

# #1376 Impact of introducing group e-monitoring (GEM) on hand hygiene adherence and MRSA acquisition at an acute care teaching hospital



Jannice So, Christine Moore, Liz McCreight, Doug Willcocks, Allison McGeer, for the Mount Sinai Hospital Infection Control Team, University of Toronto, Toronto, ON, Canada

## Abstract

**Background:** The gold standard for hand hygiene adherence (HHA) measurement is observational audit (oHHA), despite several studies documenting substantial and variable Hawthorne effects. Group e-monitoring (GEM) systems count dispenses of alcohol handrub/soap on units, and use patient census, nurse-patient ratio and studies of HHO to provide 24/7 HHA data. Data supporting their effect on HHA and on reducing healthcare associated infections are limited. We report the results of pilot studies of GEM of HHA in our hospital.

**Methods:** To complement our current multi-faceted hand hygiene program, we introduced the DebMed GMS system to 3 of 11 medical/surgical inpatient units in our hospital for 3 mos in 2014. In June 2015, the system was reintroduced to the 3 units and to 4 additional in-pt units. We report data on HHA by observational audit and by e-monitoring, and rates of MRSA acquisition and days of additional precautions for MRSA.

**Results:** GEM data prior to pilot launch demonstrated estimated actual 24/7 HHA (eHHA) of 21.21, and 39% on 3 units. Over the 3m pilot, eHHA increased by 9%; over the next 12 months (data were no longer reported), HHA on these units declined to baseline. After re-introduction of the system in 7/2015, eHHA increased more slowly; the overall rate of eHHA on monitored wards increased from 27.0% in Q3 2015 to 32.9% in Q1 2016. Increases in eHHA from Q1 - Q3 of implementation ranged from 1.9% to 12.3% on different units (Figure 1). Comparing rates in the 2 yrs prior to introduction in June 2015 and those of the most recent 6 mos, episodes of MRSA acquisition trended down from >3.0 to 0.20 /1000ptdys (Figure 2; P<0.5), and pt-days in MRSA precautions decreased from 15.8 to 12.8 /1000ptdys (Figure 3, P<.001).

**Conclusion:** Use of GEM significantly improved HHA in our hospital. Even small overall increases in HHA may be associated with clinically significant reductions in MRSA transmission.

## Background

- Measuring hand hygiene through direct observation is time consuming, resource intensive and limited by the Hawthorne Effect [1,2]
- Electronic monitoring of adherence to hand hygiene recommendations may provide a more accurate measure of practice, and assist in improving hand hygiene, but its efficacy remains relatively untested [3,4]

## Objective

- To evaluate the implementation of a group electronic monitoring system in an acute care teaching hospital.

## Methods

- Mount Sinai Hospital is a 428-bed academic acute care hospital, in Toronto, Canada. Our hand hygiene improvement program was initiated in 2004; in 2008, routine monitoring of adherence by observational audit was initiated (100 observations per unit per quarter by either central or unit auditors).
- By 2012, adherence to the four moments of hand hygiene by observational audit had increased from 40% (2004) to exceed 90% on most units, resulting in complacency among hospital staff.
- We considered the potential costs and benefits of several different methods for providing measurement and feedback of hand hygiene adherence
  - “secret shopper” auditing
  - auditing by managerial staff or staff across units
  - monitoring using volume of handrub consumed
  - electronic “badge” systems with audit and feedback
  - group electronic monitoring (GEM)
- In 2014, we have been using and evaluating a GEM system

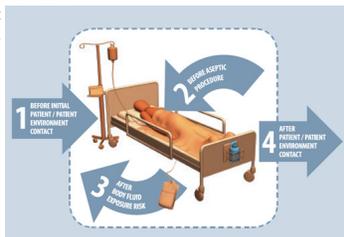
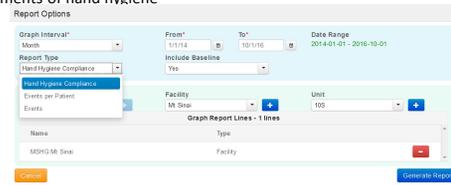


Figure 1. Your 4 Moments of Hand Hygiene. Public Health Ontario (PHO), 2010[5]

## System

- All soap and ABHR dispensers used for staff HH on each monitored unit have an electronic counter that records each time soap/alcohol are dispensed
- Each hour, the hospital system downloads the patient census to the system
- Published literature and observations at our hospital are used to determine the number of hand hygiene opportunities per patient hour on each unit that would represent 100% adherence to Ontario’s “four moments of hand hygiene”
- Users log in to a web site to obtain daily, weekly or monthly reports; “push” reports can also be emailed automatically.



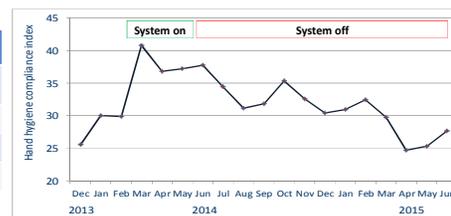
## First Pilot

- The GEM system was installed on 3 medical/surgical units in November 2013. Introduction of staff to the system began in on January 19<sup>th</sup>. Formal audit and feedback to all staff using the system began on March 1<sup>st</sup> and ended on May 31<sup>st</sup>.

TABLE: HH adherence on GEM units before and during pilot

Unit	Pre		During	
	Obs. Audit	GEM	Obs. Audit	GEM
A	83%	21%	86%	30%
B	88%	21%	86%	36%
C	90%	39%	90%	48%

FIGURE 1: HH adherence on GEM units, Dec 2013-June 2015



- Qualitative assessment of use of the GEM system by nursing unit staff:
  - Recognize that the findings of the system are reality, and see need to improve
  - More information is definitely better
  - Knowing that you are being monitored makes you more competitive about improving
  - GEM reports bring a new perspective to hand hygiene discussions, nursing council has embraced the need to change

## Acknowledgements

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## References

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## Second Pilot

- In June 2015, the system was reactivated in the first 3 units, and implemented on an additional 3 units (including 1 stepdown and 1 intensive care unit).

FIGURE 2: Overall HH adherence on GEM units, Jul 2015-Mar 2016

- Overall, adherence increased from 27% in Q2 (Jul-Sep) to 33% in Q4 (Jan-Mar)
- The increase varied by ward from 1.9% in the surgical stepdown unit to 12.4% on a medical unit

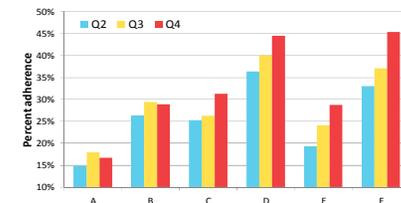


FIGURE 3: HH adherence on GEM units, July 2015 to March 2016, by unit

- We assessed nosocomial acquisition of MRSA colonization/infection on GEM wards before and during the second pilot.

FIGURE 4: Rate of hospital-acquired MRSA, GEM units, 2012-2016

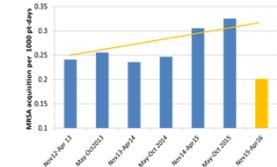
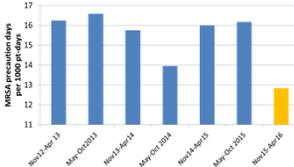


FIGURE 5: Rate of MRSA-precaution days, GEM units, 2012-2016



## Lessons learned

- This group E-monitoring system has allowed us to better assess hand hygiene adherence and to continue to improve hand hygiene practice at our hospital
- Despite the GEM, improving hand hygiene practice remains a challenge, especially in units with higher acuity of care (e.g. ICU and step-down units)
- Time and effort is required to permit healthcare providers to recognize that GEM is an accurate estimate of hand hygiene adherence
  - Demonstration that all dispensers are sending signals, and display of data as dispenses per patient hour are both important in helping staff develop faith in the system
- On-going work is needed to develop denominators (hand hygiene opportunities per patient hour) for different types of patient care units, and to assess variability between care units in different hospitals/jurisdictions
  - Changes in how patient care services are delivered in our hospital have required adjusting denominators
  - Currently, patients and visitors use very little alcohol handrub. If this changes, denominators for expected handrub consumption will need to be adjusted.
- Even relatively small changes in hand hygiene adherence may have an impact on healthcare acquisition of MRSA[6]