The REDUCE MRSA Trial

Randomized Evaluation of Decolonization vs. Universal Clearance to Eliminate MRSA
Disclosures

• The REDUCE MRSA investigative team is conducting a follow up trial in non-critical care units and Sage Products and Molnlycke are providing contributed product to participating hospitals.
Trial Rationale

- Healthcare-associated infections: top 10 cause of US deaths
- *Staphylococcus aureus* = #1 healthcare-associated pathogen
- Methicillin-resistant *S. aureus* (MRSA) is dominant form
- Debate of high risk pathogen vs high risk populations
- Uncertainty in best practice – need for definitive trial
Targeted versus Universal Decolonization to Prevent ICU Infection


Huang SS et al. NEJM Jun 2013:368:2255-2265

- Hospital Corporation of America (HCA)
- Harvard Pilgrim Healthcare Institute/Harvard Medical School
- University of California Irvine
- Rush University
- CDC Prevention Epicenters Steering Committee
Randomized hospitals and all their adult ICUs to:

- **Arm 1: Routine Care**
  - Screened all patients; isolated known MRSA+

- **Arm 2: Targeted Decolonization**
  - Screened all patients; isolated if known MRSA+
  - Decolonized if MRSA+

- **Arm 3: Universal Decolonization**
  - No screening; isolated if known MRSA+
  - Decolonized all
Outcomes

- **Primary**
  - Any MRSA clinical isolate attributed to ICU

- **Secondary**
  - MRSA bloodstream isolate attributed to ICU
  - Any bloodstream isolate attributed to ICU
Why Engage in a Partnership?

• Synergy of academic and health system priorities

• State and CMS mandates
  — Public Reporting
  — Value based purchasing

• Case for quality

---

## Catering to Strengths

<table>
<thead>
<tr>
<th>Collaborator</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCA</td>
<td>Health system infrastructure</td>
</tr>
<tr>
<td>UC Irvine</td>
<td>Centralized data systems</td>
</tr>
<tr>
<td>Harvard</td>
<td>Hospital participants</td>
</tr>
<tr>
<td>Rush University</td>
<td>Lead, coordination</td>
</tr>
<tr>
<td>CDC Prevention Epicenters</td>
<td>IRB, strain collection</td>
</tr>
<tr>
<td>AHRQ</td>
<td>Microbiology testing</td>
</tr>
<tr>
<td></td>
<td>Steering Committee</td>
</tr>
<tr>
<td></td>
<td>Funder (with additional support from CDC, HCA)</td>
</tr>
</tbody>
</table>
Collaborative Successes

• Recruitment
  — 45 hospitals in 6 weeks
  — 2 excluded

• Centralized IRB
  — HCA does not have a corporate IRB
  — 38 hospitals ceded to Harvard IRB
  — All IRB approvals in hand within 7 weeks
Decolonization in Community ICUs

- 74 adult ICUs
- 43 hospitals, 16 states
  - 1 academic center, 42 community hospitals

Baseline 12 month  Phase In  Intervention 18 month
Jan 2010  Apr 2010  Sep 2011
Trial Hospitals

Arm 1
Screen and Isolate

Arm 2
Targeted Decolonization

Arm 3
Universal Decolonization
Pragmatic Trial

• Leveraged quality improvement infrastructure
• No on-site investigators
  – Help line and email
  – Bi-weekly coaching calls
  – Protocols, computer-based training modules, FAQs
• Pragmatic outcomes
  – Based upon readily available microbiology data
  – No chart reviews
  – No possession of data
Results

- 43 Hospitals
- 74,256 patients
- 282,803 ICU patient days

- Primary Outcome
  - Universal Decolonization works best
    - MRSA significant reduction by 37%

- Secondary Outcomes
  - Universal Decolonization works best
    - MRSA bacteremia trend toward reduction by 28%
    - All-cause bacteremia significant reduction by 44%
Protocol Compliance

• Compliance monitoring
  – Once a week point prevalence checks
  – Quarterly direct observation of bathing with checklist

<table>
<thead>
<tr>
<th></th>
<th>Arm 1</th>
<th>Arm 2 (among MRSA+)</th>
<th>Arm 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>98%</td>
<td>99%</td>
<td>1%</td>
</tr>
<tr>
<td>CHG bathing</td>
<td>&lt; 1%</td>
<td>89%</td>
<td>81%</td>
</tr>
<tr>
<td>Mupirocin</td>
<td>&lt; 1%</td>
<td>91%</td>
<td>86%</td>
</tr>
</tbody>
</table>

• Reasons for non-compliance
  – < 1 day stay, refused, moribund
REDUCE MRSA Trial Summary

- **Effective, rapid, and cost-efficient pragmatic trial**
  - Trial cost: $40/patient
  - Intervention cost low
  - 18-month intervention period

- **Universal decolonization: CHG and mupirocin**
  - Markedly reduced bloodstream infections (NNT 99:1)
  - Markedly reduced MRSA cultures (NNT 181:1)
  - Saved effort and cost of screening
  - Reduced use of contact precautions
  - Minimal adverse events

- **Horizontal vs Vertical Approaches**
  - Universal better than targeted
REDUCE MRSA Trial Team

UCIrvine
University of California, Irvine

Susan Huang, MD MPH
Adrijana Gombosev, BS

Richard Platt, MD MS
Julie Lankiewicz, MPH
Taliser Avery, MPH
Fallon Hartford, MS

Ed Septimus, MD
Julia Moody, MS SM
Jason Hickok, MBA RN

Mary Hayden, MD
Karen Lolans, BS

John Jernigan, MD MS

Eric Cui, BS
Leah Terpstra, BS

Ken Kleinman, ScD
Katie Haffenhoffer, BS
Rebecca Kaganov, BA

Jonathan Perlin, MD PhD

Robert Weinstein, MD

Victoria Fraser, MD