Community-Associated Methicillin-Resistant *Staphylococcus aureus*

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Objectives

• Background on data to support reasonable approaches to control and prevention of MRSA in community settings
• Summarize draft statements from a recent meeting of CA-MRSA experts at CDC
MRSA is Increasing in Healthcare Settings

Proportion of *S. aureus* Nosocomial MRSA Infections by ICU Status

Source: NNIS DATA, Clinics Chest Med: 20:303-315
MRSA is Increasing in Healthcare Settings

Percentage of *S. aureus* Nosocomial MRSA Infections by Hospital Bedsize in 1992 and 2002, NNIS

**Number of Beds**

- <200
- 200-500
- >500

**Percentage of ORSA**

- 1992
- 2002

DHQP
MRSA is Emerging in the Community
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CA-MRSA is Increasing in Four Facilities in Hawaii, 2001-2003
CA-MRSA Prevalence Varies by Region

- **Georgia**
  - n=7819
  - Healthcare-Associated MRSA: 20%
  - Community-Associated MRSA: 9%

- **Minnesota**
  - n=3014
  - Healthcare-Associated MRSA: 88%
  - Community-Associated MRSA: 12%

- **Maryland**
  - n=1720
  - Healthcare-Associated MRSA: 100%
  - Community-Associated MRSA: 9%

CA-MRSA Prevalence in Three States – ABCS/EIP
CA-MRSA Incidence Varies by Race

Incidence of CA-MRSA by Race, ABCS/EIP
CA-MRSA Prevalence Varies by Age
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CA-MRSA Prevalence at Four Facilities in Hawaii, 2001-3
CA-MRSA Predominantly Causes Skin Disease

<table>
<thead>
<tr>
<th>Disease Syndrome</th>
<th>(%)</th>
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</thead>
<tbody>
<tr>
<td>Skin/soft tissue</td>
<td>1,266 (77%)</td>
</tr>
<tr>
<td>Wound (Traumatic)</td>
<td>157 (10%)</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>64 (4%)</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>61 (4%)</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>43 (3%)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>31 (2%)</td>
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</tbody>
</table>
CA-MRSA: Factors for Transmission
CA-MRSA: Factors for Transmission

Crowding
CA-MRSA: Factors for Transmission

Crowding

Frequent Contact
CA-MRSA: Factors for Transmission

Crowding

Frequent Contact
CA-MRSA: Factors for Transmission

Crowding

Compromised Skin

Frequent Contact
CA-MRSA: Factors for Transmission

- Crowding
- Frequent Contact
- Compromised Skin
- Contaminated Surfaces and Shared Items
CA-MRSA: Factors for Transmission

- Crowding
- Contaminated Surfaces and Shared Items
- Compromised Skin
- Frequent Contact
- Cleanliness
Approaches to Control of MRSA

- Epidemiologic and microbiological differences between HA-MRSA and CA-MRSA
- Approach to control of MRSA must now include community interventions as well
Key Prevention Strategies

- Prevent infection
- Diagnose and treat infection effectively
- Use antimicrobials wisely
- Prevent transmission
Development of Reasonable Approaches for CA-MRSA

• Data are lacking for many aspects of CA-MRSA prevention and control
• Numerous strategies have been reported to be successful; however, little is known about the independent benefit of components of the strategies
• Given these limitations, what is a reasonable approach to CA-MRSA prevention and control
Clinical Considerations
Clinical Considerations - Evaluation

*Increase Awareness*

- MRSA belongs in the differential diagnosis of skin and soft tissue infections (SSTI’s) compatible with SA
  - Abscesses, carbuncles, furuncles
  - “Spider Bite”
  - Impetigo not common
  - Erysipelas, least common
Clinical Considerations - Evaluation

**Use Local Data for Treatment**

- Prevalence of CA-MRSA varies from region to region
- When available, use local data on proportion of CA-MRSA in selecting agents
- Use local epidemiologic risk factors when available to guide therapy
Clinical Considerations - Evaluation

Collect Diagnostic Specimens

- Collect specimens for gram stain and culture
- Collect from abscess cavities, from center of complicated cellulitis, blood, sputum and normally sterile sites
- Collect for management and for surveillance
- Educate providers on appropriate technique
- Address reimbursement for collection and testing
Clinical Considerations - Management

Incision and Drainage Should Be Routine

- For patients with no systemic signs, data suggest I&D alone may be adequate.
- Send for cx and susceptibilities, failure to improve can direct subsequent therapy.
Clinical Considerations - Management

Adequate Follow-Up Must be Maintained

• Develop follow-up plan for all non-hospitalized patients

• Detailed discharge plans to return if:
  – Develop systemic symptoms
  – Worsening local symptoms
  – No improvement in 48-72 hours
Clinical Considerations - Management

**Empiric Antimicrobial Therapy May Be Needed**

- Severely Ill Patients
  - Broad coverage for multi-drug-resistant organisms
- Certain patients with SSTI’s, e.g.,
  - Those with significant associated cellulitis
  - Those with systemic signs of illness
  - Those with associated co-morbidities
Clinical Considerations - Management

*Empiric Antimicrobial Therapy May Be Needed*

- Clinicians choosing to treat empirically should consider CA-MRSA coverage:
  - Based on local prevalence if available
  - Patient severity
  - Patient co-morbidities
Empiric Beta-Lactam Therapy

- Beta-lactams may still be appropriate for mild SSTI’s in geographic areas where the prevalence is not high, because:
  - Historically a low rate of complications with cutaneous abscesses
  - Incremental benefit of adding antimicrobial therapy to I&D not clearly documented
  - Response seen in some patients
  - Alternatives have limited efficacy data, may not cover other skin pathogens, and may have unwanted side effects
Clinical Considerations - Management

*Empiric Beta-Lactam Therapy*

- If MRSA is subsequently found in a patient on empiric beta-lactam therapy, change in drug may not be required if patient is improving
Clinical Considerations - Management

Target Therapy with Alternative Antimicrobials

- Various agents proposed for SSTI Tx, more data are needed to establish efficacy and effectiveness of these agents
  - Clindamycin
  - Trimethoprim/Sulfamethoxazole
  - Tetracyclines
  - Linezolid
- Agents that are not effective
  - Fluoroquinolones
  - Azithromycin
Clinical Considerations

Additional Issues

• Provide prevention and health promotion materials to clinicians, parents, patients, teams, etc.

• Delineate the desired role of healthcare provider in managing intra-familial transmission

• Laboratory diagnostic issues need to be addressed as well
Public Health Interventions
When to Investigate

- Consider investigation when culture-proven MRSA cases have been detected in a cluster among epidemiologically-linked individuals in the community.
Public Health Intervention

When to Investigate

• Decision to investigate should take into account various factors
  – Number of cases and temporal proximity of the cluster
  – Setting in which transmission is occurring
  – Severity of illness among cases
  – Presence of ongoing transmission or recurrent illness among cohort members
  – Host factors of those likely to be infected
  – Likelihood that an intervention could be successfully implemented
Public Health Intervention

Components of an Intervention

• Disclaimer
  – Various strategies have been employed to control CA-MRSA outbreaks
  – Some combination strategies report success
  – Relative benefit of many of the components of combined interventions often is not known
  – Given limitations, a reasonable approach to control of MRSA case clusters can be considered
Components of a Public Health Intervention

Enhance Surveillance

- Initiate prospective surveillance to detect possible cases in the cohort
- Perform retrospective review to identify probable cases associated with the outbreak
- Educate members of the cohort on signs/symptoms
- Collect isolates for typing if needed
Components of a Public Health Intervention

*Use Appropriate Treatment*

- Educate clinicians and medical staff
- Insure that abscesses are being drained
- Insure that antimicrobial treatment is concordant with the susceptibility pattern of the MRSA
- Use the same regimen for empiric treatment of new potential cases
Components of a Public Health Intervention

Care For and Contain Wounds

• Educate case-patients and parents on appropriate care of wounds
• Cover and contain wounds with clean, dry dressings
• Insure the infected individual complies with appropriate hand and personal hygiene
Components of a Public Health Intervention

Exclude from Routine Activities

- If appropriate hand and personal hygiene cannot be assured, then the individual should be excluded from activities that may lead to transmission in the cohort.
Components of a Public Health Intervention

*Promote Enhanced Personal Hygiene*

- Encourage appropriate hand hygiene:
  - Alcohol-based hand gels when possible
  - Have antimicrobial-containing soap/regular soap available at sinks
  - Where possible, use liquid soap
- Encourage regular bathing, use antimicrobial-containing soaps
- Limit sharing of personal items likely to transmit infections
Components of a Public Health Intervention

Maintain a Clean Environment

• While the role of the environment in transmission of *S. aureus* is possible, the attributable risk of infection from the environment is not clear; however, practical measures to prevent transmission from high contact surfaces and items is reasonable.
Components of a Public Health Intervention

*Maintain a Clean Environment*

- Insure that cleaning is consistent with manufacturer recommendations for high touch surfaces, communal areas or equipment
- Perform targeted cleaning directed to areas/equipment where known cases had recent contact
Components of a Public Health Intervention

Notify Contacts and Parents

- Notification will provide
  - Education opportunities
  - Enhance detection of cases
  - Insure that appropriate therapy is being provided
Colonization Swab Surveys

- Swab surveys have been used in many published investigations; however, insufficient data are available to recommend their routine use.
- May be useful to:
  - Assist in public health investigations to identify risk factors or to determine extent of transmission.
  - To contribute to the understanding of CA-MRSA epidemiology.
Components of a Public Health Intervention

*Decolonization*

- Data on use of decolonizing regimens among household contacts and in community settings is limited
- Trials to determine the effectiveness of decolonization in preventing transmission during outbreak settings are needed
Components of a Public Health Intervention

Decolonization

- Decolonization regimens are reasonable:
  - Along with other measures, in a setting with ongoing transmission among members of a closely-associated, well-defined cohort
  - Along with other measures, in an individual with recurrent infections
Components of a Public Health Intervention

Decolonization

• Decolonization regimens may include:
  – In non-infected persons
    • Nasal decolonization (e.g., mupirocin)
    • And/or body antiseptics (e.g., chlorhexidine)
  – In infected persons
    • Targeted Abx + rifampin and/or body antiseptics
    • Targeted Abx + nasal decolonization and/or body antiseptics
Conclusions

• More data are needed to determine best methods for control and prevention of CA-MRSA

• Reasonable approach would focus on:
  – Increased awareness, detection, and diagnosis
  – Targeted surgical and antimicrobial therapy
  – Appropriate wound management
  – Enhanced hand and personal hygiene
  – Maintaining a clean environment
  – Decolonization in certain settings for interrupting ongoing transmission