Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting

Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School

A Webber Training Teleclass

---

**Disclaimer**

The content of this presentation is solely the responsibility of the speaker and does not necessarily represent the official view of Harvard Catalyst, Harvard University, its affiliate academic healthcare centers, or its corporate contributors.

---

**Disclosure**

The speaker has no relevant disclosure

---

**Outline**

- The scope of the *Clostridium difficile* Infection (CDI)
- Preventive measure to reduce risk of transmission in healthcare settings
- Important role of the environment in CDIs
- Efficacy (or lack thereof) of routine cleaning of hospital room surfaces
- “Touchless” technologies as an adjunct to terminal cleaning and disinfection of hospital rooms
- Impact of intensive cleaning and disinfection on hospital CDI rates
- Conclusions

---

**C. difficile Colitis**

---

**C. difficile**

---

Hosted by Dr. Pierre Parneix, Bordeaux, France

www.webbertraining.com
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting
Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School
A Webber Training Teleclass

The Scope of *C. difficile* Infection (CDI)

- CDI is the most common cause of nosocomial diarrhea in the industrialized world
- In some regions of the U.S., CDI incidence is higher than MRSA healthcare-associated infections
- CDI is the most common infectious cause of diarrhea in nursing homes
- 94% of CDI cases in the U.S. are healthcare-associated

The Scope of CDI

- CDI incidence has increased significantly in many countries
  - U.S.: 300% increase in the number of hospital days related to CDI from 1993-2008 (~1% of hospitalizations)
  - Austria: 255% increase in the rate of hospital-associated cases from 2003-2008
  - Spain: ~300% increase in the rate of hospital-associated cases from 1999-2007

Severity and Burden of CDI

- U.S.
  - 5x increase in mortality (1993-2008)
  - Longer hospitalization (8 days more than average)
  - Excess healthcare cost: $5,000-$7,000/case
  - Annual cost ~ $1 billion
- Europe
  - Estimated annual cost to E.U.: € 3 billion

Prevention of CDI

- Improving antibiotic stewardship
- Early and reliable detection of CDI
- Infection control precautions in the care of patients with CDI
  - Private room if possible
  - Gown and gloves
  - Strict hand hygiene
  - Environmental source control

Contamination of the Environment and Transmission of Pathogens in Healthcare Settings

Hosted by Dr. Pierre Parneix, Bordeaux, France
www.webbertraining.com
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting
Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School
A Webber Training Teleclass

**C. difficile** and the Hospital Environment
- Patients with CDI can excrete up to 1 billion microorganisms/g of feces
- Asymptomatic patients may also contribute to environmental contamination
- Importance of spores
  - Not destroyed by usual detergents
  - Survive alcohol hand disinfectants

**Environmental Contamination of C. difficile**
- Room contamination rate (Moharir et al. NEJM 1989;320:204-210)
  - 49% of rooms of symptomatic patients
  - 29% of rooms of asymptomatic patients
- Frequency of room surface contamination
  - Often range from 10%-50%; level correlates with frequency of *C. difficile* acquisition (Weber DJ et al, AJIC 2013;105S-110)
  - BP cuffs 10% contamination rate (vs. 11.5% for bedside commodes) likely related to "overgloving" (Manian FA et al. ICH 1996;17:180-182)
- High rate of contamination prior to treatment as well as at the time of resolution of diarrhea (37%), lower at end of treatment, but increased again at 1-4 weeks after treatment (30%) (Sethi AK et al. ICH 2010;1:21-27)

**Environmental Contamination and Hands of Personnel**
- Strong correlation between intensity of environmental contamination and hand contamination (Weber DJ et al, AJIC 2013;105S-110)

<table>
<thead>
<tr>
<th>Environment contamination</th>
<th>Hand contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25%</td>
<td>0%</td>
</tr>
<tr>
<td>26-50%</td>
<td>8%</td>
</tr>
<tr>
<td>&gt;50%</td>
<td>36%</td>
</tr>
</tbody>
</table>

**How good are we at cleaning hospital rooms?**

**Improving Cleaning of the Environment Surrounding Patients in 36 Acute Care Hospitals**

Philip C. Catling, MD, Michael M. Force, MD, Mark H. Suski, MD, Lewis C. McPhee, MD, Debra Whalen, MD, MPH, for the Marklund Environmental Hygiene Study Group

- The prevalence of *C. difficile* was higher among hand holders compared to the rest of the hand holders.
- A significant correlation was observed between the proportion of *C. difficile* contamination and the hand holders.
- The authors concluded that improving cleaning practices in hospitals could significantly reduce the spread of *C. difficile*.

Hosted by Dr. Pierre Parneix, Bordeaux, France
www.webbertraining.com
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting

Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School

A Webber Training Teleclass

Environmental Cleaning in Acute Care Hospitals

Carling PC et al. ICHIE 2008;29:1035-41

- Before and after intervention study
- Efficacy of cleaning evaluated
- Fluorescent targeting method
- “High-touch”/“high-risk objects” only
- No microbiological data
- “Structured educational/procedural intervention”
- Feedback to personnel
- “Group one-on-one teaching”

Impact of Terminal Cleaning on Room Surface Contamination with VRE and *C. difficile*.


- Single center, VA hospital
- Adequacy of cleaning of newly-vacated rooms of *C. difficile* and VRE positive patients
- Commonly touched items (i.e. bedrails, phones, call buttons, etc...) targeted
- Before and after housekeeping staff received education and feedback
- 10% bleach for all *C. difficile* rooms

Standard Procedure Before Intervention

Eckstein BC et al. BMC infect Dis 2007

- No significant difference in the rate of VRE — or *C. difficile* positive rooms before vs after housekeeping cleaning (94% vs. 71%, 100% vs 78%, respectively) despite recent *C. difficile* outbreak in the setting of:
  - 2 yr old policy of cleaning *C. difficile* rooms with bleach
    - Inservices emphasizing the importance of cleaning in preventing transmission of *C. difficile*
  - Instruction on the use of 10% bleach for terminal disinfection of *C. difficile* rooms
  - Stressing the cleaning of the frequently touched objects high touch items
  - Periodic contact with housekeeping staff to reinforce the bleach disinfection policy

Research article

Reduction of *Clostridium difficile* and vancomycin-resistant *Enterococcus* contamination of environmental surfaces after an intervention to improve cleaning methods

Brittany C. Eckstein1, Daniel A. Adams1, Elizabeth C. Eckstein2, Agam Rao3, Ajay K Seth1, Cepola K Yadavalli4, and Curtis J. Donskey5,6

*1*Infectious Disease Service, James A. Baker III Department of Medicine, VA Central Texas Health Care System, and Internal Medicine Residency Program, Baylor College of Medicine, Houston, Texas, USA. *2*Department of Epidemiology and Biostatistics, University of Illinois-Chicago, Chicago, Illinois, USA. *3*Department of Internal Medicine, Ohio State University Wexner Medical Center, Columbus, Ohio, USA. *4*Department of Medicine, Washington University School of Medicine, St. Louis, Missouri, USA. *5*Department of Medicine, University of Virginia School of Medicine, Charlottesville, Virginia, USA. *6*Department of Internal Medicine and Infectious Disease, Mayo Clinic Arizona, Phoenix, Arizona, USA.


- Single center, VA hospital
- Adequacy of cleaning of newly-vacated rooms of *C. difficile* and VRE positive patients
- Commonly touched items (i.e. bedrails, phones, call buttons, etc...) targeted
- Before and after housekeeping staff received education and feedback
- 10% bleach for all *C. difficile* rooms

Hosted by Dr. Pierre Parneix, Bordeaux, France

www.webbertraining.com
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting

Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School

A Webber Training Teleclass

---

**Eckstein BC et al. BMC Infect Dis 2007**

**Impact of Intervention on Surface Cultures**

Eckstein BC et al. BMC Infect Dis 2007

- Intervention: more education/feedback on adequacy of cleaning etc...
- Outcome
  - 0% of the 10 rooms cultured had VRE
  - 20% of the 10 rooms still had 1 or more *C. difficile* contaminated surfaces

---

**Is 20% rate of persistent *C. difficile* contamination of patient rooms “good enough”?

---

**Evaluation of Hospital Room Assignment and Acquisition of *C. difficile* Infection**


- Retrospective cohort study, 2005-2006
- All patients evaluated for diagnosis of CDI 48 h after ICU admission and within 30 days after ICU discharge
- Examined many risk factors incl. age, APACHE score, antibiotics, proton pump inhibitor use, and prior room occupant with CDI
- Results
  - Strongest risk factor for acquisition of CDI in a multivariate analysis (Hazard ratio 2.351.21-4.54) was room previously occupied by CDI patient
  - Admission to room previously occupied by CDI 11% vs 4.6% not previously occupied by CDI

---

**Shaughnessy MK, et al. ICHE 2011;32:201-206**

**Table 1: Multivariate Analysis of Risk Factors for Acquisition of *Clostridium difficile* Infection**

<table>
<thead>
<tr>
<th>Factor</th>
<th>HR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room previously occupied by CDI</td>
<td>2.35 (1.21-4.54)</td>
</tr>
<tr>
<td>Proton pump inhibitor use</td>
<td>1.21 (1-3.56)</td>
</tr>
<tr>
<td>Age</td>
<td>1.00 (1-1.00)</td>
</tr>
<tr>
<td>APACHE score</td>
<td>1.00 (0.99-1.00)</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>1.00 (1-2.00)</td>
</tr>
<tr>
<td>Prior hospital admission</td>
<td>1.00 (0.50-2.00)</td>
</tr>
<tr>
<td>Chronic disease</td>
<td>1.00 (0.50-2.00)</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1.00 (0.50-2.00)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.00 (0.50-2.00)</td>
</tr>
<tr>
<td>Cancer</td>
<td>1.00 (0.50-2.00)</td>
</tr>
<tr>
<td>Prior admission</td>
<td>1.00 (0.50-2.00)</td>
</tr>
<tr>
<td>Prior history of CDI</td>
<td>1.00 (0.50-2.00)</td>
</tr>
</tbody>
</table>

---

Hosted by Dr. Pierre Parneix, Bordeaux, France

[www.webbertraining.com](http://www.webbertraining.com)
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting

Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School

A Webber Training Teleclass

**Are there alternative ways of decontaminating hospital rooms?**

**“Touchless” Disinfection Technologies**

- Hydrogen peroxide vapor
- Ultraviolet light

**Potential Advantages of “Touchless” Disinfection Technology**

- Consistent disinfection regardless of case load, “urgency”; less likely to be hurried through
- Not affected by “human factors”
- Clinical/electronic equipment disinfection
- No risk of spreading pathogens from one area to another in the room
  - After 1 round of cleaning/disinfection with bleach, several previously culture negative sites grew MRSA or *Acinetobacter baumannii* complex (Manian FA et al. ICHE 2011;32:667-72)

**Hydrogen Peroxide Vapor/Dry Mist vs Selected Pathogens**

<table>
<thead>
<tr>
<th>Type of study</th>
<th>Pathogens</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental (HPV) (J Clin Microbiol 2009)</td>
<td>MRSA/VRE/AEC/ <em>C. difficile</em></td>
<td>6-7 log CFU/ all inactivated within 90 min-exposure</td>
</tr>
<tr>
<td>In situ (dry mist) (J Hosp Infect 2008)</td>
<td><em>C. difficile</em></td>
<td>24% room sites + post 1 x C/D (1% hypochlorite) vs 3%</td>
</tr>
<tr>
<td>In situ (dry mist) (ICHE 2009)</td>
<td><em>C. difficile</em></td>
<td>12% sites post C/D 0.5% hypochlorite) vs 1%</td>
</tr>
<tr>
<td>In situ (HPV) (J Hosp Infect 2004)</td>
<td>MRSA</td>
<td>Standard: 66% + sites HPV 1.2% + sites</td>
</tr>
</tbody>
</table>

**Hydrogen Peroxide Vapor Disinfection of Vacated Rooms**

**But does it impact CDI rates?**

Hosted by Dr. Pierre Parneix, Bordeaux, France

www.webbertraining.com
**Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting**

**Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School**

**A Webber Training Teleclass**

---

**Impact of Hydrogen Peroxide Vapor Room Decontamination on *Clostridium difficile* Environmental Contamination and Transmission in a Healthcare Setting**


- Single center, university-affiliated hospital
- Prospective before-after intervention study
- Epidemic strain of *C. difficile*
- Intervention: hydrogen peroxide vapor (HPV) decontamination of 5 high-incidence wards, followed by hospital-wide decontamination of rooms vacated by patient with CDI

---

**An Evaluation of Environmental Decontamination With Hydrogen Peroxide Vapor for Reducing the Risk of Patient Acquisition of Multidrug-Resistant Organisms**


- Microbiological sampling of surfaces
  - 11/43 (25.6%) of surfaces grew *C. difficile* before HPV decontamination
  - 0/37 of surfaces grew *C. difficile* after HPV decontamination
- CDI incidence among hospitalized patients
  - 5 “high-incidence” wards, dropped significantly (1.28 vs 2.28 cases/1000 patient-days, P=0.047)
  - Hospital wide dropped but not significantly (0.84 vs 1.36 cases/1000 patient-days, P=0.26)

---

**An evaluation of environmental decontamination with hydrogen peroxide vapor for reducing the risk of patient acquisition of multidrug-resistant organisms.**


- Single center, tertiary care hospital
- 30-month prospective cohort intervention study
- 6 “high-risk” units
- Standard cleaning with hydrogen peroxide-containing liquid cleaner/disinfectant used for rooms of patient with CDI
- Intervention: HPV used in addition to standard cleaning/disinfection
- 12 month pre-intervention phase (Jan-Dec, 2007) vs. 18 month intervention phase (1.2008-6.2009)

---

Hosted by Dr. Pierre Parneix, Bordeaux, France
www.webbertraining.com
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting

Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School

A Webber Training Teleclass

An evaluation of environmental decontamination with hydrogen peroxide vapor for reducing the risk of patient acquisition of multidrug-resistant organisms


• Conclusions
  
  – HPV decontamination used as an adjunct to standard cleaning and disinfection reduced the risk of MDRO acquisition among high-risk patients when patients are admitted to a room previously occupied by a patient infected or colonized with an MDRO
  
  – HPV in addition to a thorough infection prevention program should be implemented in high-risk environments to maximize patient safety

Implementation of hospital-wide enhanced terminal cleaning of targeted patient rooms and its impact on endemic *Clostridium difficile* infection rates

Manian FA et al. AJIC 2013;41:537-41

• Single center, 900-bed tertiary care community teaching hospital
  
  • Hospital wide (not just “high-risk” units); Pediatrics and Rehabilitation units excluded
  
  • Performed in the absence of an outbreak i.e. impact on endemic rate
  
  • Quasi-experimental: CDI rates before and after intervention
  
    
    – Intervention: 1.2009-12.2009, 196,313 hospital days

Intervention Phase

Manian FA et al. AJIC, 2013

  – Occupied rooms: daily cleaning with bleach
  
  – Newly-vacated rooms: 1 round of cleaning with bleach followed by HPV disinfection
  
  – Use of a priority scale for daily selection of rooms for HPV disinfection

Priority Scale for Daily Implementation of HPV for Terminal Disinfection of Hospital Rooms

Manian FA et al. AJIC, 2013

1. All MDRABC+ (multi-drug resistant *Acinetobacter*) rooms
2. All burn unit rooms
3. For all other rooms use a scoring system based on the targeted pathogen and location of room in the hospital
**Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting**

Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School

**A Webber Training Teleclass**

### Priority Scale for Daily HPV Decontamination of Newly-Vacated Hospital Rooms: Scoring System

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targeted pathogen</td>
<td></td>
</tr>
<tr>
<td>C. difficile *</td>
<td>4</td>
</tr>
<tr>
<td>MRSA</td>
<td>4</td>
</tr>
<tr>
<td>VRE</td>
<td>4</td>
</tr>
<tr>
<td>Other MDROs</td>
<td>1</td>
</tr>
</tbody>
</table>

*Location of room*

<table>
<thead>
<tr>
<th></th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICUs</td>
<td>2</td>
</tr>
<tr>
<td>Oncology</td>
<td>1</td>
</tr>
</tbody>
</table>

*4 rounds of cleaning/disinfection with bleach if unable to use HPV*

---

### Rates (% of Contaminated Rooms Newly-Vacated by MDRABC+ Patients Following 4x Cleaning/Disinfection

(Manian FA et al. ICHE 2011;32:667-72)

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABCpos</td>
<td>26.6</td>
</tr>
<tr>
<td>MRSApos</td>
<td>14.1</td>
</tr>
<tr>
<td>ABC+MRSA</td>
<td>16.4</td>
</tr>
</tbody>
</table>

---

### Implementation of hospital-wide enhanced terminal cleaning of targeted patient rooms and its impact on endemic *Clostridium difficile* infection rates

Manian FA et al. AJIC, 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2009: Pre 0.88 vs post 0.55, -37%, P=0.0001

---

### Frequency of HPV Disinfection of Newly-Vacated Rooms by Pathogen

Manian FA et al. AJIC, 2013

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>MDRABC, 89/89</th>
<th>CD, 180/334</th>
<th>VRE, 75/438</th>
<th>MRSA, 130/723</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
<td>54%</td>
<td>17%</td>
<td>19%</td>
</tr>
</tbody>
</table>

---

### Hand Hygiene Compliance Rates

Manian FA et al. AJIC, 2013

<table>
<thead>
<tr>
<th>Month</th>
<th>Compliance Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-June</td>
<td>Pre-Interv</td>
</tr>
<tr>
<td>31,213</td>
<td>Post-Interv 18,928</td>
</tr>
<tr>
<td>Jan-Dec</td>
<td>Pre-Interv 15,693</td>
</tr>
<tr>
<td>P&lt;0.5 steakh, 0.6 non-steakh</td>
<td></td>
</tr>
</tbody>
</table>

---

*But what about other factors?*

---

Hosted by Dr. Pierre Parneix, Bordeaux, France

www.webbertraining.com
Study Limitations

- Not a randomized controlled or concurrent cohort study
- Study did not involve nosocomial colonization/acquisition rates
- Only assessed impact of intensive terminal cleaning and disinfection in the setting of relatively high compliance with hand hygiene and isolation precautions.
- Single center

Conclusion

“Implementation of an enhanced hospital-wide terminal cleaning program* revolving around HPV decontamination of targeted hospital rooms was practical, safe, and associated with a significant reduction in the endemic rate of CDAD at our hospital”

*46% of CDI rooms cleaned and disinfected manually with 4 rounds of bleach

UV Light Disinfection

- Reduces C. difficile spore counts on surfaces by 2-4 logs (Boyce JM et al. ICU 2011;32:737-742)
- Surfaces must be in direct path of the UV light for optimal disinfection
- Shorter disinfection time
- No need for constant monitoring
- No studies demonstrating clinical efficacy in reducing transmission of C. difficile in healthcare settings
Comparison of the Microbiological Efficacy of Hydrogen Peroxide Vapor and Ultraviolet Light Processes for Room Decontamination

Nancy L. Hant, M.D. Bessie A. Mosen, Ph.D. John M. Boyle, M.D.

OBJECTIVE: To compare the microbiological efficacy of hydrogen peroxide vapor (HPV) and ultraviolet irradiation (UV) for room decontamination.

METHODS: Prospective observational study.

RESULTS: 190-bed teaching hospital.

METHODS: HPV and UV processes were performed in 11 patient rooms. Five high-touch sites were sampled before and after the processes and monthly sodium hypochlorite (SHC) were done. Carrier disks with 10^8 CFU Clostridium difficile (C. difficile) spores were placed in 5 sites before decontamination. After decontamination, all log reductions were determined and the samples recorded as growth or no growth.

RESULTS: 99% of HPV samples that had growth before HPV did not have growth after HPV, whereas 50% of sites that had growth before UV did not have growth after UV (C. difficile). The mean 6-log reduction was 2.5-log reduction for HPV and 1.8-log reduction for UV. After 2775 HPV of the 2781 samples did not grow and 18% did not grow after UV, with a range of 75-100%. For the 2781 HPV, 99% did not grow after HPV and 98% did not grow after HPV. The rate of these sites of growth were significantly more for the HPV after HPV. The sites of growth were significantly more for the HPV after HPV, with the rate of all HPV samples was 99%. The rate of all UV samples was 99% for the HP samples. HPV was significantly more effective than UV for rooms.

Manian, MGH

15 hospital rooms
• Carrier disks with ~1 M C. difficile spores place on 5 sites (overbed table, chair, floor under bed, toilet seat, shower floor)
• HPV 6-log reduction in C. difficile spores, all sites
• UV 2.2 log reduction in C. difficile spores
• 6-log reduction in biological indicator in 99% of HPV vs 0% for UV
• UV less effective for sites that are out of direct line of sight

Manian, MGH

So Does Enhanced Environmental Cleaning in Controlling Clostridium difficile Infections in the Hospital Setting Really Matter?

I Believe it Does!

Patient Room: a Hospital Area in Need of Disinfection: The Neglected Giant H.A.N.D?

Conclusions
• C. difficile infection is an important cause of healthcare associated infections
• Environmental contamination due to C. difficile is common and may serve as source of infection either directly or via hands of personnel
• Standard terminal cleaning of hospital rooms is often inadequate
• Intensive cleaning and disinfection may reduce the risk of CDI in hospitalized patients
Enhanced Environmental Cleaning in Controlling *Clostridium difficile* Infections in the Hospital Setting
Prof. Farrin A. Manian, Massachusetts General Hospital & Harvard Medical School
A Webber Training Teleclass

Next Up:

**October 16**
HEALTHCARE LAUNDRY: EPIDEMIOLOGY AND MICROBIOLOGY ISSUES
Dr. Lynne Sehulster, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention

**October 23**
INFECTION PREVENTION IN OUTPATIENT ONCOLOGY SETTINGS
Dr. Alice Guh, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention

**November 5** (Free WHO Teleclass – Europe)
PUBLIC REPORTING AND DISCLOSURE OF HAI RATES: POSITIVE IMPACT OR CONFUSION?
Dr. Michael Borg, St. Luke’s Hospital, Malta
Sponsored by the World Health Organization

**November 6** (Free Teleclass)
CBIC IS MAKING THE CERTIFICATION PROCESS WORK FOR ALL!
Craig N Gilkens and Lita Jo Henman, Certification Board of Infection Control

Thanks to Teleclass Education
**Patron Sponsors**

Hosted by Dr. Pierre Parneix, Bordeaux, France
www.webbertraining.com