Ephraim McDowell Regional Medical Center

Our Journey to Reducing the Incidence of Clostridium difficile

Jason Dean BSN, RN Clinical Effectiveness Manager
Ginger L. East, BSN, RN, CIC Infection Prevention Coordinator
Disclaimer

• Ephraim McDowell Health Inc. including its Associates have no relevant financial or nonfinancial relationship to disclose as it relates to the products, organizations, or companies described within this presentation.
Objectives

• By the end of this presentation participants will have reviewed:
  – Our collaborative efforts internal and external of EMRMC
  – How we obtained Leadership support
  – Culture change with ongoing initiatives
Ephraim McDowell Regional Medical Center

- 222 Bed Acute Care Hospital
- Danville, Kentucky
- Serving 6 Counties
- Level III Trauma Center
- Certified in Orthopedic and Spine Surgeries by TJC
- Certified Chest Pain Center by the Society of Cardiovascular Patient Care
EMRMC has Over 100 physicians representing 33 specialties
Mission Statement

• Ephraim McDowell Health is committed to providing a healing environment in the communities we serve, built on best people, practices, and performance.
EMRMC Journey Consists of:

- Increase in Healthcare Facility Onset (HO) rates and Community –Onset Healthcare Facility-Associated (CO-HFA) rates
- Human Factor: 9 year old with HO
- External Collaboration
  - Kentucky Department of Public Health (KDPH)
  - Quality Improvement Organization (QIO)
  - Local Nursing Homes and Home Health
- Internal Collaboration
  - Development of PI teams
  - EVS leadership
  - Hand Hygiene Initiative
- Leadership Support
- Sophisticated New Technology
Comments in a report released by CDC on March 25, 2014

- "CDC is known for handling outbreaks, but it's even more important to be scanning the horizon for the next important threat that needs to be tackled," Michael Bell, MD, deputy director of the CDC's Division of Healthcare Quality Promotion, said at a news conference. "Despite the progress that we've seen, three quarters of a million patients every year end up with [HAIs]. We found that on any given day 1 out of 25 patients has a hospital infection, and of those people, as many as 1 out of 9 go on to die. This is not a minor issue."
Cost of CDI in the US

- CDI accounts for 336,000 hospitalizations each year
- Aggregate hospital cost exceeds $8.2 billion yearly
- Patients with CDI diagnosis remain hospitalized for 6.9 days at a cost of $10,100/stay

In the Beginning January 2013

• C-Diff rate for QTR 1_2013 (Oct-Dec) was 7.44 per 10,000 PCD
  – Implemented 10% hypochlorite wipes on all units for low level disinfection
  – EVS started daily and terminal cleaning of patient rooms with the hypochlorite solution
  – Increase hand washing sinks on Medical-Surgical Unit
April 2013: Issue Continues

- Overall C-diff rate QTR2_2013 (Jan-Mar) = 21.00/10,000 PCD
- Increased cleaning with hypochlorite solution in the outpatient settings (Emergency Room)
- Total of 25 NAP-1 specimens isolated during the reporting period
July 2013: External Collaboration Begins

• Overall C-diff rate dropped to 13.5/10,000 PCD for QTR 3_2013 (Apr-Jun)
• Started discussions with KY QIO
• 20% of all stool specimens tested at EMRMC were positive for C-diff
• Increase of positive stool specimens from NH
  – 51% of specimens positive for C-diff from NH
  – Started partnering with NH with admitting patients with C-diff
November 2013: Start of Leadership Commitment

- Overall C-diff rate QTR4_2013 (July-Sept) = 22.8/10,000 PCD
- Internal line listing developed for FY 2013 with no definite correlation found
- Early detection flow chart created for nursing units – trial started July 2013 on 1 unit
  - Early detecting of stool specimen in high risk patients, isolation implemented until C-diff r/o
Patient Is Admitted

- Patient from Home with no history of C-Diff or diarrhea

- Patient admitted from home with diarrhea or C-Diff within Last 3 months
  - Place patient in C-Diff contact precautions. Keep in precautions until the first BM. If the BM is formed then precautions can be discontinued. If liquid, loose, or watery then send ASAP for testing and keep in precautions until result is known. If patient does not have BM after 48 hours then precautions may be discontinued.

- Patient transferred from another facility or hospitalized in last 3 months.
  - Place patient in C-Diff contact precautions for entire hospital stay.

- Patient admitted from Nursing Home
  - Negative result = Remove from precautions. Monitor patient for loose stools especially if on antibiotics.

- Patient admitted with C-Diff or if patient was C-Diff positive in last 30 days.
  - Positive result = Keep in precautions.
Early Detection Flowchart

• Data from July 2013-2014 on Med-Surg Unit
• 931 patients met criteria and placed in precautions
• 8% were positive for C-diff (74)
• 4% were positive for C-diff and transferred from another nursing unit (37)
• 48.9 % tested negative for C-diff (455)
• 25.1% did not have a BM or were discharged prior to testing (234)
November 2013: Leadership Approval of C-diff PI Team

- PI team charter submitted to Senior Leadership Team with approval
  - Consider what has changed – Community influences
  - Patient/Family Education
    - Scripting for Associates
  - Review studies published (ICHE, SHEA, and APIC) and compare IP practices
November 2013 – Leadership Awareness

• VP Medical Affairs working with hospitalist to improve recommendations from Antimicrobial Stewardship Team (AST)

• Contract developed with ID physician at UKMC

• QIO meeting to discuss current C-diff trends and review IP practices with SLT, EVS, Lab, AST, CE and MD’s

• C-diff data presented at Medical Staff meetings routinely by COO/CNO
January 2014: KDPH Collaboration

• C-Diff rate for QTR 1_2014 (Oct-Dec) was 25.93 per 10,000 PCD

• Discussed situation with Kentucky Department of Public Health
  – Assigned an outbreak number
  – Met in person with the CDC Career Epidemiology Field Officer assigned to the KDPH
  – Gathered data and submitted review
  – Recommendations at that time were to continue IP practices
  – Stop sign placement in every precaution room to remind Associates/Others to wash hands prior to leaving the patient room
March 2014: Continued
Collaboration with External Agencies

• Collaborated with QIO and their Nursing Home project lead

• Worked with EMRMC Case Management Director to discuss action plan with hospital and local nursing homes and home health agencies

• Discussed: General CDI information, Hand Hygiene, Environmental Cleaning, Patient Education, Nursing Home Infection Prevention
March 2014: Hand Hygiene Initiative

• Leadership commitment from the VP of CE to see that we change the culture of our organization through a hand hygiene project

• Completed training on correct way to perform hand hygiene with a return demonstration competency for all Associates

• Changed from compliance goal to observation goal
  – Goal was for each department to have a 90% observation compliance
Hand Hygiene Improvement Plan
March, 2014

• Hand Hygiene Proposed Plan:

**Background:**

• Our goal will be to increase hand hygiene by changing the culture regarding habits and hesitancy to intervene (i.e. limited peer oversight of specific, clinically risky, behavior) when standards of care are not met. This is a step toward high reliability (doing the right thing right, every time).
Associate Responsibility:

- Complete education of Hand Hygiene policy via Healthcare Source
- Wash in and wash out
- Hand Hygiene competency to be completed on each Associate and placed in their Associate personnel file
- Report two hand hygiene observations monthly – report through Survey Monkey.
- Remind each other to perform required hand hygiene at all times using collegial interactions, like stating, “Dr. Hands would like to see you” for those failing to perform correct hand hygiene.

• **NOTE:** These collegial efforts may be non-reported and “under the corrective action radar”.

[Logo] Ephraim McDowell Health®
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Director/Manager Responsibility:

• Report two hand hygiene observations monthly – report through Survey Monkey.

• Confirm all Associates participate in the education

• Confirm all Associates perform and report two hand hygiene observations per month

• Receive monthly, individual results and enter them into the department spreadsheet.

• Associates failing to comply with hand hygiene*:
  1. Read two (2) articles related to hand hygiene and verbalize how to improve compliance
  2. Research and write an essay on how to improve hand hygiene in their unit
  3. Begin the first step of corrective action process

* Failing to comply with hand hygiene two (2) observed times in any 30-day period.
Other Responsibility:

- CE will continue to round in all areas
- SLT will guide outlier actions (i.e. 3 consecutive months of <90% compliance by unit/department)
- EMH will recognize and congratulate high performers

Data Collection Tool:

- Less than 1 minute to complete
- User friendly – conducted through Survey Monkey
- Available on all computers
Percentage of departments with 90% of their Associates recording results for two observations per month

*Compliance not calculated during the 60-day start-up phase in April and May

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<td>NA</td>
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## Percentage of Associates observed correctly performing hand hygiene

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<td>221</td>
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<td>3367</td>
<td>4017</td>
<td>3628</td>
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<tr>
<td># practiced correctly</td>
<td>95%</td>
<td>98.2%</td>
<td>97.5%</td>
<td>97.3%</td>
<td>98.5%</td>
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<td># observations</td>
<td>191</td>
<td>863</td>
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<td>2364</td>
<td>2902</td>
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<td># practiced correctly</td>
<td>80%</td>
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<td>98.8%</td>
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<td>98.5%</td>
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<td>16</td>
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<td>429</td>
<td>493</td>
<td>436</td>
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May 2014: Continued Attempts to Decrease C-diff

- Overall C-diff rate for QTR 2_2014 (Jan-Mar) was 26.95/10,000 PCD
- March rate was 33.70/10,000 PCD
- April dropped to 15.30/10,000 PCD a 45% reduction
- Rational: Culture change to hand hygiene within the organization
Ephraim McDowell Regional Medical Center
Health Care Facility-Onset C. diff
January 2013 - January 2015

Hand Hygiene Initiative Began

HO C.diff (per 10,000 PCD)
Trendline - HO C.diff (per 10,000 PCD)
May 2014: C-Diff PI Team Focus

• Transitioned PI team to middle management
• Focused on EVS terminal cleaning and handling of IVAC pumps
• ICP visiting all C-diff patients
  – Providing education: transmission, PPE, HH
• Antibiotic stewardship
  – 1st and 2nd QTR 2014 showed that 50% of patients were on Levaquin
• Disinfectant evaluation – exploring alternative solutions
May 2014: ATP Testing Results

• Results for QTR1 and QTR 2 Shared with ICC, Leadership and C-Diff PI team

• Overall compliance increased from 84.8% QTR1 to 91.0% in QTR 2

• All C-diff rooms tested prior to being released
  – C-diff room compliance was 97%
  – Any equipment not passing would require EVS to clean/disinfect until passing

• Areas of concern: Cardiac Monitors, BMV Wand and IV carts
May 2014: Family and Patient Engagement

• Changed internal policy on Standard and Transmission-based Precautions in regards to Visiting Regulations
• Recent change came from TJC survey with our Critical Access Hospital
• Change: Visitors no complying with instructions will be unable to visit
Isolation Precautions

The patient you are visiting has been placed in isolation, which is a precaution we take to prevent the spread of germs.

For your protection and the protection of our patients, staff and other visitors, you must wear protective apparel (a gown and gloves) when visiting this patient.

You will find these items on the door or in the closet outside of the room. Please wear this protective apparel while visiting this patient.

Prior to leaving the room, remove the gown and gloves and please wash your hands to further prevent the spread of infection.

Thank you for your cooperation in helping us to prevent the spread of germs.

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Putting on Gown and Gloves

Put on the gown with the opening in the back, and secure it closed at the neck and waist.

Insert hands into gloves and extend gloves over the cuffs of the gown.

Taking off Gown and Gloves

Remove the gloves first by grasping the outside edge near the wrist and peel away from your hand, turning glove inside out. Hold in opposite gloved hand. Slide ungloved finger under the wrist of the remaining glove. Peel off from inside, creating a bag for both gloves, then discard.

To remove gown, unfasten the ties and peel gown away from neck and shoulder, turning the contaminated outside toward the inside. Fold or roll into a bundle, then discard.

Wash hands with soap and water.
July 2014: CDI Rate

- FY 2014 (Oct- June) rate: 23.64/10,000 PDC
- Overall C-diff rate for QTR 3_2014 (Apr-June) was 17.4/10,000 PCD

Graph Represents HO C.diff (per 10,000 PCD)

Lowest QTR rate noted prior to January 2013
July 2014: KDPH Results

• Overall rates are high in comparison to the average of the state but are to be in statistical control

• CDI rates appear to be random variation
  – No sudden rate increase or discrete cluster
  – No acute outbreak

• Recommendations: focus on general clinical, infection control and antimicrobial stewardship
### Summary Data for Ephraim McDowell and NHSN Reporting Facilities

**CDI Incidence Rates (per 10,000 patient days) for 2013 and 2014**

<table>
<thead>
<tr>
<th>Year</th>
<th>Ephraim McDowell Rate</th>
<th>NHSN Rate</th>
<th>Rate Ratio</th>
<th>95% CI</th>
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<td>2013</td>
<td>16.7</td>
<td>6.67</td>
<td>2.5</td>
<td>1.88-3.33*</td>
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<tr>
<td>2014</td>
<td>17.25</td>
<td>6.52</td>
<td>2.65</td>
<td>1.71-4.1*</td>
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¥ All facilities in Kentucky reporting CDI LabID data to NHSN, calculations do not include Ephraim McDowell data

± Inpatient CDI Healthcare Facility-Onset Incidence Rate

€ 2013 includes March-December and 2014 includes January-April

* Significant Value
July 2014: KDPH Results

Incidence Rate of Healthcare Facility-Onset CDI LabID Events, Ephraim McDowell Regional Medical Center, Jan 2011-Apr 2014

[Graph showing incidence rate trends over time]
July 2014: New Disinfectant/Cleaner Approved

• Infection Control Committee approved EVS to stop the use of hypochlorite solution wipes and replace with a non corrosive sporacidal

• Properties include
  – EPA registered, non-bleach
  – One-step disinfectant cleaner
  – Peroxyacetic acid and Hydrogen Peroxide formula
  – Vinegar-like smell
July 2014: Single Patient Use

• Started recycling program for Pulse Oximeters
• Decreased cost of nearly $160,000
• Single use 5 lead EKG wires on all isolation patients and started a trial - 100% use on Cardiovascular unit
• January 2015 approval to implement disposable EKG lead wires on all Cardiovascular unit patients
• Cost of disposable wires is around $12 per patient
October 2014

• Overall C-diff rate for QTR 4_2014 (July-Sept) was 27.2/10,000 PCD

• Need to go to the next level of cleaning and disinfection.

• Investigation of Xenex technology, trial started on October 27, 2014
Proven Peer Reviewed Outcome Studies

**Journal of Infection Prevention**

- **57% Decrease in HA-MRSA Rates after implementing Xenex**
  - Simmons S, Morgan M, Hopkins T, Helsabeck K, Stachowiak J, Stibich M.
  - Impact of a multi-hospital intervention utilizing screening, hand hygiene education and pulsed xenon ultraviolet on the rate of hospital associated Methicillin-resistant Staphylococcus aureus infection.
  - *JIP, 2013*

**American Journal of Infection Control**

- **53% Decrease in HA-C. diff rates after implementing Xenex**
  - Levin J, Riley l, Parrish C, English D, Sehoon A.
  - The Effect of Portable Pulsed Xenon Ultraviolet light after terminal cleaning on hospital-associated Clostridium difficile infection in a community hospital.
  - *AJIC. 2013*

**In Press**

- **20% Decrease in HA-MDRO rates with only 22% utilization**
  - Hass J, Menz J, Ortiz P, Montecalvo M.
Xenex Technology

- Only pulsed Xenex UV technology
  - Environmentally Friendly
  - 5 minute C. diff spore kill time

![Image of Xenex Technology device with control and mercury UV treatments for L. monocytogenes and E. coli comparison](image)
Xenex and C. difficile

• Environmental Impact
  – Shown to reduce the burden of C. difficile spores in the environment.¹
  – Shown to be comparable to Bleach for sporicidal disinfection.²

• Infection Reductions
  – 18% reduction in hospital associated CDI.³
  – 53% reduction in hospital associated CDI.⁴
Xenex Program

Fully Supported Program

– Program design and launch
– Technology training and education
– Marketing and Media/PR plan design and support
– Ongoing program support and reporting
– Warranty, maintenance and ongoing device support
EMRMC Xenex Strategy

Shift 1: 7a – 10p

Priority 1  All C. diff Discharges
Priority 2  3rd Floor Discharges
Priority 3  Other isolation discharges / transfers
Priority 4  3rd Floor Equipment storage areas / Public restrooms, waiting areas
Priority 5  All Standard discharges / transfers

Shift 2: 10p – 6a

Priority 1  Operating Rooms
Priority 2  Cath Labs
Xenex Operations

- Staffing needs can vary based on:
  - Current staffing levels
  - Current operational efficacy
  - Discharge pace and timing
  - Shift Goals
Implementing Xenex at EMRMC

• Goal: Use Xenex after terminal cleaning of all discharges, with special focus on the 3rd floor.
  – 33% compliance with all discharges
  – 50% compliant with 3rd floor discharges

• Infection Tracking
  – Total Hospital Associated
  – Hospital Onset
  – Community Onset, Hospital Associated
Infection Rate Changes

All Hospital Associated CDI, Jan 2013-Jan 2015

Rate per 10,000 Patient Days

Pre-Xenex
Post-Xenex

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Infection Rate Changes

Community Onset-Hospital Associated CDI, Jan 2013-Jan 2015

Rate per 10,000 Patient Days

Pre-Xenex
Post-Xenex
Linear (Pre-Xenex)
Why the Difference?

• Patient level risk factors
  – Antimicrobial use, weakened immune system, advanced age, chemotherapy drugs, etc.

• Environment risk factors
  – Cross-contamination with *C. difficile* spores

• Transfer of the patient out of a facility that is using no-touch disinfection increases the environmental risk.
Infection Rate Changes

Community Acquired CDI, Jan 2013-Jan 2015

Rate per 10,000 Patient Days

Pre-Xenex
Post-Xenex
Linear (Pre-Xenex)

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Financial Implications

• Based on previous infection rates, 16 cases of hospital acquired CDI would have been expected after implementing Xenex.
• 13 cases occurred, for 3 potentially prevented cases.
• At an estimated cost of $11,285 per infection\(^5\), a total of $33855 was avoided.
Sophisticated New Technology

- EMRMC announced to the community on Friday February 27th our acquisition of a pulsed xenon ultraviolet light machine to help reduce our HAI rates

Ephraim McDowell 2 26 15.wmv
References


2. Ghantoji, S., Stibich, M., Stachowiak, J., Cantu, S., Adachi, J., Raad, I., Chemaly, R. Non-inferiority of pulsed xenon ultraviolet light versus bleach versus for reducing environmental Clostridium difficile contamination on high-touch surfaces in Clostridium difficile isolation rooms. Journal of Medical Microbiology. Published online ahead of print January 13, 2015, doi: 10.1099/jmm.0.000004


Thank you

• Questions:

• Ginger East, Infection Prevention Coordinator
  – g Elliot@emhealth.org, 859-239-2346

• Jason Dean, Clinical Effectiveness Manager
  – jdean@emhealth.org, 859-239-3420