HUSRES Annual Report 2015

This HUSRES 2015 report is based on the HUSLAB/Whonet database 2015, which contains data on more than 190.000 microbes. EUCAST 2015 clinical breakpoints have mainly been used. The doses on which the breakpoints are based can be found at the end of the EUCAST Clinical Breakpoint Table version 6.0 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 2000-2014 can be found at www.hus.fi/ammattilaiselle/huslab-ammattilaisille/tilastot.

This year the data has mainly been analyzed focusing on empiric therapy, which means that each patient's first isolate with antibiotic result is used for the analysis instead of the most resistant one. Mycobacterium tuberculosis statistics has been added.

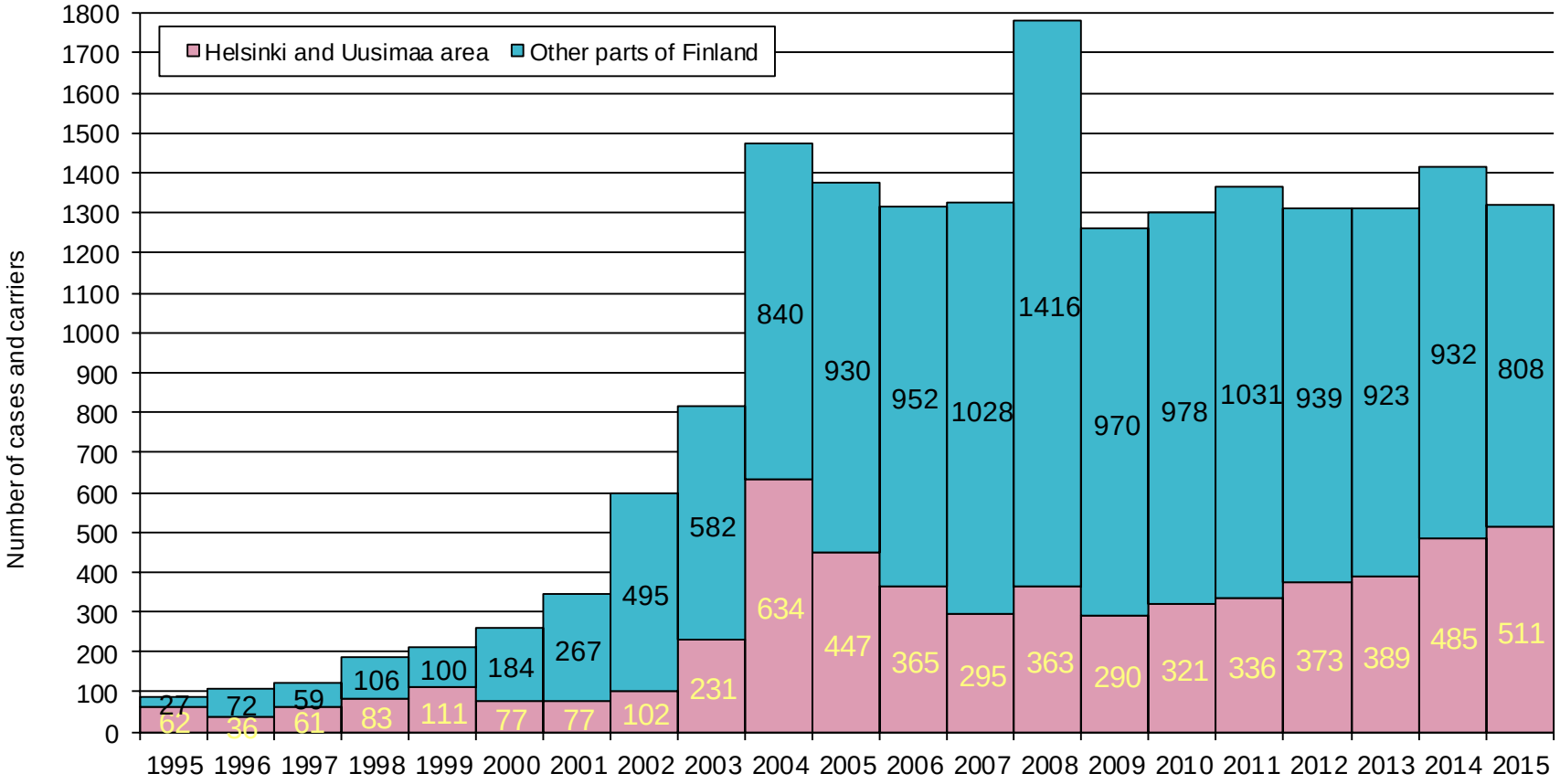
Anu Pätäri-Sampo,

M.D., Ph.D., Specialist in Clinical Microbiology,

Department of Bacteriology, HUSLAB

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 – 2015



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

A. Pätäri-Sampo

Staphylococcus aureus 2015 (%R+I)

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

Blood isolates	n	Oxa	Ery	Cli	Lev	Rif	Fus	Dox	Net	Lnz
HUCH	159	5	5	5	4	0	6	2	0	0
Jorvi Hospital	65	2	3	3	0	2	0	0	0	0
Peijas Hospital	73	0	7	7	0	0	3	0	0	0
Hyvinkää Hosp	59	0	5	5	0	0	10	0	0	0
Helsinki City H	149	6	7	5	4	0	3	0	0	0

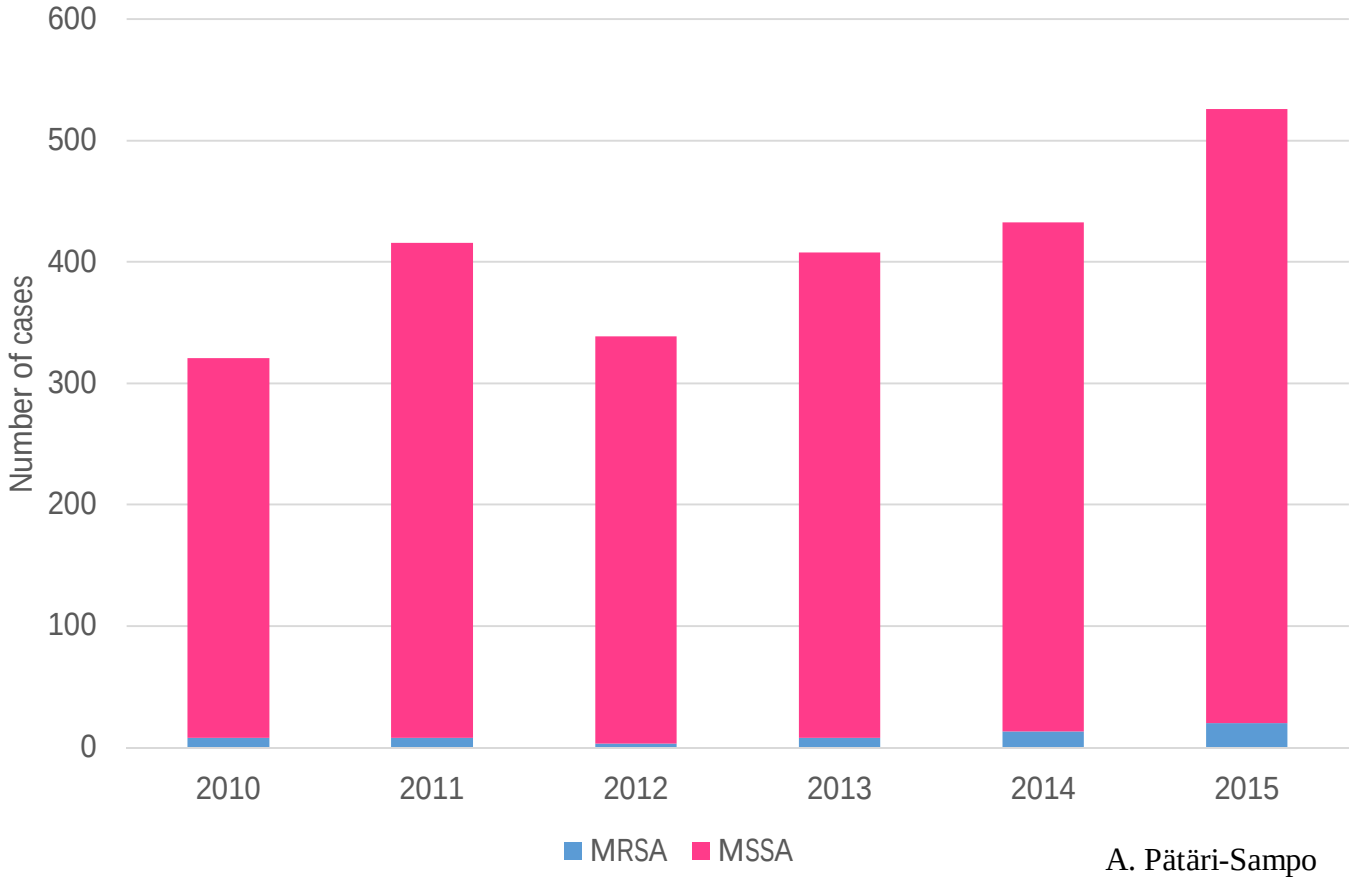
Pus isolates	n	Oxa	Ery	Cli	Lev	Rif	Fus	Dox	Net	Lnz
HUCH	2892	3	7	6	3	0	6	4	0	0
Jorvi Hospital	769	3	8	6	3	0	6	4	0	0
Peijas Hospital	359	3	7	6	2	0	5	2	0	0
Hyvinkää Hosp	367	1	5	3	3	1	7	2	0	0
Helsinki City H	585	6	8	7	4	0	5	4	0	0
Outpatients	4011	3	6	5	2		6			

A. Pätäri-Sampo

S.aureus adult bacteraemic cases 2010-2015

≥ 16 years old

HUSLAB material from Helsinki and Uusimaa districts



A. Pätäri-Sampo

Coagulase-negative staphylococci 2015 (%R+I)

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

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

2015	n	Oxa	Ery	Cli	Lev	Rif	Fus	Dox	Net	Lnz	SxT
All coagulase-negative staphylococci	3300	56	46	34	40	6	49	18	13	0	32
S. epidermidis	1300	65	51	38	47	8	61	17	15	0	31
S. lugdunensis	338	2	9	7	0	0	7	7	0	0	0

J. Haiko

Beta-hemolytic streptococci 2015 (%R+I)

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

	S. pyogenes	Group B	Group C	Group G
Penicillin	0	0	0	0
Cephalosp. I gen	0	0	0	0
Erythromycin	3	15	7	13
Clindamycin	2	14	6	11
n	10 069	4437	1601	3693

J. Haiko

Streptococcus pneumoniae 2015 (%R+I)

HUSLAB material from Helsinki and Uusimaa districts.

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

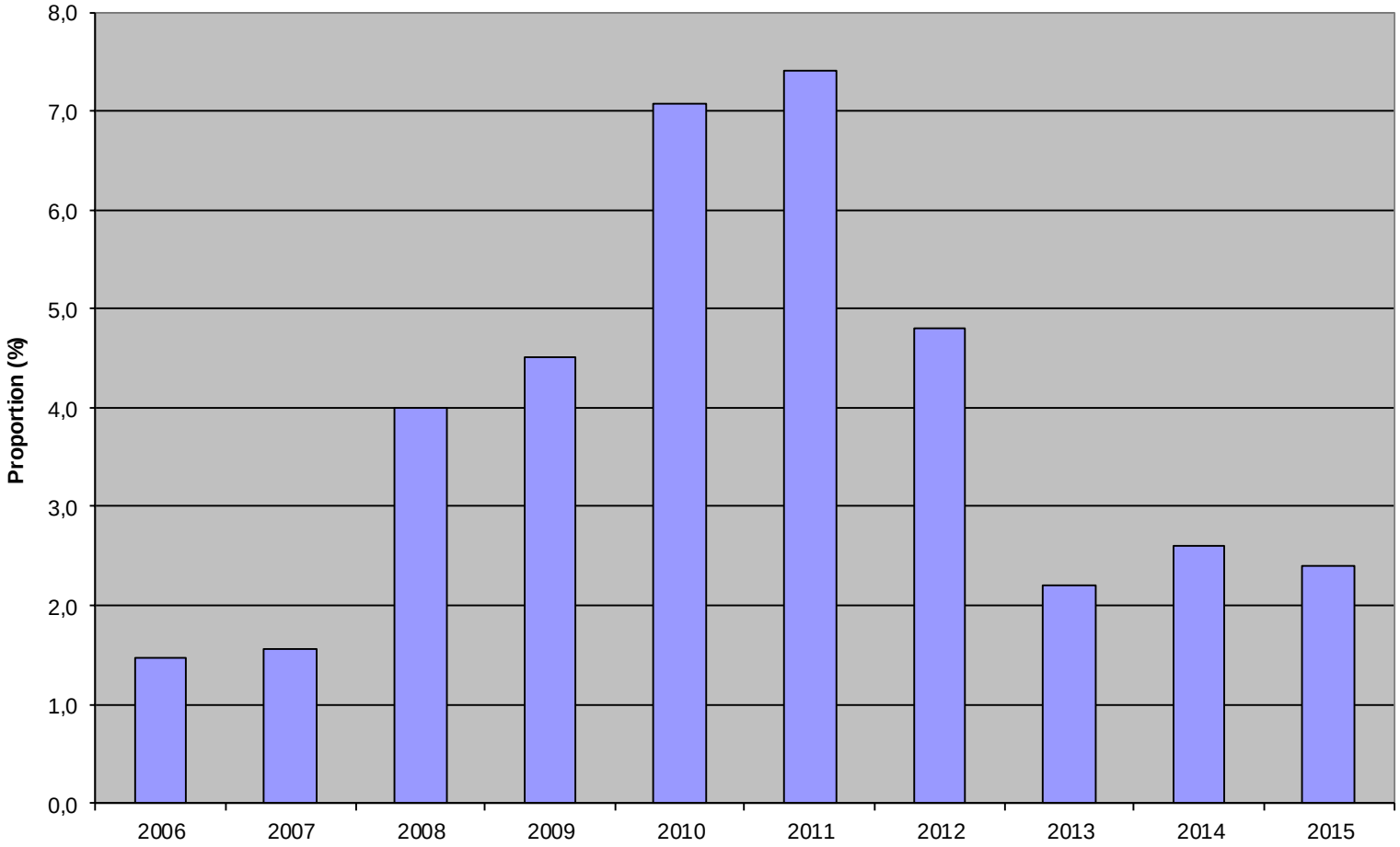
	Age ≥5 yr	Age <5 yr	Blood	Pus
Penicillin - R	0,2	0	0	0,2
Penicillin - I*	15	6	18	11
Ceftriaxone - R	0	0	0	0
Ceftriaxone - I	1,1	0,6	0	1,4
Erythromycin	16	13	14	14
Clindamycin	11	4	13	8
Doxycycline	13	4		10
Sulphamet-Trim.	15	13		14
Imipenem			0	
Levofloxacin			0	
Moxifloxacin			0	
Telithromycin			0	
n	545	160	204	507

*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.

J. Haiko

Multiresistant pneumococci* 2006 – 2015 (HUSLAB)

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



A. Pätäri-Sampo

Streptococcus viridans group, blood isolates 2015

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

	%
Penicillin -I	**7**
Penicillin -R	**2**
Ceftriaxone R*	**13**
Erythromycin I+R	**19**
Clindamycin I+R	**5**
Gentamycin (high) R	**0**
Vancomycin	**0**

n = 204

*tested n = 48

J. Haiko

Str. anginosus [*milleri*] group 2015 (%R+I)

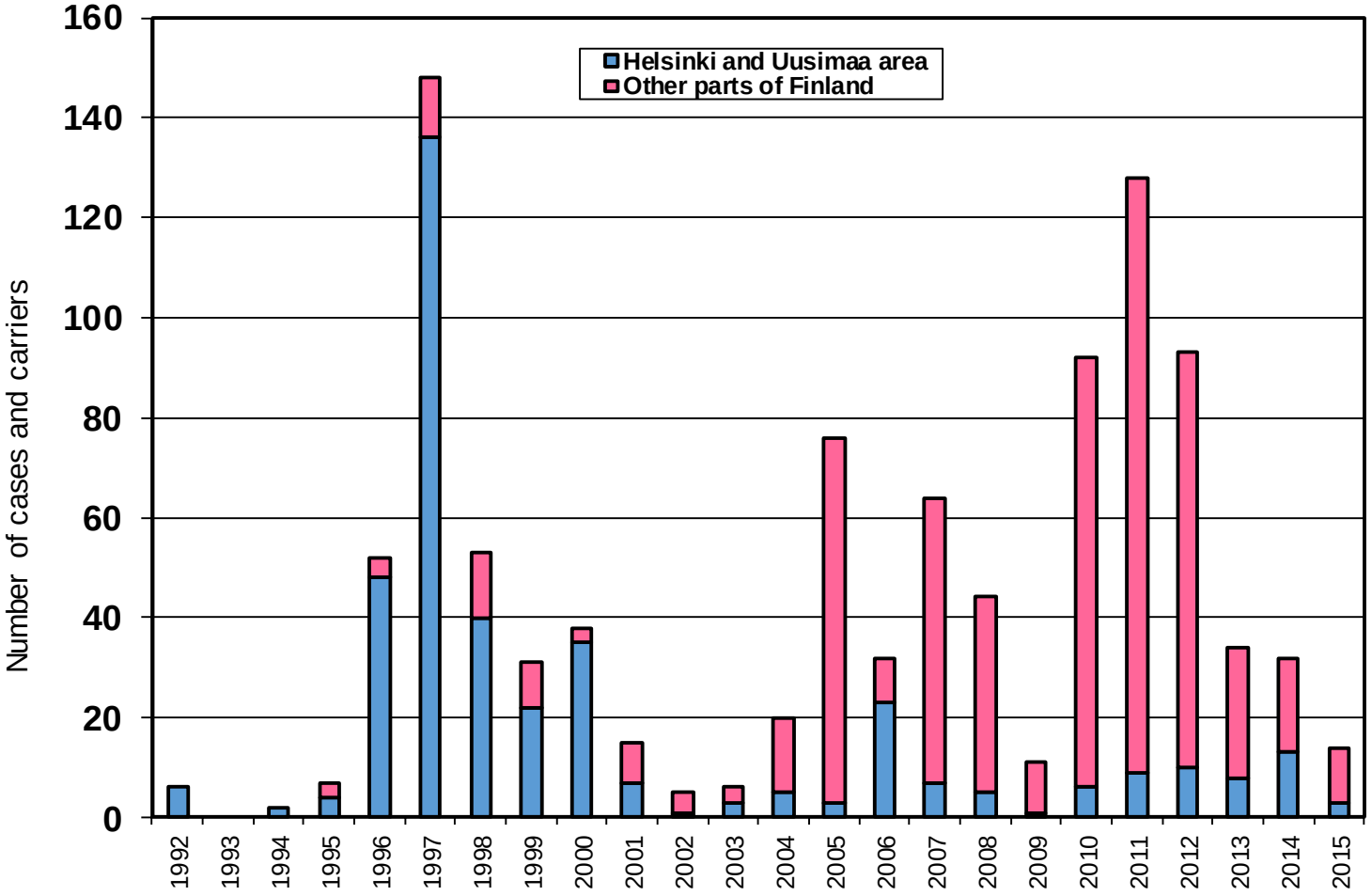
Pus and blood isolates, HUSLAB material from Helsinki and Uusimaa Districts
One isolate per patient (first isolate with antibiotic result)

Penicillin	**1**
Cephalospor. I gen.	**1**
Erythromycin	**8**
Clindamycin	**6**
Vancomycin	**0**

n = 1112

J. Haiko

VRE cases in Finland 1992-2015



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

A. Pätäri-Sampo

E. faecalis and *E. faecium* 2015

%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	0,3	0	0,1		80	81	95
Imipenem	0,7	1			85	86	
Pip/taz	0,3	0			85	82	
Linezolid	0	0			0	0	
Vancomycin	0	0	0		0	0	0
Gentam. (high)		21				17	
Levofloxacin			44				97
Nitrofurantoin*			0,2				[69]
SuTri			16				76
n	926	116	3672		328	62	655

* Breakpoints apply for E. faecalis only.

A. Pätäri-Sampo

Pseudomonas aeruginosa 2015 (%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	217	6	14	7	2	4	8
Töölö	136	5	15	4	2	2	11
Helsinki City hospitals	156	2	10	4	3	1	11
Jorvi Hospital	172	6	12	6	4	1	12
Peijas Hospital	81	1	10	3	1	1	5
Childrens´ Hospital	26	0	8	4	0	0	4
Uusimaa regional hospitals*	205	6	13	7	4	3	11
Outpat. in Health Centers	701	3	6	2	1	1	8

*Porvoo, Hyvinkää, Länsi-Uusimaa, Lohja

A. Pätäri-Sampo

Ps. aeruginosa, MDR*

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

Year	patients
2011	110
2012	83
2013	75
2014	56
2015	63

Most common resistance profiles of MDR isolates in 2015 (one per patient)

	Profile					
Number	Mero	Cefta	Tobra	Ami	Pip-tz	Cipro
20	**R**	**R**	**R**	S	**R**	**R**
18	**R**	**R**	S	S	**R**	S
17	**R**	**R**	S	S	**R**	**R**
3	**R**	**R**	**R**	**R**	**R**	**R**

A. Pätäri-Sampo

Acinetobacter spp. and *S. maltophilia* 2015 (%R+I)

Pus and blood isolates from Helsinki Uusimaa district.

One isolate per patient (the most resistant).

	n	Mero	Pi-Tz	Tob	Levo	SuTri	Mino	Ti-Cla
Acinetobacter	333	2	12	3	4	5	ND	ND
S. maltophilia	292	R	R	R	19	2	4	40

A. Pätäri-Sampo

Acinetobacter spp., MDR*, new cases 2011-2015

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**

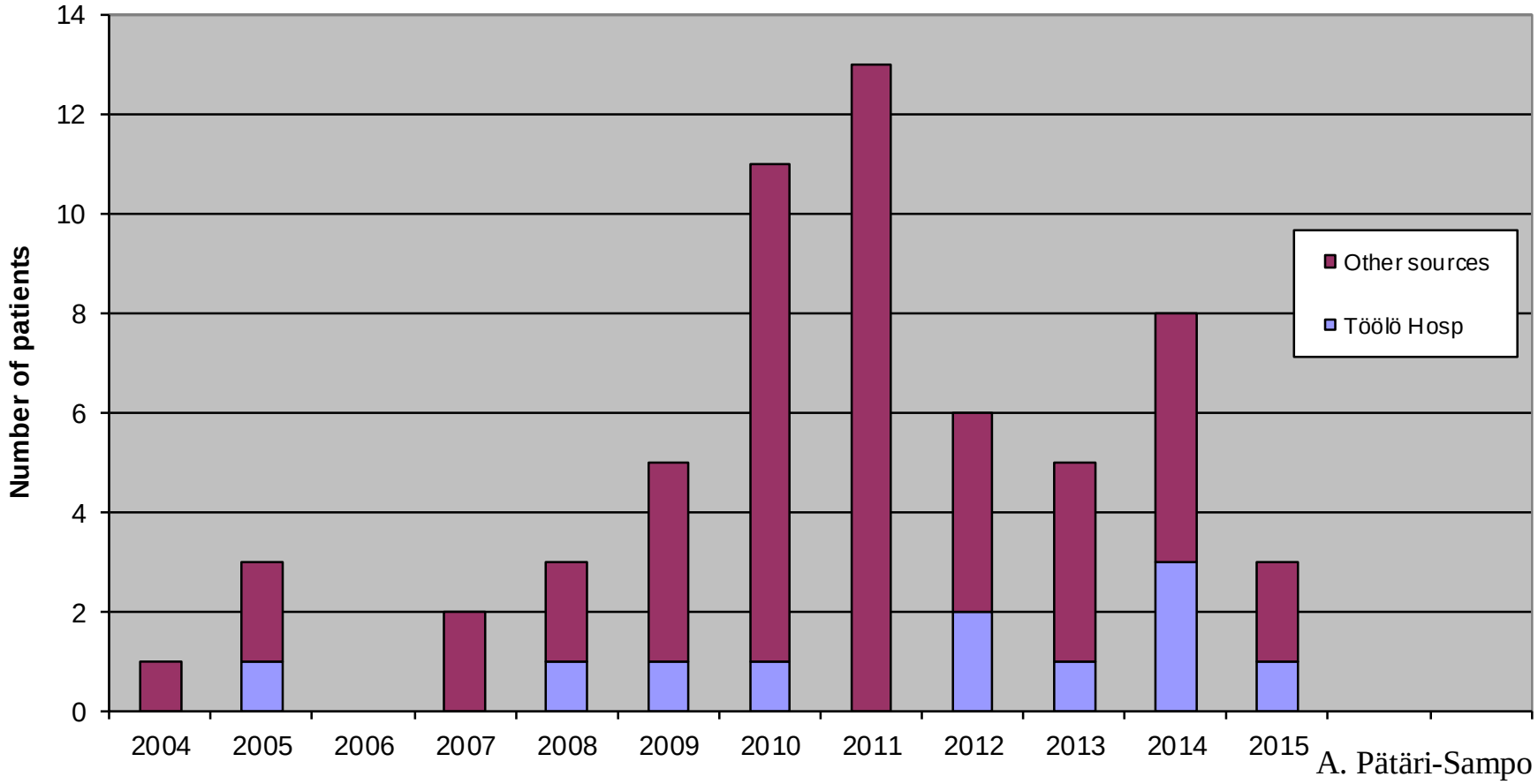
A. Pätäri-Sampo

** Isolates were positive for GES, OXA 24/40, OXA-23 carbapenemase genes.

Acinetobacter spp., MDR* isolates 2004-2015

HUSLAB material from Helsinki and Uusimaa District.
One per patient (the first isolate only). Screenings excluded.

*Nonsusceptibility to meropenem/imipenem



A. Pätäri-Sampo

Enterobacteriaceae 2015 (%R+I)

Pus and blood isolates of Helsinki University Central Hospital.

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

	n	Cfur	Ctriax	Pi-Tz	Tob	Levo	Mero
E. coli	1785	9	7	8*	6	12	0
K. pneumoniae	406	8	3	5*	3	6	0,7
K. oxytoca	230	6	3	6	0,4	0	0
P. mirabilis	163	1	1	1*	4	2	0
E. cloacae	455	(30)**	19**	19***	1	2	0,2
Citrobacter spp.	228	(21)**	16**	16***	2	3	0
S. marcescens	282	98**	3**	5***	8	4	0,3
P. vulgaris	62	87**	0**	0***	0	0	0
M. morganii	93	89**	6**	8***	5	8	0

A. Pätäri-Sampo

*: All ESBL isolates reported here as nonsusceptible.

**: Resistance (due to *ampC* derepression mutation) develops easily during therapy to cefuroxime as well as to cefotaxime and to other III gen. cephalosporins. Cephalosporin monotherapy is not recommended.

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

Enterobacteriaceae, urine isolates 2015 (%R)

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

	E. coli	K. pneum.	P. mirabilis	Enterobacter sp.	Citrobacter sp.	Other*
Nitrofurantoin	1	10	100	18	3	85
Pivmecillinam**	3	5	8	[15]	[7]	[72]
Cephalexin	7	3	3	86	44	94
Cefuroxime	5	3	1	26	11	82
Ciprofloxacin	8	2	2	1	1	2
Trimetoprim	20	15	37	9	8	27
n	24939	2791	991	1017	1127	424

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

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

A. Pätäri-Sampo

E.coli urine isolates of male patients (%R) 2015

HUSLAB material from Helsinki and Uusimaa District.

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

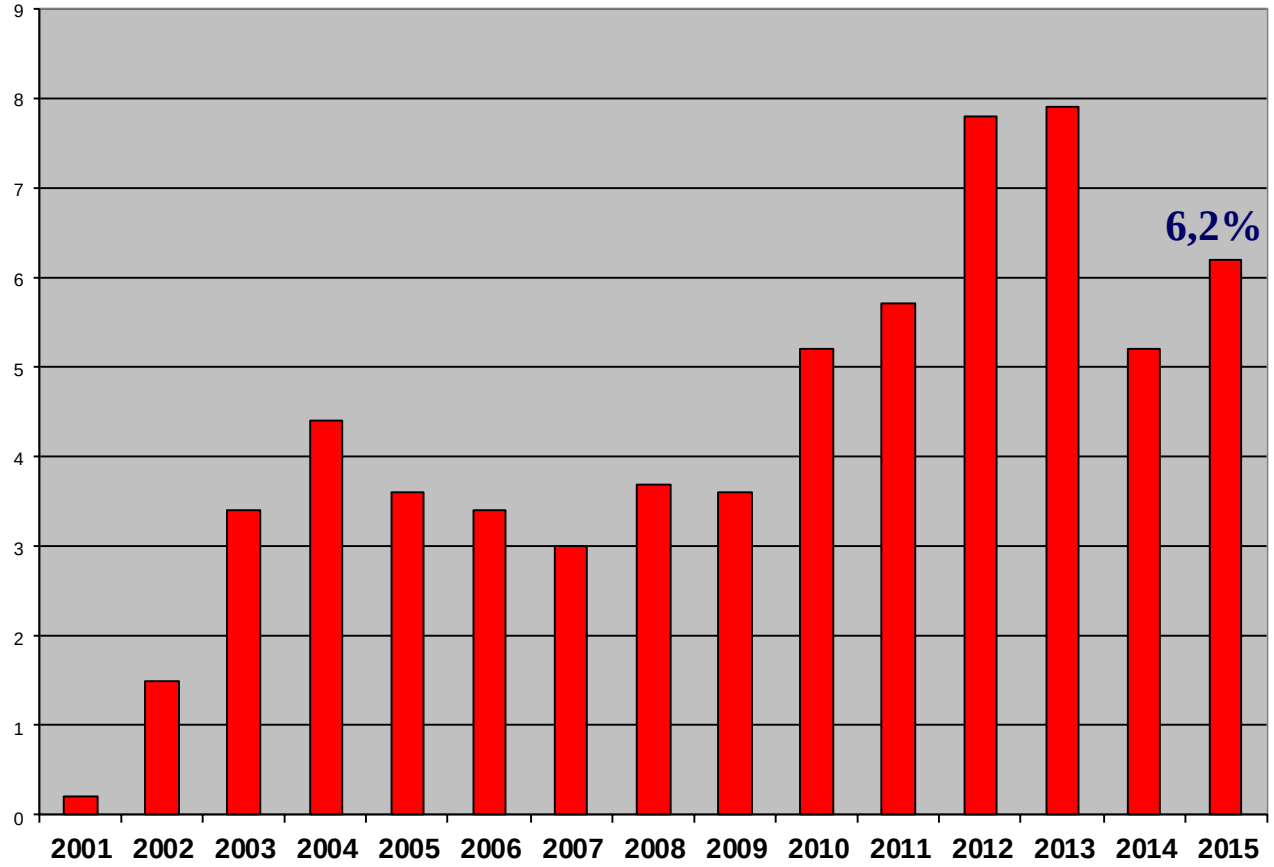
≥ 16 years	%R
Ciprofloxacin	16
Trimetoprim	21
Cefuroxime	10
Nitrofurantoin	1
Pivmecillinam	3
n	*2518*

<16 years	%R
Ciprofloxacin	7
Trimetoprim	29
Cefuroxime	8
Nitrofurantoin	0,4
Netilmycin	3
n	*235*

A. Pätäri-Sampo

ESBL- *E. coli* blood isolates
HUSLAB material 2001- 2015

One isolate per patient (the most resistant)



2015	
Females	**5,9%** (40/674)
Males	**6,7%** (30/447)

A. Pätäri-Sampo

Resistance (%R+I) of ESBL *E.coli* isolates 2015

HUSLAB material from Helsinki and Uusimaa districts. Blood, pus, and urine isolates.

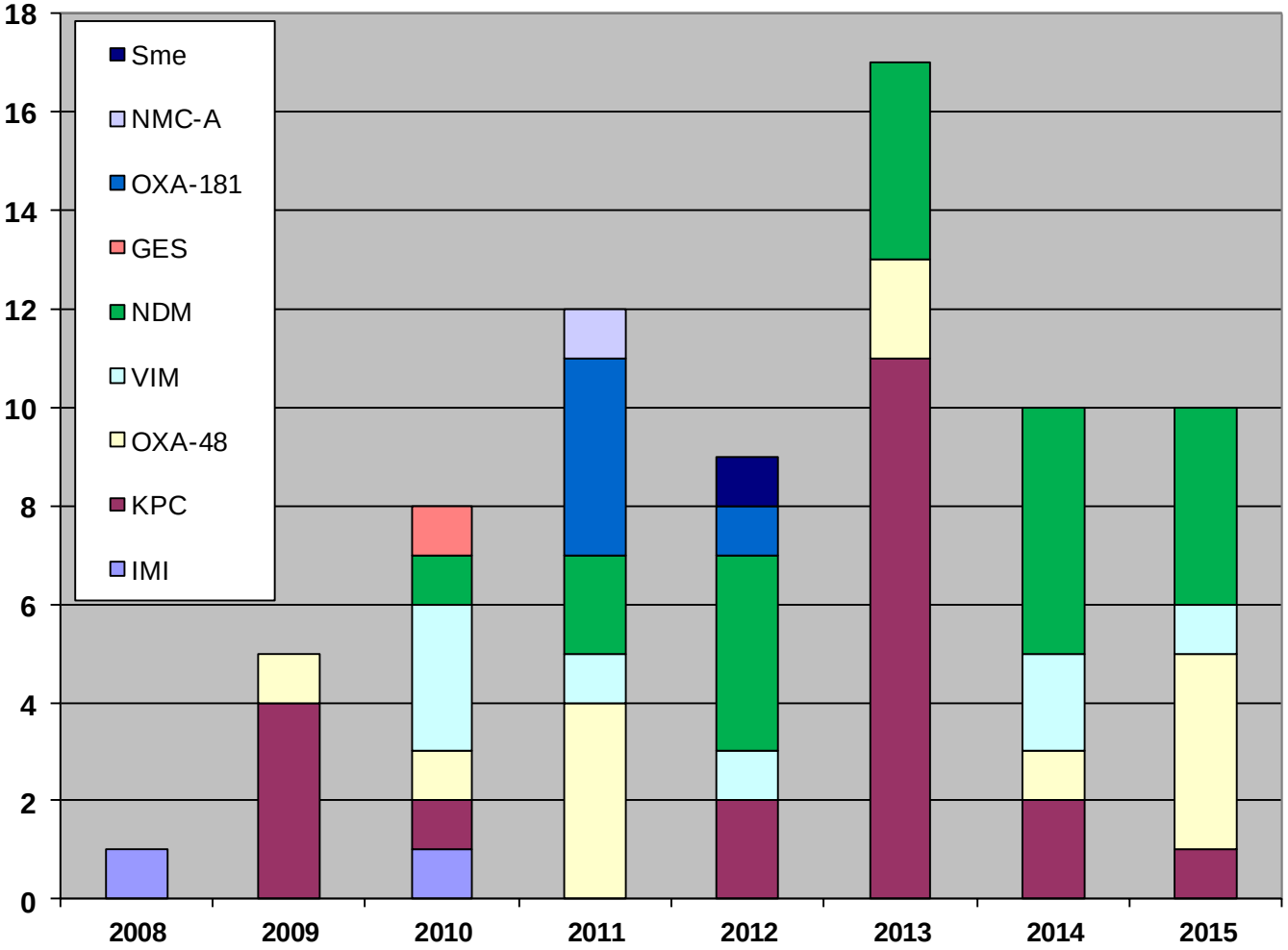
One isolate per patient (the most resistant). Screenings excluded.

	E. coli
Ciprofloxacin/levofloxacin	69
Tobramycin	36
Sulphatrimetoprim	59
Trimetoprim	62
Nitrofurantoin	3
Fosfomycin	3
Meropenem	0
Ertapenem	2
Pivmecillinam	*22**
n	*1186*

Pivmecillinam: 6% R, 16% I.

A. Pätäri-Sampo

Carbapenemase-producing *Enterobacteriaceae* (CPE) in HUSLAB 2008-2015



All KPC cases in 2013 were from one hospital epidemic.

A. Pätäri-Sampo

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

Salmonella spp. 2015 (%R+I)

HUSLAB material from Helsinki and Uusimaa District.

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

Ciprofloxacin	**21**
Ceftriaxone	**0,5**
Sulphatrimetoprim	**5**
Doxycycline	**19**
Ampicillin	**17**

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

A Pätäri-Sampo

Shigella spp. 2015 (%R+I)

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

Ciprofloxacin	27
Ceftriaxone	5
Sulphatrimetoprim	70
Doxycycline	60
Ampicillin	43

n = 37

A Pätäri-Sampo

H. influenzae & *M. catarrhalis* 2015 (%R+I)

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

	H. influenzae	M. catarrh.
Ampicillin	21	100
Amoxicill-clavul.	4	1
Cefuroxime	4	0
Doxycycline	2	0
Ciprofloxacin	0	0
Sulfa/trimethoprim	31	2
Azithromycin	100*	4
n	582	313

J. Haiko

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

Neisseria gonorrhoeae 2015 (%R+I)

HUSLAB material from Helsinki and Uusimaa Districts

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

Ciprofloxacin	**53**
Ceftriaxone	**0**
Azithromycin	**49***

n=90

Susceptibilities determined with gradient tests using TM1-agar.

A Pätäri-Sampo

*(I:35%, R:14%)
Used EUCAST breakpoints are based on a 2g-single dose in monotherapy.

Neisseria meningitidis 2010 - 2015 (%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	**3**
Ceftriaxone	**0**
Meropenem	**0**
Ciprofloxacin	**0**
Chloramphenicol	**0**
n	**39**

J. Haiko

Bacteroides spp. 2015 (%R+I)

HUSLAB material from Helsinki and Uusimaa Districts.
One isolate per patient (first isolate with antibiotic result), n=1095.

Metronidazole	**0**
Piperacillin-tazobactam	**7**
Imipenem*	**0**
Clindamycin	**46**
Doxycycline**	**21**
Penicillin G	**100**
Amoxicillin-clavulanate	**4**

*tested n = 509, **tested n = 402
Susceptibilities determined by disc diffusion method using in-house zone diameter breakpoints.

J. Haiko

Mycobacterium tuberculosis 2010-2015 (%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
Rifampicin	5	3	3	2	5	6
Isoniazid	10	8	8	7	9	10
Streptomycin	6	7	8	3	7	9
Ethambutol	2	2	2	1	1	2
Pyrazinamide	5	5	5	2	2	8
N tested	115	98	107	100	102	106

L. Savolainen

Mycobacterium tuberculosis MDR and XDR cases 2010-2015

HUSLAB material from Helsinki and Uusimaa districts

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

L. Savolainen