THE EFFECT OF A PROSPECTIVE INTERVENTION PROGRAM WITH AUTOMATED MONITORING ON HAND HYGIENE PERFORMANCE IN LONG-TERM & ACUTE CARE UNITS AT A VETERAN AFFAIRS MEDICAL CENTER

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BACKGROUND

There is recent emerging evidence that implementation of an automated hand hygiene monitoring system (AHHMS) must be part of a multimodal hand hygiene (HH) program that includes complementary strategies.^{1,2} There are few published studies describing in detail the intervention strategies used with AHHMS.

METHODS

An AHHMS that provides group HH performance rates (100 x HH product dispenses divided by the number of room entries plus exits) was implemented on two Acute Care (AC) units and six longterm care (LTC) units at a Veterans Affairs Medical Center from March 2021 through April 2022. After a 4-week baseline period and 2.5-week washout period, the 52-week intervention period included many components, such as weekly huddles, unit nurse manager engagement, vendor provided clinician-based training + feedback, leadership support, unit recognition, signage and development of a new slogan to remind colleagues to perform HH. Statistical analysis was performed with a Poisson general additive mixed model.

RESULTS – KEY LEARNINGS

- See Table 1 for Unit details + raw data by study phase.
- See Table 2 for the Program used to guide complementary intervention decisions. Note: Not all options were implemented concurrently; contact the authors for more details on timing.
- Figure 1 Analysis Highlights: During the 4-week baseline period, the median HH performance rate was 18.6 (95% CI: [16.5, 21.0]) for all 8 units. During the intervention period, the median HH rate increased to 21.6 [19.1, 24.4]. During the last 4 weeks of the intervention period (exactly 1 year after baseline), units had a median HH rate of 25.1 [22.2, 28.4], a statistically significant increase over baseline (p < 0.0001).
- Median HH rate increased from 17.5 to 20.0 (p < 0.0001) in LTC units and from 22.9 to 27.2 (p < 0.0001) in AC units [Figure 2].
- Use of alcohol-based hand rub(ABHR) increased from 57.5% during baseline to 65.1% (p < 0.0001) of total HH events. Hand washing(HW) events decreased relative to ABHR [Figure 3].
- HH Performance Rate improvement was driven by increased HH events. e.g., HH events increased from 88,758 dispenses during baseline to 123,722 dispenses in last 4 weeks of intervention.
- Direct observation results during the same periods showed HH compliance ranging from 61-86%.

					Baseline = 4 Weeks		Intervention = ~1 Year			Last 4 Weeks			
					(3/14 - 4/10/2021)		(4/29/2021 – 4/10/2022)			(3/14 - 4/10/2022)			
	Patient	Duilding	Unit	# of	0.00/3	HW	ABHR	0	HW	ABHR	0.00/03	HW	ABHR
Unit	Population	n Building	Types ¹	Rooms ²	Opp s ^o	Events	Events	Opp s ^o	Events	Events	Opp's ³	Events	Events
1	Acute Care	Tower	Med Surg	24	68,157	5,932	11,080	885,824	73,284	177,492	70,692	6,267	17,218
2	Acute Care	Tower	Gen Med	24	72,986	4,710	11,276	1,022,344	50,820	227,309	74,589	3,512	20,741
3	Long-Term Care	Tower	SNF	31	77,795	6,252	6,586	937,072	56,688	126,519	81,049	4,069	12,537
4	Long-Term Care	Tower	SNF/Rehab	13	71,885	5,089	8,356	747,083	64,475	95,944	59,544	5,275	10,245
5	Long-Term Care	320	LTC Resident	33	76,674	4,200	5,684	906,181	52,373	97,816	79,575	4,439	11,385
6	Long-Term Care	320	LTC Resident	28	50,649	4,826	5,576	647,454	55,566	80,033	51,765	9,836	5,017
7	Long-Term Care	320	Memory	24	29,519	3,208	2,123	353,318	42,045	32,180	30,478	2,617	3,669
8	Long-Term Care	320	Hospice	20	27.478	2.420	3.873	465.039	33.657	79.862	43.552	2.886	8.552

¹ Unit Type acronyms: Med Surg = Medical Surgical, SNF = Skilled Nursing Facility, Rehab = Rehabilitation. ² This is the # of rooms monitored (not occupancy) in the unit to provide a directional sense of scale. Opportunities is a way to get a sense of occupancy / unit business as well. $^{3}Opp's = Opportunities$ (i.e., # of veteran room entries + exits combined).

Figure 1: Monthly HH Performance Rates for all Units. The green curve shows change in median HH rate during the intervention period compared to the baseline & washout periods, with vertical bars showing 95% confidence intervals for the monthly HH rate.



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Table 2: The Program milestones + tasks considered by AHHMS phase:

	Major Communent From.		
Task/ Milestone	Healthcare	Vendor	Timing & Coaching Comment
Phase 1: Explore & Trial			~3-6 Months
Healthcare Leader(s) Engaged			Commitment to learn & change is key
Installation, Testing, Analysis, Decisions		\checkmark	
Phase 2: Installation, Validation, Education	Healthcare	Vendor	~3-6 Months
System Installed		\checkmark	
System Validation for Functionality		\checkmark	
System Planned + Behavioral Path Validation			
Conduct a "foot-traffic" assessment to estimate room entries + exits from non-HC workers (% HCP) ³			
Educate via "Train the Trainer" Sessions		\checkmark	
Unit Managers Inform / Educate their Unit			
Baseline Hand Hygiene Performance Rate Established		\checkmark	Set over 4-weeks w/ no results leaks
Baseline HH Results Communicated			
Goal Setting (Unit &/ or Individual)			
Initial HH Improvement Plans Determined		\checkmark	
Phase 3: Initial Improvement –	Healthcare	Vendor	~6-12-24 Months
Complementary Intervention Strategies			
Engaged, supportive nurse manager ⁴	\checkmark	\checkmark	At the unit level
Initial HH goals & plans communicated	\checkmark	\checkmark	Done broadly + well!
*Unit-based champion assigned for all shifts – (must			Not auditing, encouragement! Ideally
include nights & weekends) ⁵	,	1	backed by nurse manager.
Unit-based data champion considered / assigned ⁵			Unit clerks could be a resource in this
Strong healthcare leader(s) engaged and encouraging improvement ^{2,6,7}			Leader(s) recognized by clinical staff is critical and motivating
Identify and discuss barriers, optimize workflows &	\checkmark	\checkmark	
optimize dispenser placement ⁶		,	
**Decision on how to report results to Units regularly (to whom, by whom, frequency) ^{2,6,7}	\checkmark	\checkmark	Style and frequency adapted to the culture; consider daily versus weekly
***Weekly Accountability Calls / Huddles ^{2,8}	\checkmark		All units represented is critical
Discuss other hospital- and unit-based initiatives to promote change ^{2,7}	\checkmark	\checkmark	e.g. PDCA, learning from other hospitals, Quality best practices
Collaboration with Unit Leadership (e.g. Nurse		\checkmark	Reassess this a few months after
adapted to the unit culture. "Front Line Ownership" ⁹			baseline rollout.
Critically review the facility hand hygiene policy; update and train to it as needed	\checkmark	\checkmark	
WHO HH Self-Assessment Framework ¹⁰ Review and Consider	\checkmark	\checkmark	Self-assessment with this tool may be better between ~Year 1 to Year 2
Bring broad visibility (e.g., Grand Rounds speaker)	\checkmark		
Celebrate successes / Rewards & recognition.			Potentially unit winners; rollout slowly
Optional: Improve Direct Observation			e.g., Real-time feedback on technique
Phase 4: Improvement Efforts	Healthcare	Vendor	~Annually Thereafter
Continued/Adapted/Optimized Annually			J
Annual Assessment + Program Efforts Determined	\checkmark	\checkmark	













KEY CONCLUSIONS

The intervention increased hand sanitizer usage and HH performance rates for all units. AC units were consistently better nan LTC units, which have more visitors and more mobile eterans. Further HH improvement will rely on continued mplementation of complementary strategies and long-term nonitoring. Completion of the WHO Hand Hygiene Self-Assessment Framework¹⁰ (see Table below) shows nprovement. It also helps guide choices for future efforts.

WHO HH SELF-ASSESSMENT FRAMEWORK RESULTS ¹⁰							
Category	2019	5 May 2022					
1. System Change	60/100	100/100					
2. Training and Education	20/100	30/100					
3. Evaluation and Feedback	55/100	70/100					
4. Reminders in the Workplace	25/100	45/100					
5. Institutional Safety Climate	10/100	80/100					
Total Score	170/500	325/500					
Hand Hygiene Level (per WHO)	"Basic"	"Intermediate"					

DIFFICULT CHALLENGES + FUTURE EFFORTS

Taking the time up front to think through optimal placement of ABHR dispensers (consider "space syntax" principles).

Accounting for the tendency of resident veterans in LTC to decrease the HH rate by "dancing in the doorway".

Turnover of nurse unit managers is problematic, and requires extra oversight and personnel time to achieve timely, effective training. Effective HH by foodservice personnel with reasonable speed is tough - Further study and guidance is needed.

Maintaining HH rates over holidays and summer months.

Year 2 Goals: Promotion on May 5th ("World Hand Hygiene Day") and Improved reminders in the workplace, with weekly results posted + signage owned by each unit, is a goal for Year 2.

"Oh Snap" (Scrub Now And Prevent) created as a verbal reminder to HCP when observed to be non-compliant; the approach matters.

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