

Verification of Resistance Prevalence in Bacterial Pathogens by the Nationwide Surveillance Conducted by the Japanese Society of Chemotherapy (JSC)
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Introduction

JSC conducted the second nationwide surveillance of bacterial respiratory pathogens in 2007.

Materials & Methods

- 1) Surveillance period : January – April, 2007
- 2) Cooperative institutes : 39 Hospitals throughout Japan.
- 3) Strains tested : Isolates obtained from sputum, specimens by trans-tracheal aspiration (TTA) and/or bronchoscopy (confirmed by qualitative culture, by Gram-staining etc.) of well-defined adult respiratory tract infection (RTI) patients [community-acquired pneumonia (CAP), hospital-acquired pneumonia (HAP), acute exacerbations of chronic respiratory diseases (AECRD), and others].
- 4) Antibacterial agents tested : 44 agents as listed in Table. 1.
- 5) Susceptibility test : Conducted at the central laboratory (Kitasato University, Anti-infection Drugs Research Center) according to CLSI standards for broth microdilution methode.
- 6) For classification of penicillin susceptibility in *Streptococcus pneumoniae*, M-100 S-17 (January, 2007) was employed.
- 6) Determination of β-lactamase : Nitrocefin method and Cica-Beta Test [Kanto Chemicals, Tokyo ; for detection of extended-spectrum β-lactamase (ESBL) and metallo-β-lactamase (MBL)].

	<i>Staphylococcus aureus</i>	<i>Streptococcus pneumoniae</i>	<i>Streptococcus pyogenes</i>	<i>Moraxella catarrhalis</i>	<i>Haemophilus influenzae</i>	<i>Klebsiella pneumoniae</i>	<i>Pseudomonas aeruginosa</i>	Total
Numbers collected	231	279	9	128	223	129	179	1178
Numbers tests	226	257	6	120	206	122	171	1108

Results

Susceptibilities (Table. 1) and current trends of resistant (Fig. 1-3) in the three major bacterial respiratory pathogens.

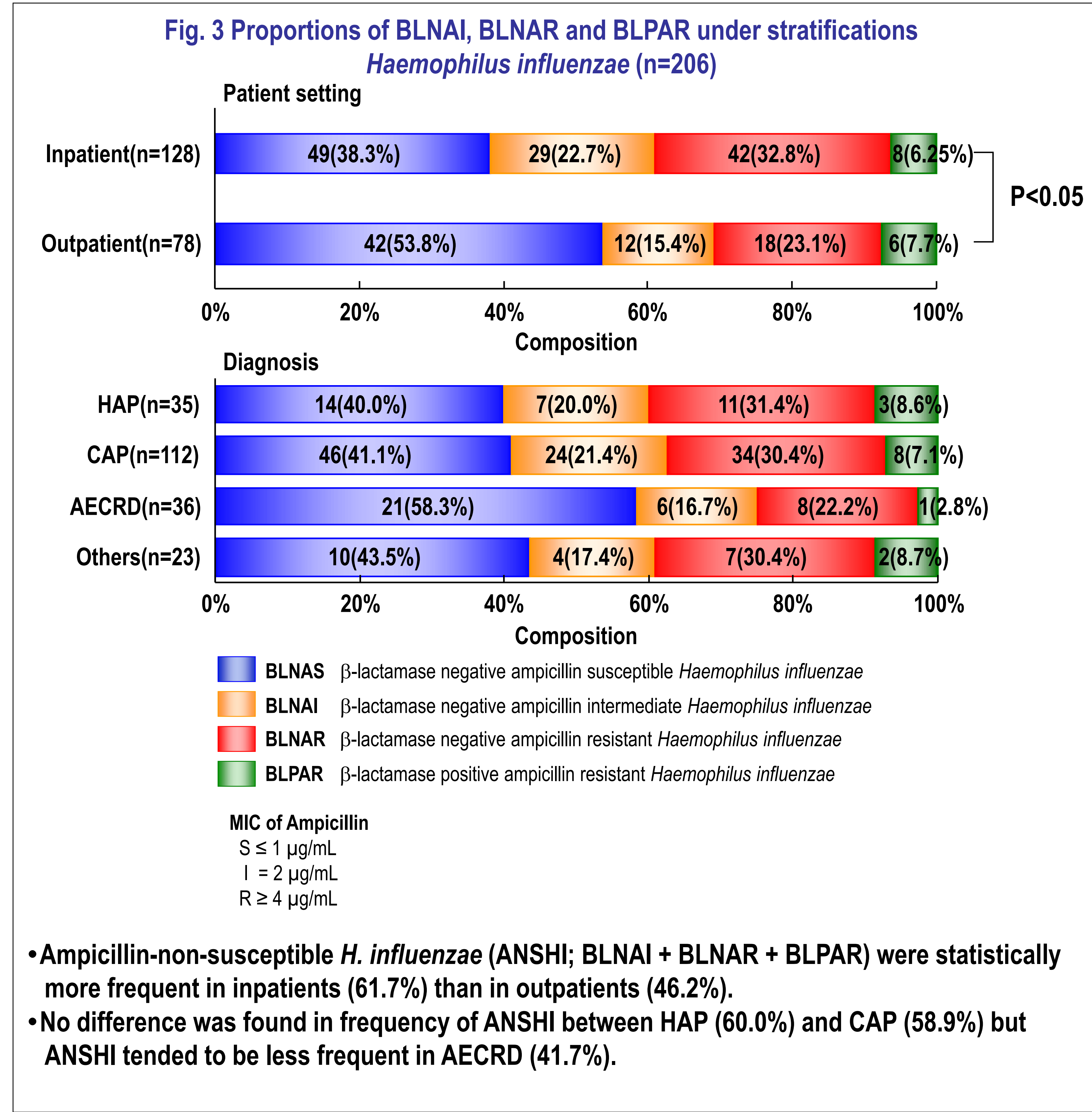
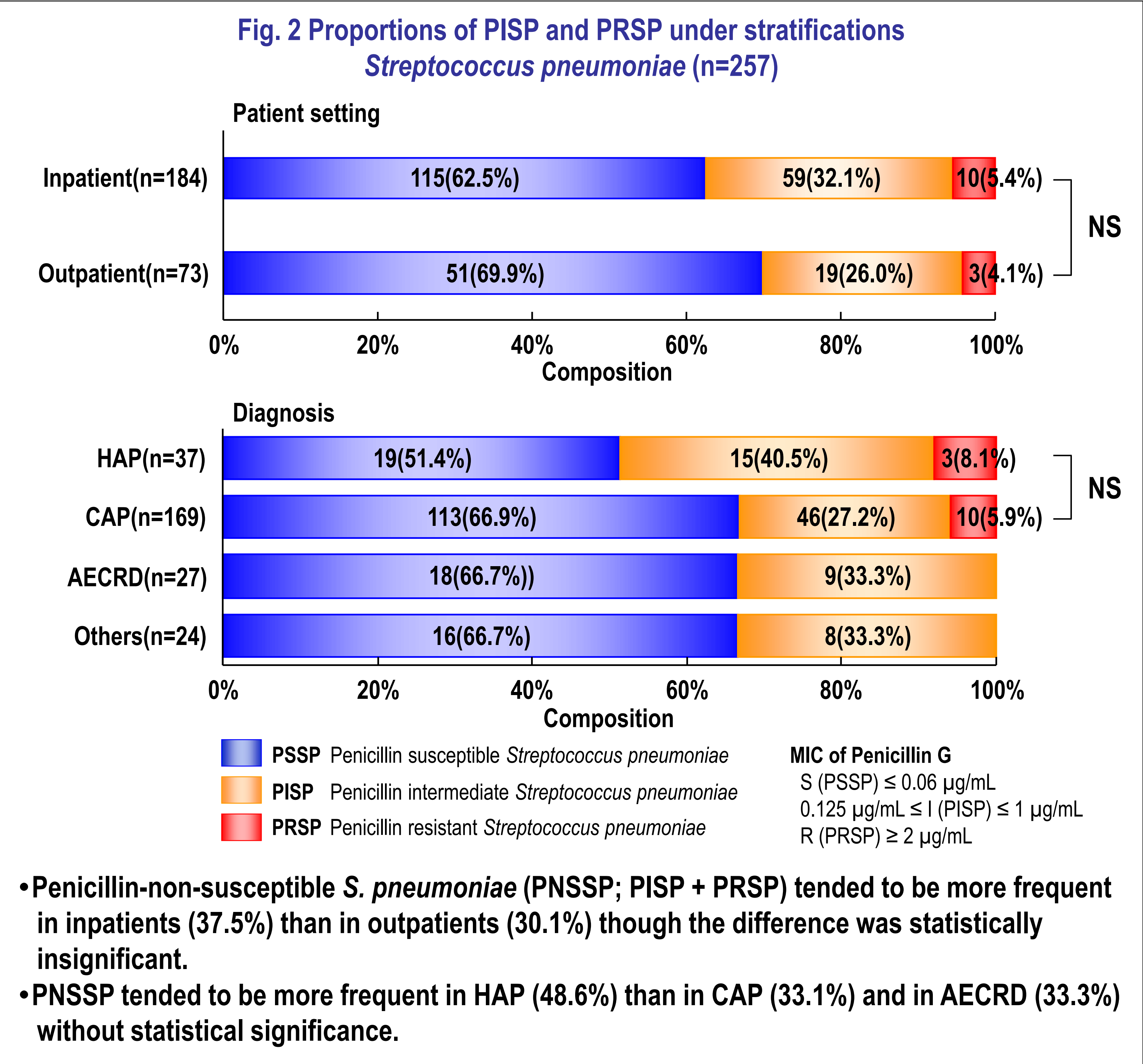
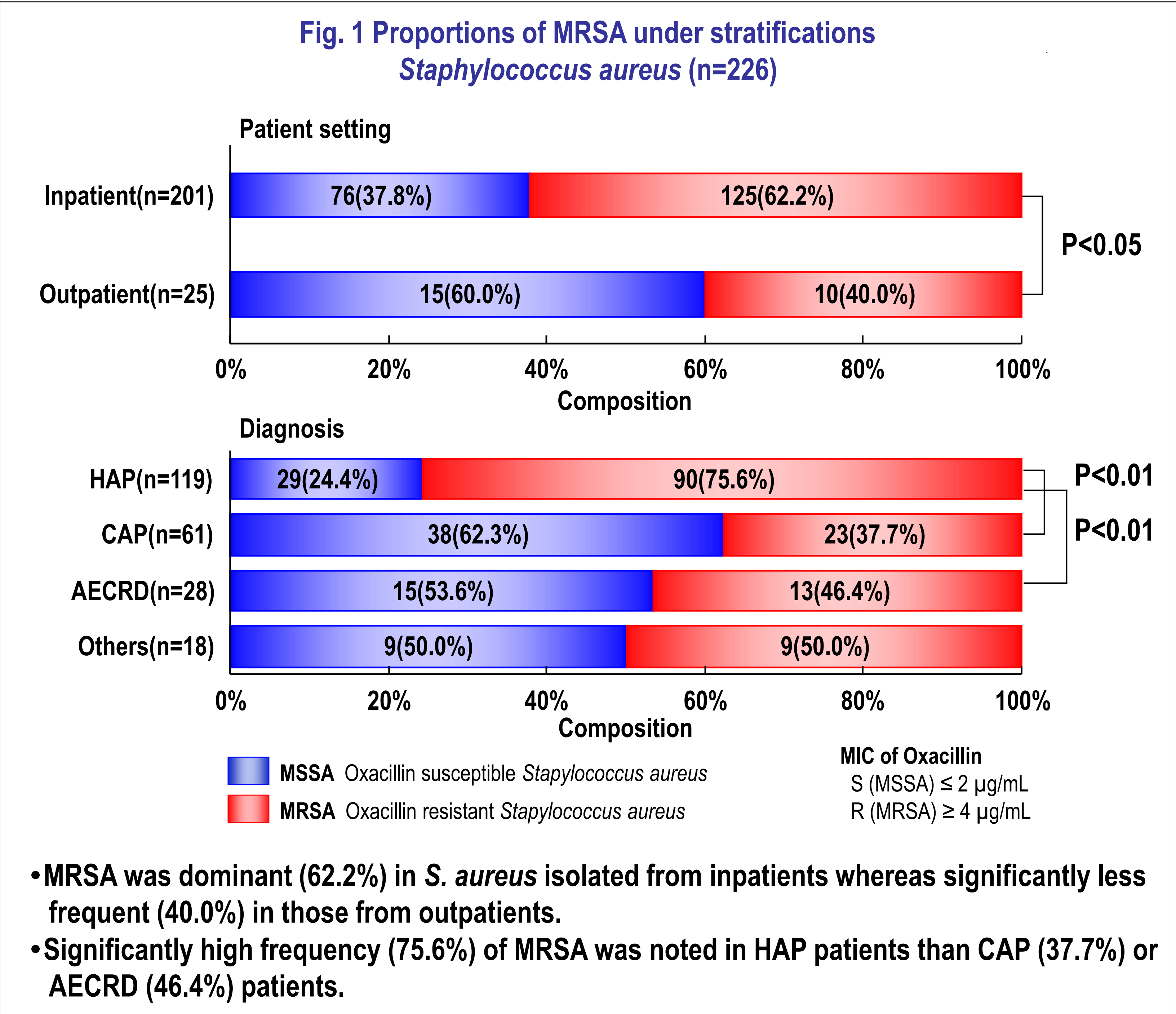


Table.1 Susceptibility of 3 major respiratory pathogens to antibacterial agents (mg/mL)

antibacterial agent	<i>Staphylococcus aureus</i> (n=226)			<i>Streptococcus pneumoniae</i> (n=257)			<i>Haemophilus influenzae</i> (n=206)		
	MIC range	MIC ₅₀	MIC ₉₀	MIC range	MIC ₅₀	MIC ₉₀	MIC range	MIC ₅₀	MIC ₉₀
Penicillin G	≤0.06 - 128	16	32	≤0.06 - 4	≤0.06	1	≤0.06 - ≥256	2	8
Ampicillin	0.125 - 128	16	64	≤0.06 - 8	0.125	2	0.25 - ≥256	2	8
Ampicillin/Sulbactam	0.125 - 64	8	32	≤0.06 - 8	0.125	2	≤0.06 - 16	2	8
Amoxicillin/Clavulanate	0.125 - ≥128	16	32	≤0.06 - 8	≤0.06	1	0.25 - 32	2	8
Piperacillin	0.5 - ≥256	64	≥256	≤0.06 - 4	≤0.06	2	≤0.06 - ≥256	≤0.06	0.25
Piperacillin/Tazobactam	0.25 - ≥256	64	128	≤0.06 - 4	≤0.06	1	≤0.06 - 1	≤0.06	0.125
Cefaclor	0.5 - ≥256	64	≥256	≤0.06 - ≥256	1	32	0.25 - 128	8	64
Ceftinir	0.125 - ≥128	≥128	≥128	≤0.06 - 16	0.25	4	≤0.06 - 16	1	8
Cefcapene	0.25 - ≥256	≥256	≥256	≤0.06 - 4	0.25	0.5	≤0.06 - 8	0.5	2
Cefditoren	0.25 - ≥128	64	≥128	≤0.06 - 1	0.125	0.5	≤0.06 - 2	0.125	0.25
Cefazolin	0.25 - ≥256	128	≥256	≤0.06 - 32	0.25	2	0.25 - ≥256	8	64
Cefotiam	0.25 - ≥256	128	≥256	≤0.06 - 16	0.25	4	0.25 - 128	4	64
Ceftazidime	4 - ≥128	≥128	≥128	≤0.06 - 32	4	8	≤0.06 - 4	0.25	0.5
Ceftriaxone	2 - ≥256	≥256	≥256	≤0.06 - 4	0.25	1	≤0.06 - 0.5	0.125	0.25
Cefepime	0.5 - ≥256	128	≥256	≤0.06 - 2	0.25	1	≤0.06 - 16	0.5	2
Cefozopran	0.5 - ≥256	16	64	≤0.06 - 4	0.25	1	≤0.06 - 64	4	8
Cefmetazole	0.5 - 128	32	64	≤0.06 - 32	0.5	8	0.5 - 64	4	16
Aztreonam							≤0.06 - 16	0.25	2
Imipenem	≤0.06 - ≥128	16	64	≤0.06 - 2	≤0.06	0.25	≤0.06 - 8	1	2
Panipenem	≤0.06 - ≥256	8	32	≤0.06 - 1	≤0.06	0.125	≤0.06 - 4	0.5	2
Meropenem	≤0.06 - 64	8	32	≤0.06 - 2	≤0.06	0.25	≤0.06 - 1	0.125	0.25
Biapenem	≤0.06 - 128	16	64	≤0.06 - 2	≤0.06	0.25	≤0.06 - 8	1	4
Doripenem	≤0.06 - 32	4	16	≤0.06 - 1	≤0.06	0.25	≤0.06 - 2	0.125	1
Faropenem	0.125 - ≥256	128	≥256	≤0.06 - 1	≤0.06	0.25	0.125 - 4	1	2
Gentamicin	0.25 - ≥256	0.5	128	1 - 16	4	8	≤0.06 - 2	1	2
Amikacin	1 - ≥256	4	16	8 - 128	32	64	0.5 - 8	4	8
Arbekacin	0.25 - 8	0.5	1	2 - 64	16	32	0.5 - 4	4	4
Ciprofloxacin	0.125 - ≥256	8	128	≤0.06 - 64	1	2	≤0.06 - 16	≤0.06	≤0.06
Lev ofloxacin	0.125 - ≥256	4	≥256	0.5 - 64	1	2	≤0.06 - 8	≤0.06	≤0.06
Tosufloxacin	≤0.06 - ≥32	4	≥32	≤0.06 - ≥32	0.25	0.25	≤0.06 - ≥32	≤0.06	≤0.06
Gatifloxacin	≤0.06 - ≥256	1	64	≤0.06 - 16	0.25	0.5	≤0.06 - 8	≤0.06	≤0.06
Pazufloxacin	0.125 - ≥256	4	≥256	≤0.06 - 128	2	4	≤0.06 - 32	≤0.06	≤0.06
Moxifloxacin	≤0.06 - 64	1	32	≤0.06 - 8	0.25	0.5	≤0.06 - 8	≤0.06	≤0.06
Minocycline	≤0.06 - 16	0.5	16	≤0.06 - 64	8	16	0.125 - 8	0.25	0.5
Erythromycin	0.5 - ≥256	≥256	≥256	≤0.06 - ≥256	≥256	≥256	0.25 - 32	4	8
Clarithromycin	0.125 - ≥128	≥128	≥128	≤0.06 - ≥128	128	128	0.5 - 64	8	16
Azithromycin	0.25 - ≥128	≥128	≥128	≤0.06 - ≥128	≥128	≥128	0.125 - 4	0.5	1
Telithromycin	≤0.06 - ≥64	≥64	≥64	≤0.06 - 4	≤0.06	0.25	0.25 - 8	2	4
Clindamycin	≤0.06 - ≥256	≥256	≥256	≤0.06 - ≥256	64	≥256	0.5 - 128	8	16
Vancomycin	0.5 - 2	1	2	≤0.06 - 0.5	0.25	0.25			
Teicoplanin	0.125 - 4	1	2						
Linezolid	1 - 4	2	2	0.25 - 2	0.5	1			
Oxacillin	0.125 - ≥256	128	≥256						
Cefoxitin	2 - ≥256	128	≥256						

Conclusion

- Nationwide surveillance revealed the tendency of resistance of bacterial pathogens in adult respiratory tract infections.
- MRSA is significantly high in inpatients particularly those with hospital-acquired pneumonia (75.6%). It is noticeable that MRSA was as high as 40% even in outpatients.
- Frequency of penicillin-non-susceptible *S. pneumoniae* is still high, 30 – 50%, irrespective of stratifications of patients.
- Ampicillin-non-susceptible *H. influenzae* were significant in inpatients with hospital- and community-acquired pneumonia.