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Increasing Compliance with a New Interunit Handoff Process: A Quality Improvement Project

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ABSTRACT

Introduction: Current literature demonstrates that standardizing interunit patient handoff improves communication, information transfer, and patient safety. However, few studies have focused on increasing staff compliance with new handoff processes. The purpose of this quality improvement project was to incorporate both user input into process design and on-the-job coaching with a newly introduced nurse handoff process between the postanesthesia care unit and Medical/Surgical units. We hypothesized that staff compliance would be 100% within 90 days. **Methods:** The team's intervention consisted of (1) involving representative frontline nursing staff in the standardization and modification of the handoff process and (2) providing on-the-job coaching as the new process was being trialed at the bedside. We designed the handoff process during a 2-day workshop and a 1.5-week pilot. Data included the number of observed noncompliant process elements and handoff duration. Three sequential 30-day plan-do-study-act cycles were followed, during which compliance observations and user feedback were used to refine the design and coaching iteratively. **Results:** A total of 1,800 process elements were observed and coached throughout a 90-day trial period. The number of observed noncompliant elements decreased from 15% (92) to 4% (22) from the first 30-day interval to the final 30-day interval. There was no undesirable increase in handoff duration (mean, 8.05±4.72 minutes), and several potential errors—related to orders, charting, and patient placement—were prevented by using the new handoff. **Conclusions:** User input and on-the-job coaching resulted in iteratively increasing frontline compliance with a new standardized handoff process. *(Pediatr Qual Saf 2019;3:e180; doi: 10.1097/pq9.0000000000000180; Published online June 13, 2019.)*

INTRODUCTION

In the United States, communication errors are a contributing cause of approximately two thirds of sentinel events, and over half of such events involve handoff failures.[1] Handoffs in patient care involve providers conveying important patient information and transparent thought processes[2] during the transfer of responsibility for the patient's care.[3] The transfer of sensitive information during handoff can be challenging, and variability can lead to adverse events.[4] A common problem centers on misaligned communication expectations,[5] especially in interunit handoffs. These handoffs introduce differences in care preferences, communication styles, pace, and cultural norms.[4] Handoff information that is biased, inaccurate, or misinterpreted can cause harm.[4] Both the Agency for Healthcare Research and Quality and the Institute of Medicine have recommended implementing standard handoff processes to improve patient safety.[6,7]

Several studies across a variety of care settings and patient populations have shown that standardizing the handoff process is effective in reducing patient safety risk.[4,8,9] In the first study of its magnitude, the Children's Hospital Association showed a significant reduction in care failures after implementation of standardized handoffs across 23 children's hospitals and more than 7,800 handoffs.[10] In 2006, the Joint Commission published National Patient Safety Goal 2E, which required a standardized process for handoffs to reduce risks to patient safety.[11] Recommendations for specific elements to include in handoffs have been shown to be effective. However, despite the evidence showing that standardized handoffs improve patient safety, most healthcare organizations struggle to practice standardized

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handoffs consistently. Use of lean methodology to increase the consistency of a handoff practice has not been widely studied.

In 2016 and 2017, our institution identified safety issues related to handoffs between our postanesthesia care unit (PACU) and Medical/Surgical (Med/Surg) units. Having applied lean methodology to standardize inpatient shift-to-shift nursing handoffs in 2016 and emergency department-to-inpatient handoffs in 2017, we set a goal to apply the lean methodology and adoption-increasing theories to maximize frontline adoption of a standardized PACU-to-Med/Surg handoff practice that included elements recommended by the Joint Commission.[5,12] Features theorized to enhance adoption include involving staff in the initial handoff design and design modification, offering leadership support, using direct observation tools to garner feedback, and allowing materials to evolve based on staff needs.[13–18] The team conducted a 2-day workshop followed by a 1.5-week pilot to design the handoff process. The team studied and iteratively improved the process throughout 3 sequential trial intervals. This project aimed to increase the frontline nursing adoption rate of a new PACU-to-Med/Surg handoff process to 100% within 90 days.

METHODS

Context

Children's Mercy is a 367-bed, free-standing children's hospital, with 2 PACUs located separately at the main and satellite campuses. In 2017, the main PACU admitted 14,437 patients, and the satellite PACU admitted 5,074 patients. The main PACU contains 15 beds and transfers patients to intensive care units, an extended stay postrecovery surgical observation unit, and 7 medical/surgical (Med/Surg) units. The satellite PACU contains 8 beds and transfers patients to 1 Med/Surg unit. We included both PACUs in the project, with 2 Med/Surg units and the observation unit included at the main campus location, and with the single Med/Surg unit included at the satellite location. The Med/Surg and observation units included in the project were selected based on having—as primary surgical units—relatively higher volumes of both patient transfers and reported handoff-related safety issues. The number of PACU handoff-related safety issues identified before the improvement project was in large part what prompted the project at its outset.

The project took place between February and May 2018 and consisted of a 2-day handoff design workshop, a 1.5-week pilot, and a 90-day implementation trial (Fig. 1). The trial was made up of three 30-day intervals. Prior improvement efforts at our institution proved these interval durations to be effective. The institution had been deploying lean methodology in pockets of the organization, including perioperative areas, since 2015.

Intervention: Frontline Input into Handoff Design

Nursing directors, as well as selected frontline nurse representatives (eg, registered nurses, educators, quality improvement coordinators) from all pilot units, participated in the 2-day workshop. As the handoff to be designed was interunit, collaborative participation by all units was critical.

During the workshop, components required for an ideal handoff were discussed and selected. The desire to build a handoff covering everything needed to safely care for the patient[12] drove the team to agree upon what information was and was not critical. Due to multiple preferences in and expectations of content deemed critical, the team needed a detailed agreement of the handoff process—more detailed than is offered by the widely published I-PASS mnemonic (illness severity, patient summary, action list, situation awareness and contingency plans, and synthesis by receiver).[1,19–22] The team intentionally incorporated the Joint Commission's "Eight Tips for Handoffs,"[12] some of which is also included in the I-PASS mnemonic,[1,19–22] when designing the standardized handoff components. The team emphasized components practiced least in the trial units during assessments of PACU-to-Inpatient handoffs before the design work (Supplemental Digital Content 1, Table, http://links.lww.com/PQ9/A98). Ultimately, the handoff design included a standardized sequence, content deemed critical for safe patient care, a face-to-face requirement, an electronic portion, involvement of patient and family, and mutual acceptance by the handoff giver and receiver. The handoff process was designed with input from frontline staff familiar with the setting and cultural norms.

Using lean methodology, the design team captured all decisions in newly documented standard work with

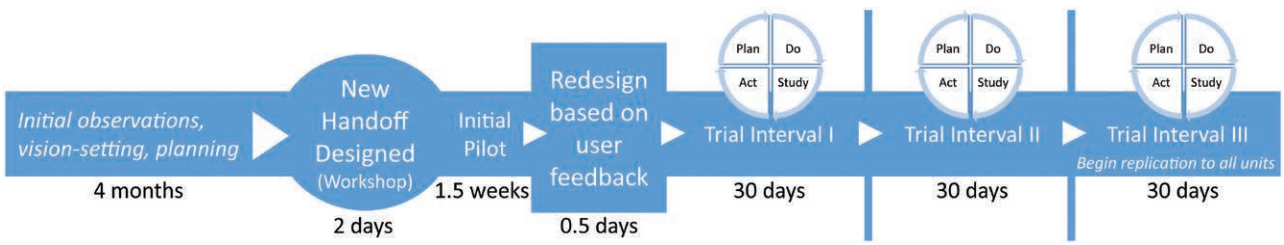

Fig. 1. The project timeline consisted of a design workshop, initial pilot, then 3 sequential trial intervals, each serving as a Plan-Do-Study-Act iteration to continually improve the handoff design.

formatted instructions of agreed to process steps and job aids. Importantly, tools already in use, both from the Med/Surg units and PACUs, were modified to incorporate the newly decided standards intuitively. During the second day of the workshop, prototypes of the modified tools, standard work, and job aids were used by frontline nurses (with guidance by workshop participants); user feedback, as well as observational findings related to intuitiveness, workflow, difficulty, or patient and family experience, informed design revisions.

A 1.5-week initial pilot phase followed the workshop (Fig. 1), during which every frontline nurse in the pilot units, accompanied by a workshop participant when available, practiced the newly designed handoff process during his or her PACU handoffs. The nurse provided real-time verbal feedback to the workshop participant and/or anonymous feedback using a 6-question survey. During the pilot phase, approximately 90 handoffs were used to practice the new process, and 50 survey responses were gathered. The workshop design team adjusted the handoff design based on survey responses and qualitative findings during the pilot.

Intervention: On-the-job Coaching

Whereas auditing conventionally refers to observing or grading compliance with a process, coaching is defined differently. An observation was considered coaching when the following lean-inspired criteria were met:

- Physical presence during handoff, with the coach observing the nurse during the actual handoff, in the actual location of the handoff
- Seeking and answering any questions the user might ask, including providing a rationale for handoff requirements
- Observing any barriers or types of waste (delays, unnecessary verbiage, excessive movement, missing supplies) the user experienced during handoff
- Garnering feedback to improve the handoff design for the user

Designated leaders including unit nursing directors, charge nurses, resource nurses, quality improvement nursing coordinators, unit educators, and staff nurses who participated in the design provided coaching. Coaching was used in 3 handoffs per week, per unit, based on the average number of weekly PACU handoffs that occur on each unit and feasibility for leaders. To standardize the coaching across the pilot units,[5] we used lean confirmation tools ("*kamishibai* cards," Fig. 2). Coaching tips and guidance were provided at the design workshop itself.

Handoff Confirmation Checklist Tool

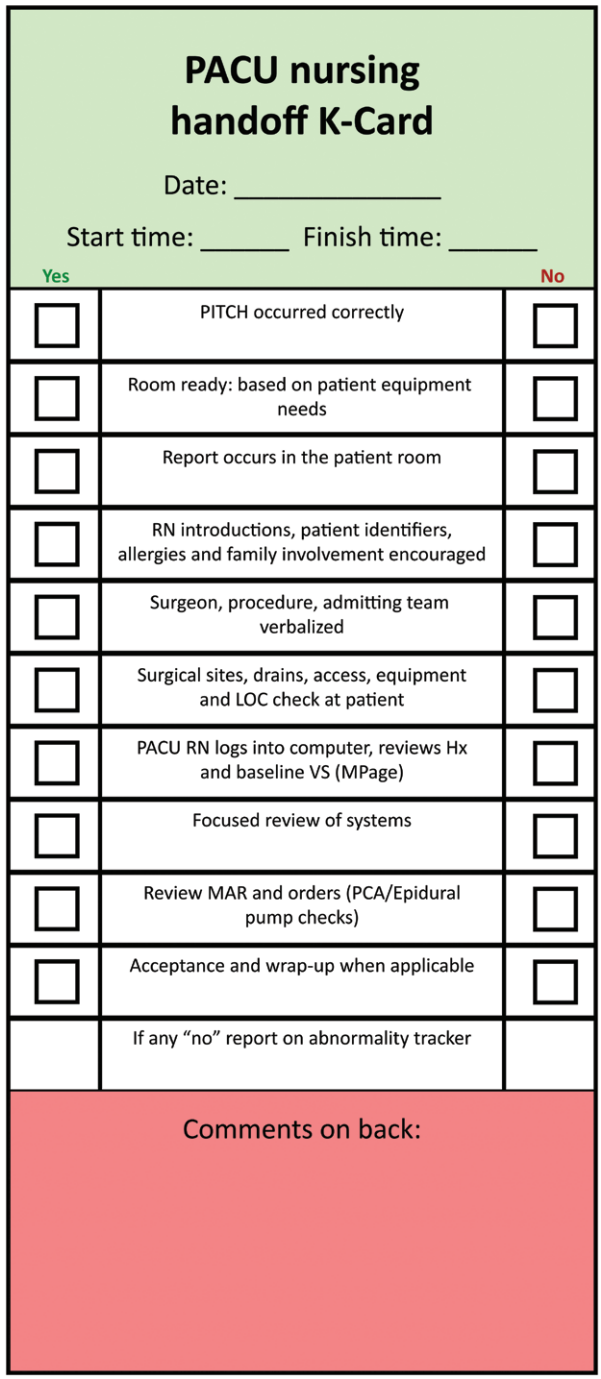

Fig. 2. The confirmation checklist tool ("*kamishibai* card") guided on-the-job coaching and was used to collect compliance data. Hx indicates history; K-card, kamishibai card; LOC, loss of consciousness; MAR, Medication Administration Record; PCA, patient-controlled analgesia; PITCH, Pre-Inpatient Telephone Call Handoff (referring to the prehandoff phone call); RN, registered nurse; VS, vital signs.

Data Collection and Analysis

On-the-job coaches observed compliance with the newly standardized handoff elements throughout the 3 intervals of the trial. For each handoff observed, 10 required elements were monitored (described in Supplemental Digital Content 1, Table, http://links.lww.com/PQ9/A98), and the number of noncompliant elements was totaled. We measured handoff duration as a balancing measure. Coach observers collected data using the lean

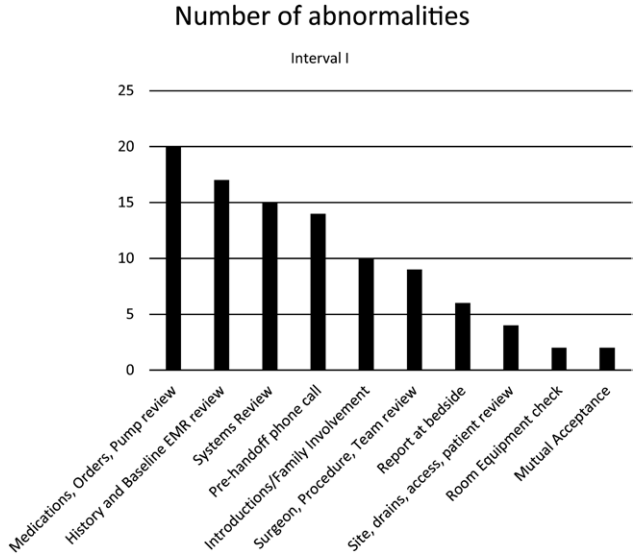

Fig. 3. At the 30-day mark, the team generated a histogram comparing occurrences of observed abnormalities. EMR indicates Electronic Medical Record.

confirmation checklist tools (Fig. 2). To track the number of confirmations performed, all confirmation checklist tools used for observed handoffs were posted to the unit's visual board, then tallied at the end of the 30-day interval. Each coach was asked to verbally report any qualitative findings of their coaching experiences at the end of each 30-day interval.

Noncompliant elements noted on the confirmation tools were compiled on a running histogram including date and category of noncompliance. Each unit maintained its abnormality histogram throughout each 30-day interval, then all noncompliant elements noted were combined into a single histogram at the end of each interval (Fig. 3). On-the-job coaches tracked additional findings (ie, categories not included on the confirmation tool such as a nonstandard sequence of elements) on the abnormality histogram. At the end of each 30-day interval, workshop participants and sponsors reviewed the noncompliant elements and findings identified throughout the on-the-job coaching. This information drove the modifications of the handoff process, standards, tools, and training.

We analyzed study data using Stata, Version 14.2 (StataCorp LLC, College Station, Tex.) and QI Macros (KnowWare International, Inc., Denver, Colo.). To test for statistical significance in comparing compliance across each of the 3 implementation intervals, we conducted a Chi-squared test for each of the 10 required handoff elements. A Fisher's exact test was used to test for independence between intervals. Statistically significant was defined as $P < 0.05$. Another method used to analyze improvement in compliance across intervals was a time series control chart.

We submitted a protocol to the institution's Office of Research Integrity and Institutional Review Board, which determined the project qualified as quality improvement and therefore waived the requirement for Institutional Review Board review and approval.

RESULTS

On-the-job Coaching

During each of the 30-day intervals, the PACU coaches observed 12 handoffs (3 per week) and the Med/Surg and observation coaches observed 48 handoffs (3 per week, for each of the 4 units). Altogether, 60 handoffs per 30-day interval, totaling 1,800 handoff elements throughout the 90-day implementation trial, were coached.

Compliance

The completion of all 10 required elements was higher at the third implementation interval than the first interval (Fig. 4). The compliance rate for 6 of the 10 elements significantly increased between interval I and interval II. Compliance for 2 elements (History and Baseline Electronic Medical Record review, Systems review) increased with even stronger significance between interval I and interval III ($P = 0.002$ and $P = 0.004$, respectively). During the first interval, 92 noncompliant abnormalities were observed (Fig. 3), compared with just 22 during the third interval. Several elements reached 100% compliance in either interval II or III (Fig. 4).

The compliance control chart (Fig. 5A) shows that the weekly compliance rate for all handoff elements increased over time. Data points for week 5 and subsequent weeks indicate an 8-point "shift" above the centerline (83.5%), representing special-cause increase—meaning statistically not due to chance alone—occurring just after completion of interval I. We sustained the compliance increase throughout the final 2 implementation intervals.

Handoff Duration

Before the design and implementation of the new handoff process, handoffs typically lasted between 5 and 15 minutes. Although handoff start and stop times were not noted for all handoffs observed (76 of the 180 handoffs, or 42%, included both times), the average postimplementation handoff duration for the durations noted was 8.05 minutes (SD, 4.72 minutes). As shown in the duration control chart (Fig. 5B), except for a single data point, there was no special-cause variation beyond the first week.

DISCUSSION

We found that applying the lean methodology and theoretical adoption-increasing strategies[13–18] while implementing Joint Commission recommendations[5,12] for a PACU-to-Med/Surg handoff process increased the adoption rate by frontline nursing staff. This approach had no undesirable impact on handoff duration. Applying the 2

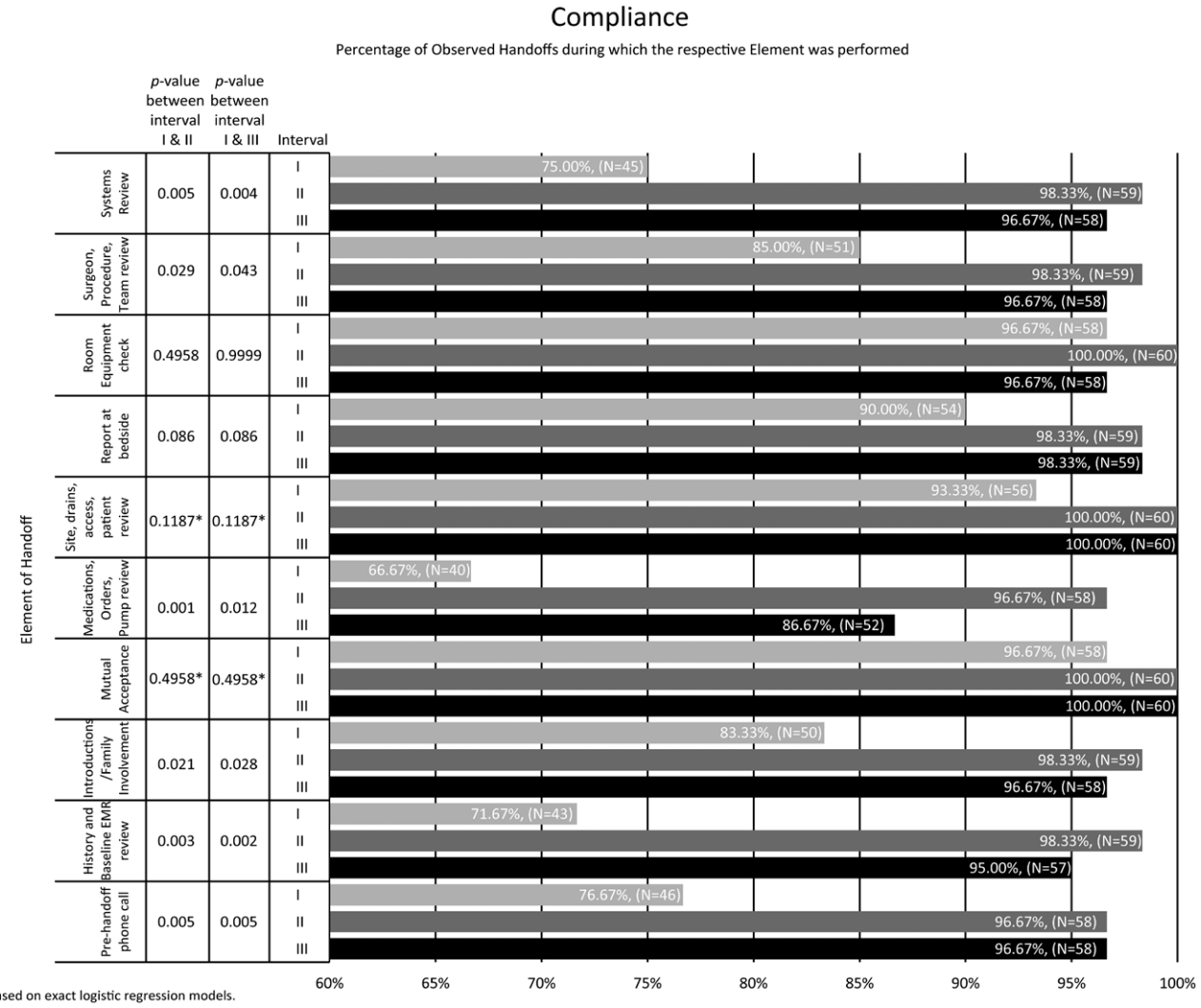

Fig. 4. For each of the 10 elements included in the newly designed handoff, compliance for each of the 3 trial intervals is compared. $P < 0.05$ was considered statistically significant. EMR indicates Electronic Medical Record.

outlined interventions achieved nearly 100% compliance with required handoff elements in just 90 days, a relatively short period for a multiunit improvement. These findings build upon prior work linking standardized handoffs with patient safety and confirm methods for operationalizing National Patient Safety Goal 2E[11] to reduce patient safety risk.

The first intervention, that is, iterative frontline input into the process both at the origin and during subsequent revisions, ensured that those with the most related knowledge of workflow, constraints, and culture designed the standards. Consequently, the design was more intuitive and more suited to the frontline routines. The second intervention, that is, on-the-job coaching, provided supportive training to users of the new process, while also enabling a safe environment for users to communicate unforeseen barriers and constraints. We targeted coaching around abnormalities and elements showing the least compliance, and through coaching dialogue, users were able to partner with coaches in resolving process issues. Continual skill development of coaches themselves enhanced the effect of coaching. Additionally, the effect of coaching was cumulative, in that during each interval, up to 60 nursing staff members who had not yet practiced the new handoff were coached.

As reported, our adoption strategies drove an increase in compliance across the 3 implementation intervals, particularly between Interval I and II. Each 30-day implementation interval served as a separate plan-do-study-act cycle (Fig. 1). Each interval activity was planned with purpose, and the results of each interval were studied to inform the subsequent interval's adjustments (Supplemental Digital Content 1, Table, http://links.lww.com/PQ9/A98). For example, the 4 handoff elements showing the most noncompliance during interval I (Fig. 3) were analyzed to inform adjustments for interval II. These adjustments likely contributed to the increased compliance that followed.

The number of PACU handoff-related safety issues identified before the improvement project was in large part what prompted the project at its outset. Although

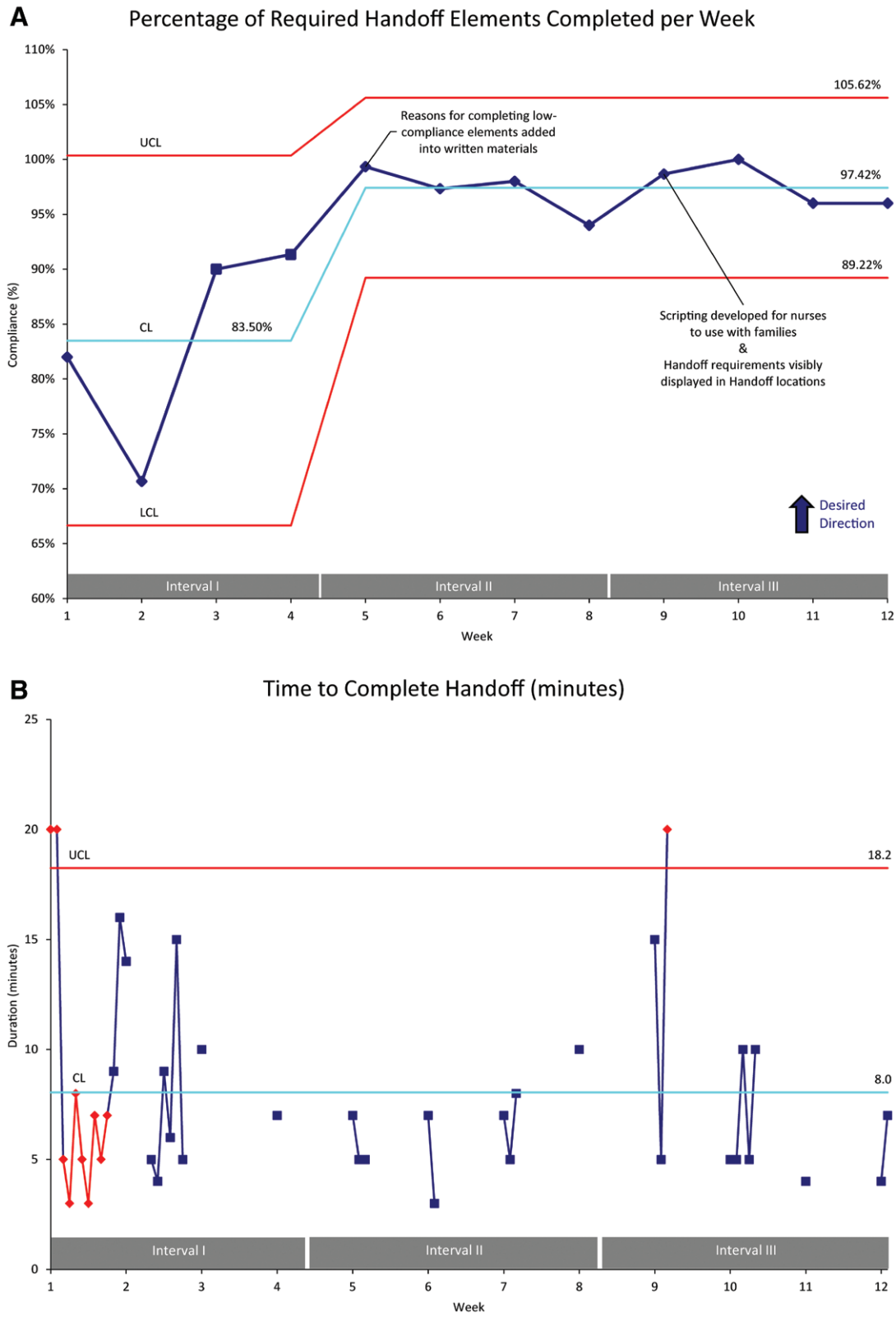

Fig. 5. Weekly handoff compliance and handoff duration throughout the 3 trial intervals are juxtaposed. A, The weekly compliance rate for all handoff elements shifted above the centerline (dashed) at week 5 and subsequent weeks, representing a statistical, special-cause increase. Because half the handoff elements were newly introduced into the handoff process, we assumed that compliance before week 1 (not shown) did not exceed 50%. B, Handoff durations are shown in minutes. After week 1, time to complete handoff remained stable within the control limits—except 1 handoff in week 9. CL indicates centerline; LCL, lower control limit; UCL, upper control limit.

we did not observe a decrease in the number of PACU handoff–related safety issues during the study period, 8 safety issues related to orders, charting, and patient placement were reportedly prevented. Potentially, this finding reaffirms the positive correlation between standardized handoffs and reduced patient safety risk described in prior studies.[4,6–11] Further study is required to understand the long-term safety impacts of standardizing handoffs. Going forward, cause analysis of safety issues can guide further refinement of the handoff standards, with the ultimate goal of reducing safety issues over time.

Additionally, despite an increase in compliance with the new standardized handoff elements, there was no undesirable impact on handoff duration and no apparent unfavorable impact on patient flow and operational efficiency. Qualitative feedback from frontline handoff users indicated that typical duration seemed to temporarily increase immediately after initial implementation (eg, user's first attempt) but consistently decreased with more process familiarity over the 90 days. Users were pleased with the handoff's overall duration which was noticeably similar to preimplementation durations. Users also reported that the standardized handoff reduced the amount of posthandoff rework and searching for missing information or unanswered questions. This reduction effectively saved time and decreased workflow delays.

As expected with improvement projects, there were several challenges with implementing the interventions. First, garnering frontline input into the design of the handoff and developing coaching plans required time away from their usual work. To mitigate this, we concentrated the work into full-day, momentum-retaining sessions. Another challenge was employing a style of coaching new to some of the selected on-the-job coaches. The team purposefully acknowledged coaching as a skillset requiring practice and development. At the end of every 30-day interval, the team of coaches shared their personal coaching experiences, the challenges faced, the lessons learned throughout the preceding interval, and coaching tips. These tips could then be applied during the following interval. Supplementing the practice of on-the-job coaching with a shared review every 30 days developed stronger coaching skillsets and comfort levels.

As with most quality improvement projects, the desire for quick, iterative improvement outweighed the desire to control for data purity. For example, because we obtained the compliance measures during in-person coaching observations, a Hawthorne effect might have been introduced. Similarly, the coach's role was intended to improve user compliance, so coaches' collection of compliance data might have included bias.

Adoption of published recommendations for improving handoff safety can be increased by incorporating frontline input and developing on-the-job coaching. After seeing the benefits of a standardized handoff and increased potential for patient safety, the frontline staff are now requesting that all interunit handoffs have a standardized process. To date, we have replicated the process successfully in the 5 remaining Med/Surg units. We have sustained a 95% compliance rate (based on coaching observations), and we are applying lessons learned from this work to an Intensive Care Unit-to-Med/Surg handoff.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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