UHS Experience with Steriliz
UV-C Room Decontaminator

Maureen Spencer, RN, BSN, M.Ed., CIC
Corporate Director, Infection Prevention
Universal Health Services
King of Prussia, PA
- UHS has an Acute Care Division that provides high quality care at 26 hospitals in California, Florida, Nevada, Oklahoma, South Carolina, Texas and Washington, DC

- UHS has a Behavioral Health Division that consists of over 300 centers/hospitals in the U.S. and England
Contaminated Environmental Surfaces

- Play an important role in transmission of pathogens
- Several studies show that cleaning and disinfection of hospital surfaces is suboptimal with only ~50% of high touch surfaces disinfected
- Need for new innovative, effective and rapid methods for environmental disinfection
- UV-C room decontaminators are mobile automated room decontamination technology that can assist EVS in routine and terminal discharge cleaning
What is Ultraviolet-C Energy?

- UV-C, or short wave ultraviolet radiation:
  - Used to destroy bacteria, mold, viruses and other biological contaminants in the air, liquids, or on surfaces
  - Specific wavelength of 253.7 nanometers
  - UV-C is technology that has been employed by hospitals safely for more than 75 years
  - UV as a component of sunlight kills microorganisms in outdoor air
  - UV-C rays break through the outer membrane of microbes and when radiation reaches the DNA of the microorganism the DNA transmits incorrect information that results in death of the microbe
  - Ultraviolet “robots” provide a powerful and concentrated effect of ultraviolet energy that can sanitize air and environmental surfaces in their path
Experience with UV “Robots” and Steriliz

- 2008 – first tested a UV robot in a hospital –challenged in a vacant nursing unit with 0.5 McFarland broth of Staph aureus and E.coli
- Showed significant log reduction after treatment
- 2011 – presented at APIC with Ann Marie Pettis on Environmental Decontamination with Innovative EVS Technology and discussed small particle generators and UV–C technology
- 2012 – after lecturing at APIC Rochester I met with the Steriliz company at their exhibit and was very impressed with their quality control system (the four meters) and the software to monitor adherence to the proper use of the equipment by EVS staff to assure adequate dosing for C difficile spores
- 2014 – Initiated a UHS corporate contract with Steriliz
Review of the Evidence
Room Decontamination with UV Radiation

William A. Rutala, PhD, MPH; Maria F. Gergen, MT (ASCP); David J. Weber, MD, MPH

OBJECTIVE. To determine the effectiveness of a UV-C-emitting device to eliminate clinically important nosocomial pathogens in a contaminated hospital room.

METHODS. This study was carried out in a standard but empty hospital room (phase 1) and in a room previously occupied by a patient with methicillin-resistant Staphylococcus aureus (MRSA) or vancomycin-resistant Enterococcus (VRE) infection (phase 2) in an acute care tertiary hospital in North Carolina from January 21 through September 21, 2009. During phase 1, 8 × 8 cm Formica sheets contaminated with approximately $10^4$–$10^5$ organisms of MRSA, VRE, multidrug-resistant (MDR) Acinetobacter baumannii, or Clostridium difficile spores were placed in a hospital room, both in direct line of sight of the UV-C device and behind objects. After timed exposure, the presence of the microbes was assessed. During phase 2, specific sites in rooms that had housed patients with MRSA or VRE infection were sampled before and after UV-C irradiation. After timed exposure, the presence of MRSA and VRE and total colony counts were assessed.

RESULTS. In our test room, the effectiveness of UV-C radiation in reducing the counts of vegetative bacteria on surfaces was more than 99.9% within 15 minutes, and the reduction in C. difficile spores was 99.8% within 50 minutes. In rooms occupied by patients with MRSA, UV-C irradiation of approximately 15 minutes duration resulted in a decrease in total CFUs per plate (mean, 384 CFUs vs 19 CFUs; $P<.001$), in the number of samples positive for MRSA (81 [20.3%] of 400 plates vs 2 [0.5%] of 400 plates; $P<.001$), and in MRSA counts per MRSA-positive plate (mean, 37 CFUs vs 2 CFUs; $P<.001$).

CONCLUSIONS. This UV-C device was effective in eliminating vegetative bacteria on contaminated surfaces both in the line of sight and behind objects within approximately 15 minutes and in eliminating C. difficile spores within 50 minutes.

*Infect Control Hosp Epidemiol* 2010; 31(10):1025-1029
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Evaluation of a Pulsed Xenon Ultraviolet Disinfection System for Reduction of Healthcare-Associated Pathogens in Hospital Rooms

Michelle M. Nerandzic, BS;1 Priyaleela Thota, MD;2 Thriveen Sankar C., MBA;2 Annette Jencson, MT, CIC;1 Jennifer L. Cadnum, BS;2 Amy J. Ray, MD;2,3 Robert A. Salata, MD;2,3 Richard R. Watkins, MD;4 Curtis J. Donskey, MD2,3,5

OBJECTIVE. To determine the effectiveness of a pulsed xenon ultraviolet (PX-UV) disinfection device for reduction in recovery of healthcare-associated pathogens.

SETTING. Two acute-care hospitals.

METHODS. We examined the effectiveness of PX-UV for killing of Clostridium difficile spores, methicillin-resistant Staphylococcus aureus (MRSA), and vancomycin-resistant Enterococcus (VRE) on glass carriers and evaluated the impact of pathogen concentration, distance from the device, organic load, and shading from the direct field of radiation on killing efficacy. We compared the effectiveness of PX-UV and ultraviolet-C (UV-C) irradiation, each delivered for 10 minutes at 4 feet. In hospital rooms, the frequency of native pathogen contamination on high-touch surfaces was assessed before and after 10 minutes of PX-UV irradiation.

RESULTS. On carriers, irradiation delivered for 10 minutes at 4 feet from the PX-UV device reduced recovery of C. difficile spores, MRSA, and VRE by 0.55 ± 0.34, 1.85 ± 0.49, and 0.6 ± 0.25 log10 colony-forming units (CFU)/cm2, respectively. Increasing distance from the PX-UV device dramatically reduced killing efficacy, whereas pathogen concentration, organic load, and shading did not. Continuous UV-C achieved significantly greater log10CFU reductions than PX-UV irradiation on glass carriers. On frequently touched surfaces, PX-UV significantly reduced the frequency of positive C. difficile, VRE, and MRSA culture results.

CONCLUSIONS. The PX-UV device reduced recovery of MRSA, C. difficile, and VRE on glass carriers and on frequently touched surfaces in hospital rooms with a 10-minute UV exposure time. PX-UV was not more effective than continuous UV-C in reducing pathogen recovery on glass slides, suggesting that both forms of UV have some effectiveness at relatively short exposure times.

Infect Control Hosp Epidemiol 2014;00(0):1–6
Postdischarge decontamination of MRSA, VRE, and Clostridium difficile isolation rooms using 2 commercially available automated ultraviolet-C–emitting devices

Titus Wong MD, MHScc, FRCPC a,b,1, Tracey Woznow BSc, BEd(Sec) a, Mike Petrie c, Elena Murzello BScN, MBA d, Allison Muniak MASc d, Amin Kadora MBA e, Elizabeth Bryce MD, FRCPC a,b,*,1

a Division of Medical Microbiology and Infection Control, Vancouver General Hospital, Vancouver, BC, Canada
b Department of Pathology and Laboratory Medicine, Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada
c Business Initiatives and Support Services, Lower Mainland Health Authorities, Vancouver, BC, Canada
d Quality and Patient Safety, Vancouver Coastal Health, Vancouver, BC, Canada
e School of Business, Capilano University, North Vancouver, BC, Canada
Background: Two ultraviolet-C (UVC)–emitting devices were evaluated for effectiveness in reducing methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), and Clostridium difficile (CD).

Methods: Six surfaces in rooms previously occupied by patients with MRSA, VRE, or CD were cultured before and after cleaning and after UVC disinfection. In a parallel laboratory study, MRSA and VRE suspended in tryptase soy broth were inoculated onto stainless steel carriers in triplicate, placed in challenging room areas, subjected to UVC, and subcultured to detect growth.

Results: Sixty-one rooms and 360 surfaces were assessed. Before cleaning, MRSA was found in 34.4%, VRE was found in 29.5%, and CD was found in 31.8% of rooms. Cleaning reduced MRSA−, VRE−, and CD−contaminated rooms to 27.9%, 29.5%, and 22.7%, respectively (not statistically significant). UVC disinfection further reduced MRSA−, VRE−, and CD−contaminated rooms to 3.3% (P = .0003), 4.9% (P = .0003), and 0% (P = .0736), respectively. Surface colony counts (excluding floors) decreased from 88.0 to 19.6 colony forming units (CFU) (P < .0001) after manual cleaning; UVC disinfection further reduced it to 1.3 CFU (P = .0013). In a multivariable model of the carrier study, the odds of detecting growth in broth suspensions after UVC disinfection were 7 times higher with 1 machine (odds ratio, 6.96; 95% confidence interval, 3.79-13.4) for a given organism, surface, and concentration.

Conclusions: UVC devices are effective adjuncts to manual cleaning but vary in their ability to disinfect high concentrations of organisms in the presence of protein.
Prior to cleaning, MRSA, VRE, and CD contaminated 13.8%, 11.4%, and 7.2% of surfaces, respectively. Although manual cleaning reduced the bioburden, UVC disinfection further reduced bioburden by 8- to 10-fold (Table 3).
With respect to the performance of the 2 UVC-emitting machines, both were equally excellent in enhancing the overall patient room cleanliness as an adjunct to manual cleaning in a real-world setting. However, there were important operational and usability differences between the machines. Machine 1 has a faster average use time of 14 minutes compared with machine 2’s time of 35 minutes for a regular setting and 57 minutes for the sporicidal cycle. However, machine 1 did have a longer setup time to place the 4 detectors in the room corners, increased hands-on time to move the machine to the different room positions as per manufacturer recommendations, and increased time to clean the 4 detectors after each use. Machine 2, while having much longer cycle times, can be left in the patient room with little to no user interference. We performed a human factors evaluation, including a needs assessment, heuristic evaluation, and task analysis to compare the design of a device with validated design rules to identify usability problems.²¹-²³
How an institution decides on the machine that is right for them will depend largely on hospital room capacity, peak turnover times, usability and workflow assessments, and patient and staff safety. In an institution where occupancy rates near 100% and room turnover time must be as short as possible, it would make sense to choose the faster emitter. Conversely, an institution where occupancy is lower, with less room turnover time pressures, could take advantage of the walk-away nature of another machine so that the housekeeper can focus on other tasks. Other important factors to consider are the ability to select only 1 cycle time (less possibility of user error in cycle selection), ergonomic issues, including the footprint of the machine and its ability to pass through small entrances, the sight-line of the machine when it has a cover (making it more difficult for petite operators to maneuver equipment), and the user-friendliness of the software. We recommend that each institution perform both a needs assessment and human factors engineering analysis when considering UVC technology because it is important to understand the physical and cognitive demands placed on the operator of the device.
CONCLUSIONS

Manual cleaning of patient rooms is suboptimal. UVC-emitting machines effectively reduce patient room contamination with MRSA, VRE, and CD over and above manual cleaning when used sequentially. More study is required to determine its effect on the prevention of hospital-acquired infections.
Effect of Variation in Test Methods on Performance of Ultraviolet-C Radiation Room Decontamination

Jennifer L. Cadnum, BS;¹,² Myreen E. Tomas, MD;¹ Thriveen Sankar, MNO;¹,² Annette Jencson, CIC;¹ J. Itty Mathew, MLS;² Sirisha Kundrapu, MD;² Curtis J. Donskey, MD²,³

OBJECTIVE. To determine the effect of variation in test methods on performance of an ultraviolet-C (UV-C) room decontamination device.

DESIGN. Laboratory evaluation.

METHODS. We compared the efficacy of 2 UV-C room decontamination devices with low pressure mercury gas bulbs. For 1 of the devices, we evaluated the effect of variation in spreading of the inoculum, carrier orientation relative to the device, type of organic load, type of carrier, height of carrier, and uninterrupted versus interrupted exposures on measured UV-C killing of methicillin-resistant Staphylococcus aureus and Clostridium difficile spores.

RESULTS. The 2 UV-C room decontamination devices achieved similar log₁₀ colony-forming unit reductions in the pathogens with exposure times ranging from 5 to 40 minutes. On steel carriers, spreading of the inoculum over a larger surface area significantly enhanced killing of both pathogens, such that a 10-minute exposure on a 22-mm² disk resulted in greater than 2 log reduction in C. difficile spores. Orientation of carriers in parallel rather than perpendicular with the UV-C lamps significantly enhanced killing of both pathogens. Different types of organic load also significantly affected measured organism reductions, whereas type of carrier, variation in carrier height, and interrupted exposure cycles did not.

CONCLUSIONS. Variation in test methods can significantly impact measured reductions in pathogens by UV-C devices during experimental testing. Our findings highlight the need for standardized laboratory methods for testing the efficacy of UV-C devices and for evaluations of the efficacy of short UV-C exposure times in real-world settings.

FIGURE 1. Efficacy of the Tru-D versus Clorox Healthcare Optimum-UV System for killing of *Clostridium difficile* spores and methicillin-resistant *Staphylococcus aureus* (MRSA). Steel disk carriers were inoculated with $1 \times 10^6$ colony-forming units (CFU) of the pathogens in 10\(\mu\)L of phosphate-buffered saline and the inoculum was spread to cover the 10-mm\(^2\) surface area of the disk. The carriers were placed 4 feet from the devices at a height of 4 feet and irradiated for 5, 10, 20, or 40 minutes. The means of data from triplicate experiments are presented. Error bars indicate standard error.
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IN-TRAK™ (patent pending) infection tracking software
Reports : Room Disinfection Job Summary

Customer
Aiken Regional Medical Center (UHS)

Aiken Regional Medical Center (UHS)

Date Range
From: 6/1/2016
To: 6/30/2016

Location
Site: Site
Unit: All
Room: All
Category: All

Job Status
☑ Completed Jobs
☐ Cancelled Jobs

Devices
☑ RD2 221
☑ RD2 222
☑ RD2 225
Dose

Sorted By
Create Time Ascending
Submit Export

Aiken Regional Medical Center (UHS)

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<td>244</td>
<td>22 secs</td>
<td>Rancho Springs Medical Center (UHS::SWHS)</td>
<td>12/17/15</td>
<td>06/06/16 5:55 pm</td>
</tr>
<tr>
<td>245</td>
<td>4.44 mins</td>
<td>Rancho Springs Medical Center (UHS::SWHS)</td>
<td>12/17/15</td>
<td>06/01/16 10:07 pm</td>
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<td>246</td>
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<td>Inland Valley Medical Center (UHS::SWHS)</td>
<td>06/06/15</td>
<td>06/05/16 2:17 am</td>
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<tr>
<td>247</td>
<td>3.07 mins</td>
<td>Inland Valley Medical Center (UHS::SWHS)</td>
<td>06/06/15</td>
<td>06/06/16 5:35 pm</td>
</tr>
<tr>
<td>248</td>
<td>41 secs</td>
<td>Summervin Hospital Medical Center (UHS)</td>
<td>06/06/15</td>
<td>06/06/16 6:15 pm</td>
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<td>249</td>
<td>3.37 mins</td>
<td>St. Mary's Regional Medical Center (UHS)</td>
<td>06/06/15</td>
<td>06/06/16 7:25 pm</td>
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<td>301</td>
<td>55 secs</td>
<td>Spring Valley Hospital Medical Center (UHS)</td>
<td>06/04/16</td>
<td>06/04/16 1:27 am</td>
</tr>
<tr>
<td>302</td>
<td>6 hrs</td>
<td>Spring Valley Hospital Medical Center (UHS)</td>
<td>06/04/16</td>
<td>06/03/16 10:54 pm</td>
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<tr>
<td>303</td>
<td>30 secs</td>
<td>Spring Valley Hospital Medical Center (UHS)</td>
<td>06/04/16</td>
<td>06/04/16 11:23 pm</td>
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<tr>
<td>306</td>
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<td>Northern Nevada Medical Center (UHS)</td>
<td>03/04/16</td>
<td>06/06/16 3:22 pm</td>
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<tr>
<td>307</td>
<td>2.35 mins</td>
<td>Northern Nevada Medical Center (UHS)</td>
<td>03/04/16</td>
<td>06/04/16 12:56 am</td>
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<tr>
<td>310</td>
<td>3.16 mins</td>
<td>Desert Springs Hospital (UHS)</td>
<td>04/04/16</td>
<td>06/03/16 1:16 am</td>
</tr>
<tr>
<td>311</td>
<td>34 days</td>
<td>Desert Springs Hospital (UHS)</td>
<td>04/22/16</td>
<td>05/02/16 11:57 am</td>
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<tr>
<td>312</td>
<td>25 hrs</td>
<td>Desert Springs Hospital (UHS)</td>
<td>04/22/16</td>
<td>06/03/16 8:12 am</td>
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</tbody>
</table>

### Last Synchronization

- **State**: Ok, Slow, Late, None, Unknown
- **Period**: < 5 minutes, < 2 hours, < 2 days, < 2 weeks, > 2 weeks

### Operator Performance - Treatments (avg m/s)

- **Dmillet**: 226 (11:29)
- **Amoreno**: 187 (08:32)
- **rsandoval**: 81 (07:01)
- **Jkarr**: 65 (08:43)
- **tonysma**: 61 (14:28)
- **droskel**: 55 (10:51)
- **host-madsen**: 44 (05:24)
- **cmcginnis**: 41 (30:11)
- **avonrueden**: 33 (06:28)
- **nbarone**: 32 (20:54)

Top performers within the past 14 days.
Continuous UV-C room decontamination works effectively in reducing contaminants left in the environment after routine or terminal cleaning and disinfection.

Steriliz room decontaminator has a quality control program with 4 remote UVC challenge device sensors that assure the correct dosage of UV is achieved during treatments.

Steriliz is faster and more efficient than other models.

Software helps IP monitor compliance with use of the technology to treat rooms and surfaces.
Thank You

Questions?
Prevention of C. Difficile Infections: The Rochester, NY Experience

Michelle Vignari RN, CIC
Director of Infection Prevention and Disaster Management
Thompson Health
Canandaigua, New York
The Rochester, NY CDI Experience
2012-Current

Two Stories:

- Rochester General Hospital
  - My “Home” for 22 years.

- The Rochester, NY Region
  - Four major acute care hospitals: All “Competitors:”
    - Rochester General Hospital
    - Strong Memorial Hospital
    - Highland Hospital
    - Unity Hospital
Rochester General Hospital

Rochester General Hospital (RGH), Rochester Regional Health’s flagship affiliate, one of the region’s busiest tertiary care hospitals.

- 528 beds
  - 307 private rooms
  - 40 ICU beds
- Averages 28,000 admissions/year
- Average Daily Census: 467
- Service Lines
  - Major Cardiac Surgery Center
  - Cancer Center
  - Joint Center
  - Woman’s Health
  - Comprehensive Surgical Services
  - Over 40 medical practices
  - Ambulatory Care Services
  - Dialysis
  - Surgery Center
23% increase in Crude CDI Rates: (no risk adjustment)
- 2010: 8.69 per 10,000 pt days
  - 159 cases
- 2011: 10.7 per 10,000 pt days
  - 194 cases
  - Statistically higher than NYS average
    - No real change in patient days
  - Toxigenic strain seen

Almost half million infections
- 83,000 recurrences
- 29,000 deaths
RGH: Next Steps

GAP Analysis
- Evidence Based Literature vs. Current Practice
  - Close any gaps identified

What’s Next after all prevention strategies have been explored?
- Studies by Rutala and Boyce show promise in a novel approach: Total room UV disinfection.
  - Kill viruses, bacteria and spores on environmental surfaces.
- Could Ultraviolet-C light (UV-C) technology have a role in reduction of CDI.
In a day of evidence based medicine, value based purchasing and delivering high reliability healthcare, technology choices should be carefully researched and chosen.

- **Dose:** What is the *delivery dose* to achieve virus, bacteria AND spore eradication?
- **Time:** What is the *time* it takes to deliver that dose?
- **Measurement:** Can the above variables be *measured*?
Why R-D™ Rapid Disinfector

- **Patented** wireless sensors measure and report on UV-C light dosages delivered to targeted areas.
  - **Time:** Average 15 minutes or less
  - **Dose based performance.**
- Real-time job status via browser-enabled devices (phones and tablets)
- Utilization data available for records.
- Pause and reposition functionality to more quickly and efficiently disinfect rooms, including shadowed areas.
UV-C Technology is a capital investment: *Bring your A Game!*

- Understand how to reach out and who can be your point person.
  - Engage an executive champion.
- Be prepared with the current state and fully understand the problem.
  - Engage them with the impact on patient safety and the patient experience.

- **Most Important Key Element:**
  - Show/propose how UV-C disinfection will deliver a measurable return to the organization.
RGH’s Experience

- One of first beta sites for the use of the R-D Rapid Disinfector.
  - RGH Epidemiologist and Microbiologist involved in log reduction studies.

- Creation of a multidisciplinary team approach to the reduction of CDI using UV-C technology.
Our Multidisciplinary Team

- Infection Prevention
  - Infectious Disease/Epidemiologist
- Environmental Services (EVS)
  - Integral link
  - Undervalued
- Microbiology

- Pharmacy
  - Antimicrobial stewardship
- Nursing
- Ancillary Departments
  - Resp, Dietary, social work etc.
- Leadership
  - Executive sponsor
RGH’s Experience

- **Standardized protocols:**
  - Isolation Protocols
  - Dedicated patient equipment
  - Equipment cleaning guidelines

- **Antimicrobial stewardship**
  - Data mining alerts
    - Drug/bug mismatch
    - De-escalate therapies
  - CDI testing / treatment guidelines

- **Environmental cleaning/disinfection**
  - EVS/Nursing/All team members
  - Bleach based cleaner/disinfectant
  - Daily/Terminal Cleans
  - Measurement of effective cleaning
    - Face to face audits
    - ATP
    - UV-C

- **Bi-weekly meetings**
  - Unit CDI burden evaluated
    - HO/CO/CO-HCF
  - Pro-active approach vs re-active: *Clean Sweeps!*
  - Units identified with a increase hospital onset rate OR increase overall CDI patient burden are triggered for a *Clean Sweep.*
    - All rooms terminal cleaned/disinfected/UV-C’d.
      - Use empty swing bed to facilitate patient movement.
    - All available portable equipment put in room to be UV-C’d.
    - Unit common areas terminal cleaned focusing on all touch point areas.

The Success Of Teamwork
Coming together is a beginning.
Keeping together is progress.
Working together is success.
~ Henry Ford ~

More Quotes @ IMGQuotes.com
Quality Improvement Project for Four Major Hospitals: Rochester, NY

The Attributable Cost of Hospital Onset C. difficile Infections in the 4 Rochester Hospitals-2011

<table>
<thead>
<tr>
<th>Cost$</th>
<th>LOS*</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ $6,408-9,124 per case</td>
<td>~ 3-12 days</td>
<td>~ 3-7%</td>
</tr>
<tr>
<td>Total for 4 Rochester Hospitals</td>
<td>Total for 4 Rochester Hospitals</td>
<td>Higher in elderly patients</td>
</tr>
<tr>
<td>~$4-5 million</td>
<td>1700-7,000 days</td>
<td></td>
</tr>
</tbody>
</table>

$ Does not include cost of re-hospitalization and recurrence of infection
*LOS: length of stay

Community Data: 2011

Community Approach

Engage:
CEO & Senior Leadership buy-in
Team creation
City-wide prevention and team-building workshops

Evaluate:
Feedback of process measure compliance
Follow rates of CDI, 30 days-readmission, and CDI complications

Educate:
City-wide prevention toolkit
Local production of a movie for environmental services staff

Execute:
Hospital-based multidisciplinary teams
Identification of local champions for intervention implementation


Rochester Patient Safety Collaborative
**Infection Prevention Protocols**
- Equipment grid: who cleans what.
- Isolation timeline: When to d/c CDI isolation.

**Environmental:**
- Bleach based disinfectants
- ATP/UV-C
- Daily and terminal cleaning protocols

**Appropriate Testing:**
- Found testing is inappropriate is up to 25% of patients.
  - Educate staff on definition of diarrhea.
  - Guidelines for stool testing developed.

**Antimicrobial Stewardship**
- Tiered algorithm for treatment
“Without Data You’re Just Another Person With an Opinion.”

W. Edwards Deming
Community Results

Results – Change in Hospital Onset CDI

36% decrease during 2015 as compared to baseline

http://www.rochesterpatientsafety.com/
Community Results

Cost Saving
- 154 fewer cases
- Total for 4 Hospitals
  - ~$ 0.9-1.4 million

LOS Reduction*
- ~ 3-12 days
- Total for 4 Hospitals
  - 462 – 1,848 days

*LOS: length of stay

RGH CMS Data:
Risk adjusted for Facility size, medical school affiliation, community onset cases, lab type used.

Statistical Reductions sustained for 3 consecutive years

- **2013 SIR: 0.846**
  - P value **0.0319**
  - 15% less cases than predicted

- **2014 SIR: 0.722**
  - P value **0.000**
  - 28% less cases than predicted

- **2015 SIR: 0.698**
  - P value **0.000**
  - 30% less cases than predicted
RGH NYS Data:

Risk adjusted for CDI risk index, days at risk, lab type used. *(Limitations to this method)*

- 63% rate reduction from 2011-2015
- P value: <0.0001
- Sustained for 3 consecutive years!
Summary

Novel measurable technologies using UV-C, as the R-D Rapid Disinfector, combined with a comprehensive CDI prevention bundle can contribute to the reduction of Healthcare Acquired Infections!
Questions?