

The Joint Commission

Journal on Quality and Patient Safety®

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September 2013
Volume 39 Number 9



“By analyzing administrative data, local provider surveys, and enhanced chart reviews, the Mortality Review Committee obtained a more complete understanding of opportunities to reduce the mortality index and improve patient care.”

***—The Mortality Review Committee:
A Novel and Scalable Approach to
Reducing Inpatient Mortality (p. 393)***

Reducing Preventable Inpatient Mortality

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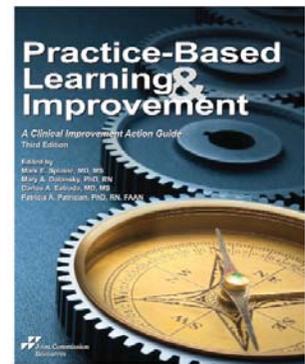
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Methods, Tools, and Strategies

Using Four-Phased Unit-Based Patient Safety Walkrounds to Uncover Correctable System Flaws

April M. Taylor, MS, MHA, CPHQ; John Chuo, MD, MS; Ana Figueroa-Altmann, MSN, RN, DM(c); Susan DiTaranto, MHA, RN; Kathy N. Shaw, MD, MSCE

Patient safety must be a clearly declared high-priority aim of both health care professionals and their institutions.¹ Reducing risk and ensuring safety require greater attention to systems that help prevent and mitigate error. Smaller, microsystem units can provide the framework for quality improvement (QI) in which one can build will, generate ideas, and execute change.²⁻⁴ Key to the execution is recognition of good work and response to improvement suggestions from staff.⁵ When staff concerns are heard, and errors lead to improvement instead of punishment, error reporting can increase and provide more opportunities for improvement.⁶

A system that brings high-level hospital administration and medical staff together to share responsibility for QI is critical.⁷ Patient Safety Leadership Walkrounds™ (PSWR) is an example of a QI activity designed to promote senior executive awareness of patient safety and to encourage overall investment of an organization in patient safety.⁸ Furthermore, PSWR are inexpensive to implement while having high value.⁹ Although PSWR were initially conceptualized as a tool to inform senior leadership of patient safety issues, Shaw et al. showed that PSWR run by local unit leadership can inspire and support staff from all disciplines to successfully work together to improve safety and quality of care.⁶ The unit-based PSWR process described in this study is similar to other programs described in the literature, yet our version differs in the focus on unit leadership, including, but not limited to, the nurse manager and medical director. Hospital leaders, albeit important, are infrequent visitors to a unit. Unlike traditional PSWR, which are run periodically by hospital administrators, the unit-based PSWR process described herein is designed to occur at greater frequency and involve all types and levels of staff at all hours of the day and days of the week. Information gathered during PSWR creates a cycle of information-analysis-feedback that drives safety-focused changes. In this article, we describe how the walkrounds process, which had been implemented successfully in our institution's emergency department in 2005,⁶ was spread to six other units in the hospital.

Article-at-a-Glance

Background: A unit-based Patient Safety Leadership Walkrounds™ (PSWR) model was deployed in six medical/surgical units at The Children's Hospital of Philadelphia to identify patient safety issues in the clinical microsystem. Specific objectives of PSWR were to (1) provide a forum for frontline staff to freely report and discuss patient safety problems with unit local leaders, (2) improve teamwork and communication within and across units, and (3) develop a supportive environment in which staff and leaders brainstorm on potential solutions.

Methods: Baseline data collection and discussion with leaders and staff from the pilot units were used to create a standard set of safety tools and questions. Through multiple Plan-Do-Study-Act cycles, safety tools and questions were refined, while the process of walkrounds in each of the six pilot units was customized.

Results: Leaders in all six pilot units indicated that PSWR helped them to uncover previously unidentified safety concerns. Top-impact areas included nurse-medical team relationship, work-flow flaws, equipment defects, staff education, and medication safety. The project engaged 149 individuals across all disciplines, including 33 physicians, and entailed 34 PSWR in its first year. Information from these pilot units initiated safety changes that spread across multiple units, with identification of hospital-wide quality and patient safety issues.

Conclusions: For participating units, the PSWR process is a situational awareness tool that helps management periodically assess new or unresolved vulnerabilities that may affect safety and care quality on the unit. Unit-based PSWR help identify safety concerns at the microsystem level while improving communication about safety events across units and to hospital leaders in the macrosystem.

Table 1. Characteristics of Pilot Units*

Hospital Unit	Number of Beds	Average LOS	Types of Specialties
Neonatal Intensive Care	68	21.3	Neonatology
Oncology	35	7.5	Oncology
General Medical Unit 1	24	4.6	Pulmonary, General Pediatrics
General Medical Unit 2	24	4.9	Gastroenterology, Endocrinology, Metabolism
Hospitalists, General Pediatrics	15	2.5	General Pediatrics
Integrated Care Service	20	8.2	General Pediatrics

* LOS, length of stay.

Specifically, we examine how PSWR led by unit-based leaders contributed to the identification of patient safety issues at the microsystem and organizational (macrosystem) level.

In 2008 our institution created physician medical director and nurse manager partnerships on inpatient units to facilitate patient safety work and establish unit-based quality and safety committees. Although the importance of such partnerships at the microsystem level was acknowledged, mechanisms to engage frontline staff were not in place. On the basis of the experience of how our emergency department used unit-based PSWR to promote a safety culture,⁶ we introduced unit-based PSWR on select units to formalize (1) leadership by physician and nurse partners and (2) participation of all staff in identifying patient safety issues.

We report the number and type of QI initiatives identified during PSWR conducted and the number and type of staff who participated. In addition, we describe improvement initiatives, subject domains, and change concepts initiated locally in single hospital units and in multiple units, as well as those that have spread throughout the hospital.

Methods

SETTING

We conducted the study in 2009 in six medical/surgical units at The Children’s Hospital of Philadelphia. These units were selected with the goal of representing a diverse array of medical specialties, provider and patient types, and safety issues (Table 1, above). We required a nurse manager and medical director from each unit to participate as leaders in the planning and implementation of PSWR on their unit.

PLANNING THE INTERVENTION

We describe four phases of the PSWR framework⁶ (Figure 1, page 398). The first two phases involved interactions with staff

on the unit floors, while the last two phases describe how knowledge gained from staff was discussed with and among unit leadership. Standard PSWR questions designed to engage staff in identifying key system flaws were used in every PSWR¹⁰ (Table 2, page 399). All PSWR were multidisciplinary, including nurses, physicians, and clerical and other frontline staff such as respiratory therapists, child-life specialists, pharmacists, technicians and, when available, parents. Each unit’s physician and nurse champions were charged to (1) organize PSWR sessions so that each PSWR event was led by a different MD/nurse pair, (2) aggregate and report findings, and (3) initiate improvement projects.

Although each unit’s physician and nurse champions (most often the nurse manager and medical director) organized the PSWR sessions, individual PSWR were led and facilitated by different physician-nurse pairs on the unit, with the goal of building ownership and accountability across levels and disciplines.

PLANNING THE STUDY OF THE INTERVENTION

The intervention was studied in a prospective design in which the primary outcome was the assessment of improvements made as a result of unit-based PSWR. The number and type of staff participating in unit-based PSWR were manually collected and recorded on a standard template. Quality improvements initiated at the individual unit and organization levels (microsystem and macrosystem, respectively) required formation of a multidisciplinary team consisting of frontline providers and unit leadership. They also required delineation of clearly defined goals that focused on improving systems and processes.

Methods of Evaluation. Pilot units were provided with standard templates to record the date and time of PSWR and the number and type of participants. Patient safety concerns and vulnerabilities identified during PSWR were logged by the pilot

Four Phases of the Unit-Based Patient Safety Walkrounds

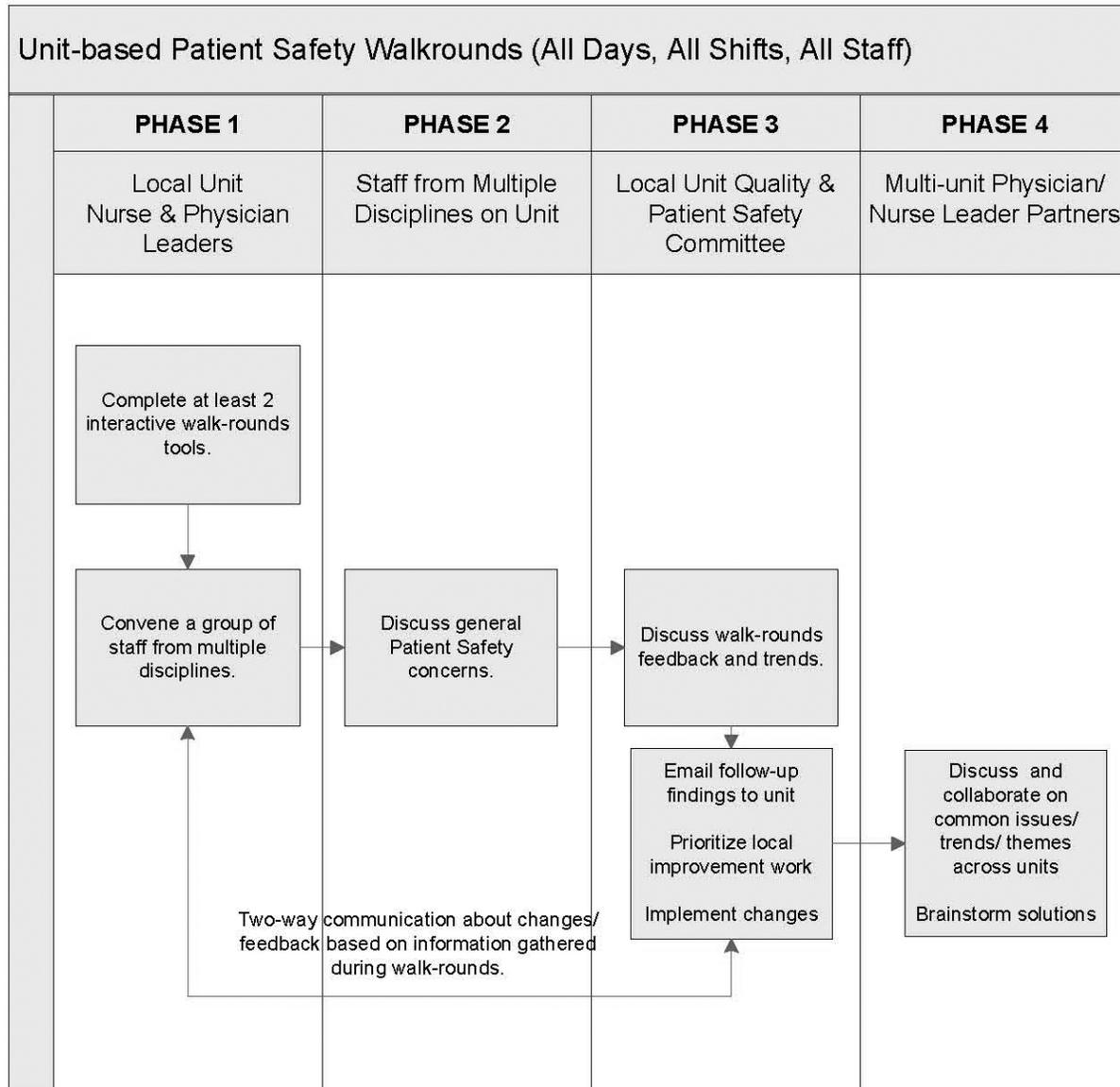


Figure 1. The phases are as follows: Phase 1: Local nurse and physician leaders convene a group of frontline staff and complete a short safety assessment for the unit. Phase 2: Engage the group in a general discussion of patient safety concerns. Phase 3: Discuss findings with the local unit quality and safety committee. Phase 4: Discuss findings with unit leaders across units to identify macro-level safety issues.

units on provided templates and discussed at their unit-based quality and patient safety committee for immediate action and prioritization. Individual units prioritized actions based on their own local needs, as well as the organizational patient safety initiatives for that fiscal year. Improvement projects sponsored under PSWR tracked the category of improvement (for example, medication safety, communication) and project status (inactive, in progress, or complete). To ensure accountability and contin-

ual assessment, unit leaders in the pilot units met and reported monthly on the status of improvement projects. At this meeting, common problems and opportunities for spread across the organization are identified and the appropriate work plans are started.

Analysis. The time, date, participants, and findings in each PSWR collected by the pilot units were aggregated and stratified by level (microsystem, macrosystem), subject domain (for

Table 2. General Patient Safety Walkrounds Questions*

Questions	Examples
Can you think of any events in the past day or few days that have resulted in prolonged hospitalization for a patient?	Iatrogenic infection Team miscommunication Delayed medication orders
Have there been any near misses that almost caused patient harm but didn't?	Incorrect prescription caught by pharmacy Incorrect patient for surgery caught by OR nurse
Have there been any incidents lately that you can think of in which a patient was harmed?	Iatrogenic infections Surgical complications
What aspects of the environment are likely to lead to the next patient harm?	<i>Consider:</i> Patient flow Information communication Tools used in patient care
Is there anything we could do to prevent the next adverse event?	Improve patient handoff. User-friendly work flow Robust safety culture Empower front line to speak up when they notice that something is wrong.
Can you think of a way in which the system or your environment fails you on a consistent basis?	Lack of important information Poor process Poor communication Unclear goals and expectations
What specific intervention from leadership would make the work you do safer for patients?	Organize interdisciplinary evaluation of problems. Assist in changing poor attitudes. Facilitate construction group interaction.
What would make the walkrounds more effective?	Impromptu conversations about safety Involved at the individual level Ensure adequate time for safety activities.

* Adapted from Institute for Healthcare Improvement. Patient Safety Leadership WalkRounds™. (Updated: May 1, 2011.) Accessed Jul 16, 2013. <http://www.ihl.org/knowledge/Pages/Tools/PatientSafetyLeadershipWalkRounds.aspx>. OR, operating room.

Table 3. Patient Safety Walkrounds Participation by Unit, June 2009–December 2009

Unit	No. of Walkrounds Conducted	No. of Unique Participants	RN % of Total Participants	MD % of Total Participants	Other % of Total Participants
Neonatal Intensive Care	6	38	55	18	26
Oncology	6	36	50	22	28
General Medical Unit 1	6	15	60	27	13
General Medical Unit 2	4	11	55	36	9
Hospitalists, General Pediatrics	6	26	58	19	23
Integrated Care Service	6	23	61	22	17
Total	34	149	56	22	22

example, handoff, family relations, clinical data management, infection control, medication safety), and type of change concept to examine the qualitative outcomes of staff participation and findings.¹¹

Results

UNIT LEVEL (MICROSYSTEMS)

After a six-month education and ramp-up period (January

2009–June 2009), the six pilot units conducted 34 unit-based PSWR during the following six months. Overall, 149 persons participated: 33 physicians, 83 nurses, and 33 respiratory therapists, child life specialists, pharmacists, clerks, technicians, environmental service staff, and parents. Table 3 (above) displays the participation breakdown by unit.

Top-impact areas from doing PSWR included nurse-medical team relationship, work-flow flaws, equipment defects, staff ed-

ucation, and medication safety. For example, it was discovered in the neonatal ICU that delays in Infectious Disease approval could delay antibiotic administration. The issue was discussed at the unit's QI meeting, and a physician notification system was put into place that reduced antibiotic administration delays. In one unit, staff reported discomfort with addressing parental concerns related to sharing rooms with roommates who were on precautions to prevent spreading an infectious disease. A patient family education plan was subsequently developed with parental input.

ACROSS MICROSYSTEM LEVELS

A monthly meeting of pilot units enabled units to share findings and solutions. For example, it was discovered that families discharged later in the day had difficulty filling oral prescriptions, which prompted staff to provide parents the remainder of unused medications to avoid missing a dose. This system flaw, which spanned across units, led to greater efforts to enable parents to fill prescriptions before discharge. In another example, it was discovered that safety precaution guidelines varied between units for the same patient condition. Electronic order sets for the management of complex diseases such as seizures were created to help staff standardize safer care across the board.

ORGANIZATION LEVEL (MACROSYSTEM)

QI projects were implemented throughout the institution as a result of PSWR. We highlight two such projects—addressing biometric (height and weight) documentation and improving access to the formula room—to illustrate how solving unit-specific issues and sharing these results across units can have a broader organizational impact.

Biometric Documentation. A unit discovered that a patient weight had been inaccurately transcribed and entered into the electronic medical record, resulting in incorrect medication dosages. Although the patient was not harmed, the leadership team of the unit used a PSWR to discuss height and weight measurements. Review of charts and discussion with participants at the PSWR revealed variation in practice and adherence to policies related to patient growth assessment—a problem subsequently noted during PSWR in other units and shown to be widespread across the organization. A tool was developed to assess compliance with policies related to growth assessment, which was used across the units during PSWR (Appendix 1, available in online article). The results confirmed that measuring height and weight needed to be standardized across the institution to have reliable and reproducible biometrics critical to medication-dose calculations. As a result of the PSWR findings, the

hospital's nursing leadership formed a hospitalwide group to address the issue.

Improving Access to the Formula Room. Discussion during a PSWR yielded a concern about access to the formula room on off-shifts by nursing staff. Concerns included challenges with having security help gain entry into this locked area after the 8 P.M. closing time and lack of organization in the formula room. Sharing these concerns with other units implementing PSWR revealed similar problems with formula room access elsewhere in the hospital. A work group, which consisted of nursing, nutrition, and dietary staff, produced the following results: (1) a formula substitution reference list to help physicians and residents make appropriate substitutions during off-shifts; (2) a dedicated formula room intranet site to answer frequently asked questions; (3) formula room access until 11:00 P.M.; (4) reorganization of the formula room using Lean methodology; and (5) a location map to help providers easily find the appropriate formula.

Formula room access and biometric documentation are two of many examples, as shown in Table 4 (page 401) of using unit-based PSWR to uncover improvement opportunities throughout the hospital. The monthly meeting of the medical directors and nurse managers from the six units provided a forum in which challenges and successes of the previous month's PSWR were shared and systemwide issues and concerns identified. Disseminating information this way catalyzed the launch of many work groups to address systemwide issues. Instead of the traditional top-down approach to the identification of safety issues for organizationwide improvement priorities, the issues identified by the front line during PSWR and then further discussed and prioritized by a multidisciplinary group of unit leaders as organizationwide concerns were brought forth to hospital leadership to determine a plan to address them. Although these meetings began as a support group to those implementing unit-based PSWR, they became instrumental in identifying, developing, and implementing QI projects.

Discussion

We report a hospital initiative to conduct unit-based PSWR that was intended to identify system vulnerabilities that reduce the quality of care and patient safety. Our results indicate that unit-based PSWR can lead to important local-level improvement projects that can be scaled to the organizational level.

UNIT-LEVEL EFFECTS

Engaging frontline staff working at the microsystem level in the walkrounds process is critical for improving the safety and

Table 4. Impact of Patient Safety Walkrounds, June 2009–December 2009

Concern Identified	Subject Domain	Change Concepts	Action	Level Addressing Concern	
				Single Unit	Multiple Units/Hospital
Handoffs at shift change	Communication	Standardization, education, reminders	Identified information to be discussed routinely. Provided staff education.	X	
Adherence to isolation precautions	Infection control	Education, standardization	Provided in-service education to staff. Implemented audit process.	X	
Bruising with Insuflon® catheter use	Process	Education, standardization	In-serviced new staff. Instituted regular huddles on patient care concerns.	X	
Adherence to two patient identifiers	Process	Education, reminders	Educated staff about the importance. Instituted point-of-care feedback.	X	
Parental concerns about roommates on infection precautions	Communication	Education, standardization	Developed communication tips. Educated staff on communication strategies with parent.	X	
Provision of inpatient medication to families at discharge	Medication safety	Education, process engineering	Educated staff on policy. Developed new work flows to help parents obtain discharge medications.		X
Practice variation for patients on seizure precautions	Process	Standardization	Developed seizure precaution order sets.		X
Delays in approving antibiotic use	Medication safety	Process engineering, standardization, education	Designed physician notification system to identify patients who need Infectious Disease approval.		X
Variation in patient weight measurement	Documentation	Education, standardization	Educated staff on policy and weight measurement tools.		X
Variation in patient allergy alerts	Medication safety	Education, standardization	Instituted review of patients with food allergies as part of safety huddles. Conducted multidisciplinary anaphylaxis simulations.		X

quality of care in the unit.^{6,9} Our study suggests that unit-based PSWR improved the supervisor-staff relationship in two areas: recognition of good work and response to staff improvement suggestions. PSWR led to the creation of new processes and communication pathways to help teams solve problems more efficiently. Many pilot units implemented systems to track and prioritize patient safety issues and to update staff on the impact their PSWR discussions had on patient safety with e-mails or

monthly newsletters. In many instances, PSWR gave unit quality and patient safety committees early warning of urgent patient safety issues and the associated system vulnerabilities. The unit-based PSWR improved vertical communication among the management hierarchy and lateral communication between members of the care team. The majority of feedback from nurses and attending physicians in the pilot units cited the PSWR experience as positive, engaging, and often enlightening.

Encouraging each unit to customize the PSWR process and content to its unique work flow and needs enabled a richer discussion about safety. For example, some of the units with busy hallways found it more productive to gather in a conference room for the PSWR discussion, while others preferred to huddle outside patient rooms or bays. Having a flexible framework allowed PSWR to better accommodate clinician and nurse schedules and engage more staff.

LATERAL EFFECTS AMONG PILOT UNITS

Monthly meetings among pilot units provided a forum to share safety stories and issues, such as those involving biometric documentation and access to the formula room, uncovered at the unit level and discuss solutions that were applicable across two or more units. Standardization of work-flow processes that involve communication of critical biometric data has been shown to be critical for patient safety,¹² and standardization of procedures and policies can reduce opportunities for errors associated with practice variation. The belief that these types of improvements may require cross-departmental buy-in and collaboration is emphasized by Frankel et al.⁹ The concept of collaborative improvement has been reported for advancing innovation and education in hospitals, as well as determining clinical guidelines for complex diseases.^{13–15}

ORGANIZATION-LEVEL EFFECTS

Our finding that unit-driven PSWR can help identify organizational (macrosystem) as well as microsystem patient safety issues is consistent with the literature.⁹ Hospitals that allow frontline clinicians to help decide the institutional improvement initiatives are more effective in establishing a safer patient care environment.¹⁶ Learning points generated during PSWR were applicable elsewhere in the institution and led to improvement spread to non-pilot units, as shown in standardization of height and weight measurement and documentation hospitalwide. Key to scalability and spread is the organization's ability to synergize and leverage its assets, such as staffing structure, information technology, and leadership, to achieve its improvement goals.

We found that PSWR helped to identify major problem areas such as medication safety and clinical data management. Often, such problems are experienced only by frontline providers doing the work flows that deliver medications or use clinical data. PSWR provide a forum that allows these providers to share their experiences in the care system and report its vulnerabilities.

Standardization and education were the most widely used change concepts in problems identified through PSWR. Standardization aims to increase adherence to evidence-based prac-

tice and reduce practice variation. Studies suggest that compliance with evidence-based care processes can improve patient outcomes¹⁷ and reduce health care costs¹⁸—and is key for high-performing health systems.¹⁹ Operationally, reducing practice variation decreases the probability of miscommunication, misunderstanding, and misperceptions. PSWR represents an example of standardization of a multilevel, multidisciplinary communication method to identify problems in the care system. Care processes such as handoffs and medication management can be approached in similar ways.

For participating units, the PSWR process is a situational awareness tool that helps management periodically assess new or unresolved vulnerabilities that may affect safety and care quality on the unit. Unit-based PSWR are intended as an adjunct to general “managing by walking around” and standard unit management operations through incorporation of structured patient safety questions and tools and inclusion of additional nursing and medical staff in conducting PSWR. In addition, the findings of unit-based PSWR are communicated to senior leaders as described above and are incorporated in the talking points at executive-level walkrounds.

LIMITATIONS

Although PSWR uncovered a multitude of improvement opportunities, it provided only a glimpse of how processes within the care system were related. A more formal approach to system evaluation is needed to truly understand the interdependencies that exist. A quantitative analysis of PSWR's impact on safety culture would also be useful but would require a more complex experimental design and robust data infrastructure. To that end, at our institution we have built real-time electronic unit-level dashboards that enable each unit to monitor key quality outcome metrics (for example, infection rates, medication errors, patient flow) (Appendix 2, available in online article). We expect that access to more timely data before and during walkrounds will inform the quality of discussion on patient safety issues during PSWR, including factors in the system that may influence the observed outcomes.

FUTURE WORK

Future work should identify and implement systems to objectively measure the effect of PSWR for improving safety and quality. Quantifiable measures could include patient safety events avoided, lives saved, or reduced costs as a result of projects identified through PSWR. Although challenges exist in isolating the impact of PSWR above and beyond the influence of other initiatives, a stepped wedge or factorial experimental design could

potentially help to isolate effects.^{20–22} Future studies should identify and control for nonexperimental differences between study and nonstudy units and develop electronic data management systems capable of tracking project outcome, process, and balancing metrics²³ easily over time.

Conclusions

Unit-based PSWR offer an effective way for frontline health care providers to (1) explore issues contributing to actual or near miss safety events, (2) understand the underlying system flaws, and (3) synergize staff-leadership efforts to provide safer care. Using unit-based PSWR as a standardized forum to discuss patient safety issues facilitates the improvement process and communication at both the macro- and microsystem levels. **U**

The authors thank the participating medical directors and nurse managers, listed in alphabetical order: Allison Ballantine, MD, MEd; Jean Anne Cieplinski, MSN, RN; Linda DeSantis, MSN; Jacquelyn Evans, MD; Jessica Hills, MD; Tynne Hinson, MSN, RN; Leslie Kersun, MD; Lucinda Leung, MD; Andrew A. Palladino, MD; Howard Panitch, MD; Anne Reilly, MD; Barbara A. Scollon, MSN, MBA.

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Online-Only Content

See the online version of this article for
Appendix 1. Patient Weights Quality Improvement Tool
Appendix 2. Real-Time Unit-Level Dashboards

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Appendix 1. Patient Weights Quality Improvement Tool. (continued)

Questions for Nursing Staff:	
When patient's are admitted to your unit from the emergency department or another hospital, is it your practice to re-weigh the patient?	
If a patient is admitted for more than 7 days, what is your practice for re-weighing the patient (i.e. how frequently do you re-weigh)?	
If a patient is re-weighed daily, is it your practice to update the weight in the electronic medical record (EMR) as well? If no, how frequently is the EMR updated?	
Do you routinely use the Stryker bed or bed with in-line scale to weigh patients? If no, why?	
Have you ever used nutritionists to assist you with obtaining difficult weights/lengths? If yes, how often?	
In addition to nursing, do any other staff on your unit obtain patient weights, heights, or lengths? If yes, please specify.	
Questions for Physicians:	
Is it your team preference to order medications based on the patient's weight recorded at admission or utilizing the most recently recorded patient weight?	
Are you aware that physicians can enter a weight when placing medication orders in the electronic medical record for dosage calculations?	
Questions for Other Staff (Nurse Tech, Clinical Nurse Specialist, Nursing Co-Op Student, Nursing Assistant):	
When patient's are admitted to your unit from the Emergency Department or another hospital, is it your practice to re-weigh the patient?	
Do you routinely use the Stryker bed or bed with in-line scale to weigh patients? If no, why?	
Do you have any barriers to weighing or re-weighing patients?	

Appendix 2. Real-Time Unit-Level Dashboards

Measure	FY2	FY2 Annualized	FY1	Projected Variance	% Change
Discharges	2,768	2,846	2,999	-153.0	-5.1%
Discharged by 11am	9.6%	9.6%	10.5%	-0.0	-8.8%
Census: MN	16.3	16.3	16.3	-0.0	-0.0%
Census: 4pm	16.6	16.6	16.8	-0.2	-1.1%
LOS: Mean	2.5	2.5	2.5	0.0	1.5%
LOS: Median	2.0	2.0	2.0	0.0	0.0%
Infections: CLABSI	1	1.0	2	-1.0	-48.6%
Infections: CAUTI	0	0.0	0	0.0	-
Infections: VAP	0	0.0	0	0.0	-
Infections: NVR	2	2.1	1	1.1	105.6%
Infections: SSI	2	2.1	1	1.1	105.6%
Infections: Total	5	5.1	4	1.1	28.5%

Real-time unit-level dashboards prompt discussion of performance on key quality outcome metrics during unit-based Patient Safety Walkrounds. Dashboards include percentage change from the prior year to signal both positive and negative performance variance. FY, fiscal year; MN, midnight; LOS, length of stay; CLABSI, central line-associated bloodstream infection; CAUTI, catheter-associated urinary tract infection; VAP, ventilator-associated pneumonia; NVR, nosocomial viral; SSI, surgical site infection.