

The nationwide surveillance of bacterial urinary pathogens conducted by the Japanese Society of Chemotherapy (JSC)

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Introduction

JSC conducted the first nationwide surveillance of bacterial urinary pathogens in 2008.

Materials and Methods:

- 1) Surveillance period: January – June 2008.
- 2) Cooperative institutes: 28 medical institutions throughout Japan.
- 3) Strains tested: A total of 715 strains belonging to six clinically relevant bacterial species were collected from adult patients with well-diagnosed complicated urinary tract infections.
- 4) Antibacterial agents tested: 39 agents as listed in Table 1.
- 5) Susceptibility test: Conducted at the central laboratory (The Kitasato University, Anti-infective Drugs Research Center) according to CLSI standards for broth micro dilution methods.
- 6) Determination of β -lactamase: Nitrocefin method and Cica-Beta Test [Kanto Chemicals, Tokyo; for detection of expanded spectrum β -lactamase (ESBL) and metallo β -lactamase (MBL)].
- 7) Referring to the CLSI breakpoint, the susceptibility of each pathogen was classified into the following categories:
S: sensitive, I: intermediate, R: resistant

Bacterial strains

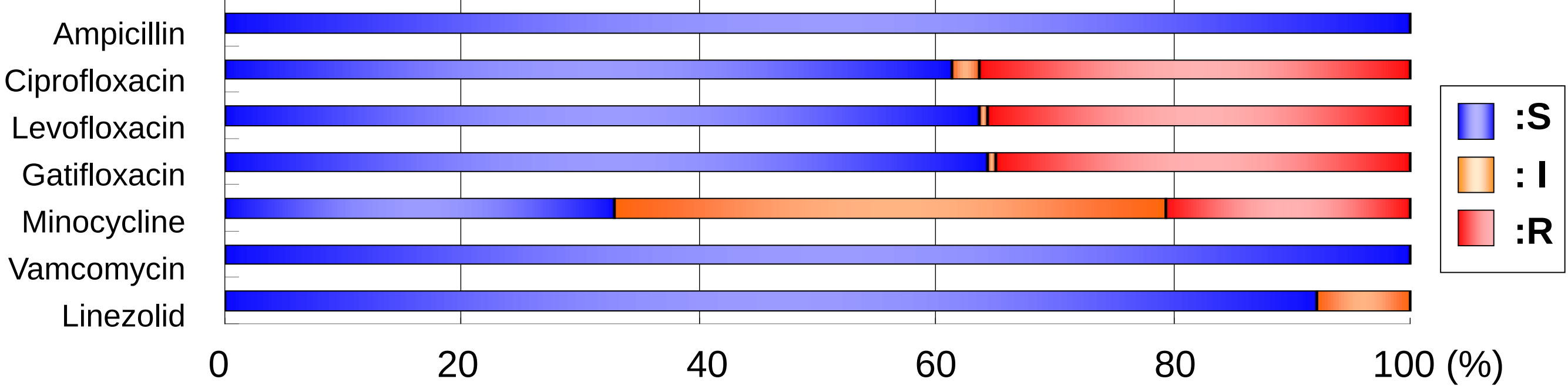
	<i>Enterococcus faecalis</i> (N=140)	<i>Escherichia coli</i> (N=255)	<i>Klebsiella pneumoniae</i> (N=93)	<i>Proteus mirabilis</i> (N=42)	<i>Serratia marcescens</i> (N=44)	<i>Pseudomonas aeruginosa</i> (N=114)	Total
Numbers collected	147	263	98	45	46	116	715
Numbers tested	140	255	93	42	44	114	688

Results

Backgrounds of Patients

	Total : 688
Inpatients	31.4% (216)
Outpatients	68.6% (472)
Male	50.1% (345)
Female	49.6% (341)
Age (yrs)	
20 – 29	2.0% (14)
30 – 39	2.2% (15)
40 – 49	2.8% (19)
50 – 59	10.2% (70)
60 – 69	18.8% (129)
70 – 79	34.3% (236)
80 –	29.8% (205)
Underlying disease	
Neurogenic bladder	50.3% (346)
Prostatomegaly	17.4% (120)
Bladder cancer	12.1% (83)
Hydronephrosis	5.4% (37)
Nephrolithiasis	4.9% (34)
Prostate cancer	4.8% (33)
Ureterolithiasis	3.5% (24)
Ureterostenosis	3.1% (21)
Cystolithiasis	2.5% (17)
Vesical diverticulum	1.0% (7)
Vesicoureteral reflux	1.0% (7)
Nephrocystosis	0.7% (5)
Others	18.9% (130)

Fig. 1 Susceptibility of *E. faecalis* to 7 antibacterial agents (n=140)

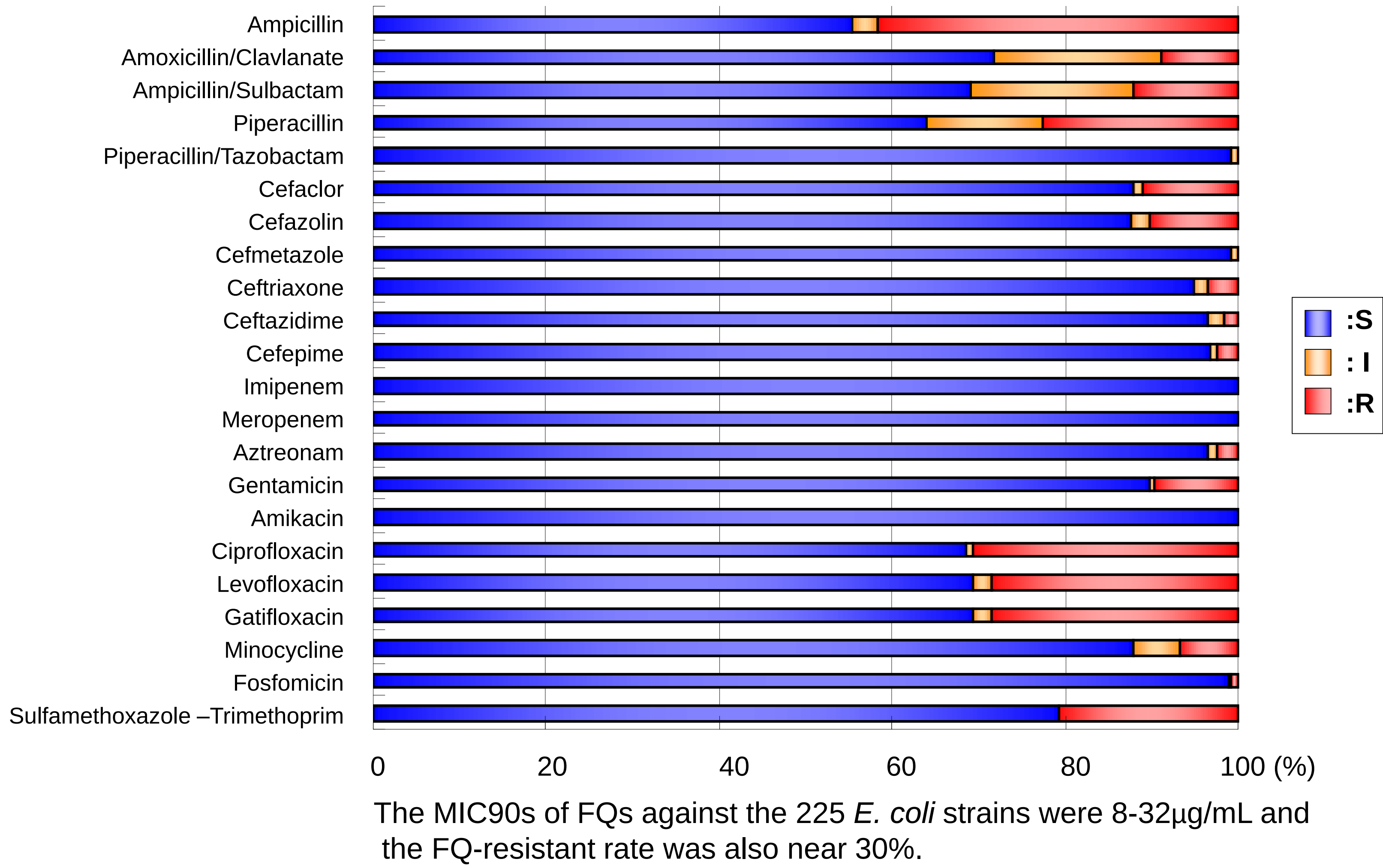


In a susceptibility distribution of 140 *E. faecalis*, Ampicillin and Vancomycin were relatively active, but 11 strains (7.8%) were intermittent to Linezolid. The proportion of Fluoroquinolone(FQ)-resistant strains was about 35%.

Table 1 Susceptibility of 6 urinary pathogens to antibacterial agents (μ g/mL)

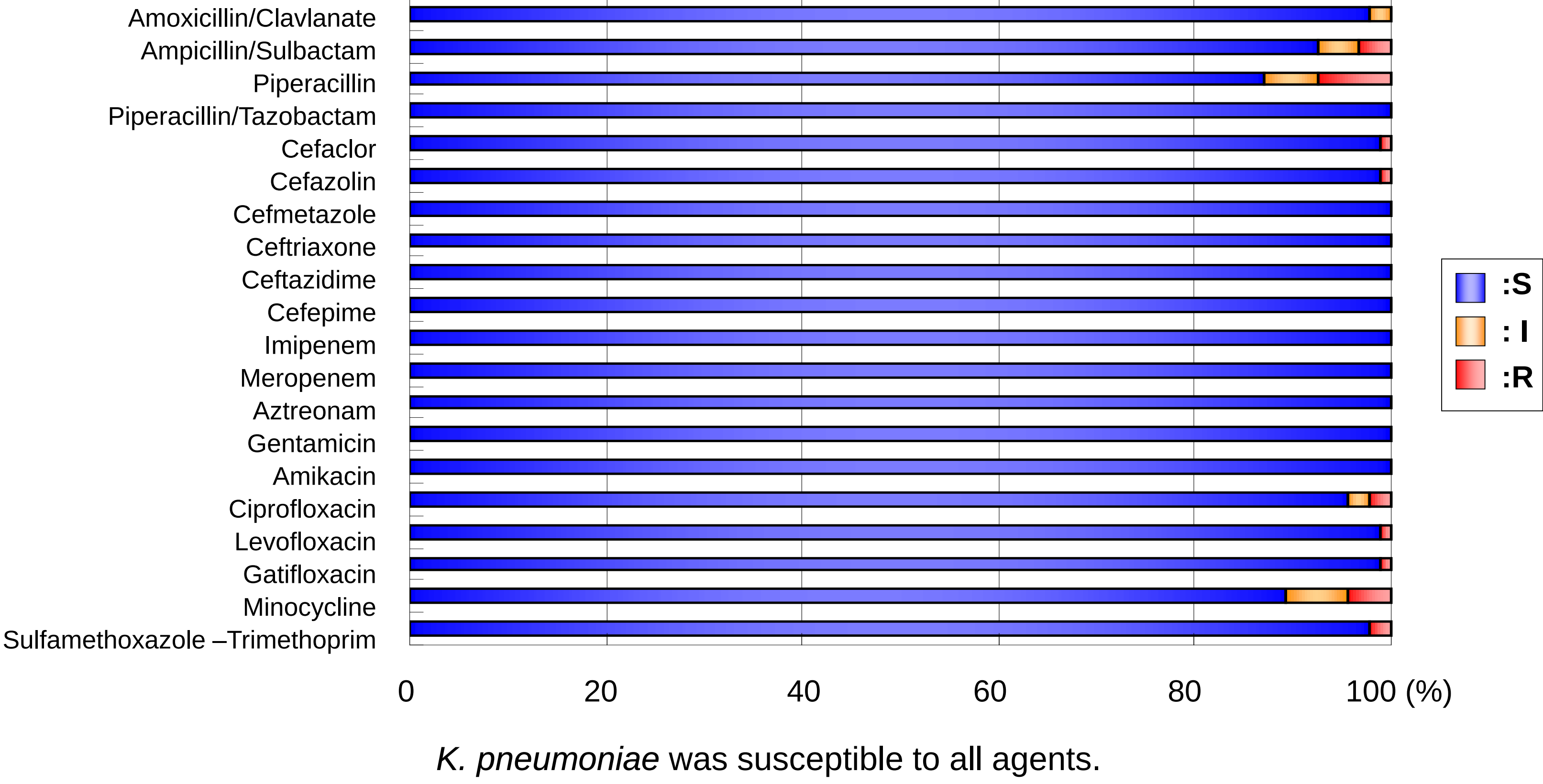
Antibacterial agent	1) <i>Enterococcus faecalis</i> (N=140)			2) <i>Escherichia coli</i> (N=255)			3) <i>Klebsiella pneumoniae</i> (N=93)			4) <i>Proteus mirabilis</i> (N=42)			5) <i>Serratia marcescens</i> (N=44)			6) <i>Pseudomonas aeruginosa</i> (N=114)		
	MIC range	MIC ₅₀	MIC ₉₀	ESBL: 13	MIC range	MIC ₅₀	MIC ₉₀	ESBL: None	MIC range	MIC ₅₀	MIC ₉₀	ESBL: 5	MIC range	MIC ₅₀	MIC ₉₀	MDRP: 2	MBL: 3	
Ampicillin	0.25 – 8	2	4	0.5 – $\geq$ 256	8	$\geq$ 256						0.5 – $\geq$ 256	2	$\geq$ 256				
Amoxicillin/Clavulanate				0.25 – $\geq$ 128	8	16		0.5 – 16	2	4		0.5 – 16	0.5	8				
Ampicillin/Sulbactam	0.25 – 8	2	4	$\leq$ 0.06 – 128	4	32		0.5 – 64	4	8		0.5 – 32	1	8				
Piperacillin	0.5 – 16	4	4	0.25 – $\geq$ 256	2	$\geq$ 256		1 – $\geq$ 256	4	64		0.125 – $\geq$ 256	0.5	$\geq$ 256				
Piperacillin/Tazobactam	0.5 – 16	4	4	0.25 – 64	2	4		0.5 – 16	2	4		0.125 – 64	0.25	1				
Cefaclor				0.125 – $\geq$ 256	2	32		0.125 – 32	0.5	0.5		0.5 – $\geq$ 256	1	$\geq$ 256				
Cefditorene				$\leq$ 0.06 – $\geq$ 128	0.25	2		$\leq$ 0.06 – 4	0.25	0.5		$\leq$ 0.06 – $\geq$ 128	$\leq$ 0.06	$\geq$ 128				
Cefcapene				$\leq$ 0.06 – $\geq$ 256	0.5	2		$\leq$ 0.06 – 4	0.25	1		$\leq$ 0.06 – 64	$\leq$ 0.06	16				
Cefazolin				0.5 – $\geq$ 256	2	32		0.5 – 128	1	2		2 – $\geq$ 256	4	$\geq$ 256				
Cefmetazole				0.125 – 32	0.5	2		0.25 – 8	0.5	2		1 – 8	2	2				
Cefotiam				$\leq$ 0.06 – $\geq$ 256				$\leq$ 0.06 – 8	0.25	0.5		0.25 – $\geq$ 256	0.25	$\geq$ 256				
Flomoxef				$\leq$ 0.06 – 32	$\leq$ 0.06	0.25		$\leq$ 0.06 – 0.25	$\leq$ 0.06	0.125		0.125 – 0.5	0.25	0.25				
Ceftriaxone				$\leq$ 0.06 – $\geq$ 256	$\leq$ 0.06	0.25		$\leq$ 0.06 – 8	$\leq$ 0.06	0.125		$\leq$ 0.06 – $\geq$ 256	$\leq$ 0.06	32				
Ceftazidime				$\leq$ 0.06 – 64	0.125	0.5		$\leq$ 0.06 – 0.5	0.125	0.25		$\leq$ 0.06 – 4	$\leq$ 0.06	0.25				
Cefpirome	0.5 – $\geq$ 256	8	64	$\leq$ 0.06 – $\geq$ 256	$\leq$ 0.06	0.125		$\leq$ 0.06 – 2	$\leq$ 0.06	0.125		$\leq$ 0.06 – $\geq$ 256	$\leq$ 0.06	$\geq$ 256				
Cefepime				$\leq$ 0.06 – 64	$\leq$ 0.06	0.125		$\leq$ 0.06 – 1	$\leq$ 0.06	0.125		$\leq$ 0.06 – $\geq$ 256	$\leq$ 0.06	128				
Imipenem	0.125 – 4	0.5	2	$\leq$ 0.06 – 0.5	0.125	0.25		$\leq$ 0.06 – 0.5	0.125	0.25		0.125 – 8	2	4				
Meropenem	$\leq$ 0.06 – 8	1	2	$\leq$ 0.06 – 0.25	0.125	0.25		$\leq$ 0.06 – 0.25	0.125	0.25		0.125 – 4	2	4				
Aztreonam	0.25 – 16	4	8	$\leq$ 0.06 – 0.25	$\leq$ 0.06	$\leq$ 0.06		$\leq$ 0.06 – 0.5	$\leq$ 0.06	0.25		0.25 – 64	0.5	2				
Gentamicin	0.25 – 16	4	8	$\leq$ 0.06 – 1	$\leq$ 0.06	$\leq$ 0.06		$\leq$ 0.06 – 1	0.125	0.5		0.5 – 4	2	4				
Isipamicin				$\leq$ 0.06 – 0.125	$\leq$ 0.06	$\leq$ 0.06		$\leq$ 0.06 – 0.125	$\leq$ 0.06	0.125		$\leq$ 0.06 – 2	0.25	0.5				
Amikacin	0.25 – 8	2	8	$\leq$ 0.06 – 0.125	$\leq$ 0.06	$\leq$ 0.06		0.5 – 2	0.25	1		0.25 – 4	1	2				
Ciprofloxacin	0.25 – 16	1	4	0.125 – 4	0.5	1		0.5 – 2	0.25	1		0.25 – 16	1	2				
Levofloxacin				$\leq$ 0.06 – 128	$\leq$ 0.06	0.5		$\leq$ 0.06 – 4	$\leq$ 0.06	0.125		$\leq$ 0.06 – 16	$\leq$ 0.06	0.125				
Tosufloxacin				0.125 – 128	0.5	8		0.125 – 0.5	0.25	0.25		0.25 – 64	0.5	2				
Gatifloxacin				0.25 – 8	1	2		0.25 – 1	0.5	0.5		2 – 8	4	4				
Minocycline				0.5 – 16	2	4		0.5 – 2	1	2		1 – 8	4	4				
Fosfomicin				$\leq$ 0.06 – 128	$\leq$ 0.06	32		$\leq$ 0.06 – 8	$\leq$ 0.06	0.25		$\leq$ 0.06 – $\geq$ 256	$\leq$ 0.06	16				
Sulfamethoxazole – Trimethoprim				0.125 – 32	$\leq$ 0.06	16		$\leq$ 0.06 – 8	$\leq$ 0.06	0.5		$\leq$ 0.06 – $\geq$ 256	0.125	8				
Linezolid				0.125 – $\geq$ 256	0.5	8		0.125 – 0.5	0.25	0.25		0.125 – 32	0.5	1				
Colistin				0.25 – 8	1	2		0.25 – 1	0.5	0.5		0.25 – 16	16	32				
Polymyxin B				0.125 – $\geq$ 256	0.5	4		0.5 – 16	2	8		0.5 – $\geq$ 256	4	128				

Fig. 2 Susceptibility of *E. coli* to 22 antibacterial agents (n=225)



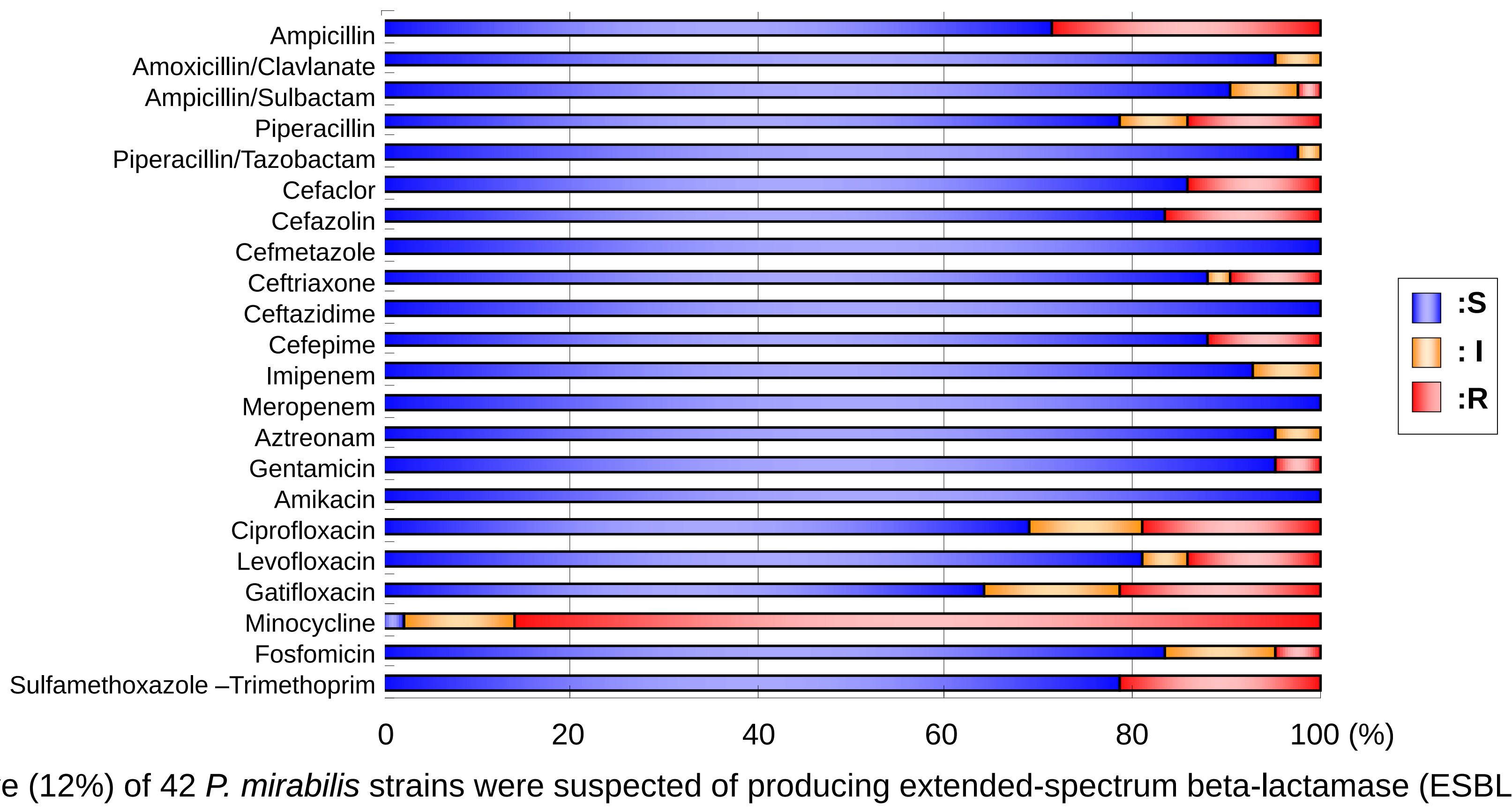
The MIC90s of FQs against the 225 *E. coli* strains were 8-32 μ g/mL and the FQ-resistant rate was also near 30%.

Fig. 3 Susceptibility of *K. pneumoniae* to 20 antibacterial agents (n=93)



K. pneumoniae was susceptible to all agents.

Fig. 4 Susceptibility of *P. mirabilis* to 22 antibacterial agents (n=42)



Five (12%) of 42 *P. mirabilis* strains were suspected of producing extended-spectrum beta-lactamase (ESBL).

Fig. 5 Susceptibility of *S. marcescens* to 16 antibacterial agents (n=44)

