

# A Lean Six Sigma Approach to Improving Accuracy of Manual Hand Hygiene Observations

Marci Drees, MD, MS<sup>1,2\*</sup>; Kathleen Bonis, RRT<sup>1</sup>; Krystal M. Coles, 6SMBB, MBA<sup>1</sup>; John Emberger RRT-ACCS FAARC CPHQ<sup>1</sup>;

Lauri L. Littleton, DNP, MSN, RN-BC, NE-BC<sup>1</sup>; Mark Mirage, BSEN, MBA, CLSSBB, CPHQ<sup>1</sup>;

Austin F. Mount-Campbell, PhD<sup>1</sup>; Carol A. Briody, MT (ASCP)<sup>1</sup>

1. ChristianaCare, Newark, DE; 2. Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia, PA.

\*Corresponding Author:  
mdrees@christianacare.org

## BACKGROUND

- Hand hygiene (HH) is widely regarded as the most important factor in preventing transmission of infections.
- Since 2012 our health system has utilized unit-based direct observation to measure HH compliance. Although direct observation is widely used and considered gold standard, the discrepancy between unit-based HH compliance and Infection Prevention validation HH audits was increasing over time.
- To understand the drift in HH compliance, we began a Lean Six Sigma (LSS) Green Belt project to improve unit-based HH observation accuracy.

## OBJECTIVES

- To determine factors leading to falsely elevated unit-based HH compliance reporting
- To increase the transparency and actionability of our unit-based HH monitoring program
- To increase frequency and transparency of IP validation HH audits
- To improve the accuracy of unit-based HH observations

## METHODS

**Study design:** Prospective performance improvement project

**Setting:** 2-hospital, >1200-bed community-based academic healthcare system in northern Delaware

**Interdisciplinary team:** Infection Prevention, Hospital Epidemiologist, Nursing (leadership & front line), Performance Improvement, Respiratory Care, Human Factors Engineer

### Define:

- Team members conducted in person & electronic surveys of observers and unit-based leaders to obtain Voice of Customer (VOC)
- Calculated cost of poor quality (COPQ) based on wasted RN/PCT time to perform observations that did not produce actionable data
- Human factors review of current process (in-person interviews)

### Measure:

- Created detailed process map
- Measured frequency and results of IP validation
- Calculated percentage of observers who had completed formal web-based training
- Estimated staff represented by HH observations, and unit leader HH dashboard use
- Calculated accuracy of unit-based observations (vs. IP observations)

### Analyze:

- Determined contributing factors to HH inaccuracy using cause & effect diagram, 5 Why's
- Ranked contributing factors using Failure Mode Effects Analysis (FMEA) & Impact Control Matrix
- Re-analyzed Process map using value-added/non-value-added & Kaizen bursts
- Tested theories (4) using available data

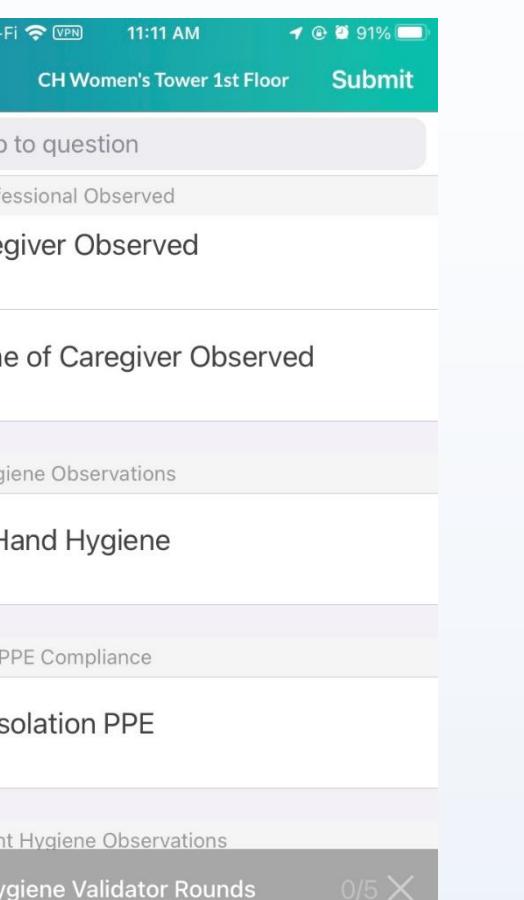


Figure 1. Screenshot of new mobile tool, available on desktop, phone or tablet

### Improve:

- Removed HH compliance rates & number from unit-based report card (frontline staff focusing on quantity, not quality, of observations)
- Moved from archaic observation web-form to new mobile-based Cipher Rounding tool (used throughout system for other rounds)
  - Created HH, PPE and equipment cleaning observation scripts
  - Cipher tool allows for real-time reporting in HH dashboard
  - Created IP validation scripts in same platform
- Revised and shortened web-based observation training module
- Created process to ensure all observers completed web-based training prior to having access to HH script
- Required IPs to perform weekly validation rounds on their units
- Developed weekly reports that are pushed to unit-based leaders

### Control:

- Ongoing audits of web-based education completion by observers
- Review IP validation requirements during quarterly staff reviews
- Created visual controls (job aids)
- Human factors review of revised process, guiding revisions
- Unit leaders continue to get weekly reports including number of observations & HH compliance; IP follows up if suboptimal

## RESULTS

### Baseline data:

- IP validation typically occurred < once per year; discrepancy between unit-based and IP compliance rates ranged from 32-41% (Fig 2)
- 75% of nurses and 68% of patient care techs (PCT) conducted observations without formal training
- Majority of HCP being observed were RNs and PCTs
- 29/40 nursing leaders did not access the HH dashboard at all (1 month sample)
- COPQ (wasted time alone) estimated at \$38,500/year – does not include cost of HAI, or potential regulatory penalties
- Detailed process map revealed multiple non-value-added steps (Fig 3)

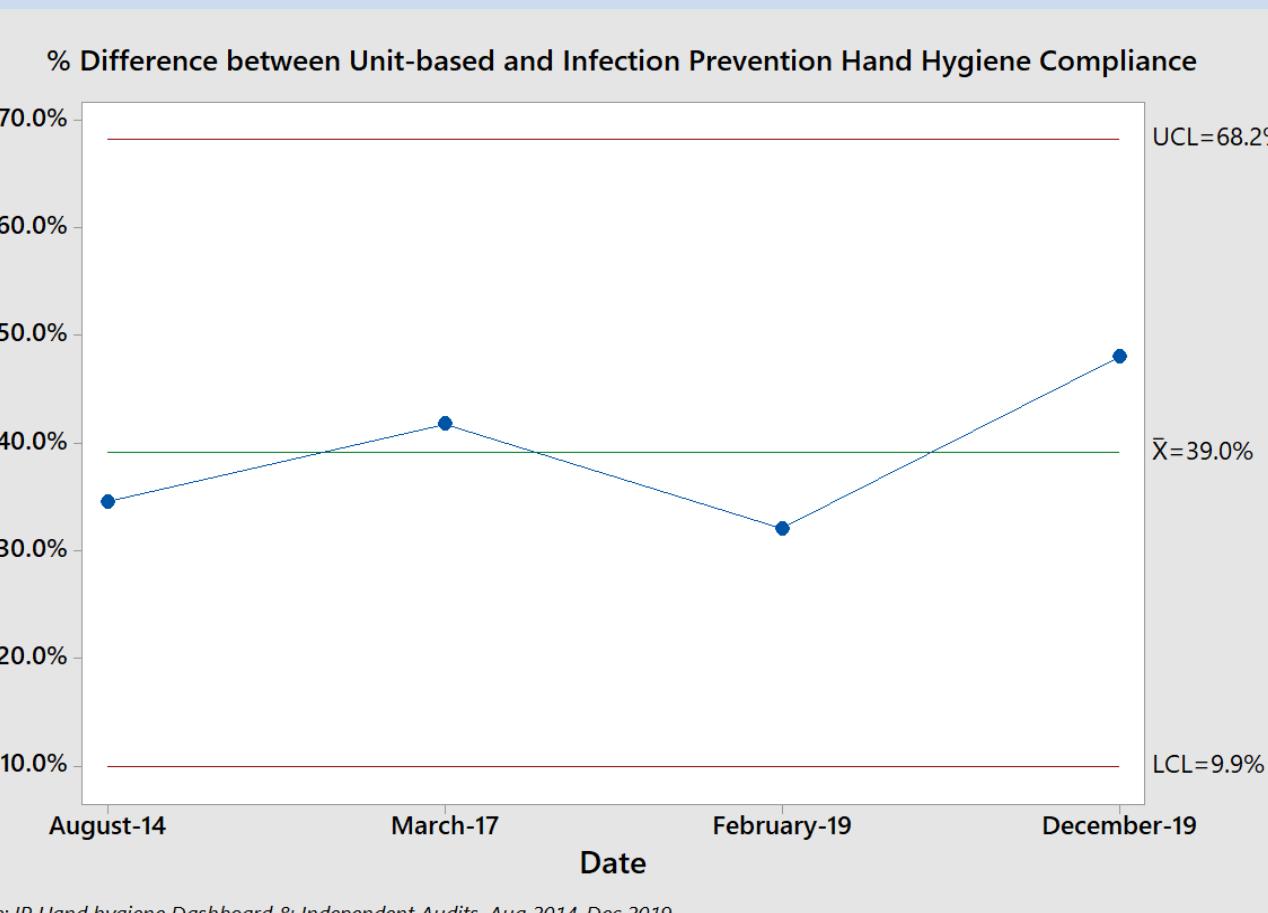


Figure 2. Baseline control chart, revealing infrequent IP validation & large discrepancy between unit-based and IP HH compliance rates.

Figure 3A-B. Detailed process maps (left, current state; right, updated process). Value-added steps in green, non-value-added but business required in yellow, non-value-added in red. Kaizen bursts noted in yellow explosions.

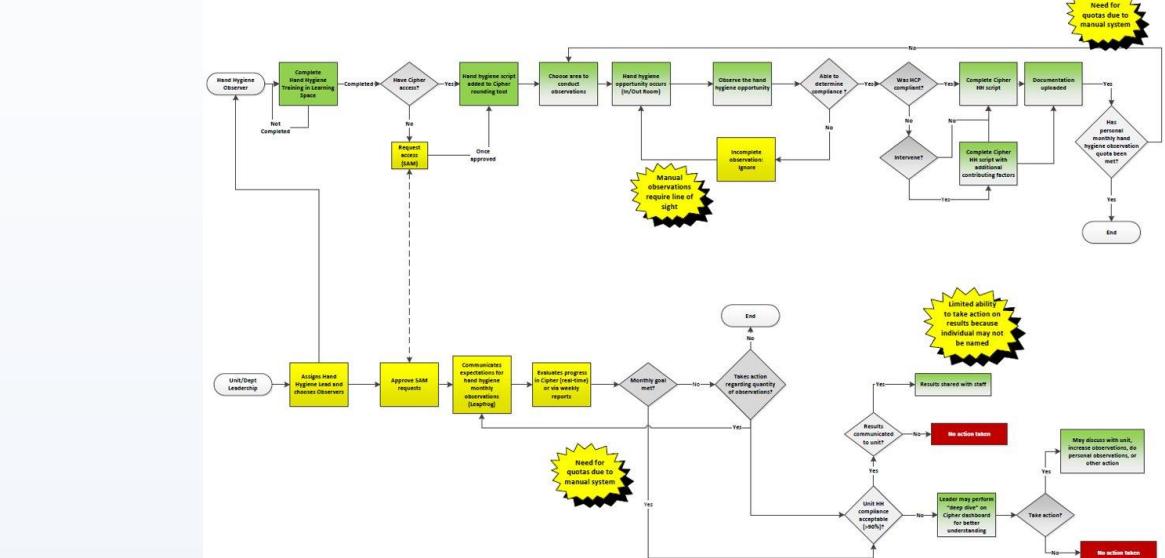
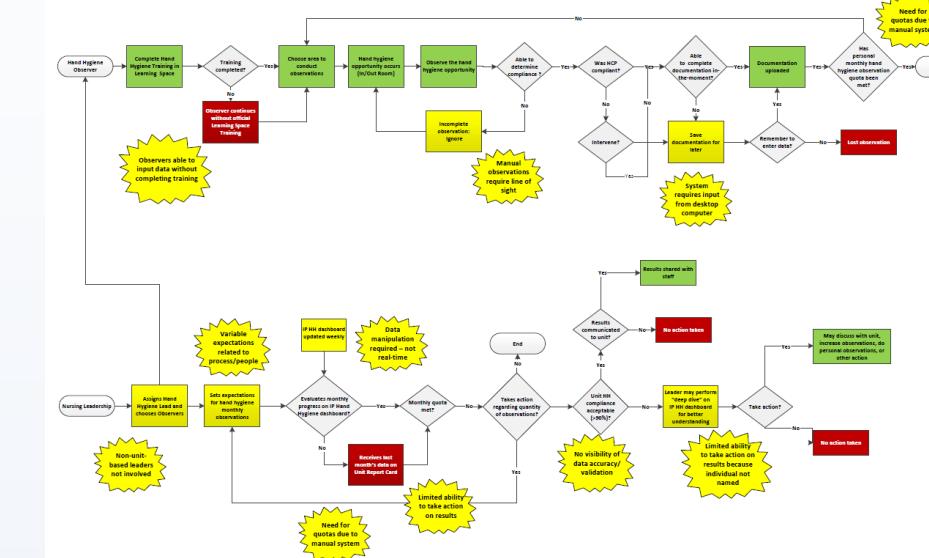


Figure 4. Unit-based & IP validation round volume, during pilot (Nov 2020) and early implementation.

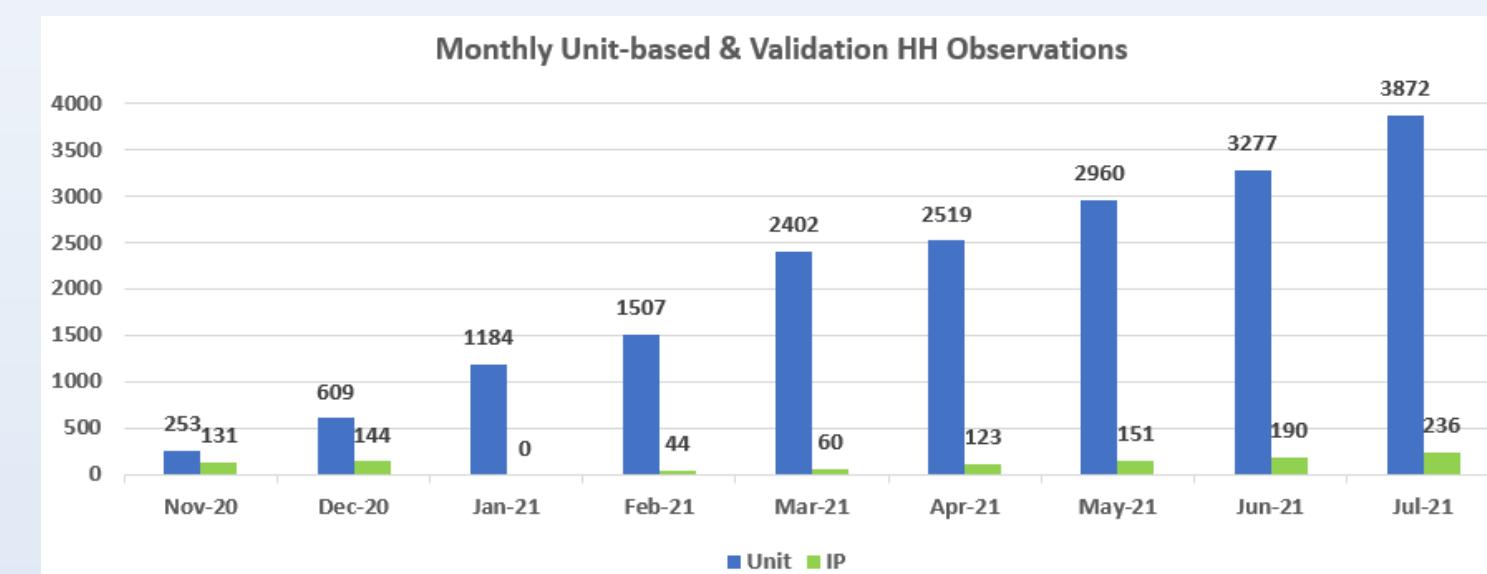


Figure 5. Dashboard views of unit-based vs IP HH observations.

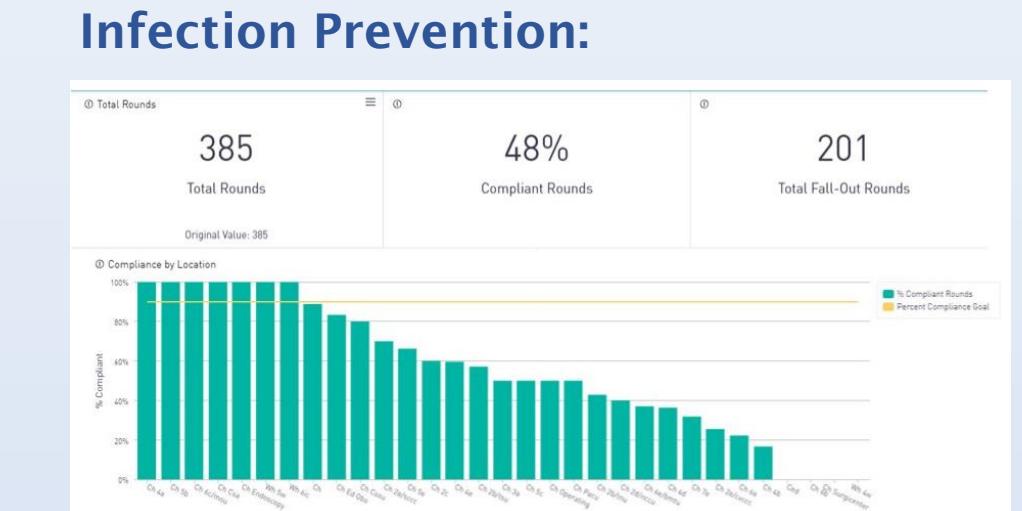
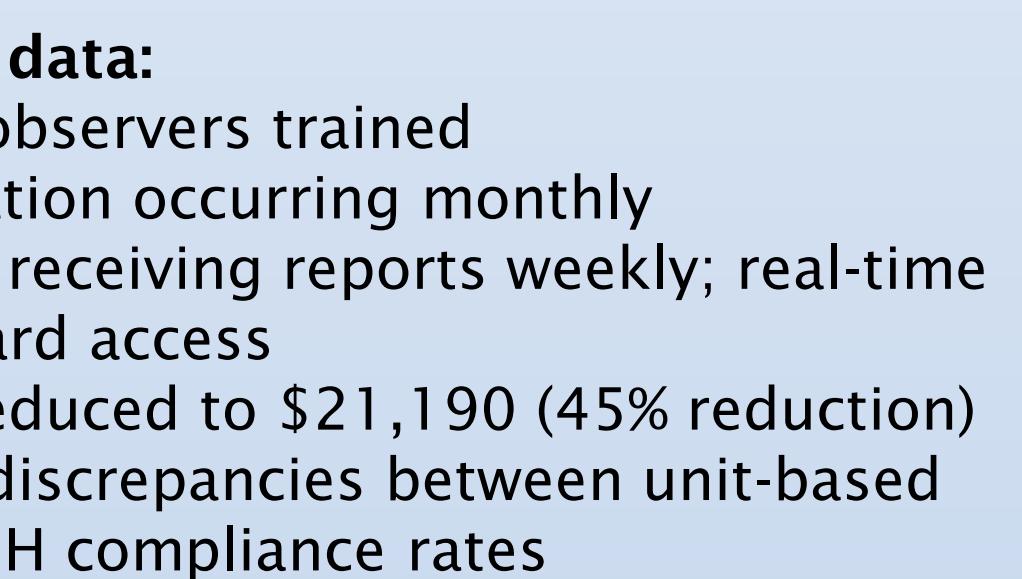


Figure 6. Updated control chart showing pre-, mid- and post-implementation phases.



Follow-up data:

- 98% of observers trained
- IP validation occurring monthly
- Leaders receiving reports weekly; real-time dashboard access
- COPQ reduced to \$21,190 (45% reduction)
- Similar discrepancies between unit-based and IP HH compliance rates

## CONCLUSIONS

- Using multidisciplinary process improvement, we enhanced our manual HH observation processes, allowing for transparent and real-time access to HH observation data.
- However, no improvement in HH accuracy was observed.
- Unit-based staff, who lack dedicated time for HH observation, are biased to document HH compliance over non-compliance, even with recent re-training in non-biased HH observation processes and elimination of penalties.
- To improve HH accuracy, we recommend either dedicated neutral HH observers or automated systems.

