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

Hospital and Healthcare Association of Pennsylvania
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Paul Alper, BA chairman@EHCOhealth.org

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


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

FATALITY 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
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?
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...
Electronic monitoring in combination with direct observation as a means to significantly improve hand hygiene compliance

John M. Boyce MD *

J.M. Boyce Consulting, Inc., Middletown, CT

Monitoring hand hygiene compliance among health care personnel (HCP) is an essential element of hand hygiene promotion programs. Observation by trained auditors is considered the gold standard method for establishing hand hygiene compliance rates. Advantages of observational surveys include the unique ability to establish compliance with all of the World Health Organization "My 5 Moments for Hand Hygiene" initiative Moments and to provide just-in-time coaching. Disadvantages include the resources required for observational surveys, insufficient sample sizes, and nonstandardized methods of conducting observations. Electronic and camera-based systems can monitor hand hygiene performance on all work shifts without a Hawthorne effect and provide significantly more data regarding hand hygiene performance.
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 NEW CAUSE AND EFFECT CONTINUUM

MANDATORY IMPROVEMENT:

With significant cuts to reimbursement fees ($94B by 2022) and penalties for poor quality (CMS Penalties), continuous improvement is mandatory. When 100% of hand hygiene events are captured, compliance can improve, risk of infections and penalties are reduced and costs are avoided.
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: 0.381
- MRSA Rate per 1000 Pt. Days Post E Monitoring: 0.267
  - 42.8% Decrease

Cost Avoidance by Eliminated MRSA Infections > $433,000
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
‘Generic’ Example of How E Monitoring Works

Reports and Data may be at the Unit/Group or Individual Level Depending on Technology Platform and Mode Used

1) HH Events are Captured & Transmitted
2) Software Analyzes Data and Creates HH Reports
3) Dashboard With Reports and Data Are Available to Staff

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

Connie Steed, Director of IP for the Greenville Health System
Will Share her Journey
Greenville Health System Hand Hygiene: Our Journey to Improve

Connie Steed, MSN, RN, CIC, FAPIC
Director, Infection Prevention
Greenville Health System
Organization Overview

- GHS includes 7 hospital campuses in the Upstate South Carolina:
  - GMMC campus: 746 bed academic / tertiary hospital, rehab, and psychiatric hospitals, ambulatory surgery facility
  - OCMC: ~ 160 acute care beds, LTC facility
  - HMH: < 100 beds
  - GrMH: < 100 beds
  - PMC: < 100 beds short stay surgery hospital, ambulatory surgery facility
  - LCMH: < 100 beds
  - NG LTACH: 59 bed Long-Term Acute Care > 150 Ambulatory care sites
Hand Hygiene Background

• **2008 and prior years:** Direct observation with secret shoppers (unit staff). Consistent 95-100% compliance > 50 observers. Validity concerns.

• **2009 GHS wide hand hygiene initiative:** 2 RN Dedicated observers. Initial observations 53% and improve to ≥90%. Concern of Hawthorne effect and small number of observations.

• **2010-Present:** Electronic monitoring research and implementation. GHS Beta Test site for one of the E-monitoring systems now on the market. Assisted in the development of monitoring system including research to establish metrics and the formulas, validate the process and assess impact on HAIs.
Monitoring In and Out of Room HH Not Sufficient

Why?

- 35% of HHO occur inside the patient room and are missed with in and out measurement.

- HHOs inside the room are higher risk than those associated with entry and exit.

- Compliance rates are lower for moments 2 and 5.
Accuracy Of Electronic HHC System Validated; Hawthorne Effect Proved (AJIC 2014)

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

- Compliance Rates with DO Overstated by as high as 47%; 33% on Average

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

Pearson correlation coefficient Video vs. Reality vs. E Monitoring = 0.976 (p-value = 0.004)
Electronic Monitoring Implementation:

Focus on inpatient units and emergency rooms

- Pilot testing on targeted units, then spread to all GHS facilities.
- Education of managers first and those to have access to data; followed by frontline nursing staff.
  1. Push reports & 24/7 access to data.
  2. Process for communication of data to frontline staff, establishment of unit based action plans to improve hand hygiene (HH).
- HH compliance component of unit report card. Reviewed by unit team, including MD director, nursing and others.
- Infection prevention check in with units to monitor process/progress.
- Electronic system used to monitor compliance and communicate with staff.
Reports: Daily, Weekly, Monthly
E- Monitoring Dispenser Report
C. difficile Patient Room

Dispenser HH-Events Report
DAILY: Fri, May 13 2016 to Thu, May 19 2016

Graph Options

Pt placed in Precautions

Soap

Sanitizer

Graph Summary Table

Dispenser Summary Table
Unit-based / Team focus: Unit teams developed strategies and implemented them. HH improvement occurred.

Challenges for Implementation

- Data denial. People liked their direct observation numbers. Vital to helping with this was our validation study.

- Nursing staff felt they were too much of the focus. Why aren’t other areas assessed? Nursing staff 85% of HH opportunities on patient units. Key to success is the safety culture and leadership on the unit. People need to be able to talk to each other about their practices.

- Dispenser battery issues which have been resolved. Batteries now have 5-year life.
# Hand Hygiene Compliance

## Electronic Monitoring (GMH)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th># HH Events</th>
<th># HH Opportunities</th>
<th>% Compliance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2012-2013</td>
<td>9,495,225</td>
<td>18,790,753</td>
<td>50%</td>
</tr>
<tr>
<td>FY 2013-2014</td>
<td>12,182,993</td>
<td>20,936,813</td>
<td>58%</td>
</tr>
<tr>
<td>FY 2014-2015</td>
<td>13,519,934</td>
<td>20,890,758</td>
<td>65%</td>
</tr>
<tr>
<td>FY 2015-2016</td>
<td>14,457,651</td>
<td>21,971,621</td>
<td>66%</td>
</tr>
<tr>
<td>Oct 16-Mar 17</td>
<td>6,343,578</td>
<td>9,401,112</td>
<td>67.5%</td>
</tr>
</tbody>
</table>

## Direct Observation

<table>
<thead>
<tr>
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<th># HH Events</th>
<th># HH Opportunities</th>
<th>% Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2014-2015</td>
<td>2,485</td>
<td>2,754</td>
<td>90%</td>
</tr>
<tr>
<td>FY 2015-2016</td>
<td>2,384</td>
<td>2,562</td>
<td>93%</td>
</tr>
<tr>
<td>Oct 16-Mar 17</td>
<td>1,194</td>
<td>1,285</td>
<td>93%</td>
</tr>
</tbody>
</table>

*All years statistically significant improvement.
Have we impacted outcome?

- Marker for outcome improvement: MRSA infections
- Clusters/outbreaks of *C. difficile* and other MDROs. Using patient room level data.
GMH MRSA Study

Background

• 23 nursing units at GMH during April 2014 to March 2015.
• Predicted 81 MRSA infections if rates stayed the same from the pre-intervention period.
• Hand hygiene (HH) improved due to feedback reports from Electronic Monitoring System and unit-based improvements.

Findings

• Hand hygiene compliance improved from 54.9% to 68.8% (25.5% improvement).
• 57 MRSA infections occurred- meaning 24 infections were prevented.
• Total costs avoided=$433,644.00:
  – Actual excess costs avoided= $8668/ patient = $208,000.00
  – Avoided 108 excess LOS days = $2089.00/ day= $225,612.00
Electronic Hand Hygiene Compliance and Hospital-Acquired MRSA Infection

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

\[ N=23 \text{ units} \]

**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. 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.
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.
...A Few More Words About The Evidence...
...A Few More Words About
The Evidence...
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%

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

✓ Captures 100% of all hand hygiene events (soap and sanitizer)
✓ 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.
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
✓ 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 small successes (The goal is progress vs. perfection)
✓ Give frequent feedback on performance – share the data daily at first – 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
accurately and reliably

“If you can’t measure it, you can’t improve it.”

- Peter Drucker
See our Evidence Road Map for A Compendium of Outcome Studies

Discussion and Questions?

Paul Alper, Chairman, EHCO™
chairman@EHCOhealth.org

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 Nationally as measured with a validated system capable of 24/7/365 capture of all hand hygiene behavior
Partnering for Public Health & Patient Safety

AiRISTA FLOW

BIOVIGIL
Hand Hygiene Awareness

CleanHands SAFE HANDS

CENTRAK
Enterprise Location Services™

deb'med

ECOLAB

HALYARD
FORMERLY KIMBERLY-CLARK HEALTH CARE

SWIPE SENSE

VERSUS
Locating Advantages for Healthcare™

EHCO
ELECTRONIC HAND HYGIENE COMPLIANCE ORGANIZATION