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**PEACH**

**Prevention Epicenter of Emory  
and Atlanta Consortium Hospitals**

# Prevention Epicenter Hand Hygiene Study

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# Comparing Feedback Strategies using an Automated Hand Hygiene System

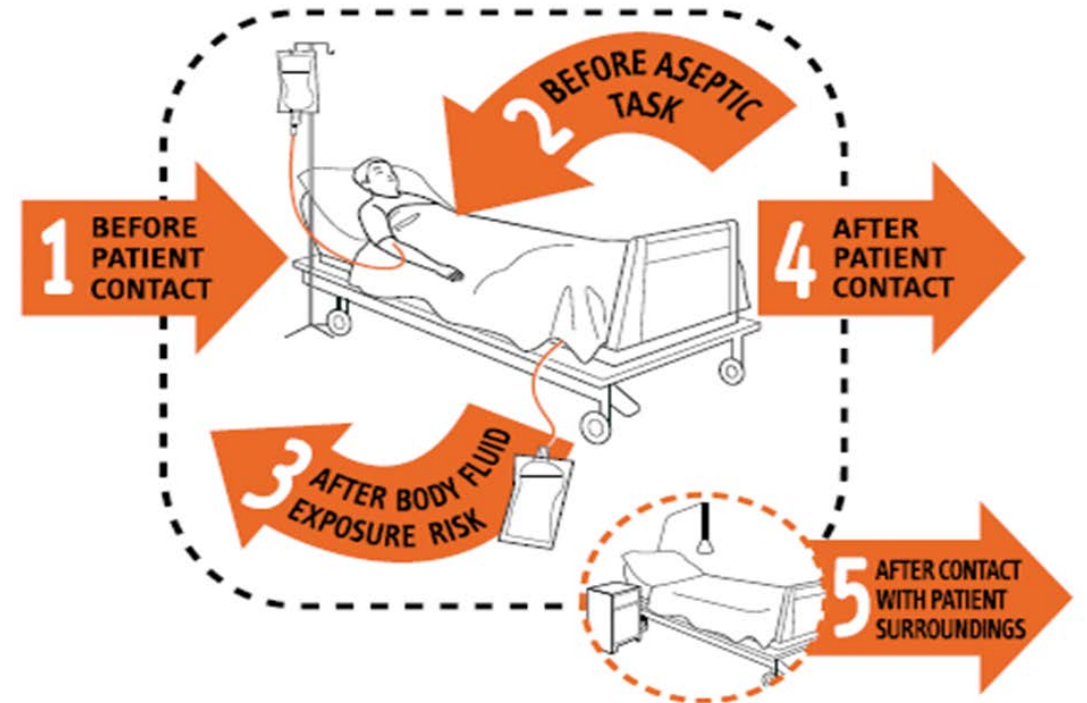
- Electronic hand hygiene monitoring technologies have the potential to lead to sustained improvements in HH compliance
- Most studies to date limited in scope
- This study uses current technology with novel software developed by a start up company with roots at Georgia Tech and Emory
- Preliminary studies showed high correlation between observed and electronically recorded compliance
- This study is larger in scope [6 ICUs (82 beds) and 3 wards (110 beds) in 2 hospitals] and longer in duration than other studies
  - All adult ICUs and floors 31 and 41 at EUHM
  - 3<sup>rd</sup> floor and ICU at EJCH



# Does Automated Hand Hygiene Monitoring Capture all Hand Hygiene Opportunities?

- WHO - 5 “moments” for hand hygiene
- Monitoring for compliance with all 5 moments is difficult
- Monitoring compliance on room entry and room exit is a simpler strategy advocated by many healthcare organizations and captures about 85% of the WHO 5 moments
- This electronic system attempts to monitor HH on room entry and room exit

## Your 5 moments for HAND HYGIENE



# System Components

## Badge Reel



- Contains Bluetooth beacon
- 1 year battery

## Sensor

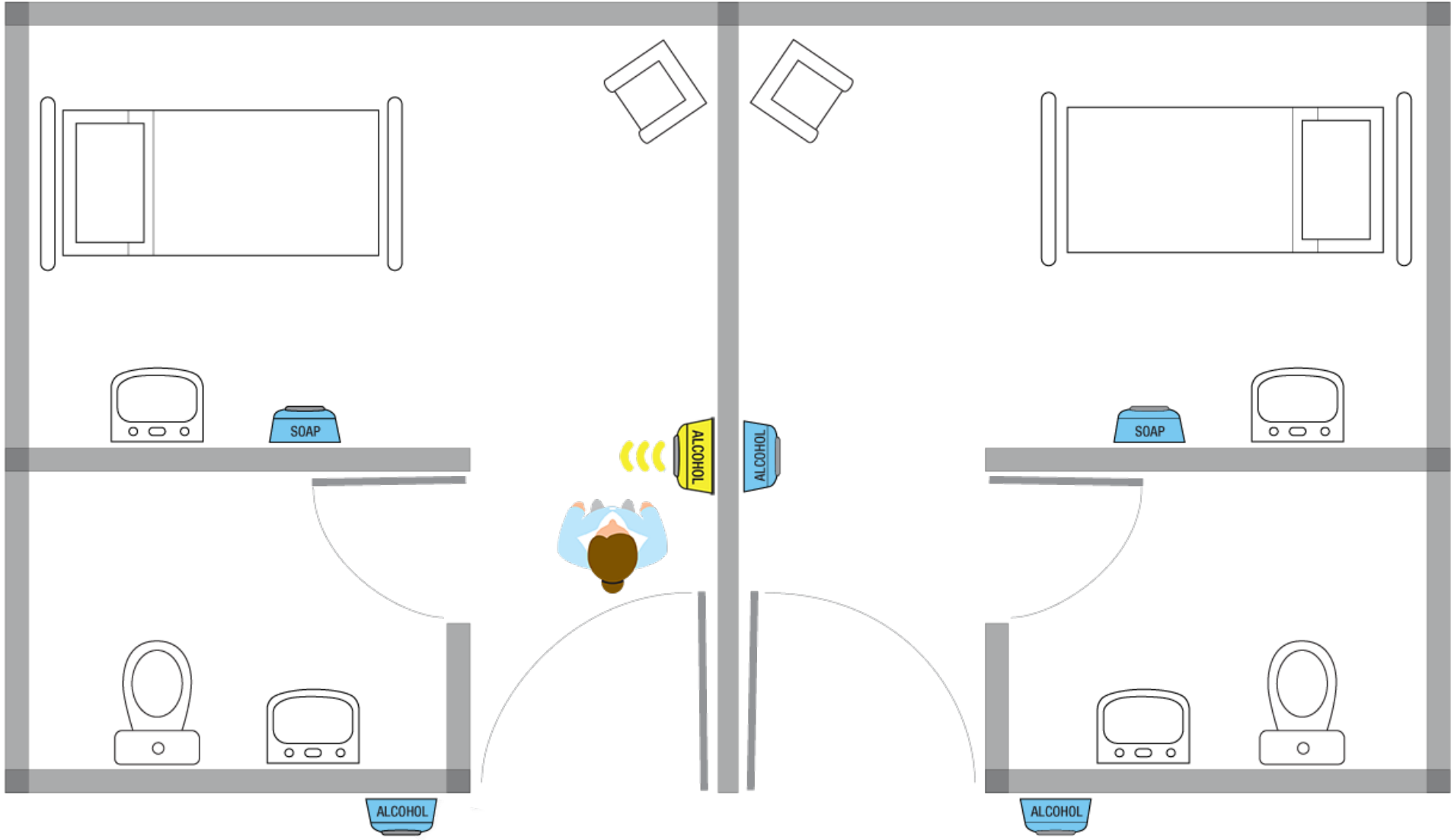


- Detects Bluetooth badge and hand hygiene product use
- Communicates with adjacent dispensers
- Provides real-time voice reminder to improve behavior
- Customizable down to individual rooms
- One ultrasound proximity sensor per room

## Infrastructure



- 2-Way Secure communication
- Does not interfere with hospital WIFI



# Comparing Feedback Strategies using an Automated Hand Hygiene System

## Aims

- Using a prospective observational cohort design with multiple interventions, identify the optimal combination of provider feedback and device audio reminders to improve HH compliance
- Using qualitative research methods, assess healthcare worker attitudes and beliefs regarding the monitoring of, and providing feedback on, individual HH compliance and the use of audio reminders to promote HH compliance.

# Progress to Date

- 10/1/16 through 12/31/16
- Installed and tested approx. 600 sensors in 192 rooms
- Enrolled 500 healthcare workers
- 10/1/16-12/31/16 recorded data at EUHM
  - 1,026,147 hand hygiene “opportunities” (motion sensor events)
  - 284,996 Badged Compliant HH Events
  - 97% of Dispenses ABHR
    - 52% in hallway
  - 3% Soap

# Validation of Electronic System Compared to Observed Events

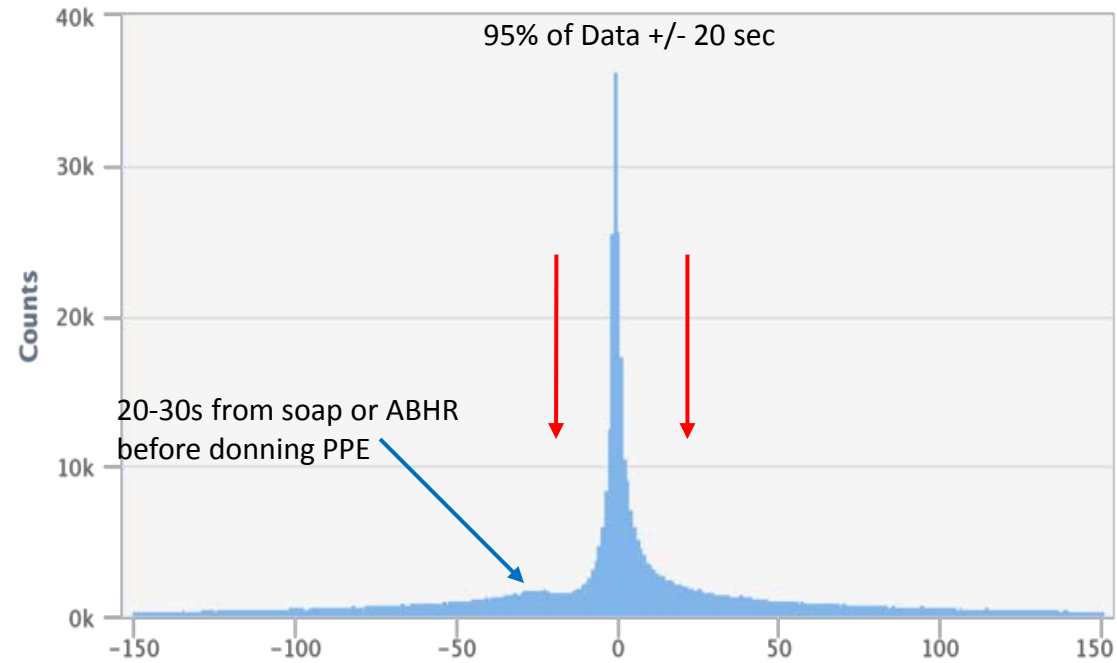
Action	Detected	Observed opportunities	%
Detection of room entry/exit	163	172	95
Detection of HH product dispense	163	164	99
Identified individual Bluetooth beacon – entry/exit	126	163	79
Identified Bluetooth beacon – product dispense	130	163	80

- Electronic system very good at detecting movement and product use
- Individual badge detected about 80% of time
- No attribution to wrong badge



# EUHM– All HH Data

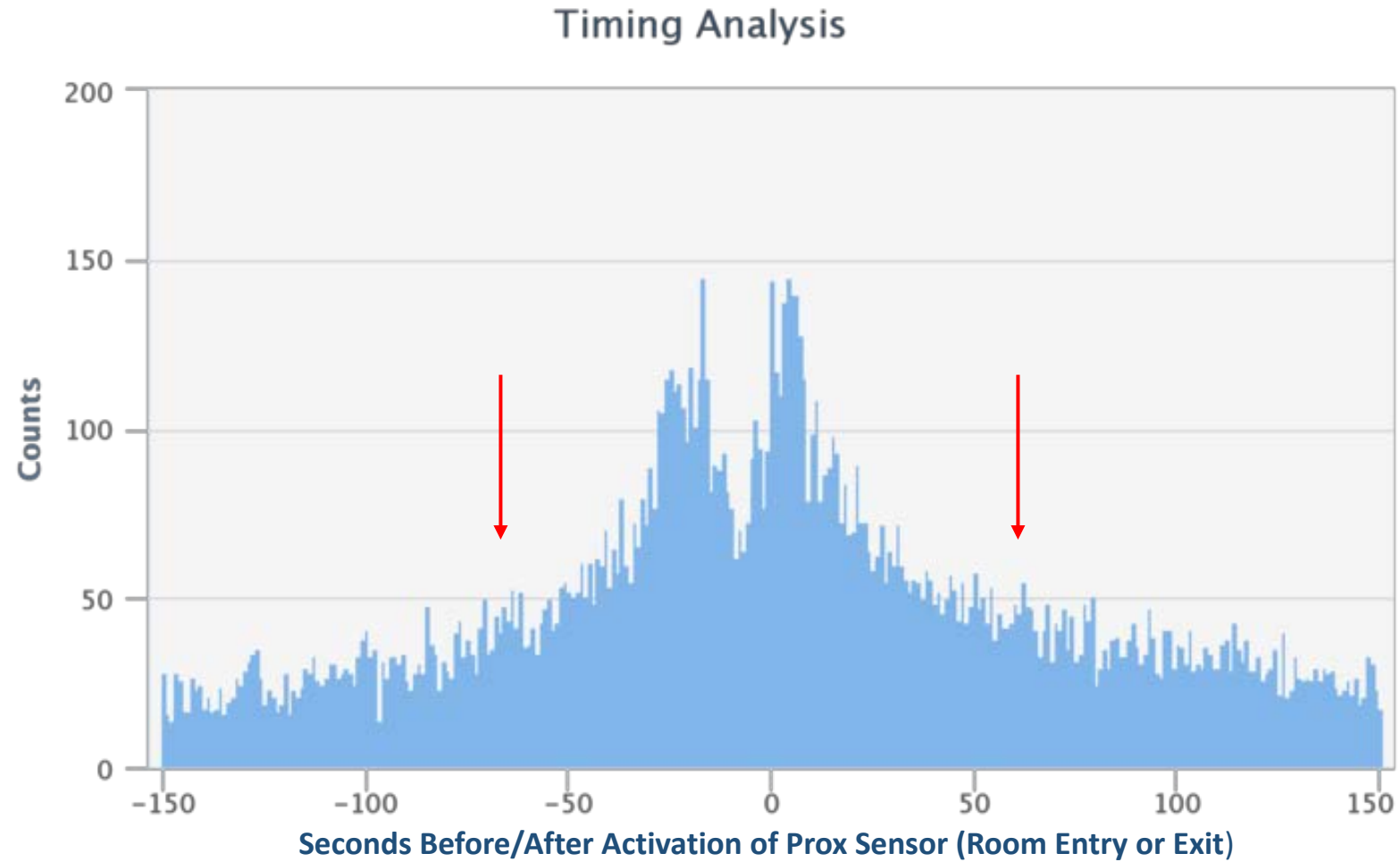
Timing Analysis



Seconds before or after activation of proximity sensor  
(room entry or exit)

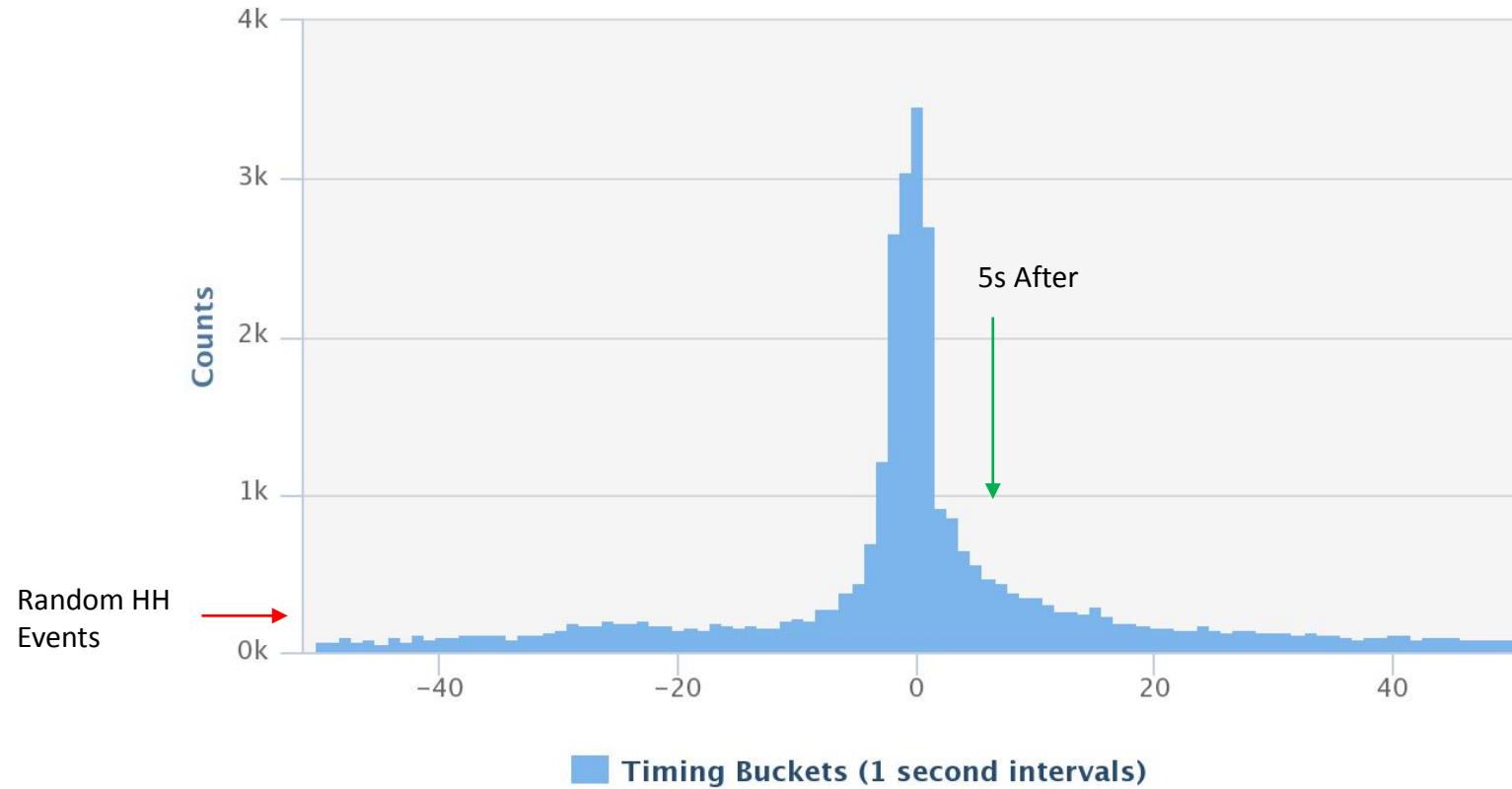


# EUHM Total Soap Dispenses



# 31 ICU – All Data

Timing Analysis

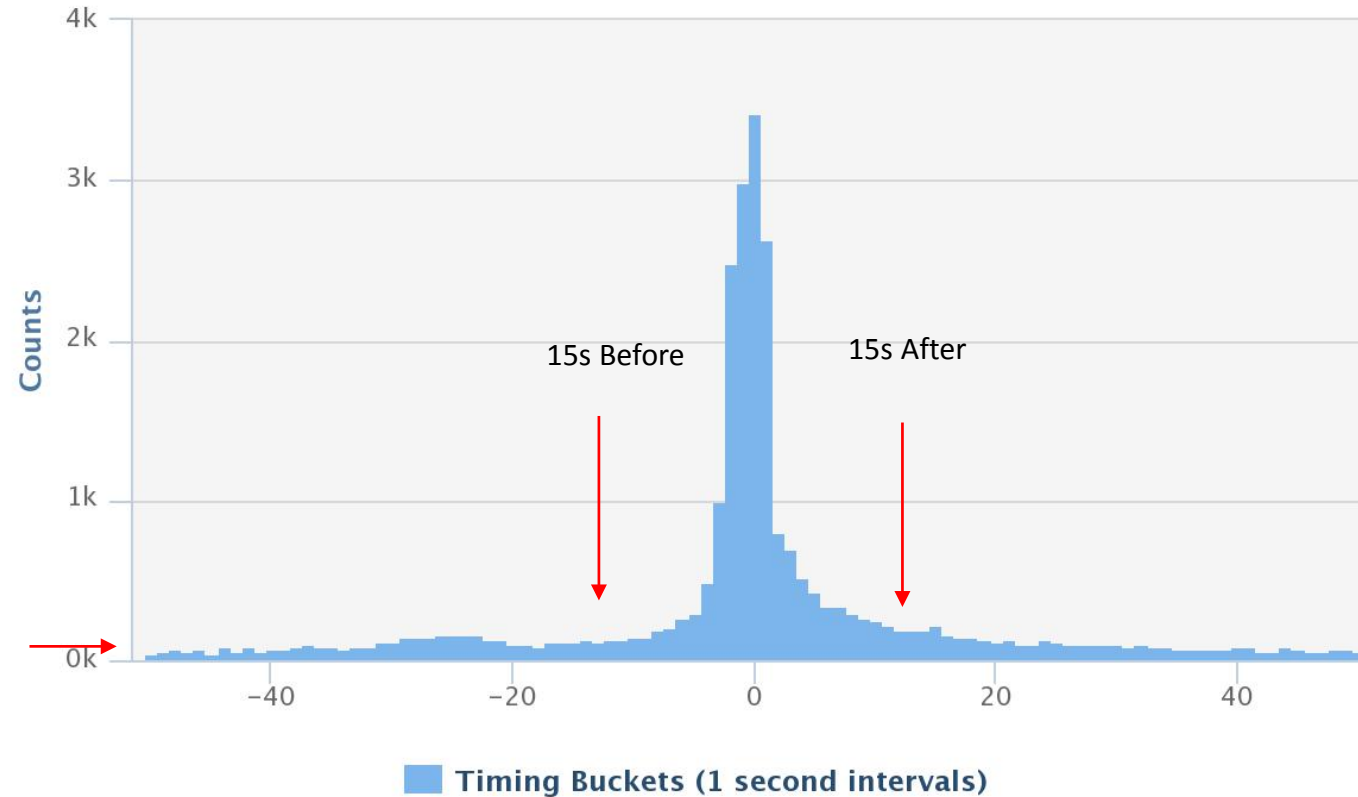


# 31 ICU – Hallway ABHR Data

## Timing Analysis

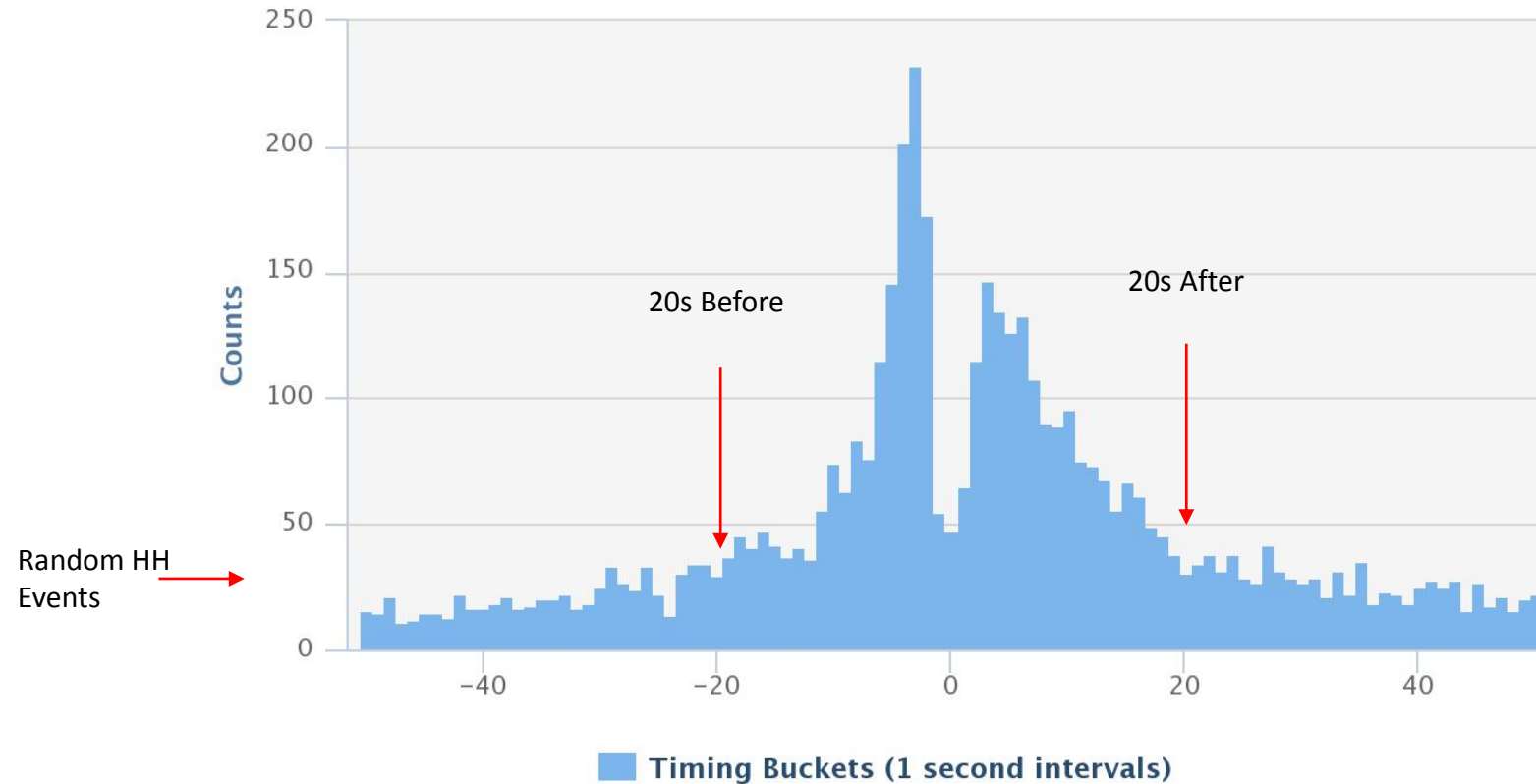


Random HH  
Events



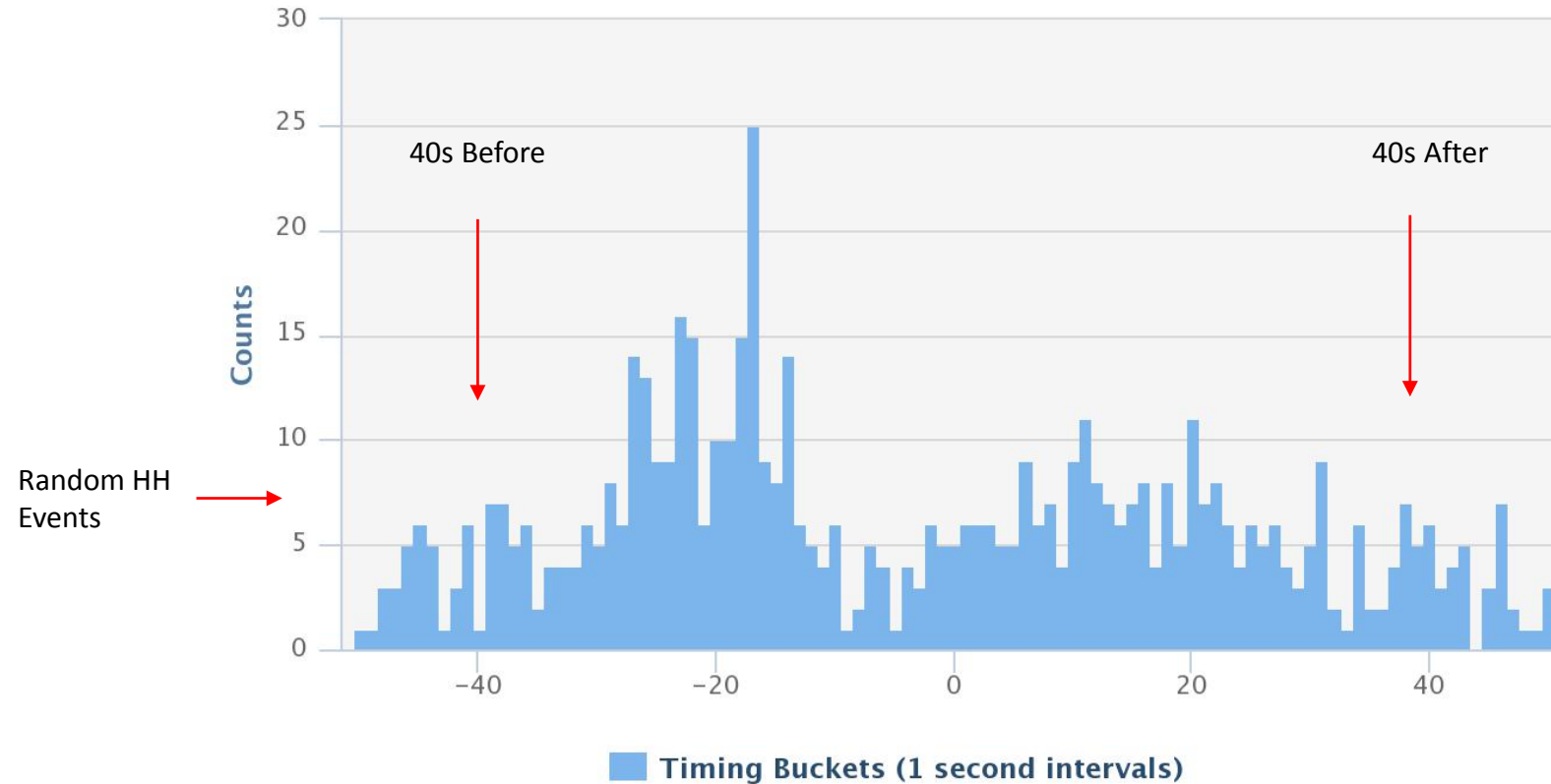
# 31 ICU – In Room ABHR Data

## Timing Analysis



# 31 ICU – In Room Soap Data

## Timing Analysis



# 31 ICU – Recommended Timings

- Voice= 5 sec
- Hallway ABHR= +/- 15 sec
- In Room ABHR= +/- 20 sec
- Hallway/Utility/Med Room= +/- 60 sec\*
- In Room Soap= +/- 40 sec
- Isolation rooms= 30 additional seconds before\*
- *C. diff* = 30 additional seconds before\*

\*Note: Isolation recommendation based on non-EUHM data

# Study Design

Table. Study design for interventions by site								
	Period 0	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Hospital A Group 1	Installation, testing, and validation	Baseline	Group feedback	Group feedback+ Individual feedback	Group feedback	Individual feedback + voice reminder	Group feedback only	Optimize feedback and reminder process
Hospital A Group 2	Installation, testing, and validation	Baseline	Group feedback	Group feedback + voice reminder	Group feedback	Individual feedback + voice reminder	Group feedback only	Optimize feedback and reminder process
Hospital B	Installation, testing, and validation	Baseline	Test voice reminder strategies	Group feedback + Voice reminder	Randomize participants: Individual feedback vs no individual feedback			Optimize feedback and reminder process
Qualitative study			Interviews				Interviews	Interviews



# Project 3: Challenges and Solutions

## Challenges

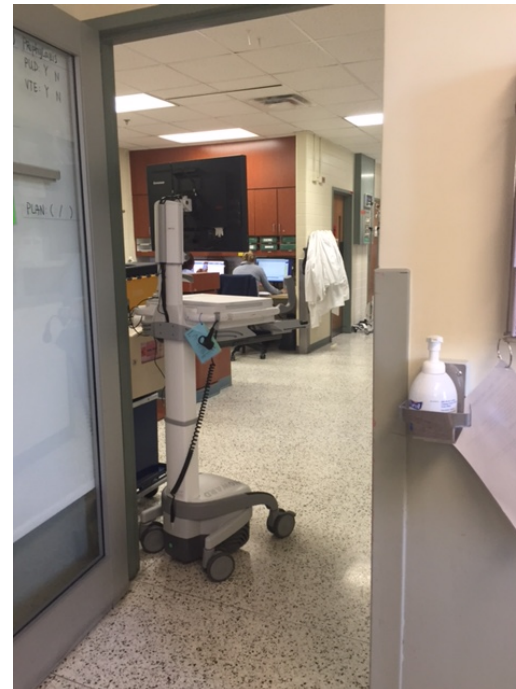
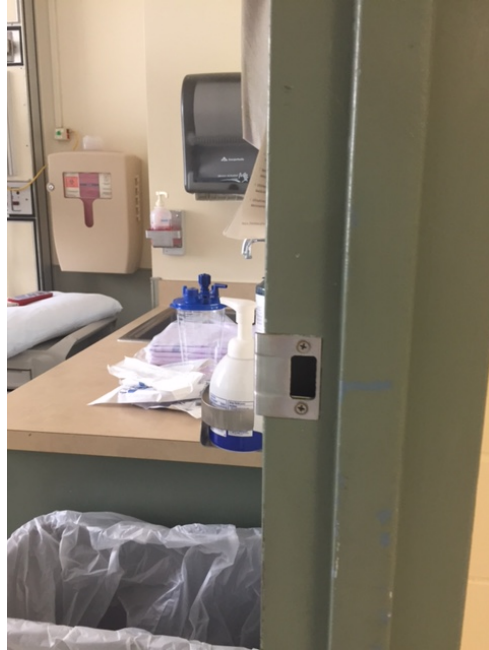
- Scale of installation
- Custom designed sensors
- Documentation of Room Modes
- Variable battery life
- Enrollment/Badge Use
- 1 ICU relocating during the study
- Limitations of technology

## Mitigation

- Prolonged, unit-specific validation
- Re-engineering
- Integration with Theradoc
- More time for battery changes
- Increased communication
- ? Exclude unit from main analysis
- Sensor unreliable data (ie, multiple badged HCW in room)

Delay  
start of  
study

# Substudy – Relationship Between Location/visibility of Dispenser and HH Product Use



# Summary

- Electronic hand hygiene monitoring systems can capture huge amounts of data
- Most HH events occur close in time to detection by proximity sensors
  - Supports calculating compliance based on timing algorithms
- Comparison of HH compliance measured by electronic systems to observations is needed
- TBD - do interventions such as providing individual feedback or immediate voice reminders improve hand hygiene compliance rates

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## **Clean Hands Safe Hands LLC**