

Susceptibility of *P. aeruginosa* From Asia During 2009-2010: Data From TEST Including Multi-drug resistant (MDR) Isolates

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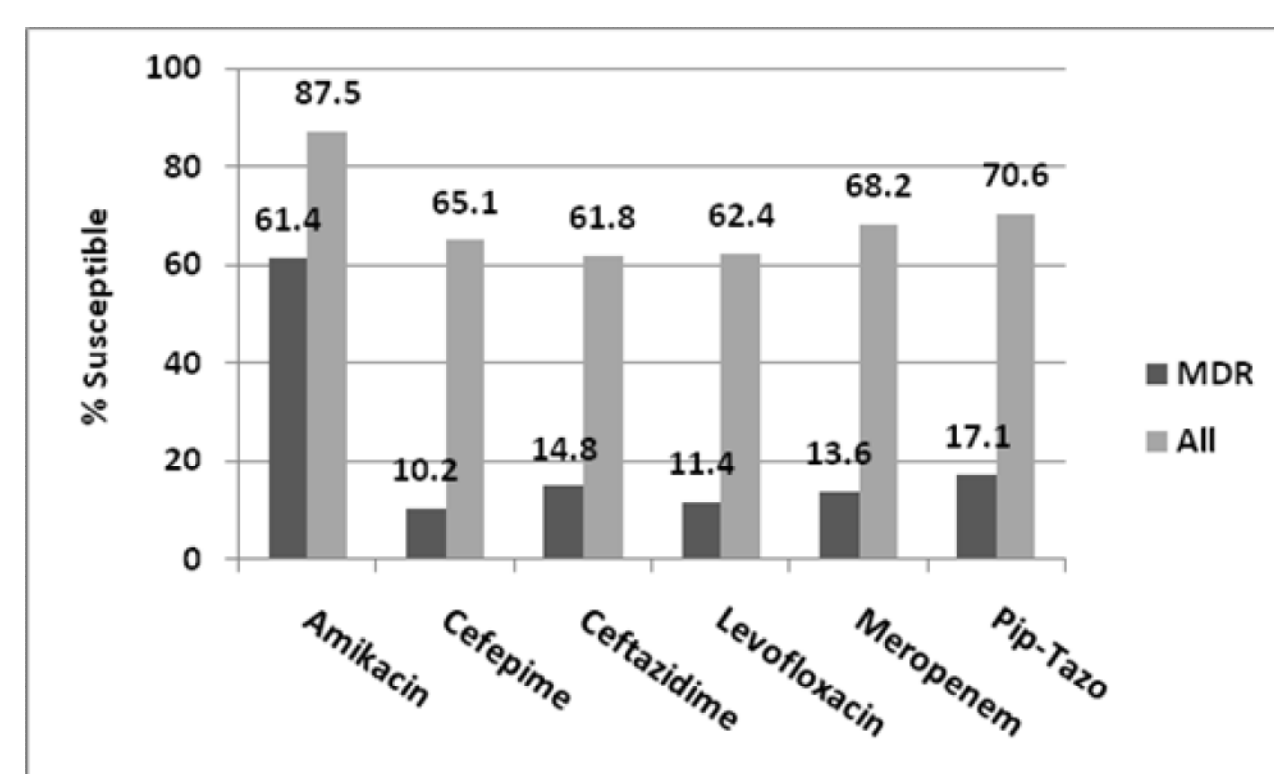
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Revised Abstract

Background: The Tigecycline Evaluation and Surveillance Trial (TEST) monitors the activity of tigecycline and comparators against multiple pathogens collected worldwide. Such monitoring assists in investigating resistance rates either globally, regionally or by country. The current report describes susceptibility of 327 *P. aeruginosa* isolates from Asia of which 88 (27%) were multi-drug resistant isolates (isolates resistant to three different drug classes). **Methods:** A total of 327 clinical isolates were collected from multiple infection sources in Asia during 2009-2010. Susceptibility testing was performed as per CLSI guidelines and interpreted using CLSI /FDA clinical breakpoints. **Results:** Susceptibility of all isolates and MDR isolates is shown below:



Conclusions: Of the total of 327 isolates, a large proportion (27%) were MDR. The highest susceptibility for all isolates was observed with amikacin (87.5%) and piperacillin-tazobactam (70.6%), though even for these agents activity was significantly diminished against MDR isolates. Resistance in Asian *P. aeruginosa* isolates is high, further limiting available therapeutic options.

Introduction

An opportunistic, nosocomial pathogen of immunocompromised individuals, *P. aeruginosa* typically infects the pulmonary tract, urinary tract, burns, wounds, and also causes other blood infections. It is the most common cause of infections of burn injuries and of the external ear (otitis externa), and is the most frequent colonizer of medical devices (e.g., catheters). *Pseudomonas* can, in rare circumstances, cause community-acquired pneumonias as well as ventilator-associated pneumonias, being one of the most common agents isolated. One in ten hospital-acquired infections are from *Pseudomonas*. The organism is also associated with the skin lesion ecthyma gangrenosum. *P. aeruginosa* is frequently associated with osteomyelitis involving puncture wounds of the foot. The present report described the susceptibility of recent clinical isolates of *P. aeruginosa* from Asia (2009 – 2010) to a range of antimicrobial agents as part of the Tigecycline Evaluation and Surveillance Trial (TEST).

Materials & Methods

- ❖ **Clinical isolates:** Isolates were identified to the species level and tested at each participating laboratory. All organisms were deemed clinically significant by local participant criteria. Isolate inclusion was independent of medical history, antimicrobial use, age, or gender. All sites identified each study isolate utilizing local laboratory criteria. All isolates were from the period 2009 - 2010 and originated from various countries in Asia.
- ❖ **Susceptibility testing:** Minimum inhibitory concentrations (MICs) were determined using plates manufactured by TREK (TREK Diagnostic Systems, Cleveland, OH), following manufacturer and Clinical and Laboratory Standards Institute (CLSI) instructions for broth microdilution testing [1]. Susceptibility was determined using clinical breakpoints published by the CLSI [2]. The following antimicrobial agents were supplied by the panel manufacturer TREK and included on the panels with their dilution ranges (expressed in mcg/ml): amikacin (0.5-64); amoxicillin-clavulanic acid (0.12/0.06-32/16); ampicillin (0.06-16); cefepime (0.5-32); ceftazidime (8-32); ceftriaxone (0.06-64); meropenem (0.12-16); levofloxacin (0.008-8); minocycline (0.5-16); piperacillin-tazobactam (0.06/4-128/4). *E. coli* ATCC 25922 and ATCC 35218 and *P. aeruginosa* ATCC 27853 were tested as quality control organisms.

References

1. Clinical Laboratory Standards Institute. 2009. Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standards -- Eighth Edition. CLSI document M07-A8 Wayne, PA.
2. Clinical and Laboratory Standards Institute. 2011. Performance Standards for Antimicrobial Susceptibility Testing; Twenty-First Informational Supplement. CLSI Document M100-S21. Wayne, PA.

Acknowledgements

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Results

Figure 1. Number of all *P. aeruginosa* isolates and multi-drug resistant (MDR) isolates by country.

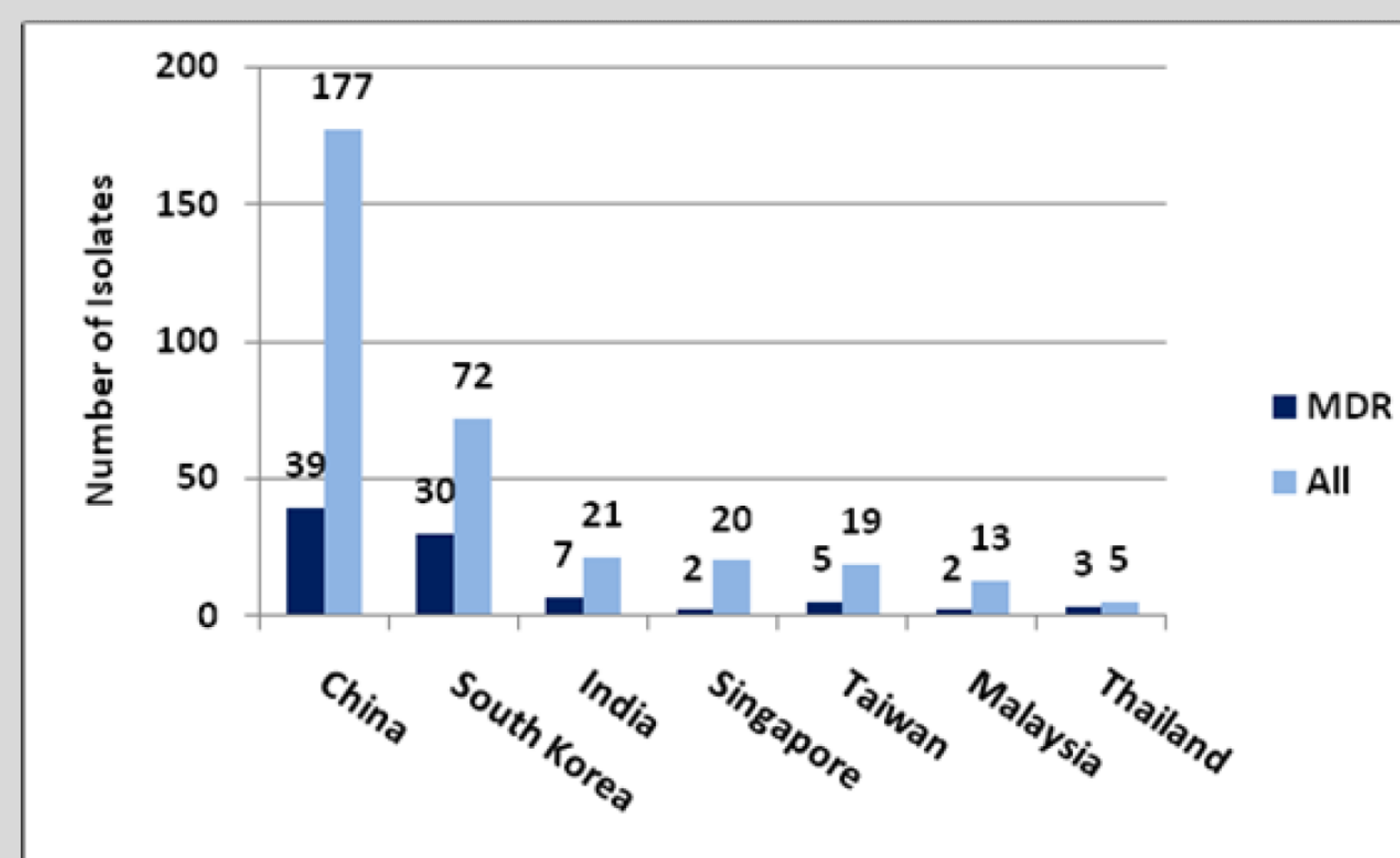


Figure 2. Number of all *P. aeruginosa* isolates and MDR isolates by source.

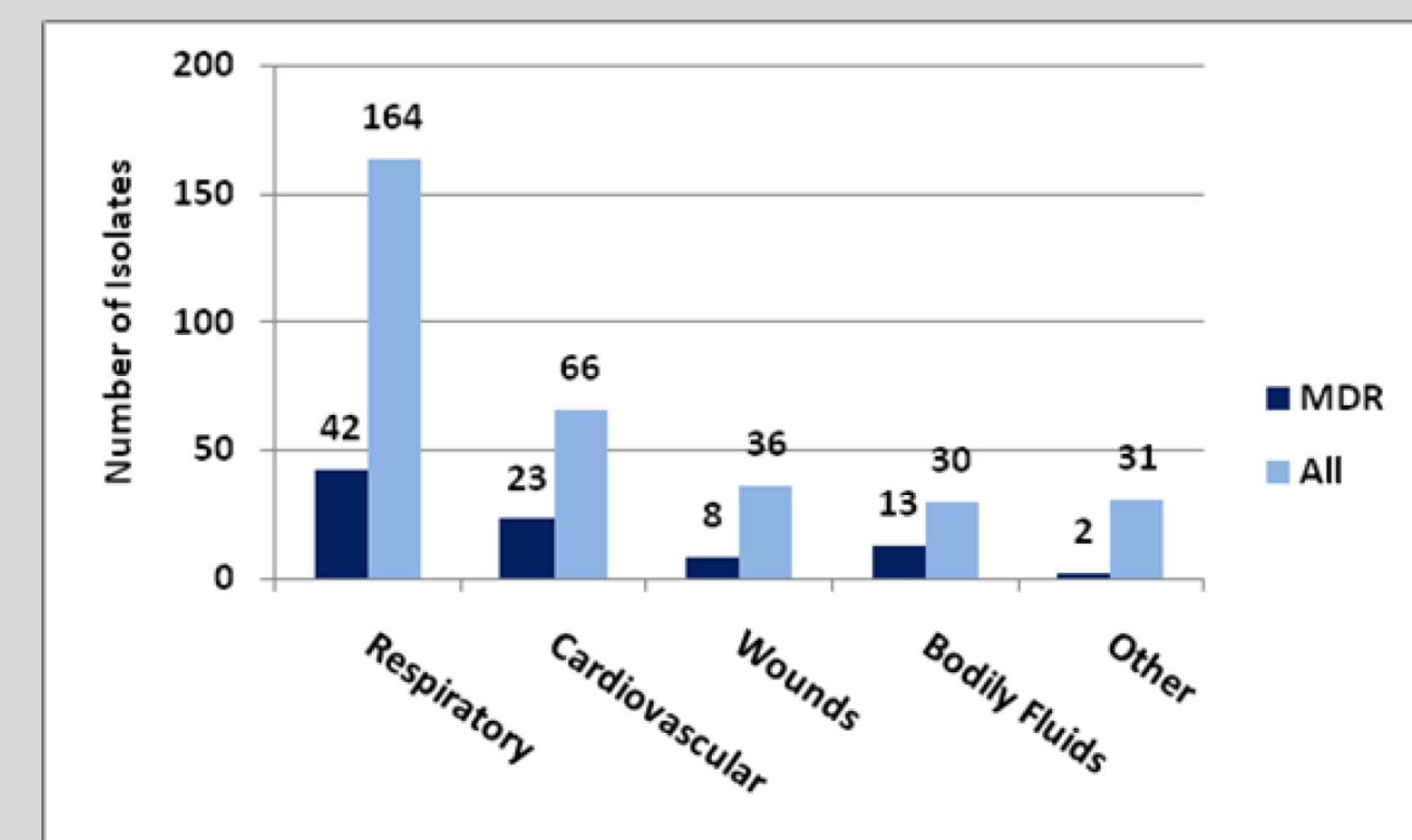
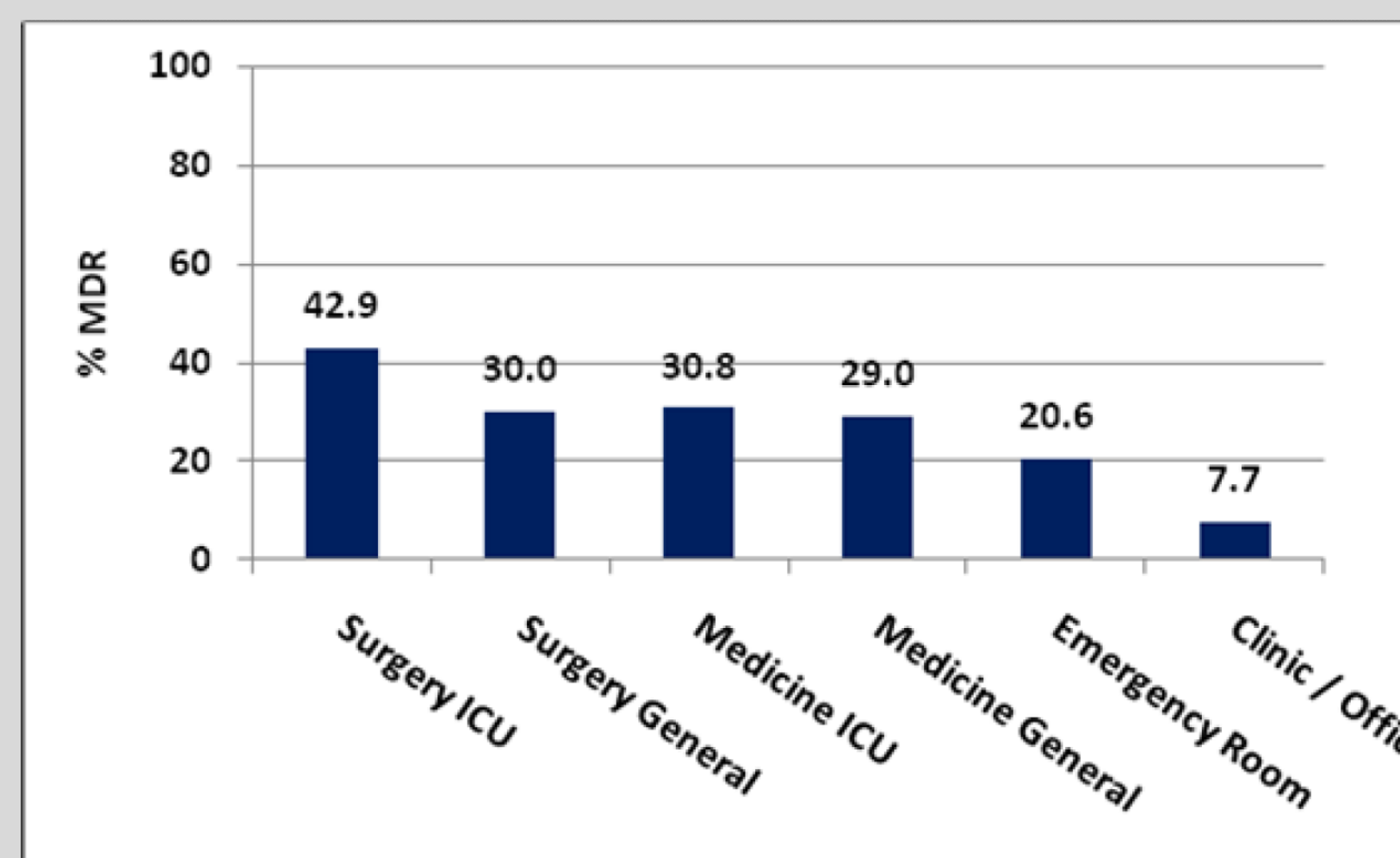


Figure 3. Proportion of *P. aeruginosa* isolates that are MDR by location*.



* Only locations with n≥10 were included

Figure 4. Susceptibility of all isolates (n = 327) and MDR isolates (n = 88) to antimicrobial agents.

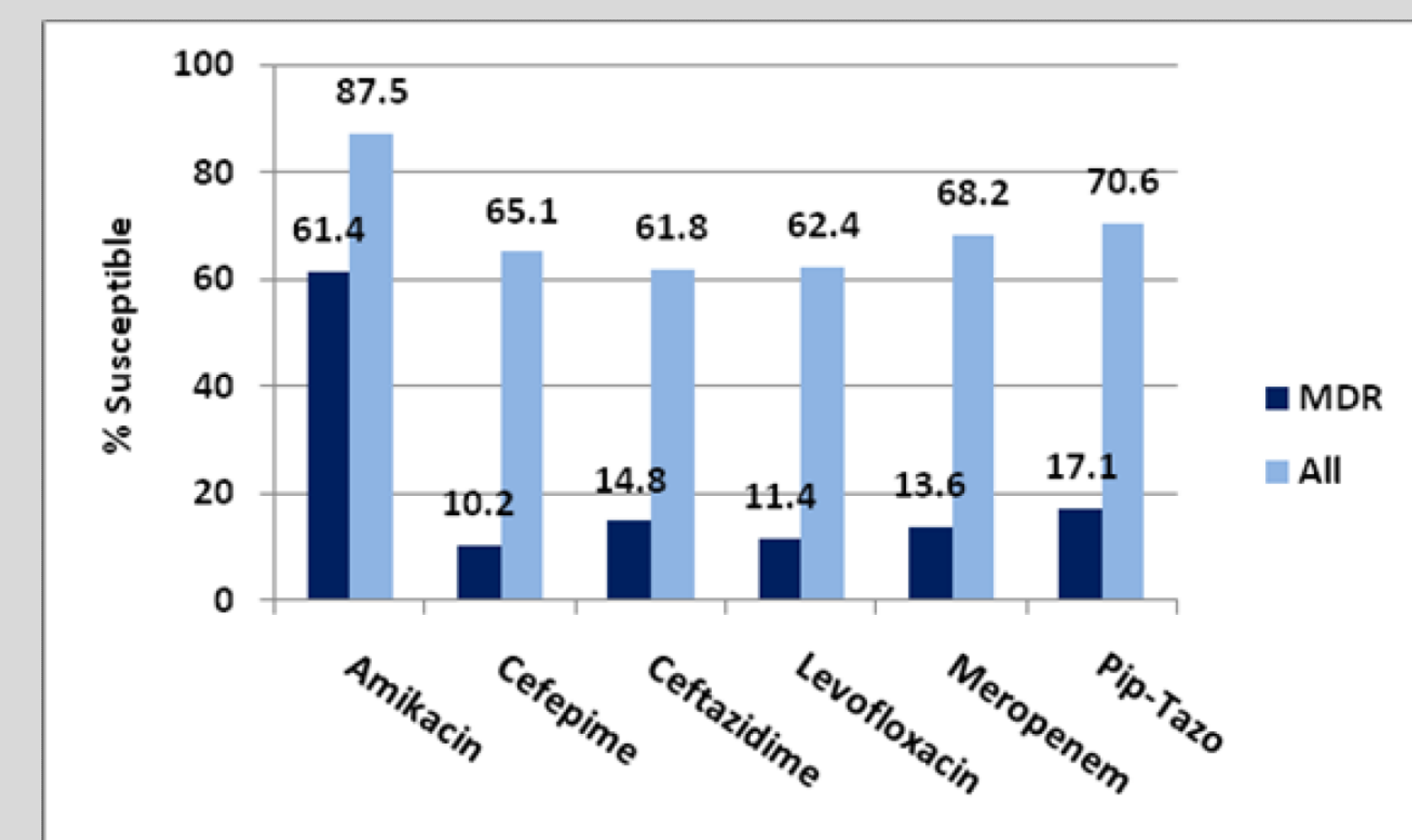


Table 1. Activity of antimicrobial agents against all isolates (n = 327) and MDR isolates (n = 88).

Agent	All isolates (n = 327)				MDR Isolates (n = 88)			
	MIC ₅₀	MIC ₉₀	MIN	MAX	MIC ₅₀	MIC ₉₀	MIN	MAX
Amikacin	4	32	≤ 0.5	> 64	8	> 64	≤ 0.5	> 64
Cefepime	8	32	≤ 0.5	> 32	32	> 32	8	> 32
Ceftazidime	≤ 8	> 32	≤ 8	> 32	> 32	> 32	≤ 8	> 32
Levofloxacin	1	> 8	0.06	> 8	> 8	> 8	0.25	> 8
Meropenem	1	> 16	≤ 0.06	> 16	16	> 16	0.12	> 16
Pip-Tazo	16	> 128	0.25	> 128	> 128	> 128	4	> 128

MIN, minimum MIC; MAX, maximum MIC.

Conclusions

- ❖ Of the total of 327 isolates, a large proportion (27%) were MDR of which most were from respiratory and cardiovascular sources.
- ❖ The highest susceptibility for all isolates was observed with amikacin (87.5%) and piperacillin-tazobactam (70.6%), though even for these agents activity was significantly diminished against MDR isolates.
- ❖ Resistance in Asian *P. aeruginosa* isolates is high, further limiting available therapeutic options.