Community Onset MRSA Infections in Australia: A Tale of Two Clones

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Community Associated MRSA

- Papua New Guinea
- Asia
- Europe
- United Kingdom
- Ireland
- Canada
- United States of America
- Central America
- South America

Community Associated MRSA

- Lack risk factors associated with healthcare-associated MRSA
- Skin and soft tissue infections in young people
- Laboratory Findings
  - Susceptible to most non-β-lactam antimicrobials
  - Very rapid growth times
  - Clone types different from healthcare-associated MRSA
  - SCCmec IV (V, VII, VIII)
  - Panton Valentine leukocidin (PVL) [lukF and lukS genes]
  - Greater clonal diversity
Community Associated MRSA – Western Australia

Five major global community-associated MRSA clones

The Australian Group on Antimicrobial Resistance (AGAR)

Biennial Community Staphylococcus aureus Awareness Programmes 2000 - 2008

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Biennial Community Staphylococcus aureus Awareness Programmes

Percentage of Staphylococcus aureus Identified as MRSA

Significant increase from 2000 to 2008 (p <0.0001)
The Australian Group on Antimicrobial Resistance (AGAR)
Biennial Community Staphylococcus aureus Awareness Programmes

Percentage of Staphylococcus aureus Identified as MRSA by Region

AGAR 2008 Community S. aureus Surveillance Programme
Box Plot of Age of Patients Infected with CA-MRSA and HA-MRSA

CA-MRSA
Mean: 40 years
Median: 35 years

HA-MRSA
Mean: 69 years
Median: 74 years

The Australian Group on Antimicrobial Resistance (AGAR)
Biennial Community Staphylococcus aureus Awareness Programmes
HA-MRSA and CA-MRSA as a Percentage of S. aureus

AGAR 2008 Community S. aureus Surveillance Programme
CA-MRSA and HA-MRSA Acquisition by Decade of Life
Box Plot of Age of Patients Infected with PVL Positive and PVL Negative CA-MRSA

- PVL NEG CA-MRSA
  - Mean: 53 years
  - Median: 56 years
- PVL POS CA-MRSA
  - Mean: 33 years
  - Median: 30 years

Community-Associated MRSA Clones
- 340 isolates consisting of 22 clones, 62% of MRSA

Healthcare-Associated MRSA clones
- 207 isolates consisting of 4 clones, 38% of MRSA

AGAR 2008 Community *S. aureus* Surveillance Programme

- ST22-MRSA-IV (EMRSA-15) [112]
- ST1-MRSA-IV (WA MRSA-1) [63]
- ST239-MRSA-II (Aus2 and Aus3 EMRSA) [93]
- ST1-MRSA-V [1]
- ST5-MRSA-II (New York Japan MRSA or USA100) [1]
- ST5-MRSA-IV (WA MRSA-3) [20]
- ST36-MRSA-II (EMRSA-16 or USA200) [1]
- ST73-MRSA-IV (WA MRSA-65) [5]
- ST5-MRSA-IV [1]
- ST5-MRSA-V [2]
- ST8-MRSA-IV (USA300) [10]
- ST834-MRSA-IV (WA MRSA-13) [1]
- ST30-MRSA-IV (WSPP) [47]
- ST45-MRSA-V (WA MRSA-4) [2]
- ST45-MRSA-V (WA MRSA-84) [7]
- ST45-MRSA-IV (WA MRSA-23) [2]
- ST59-MRSA-IV (WA MRSA-15) [2]
- ST59-MRSA-V (Taiwan CA-MRSA) [1]
- ST72-MRSA-IV (WA MRSA-44) [2]
- ST130-MRSA-IV (WA MRSA-72) [1]
- ST78-MRSA-V (WA MRSA-2) [18]
- ST80-MRSA-IV (European CA-MRSA) [2]
- ST88-MRSA-V [1]
- ST207-MRSA-V [1]

Qld CA-MRSA (ST93-MRSA-IV) [27.4% of MRSA]

EMRSA-15 (ST22-MRSA-IV) [38.5% of MRSA]

First identified in Caucasian patients in Ipswich Queensland (Munckhof et al. 2003) - boils, bacteraemia, pneumonia

Epidemic potential

Substantial outbreaks (causing boils) in aboriginals living in rural NSW (Gosbell et al. 2004)

Multiple reports of severe infections including necrotising pneumonia (including fatal cases), deep abscesses, osteomyelitis, septic arthritis and bacteraemia

First identified in the Midlands and South-East England in the early 1990s

Major HA-MRSA clone in United Kingdom, Ireland, several European countries, New Zealand, Singapore and Australia

First reported in Australia in 1997 (Pearman et al. 1998)

In Western Australia frequently isolated from patients in long term care facilities and pre-employment screening of healthcare workers from Ireland and the United Kingdom
**Antibiogram:**

- **Ciprofloxacin:** 100% sensitive, 0% resistant
- **Erythromycin:** 9% sensitive, 91% resistant
- **Tetracycline:** 1% sensitive, 99% resistant
- **Mupirocin:** <1% sensitive, 99% resistant
- **Fusidic Acid:** <1% sensitive, 99% resistant
- **Tobramycin:** 9% sensitive, 91% resistant
- **Gentamicin:** 0% sensitive, 100% resistant
- **Cotrimoxazole:** 1% sensitive, 99% resistant
- **Rifampicin:** 0% sensitive, 100% resistant
- **Clindamycin:** 3% sensitive, 97% resistant

**Panton Valentine Leucocidin:**

- Positive
- Negative

**Regional Distribution as a Percentage of MRSA**

- **Qld CA-MRSA (ST93-MRSA-IV):** 27.4% of MRSA (Community-Associated MRSA Clone)
- **EMRSA-15 (ST22-MRSA-IV):** 20.5% of MRSA (Healthcare-Associated MRSA Clone)

**Regional Distribution 2000 – 2008**

- **Qld CA-MRSA:** 27.4%
- **EMRSA-15:** 20.5%

**Percentage of Staphylococcus aureus**

- **Qld CA-MRSA:** 20.5%
- **EMRSA-15:** 0.5%

**AGAR 2008 Community *S. aureus* Surveillance Programme**

- Qld CA-MRSA (ST93-MRSA-IV) 27.4% of MRSA
- EMRSA-15 (ST22-MRSA-IV) 20.5% of MRSA

**Number of Isolates per decade of life**

- PVL Positive
- PVL Negative

**Summary**

Percentage of *S. aureus* infections identified as MRSA increasing in the Australian community

Although polyclonal this increase is primarily a tale of two clones

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