

HUSRES Annual Report 2016



This HUSRES 2016 report is based on the HUSLAB/Whonet database 2016, which contains data on more than 180.000 microbes. EUCAST 2016 clinical breakpoints have mainly been used. The antimicrobial agent dosages on which the breakpoints are based can be found at the end of the EUCAST Clinical Breakpoint Table version 6.0 at www.eucast.org .

The isolates originate from the patients of Helsinki University Central Hospital, of other hospitals in Helsinki Uusimaa region, and of outpatient health centers.

Previous annual reports from years 2000-2015 can be found at www.hus.fi/ammattilaiselle/huslab-ammattilaisille/tilastot.

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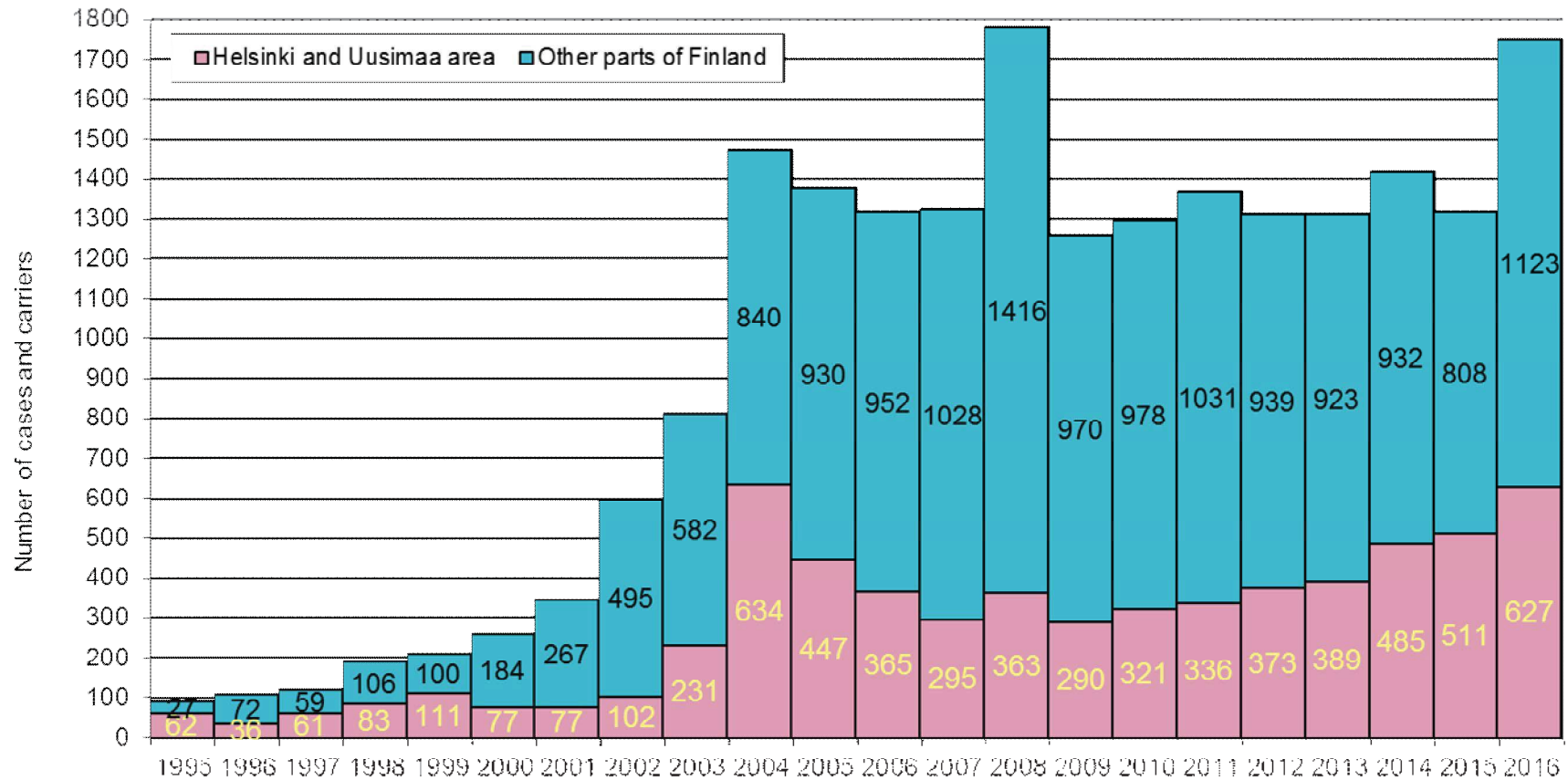


Susceptible (S) *Concentration of antimicrobial agent associated with a high likelihood of therapeutic success when using standard dosing.*

Intermediate (I) *Concentration of antimicrobial agent associated with a high likelihood of therapeutic success when using high dosing. I can be interpreted as S when high antibiotic concentrations will be reached in the infection focus, for example in urinary tract infections.*

Resistant (R) *Concentration of antimicrobial agent associated with a high likelihood of therapeutic failure.*

MRSA cases in Finland 1995 – 2016



Source of data: National Institute for Health and Welfare: Statistics database of infectious diseases

A. Pätäri-Sampo

Staphylococcus aureus 2016 (%R+I)

One isolate per patient: the first isolate with antibiotic result. MRSA screenings excluded.

Blood isolates	n	Oxa	Ery	Cli	Lev	Rif	Fus	Dox	Net	Lnz
HUCH	152	6	6	5	3	0	6	0	0	0
Jorvi Hospital	46	4	11	7	2	0	9	4	0	0
Peijas Hospital	78	5	8	8	8	1	4	5	0	0
Hyvinkää Hosp	37	3	11	5	5	0	8	3	0	0
Helsinki City H	154	6	9	6	5	1	4	3	0	0

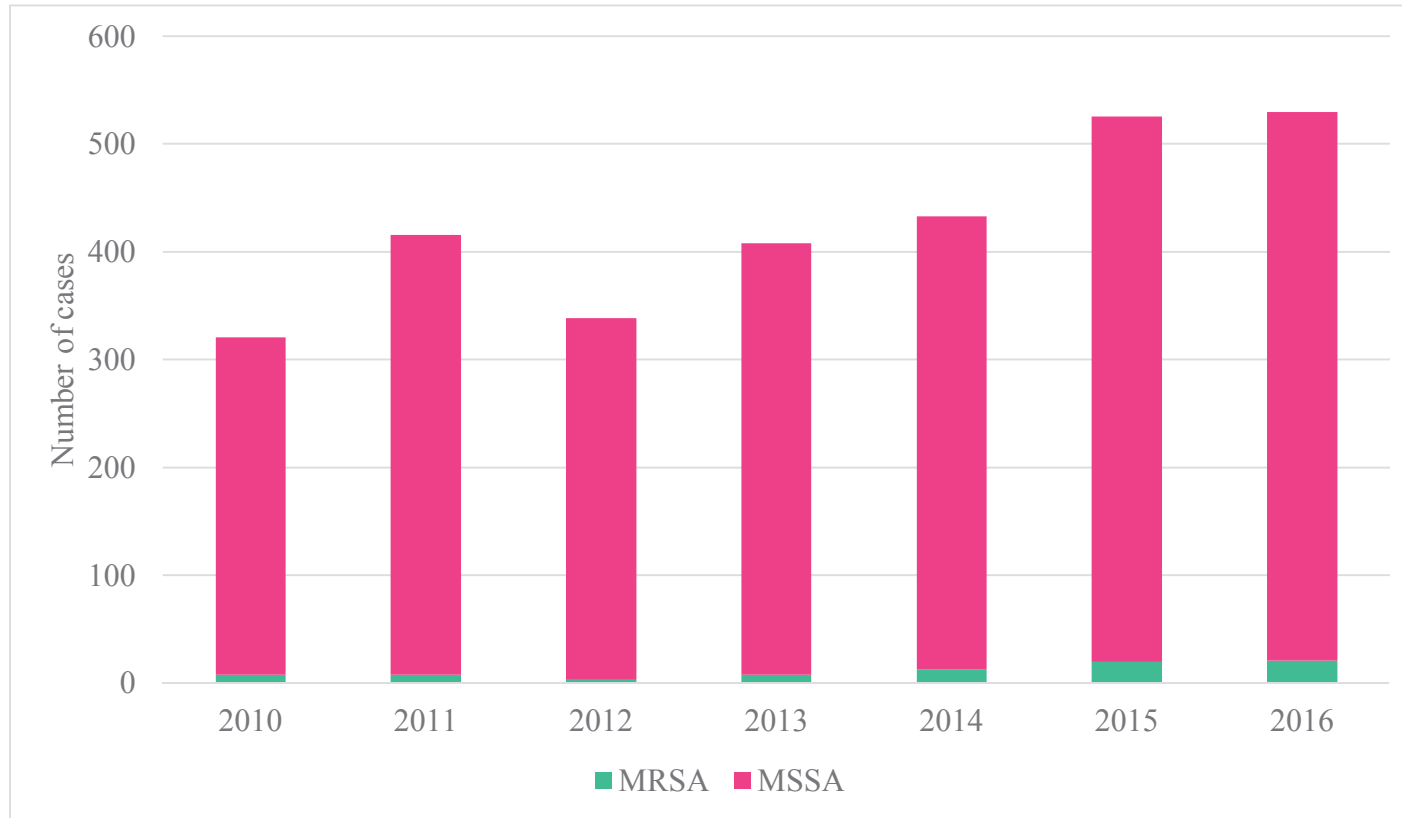
Pus isolates	n	Oxa	Ery	Cli	Lev	Rif	Fus	Dox	Net	Lnz
HUCH	2905	3	8	6	3	0	7	4	0	0
Jorvi Hospital	811	5	8	7	3	1	5	5	0	0
Peijas Hospital	435	3	6	6	3	0	5	3	0	0
Hyvinkää Hosp	392	2	9	8	3	0	5	4	1	0
Helsinki City H	622	7	9	7	6	0	6	3	0	0
Outpatients	4144	3	6	5	3		7			

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S.aureus adult bacteraemic cases 2010-2016

≥ 16 years old

HUSLAB material from Helsinki and Uusimaa districts



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Coagulase-negative staphylococci 2016 (%R+I)

Pus and blood isolates. HUSLAB material from Helsinki and Uusimaa districts.

One isolate per patient (the first isolate with antibiotic result).

	2016	n	Oxa	Ery	Cli	Lev	Rif	Fus	Dox	Net	Lnz	SxT
All coagulase-negative staphylococci		2968	57	46	34	37	6	47	18	11	0	27
<i>S. epidermidis</i>		1141	72	52	39	46	8	61	16	12	0	30
<i>S. lugdunensis</i>		315	2	10	8	0,3	0	7	10	0	0	1

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Beta-hemolytic streptococci 2016 (%R+I)

HUSLAB material from Helsinki and Uusimaa Districts.
One isolate per patient (first isolate with antibiotic result).

	S. pyogenes	S. agalactiae	Group C	Group G
Penicillin	0	0	0	0
Cephalosp. I gen	0	0	0	0
Erythromycin	4	16	7	14
Clindamycin	2	15	6	12
n	11 405	3935	1651	3830

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Streptococcus pneumoniae 2016 (%R+I)

HUSLAB material from Helsinki and Uusimaa districts.

One isolate per patient (first isolate with antibiotic result).

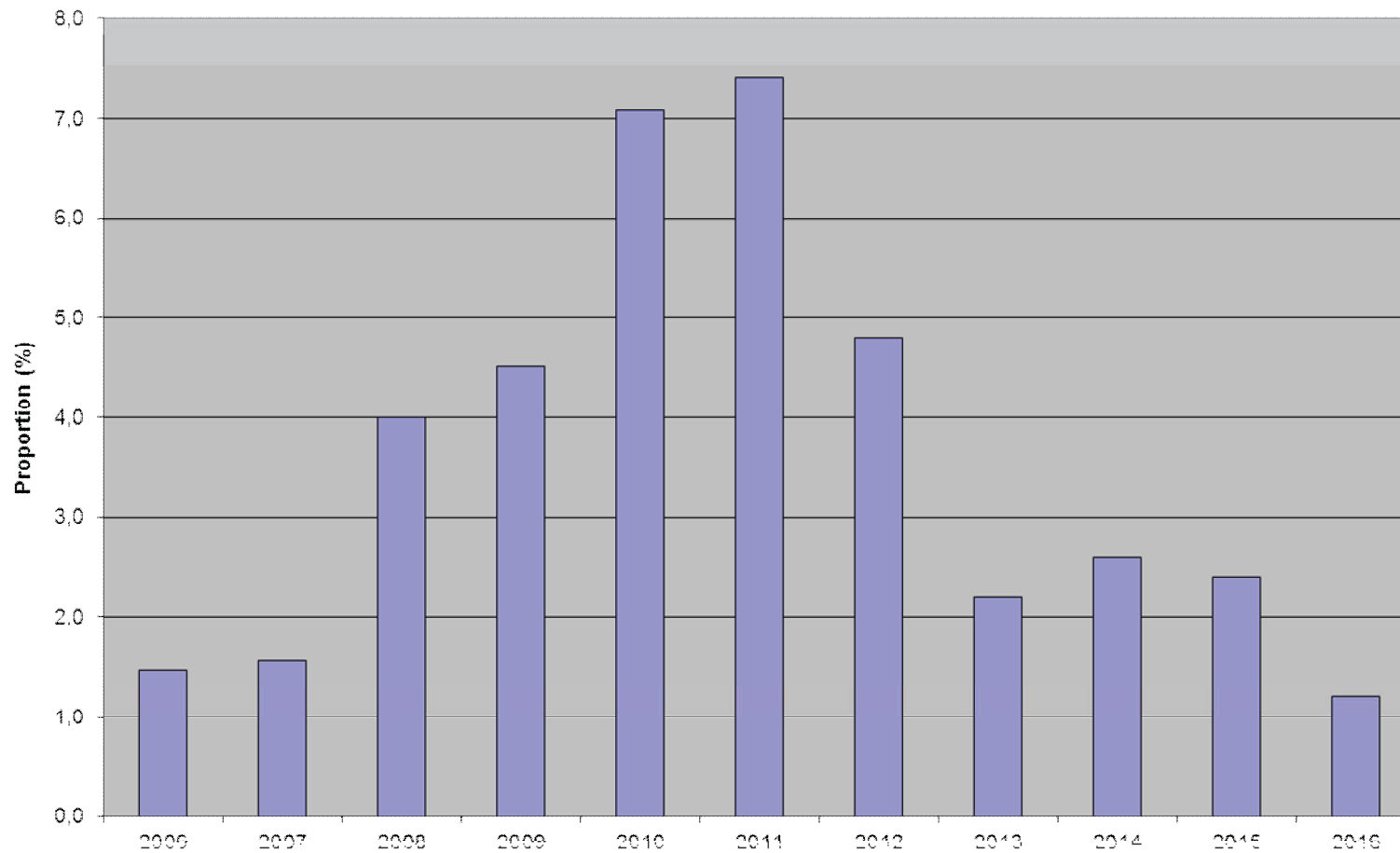
	Age ≥5 yr	Age <5 yr	Blood	Pus
Penicillin - R	0,2	0	0	0,2
Penicillin - I*	14	13	13	14
Ceftriaxone - R	0	0	0	0
Ceftriaxone - I	0,3	0	0	0,4
Erythromycin	14	11	10	14
Clindamycin	9	5	8	9
Doxycycline	12	6		11
Sulphamet-Trim.	14	15		14
Imipenem			0	
Levofloxacin			0	
Moxifloxacin			0	
Telithromycin			2	
<i>n</i>	600	131	227	519

*The I category should be interpreted as S in pneumonia at the adult dose of 2 milj. IU x 6 and as R in meningitis.

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Multiresistant pneumococci* 2006 – 2016

* Pen I/R (MIC > 0.064 µg/ml) and non-susceptibility to Ery, Cli, Dox, and SxT. One isolate per patient (the most resistant). HUSLAB material.



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***Streptococcus viridans* group, blood isolates 2016**

HUSLAB material from Helsinki and Uusimaa Districts
One isolate per patient (first isolate with antibiotic result)

	%
Penicillin -I	3
Penicillin -R	2
Erythromycin I+R	21
Clindamycin I+R	4
Gentamycin (high) R	1
Vancomycin	0

n = 189

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Str. anginosus [milleri] group 2016 (%R+I)

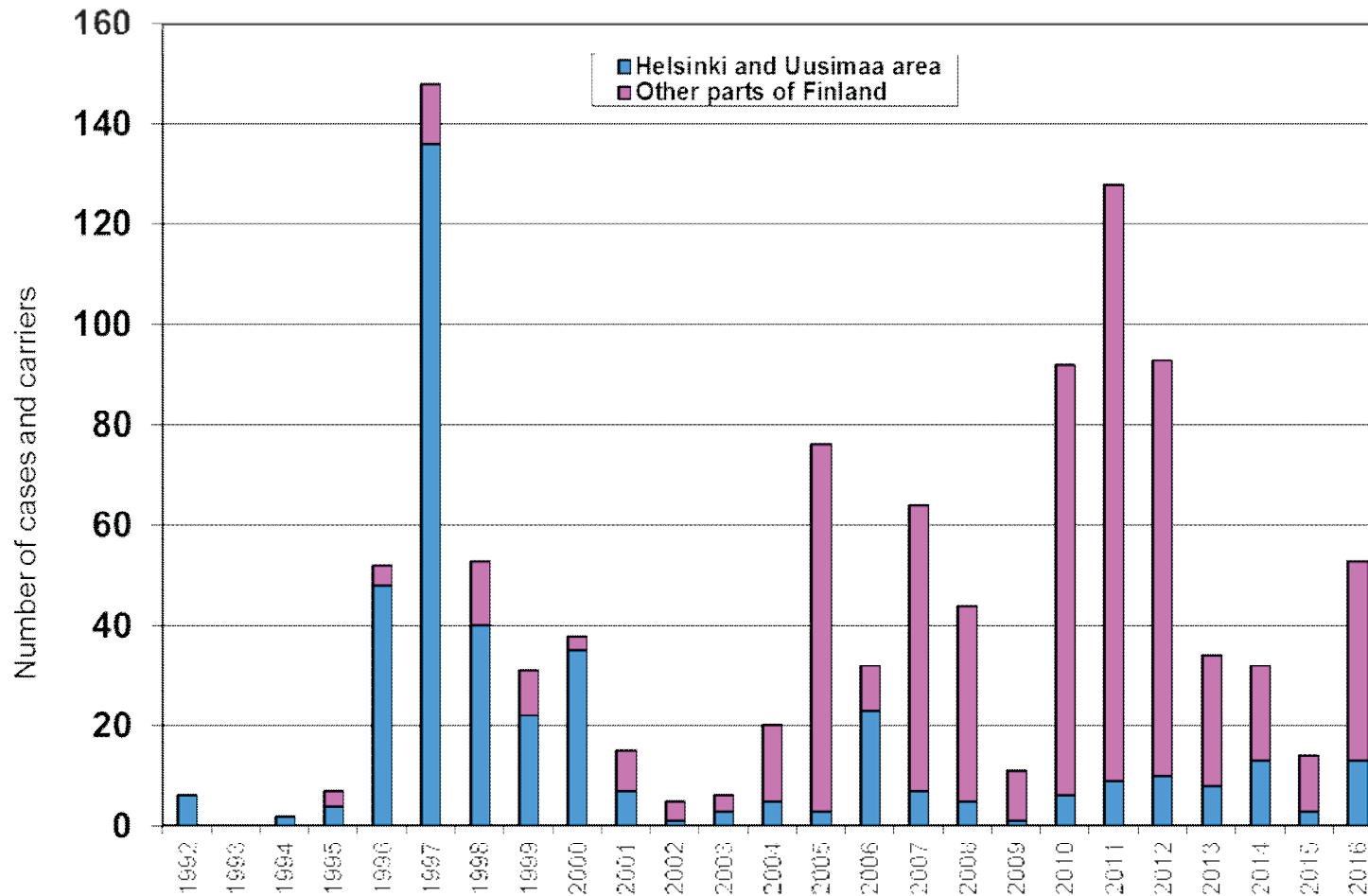
Pus and blood isolates, HUSLAB material from Helsinki and Uusimaa Districts
One isolate per patient (first isolate with antibiotic result)

Penicillin	0,4
Cephalospor. I gen.	0,3
Erythromycin	9
Clindamycin	7
Vancomycin	0

n = 1102

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VRE cases in Finland 1992-2016



Source of data: National Institute for Health and Welfare: Statistics database of infectious diseases

A. Pätäri-Sampo

E. faecalis and *E. faecium* 2016

%R+I (pus & blood); %R (urine). HUSLAB material from Helsinki and Uusimaa district. One isolate per patient (the first with antibiotic result).

	E. faecalis			E. faecium		
	pus	blood	urine	pus	blood	urine
Ampicillin	0	0	0,1	79	82	90
Imipenem	0	0		85	87	
Pip/taz	0	0		87	92	
Linezolid	0	0,8**		0	1,7***	
Vancomycin	0,1	0	0	0,6	0	0
Gentam. (high)		15			20	
Levofloxacin			19			87
Nitrofurantoin*			0,3			[66]
SuTri			20			66
n	835	119	3675	313	60	589

* Breakpoints apply for *E. faecalis* only, **1 isolate with MIC>256 mg/l, *** 1 isolate with MIC=12 mg/l.

A. Pätäri-Sampo

Pseudomonas aeruginosa 2016 (%R+I)

Pus and blood isolates. One isolate per patient (The first isolate with antibiotic result only).
HUSLAB material from Helsinki and Uusimaa District.

	n	Ctaz	Mero	Pi-Tz	Tob	Ami	Cip
Meilahti	265	3	13	6	3	2	9
Töölö	123	3	17	3	2	0	14
Helsinki City hospitals	151	3	9	5	1	0	7
Jorvi Hospital	185	3	9	2	1	0	11
Peijas Hospital	80	6	13	9	0	2	10
Childrens' Hospital	20	0	5	5	0	5	0
Uusimaa regional hospitals*	223	7	13	6	1	1	14
Outpat. in Health Centers	732	4	8	3	1	1	5

*Porvoo, Hyvinkää, Länsi-Uusimaa, Lohja

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P. aeruginosa, MDR*

*Nonsusceptibility to at least meropenem and ceftazidime. HUSLAB material from Helsinki and Uusimaa District. Screenings excluded.

Year	Number of patients
2011	110
2012	83
2013	75
2014	56
2015	63
2016	33*

*The isolates did not show common carbapenemase genes.

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***Acinetobacter* spp. and *S. maltophilia* 2016 (%R+I)**

Pus and blood isolates from Helsinki Uusimaa district.

One isolate per patient (the most resistant).

	n	Mero	Tob	Levo	SuTri	Mino
Acinetobacter	259	0	5	2	6	ND
S. maltophilia	229	R	R	20	2	2

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Acinetobacter spp., MDR*, new cases 2011-2016

HUSLAB material from Helsinki and Uusimaa District.

One per patient (the first isolate with antibiotic result). Screenings excluded.

*Nonsusceptibility to meropenem

Year	Patients
2011	14
2012	2
2013	4
2014	8
2015	3
2016	0

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Enterobacteriaceae 2016 (%R+I)

Blood isolates in HUSLAB material from Helsinki and Uusimaa District

One isolate per patient (the first isolate with antibiotic result)

	n	Cfur	Ctriax	Pi-Tz	Tob	Levo	Mero
E. coli	1227	10	8	8*	8	14	0
K. pneumoniae	188	7	4	6*	3	5	0,5
P. mirabilis	47	0	0	0	2	9	0
K. oxytoca	42	12	10	12	0	5	0
E. cloacae	80	(33)**	24**	24***	2	4	0
Citrobacter spp.	42	(26)**	17**	19***	0	2	0
S. marcescens	37	100**	11**	11***	14	5	0

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* All ESBL isolates reported here as nonsusceptible: S isolates converted to I in lab reports.

** Resistance (due to *ampC* derepression mutation) may develop during therapy to cefuroxime as well as to ceftriaxone and other III gen. cephalosporins. Cephalosporin monotherapy is thus not recommended.

*** All ceftriaxone-nonsusceptible isolates (mainly *ampC* isolates) reported here as nonsusceptible

Enterobacteriaceae, urine isolates 2016 (%R)

HUSLAB material from Helsinki and Uusimaa districts. One isolate (the first) per patient

	E. coli	K. pneum.	P. mirabilis	Enterobacter spp.	Citrobacter spp.	Other*
Nitrofurantoin	1	11	100	20	4	89
Pivmecillinam**	3	5	6	[14]	[9]	[68]
Cephalexin	7	3	3	87	44	93
Cefuroxime	6	4	1	24	11	83
Ciprofloxacin	9	2	2	1	2	3
Trimetoprim	20	19	33	10	9	34
n	25648	3020	1026	1050	1062	450

* Other Proteus spp, Morganella spp, Providencia spp., Serratia spp.

** Breakpoints apply to E. coli, K. pneumoniae, and P. mirabilis.

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E.coli urine isolates of male patients (%R) 2016

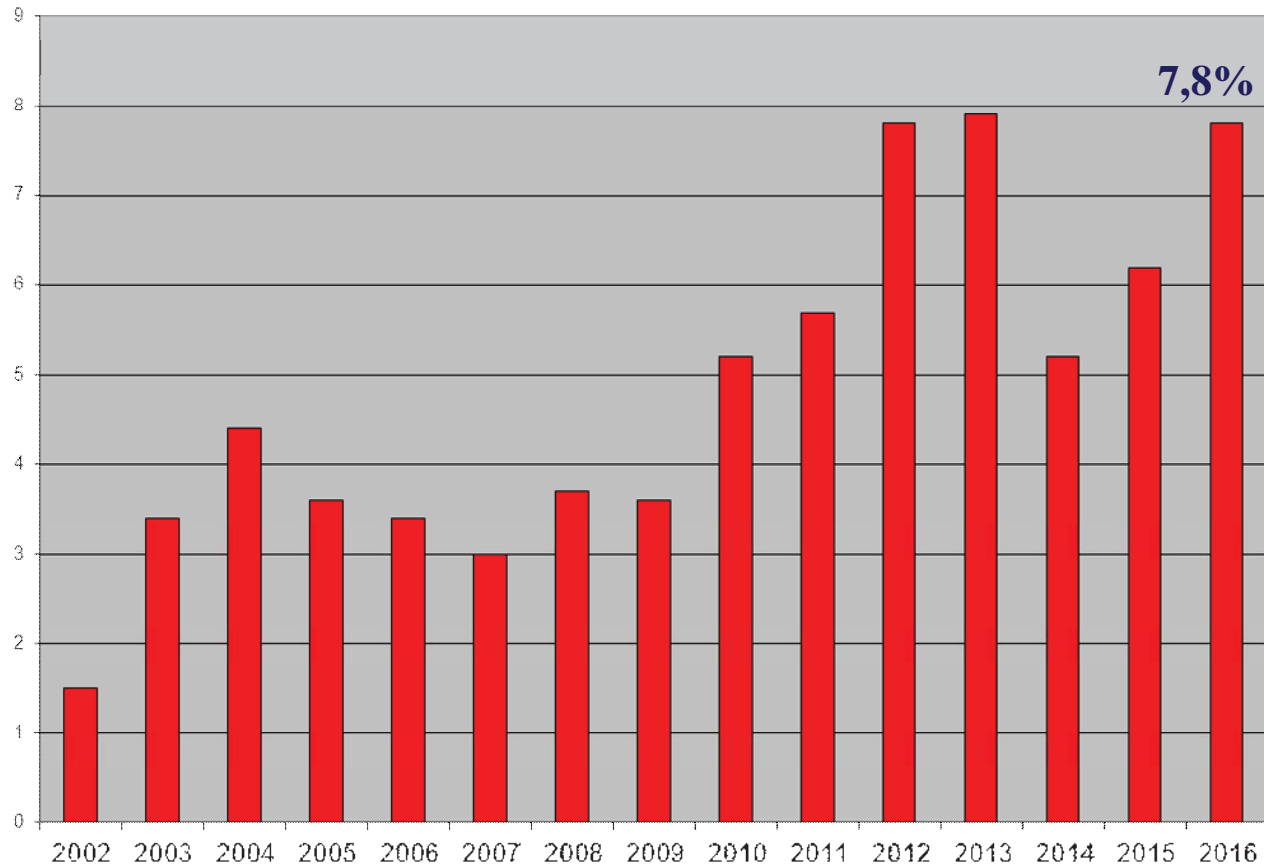
HUSLAB material from Helsinki and Uusimaa District.

One isolate per patient (the first with antibiotic result). Screenings excluded.

≥ 16 years	%R	<16 years	%R
Ciprofloxacin	18	Ciprofloxacin	6
Trimetoprim	22	Trimetoprim	24
Cefuroxime	12	Cefuroxime	11
Nitrofurantoin	1	Nitrofurantoin	0
Mecillinam	3	Netilmycin	2
<i>n</i>	2585	<i>n</i>	219

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ESBL- *E. coli* bacteremic cases HUSLAB material 2001- 2016



2016

Females **6,1%** (47/766)

Males **10,6%** (49/461)

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Resistance (%R+I) of ESBL *E.coli* isolates 2016

HUSLAB material from Helsinki and Uusimaa districts.

One isolate per patient (the most resistant). Screenings excluded.

	E. coli
Ciprofloxacin	65
Tobramycin	36
Sulphatrimetoprim	57
Trimetoprim	58
Nitrofurantoin	3
Fosfomycin	2
Meropenem	0
Ertapenem	1
Pivmecillinam*	22
Piperacillin-tazobactam**	26
Ceftolozane-tazobactam***	6
<i>n</i>	1297

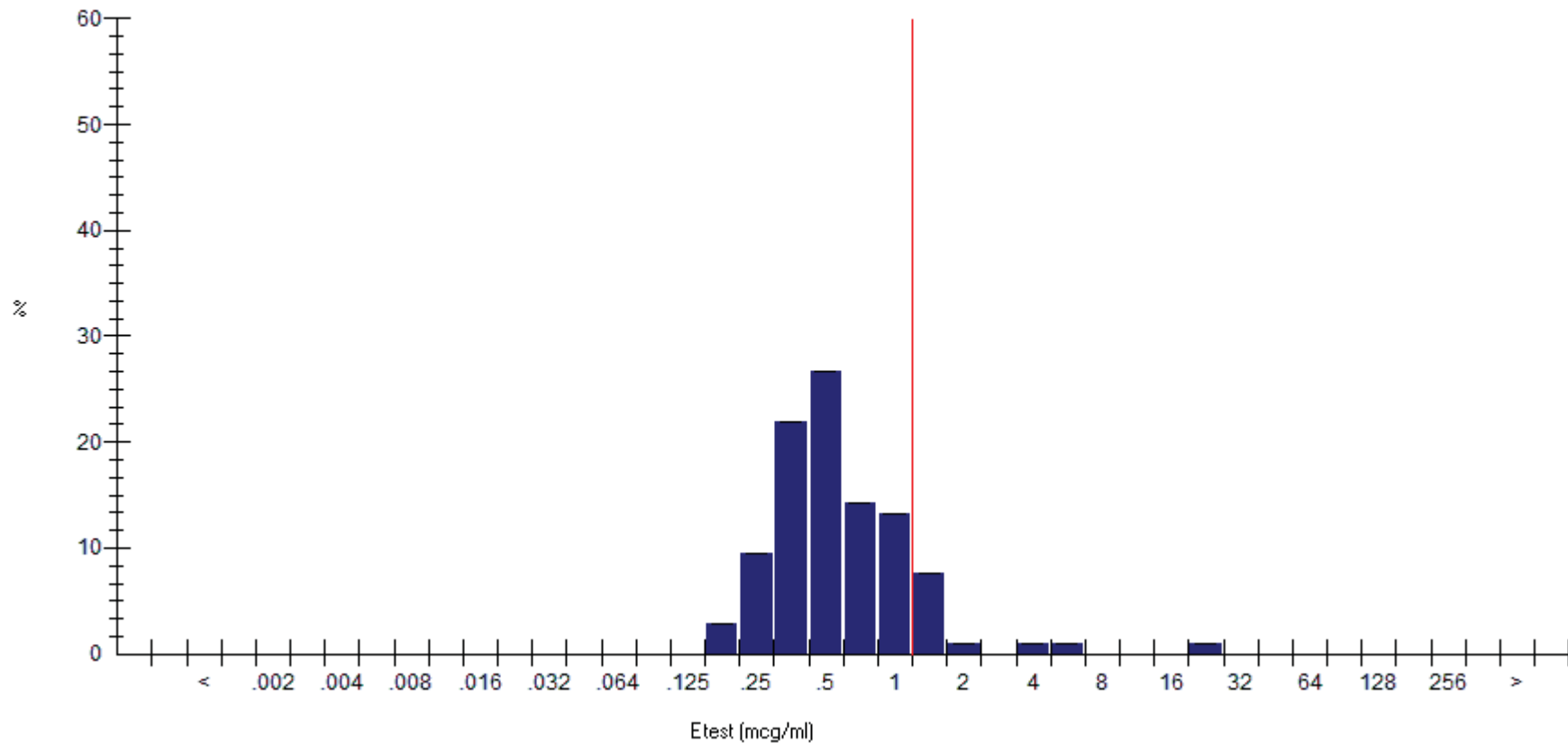
*Pivmecillinam: 8% R, 14% I, n=1093

**Piperacillin-tazobactam: 6% R, 20% I, n=234

***Tested n=66

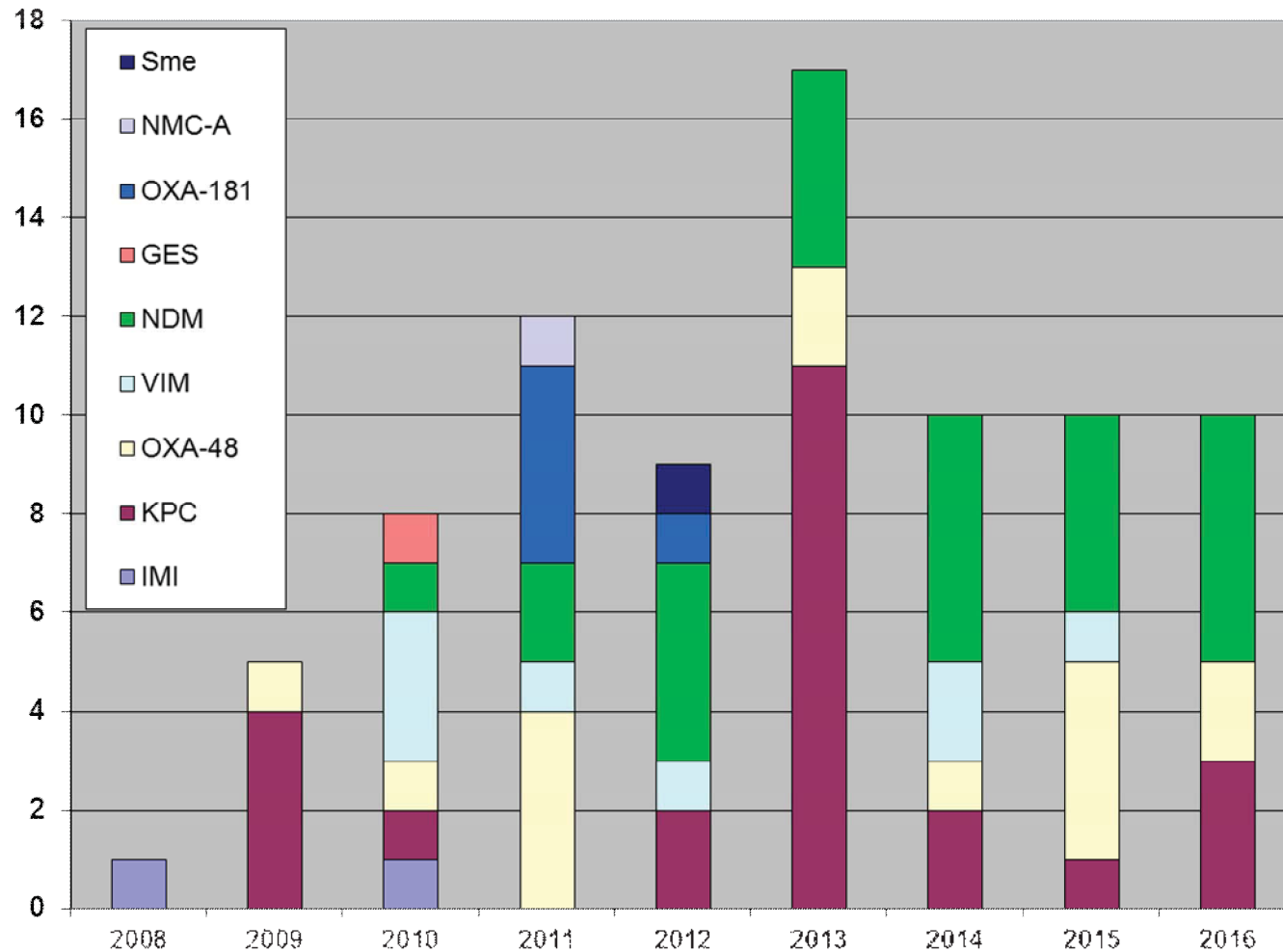
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Ceftolozane-tazobactam MIC distribution *E. coli* isolates 2016-2/2017 HUSLAB material



MIC was determined by gradient test, McFarland 0.5 on MH agar at 35°C. Tested n=105, of which 90 were ESBL isolates.

Carbapenemase-producing *Enterobacteriaceae* (CPE) in HUSLAB 2008-2016



All KPC cases in 2013 were from one hospital epidemic.

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2014: Totally 8 patients. One had both KPC and VIM, one NDM and VIM.

Salmonella spp. 2016 (%R+I)

HUSLAB material from Helsinki and Uusimaa District.

One isolate per patient (the first with antibiotic result). Includes screenings.

Ciprofloxacin	24
Ceftriaxone	2
Sulphatrimetoprim	7
Doxycycline	20
Ampicillin	28

Year	ESBL %	Tested isolates
2011	2,6	389
2012	1,9	432
2013	1,8	391
2014	2,8	322
2015	0,5	370
2016	2,1	339

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Shigella spp. 2016 (%R+I)

HUSLAB material from Helsinki and Uusimaa Districts.
One isolate per patient (the first isolate with antibiotic result)

Ciprofloxacin	31	<i>n</i> = 29
Ceftriaxone	17	
Sulphatrimetoprim	86	
Doxycycline	72	
Ampicillin	45	

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H. influenzae & *M. catarrhalis* 2016 (%R+I)

HUSLAB material from Helsinki and Uusimaa Districts.
One isolate per patient (first isolate with antibiotic result).

	H. influenzae	M. catarrh.
Ampicillin	26	100
Amoxicill-clavul.	8	2
Cefuroxime	8	0
Doxycycline	2	0
Ciprofloxacin	0,4	0
Sulfa/trimethoprim	30	4
Azithromycin	100*	2
n	549	261

* EUCAST breakpoint sets most isolates (95%) to category I.

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Neisseria gonorrhoeae 2016 (%R)

HUSLAB material from Helsinki and Uusimaa Districts
One isolate per patient (first isolate with antibiotic result).

Ciprofloxacin	53	n=151
Ceftriaxone	0	
Azithromycin	13*	

Susceptibilities determined with gradient tests
using TM1-agar.

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*Used EUCAST breakpoint (R>0.5mg/l) is based on
a 2g-single dose in monotherapy.

Neisseria meningitidis 2010 - 2016 (%R+I)

HUSLAB material from Helsinki and Uusimaa Districts.

Invasive isolates: blood and cerebrospinal fluid.

One isolate per patient (first isolate with antibiotic result)

Penicillin-I	18
Penicillin-R	2
Ceftriaxone	0
Meropenem	0
Ciprofloxacin	0
Chloramphenicol	0
n	44

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***Bacteroides* spp. 2016 (%R+I)**

HUSLAB material from Helsinki and Uusimaa Districts.
One isolate per patient (first isolate with antibiotic result), n=1355

Metronidazole	0
Piperacillin-tazobactam	16
Imipenem	0
Clindamycin	51
Doxycycline*	10
Penicillin G	93
Amoxicillin-clavulanate	6

Tested approx 930 isolates, *tested n=155
Susceptibilities determined by disc diffusion method
using in-house zone diameter breakpoints.

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Mycobacterium tuberculosis 2010-2016 (%R)

HUSLAB material from Helsinki and Uusimaa districts
One isolate per patient: the first isolate with antibiotic result

Year	2010	2011	2012	2013	2014	2015	2016
Rifampicin	5	3	3	2	5	6	3
Isoniazid	10	8	8	7	9	10	10
Streptomycin	6	7	8	3	7	9	2
Ethambutol	2	2	2	1	1	2	0
Pyrazinamide	5	5	5	2	2	8	3
N tested	115	98	107	100	102	106	67

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Susceptibilities were determined at the national reference laboratory:
National Institute for Health and Welfare, Finland.

Mycobacterium tuberculosis MDR and XDR cases 2010-2016

HUSLAB material from Helsinki and Uusimaa districts

	2010	2011	2012	2013	2014	2015	2016
MDR (RIF ja INH R)	5	3	3	1	4	5	1
XDR (RIF, INH, aminoglycoside and fluoroquinolone R)	0	0	0	0	1	1	1

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