

Simulation Training for Rapid Assessment and Improved Teamwork - Lessons Learned from a Project Evaluating Clinical Handoffs

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Effective communication between clinicians is a crucial component of safe care. High-quality communication may be especially critical during care transitions between clinicians (handoffs). In a two-year quasi-experimental Quality Improvement project, we are using simulation learning to evaluate and improve communication between anesthesia providers and nurses as care is transitioned from the operating room to the post-anesthesia care unit (PACU). Using a multiple baseline, staggered entry, prospective cohort design with repeated measures, we are introducing a training intervention and evaluating its effects on dyadic communication. The primary hypothesis is that simulation-based communication skills training of PACU personnel will significantly improve the quality of handoffs. Clinicians' performance is being compared before and after their training on four dimensions of handoff effectiveness: information transfer; use of best evidence handoff strategies; interpersonal skills; and team behaviors. Clinicians also rate their own handoffs. Lessons learned and results to date will be presented.

INTRODUCTION

Overcoming problems in communication and coordination among nurses and physicians remains a critical challenge to the improvement of patient safety. Institutional experience and the literature suggest that handoffs are a "high risk" situation that can cause gaps in care due to communication/teamwork failures (Cook, Render, & Woods, 2000), which may be the most important contributors to preventable adverse events in healthcare. Starting in 2006, we undertook an institutional quality improvement initiative to use simulation to evaluate and improve hospital-based transitions of care. The training initiative, called STRAIT (Simulation Training for Rapid Assessment and Improved Teamwork), is initially targeted at anesthesia provider-post-anesthesia care unit (PACU) nurse handoffs. We chose this particular clinical handoff because it involves inter-professional communication about an at-risk patient and because it is a well-defined and logistically feasible encounter amenable to study and improvement. We expect the initiative to be readily adapted to other patient handoffs.

Communication was the most frequently cited cause of medication errors reported to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) from 1997-2003 (Joint Commission on Accreditation of Healthcare Organizations, 2005). In Australia, communication errors were twice as likely to be cited as the primary cause of in-hospital mortality as errors of clinical skill (Wilson et al., 1995). In emergency medicine, teamwork failures have been associated with over 40% of lawsuits (Risser et al., 1999). In an anesthesia study, communication problems contributed to 20 of 98 (20%) of non-routine events reported by anesthesia providers (Weinger, Slagle, Jain, & Ordonez, 2003). While differences in incidence in the above studies are due to different methods, definitions, and review criteria, the message is consistent – communication between clinicians is a major patient safety issue.

Clinician communication is believed to be essential for establishing a culture of safety (Barach & Small, 2000; Singer et al., 2003). While most health care is provided by interdisciplinary teams, performance incentives are targeted at individuals, not teams, as are job and other selection and assessment processes (Barach & Weinger, 2007; Kohn, Corrigan, &

Donaldson, 1999). Traditional specialty-centric clinical education programs are deficient in team training. To coordinate effectively, team members must have mutual knowledge about each member's roles, functions, skills, competencies, and goals (Klein, Feltovich, Bradshaw, & Woods, 2005). Both verbal and nonverbal communication is critical to successful teamwork (Kanki, Lozito, & Foushee, 1989; Xiao, Mackenzie, Patey, & Group, 1998).

Especially when communication must cross professional boundaries (e.g., nurse and physician), differences in culture, training, norms, attitudes, perspectives, goals, expectations, status, gender, and socioeconomics can predispose to misunderstandings. Effective communication is even more difficult when the individuals involved are stressed by time pressure, sleep deprivation, or fatigue – situations ubiquitous in health care (Barach & Weinger, 2007; Weinger & Englund, 1990). Other challenges include: hierarchical status, uncertainty about care responsibility, and lack of standardized communication methods (Thomas, Sexton, & Helmreich, 2003). Variations in communication style can also lead to frustration or misunderstanding. Physicians tend to use short statements to summarize critical patient information whereas nurses may be more descriptive and detailed in their presentation of patient data (Haig, Sutton, & Whittington, 2006). Nurses typically have a more jaundiced view of the quality of teamwork than physicians (Makary et al., 2006).

Handoffs are critically important for establishing a shared mental model around the patient's condition. Successful handoffs avoid unwarranted shifts in goals, decisions, priorities, or plans, including missing tasks or redoing ones performed by the previous person (Patterson, Roth, Woods, Chow, & Gomes, 2004). Numerous qualitative descriptions of clinical handoffs exist (Cooper, Long, Newbower, & Philip, 1982; Kerr, 2002; Miller, 1998), but few rigorous studies. Handoffs between inpatient residents have been more widely studied (Solet, Norvell, Rutan, & Frankel, 2005; Sutcliffe, Lewton, & Rosenthal, 2004; Van Eaton, Horvath, Lober, Rossini, & Pellegrini, 2005) although proposed interventions have focused on use of technology (Frank, Lawless, & Steinberg, 2005; Van Eaton et al., 2005).

The primary hypothesis of our project is that simulation-based communication skills training of PACU personnel will significantly improve the quality of handoffs. We also hypothesize that such training will enhance the PACU's culture of communication and quality of care. Thus, our project's three Aims are to: 1) develop a simulation training intervention (STRAIT) for PACU handoffs; 2) determine if STRAIT improves PACU handoff quality; and 3) study the impact of a training intervention on the PACU's communication culture and outcomes. This paper describes our initial efforts to develop, deploy, and evaluate quality improvement in clinician-clinician communication.

METHODS

Study Design

After an initial 2-month baseline of observations of actual patient handoffs starting in June 2007, clinicians from one PACU will receive STRAIT. Training in the second PACU will begin in January 2008. The results of daily field observations are fed back to clinicians during the intervention. STRAIT consists of preparatory web didactics and experiential learning using hybrid simulation. Prior to every training session, clinicians perform a videotaped simulated handoff. Individual clinician's simulated handoff performance will be compared before and after their training (Aim #1) on four dimensions of handoff effectiveness: information transfer; use of best evidence handoff strategies; interpersonal skills; and team behaviors. Clinicians also rate their own handoffs. For Aim #2, trained observers apply abbreviated metrics of the same effectiveness dimensions to actual PACU handoffs pre- vs. post-STRAIT. For Aim #3, we will assess pre- vs. post-STRAIT differences in clinician responses to a communication culture survey and in selected PACU-specific outcome measures.

Critical steps in the study's development and implementation have been: Curriculum development and implementation, handoff evaluation instrument development and validation, handoff observation logistics, observer training, and data management issues. Each of these steps has presented both obstacles and opportunities.

RESULTS

In the early stages of project development and deployment, we learned much about teaching and evaluating clinician-clinician communication. The following sections discuss these “lessons learned.”

Curriculum Development and Implementation

Although much literature has been produced about communication, most address the hazards of not communicating well, and offer little assistance in identifying the underpinnings of what makes communication effective in the clinical setting. To best determine what the core curriculum should entail for the purposes of this project, live observations of care provider interchanges in the PACU and targeted interviews were conducted.

A key observation was that the management of barriers to effective communication such as time pressure, patient acuity, and competing priorities was critical to successful handoffs. These factors have become a primary focus of the curriculum. The curriculum consists of a general orientation to need for standardized handoffs, basic understanding of the role and responsibility of each care provider, obstacles to effective and efficient handoffs, and strategies to manage these common barriers.

The mechanism for delivery of content and validation of skills will be through a blended learning approach. The learner will first be assigned an interactive multimedia web-based learning module covering the core content and only then will participate in a 2-hour practicum utilizing both standardized patients and mannequin simulators. The web-based learning module and practicum are intended to stimulate thought and reinforce positive behaviors that will ideally translate to daily practice.

When developing curriculum and implementing web-based training interventions, it is important to carefully consider the nature, requirements, and potential challenges of your institution’s informatics infrastructure and security (e.g., firewalls). We engaged in the careful selection of software during the design phase to ensure that it is user-friendly for both developers and users and to help prevent technical problems and usability issues.

We quickly came to appreciate the importance of seeking information from front-line clinicians (through observation and interview) as well as unit administrators, allowing us to tailor the training curricula and simulated handoff scenarios to the needs of the intended trainees. Issues and topics that the project team initially thought were critical to include in training were not always congruent with those of our constituents. Collaboratively, the team and trainee representatives used the resulting educational objectives to create structured vignettes and case scenarios.

Development and Validation of Instruments

A unified two-page data collection instrument, adapted from prior research and iteratively refined, is being used to evaluate handoff effectiveness. The instrument’s design was driven by the fact that actual handoffs are typically only 2-5 minutes in duration. Choosing a scale (i.e., ordinal vs. continuous, level of granularity), identifying behavioral anchors, and limiting the number of ratings during actual handoffs all proved to be design challenges. The final version includes seven subscale and one summative global 5-point behaviorally anchored ratings. The subscales incorporate assessment of:

- 1) Information content based on the Situation-Background-Assessment-Recommendations (SBAR) formulation (Haig et al., 2006);
- 2) Strategies for managing information flow, concurrent tasks, and alternative communication style (Patterson et al., 2004);
- 3) Teamwork behaviors of the clinician dyad including communication, coordination, conflict resolution, climate and culture, shared mental models, and decision-making (Baker & Salas, 1992); and
- 4) Interpersonal skills including social interaction, engagement, cooperation, respect, and non-verbal behavior (Hall, Harrigan, & Rosenthal, 1995).

Each observed clinician is also asked to rate their satisfaction with the handoff, its effectiveness, and to identify obstacles, which are also identified by observers, that reduced handoff effectiveness. A Communication Culture survey has been adapted from a subsection of the Safety Attitudes

Questionnaire (SAQ) (Sexton et al., 2006) to obtain subjective ratings of this construct in the PACU versus the operating room as a comparison group.

Preliminary results have demonstrated that these instruments are effective for scoring live handoffs in the PACU despite the aforementioned time constraints. Pilot data also found that paper artifacts played an important role in most handoffs and, as a result, the extent of their usage was added to observers' evaluations.

Handoff Observations and Observer Training

Training and establishing the reliability of observers can be challenging (Slagle, Weinger, Dinh, Brumer, & Williams, 2002). However, we found that there was significant benefit to initiating observer training in parallel with the development of the clinician curriculum and measurement instruments. For example, observers provided feedback on the evolving simulation-based handoff curriculum.

The ability to videotape handoffs (albeit simulated ones) substantially enhanced training and assessment of observers. The brief nature of patient handoffs and the busy environment in which they occur required observers to be trained in the best ways to conduct and position themselves.

While independent groups of observers assess the actual versus the simulated (videotaped) handoffs, all observers receive the same training to enhance our ability to compare these two data sets. Note that while the observers of the simulated handoffs can be blinded as to participant experience and training, this was not entirely possible with observers of actual handoffs. Another challenge is attaining uniform quality among observers with different backgrounds (nurses, human factors engineers, technicians). Nonetheless, a formal and rigorous training and "certification" process was established. Inter-rater reliability is assessed by first comparing observers' ratings of videotaped handoffs and then having pairs of observers independently score real patient handoffs in the PACU.

Data Management Issues

Three separate databases needed to be built to track the simulation training, actual PACU observations,

and communication culture survey. Provider demographic information proved to be widely distributed within the organization (including human resources, clinical departments, hospital units, residency programs, etc.) and obtaining these data was a logistical and political challenge. Notification, scheduling, and tracking mechanisms were designed and implemented in synchrony with the implemented databases. It was a major challenge to schedule off-site training of operational clinicians, despite a strong leadership commitment to the project (including the provision of PACU observers and the hiring of expensive replacement workers), given the complex and ever-changing schedules of nurses and resident physicians. We had to incorporate a mechanism to identify and notify "backup" trainees.

All clinicians were assigned a randomly generated ID number with the goal of eliminating any identifying provider (or patient) data. However, provider information had to be retained initially to allow appropriate tracking of training status.

With regard to PACU observation sessions, deidentified patient data were required (since patient factors affect handoff difficulty). Collecting patient data poses technical as well as privacy and confidentiality issues. Required data elements were spread among several data warehouses within the institution, and they differed in format and terminology. The team also struggled with the optimal platform with which to collect actual handoff data. While electronic devices (e.g., handheld or tablet PC) streamline data propagation through the database reliably and conveniently, disadvantages include cost, need for software development, lack of permanent validation records (e.g. paper), and fear of device loss or damage.

DISCUSSION

This paper discusses challenges and opportunities associated with designing and implementing a controlled study to evaluate the effectiveness of a clinician communication training intervention. Such studies, conducted in the operational environment, are inherently complex and necessitate many compromises. However, what is lost in terms of experimental control is gained in face validity,

generalizability, and impact. Despite these challenges, rigorous evaluation of training interventions are critical to advancing patient safety. The effectiveness of experiential learning, including simulation, in inter-professional communication training must be ascertained. This project begins to tackle these important issues.

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