

# Institutional Prevalence of Drug-Resistant Pathogens in Community-Acquired Pneumonia



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## Background

- Community-acquired pneumonia (CAP) is a leading cause of hospitalizations, plays a major role in reported mortality, and incurs significant costs.<sup>1</sup>
- Prior definition of HCAP led to increased prescribing of unnecessary broad-spectrum antimicrobials.
- Treatment regimens involving the unnecessary use of broad-spectrum antimicrobials has contributed to the emergence of drug-resistant pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa* (PsA).<sup>2</sup>
- HCAP risk factors were neither sensitive nor specific to identify drug-resistant pathogens as a cause of CAP. Use of HCAP risk factors to guide antimicrobial therapy has therefore been removed from the Infectious Diseases Society of America (IDSA) HAP/VAP guidelines and are not supported by the 2019 IDSA CAP guidelines.<sup>3,4</sup>
- The 2019 IDSA guidelines for management of adults with CAP emphasize the need for clinician understanding of local epidemiology data and validated risk factors to guide the selection of appropriate antimicrobial treatment.<sup>4</sup>
- Currently, local epidemiology data is unknown.

## Objective

To determine the prevalence of MRSA and PsA CAP and identify risk factors associated with CAP caused by drug-resistant pathogens at our institution.

## Methods

- Retrospective observational study
- Conducted at 870-bed public county hospital
- Prevalence was determined by comparing the number of blood and adequate sputum cultures with MRSA or PsA isolates to the total number of CAP cases analyzed.

### Inclusion Criteria

- Admitted to Parkland Hospital
- Received a clinical diagnosis of CAP or HCAP within 48 hours of admission between March 2016 and March 2021

### Exclusion Criteria

- Diagnosis of SARS-CoV-2 on same admission
- History of SARS-CoV-2 that required intubation
- Chronic ventilation
- Existing tracheostomy or laryngectomy

## Results

**Table 1. Prevalence of MRSA and PsA Based on Culture Data**

Total CAP Cases <sup>0</sup>	Type of Culture Obtained	Cultures Collected	Cultures with Expected CAP Organism Isolated	Cultures with Likely Contaminant Isolated	Cultures with MRSA or PsA Isolated	% Prevalence of MRSA or PsA (Among Total CAP Cases)
220	Sputum	35	4	1	3	1.36
	Blood	208	6	28	0	0

**Table 2. MRSA Nares Screening Test Data**

Total CAP Cases	Number of MRSA Nares Screenings Completed	Number of Positive MRSA Nares Screenings	% Positive (Total Cases)
220	22	1	0.45

**Table 3. CAP Case Characteristics**

Characteristic <sup>1</sup>	Total (N=220)
Age, years – mean (SD)	61 (11.2)
Male Sex – n (%)	109 (49.5)
Race – n (%)	
White	65 (29.5)
Black	155 (70.5)
Comorbid Conditions – n (%)	
Chronic obstructive pulmonary disease	39 (17.7)
Bronchiectasis	3 (1.4)
Cirrhosis	20 (9.1)
Diabetes mellitus, type 2	81 (36.8)
Chronic kidney disease	49 (22.3)
Human immunodeficiency virus	32 (14.5)
Immunocompromised state	30 (13.6)
Social History – n (%)	
Active tobacco use	82 (37.3)
Residence in nursing home or long-term care (LTC) facility	8 (3.6)
Homelessness	19 (8.6)
Residence in congregate care facility or group home	6 (2.7)
Healthcare-Related Factors – n (%)	
Chronic dialysis	15 (6.8)
Hospitalization (within 90 days prior to admission)	73 (33.2)
Receipt of IV antibiotics (within 90 days prior to admission)	40 (18.2)
Previous isolation of MRSA/PsA from sputum culture (within 1 year prior to admission)	2 (0.9)
Previous isolation of MRSA/PsA from any non-sputum culture (within 1 year prior to admission)	2 (0.9)
Previous positive MRSA nares swab (within 1 year prior to admission)	0 (0)
Co-Infections During Same Admission – n (%)	
Influenza	1 (0.5)
Respiratory syncytial virus (RSV)	1 (0.5)

## Conclusions

- Overall prevalence of CAP caused by MRSA and PsA is low (<2%) at Parkland Hospital
- Unable to assess risk factors associated with CAP caused by MRSA and PsA due to small sample size

## Strengths and Limitations

### Strengths

- Results help identify local prevalence of MRSA and PsA as a cause of CAP
- Analyzed frequency of MRSA or PsA relative to the number of all CAP cases as per IDSA recommendations for assessment of prevalence

### Limitations

- Descriptive statistics only
- Limited analysis of patients with CAP caused by MRSA and PsA
- Criteria used for classification of severe CAP differed from IDSA definition of severe CAP
- Findings specific to population at Parkland

## Future Directions

- Larger sample size
- Identification of locally validated risk factors for CAP caused by MRSA or PsA at Parkland
- Standardization of criteria for severe CAP
- Assessment of treatment appropriateness

## References

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