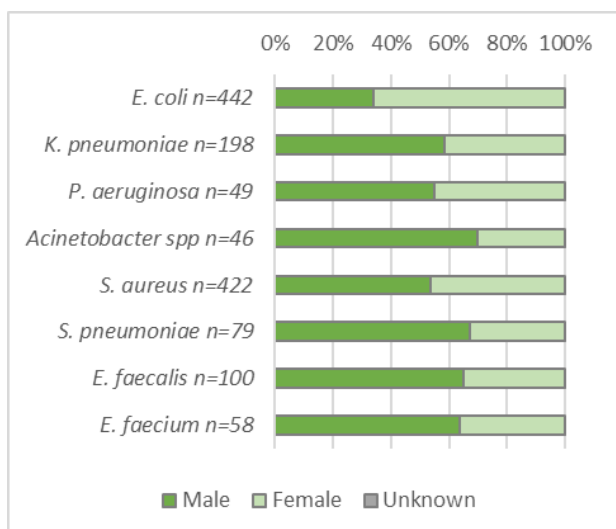
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Latvia 2015-2019

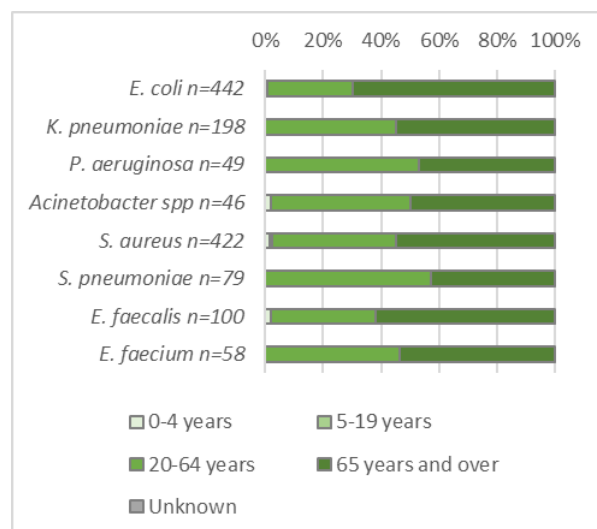
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	11	201	35	11	253	20	12	205	23	11	348	27	10	442	20
<i>K. pneumoniae</i>	11	115	55	8	95	37	7	116	41	13	204	36	9	198	32
<i>P. aeruginosa</i>	6	13	23	5	16	31	4	14	64	4	39	31	6	49	44
<i>Acinetobacter</i> spp.	6	61	69	7	82	62	7	34	62	7	51	65	8	46	61
<i>S. aureus</i>	15	253	21	14	286	21	11	229	22	14	376	20	11	422	20
<i>S. pneumoniae</i>	9	64	56	8	63	60	9	53	38	7	69	38	6	79	33
<i>E. faecalis</i>	10	60	45	12	89	37	8	74	38	10	89	38	10	100	25
<i>E. faecium</i>	10	34	50	6	56	46	5	39	54	7	49	41	8	58	43

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Latvia, 2019



Proportion of isolates by patient age group, by microorganism, Latvia, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Latvia 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	192	53.6	247	55.1	202	60.4	347	56.2	438	57.8	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	201	17.9	253	24.1	205	22.0	348	20.4	442	19.7	
	Carbapenem (imipenem/meropenem) resistance	192	0.0	246	0.0	203	0.0	346	0.0	439	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	194	27.8	245	27.8	201	30.3	344	24.1	442	24.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	191	14.1	244	12.7	201	13.4	348	8.9	440	11.6	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	191	10.5	242	10.3	197	11.2	344	7.0	440	9.3	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	115	47.0	95	47.4	116	33.6	204	37.7	198	36.9	<
	Carbapenem (imipenem/meropenem) resistance	112	0.0	90	2.2	116	1.7	204	0.5	198	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	112	42.0	91	41.8	116	32.8	200	38.5	198	36.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	113	43.4	91	38.5	115	29.6	203	31.0	198	28.3	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	112	36.6	91	31.9	115	24.3	199	27.6	198	25.3	<
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	11	27.3	15	26.7	14	35.7	39	35.9	45	35.6	N/A
	Ceftazidime resistance	13	23.1	15	26.7	14	42.9	39	33.3	49	32.7	N/A
	Carbapenem (imipenem/meropenem) resistance	13	15.4	16	31.3	14	57.1	39	28.2	49	32.7	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	13	23.1	16	31.3	14	64.3	39	23.1	49	28.6	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	11	9.1	15	20.0	14	42.9	39	28.2	49	22.4	N/A
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	13	15.4	16	18.8	14	42.9	39	30.8	49	22.4	N/A
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	61	68.9	82	73.2	34	79.4	51	78.4	46	84.8	>#
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	60	78.3	68	85.3	33	81.8	47	80.9	24	83.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	61	59.0	81	77.8	33	78.8	48	60.4	44	68.2	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	60	46.7	67	67.2	32	75.0	44	56.8	22	50.0	
<i>S. aureus</i>	MRSA	251	5.6	284	4.2	210	5.7	315	5.7	421	7.4	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	59	8.5	61	11.5	51	17.6	69	10.1	79	10.1	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	58	5.2	52	5.8	28	3.6	66	9.1	76	5.3	
	Combined penicillin non-wild-type and resistance to macrolides	53	1.9	51	3.9	28	3.6	66	6.1	76	3.9	
<i>E. faecalis</i>	High-level gentamicin resistance	58	36.2	87	46.0	72	45.8	86	32.6	93	44.1	
<i>E. faecium</i>	Vancomycin resistance	34	17.6	56	28.6	39	25.6	48	35.4	58	39.7	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Lithuania

National institutions/organisations participating in EARS-Net:

National Public Health Surveillance Laboratory, www.nvspl.lt | Institute of Hygiene, www.hi.lt

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Lithuania 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	90	100	100	100	100
Geographical representativeness	High	High	High	High	High
Hospital representativeness	Unknown	High	High	High	High
Blood culture sets/1000 patient days	Unknown	7.1	6.3	5.3	6.1
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Lithuania 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	94	89
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

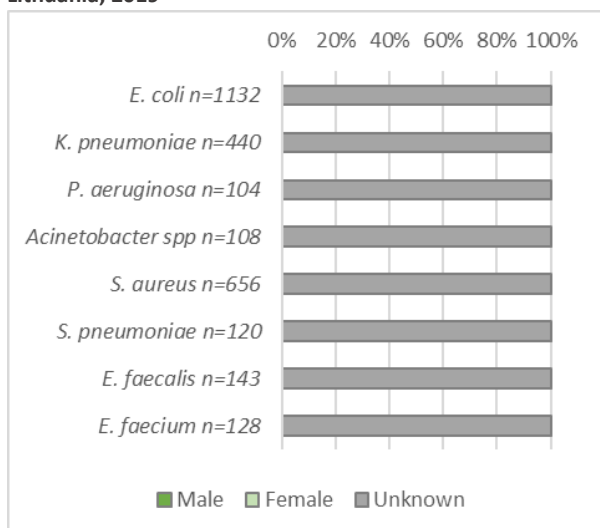
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Lithuania 2015-2019

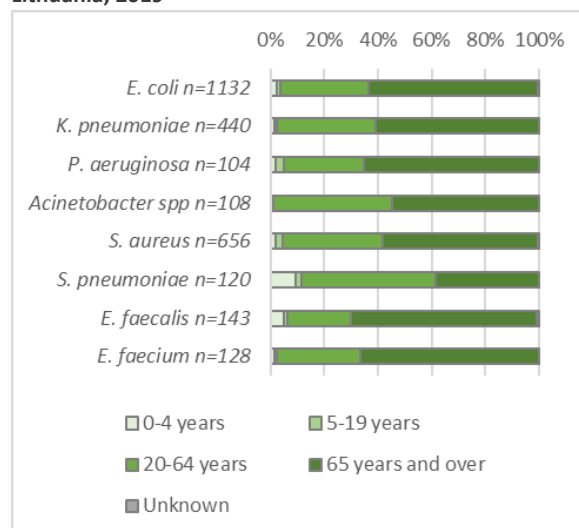
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	15	583	22	17	797	21	16	852	19	17	1109	17	18	1132	20
<i>K. pneumoniae</i>	12	179	39	16	326	33	15	326	30	17	371	24	17	440	28
<i>P. aeruginosa</i>	9	41	37	13	74	36	13	89	36	13	101	32	17	104	32
<i>Acinetobacter</i> spp.	11	73	62	11	87	64	12	87	56	13	88	58	13	108	57
<i>S. aureus</i>	14	376	27	17	505	23	16	515	20	18	693	24	18	656	21
<i>S. pneumoniae</i>	14	87	45	12	99	28	14	109	27	13	93	29	16	120	38
<i>E. faecalis</i>	12	81	38	13	86	31	13	111	26	14	138	25	15	143	30
<i>E. faecium</i>	8	52	40	13	61	38	13	80	33	14	99	34	14	128	38

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Lithuania, 2019



Proportion of isolates by patient age group, by microorganism, Lithuania, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Lithuania 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	582	59.6	794	59.2	845	57.8	1106	59.0	1129	59.1	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	581	16.0	795	14.7	852	16.8	1109	15.3	1132	13.9	
	Carbapenem (imipenem/meropenem) resistance	579	0.0	793	0.0	849	0.0	1100	0.0	1122	0.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	583	20.6	790	19.7	849	25.2	1104	19.7	1129	18.0	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	583	10.1	791	8.0	848	8.3	1103	7.9	1129	7.6	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	581	4.3	783	2.6	845	4.4	1098	4.6	1126	4.5	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	178	51.7	326	56.7	326	63.2	371	55.8	440	55.0	
	Carbapenem (imipenem/meropenem) resistance	177	0.0	325	0.0	325	0.6	371	0.3	438	3.4	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	179	45.8	324	54.6	326	64.7	370	56.8	438	52.1	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	179	46.4	325	49.2	322	53.7	369	48.5	435	39.8	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	178	39.9	323	42.1	322	48.1	368	45.1	433	35.3	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	41	29.3	74	13.5	89	18.0	101	17.8	102	23.5	
	Ceftazidime resistance	41	19.5	74	10.8	88	14.8	101	11.9	103	15.5	
	Carbapenem (imipenem/meropenem) resistance	41	26.8	74	16.2	89	24.7	101	21.8	104	16.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	41	26.8	73	15.1	89	21.3	101	12.9	104	17.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	41	24.4	74	14.9	89	13.5	101	9.9	103	12.6	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	41	24.4	74	10.8	89	16.9	101	11.9	104	12.5	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	73	80.8	87	81.6	87	88.5	88	89.8	108	85.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	73	93.2	87	87.4	86	91.9	88	90.9	108	91.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	73	90.4	87	82.8	86	81.4	87	85.1	107	83.2	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	73	76.7	87	75.9	85	77.6	87	85.1	107	78.5	
<i>S. aureus</i>	MRSA	376	8.5	503	11.3	514	8.8	691	8.4	656	9.3	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	87	16.1	99	16.2	109	15.6	93	19.4	120	10.8	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	72	12.5	94	18.1	107	15.9	92	20.7	119	10.1	
	Combined penicillin non-wild-type and resistance to macrolides	72	11.1	94	12.8	107	11.2	92	13.0	119	7.6	
<i>E. faecalis</i>	High-level gentamicin resistance	63	44.4	45	35.6	60	36.7	65	27.7	78	41.0	
<i>E. faecium</i>	Vancomycin resistance	52	17.3	61	21.3	80	36.3	99	31.3	128	39.8	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Luxembourg

National institutions/organisations participating in EARS-Net:

National Health Laboratory

Microbiology Laboratory, Centre Hospitalier de Luxembourg

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Luxembourg 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	100	100	100	100	Unknown
Geographical representativeness	High	High	Unknown	High	Unknown
Hospital representativeness	Unknown	Unknown	Unknown	High	Unknown
Blood culture sets/1000 patient days	Unknown	26	Unknown	28.2	Unknown
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	Unknown

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Luxembourg 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

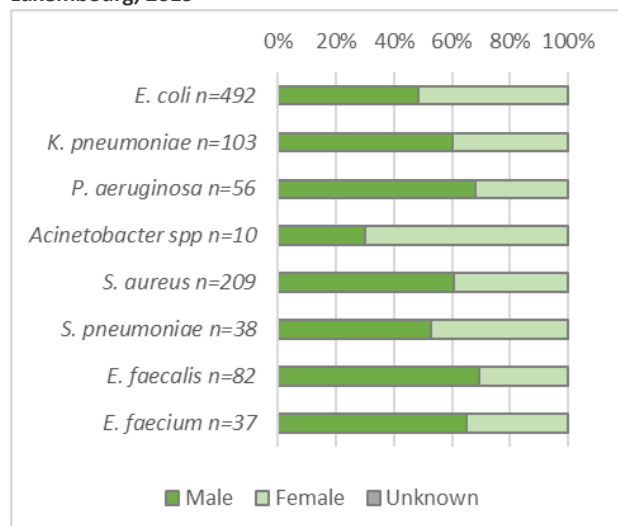
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Luxembourg 2015-2019

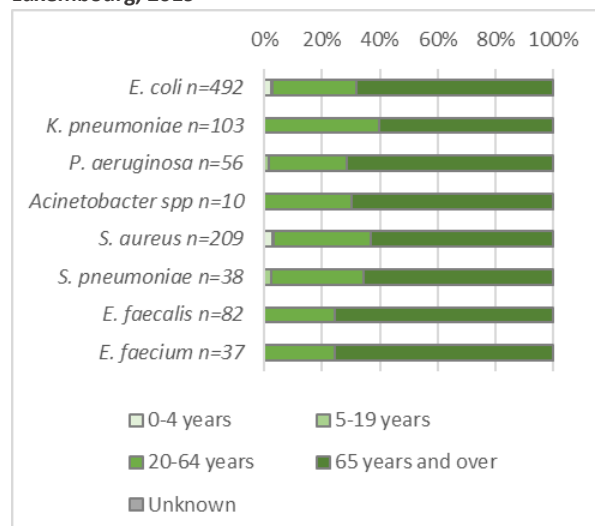
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	5	347	7	4	419	11	4	433	8	4	424	11	4	492	8
<i>K. pneumoniae</i>	4	60	19	4	78	25	4	99	21	4	85	18	4	103	18
<i>P. aeruginosa</i>	4	28	17	4	40	15	4	56	21	4	59	7	4	56	18
<i>Acinetobacter spp.</i>	2	8	0	2	8	38	2	8	0	2	11	9	3	10	20
<i>S. aureus</i>	7	135	21	4	188	25	4	200	17	4	181	13	4	209	15
<i>S. pneumoniae</i>	5	29	17	4	51	10	4	49	12	4	45	21	4	38	11
<i>E. faecalis</i>	5	58	17	4	48	24	4	87	27	4	51	20	4	82	24
<i>E. faecium</i>	4	23	55	4	31	20	4	34	32	4	29	18	4	37	32

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Luxembourg, 2019



Proportion of isolates by patient age group, by microorganism, Luxembourg, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Luxembourg 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	347	60.2	419	53.2	433	55.9	420	55.2	492	57.5	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	347	12.7	418	13.6	433	9.7	424	12.5	492	12.6	
	Carbapenem (imipenem/meropenem) resistance	347	0.0	418	0.0	433	0.0	424	0.0	492	0.6	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	347	24.2	418	28.9	433	22.9	418	21.8	492	20.5	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	347	8.9	418	9.1	433	10.4	423	7.3	492	10.2	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	347	5.2	418	3.8	433	3.5	417	3.8	492	3.9	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	60	28.3	78	35.9	99	27.3	85	29.4	103	25.2	
	Carbapenem (imipenem/meropenem) resistance	60	0.0	78	0.0	99	0.0	85	0.0	103	1.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	60	20.0	78	35.9	99	28.3	85	24.7	103	27.2	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	60	15.0	78	26.9	99	18.2	85	20.0	103	17.5	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	60	13.3	78	24.4	99	17.2	85	15.3	103	13.6	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	27	0.0	40	12.5	54	11.1	56	12.5	44	2.3	
	Ceftazidime resistance	28	7.1	40	5.0	56	12.5	59	8.5	56	3.6	
	Carbapenem (imipenem/meropenem) resistance	24	8.3	31	6.5	56	10.7	54	11.1	31	9.7	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	28	17.9	40	12.5	56	12.5	59	22.0	56	8.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	28	3.6	40	15.0	56	5.4	53	3.8	56	1.8	
	Combined resistance to ≥ 3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	28	3.6	40	2.5	56	5.4	59	3.4	56	0.0	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	7	**	8	**	8	**	6	**	8	**	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	8	**	8	**	8	**	11	0.0	10	10.0	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	8	**	8	**	8	**	11	0.0	10	0.0	N/A
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	7	**	8	**	8	**	6	**	8	**	N/A
<i>S. aureus</i>	MRSA	135	8.9	187	10.2	200	9.5	181	7.7	209	6.2	
<i>S. pneumoniae</i>	Penicillin non-wild-type ***	27	3.7	51	13.7	45	6.7	45	11.1	38	21.1	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	29	0.0	51	15.7	49	8.2	45	11.1	38	7.9	
	Combined penicillin non-wild-type and resistance to macrolides	27	0.0	51	7.8	45	4.4	45	4.4	38	2.6	
<i>E. faecalis</i>	High-level gentamicin resistance	56	14.3	48	12.5	82	22.0	45	6.7	82	4.9	<
<i>E. faecium</i>	Vancomycin resistance	23	0.0	31	0.0	34	0.0	28	0.0	37	2.7	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** Less than 10 isolates reported, no percentage calculated

*** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Malta

National institutions/organisations participating in EARS-Net:
Malta Mater Dei Hospital, Msida

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Malta 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	95	95	95	95	95
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	22.7	25	26.3	29.2	28.5
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Malta 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

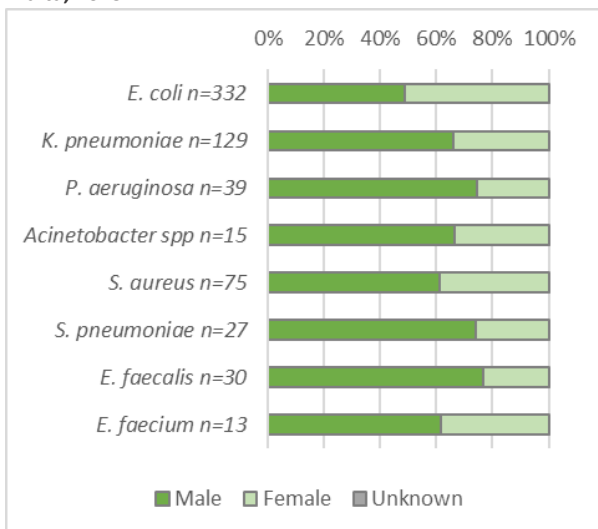
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Malta 2015-2019

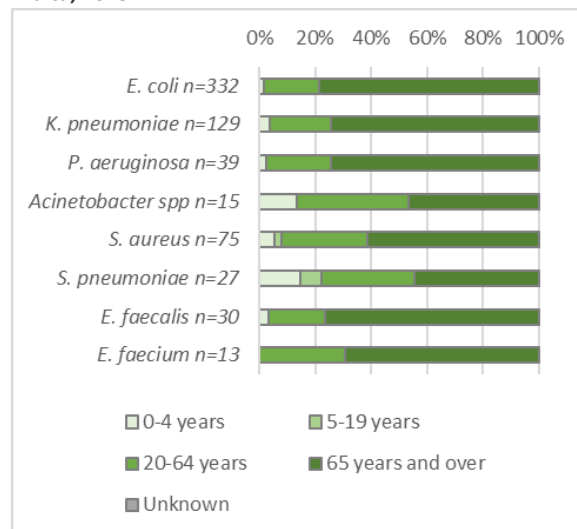
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	1	238	2	1	328	4	1	314	1	1	332	2	1	332	1
<i>K. pneumoniae</i>	1	88	15	1	102	10	1	117	10	1	137	13	1	129	10
<i>P. aeruginosa</i>	1	25	8	1	40	5	1	37	19	1	29	14	1	39	23
<i>Acinetobacter spp.</i>	1	15	18	1	7	29	1	9	0	1	9	0	1	15	7
<i>S. aureus</i>	1	87	4	1	97	9	1	97	1	1	90	10	1	75	7
<i>S. pneumoniae</i>	1	20	5	1	10	0	1	19	7	1	37	0	1	27	0
<i>E. faecalis</i>	1	31	7	1	33	3	1	29	5	1	32	6	1	30	3
<i>E. faecium</i>	1	6	0	1	12	25	1	13	10	1	15	0	1	13	8

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Malta, 2019



Proportion of isolates by patient age group, by microorganism, Malta, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Malta 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	238	55.5	328	60.1	314	59.6	332	59.6	332	64.8	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	238	11.8	328	14.6	314	15.6	332	15.4	332	17.5	
	Carbapenem (imipenem/meropenem) resistance	238	0.0	328	0.0	314	0.0	332	0.0	332	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	238	37.4	328	41.5	314	43.3	332	41.9	332	40.1	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	238	12.2	328	10.4	314	10.8	332	9.9	332	9.9	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	238	7.1	328	5.5	314	6.4	332	4.5	332	5.1	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	88	15.9	102	21.6	117	35.0	137	53.3	129	37.2	>
	Carbapenem (imipenem/meropenem) resistance	88	4.5	102	5.9	117	10.3	136	15.4	129	7.8	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	88	26.1	102	33.3	117	39.3	137	55.5	129	44.2	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	88	22.7	102	22.5	117	31.6	137	46.7	129	26.4	>
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	88	14.8	102	14.7	117	28.2	137	43.8	129	22.5	>
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	25	16.0	40	10.0	37	18.9	29	17.2	39	15.4	
	Ceftazidime resistance	25	8.0	40	7.5	37	13.5	29	13.8	39	15.4	
	Carbapenem (imipenem/meropenem) resistance	25	16.0	40	12.5	37	10.8	29	3.4	39	7.7	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	25	12.0	40	10.0	37	10.8	29	0.0	39	12.8	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	25	16.0	40	7.5	37	10.8	29	0.0	39	5.1	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	25	12.0	40	5.0	37	8.1	29	3.4	39	7.7	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	15	13.3	7	**	9	**	9	**	15	0.0	N/A
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	15	13.3	7	**	9	**	9	**	15	6.7	N/A
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	15	13.3	7	**	9	**	8	**	14	0.0	N/A
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	15	6.7	7	**	9	**	8	**	14	0.0	N/A
<i>S. aureus</i>	MRSA	87	49.4	97	37.1	95	42.1	88	36.4	75	24.0	<
<i>S. pneumoniae</i>	Penicillin non-wild-type ***	20	35.0	10	10.0	19	31.6	37	24.3	27	33.3	N/A
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	20	40.0	9	**	19	36.8	37	24.3	25	28.0	N/A
	Combined penicillin non-wild-type and resistance to macrolides	20	25.0	9	**	19	26.3	37	13.5	25	20.0	N/A
<i>E. faecalis</i>	High-level gentamicin resistance	29	27.6	33	39.4	29	34.5	31	22.6	30	26.7	
<i>E. faecium</i>	Vancomycin resistance	6	**	12	8.3	13	0.0	15	26.7	13	0.0	N/A

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** Less than 10 isolates reported, no percentage calculated

*** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Netherlands

National institutions/organisations participating in EARS-Net:

National Institute for Public Health and the Environment, www.rivm.nl

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Netherlands 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	70	70	70	72	70
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	Unknown	Unknown
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Netherlands 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	73	85	85	92	89
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	93	100	100	100	100*

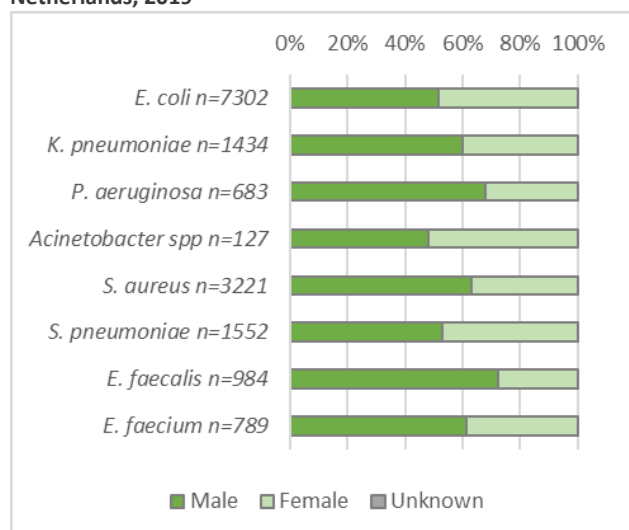
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Netherlands 2015-2019

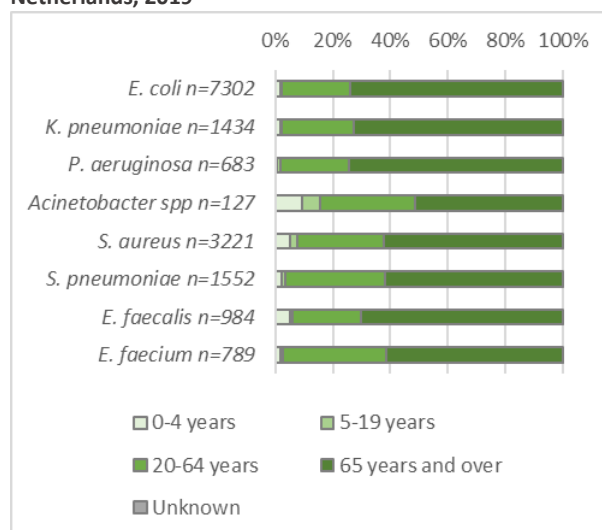
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	36	7076	7	36	7251	7	37	7515	6	39	8276	5	35	7302	5
<i>K. pneumoniae</i>	36	1198	9	36	1321	9	37	1330	10	39	1521	7	35	1434	7
<i>P. aeruginosa</i>	36	624	18	36	660	13	37	738	14	39	808	11	35	683	12
<i>Acinetobacter</i> spp.	28	96	15	35	136	10	34	132	16	36	149	14	31	127	13
<i>S. aureus</i>	36	2770	11	36	3044	9	37	3045	9	39	3568	9	35	3221	9
<i>S. pneumoniae</i>	36	1701	12	36	1736	9	37	1708	9	39	1938	8	35	1552	7
<i>E. faecalis</i>	36	830	17	36	933	18	37	1014	15	39	1087	15	35	984	14
<i>E. faecium</i>	36	756	44	35	867	44	37	882	39	39	1008	35	35	789	37

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Netherlands, 2019



Proportion of isolates by patient age group, by microorganism, Netherlands, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Netherlands 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	7070	47.7	7246	46.1	7512	46.0	8272	46.0	7301	45.4	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	7074	6.1	7250	6.6	7509	6.4	8270	7.3	7300	7.5	>
	Carbapenem (imipenem/meropenem) resistance	7070	0.0	7245	0.0	7506	0.0	8272	0.0	7299	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	7074	13.2	7249	12.9	7511	14.4	8274	14.7	7298	14.6	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	7074	6.1	7248	6.2	7512	5.9	8275	6.3	7301	7.0	>#
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	7073	2.0	7247	2.3	7504	2.1	8268	2.2	7296	2.6	>#
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1198	9.4	1320	10.5	1329	10.9	1520	10.7	1434	9.6	
	Carbapenem (imipenem/meropenem) resistance	1197	0.2	1317	0.1	1330	0.5	1520	0.5	1433	0.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1198	7.3	1320	7.1	1330	11.7	1521	11.6	1432	11.1	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1198	6.9	1320	6.8	1330	7.4	1521	7.0	1434	6.0	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1198	3.6	1320	3.9	1329	4.7	1520	4.4	1432	3.5	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	603	5.5	635	4.1	696	7.0	764	6.2	621	5.8	
	Ceftazidime resistance	624	4.3	660	3.3	738	3.5	805	2.7	662	3.5	
	Carbapenem (imipenem/meropenem) resistance	622	3.7	660	4.4	736	4.5	805	5.1	682	5.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	624	5.6	659	6.1	738	9.1	808	8.9	682	10.4	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	624	2.6	658	2.4	738	3.7	808	2.4	683	1.6	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	624	2.2	660	2.3	738	2.0	808	1.9	683	1.9	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	94	4.3	132	0.0	130	0.8	148	4.7	124	0.8	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	96	5.2	134	2.2	132	3.0	149	7.4	127	7.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	96	9.4	131	3.1	130	3.1	148	4.7	124	3.2	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	94	3.2	128	0.0	129	0.8	147	4.8	122	0.8	
<i>S. aureus</i>	MRSA	2770	1.6	3041	1.2	3045	1.6	3566	1.2	3221	1.6	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	1498	1.9	1544	2.5	1532	3.4	1713	3.0	1360	4.0	>
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	1560	3.4	1602	3.1	1597	5.1	1806	3.9	1406	4.8	>#
	Combined penicillin non-wild-type and resistance to macrolides	1357	0.9	1410	0.5	1422	1.0	1583	0.9	1215	1.3	
<i>E. faecalis</i>	High-level gentamicin resistance	519	22.7	661	25.3	708	23.6	757	22.5	604	20.0	
<i>E. faecium</i>	Vancomycin resistance	756	1.9	866	1.0	881	1.4	1006	1.3	786	0.9	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Norway

National institutions/organisations participating in EARS-Net:

University Hospital of North Norway

Norwegian Institute of Public Health

St. Olav University Hospital, Trondheim

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Norway 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	100	100	100	94	94
Geographical representativeness	High	High	High	High	High
Hospital representativeness	Unknown	Unknown	High	High	High
Blood culture sets/1000 patient days	56.9	63.2	Unknown	47.4	86.7
Patient and isolate representativeness	Unknown	Unknown	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Norway 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	89	89
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

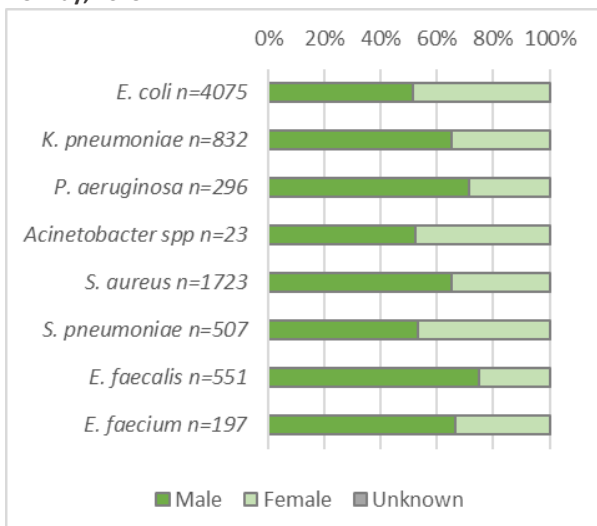
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Norway 2015-2019

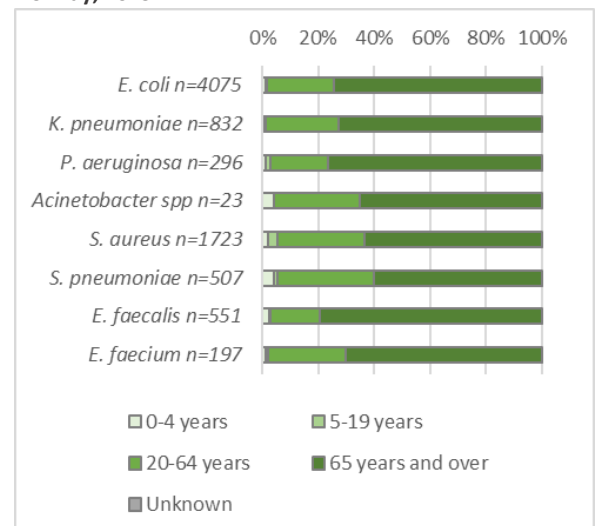
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	18	3302	5	18	3618	4	18	3734	4	18	3880	3	18	4075	3
<i>K. pneumoniae</i>	18	701	7	18	811	5	18	781	5	18	738	5	18	832	5
<i>P. aeruginosa</i>	18	230	7	18	227	5	18	205	5	18	250	5	18	296	4
<i>Acinetobacter spp.</i>	11	32	13	12	33	6	12	31	10	11	32	13	12	23	5
<i>S. aureus</i>	18	1457	7	18	1485	5	18	1507	6	18	1630	6	18	1723	6
<i>S. pneumoniae</i>	18	429	5	18	504	3	18	482	6	18	506	6	18	507	5
<i>E. faecalis</i>	18	439	8	18	530	7	18	526	7	18	525	6	18	551	6
<i>E. faecium</i>	18	186	11	18	215	16	18	209	10	18	174	10	18	197	7

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Norway, 2019



Proportion of isolates by patient age group, by microorganism, Norway, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Norway 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	3299	45.8	3615	42.9	3731	42.2	3880	42.3	4072	41.0	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	3301	6.0	3617	5.6	3734	5.9	3879	6.8	4075	6.2	
	Carbapenem (imipenem/meropenem) resistance	3297	0.0	3616	0.1	3733	0.1	3879	0.0	4040	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	3298	10.2	3611	10.9	3731	13.6	3877	12.9	4068	11.3	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	3301	6.0	3614	5.5	3732	7.2	3880	5.7	4074	5.6	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	3298	1.9	3609	1.9	3729	2.4	3876	2.0	4068	1.7	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	701	5.0	811	5.8	781	5.8	737	7.5	832	7.7	>
	Carbapenem (imipenem/meropenem) resistance	700	0.1	810	0.0	781	0.0	736	0.1	826	0.2	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	700	5.0	808	4.3	781	10.2	735	13.1	832	8.8	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	700	3.6	809	3.3	781	4.2	737	5.3	831	6.1	>
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	699	2.3	807	2.6	781	3.2	735	3.8	831	3.9	>
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	227	5.7	215	7.4	183	6.0	227	5.7	270	4.1	
	Ceftazidime resistance	216	5.6	224	7.1	197	5.1	240	6.3	282	3.9	
	Carbapenem (imipenem/meropenem) resistance	228	5.7	225	6.7	205	3.4	250	4.8	296	7.4	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	230	5.2	227	5.7	205	4.9	250	10.4	296	5.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	219	0.9	213	0.9	183	0.5	236	0.8	292	0.3	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	230	1.3	227	2.6	205	1.5	250	2.4	296	2.0	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	32	9.4	33	0.0	31	0.0	32	0.0	23	0.0	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	32	9.4	33	3.0	31	0.0	32	0.0	23	0.0	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	32	9.4	32	3.1	31	0.0	32	0.0	23	4.3	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	32	9.4	32	0.0	31	0.0	32	0.0	23	0.0	<
<i>S. aureus</i>	MRSA	1453	1.2	1448	1.2	1462	1.0	1547	0.9	1644	1.1	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	429	5.4	500	4.4	480	4.8	500	5.0	504	6.3	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	403	4.0	473	5.3	439	5.5	460	7.6	459	5.7	
	Combined penicillin non-wild-type and resistance to macrolides	403	1.7	469	2.3	439	2.5	454	3.5	457	3.5	
<i>E. faecalis</i>	High-level gentamicin resistance	163	9.8	221	15.8	216	14.4	216	13.4	182	12.1	
<i>E. faecium</i>	Vancomycin resistance	185	0.0	213	1.9	202	4.5	171	2.3	196	1.0	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Poland

National institutions/organisations participating in EARS-Net:

National Medicines Institute, Department of Epidemiology and Clinical Microbiology

National Reference Centre for Susceptibility Testing

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Poland 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	14	20	19	17	17
Geographical representativeness	Medium	Medium/High	Medium/High	Medium	Medium
Hospital representativeness	Medium	High	High	Medium	Medium
Blood culture sets/1000 patient days	31.9	30.3	38.1	38.6	39.8
Patient and isolate representativeness	Medium	High	High	Medium	Medium

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Poland 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	93	92	96	93	98
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

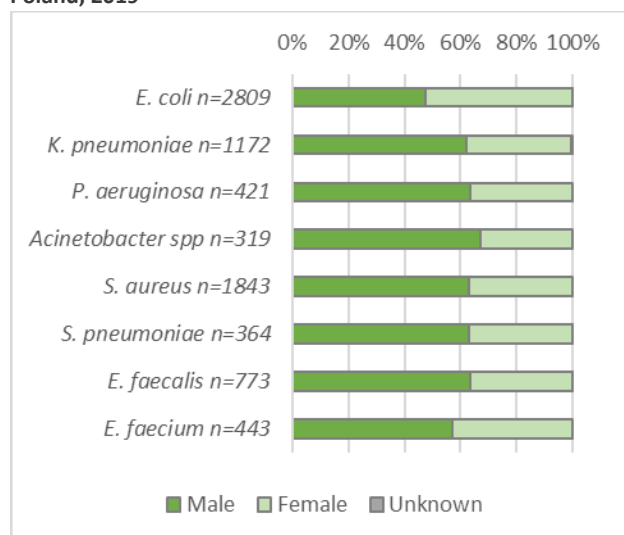
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Poland 2015-2019

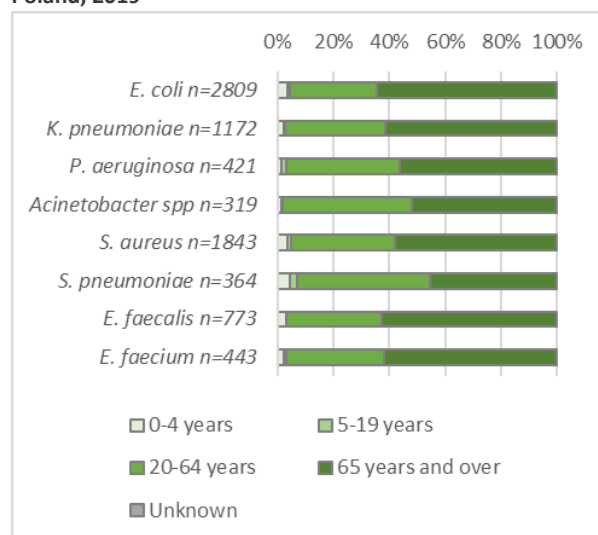
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	48	1616	13	67	2735	15	65	2881	30	55	2627	27	54	2809	31
<i>K. pneumoniae</i>	47	679	37	66	1142	36	65	1203	43	53	1221	47	55	1172	45
<i>P. aeruginosa</i>	40	260	39	60	403	32	64	417	46	54	394	45	54	421	40
<i>Acinetobacter spp.</i>	38	246	59	53	394	51	56	352	60	48	290	63	46	319	64
<i>S. aureus</i>	48	1192	17	65	1842	18	66	1848	33	57	1986	30	55	1843	34
<i>S. pneumoniae</i>	40	230	14	57	343	15	60	374	30	53	369	28	49	364	29
<i>E. faecalis</i>	47	432	40	65	743	32	65	758	48	53	733	43	53	773	48
<i>E. faecium</i>	41	216	38	55	405	31	60	410	44	49	385	44	53	443	43

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Poland, 2019



Proportion of isolates by patient age group, by microorganism, Poland, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Poland 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	346	64.7	1034	64.5	913	69.4	890	64.3	836	61.6	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1610	11.9	2719	13.7	2866	16.7	2620	17.6	2803	17.1	>#
	Carbapenem (imipenem/meropenem) resistance	1499	0.1	2553	0.0	2741	0.0	2500	0.1	2683	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1571	27.9	2637	33.1	1832	35.9	2567	34.7	2753	33.0	>#
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1581	11.2	2521	13.3	2719	14.0	2449	15.1	2614	12.6	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1532	6.1	2411	8.5	1666	8.2	2386	10.5	2564	9.3	>#
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	676	64.2	1142	64.4	1203	63.0	1219	64.6	1166	58.3	<#
	Carbapenem (imipenem/meropenem) resistance	660	0.5	1123	2.1	1161	6.4	1183	8.1	1155	7.7	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	659	63.9	1119	66.8	739	66.3	1207	68.2	1159	61.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	666	58.6	1075	56.7	1165	55.5	1178	54.2	1128	47.5	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	645	54.0	1052	53.6	703	52.6	1162	51.5	1112	45.0	<
	<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	232	32.8	370	27.6	374	31.0	366	34.4	409	26.4
Ceftazidime resistance		259	27.8	401	19.5	415	24.6	390	26.9	418	20.1	
Carbapenem (imipenem/meropenem) resistance		254	37.0	397	26.2	393	24.2	374	33.2	409	24.4	
Fluoroquinolone (ciprofloxacin/levofloxacin) resistance		257	36.2	400	31.0	358	37.2	389	39.1	417	34.1	
Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance		258	30.6	367	25.6	384	25.5	384	26.0	402	19.7	<#
Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)		260	27.3	403	20.3	417	22.1	394	29.2	420	22.6	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	244	65.6	391	66.0	344	67.4	278	67.3	317	71.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	243	88.1	393	83.0	348	83.0	268	86.9	304	85.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	245	70.2	387	72.6	344	72.7	285	67.4	315	70.8	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	240	54.6	383	59.3	333	59.5	251	62.9	299	63.2	>#
<i>S. aureus</i>	MRSA	958	15.8	1772	16.4	1805	15.2	1959	15.9	1841	14.9	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	217	24.4	337	19.3	290	16.6	343	15.7	310	15.5	<#
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	206	30.6	277	30.3	253	24.5	309	24.9	312	25.0	
	Combined penicillin non-wild-type and resistance to macrolides	195	19.5	271	16.6	241	14.1	285	10.9	268	13.4	<#
<i>E. faecalis</i>	High-level gentamicin resistance	388	46.4	666	43.1	660	41.2	645	41.6	706	40.2	
<i>E. faecium</i>	Vancomycin resistance	215	17.7	405	26.2	400	31.5	374	35.8	432	44.0	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Portugal

National institutions/organisations participating in EARS-Net:
National Institute of Health Doutor Ricardo Jorge, www.insarj.pt
Ministry of Health Directorate-General of Health
Directorate-General of Health

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Portugal 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	96	97	97	97	97
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	195.4	Unknown	148.1	206.9	244.2
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Portugal 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	92	88	88	83	93
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	97	99	100	98	100*

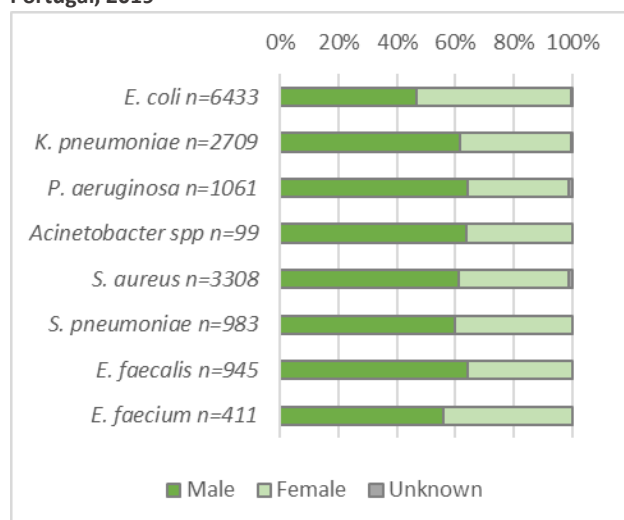
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Portugal 2015-2019

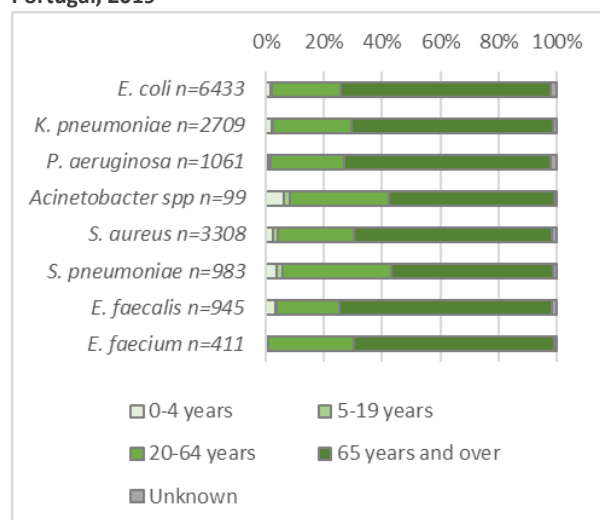
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	58	5377	5	60	5786	4	62	6452	4	59	5921	4	58	6433	4
<i>K. pneumoniae</i>	58	2099	10	59	2352	12	61	2743	10	58	2604	10	55	2709	9
<i>P. aeruginosa</i>	56	1192	15	57	1230	13	57	1220	13	55	1115	12	54	1061	11
<i>Acinetobacter</i> spp.	43	312	17	39	207	22	36	174	16	39	127	18	30	99	14
<i>S. aureus</i>	57	3645	7	59	3482	7	64	3789	5	59	3940	7	59	3308	6
<i>S. pneumoniae</i>	51	843	3	57	928	3	54	1056	1	55	1062	Unknown	53	983	Unknown
<i>E. faecalis</i>	53	981	10	56	972	2	58	1014	8	56	979	9	54	945	9
<i>E. faecium</i>	43	459	22	45	411	2	46	467	16	47	440	16	43	411	15

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Portugal, 2019



Proportion of isolates by patient age group, by microorganism, Portugal, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Portugal 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	5177	57.8	5772	59.2	6245	56.2	5895	55.1	5933	58.5	
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	5376	16.1	5784	16.1	6441	15.6	5881	14.7	6390	16.1	
	Carbapenem (imipenem/meropenem) resistance	5354	0.1	5760	0.0	6384	0.3	5797	0.5	6372	0.1	>#
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	5371	29.7	5783	28.9	6424	27.3	5868	25.5	6431	26.5	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	5372	13.8	5765	13.1	6387	11.9	5825	12.2	6428	12.1	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	5366	7.6	5762	7.7	6365	6.6	5746	6.2	6384	6.3	<
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	2094	40.4	2349	46.7	2743	44.9	2579	50.0	2697	47.6	>
	Carbapenem (imipenem/meropenem) resistance	2085	3.4	2340	5.2	2720	8.6	2563	11.7	2690	10.9	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	2094	38.6	2350	41.7	2736	45.7	2592	43.8	2704	45.8	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	2090	32.6	2337	35.0	2717	33.5	2572	34.4	2708	32.2	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	2084	25.0	2332	27.2	2711	28.4	2538	26.7	2692	26.5	
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	1176	24.5	1230	22.7	1206	24.2	1096	21.9	1054	20.3	<
	Ceftazidime resistance	1185	19.2	1228	18.0	1216	18.6	1090	18.6	1054	17.6	
	Carbapenem (imipenem/meropenem) resistance	1191	19.8	1227	19.2	1215	18.3	1108	15.7	1052	17.8	<#
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	1185	22.7	1227	20.1	1208	23.7	1104	23.7	1057	21.6	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1191	13.5	1230	11.6	1210	12.1	1109	11.9	1060	9.9	<
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	1186	16.9	1230	14.8	1214	16.1	1108	15.3	1056	14.1	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	307	57.7	206	51.9	172	40.7	127	30.7	90	31.1	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	308	55.8	206	50.5	172	38.4	123	34.1	88	26.1	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	310	46.5	206	39.3	168	28.6	126	25.4	93	24.7	<
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	302	45.0	206	37.9	166	24.1	123	22.0	83	20.5	<
<i>S. aureus</i>	MRSA	3619	46.8	3454	43.6	3728	39.2	3810	38.1	3265	34.8	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	797	11.2	884	12.2	997	12.8	986	13.4	887	13.9	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	822	16.3	912	14.4	1024	14.8	985	15.5	952	12.8	
	Combined penicillin non-wild-type and resistance to macrolides	776	6.4	868	6.6	978	7.1	922	8.0	865	7.5	
<i>E. faecalis</i>	High-level gentamicin resistance	872	33.3	851	33.8	931	25.8	778	26.6	881	22.2	<
<i>E. faecium</i>	Vancomycin resistance	459	20.3	411	7.5	461	7.2	436	4.4	410	9.0	<

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

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Romania

National institutions/organisations participating in EARS-Net:
National Institute of Public Health

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Romania 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	15	Unknown	Unknown	11	11
Geographical representativeness	Unknown	Unknown	Unknown	Poor	Poor
Hospital representativeness	Unknown	Unknown	Unknown	Poor	Poor
Blood culture sets/1000 patient days	Unknown	Unknown	Unknown	34	21
Patient and isolate representativeness	Unknown	Unknown	Unknown	Poor	Poor

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Romania 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	94	87	93	93	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	28	31	38	69	100*

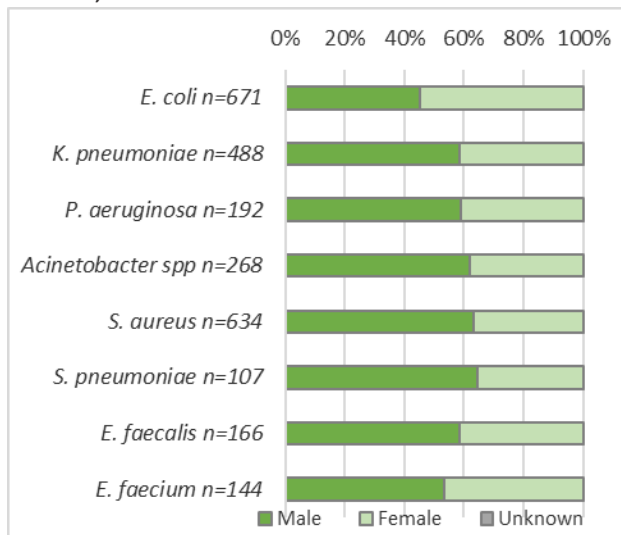
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Romania 2015-2019

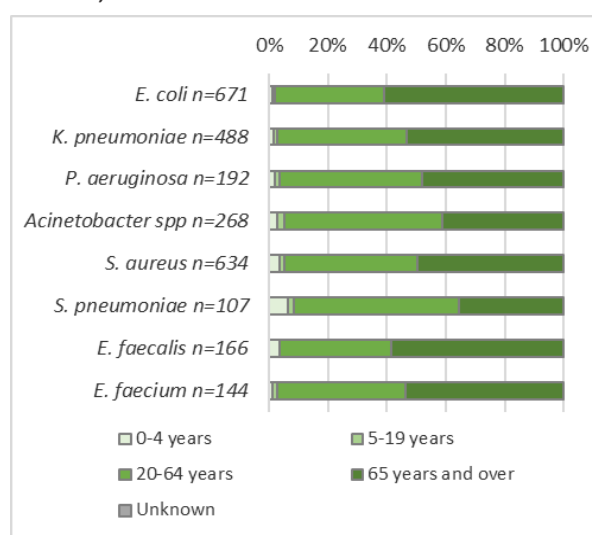
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	12	371	10	13	420	10	14	518	14	17	654	13	15	671	12
<i>K. pneumoniae</i>	13	271	39	13	344	40	14	339	43	17	443	44	15	488	43
<i>P. aeruginosa</i>	11	92	49	13	93	39	14	132	46	17	156	40	14	192	44
<i>Acinetobacter spp.</i>	13	190	56	13	160	54	12	183	73	17	218	73	15	268	75
<i>S. aureus</i>	13	424	22	14	495	25	14	535	23	17	626	24	14	634	23
<i>S. pneumoniae</i>	9	70	1	8	60	12	11	81	22	12	93	24	11	107	15
<i>E. faecalis</i>	12	113	21	13	115	37	14	128	37	17	178	25	14	166	35
<i>E. faecium</i>	10	72	38	13	78	47	13	64	45	15	79	43	14	144	48

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Romania, 2019



Proportion of isolates by patient age group, by microorganism, Romania, 2019



Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Romania 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	259	73.0	376	72.3	494	68.2	542	62.2	538	63.0	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	369	26.8	418	23.4	518	18.7	654	20.2	664	20.3	<
	Carbapenem (imipenem/meropenem) resistance	368	1.9	411	1.0	510	0.4	653	0.0	666	0.6	<#
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	371	30.7	418	30.6	518	26.4	646	29.1	654	28.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	366	18.3	414	15.0	513	15.2	649	12.8	594	11.6	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	364	13.5	410	11.7	513	9.7	641	7.2	576	7.3	<
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	270	70.7	344	68.0	339	62.5	443	61.4	479	64.1	<#
	Carbapenem (imipenem/meropenem) resistance	271	24.7	334	31.4	334	22.5	441	29.5	470	32.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	267	61.4	342	60.8	337	64.1	441	57.4	471	62.0	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	266	54.1	336	61.9	338	58.6	436	50.9	411	53.0	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	261	49.8	335	55.2	336	55.4	434	46.3	402	52.0	
	<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	78	59.0	86	48.8	131	52.7	135	45.9	178	52.8
Ceftazidime resistance		85	65.9	86	44.2	127	55.9	152	46.7	180	52.2	
Carbapenem (imipenem/meropenem) resistance		92	66.3	93	51.6	131	63.4	156	55.1	184	55.4	
Fluoroquinolone (ciprofloxacin/levofloxacin) resistance		92	62.0	89	51.7	132	62.1	155	52.3	184	52.2	
Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance		90	63.3	87	50.6	132	57.6	146	50.7	176	48.9	<
Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)		92	63.0	90	48.9	132	59.1	154	49.4	185	49.7	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	189	81.5	160	85.0	182	87.4	218	85.3	264	88.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	189	82.5	157	91.1	183	89.1	218	88.1	262	91.2	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	188	80.9	152	89.5	183	83.6	210	80.0	241	83.8	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	186	76.9	152	82.9	182	81.3	210	77.6	236	83.5	
<i>S. aureus</i>	MRSA	297	57.2	477	50.5	507	44.4	600	43.0	625	46.7	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	41	39.0	56	41.1	79	29.1	90	40.0	86	19.8	<#
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	20	30.0	59	37.3	76	26.3	93	32.3	92	17.4	<#
	Combined penicillin non-wild-type and resistance to macrolides	20	25.0	56	30.4	75	24.0	90	26.7	74	9.5	<
<i>E. faecalis</i>	High-level gentamicin resistance			87	56.3	89	44.9	168	37.5	155	40.6	NA
<i>E. faecium</i>	Vancomycin resistance	72	25.0	77	39.0	64	34.4	77	40.3	140	35.7	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Slovakia

National institutions/organisations participating in EARS-Net:
National Reference Centre for Antimicrobial Resistance
Public Health Authority of the Slovak Republic
Regional Public Health Authority Banska Bystrica

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Slovakia 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	75	70	68	64	56
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	20.1	20.3	20.8	23.7	36.1
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Slovakia 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	100	100
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

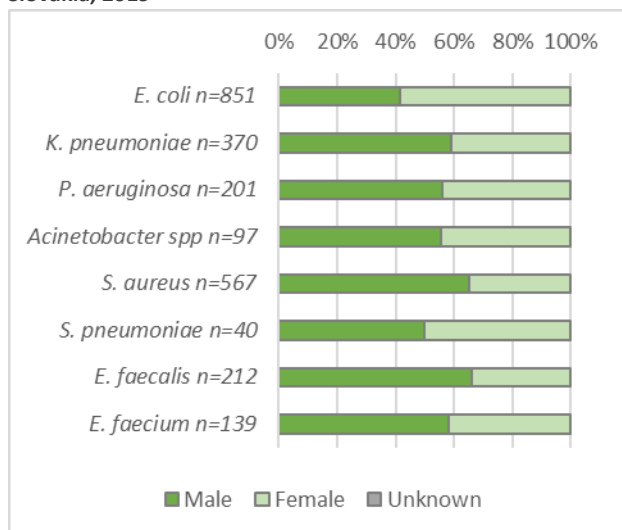
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Slovakia 2015-2019

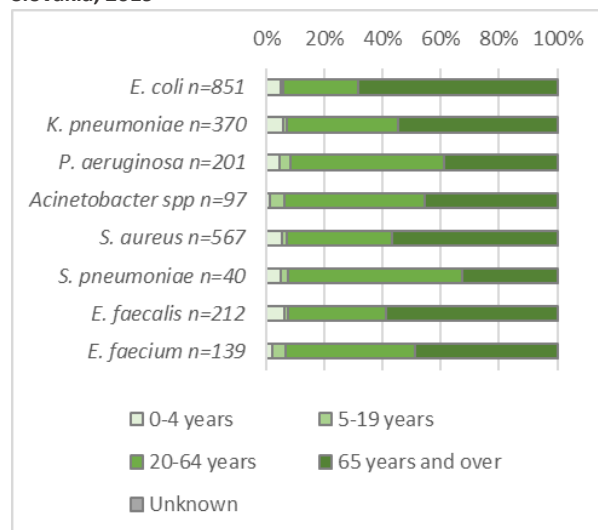
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	14	896	15	13	829	15	13	882	15	12	983	14	10	851	14
<i>K. pneumoniae</i>	14	475	35	13	466	28	13	468	32	11	505	33	10	370	26
<i>P. aeruginosa</i>	14	278	37	12	191	37	13	211	30	11	259	32	10	201	30
<i>Acinetobacter spp.</i>	14	154	35	13	115	32	13	126	39	11	146	36	8	97	44
<i>S. aureus</i>	14	583	22	13	572	26	13	614	21	12	627	25	10	567	18
<i>S. pneumoniae</i>	9	34	35	5	13	31	10	40	30	9	47	13	6	40	20
<i>E. faecalis</i>	14	255	33	13	233	24	13	226	29	12	256	32	10	212	32
<i>E. faecium</i>	14	146	37	12	126	33	11	122	32	11	168	33	10	139	32

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Slovakia, 2019



Proportion of isolates by patient age group, by microorganism, Slovakia, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Slovakia 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	878	62.8	817	62.3	853	64.9	967	61.7	849	57.8	<#
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	893	30.0	824	29.7	870	30.9	973	30.1	846	23.0	<
	Carbapenem (imipenem/meropenem) resistance	830	0.0	751	0.0	844	0.0	924	0.0	785	0.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	894	44.2	826	40.4	882	43.2	969	42.1	850	34.0	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	896	24.2	828	20.2	875	22.5	969	21.6	847	16.6	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	891	17.1	822	14.8	863	17.7	965	16.6	842	12.7	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	469	67.2	465	61.3	459	63.2	497	55.9	367	57.5	<
	Carbapenem (imipenem/meropenem) resistance	436	0.9	435	2.5	450	4.4	488	3.5	351	4.6	>#
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	474	70.0	466	66.3	466	66.7	497	61.0	367	56.9	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	475	66.5	466	62.4	468	61.1	496	54.8	369	49.3	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	468	59.6	465	55.7	457	57.1	491	49.5	366	45.1	<
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	257	37.0	165	27.3	180	33.3	236	28.0	175	28.0	<#
	Ceftazidime resistance	247	34.8	164	31.1	180	35.6	237	32.1	178	31.5	
	Carbapenem (imipenem/meropenem) resistance	262	51.9	182	42.3	202	47.0	248	44.0	197	39.1	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	278	52.2	190	47.4	211	46.9	252	52.4	201	46.3	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	277	41.9	191	33.0	211	36.0	254	37.4	199	33.2	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	270	40.0	183	33.3	202	38.1	248	35.5	197	30.5	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	142	28.2	109	28.4	120	31.7	141	44.0	96	55.2	>
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	154	51.9	115	46.1	126	52.4	141	56.0	94	61.7	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	154	42.9	115	40.9	125	40.0	144	44.4	97	46.4	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	142	23.2	109	24.8	119	25.2	139	36.0	93	41.9	>
<i>S. aureus</i>	MRSA	583	28.1	571	27.1	613	29.2	610	26.6	563	27.2	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	27	22.2	13	7.7	39	25.6	46	13.0	40	5.0	N/A
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	34	32.4	12	8.3	31	35.5	45	24.4	36	11.1	N/A
	Combined penicillin non-wild-type and resistance to macrolides	27	22.2	12	0.0	30	23.3	44	11.4	36	2.8	N/A
<i>E. faecalis</i>	High-level gentamicin resistance	234	49.1	213	45.1	213	25.8	215	40.0	201	32.8	<
<i>E. faecium</i>	Vancomycin resistance	143	14.7	125	26.4	122	32.0	161	32.3	137	29.2	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Slovenia

National institutions/organisations participating in EARS-Net:

National Institute of Public Health, www.nijz.si

Medical faculty, University of Ljubljana

"National Laboratory of Health, Environment and Food"

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Slovenia 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	99	99	99	99	99
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	35.1	35	41.2	36.8	40.4
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Slovenia 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	100	100	100	100	91
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	91	91	91	91	100*

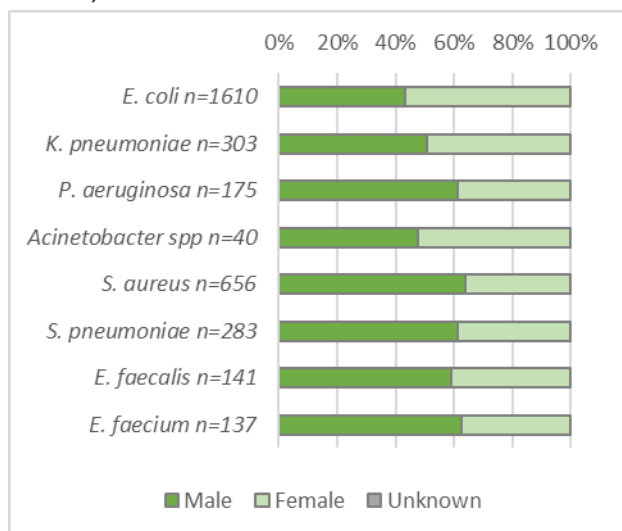
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Slovenia 2015-2019

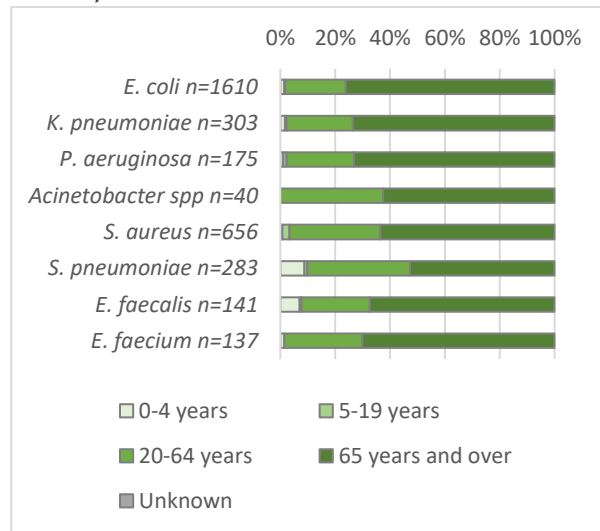
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	10	1326	9	10	1420	11	10	1435	9	10	1668	7	10	1610	6
<i>K. pneumoniae</i>	10	237	19	10	267	20	10	312	20	10	289	14	10	303	14
<i>P. aeruginosa</i>	10	141	27	10	143	40	10	138	30	10	174	24	10	175	26
<i>Acinetobacter spp.</i>	7	31	35	7	60	37	4	36	50	8	39	33	8	40	38
<i>S. aureus</i>	10	513	12	10	534	12	10	576	13	10	606	9	10	656	10
<i>S. pneumoniae</i>	10	323	14	10	269	12	10	319	10	10	271	13	10	283	10
<i>E. faecalis</i>	10	133	20	10	161	25	10	171	19	10	162	15	9	141	24
<i>E. faecium</i>	9	124	34	9	111	42	9	149	41	9	134	32	10	137	32

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Slovenia, 2019



Proportion of isolates by patient age group, by microorganism, Slovenia, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Slovenia 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	1326	54.8	1420	57.1	1435	51.6	1668	53.5	1610	51.7	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1326	13.7	1420	12.5	1435	12.5	1668	11.3	1610	9.8	<
	Carbapenem (imipenem/meropenem) resistance	1326	0.0	1420	0.0	1435	0.0	1668	0.0	1610	0.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1325	24.6	1420	25.6	1383	24.9	1668	22.8	1610	19.0	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1326	12.9	1420	10.6	1435	11.4	1668	9.4	1610	7.8	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1325	8.1	1420	6.9	1383	6.3	1668	4.7	1610	4.0	<
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	237	22.8	267	22.8	312	23.7	289	14.9	303	16.5	<
	Carbapenem (imipenem/meropenem) resistance	237	0.8	267	0.0	312	0.0	289	0.7	303	0.3	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	237	24.5	267	29.6	306	30.4	289	27.3	303	19.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	237	19.0	267	16.5	312	16.0	289	12.8	303	8.3	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	237	16.9	267	13.1	306	16.0	289	10.0	303	7.6	<
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	141	9.9	143	19.6	138	13.0	174	16.1	175	14.9	
	Ceftazidime resistance	141	9.9	143	17.5	138	13.0	174	14.9	175	16.0	
	Carbapenem (imipenem/meropenem) resistance	141	15.6	143	19.6	138	17.4	174	14.9	175	20.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	141	14.2	143	20.3	123	20.3	174	21.8	175	18.9	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	141	9.2	143	13.3	138	8.7	174	6.9	175	4.0	<
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	141	7.1	143	15.4	138	10.9	174	11.5	175	12.0	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	31	38.7	60	43.3	36	41.7	39	17.9	40	22.5	<
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	31	58.1	60	55.0	36	47.2	39	28.2	40	27.5	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	31	41.9	60	43.3	36	41.7	39	20.5	40	25.0	<
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	31	35.5	60	38.3	36	41.7	39	17.9	40	20.0	<
<i>S. aureus</i>	MRSA	513	9.2	534	11.0	576	9.0	606	11.7	656	7.5	
<i>S. pneumoniae</i>	Penicillin non-wild-type **	323	9.0	269	6.7	319	10.0	271	9.6	283	11.0	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	323	18.6	269	13.4	216	15.7	271	10.3	283	9.9	<
	Combined penicillin non-wild-type and resistance to macrolides	323	5.0	269	3.3	216	6.5	271	4.8	283	4.9	
<i>E. faecalis</i>	High-level gentamicin resistance	133	32.3	152	43.4	167	33.5	161	20.5	138	22.5	<
<i>E. faecium</i>	Vancomycin resistance	124	4.8	111	0.0	149	0.7	134	0.0	137	2.9	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

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Spain

National institutions/organisations participating in EARS-Net:

Health Institute Carlos III, www.isciii.es

National Centre for Microbiology

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Spain 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	40	38	37	31	32
Geographical representativeness	High	High	High	Medium	Medium
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	46.2	60.4	Unknown	57.3	67.6
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Spain 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	98	98	90	95	91
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	43	46	58	71	100*

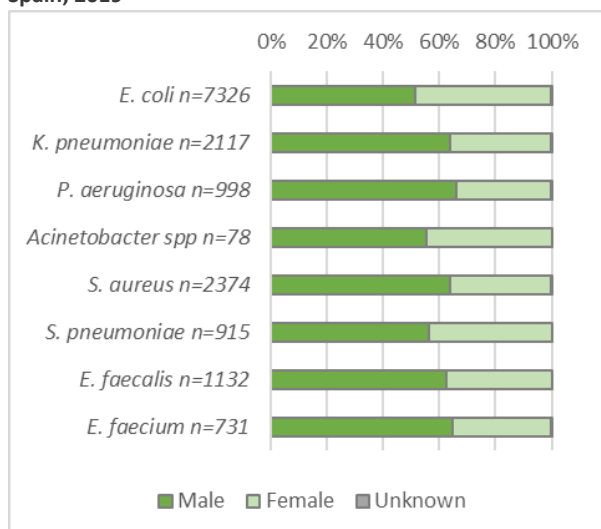
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Spain 2015-2019

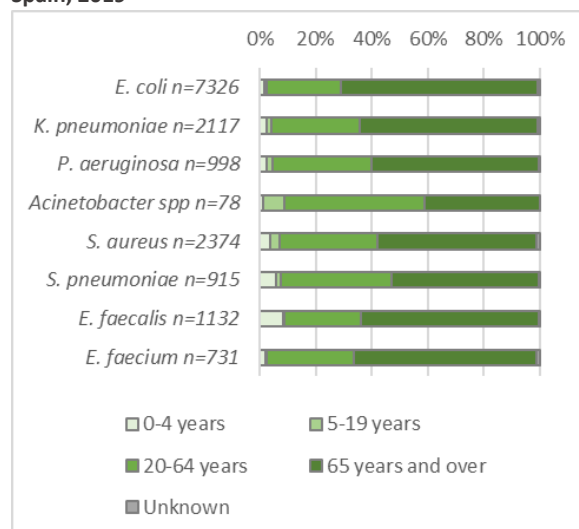
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	40	6493	6	38	6804	6	37	6032	6	39	7933	Unknown	37	7326	5
<i>K. pneumoniae</i>	40	1510	15	38	1680	13	36	1514	13	38	1995	Unknown	37	2117	Unknown
<i>P. aeruginosa</i>	40	884	22	37	843	19	36	869	17	38	1122	Unknown	37	998	15
<i>Acinetobacter spp.</i>	26	96	44	24	106	41	22	92	49	18	81	37	20	78	31
<i>S. aureus</i>	39	2003	13	37	1973	11	37	1925	12	39	2531	Unknown	39	2374	11
<i>S. pneumoniae</i>	36	672	10	36	672	8	34	752	8	37	1033	Unknown	35	915	Unknown
<i>E. faecalis</i>	39	992	21	37	988	18	36	969	19	38	1163	Unknown	36	1132	14
<i>E. faecium</i>	38	580	17	35	630	20	35	599	Unknown	37	769	Unknown	35	731	Unknown

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Spain, 2019



Proportion of isolates by patient age group, by microorganism, Spain, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Spain 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	6427	63.9	6795	64.1	5947	62.4	7599	62.9	6805	61.6	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	6428	11.6	6800	15.0	6027	12.8	7923	13.8	7318	14.0	>
	Carbapenem (imipenem/meropenem) resistance	6399	0.0	6794	0.1	6026	0.0	7924	0.0	7319	1.6	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	6484	31.6	6797	32.8	5781	32.5	7616	32.1	7166	29.7	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	6489	14.7	6800	14.5	6029	13.7	7924	14.1	7277	13.5	<
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	6416	5.5	6791	6.2	5774	5.5	7598	6.4	7112	6.2	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1491	20.3	1677	22.4	1513	21.3	1994	25.5	2110	23.9	>#
	Carbapenem (imipenem/meropenem) resistance	1483	2.2	1677	2.1	1510	2.8	1995	3.8	2112	4.4	>
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1508	21.6	1676	22.7	1486	22.5	1927	23.8	2089	22.5	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1509	16.0	1678	15.5	1513	17.4	1995	19.3	2084	16.7	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	1488	11.7	1674	12.4	1484	12.8	1926	15.7	2053	14.0	>#
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	869	8.5	817	7.8	813	7.4	1076	9.1	967	13.9	>#
	Ceftazidime resistance	816	10.4	836	10.2	862	9.6	1087	8.7	988	10.7	
	Carbapenem (imipenem/meropenem) resistance	872	22.7	842	21.4	861	18.4	1120	18.5	997	21.8	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	881	23.0	843	23.0	868	19.9	1102	20.1	995	17.9	<
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	883	16.4	843	15.3	864	12.4	1121	11.6	973	14.0	<#
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	874	14.0	843	14.0	863	10.7	1120	10.6	997	12.5	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	95	53.7	106	62.3	92	66.3	81	54.3	78	59.0	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	95	64.2	106	68.9	92	68.5	81	56.8	77	58.4	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	96	49.0	106	50.9	92	52.2	81	49.4	78	50.0	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	94	41.5	106	44.3	92	48.9	81	44.4	77	50.6	
<i>S. aureus</i>	MRSA	1969	25.3	1945	25.8	1856	25.1	2444	24.2	2374	19.2	<
<i>S. pneumoniae</i>	Penicillin non-wild-type **	665	23.5	643	25.0	735	22.3	981	18.5	835	18.8	<
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	631	21.2	630	24.9	717	21.8	1007	18.0	866	20.6	
	Combined penicillin non-wild-type and resistance to macrolides	624	11.7	612	13.7	701	12.4	957	9.6	796	10.6	
<i>E. faecalis</i>	High-level gentamicin resistance	936	40.0	952	37.5	873	36.9	1002	34.8	1007	34.1	<
<i>E. faecium</i>	Vancomycin resistance	571	2.5	628	2.1	570	1.8	764	2.5	729	1.2	

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

For more information on data cleaning and merging, please refer to the EARS-Net reporting protocol.

Sweden

National institutions/organisations participating in EARS-Net:
The Public Health Agency of Sweden, www.folkhalsomyndigheten.se

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, Sweden 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	75	75	57	51	78
Geographical representativeness	High	High	High	High	High
Hospital representativeness	High	High	High	High	High
Blood culture sets/1000 patient days	128.2	139	156.7	107	105.6
Patient and isolate representativeness	High	High	High	High	High

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, Sweden 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	89	100	100	100	95
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	100	100	100	100	100*

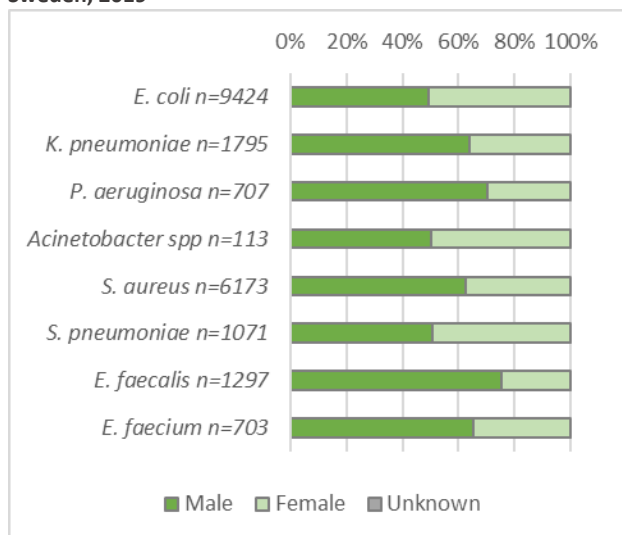
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), Sweden 2015-2019

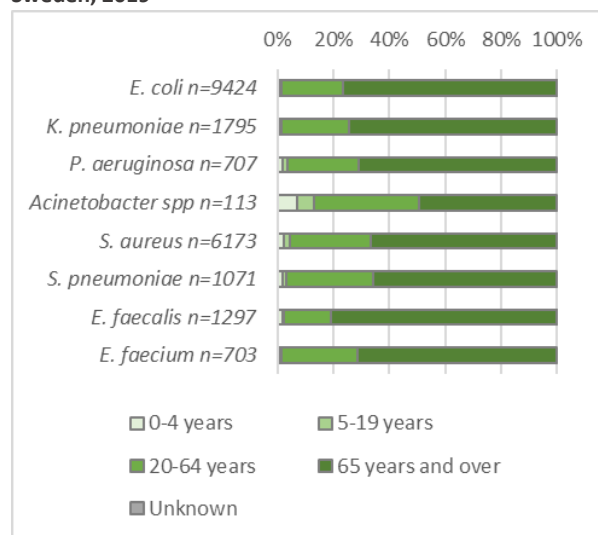
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	17	6768	Unknown	14	6970	Unknown	10	5807	Unknown	9	5392	Unknown	19	9424	Unknown
<i>K. pneumoniae</i>	17	1141	Unknown	15	1537	Unknown	10	1034	Unknown	9	1089	Unknown	19	1795	Unknown
<i>P. aeruginosa</i>	17	435	Unknown	13	473	Unknown	10	446	Unknown	9	412	Unknown	19	707	Unknown
<i>Acinetobacter</i> spp.	9	35	Unknown	12	86	Unknown	1	54	Unknown	1	55	Unknown	1	113	Unknown
<i>S. aureus</i>	17	3415	Unknown	15	3903	Unknown	11	3800	Unknown	9	3640	Unknown	20	6173	Unknown
<i>S. pneumoniae</i>	17	867	Unknown	14	904	Unknown	11	755	Unknown	9	676	Unknown	19	1071	Unknown
<i>E. faecalis</i>	17	868	Unknown	14	1019	Unknown	11	1630	Unknown	9	687	Unknown	19	1297	Unknown
<i>E. faecium</i>	17	412	Unknown	14	561	Unknown	11	622	Unknown	9	428	Unknown	19	703	Unknown

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, Sweden, 2019



Proportion of isolates by patient age group, by microorganism, Sweden, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, Sweden 2015-2019

Bacterial species	Antimicrobial group /agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	396	34.1	.	.	.	.	.	.	.	.
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	5995	6.2	6958	8.3	5790	7.4	5390	8.3	9419	7.8	>
	Carbapenem (imipenem/meropenem) resistance	5307	0.1	6927	0.1	5769	0.0	5388	0.0	9413	0.0	<#
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	5525	12.6	6947	13.7	5762	15.8	5378	18.1	9412	15.9	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	5761	6.4	6949	7.2	5758	6.5	5378	7.7	9410	6.0	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	5257	2.5	6939	3.1	5746	2.0	5368	3.1	9405	2.2	
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	1001	3.3	1537	4.9	1034	5.6	1089	5.5	1795	8.3	>
	Carbapenem (imipenem/meropenem) resistance	900	0.0	1531	0.1	1033	0.1	1088	0.2	1793	0.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	907	4.5	1533	5.4	1034	9.8	1087	10.1	1789	10.5	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	943	3.2	1141	3.4	1033	4.7	1087	3.0	1794	4.2	
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	860	1.9	1141	2.1	1033	3.3	1086	2.6	1789	3.2	>#
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	399	5.8	472	7.4	446	6.3	411	7.8	706	6.8	
	Ceftazidime resistance	379	4.5	473	7.4	446	4.5	412	6.1	706	5.1	
	Carbapenem (imipenem/meropenem) resistance	398	6.5	472	11.0	446	9.0	412	4.4	706	9.8	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	382	4.7	469	6.0	445	9.0	408	7.1	706	9.2	>#
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	387	1.3	471	0.8	444	0.9	411	1.0	707	2.3	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	386	2.6	472	5.3	446	3.1	412	1.9	706	3.5	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	34	2.9	84	1.2	54	0.0	54	3.7	112	3.6	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	26	3.8	86	4.7	54	0.0	55	7.3	113	8.0	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	26	3.8	85	5.9	51	0.0	55	5.5	113	5.3	
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	26	3.8	84	1.2	51	0.0	54	3.7	112	2.7	
<i>S. aureus</i>	MRSA	3124	0.8	3450	2.3	3787	1.2	3639	1.9	5948	1.8	>#
<i>S. pneumoniae</i>	Penicillin non-wild-type **	420	9.8	882	7.1	750	6.1	676	5.2	1070	6.5	<#
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	850	6.6	899	5.3	750	4.7	674	4.5	1069	6.5	
	Combined penicillin non-wild-type and resistance to macrolides	409	5.6	877	4.0	745	3.0	674	2.7	1068	3.7	
<i>E. faecalis</i>	High-level gentamicin resistance	579	12.6	722	13.4	945	13.3	627	12.8	1225	10.0	<#
<i>E. faecium</i>	Vancomycin resistance	408	0.0	546	0.4	530	0.0	428	1.4	693	1.0	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

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United Kingdom

National institutions/organisations participating in EARS-Net:

Public Health England, www.gov.uk/government/organisations/public-health-england

Health Protection Scotland, www.hps.scot.nhs.uk

Public Health Agency Northern Ireland

Public Health Wales, www.publichealthwales.org

Coverage and representativeness of population, hospitals and isolates included in EARS-Net, United Kingdom 2015-2019

	2015	2016	2017	2018	2019
Estimated national population coverage (%)	Unknown	Unknown	Unknown	Unknown*	Unknown*
Geographical representativeness	Unknown	Unknown	Unknown	Medium*	Medium*
Hospital representativeness	Unknown	Unknown	Unknown	High	High
Blood culture sets/1000 patient days	65.4	59.8	52	Unknown	Unknown
Patient and isolate representativeness	Unknown	Unknown	Unknown	High	High

* Estimated 100 % population coverage and high representativeness in Northern Ireland, Scotland and Wales.

Laboratories contributing data to EARS-Net: participation in EARS-Net EQA and use of clinical guidelines, United Kingdom 2015-2019

	2015	2016	2017	2018	2019
Percentage laboratories participating in EARS-Net EQA (%)	90	88	82	82	84
Percentage laboratories using EUCAST or EUCAST harmonised guidelines (%)	98	98	96	100	100*

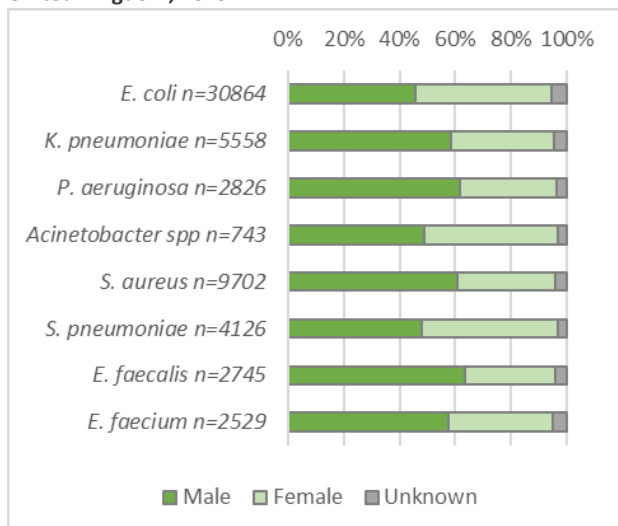
* Starting with 2019 data, EARS-Net was restricted to laboratories using EUCAST or EUCAST-harmonised methodology and breakpoints.

Annual number of reporting laboratories*, number of reported isolates and proportion of isolates reported from patients in intensive care units (ICU), United Kingdom 2015-2019

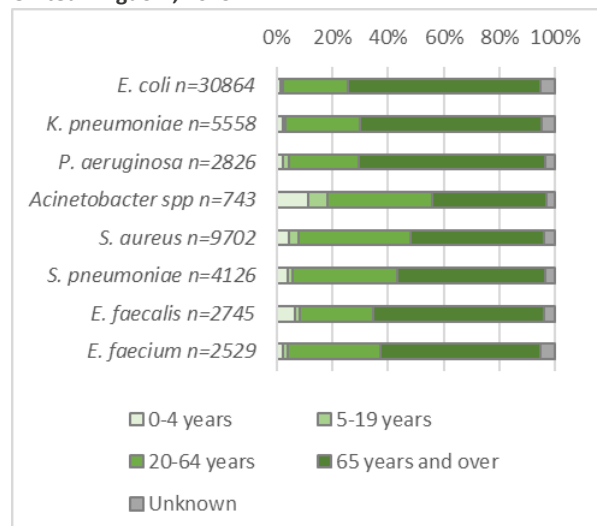
Bacterial species	2015			2016			2017			2018			2019		
	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)	Lab. (N)	Isolates (N)	Isolates from ICU (%)
<i>E. coli</i>	22	6117	Unknown	91	23714	Unknown	106	31579	Unknown	105	32571	Unknown	101	30864	Unknown
<i>K. pneumoniae</i>	22	1077	Unknown	89	4236	Unknown	105	5519	Unknown	104	5808	Unknown	100	5558	Unknown
<i>P. aeruginosa</i>	22	541	Unknown	87	2187	Unknown	104	2911	Unknown	100	2817	Unknown	98	2826	Unknown
<i>Acinetobacter</i> spp.	20	153	Unknown	77	615	Unknown	96	818	Unknown	91	746	Unknown	83	743	Unknown
<i>S. aureus</i>	47	3125	Unknown	92	7798	Unknown	106	10031	Unknown	103	9646	Unknown	101	9702	Unknown
<i>S. pneumoniae</i>	44	1126	Unknown	90	3522	Unknown	102	4373	Unknown	99	4571	Unknown	99	4126	Unknown
<i>E. faecalis</i>	22	422	Unknown	87	1868	Unknown	103	2792	Unknown	102	2887	Unknown	96	2745	Unknown
<i>E. faecium</i>	20	354	Unknown	85	1919	Unknown	101	2306	Unknown	98	2730	Unknown	98	2529	Unknown

* Number of laboratories reporting at least one isolate during the specific year. Please note that the total number of laboratories participating in EARS-Net might be higher.

Proportion of isolates by patient sex, by microorganism, United Kingdom, 2019



Proportion of isolates by patient age group, by microorganism, United Kingdom, 2019



Total number of invasive isolates tested (N) and percentage of isolates with resistance phenotype (%) and trend, by bacterial species and antimicrobial group/agent, United Kingdom 2015-2019

Bacterial species	Antimicrobial group/agent	2015		2016		2017		2018		2019		Trend 2015-2019*
		N	%	N	%	N	%	N	%	N	%	
<i>E. coli</i>	Aminopenicillin (amoxicillin/ampicillin) resistance	5117	65.8	21614	62.7	28647	62.5	29502	60.8	28228	60.3	<
	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	5169	11.3	21846	9.2	27925	10.3	28677	11.0	26593	11.5	>
	Carbapenem (imipenem/meropenem) resistance	5497	0.3	22762	0.0	30074	0.0	31229	0.0	29609	0.0	<
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	5812	15.6	22883	16.3	30185	17.5	31340	17.7	29703	17.8	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	6052	9.9	23166	9.9	30739	10.0	32119	10.5	30448	10.7	>
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	5119	4.5	21101	4.0	26808	4.1	27756	4.5	25761	4.7	>#
<i>K. pneumoniae</i>	Third-generation cephalosporin (cefotaxime/ceftriaxone/ceftazidime) resistance	916	10.5	3914	8.9	4973	11.4	5181	13.0	4867	13.2	>
	Carbapenem (imipenem/meropenem) resistance	962	0.4	4068	0.3	5274	0.6	5592	0.7	5275	0.7	>#
	Fluoroquinolone (ciprofloxacin/levofloxacin/ofloxacin) resistance	1011	13.3	4065	7.5	5293	9.3	5600	13.1	5302	12.8	>
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	1070	9.3	4135	6.7	5363	7.9	5709	9.1	5406	8.2	>#
	Combined resistance to third-generation cephalosporins, fluoroquinolones, and aminoglycosides	906	4.2	3764	3.7	4760	4.2	5005	5.7	4648	5.4	>#
<i>P. aeruginosa</i>	Piperacillin+tazobactam resistance	490	6.3	2039	6.0	2697	5.3	2589	5.6	2571	5.6	
	Ceftazidime resistance	472	6.1	2021	4.3	2680	4.7	2621	4.9	2631	5.0	
	Carbapenem (imipenem/meropenem) resistance	499	2.4	2108	5.1	2804	5.7	2748	6.0	2742	5.9	>
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	522	8.8	2119	6.9	2802	7.7	2739	9.8	2749	8.7	>#
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	539	5.2	2140	3.6	2831	3.9	2781	4.5	2792	4.3	
	Combined resistance to ≥3 antimicrobial groups (among piperacillin+tazobactam, ceftazidime, carbapenems, fluoroquinolones and aminoglycosides)	501	3.4	2131	2.5	2830	2.4	2771	3.0	2778	2.9	
<i>Acinetobacter</i> spp.	Carbapenem (imipenem/meropenem) resistance	132	0.8	584	1.5	782	2.8	714	1.8	718	2.1	
	Fluoroquinolone (ciprofloxacin/levofloxacin) resistance	139	7.2	589	4.4	793	6.3	720	2.9	707	7.1	
	Aminoglycoside (gentamicin/netilmicin/tobramycin) resistance	153	2.0	598	3.3	790	4.6	726	5.1	721	5.1	>#
	Combined resistance to carbapenems, fluoroquinolones and aminoglycosides	131	0.0	558	0.9	746	1.7	676	0.9	670	1.2	
<i>S. aureus</i>	MRSA	2757	10.8	6717	6.7	8883	6.9	9045	7.3	9114	6.0	<
<i>S. pneumoniae</i>	Penicillin non-wild-type ***	1095	7.8	3201	4.9	3963	5.3	4162	5.6	3667	5.5	
	Macrolide (erythromycin/clarithromycin/azithromycin) resistance	1077	6.9	3423	5.9	4273	5.6	4450	5.6	3871	5.5	
	Combined penicillin non-wild-type and resistance to macrolides	1060	2.6	3136	2.6	3885	1.9	4052	2.0	3427	2.3	
<i>E. faecalis</i>	High-level gentamicin resistance		.		.		.		.	19**	36.8	N/A
<i>E. faecium</i>	Vancomycin resistance	218	17.0	1803	17.0	2202	25.8	2615	24.7	2428	22.2	>

* > and < indicate significantly increasing and decreasing trends, respectively. # indicates a significant trend in the overall data, but no trend detected in data restricted to laboratories reporting continuously for all five years.

** Data from England not included.

*** For this report, the term penicillin non-wild-type refers to *S. pneumoniae* isolates reported by the local laboratories as 'susceptible, increased exposure' (I) or resistant (R) to penicillin, assuming MICs to benzylpenicillin above those of the wild-type isolates, i.e. >0.06 mg/L. The analysis is based on the qualitative susceptibility categories S, I and R, as quantitative susceptibility information was missing for a large proportion of the data. It should be understood that laboratories not using EUCAST clinical breakpoints might define the cut-off values for the susceptibility categories differently.

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