Driving Sustainable Change in Hand Hygiene -
The Problem We Only THINK We Solved

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Chairman EHCO, The Electronic Hand Hygiene Compliance Organization, Inc. A Non Profit Organization
All studies and papers cited are available here: http://www.ehcohealth.org/category/the-evidence/

• APIC (Association of Professionals in Infection Control and Epidemiology) Member
• IDSA (Infectious Diseases Society of America) Member
• WHO (World Health Organization) Private Organizations for Patient Safety (POPS) Member


The HAI Problem and Population Impact

During the hour we are together – 80 patients will get an HAI and of those, 9 will die!

FATALLY FACT:
Every year in the US, more than 700,000 patients contract an avoidable infection known as a *Healthcare-associated infection (HAI)*, and of those 75,000 will die.¹

¹CDC Data
INDIANA
ACUTE CARE HOSPITALS

Healthcare-associated infections (HAIs) are infections patients can get while receiving medical treatment in a healthcare facility. Working toward the elimination of HAIs is a CDC priority. The standardized infection ratio (SIR) is a summary statistic that can be used to track HAI prevention progress over time; lower SIRs are better. The infection data are reported to CDC’s National Healthcare Safety Network (NHSN). HAI data for nearly all U.S. hospitals are published on the Hospital Compare website. This report is based on 2014 data, published in 2016.

CLABSIs

CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS
When a tube is placed in a large vein and not put in correctly or kept clean, it can become a way for germs to enter the body and cause deadly infections in the blood.

- Indiana hospitals reported a significant decrease in CLABSIs between 2013 and 2014.
- Among the 59 hospitals in Indiana with enough data to calculate an SIR, 7% had an SIR significantly higher (worse) than 0.50, the value of the national SIR.

CAUTIs

CATHETER-ASSOCIATED URINARY TRACT INFECTIONS
When a urinary catheter is not put in correctly, not kept clean, or left in a patient for too long, germs can travel through the catheter and infect the bladder and kidneys.

- Indiana hospitals reported a significant decrease in CAUTIs between 2013 and 2014.
- Among the 70 hospitals in Indiana with enough data to calculate an SIR, 6% had an SIR significantly higher (worse) than 1.00, the value of the national SIR.

MRSA Bacteremia

LABORATORY IDENTIFIED HOSPITAL-ONSET BLOODSTREAM INFECTIONS
Methicillin-resistant Staphylococcus aureus (MRSA) is a bacteria usually spread by contaminated hands, in a healthcare setting, such as a hospital, MRSA can cause serious bloodstream infections.

- Indiana hospitals reported no significant change in MRSA bacteremia between 2013 and 2014.
- Among the 45 hospitals in Indiana with enough data to calculate an SIR, 7% had an SIR significantly higher (worse) than 0.87, the value of the national SIR.

SSIs

SURGICAL SITE INFECTIONS
When germs get into an area where surgery is or was performed, patients can get a surgical site infection. Sometimes these infections involve only the skin. Other SSIs can involve tissues under the skin, organs, or implanted material.

SSI: Abdominal Hysterectomy
- Indiana hospitals reported no significant change in SSIs related to abdominal hysterectomy surgery between 2013 and 2014.
- Among the 20 hospitals in Indiana with enough data to calculate an SIR, 5% had an SIR significantly higher (worse) than 0.83, the value of the national SIR.

SSI: Colon Surgery
- Indiana hospitals reported no significant change in SSIs related to colon surgery between 2013 and 2014.
- Among the 50 hospitals in Indiana with enough data to calculate an SIR, 6% had an SIR significantly higher (worse) than 0.98, the value of the national SIR.

C. difficile Infections

LABORATORY IDENTIFIED HOSPITAL-ONSET C. DIFFICILE INFECTIONS
When a person takes antibiotics, good bacteria that protect against infections are destroyed for several months. During this time, patients can get sick from Clostridium difficile (C. difficile), bacteria that cause potentially deadly diarrhea, which can be spread in healthcare settings.

- Indiana hospitals reported no significant change in C. difficile infections between 2013 and 2014.
- Among the 94 hospitals in Indiana with enough data to calculate an SIR, 11% had an SIR significantly higher (worse) than 0.92, the value of the national SIR.
accurate

"Without data you're just another person with an opinion."

- W. Edwards Deming, Data Scientist
The Pitfalls of Direct Observation as A Measurement Tool (Excellent for Many Other Applications)

- Hawthorne effect – overstates compliance rates by up to 300%
- Small sample size not statistically reliable
- Lack of accurate data and timely feedback essential to drive behavior change
- Observer bias
- Lack of inter rater reliability
The Limitations of Direct Human Direct Observation (DO) for Measurement of HHC

Srigley et al demonstrated, in 2014, that HCWs were 3x more likely to clean hands when in the line of sight of a direct observer! A 300% Hawthorne Effect.
Ontario hospital staff not washing hands as often as reported: study

Infection control experts find boasts of 90% compliance are greatly exaggerated. When workers aren’t monitored, hand-washing plummets.
Think about this...

- First, Do No Harm? Then why do we allow “Secret Shoppers” to observe the care of patients with unclean hands....and not do anything to stop it!

*Is this ethical?*

*If not, what are we going to do about it?*

*What are YOU going to do about it?*

*Is this a “stop the line” moment?*
Juxtaposed Roles – DO + E Monitoring => the New Gold Standard? What one hospital system is doing...

- The New Paradigm will likely be to de-couple DO from measurement – and use it for what it is best at –
  - Real Time Coaching and Feedback
  - Obstacle and Barrier Identification
    - As the Basis for Action Planning to Remove Them
  - Technique Assessment
- Enhancing DO with E Monitoring as was presented at SHEA 2016 by Kelly et al
Combination of Direct Observation with E-Monitoring Data

Combines the use of the Direct Observation as a coaching and mentoring tool with feedback using compliance data from the Electronic Monitoring System to drive improvement in HHC on all 4 units in the study.

Paper Presented at SHEA 2016

Connie will talk about the results shortly...
This article reinforces this new paradigm with an article by John Boyce.
Electronic HH Compliance Measurement Can Make a Critical Difference (the first major/disruptive change in HH since Alcohol Based Hand Rubs were introduced)

• Electronic data collection captures 100% of hand hygiene events (HHE) and eliminates the Hawthorne effect

• Visibility to compliance rates 24 / 7 / 365

• Accurate and reliable data provides insight for targeted intervention and continuous improvement – complacency when rates are artificially overstated is eliminated; instead a sense of urgency to improve spurs culture and behavior change
The Improvement Imperative with Hospital Acquired Condition (HAC) Penalty Changes for 2017: MRSA and C Diff rates become part of the penalty calculation.
The E Monitoring Technology Universe – 3 Categories

1. **Group Monitoring** - Non Badge Based (Stand Alone)
2. **Individual or Group Monitoring** – Badge Based (Stand Alone)
3. **Individual or Group Monitoring** - Badge Based Enabled with a Real Time Locating System (RTLS) Infrastructure

Capable of Capturing 100% of HHEs and Eliminating the Hawthorne Effect along with the Practice of Secret Shoppers Seeing Non Compliance and Allowing Care to Proceed Anyway
Reports and Data may be at the Unit/Group or Individual Level Depending on Technology Platform and Mode Used

100% of Hand Hygiene Events Captured 24/7/365 Eliminating Bias, Hawthorne Effect and Unreliability of Direct Observation
The Evidence...

Real World Results That Demonstrate the Accuracy Along with the Clinical, Economic and Safety Culture Benefits of E Monitoring
Video Validation Study – Camera in Room
Accuracy Of Electronic HHC System Validated with Video Monitoring; Hawthorne Effect Proved (AJIC 2014)

Hand Hygiene Compliance Rates on Research Study Unit:
Direct Observation vs. Video Validation vs. Electronic Group Monitoring

Substantial Hawthorne Effect Revealed:
Compliance Rates with DO Overstated by as high as 47%

Final Quarter Hawthorne Effect = 47%

Video taping and Electronic Group Monitoring Rates are Statistically Equivalent for 12 straight months

Pearson correlation coefficient
Video Reality vs. E Monitoring = 0.976.  |  p-value = 0.004
Greenville Memorial Hospital

- 746-bed teaching hospital in Greenville, SC
- Connie Steed, IP
- Study conducted on 23 of their units
- 647 total beds; 87% of the total
- Those units/beds had both electronic hand hygiene compliance data and consistent MRSA surveillance during study period
- Results are for the 12 months post completion of the electronic monitoring implementation
Improved WHO Five Moment Compliance Reduces Infections (AJIC, 2016)

Five Moment Hand Hygiene Compliance Improvement

Compliance Before E Monitoring: 54.9%
Compliance After E Monitoring: 68.8%

25.5% Increase

MRSA Reduction

MRSA Rate per 1000 Pt. Days Pre E Monitoring: .381
MRSA Rate per 1000 Pt. Days Post E Monitoring: .267

42.8% Decrease

Cost Avoidance by Eliminated MRSA Infections > $433,000
CONCLUSIONS

Our data add to the increasing body of evidence that improved HHC is associated with decreased health care–associated infection. Of note, our study is unique in that we used unit-specific WHO5-based electronic monitoring to show unit-specific reductions in MRSA infections. In addition, we show that electronic monitoring of hand hygiene can lead to clinically important organizational change and, most importantly, improved patient safety.
Electronic Hand Hygiene Compliance and Hospital-Acquired MRSA Infection

Each circle is a unit’s data point for the overall study time frame

N=23 units

Conclusion: There is a statistically significant negative correlation between HHCI and MRSA infection rate, i.e., as HHCI increases, MRSA decreases.

Note: Solid line is regression line, dashed line is 96% confidence interval for regression line.
C Diff Reduction Study
(APIC, 2014; Prevention Strategist Q1 2017)

At the same teaching hospital, data on soap versus sanitizer usage provided by their e-monitoring system, resulted in significantly increased hand hygiene compliance along with the clostridium difficile (CDI) rate decreasing from 7.03/10,000 patient days to 2.38/10,000 patient days.

This was a 66% reduction in the C Diff Rate as a result of real time feedback from e monitoring data – How?
Real-Time Feedback Proven to Reduce C diff Rates

With E Monitoring, Real Time Feedback on Soap and Water vs Hand Sanitizer Use with C Diff Rooms Is Possible!
Real-Time Feedback Proven to Reduce C diff Rates

Staff can be told in real-time to switch from sanitizer to soap to ensure proper C diff protocol is followed – a proven way to reduce C diff.

Individual rooms/dispensers can be accessed to provide virtually real-time feedback on C Diff Protocol Compliance.
C. difficile Outbreak: Successful Control

- 32 bed Oncology unit during 2014
- 6 C. diff cases during 1 month – An increase from previous months where the average # of cases was 0-1/month.
- Hand hygiene (HH) observations found sanitizer use rather than soap and water.
- Used electronic monitoring system to show staff their HH with soap vs sanitizer for C. diff cases. Placed “do not use” signs on sanitizers.
- HH with soap and water increased to 94% quickly.
- Outbreak brought under control. Using the electronic monitoring data helped take quick action to improve. C Diff rate was reduced by 66%.
Riverside Medical Center Participates in MHA Health Foundation HIIN

300+ Beds Kankakee, IL
Martha Bouk, IP
Dec 2013 Commencement of Quality Improvement Initiative Focused on HH
MRSA Reduction/Penalty Elimination – APIC, 2016

Following implementation of an e-monitoring System:

• Hospital HHC increased from 57% in Dec 2013 to 79% in Sept 2015 – a 39% increase.

• Hospital onset MRSA rate dropped from 3.94 to 1.98 per 10,000 patient days – a 50% reduction.

• The facility paid no Readmissions penalties in 2015 and was one of only 7 hospitals in Illinois that paid no ACA related penalties in 2015. They had paid a 0.24% of CMS Revenue penalty in 2013
What to Look for in an E Monitoring System
What to Look for in an E-Monitoring Solution

**Must have criteria:**

✓ Capable of capturing 100% of all hand hygiene events (soap and sanitizer)
✓ Capable of room level reporting of soap vs. sanitizer use for C Diff control
✓ Includes a behavior change framework for how to use the data with front line staff to drive sustainable behavior change,
✓ Inherently fosters a “just culture” and “psychological safety”
✓ Validated Accuracy
✓ Evidence Based
What to Look for in an E-Monitoring Solution

Other Considerations – User Must Decide Based on What is Best for your Institution and Culture

✓ **Standard of Care** - Tracks World Health Organization (WHO) 5 Moments for Hand Hygiene or Wash in/Wash Out

✓ **Hand Hygiene Products Used** – Universal system (no product change required) or HH Brand Specific (requires specific brand)

✓ **Reporting Level** – Group, Individual or Both

✓ **Functionality** – Such as Gentle Reminder & Awareness Function; Auto Push Reports via E Mail

✓ **Infrastructure** - Stand Alone or RTLS Application

✓ **Financial** - Capital expense; subscription/annual fee model or hybrid
Putting It All Together

What is emerging as a “best practice” evidence based model for sustained hand hygiene compliance improvement when giving feedback based on e-monitoring? Here is what the latest outcomes tell us.
Organizational Learning

Feedback & Reinforcement

Support, Resources & Accountability

Local, Focused Implementation

Communication & Collaboratives

Frontline Staff Engagement

Fostering Change

Key elements of behavior change. Welsh, et.al. AJIC 2012;40(1):29
Building E Monitoring Data Use into the Safety Culture -

Evidence Based Practice for Driving Sustainable Behavior Change & Results

✓ Ensure top down leadership engagement is authentic and known by all
✓ Leadership models expected behaviors of compliance and psychological safety
✓ Foster psychological safety and promote a "just" safety culture
✓ Use DO for Unit Based feedback and real time barrier identification - then develop and agree on an action plans to remove them (DO’s and Secret Shoppers no longer “measure” HH.)
✓ Agree on unit specific improvement goals & celebrate all successes (The goal is progress vs. perfection)
✓ Give frequent feedback on performance – share the data daily – front line staff engagement is essential
✓ Make HHC improvement part of performance evaluation with routine reporting of results to senior leadership for facility wide feedback
Lessons Learned

• You can improve HH using electronic technology! The best approach is a combination of electronic monitoring and targeted direct observation (conducted by trained, unbiased observers).

• Direct observation needed to assess for barriers and to identify issues such as not cleaning hands after glove removal, work flow issues.

• Data denial. You have to deal with it! Address it up front.

• Vital to success is the culture on the unit and the leadership.
Lessons Learned (cont.)

• Involvement of the front line staff is important for buy-in and successful improvement. Helpful to assess stakeholders.

• Readily available data helps.

• Leadership buy-in: They want to know their return on investment: HAI reduction, improved patient safety. “Hands are weapons.”

• Accountability for HH compliance rates: We placed on report cards.
If you can’t measure it, you can’t improve it.

- Peter Drucker
Someday, Direct Observation/Secret Shoppers As Way to Measure Hand Hygiene Will Be As Obsolete As...
healthcare workers smoking in break rooms and doctors advertising cigarettes!!!
See our Evidence Road Map for A Compendium of Outcome Studies

Discussion and Questions?

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Thank you!
EHCO™
Electronic Hand-Hygiene Compliance Organization

EHCO™ is a not for profit consortium of healthcare technology companies that provide SMART (Systems that Measure Accurately and in Real-Time) hand hygiene compliance (HHC) systems.

Technology platform and hand hygiene product brand neutral when it comes to dealing with this patient safety and public health issue.

We are bringing the science and evidence to CMS/CMMI/PfP; TJC, CDC, APIC, SHEA, IDSA, DNV etc. in order to change the standards, guidelines and recommendations for how hand hygiene compliance is measured.
Our Ask

That Hand Hygiene Rates Be Reported Nationwide as measured with a validated system capable of 24/7/365 capture of all hand hygiene behavior.

That Secret Shoppers be required to intervene when hand hygiene is not performed prior to patient care.
Partnering for Public Health & Patient Safety