Using Real Time Data from EMR to Improve Compliance with Standard of Care

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BACKGROUND

- Hygiene bundles reduce the incidence of bloodstream infections and are recommended by the CDC.[1] Daily bath is a component of the hygiene bundle.[2]
- Locally developed real-time decision support tool allows us to catch misses before they occur. Personal communication devices (PCDs) allow us to alert caregivers directly and efficiently.
- Behavioral economics is a field that studies cognitive factors that motivate human actions.[3] The concepts of immediacy, ranking, loss aversion and mental accounting can be applied to daily bath compliance.

Hypothesis:

Strategically sharing information using real time data from the EMR and concepts from behavioral economics can increase compliance with TCH bath policy.

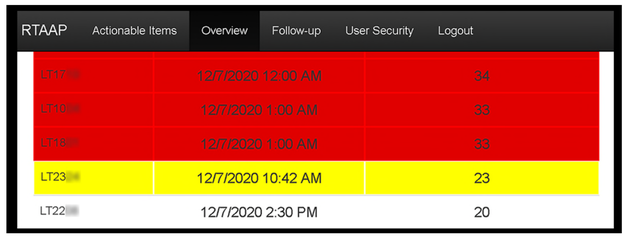

Figure 1. Real Time Sample Bath Compliance Run. Figure shows missed baths in red (>24 hours) and close misses in yellow (23-24 hours).

PURPOSE

The purpose of this project was to determine if real time data from the EMR could improve hygiene bundle compliance.

SPECIFIC AIMS

1. Determine **contributing factors** of noncompliance.
2. Measure **baseline ICU bath noncompliance** rate.
3. Develop **strategic interventions**.
4. Measure **post-intervention noncompliance** rate.

METHODS

Factors contributing to noncompliance were identified by interviewing bedside RNs by convenience sampling.
Baseline and Post-intervention ICU bath noncompliance was determined via retrospective data collected from TCH bath compliance quality improvement project 2019-2021.
Strategic interventions were developed based on concepts of behavioral economics including retrospective bath reports and prospective noncompliance alerts to bedside and charge RNs.

RESULTS

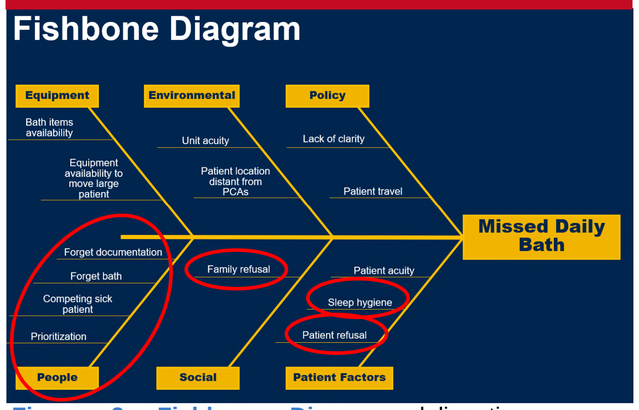

Figure 2. Fishbone Diagram delineating causes attributed to missing baths based on RN interviews..

Unit	Missed Baths (total)	Missed Baths (percentage)	Total Bath Opportunities
All Units	4,469	10%	44,825
Pediatric ICUs	1,923	9%	21,758
Surgical/ Neuro ICU	553	10%	5,679
Pulm/HemOnc ICU	653	11%	5,898
Medical ICU	315	14%	2,272
TICU	402	5%	7,909
Cardiac ICUs	991	8%	12,308
CPCU	1,555	15%	10,759

Table 1. Pre-intervention Daily Bath Compliance. Table includes daily bath compliance for all ICUs and the CPCU at TCH between Jan 1st 2019 and Dec 31st 2019. TICU: transitional ICU, CPCU: cardiopulmonary care unit.

INTERVENTIONS

Develop Strategic Interventions: concepts of behavioral economics applied to daily bath compliance project.

Concept	Intervention	Measurement
reminder close to time limit results in task being completed	*text reminder within 4 hours of when bath is due*	*measure bath compliance before and after intervention*
framing losses instead of gains more powerful	*state increase of infection risk with missed baths*	*reports with institution wide "lost bath opportunities"*
achievement of separate components	*break down data for each component of hygiene bundle*	*bath report further breaks down data for each unit*

Post Intervention bath noncompliance: CPCU selected for data analysis as it experienced both bath reports and PCD text alerts interventions.

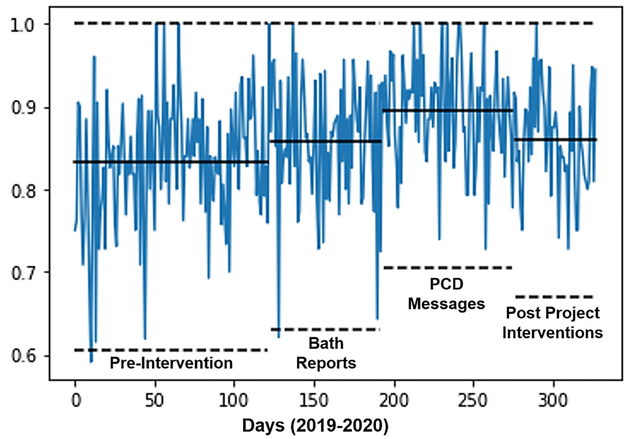

Figure 3. CPCU Daily Bath Compliance Improved with Real Time Alerts. Control chart above demonstrates four time periods: **pre-intervention** (122 days), **retrospective reports** (70 days), **prospective alerts** (83 days), and **post-intervention** (50 days).

KEY RESULTS

❖ Retrospective daily bath reports in the CPCU **increased compliance** (p=0.01).

❖ **Prospective PCD alerts had the greatest improvement in daily bath compliance in the CPCU**.

❖ Compliance improved from **83% to 90%** with **PCD reminders**, and **worsened to 86%** when reminders were stopped (both p=0.002).

❖ **PCD messages** period had the **least variation** of all periods signifying a **stable process**.

CONCLUSION

Real time data from the EMR shared both retrospectively and prospectively using behavioral economics concepts increased compliance with TCH bath policy.

Despite our successful pilot with daily bath reports and PCD message alerts, the project was terminated because of low administrative priority.

This project serves as a model for applying real-time EMR tools to clinical decision-making algorithms and value-based care delivery.

REFERENCES

1. Effectiveness of insertion and maintenance bundles to prevent central-line-associated bloodstream infections in critically ill patients of all ages: a systematic review and meta-analysis. Ista, E et al. Lancet Infect Dis 2016 Jun; 16(6): 724-734.
2. CLABSI Prevention Guideline. Texas Children's Hospital Evidence Based Outcomes Center.
3. Using behavioral economics to design physician incentives that deliver high-value care. Ezekiel, J et al. Ann Intern Med 2016; 164:114-9.