

# Cluster of Severe Methicillin-Resistant Staphylococcus aureus Community-Acquired Pneumonia During the Influenza Season —Louisiana, December 2006–January 2007

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## Background

### Methicillin-Resistant Staphylococcus aureus (MRSA)

- MRSA
  - Resistant to beta lactam antibiotics
  - Skin and soft tissue infections (SSTI) increasing in the community
  - Severe infections (pneumonia and sepsis)
- MRSA community-acquired pneumonia (CAP)
  - Recently emerged
  - Infrequently reported
  - Rapidly fatal
  - Differential diagnosis difficult

### Cluster of MRSA Community-Acquired Pneumonia—Alexandria, LA

- December 2006
  - 4 cases of MRSA CAP
  - 2 pediatric deaths
  - LA Office of Public Health notified
- January 2007
  - Case investigation begins

### Objectives

- Determine if cases epidemiologically linked
- Identify additional cases
- Describe clinical characteristics

### Case Definition

- Community-acquired pneumonia
- Lab-confirmed influenza or influenza-like illness (ILI)
- MRSA culture from sterile site or sputum collected < 48 hours after hospitalization

## Methods

- Enhanced surveillance for additional cases
  - Email notification to Infection Control Practitioners, regional epidemiologists, and physicians
- Review of patient's medical charts
  - Clinical information
  - Antibiotic treatment
- Laboratory testing at CDC
  - MRSA isolates
  - Pathology specimens

## Results

### Patient Characteristics

Case	Age	Gender	Race	Co-Morbidity	Outcome
1	10 yrs	Male	White	None	Died
2	43 yrs	Male	Black	Hepatitis C Hypertension	Survived
3	26 yrs	Male	White	None	Survived
4	14 yrs	Male	White	None	Died
5	21 yrs	Male	Hispanic	None	Survived
6	4 mos	Female	Black	None	Survived

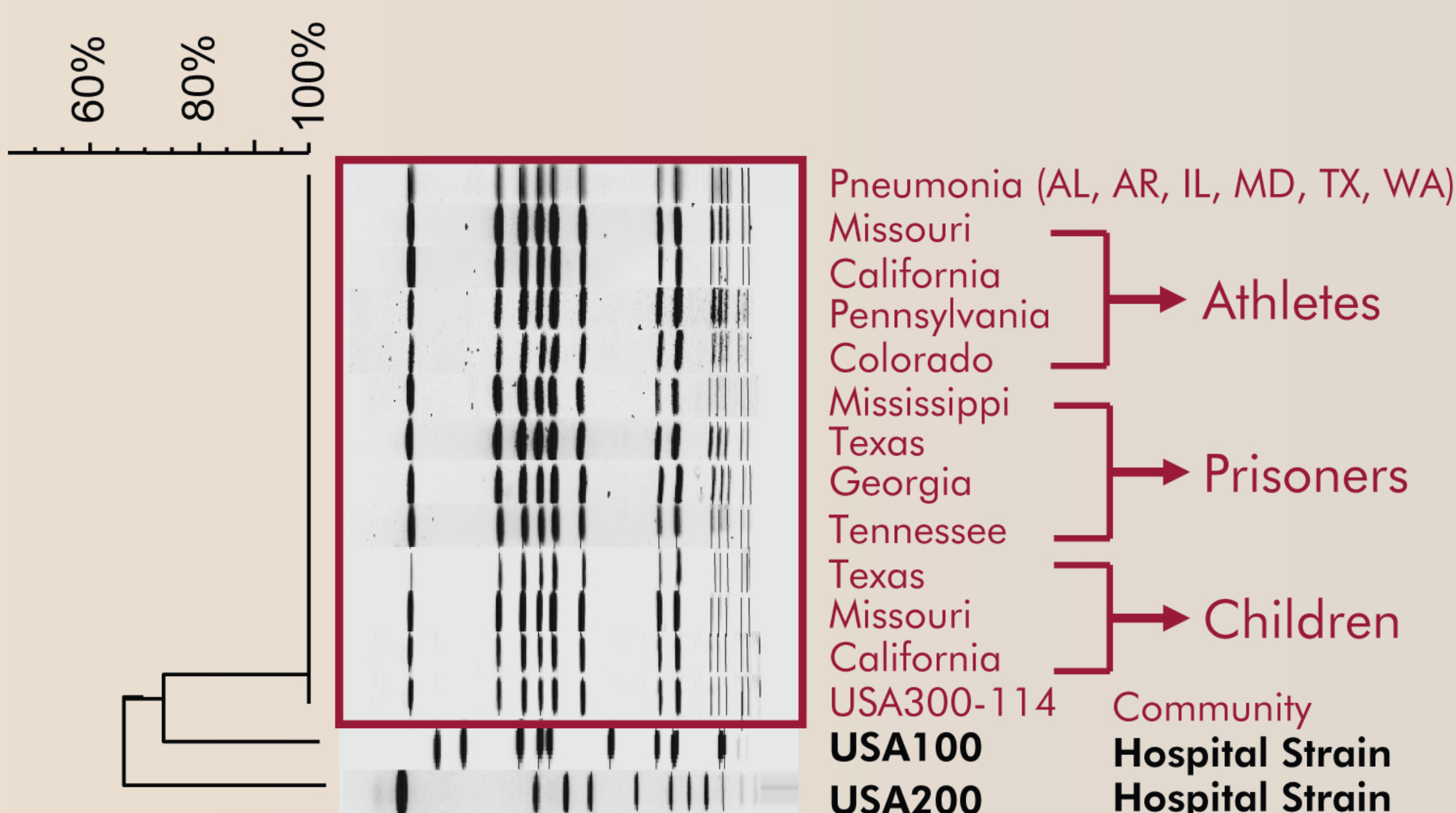
### Clinical Characteristic

Characteristic	No	(%)
Influenza A	3	(50)
Multi-lobar infiltrate	5	(83)
Ventilator	6	(100)
ICU Admission	6	(100)
Vancomycin	1	(17)
MRSA SSTI	4	(67)
Flu Vaccine	0	(0)

### Laboratory Results

- MRSA isolates from 5 patients
- Indistinguishable pulsed-field gel electrophoresis (PFGE) pattern
  - CA-MRSA USA300-0114
  - Positive for the Panton-Valentine leukocidin (PVL) toxin genes

### Common CA-MRSA Strain in the United States

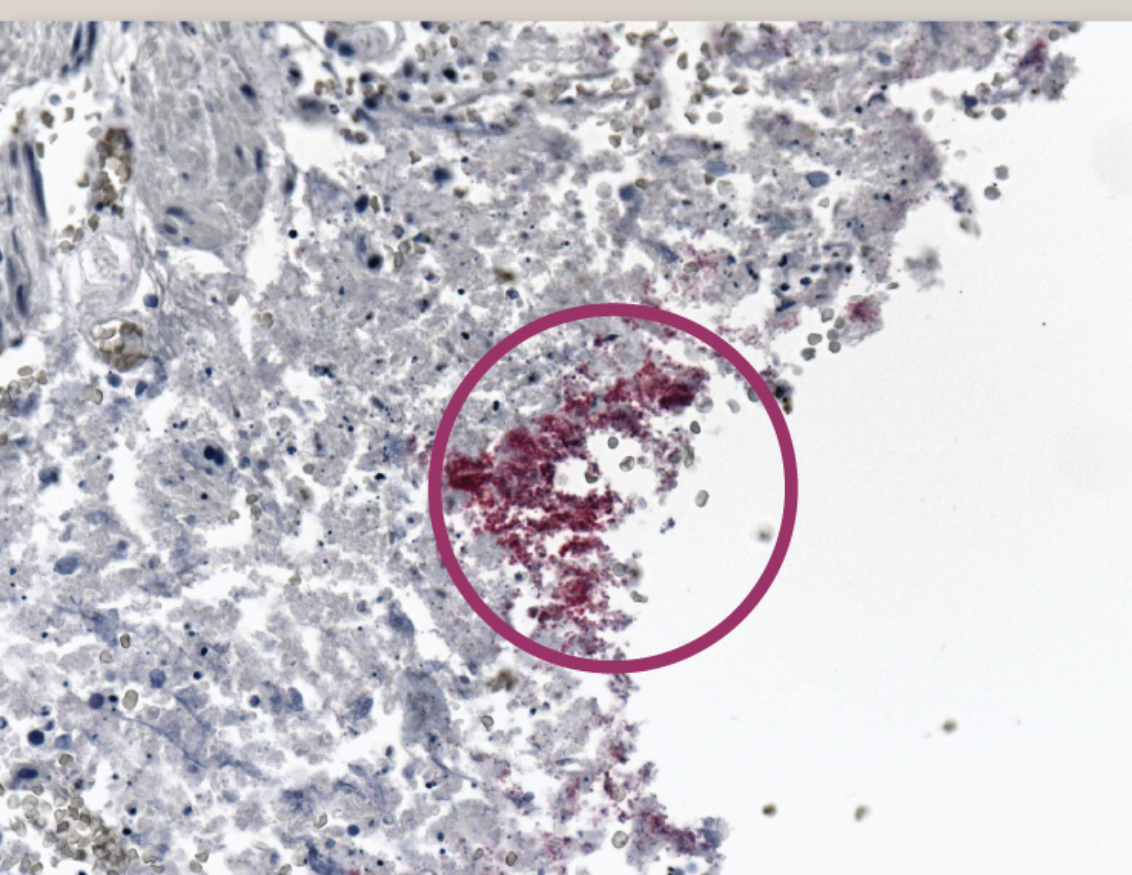


## Pediatric Deaths

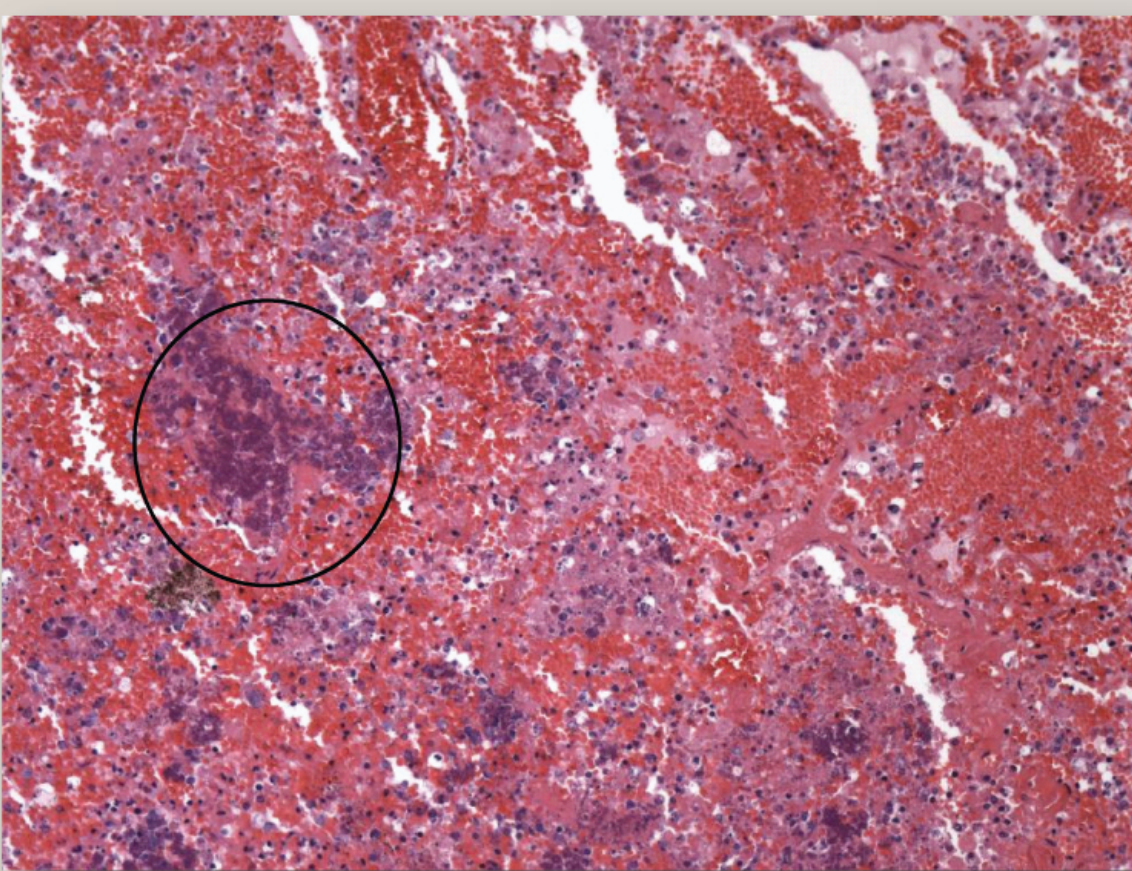
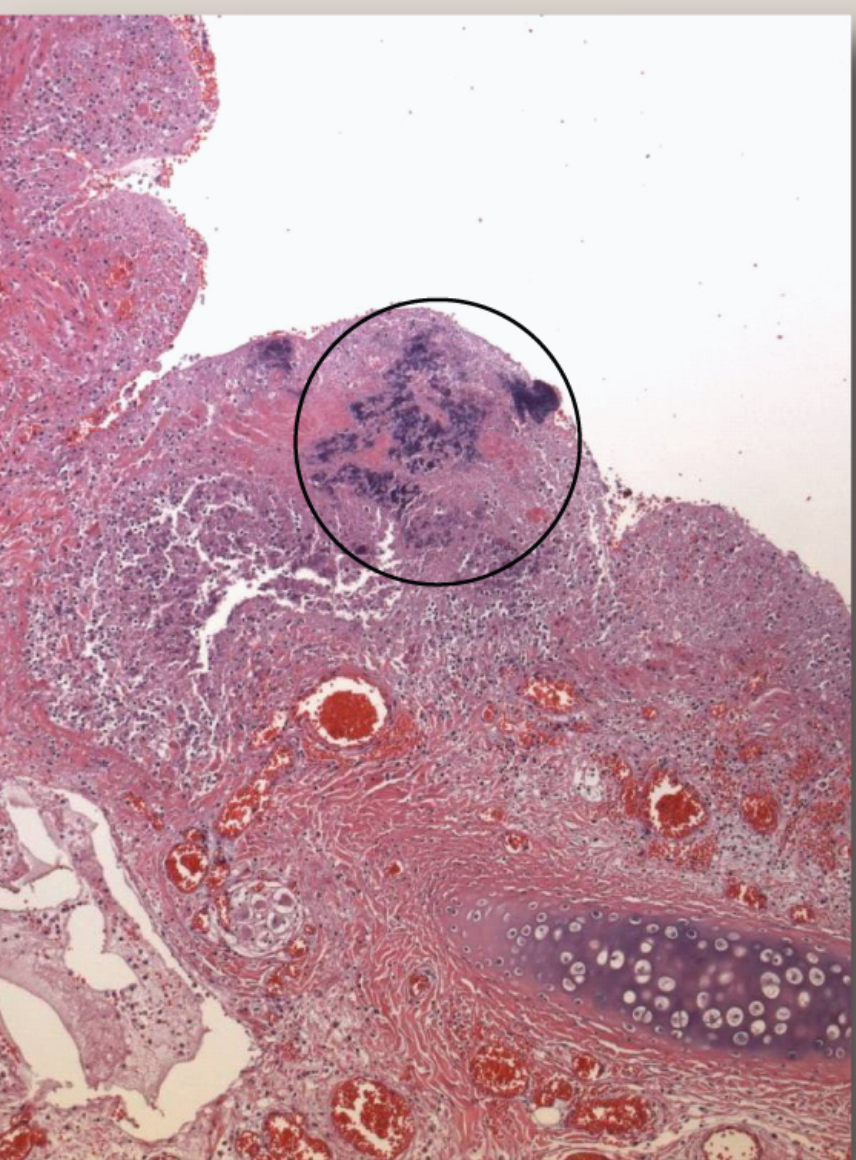
- Case 1: 10 year old male
- 12/6/2006: Onset of ILI
  - 12/7/2006: Went to local ER at 8:40pm
    - Fever of 104 F
    - Started on IV ceftriaxone
  - 12/8/2006: Transferred to PICU
    - Ceftriaxone and IV vancomycin
  - Influenza A positive
  - 12/9/2006:
    - Patient died

- Case 4: 14 year old male
- 12/26/2006: ER visit with flu-like symptoms
    - Clarithromycin and penicillin (presumption strep throat)
  - 12/27/2006: Visited family physician
    - Tamiflu prescribed (ILI)
  - 12/28/2006: Admitted to hospital
    - Ceftriaxone and vancomycin
    - Diagnosis of bilateral pneumonia
    - Influenza A positive
    - Patient died

### Pathology Results



Immunohistochemistry with the polyclonal antibody against *S. aureus* showing the bacteria in red in the bronchiole.



Lung parenchyma

hematoxylin and eosin stain.

## Conclusions

- MRSA CAP resulted in severe morbidity and mortality in otherwise healthy individuals
- No epidemiological links among case-patients
- Common risk factors
  - All cases had ILI symptoms
  - 3 patients had laboratory-confirmed Influenza A
  - 4 patients had a recent history of MRSA SSTI

## Limitations

- No established surveillance system for MRSA CAP
  - No surveillance for pneumonia
  - Limited surveillance for MRSA

## Recommendations

- Heightened index of suspicion for MRSA CAP during influenza season
- Empiric treatment with linezolid or vancomycin for suspected MRSA CAP
- Improved surveillance
- Further research

## Acknowledgments

### Louisiana Office of Public Health

R Ratard  
M Pogue  
S Burton  
J Naponick  
P Kreyling  
T Stefansky  
C Jones-Nazar  
D Robertson  
J Eavey

### Centers for Disease Control and Prevention

- DHQP/NCPDCID
  - J Hageman
  - R Gorwitz
  - A Kallen
  - K Anderson
  - G Fosheim
  - S McAllister
  - J Patel
  - B Limbago
- ID/NCIRD
  - A Fry
  - L Brammer
  - D Shay
- NCZVED/IDPB
  - J Guarner
  - S Zaki
- CDD/OWCD
  - D Bensyl

