Chasing Zero Infections Coaching Call
Don’t Be Resistant: Reducing MRSA and Other Multi-Drug Resistant Organisms
May 8, 2018
Agenda

• Welcome & FHA Mission to Care HIIN Trends and Progress: HIIN Overview, Hospital-onset MRSA Bacteremia and the Up Campaign
  – Cheryl Love, RN, BSN, BS-HCA, MBA, LHRM, CPHRM, Director of Quality and Patient Safety and Improvement Advisor, FHA

• Coaching Call: Reducing MRSA and other Multi-Drug Resistant Organisms
  – Linda R. Greene, RN, MPS, CIC, FAPIC, Manager of Infection Prevention, UR Highland Hospital, Rochester, NY

• Upcoming HIIN Events and Opportunities
• Evaluation & Continuing Nursing Education
HIIN Core Topics – Aim is 20% reduction

- Adverse Drug Events (ADE)
- Catheter-associated Urinary Tract Infections (CAUTI)
- Clostridium Difficile Infection (CDI)
- Central line-associated Blood Stream Infections (CLABSI)
- Hospital-onset MRSA Bacteremia
- Injuries from Falls and Immobility
- Pressure Ulcers (PrU)
- Sepsis
- Surgical Site Infections (SSI)
- Venous Thromboembolisms (VTE)
- Ventilator Associated Events (VAE)
- Readmissions (12% reduction)
- Worker Safety
Hospital-onset MRSA

Source: HRET Comprehensive Data System, May 7, 2018
Florida HIIN

Hospital Performance Report - Project to Date

Summary of Progress Meeting 20/12 Goal:

<table>
<thead>
<tr>
<th>Your Performance</th>
<th>Rate</th>
<th>Reduction</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0%</td>
<td>20% or greater reduction</td>
</tr>
<tr>
<td>1</td>
<td>100.0%</td>
<td>0% - 19% reduction</td>
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<tr>
<td>0</td>
<td>0.0%</td>
<td>Increase instead of reduction</td>
</tr>
<tr>
<td>1</td>
<td>100.0%</td>
<td>Total Measures</td>
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Effective Date: May 7, 2018

All measures calculated per 1,000 unless noted.
* Rate calculated per 100
** No multiplier

Measure Rates

<table>
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<tr>
<th>Project</th>
<th>Measure</th>
<th>Rate (BL)</th>
<th>Monitoring Data - October 2016 to Most Recent Data</th>
<th>Hospital Target 9/2018</th>
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</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>Hospital-onset MRSA bacteremia events</td>
<td>0.069</td>
<td>Most Recent Data 2/18 # Harms 472 Denom. 7,137,566 Average Rate 0.066 Progress 0.048</td>
<td>0.048</td>
</tr>
</tbody>
</table>
MRSA and MDRO Resources, Trainings and Tools

Online Resources:
- MDRO Change Package
- MDRO Checklist
- SOAP UP Resources
- Watch Past Webinars
- HRET HIIN Resource Library
- Guides
- Case Studies

and http://www.hret-hiin.org
Raise your game: The UP Campaign

Cross cutting set of practices to better engage front-line staff without creating additional burdens
HAND HYGIENE reduces harm in SEVEN focus areas

CDI  CAUTI  SSI  VAE  CLABSI  Sepsis  MDRO

S O A P - U P

http://www.fha.org/soapup

American Hospital Association

Mission to Care

An Initiative of the Florida Hospital Association Hospital Improvement Innovation Network
PROGRESSIVE MOBILITY reduces harm in EIGHT focus areas

- Falls
- PrU
- Delirium
- CAUTI
- VAE
- VTE
- Readmissions
- Worker Safety

GET - U P

http://www.fha.org/getup

American Hospital Association

An Initiative of the Florida Hospital Association Hospital Improvement Innovation Network
SEDATION MANAGEMENT reduces harm in SEVEN focus areas

http://www.fha.org/wakeup

American Hospital Association

H Mission To Care

An Initiative of the Florida Hospital Association
Hospital Improvement Innovation Network

H HRET

Health Research & Educational Trust
ONGOING EVALUATION OF MEDICATIONS reduces harm in TEN focus areas

ADE  Readmissions  Falls  CDI  CAUTI  SSI  VAE  CLABSI  Sepsis  MDRO

SCRIPT-UP

American Hospital Association

H Mission to Care
An Initiative of the Florida Hospital Association Hospital Improvement Innovation Network
MDRO’s

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Polling Question 1

What is your background?

1. Infection Preventionist
2. Quality
3. Nurse
4. Other
Definitions

Colonization

Growth and Multiplication without Disease

Infection

Clinical or subclinical response

You make me SICK!

When germ relationships go bad
MRSA

Staphylococcus aureus

- Microbiology – Gr+ cocci with many virulent factors
- Frequent nosocomial- and community-acquired pathogen
- Mode of transmission – contact
- Clinical manifestations:
  - Skin and soft tissue infections
  - Pneumonia
  - Osteomyelitis / Arthritis
  - Bacteremia / Sepsis
  - Endocarditis
  - Toxin-mediated disease
Year: 1950’s
History of MRSA
A cure all for staph ?
Where does MRSA reside?

- Epidemiologic niche:
  - Nasal carriage (anterior nares)
  - GI tract (rectal)
  - Perineal
  - Throat

- Nasal carriage – 30% of adults
  - 20% Persistent carriers
  - 60% Transient carriers
  - 20% Never carriers

- Nosocomial transmission – transient hand carriage
How does resistance develop?

- Beta-lactams are antibiotics that prevent SA (and other germs) from producing cell walls. That's generally bad news for the bacteria.

(i.e. penicillin, cephalosporins, monbactams, carbapenems)

- Some SA have a gene, however, that allows them to form an enzyme called beta-lactamase. The enzyme destroys beta-lactams before the beta-lactams can destroy the bacterium.
Adaptation under pressure
Clinical Significance

Mom, Dad... I'm going vegan...

When flesh-eating bacteria rebel

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Strategies for Prevention

Horizontal vs. Vertical Prevention

Prevention strategies that target specific organisms

Prevention techniques used to address all organisms
**Vertical Approaches**

**Vertical approaches** reduce risk of infections due to specific pathogens:

- Active surveillance testing to identify asymptomatic carriers
- Contact precautions for patients colonized or infected with specific organisms
- Decolonization of patients colonized or infected with specific organisms

Septimus et. Al *ICHE* July 2014, 35; 7
Horizontal Approaches

Horizontal approaches reduce risk of a broad range of infections and are not pathogen specific:

- Standard precautions (i.e. hand hygiene) universal use of gloves or gloves and gowns
- Universal decolonization (i.e. chlorhexidine gluconate bathing)
- Antimicrobial stewardship
- Environmental cleaning and disinfection

Septimus et. Al. *ICHE* July 2014, 35; 7
What do recent guidelines say?


- Use contact precautions for MRSA Colonized and MRSA infected individuals
- Laboratory based alert system to notify hospital of admission
- Provide MRSA data to key stakeholders
- Educate patients and families about MRSA
- Ensure cleaning and disinfection of equipment
- Screen HCWs in outbreak situation
- Targeted decolonization

* No level 1 (high degree of evidence)
Standard Precautions

Standard Precautions Only
Targeted Prophylaxis

High Risk Populations i.e. Dialysis, ICU

Select Surgical Populations:

Comparison of the matched groups revealed that implementation of the bundle was associated with reduced superficial SSIs (19.3% vs 5.7%, \( P < .001 \)) and postoperative sepsis (8.5% vs 2.4%, \( P = .009 \)). No significant difference was observed in deep SSIs, organ-space SSIs, wound disruption, length of stay, 30-day readmission, or variable direct costs between the matched groups.

Conclusions and Relevance The preventive SSI bundle was associated with a substantial reduction in SSIs after colorectal surgery. The increased costs associated with SSIs support that the bundle represents an effective approach to reduce health care costs.
Targeted versus Universal Decolonization to Prevent ICU Infection


Study

- Group 1 implemented MRSA screening and isolation
- Group 2 targeted decolonization (i.e., screening, isolation, and decolonization of MRSA carriers);
- Group 3, universal decolonization

In routine ICU practice, universal decolonization was more effective than targeted decolonization or screening and isolation in reducing rates of MRSA clinical isolates and bloodstream infection from any pathogen.
Polling Question 2

Do you place MRSA patients in contact precautions?

1. All patients infected or colonized
2. Infected patients only
3. No
4. Depends on situation and location
Discussion
MRSA bacteremia Lab ID

- Discuss challenges with this measure
- Share best practices for reducing MRSA BSI
VRE- “Not so Fearless”

Enterococcus

- gram positive cocci in chains
- Human colon is a reservoir
- Intrinsically rugged organism
- Translocation across mucosa; systemic spread
- Biofilm
Enterococcus: Epidemiology

- Account for 110,000 urinary tract infections
- 25,000 cases of Bacteremia
- 40,000 wound infections
- 1,100 cases of endocarditis
- Most infections occur in hospitals
- Since 1989, a rapid increase of VRE
Epidemiology of VRE

- Risk factors for colonization/infection in USA
  - Severe underlying disease (malignancy, ICU, long hosp); antibiotics (vancomycin)
- Reservoirs, routes of dissemination not fully understood
  - Multiple patterns are seen in some institutions (endogenous infection from intestinal source?)
  - Clonal outbreaks are seen in others (transmission by HCWs?, fomites?)
VRE Screening

Who should be screened?

- Facility-specific decision.
- Selectively screen newly admitted, known positives or high-risk patients
- Source Rectal swab or stool

CDC recommendations can assist in the determination of a screening strategy – 1995 Recommendations
General Recommendations

- Prevention measures similar to MRSA
- Clearing 3 rectal swabs 1 week apart?
Precautions

Lack of consensus

Contact Precautions vs. Tailored approach

Endemic in organization?

Much information in the international literature
Control of VRE

Conclusions:
• VRE leads to many cases of colonization, few infections
• Chain of infection is broken by applying standard Hygienic measures
• Standard precautions and environmental hygiene
• Spatial isolation for high risk groups with VRE
Objective. To evaluate the effectiveness of daily CHG bathing in a non-ICU setting to reduce methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE) hospital-acquired infections (HAIs), compared with daily bathing with soap and water.

Patients. A total of 7,102 and 7,699 adult patients were admitted to the medical service in the control and intervention groups, respectively. Patients admitted from January 1 through December 31, 2008, were bathed daily with soap and water (control group), and those admitted from February 1, 2009, through March 31, 2010, were bathed daily with CHG-impregnated cloths (intervention group).

Results. Daily bathing with CHG was associated with a 64% reduced risk of developing the primary outcome, namely, the composite incidence of MRSA and VRE HAIs (hazard ratio, 0.36 [95% CI, 0.2-0.8]; *P* = .01). There was no change in the incidence of *C. difficile* HAIs (*P* = .6). Colonization with MRSA was associated with an increased risk of developing a MRSA HAI (hazard ratio, 8 [95% CI, 3-19]; *P* < .001).

Conclusion. Daily CHG bathing was associated with a reduced HAI risk.
## Survival of Pathogens on Surfaces

<table>
<thead>
<tr>
<th>Organism</th>
<th>Survival time</th>
</tr>
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<tbody>
<tr>
<td>Clostridium difficile (spores)</td>
<td>&gt;5 Months</td>
</tr>
<tr>
<td>Acinetobacter spp</td>
<td>3 Days to 11 months$^{79}$</td>
</tr>
<tr>
<td>Enterococcus spp including VRE</td>
<td>5 Days to &gt;46 months$^{32}$</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>6 Hours to 16 months</td>
</tr>
<tr>
<td>Klebsiella spp</td>
<td>2 Hours to &gt;30 months</td>
</tr>
<tr>
<td>Staphylococcus aureus, including MRSA</td>
<td>7 Days to &gt;12 months$^{80}$</td>
</tr>
<tr>
<td>Norovirus (and feline calicivirus)</td>
<td>8 Hours to &gt;2 weeks$^{81}$</td>
</tr>
</tbody>
</table>

NOTE. Adapted from Kramer et al.$^{31}$

J.A. Otter et al. / American Journal of Infection Control 41 (2013) S6-S11
The Inanimate Environment Can Facilitate Transmission

represents VRE culture positive sites

Polling Question 3

Is VRE a concern for your organization?

1. Yes
2. No
Polling Question 4

Do you place patients with VRE on precautions?

1. Yes

2. No
Understanding CRE, the 'nightmare' superbug that contributed to 2 deaths in L.A.
In 2011, the U.S. National Institutes of Health experienced an outbreak of carbapenem-resistant *K. pneumoniae* that affected 18 patients, 11 of whom died.

Outbreak traced to three independent transmissions from a single patient who was discharged 3 weeks before the next case became clinically apparent.
CRE

- CRE stands for Carbapenem-resistant Enterobacteriaceae

- These are a part (or subgroup) of Enterobacteriaceae that are difficult to treat because they are resistant to commonly used antibiotics.

- Occasionally CRE are completely resistant to all available antibiotics.

- CRE are an important threat to public health
Carbapenems

- Carbapenem antibiotics are often used as the last line of treatment for infections caused by resistant Gram-negative bacilli.

- Over the past decade, members of the Enterobacteriaceae family of bacteria have begun to develop Resistance to carbapenems and these resistant bacteria have spread throughout the U.S.
  - Klebsiella spp, E. coli
  - Enterobacter spp.
Enterobacteriaceae resistant to imipenem, meropenem, doripenem, or ertapenem OR documentation that the isolate possess a carbapenemase

Definition changed in 2015

Broad definition
Resistance

Carbapenem-resistant Enterobacteriaceae (CRE) are usually resistant to all β-lactam agents as well as most other classes of antimicrobial agents.

The treatment options for patients infected with CRE are very limited. Healthcare-associated outbreaks of CRE have been reported.
CRE: Just Another Type of MDRO?

What makes CRE special…

- Few treatment options available
- High mortality rate (50% or greater in some studies)
- No decolonization strategy
- Resistance can hop between Enterobacteriaceae
  - Making those potentially untreatable
  - Infections could begin appearing in otherwise healthy people
  - High speed/rate of resistance transfer
Outcomes of CRE


SETTING: Mount Sinai Hospital, a 1,171-bed tertiary care teaching hospital in New York City

METHODS: In the first matched case-control study, case patients with carbapenem-resistant K. pneumoniae infection were compared with control patients with carbapenem-susceptible K. pneumoniae infection.

In the second case-control study, patients who survived carbapenem-resistant K. pneumoniae infection were compared with those who did not survive, to identify risk factors associated with mortality among patients with carbapenem-resistant K. pneumoniae infection.
Outcomes

99 cases – 99 controls

Independent risk factors:

- Stem cell transplant (P=.008)
- Mechanical ventilation (P=.04)
- Increased length of stay (P=.01)
- Exposure to cephalosporins (P=.02)
- Previous exposure to carbapenems (p=<.001)
Mortality

- Case patients were more likely than control patients to die during hospitalization (48% vs 20%; P<.001)

- Case patients death attributable to infection (38% vs 12%; P<.001)

- High mortality
How is it spread?

- Person to Person

- Contact with infected or colonized persons

- Contact with wounds or stool has been implicated
http://www.cdc.gov/vitalsigns/hai/cre/
Environment as Source for CRE Transmission

- Cultures of environmental samples from rooms of CRE carriers
- Sampled pillow, groin, legs, bedside table and infusion pump on 2 wards
  - 18% to 29% positive for CRE
- Percent positive higher closer to patient

Duration of KPC Carriage

- KPC Patients swabbed 5 to 6 times (at discharge, 2 weeks, 1, 2, 3 mos post-discharge)
- Overall resolution of carriage (2 consecutive negatives)
  - 62/125 (52%)
  - 39% of recently identified patient
  - 79% of remotely identified patients (> 4 mos prior)

Facility-Level Prevention Strategies
Acute and Long-Term Care

- Core Measures
  - Hand Hygiene
  - Contact Precautions
  - Staff Education
  - Minimize Device Use
  - Patient and Staff Cohortng
  - Laboratory Notification
  - Antimicrobial Stewardship
  - CRE Screening
Prevention

- **Contact Precautions (CP)**
- CP for patients colonized or infected with CRE
- Systems in place to identify patients at readmission
- Education of HCP about use and rationale behind CP
- Adherence monitoring
- Consideration of pre-emptive CP in patients transfer from high-risk settings
Is it me, or do our kids seem much more resistant than we ever were?
Polling Question 5

Is CRE a concern for your organization?

1. Yes
2. No
Investigation of 39 cases of The New Delhi metallo-β-lactamase (NDM) 

Bacterial contamination despite absence of any processing lapses 

http://jama.jamanetwork.com/article.aspx?articleID=1911326
Clinical Significance

Most flexible endoscopes are forward viewing.

Duodenoscopes are side-viewing.

Duodenoscope

The Elevator

Supplemental Measures to Enhance Duodenoscope Reprocessing: FDA Safety Communication

Date Issued: August 4, 2015

http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm454766.htm
Polling Question 6

Do you routinely culture duodenoscopes?

1. Yes
2. No
3. Check by other means (i.e. ATP)
Multiply Resistant Gram Negatives

- Gram-negative bacteria cause infections including pneumonia, bloodstream infections, wound or surgical site infections, and meningitis in healthcare settings.
- Gram-negative bacteria are resistant to multiple drugs and are increasingly resistant to most available antibiotics.
- These bacteria have built-in abilities to find new ways to be resistant and can pass along genetic materials that allow other bacteria to become drug-resistant as well.
COMMON MICROORGANISMS
GRAM NEGATIVE BACILLI
(ENTEROBACTERIACEAE)

ESBL and CRE

• Klebsiella pneumoniae
• Escherichia coli
• Enterobacter cloacae
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Type</th>
<th>Topic</th>
<th>Access Event Archive: Recording</th>
<th>Slides</th>
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<td>Mar. 14, 2018</td>
<td>Interactive Coaching Call</td>
<td>Strategies to Reduce Surgical Site Infections (SSI)</td>
<td>[Access Event Archive: Recording]</td>
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<tr>
<td>Apr. 10, 2018</td>
<td>Interactive Coaching Call</td>
<td>Reducing PICC and Central Line Utilization to Eliminate CLABSI</td>
<td>[Access Event Archive: Recording]</td>
<td>Slides</td>
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<tr>
<td>May 8, 2018</td>
<td>Interactive Coaching Call</td>
<td>Don’t Be Resistant: Reducing MRSA and Other Multi-drug Resistant Organisms</td>
<td>[Event Archive will be available]</td>
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<tr>
<td>Jun. 12, 2018</td>
<td>Didactic Webinar</td>
<td>Fortify Your Unit Safety Culture to Reduce Infections</td>
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<td>Aug. 14, 2018</td>
<td>Interactive Coaching Call</td>
<td>Sustaining Zero Infections: Stop the “Whack a Mole” Syndrome</td>
<td>[Register]</td>
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</table>

Check the weekly [MTC HIIN Upcoming Events](#) for details and registration
Upcoming Virtual Events

- **May 11** – FHA | Managing Opioid Abuse: An Introduction to EDIE
- **May 23** – PfP | Exploring Collaboration around the ED Opioid Awareness Initiative
- **May 29** – FHA HIIN Safety Culture Measurement Project Kick-off
- **Jun 1** – HRET HIIN Culture of Safety Virtual Event – Disaster Preparedness
- **Jun 5** – HRET HIIN Measurement Matters: Ground-breaking CDI Practices
- **Jun 12** – HRET HIIN Readmissions Sepsis Fishbowl Series: Part 3

Check the weekly *MTC HIIN Upcoming Events* for details and registration
Readmissions Discussion Forums

- May 17, 2018: Jupiter Medical Center, Jupiter, FL
- May 23, 2018: FHA Corporate Office, Orlando, FL
- Jun. 15, 2018: Courtyard Pensacola, Pensacola, FL
- Other Areas to be Announced

WAKE UP to Protect Patients from Oversedation

- Jun. 12, 2018: FHA Corporate Office, Orlando, FL
- Jun. 14, 2018: Sacred Heart Hospital, Pensacola, FL

Check the weekly MTC HIIN Upcoming Events for details and registration.
Eligibility for Nursing CEU requires submission of an evaluation survey for each participant requesting continuing education:

https://www.surveymonkey.com/r/chasingzero050818

Share this link with all of your participants if viewing today’s webinar as a group (Survey closes May 18th)

Be sure to include your contact information and Florida nursing license number

FHA will report 1.0 credit hour to CE Broker and a certificate will be sent via e-mail (Please allow at least 2 weeks after the survey closes)
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