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Implementation of TeamSTEPPS in the Operating Room a Quality Improvement Project

Teresa D. Vincent, DNP(c), BSEd, RN, CNOR

### Abstract

This project aimed to determine if implementing Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) at Norton Women's Kosair Children's Hospital (NWKCH) main operating room would decrease the occurrence of adverse events leading to patient harm. The TeamSTEPPS' goal is to create high-reliability teams (HRT) and thus limit the potential for patient harm, including but not limited to wrong site surgery and unintentionally retained foreign objects. In the last decade, the healthcare industry has increased focus on patient safety; however, even with the implementation of evidence-based practice and new technical advances, patient safety within the operating room has not significantly improved.

*Keywords:* operating room, patient harm related events, patient safety, surgery, TeamSTEPPS.

### Implementation of TeamSTEPPS in the Operating Room

The purpose of this project was to determine if implementing Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) at Norton Women's Kosair Children's Hospital (NWKCH) main operating room (OR) would decrease the occurrence of adverse events resulting in patient harm, commonly referred to as adverse patient harm related events (APHRE). The TeamSTEPPS' goal is to create high-reliability teams (HRT) and thus limit the prevalence of APHRE. Among the HRT characteristics, the most notable are: (a) situational awareness, (b) standardized communication, (c) closed-loop communication and (d) shared mental model.<sup>1,2</sup> In 2005, Awad and colleagues identified communication failure as the leading source of adverse events in the OR.<sup>3</sup> Teaching teams how to properly communicate with each other appears to be an attainable solution for avoiding errors.

### Description of Problem

The Centers for Disease Control and Prevention (CDC) estimated that 51.4 million inpatient and 57.1 million outpatient surgical procedures were performed in 2009 in the United States (US), which represents multiple opportunities for APHRE to occur.<sup>4,5</sup> Such events are often life changing for the patient and surgical team and include but are not limited to wrong-site surgery, lost specimen, retained foreign body, implantation of incorrect device, wrong procedure, incomplete procedure, and surgical site infection.

In 1999, The Institute of Medicine (IOM) published *To Err is Human* and informed the public about medical error frequencies. The report identified communication and system factors as sources of most errors, rather than the weaknesses of individuals.<sup>6</sup> In addition, The Joint Commission (TJC) posits that communication breakdown is one of the leading causes of wrong-site surgery, as well as other sentinel events in the operating room.<sup>7</sup>

### Setting

Norton Women's Kosair Children's Hospital (NWKCH) is one of five hospitals within the Norton Healthcare (NHC) system. Licensed for 373 beds, this acute care facility supports the community by providing a multitude of inpatient and outpatient services. Although its 12 operating suites allow surgical interventions 24 hours/day, 365 days/year, 75-80% of all surgical cases are completed during standard hours (7:30 am–5:00 pm, Monday through Friday). According to the available data, approximately 8,200 surgeries are performed annually.

### Intended Outcomes

This particular phase (Phase II) of a long-standing 4-phase quality improvement (QI) project in the NWKCH OR aimed to increase the completion of Patient Safety Reports (PSR) and debriefing forms by 10%, while decreasing the number of APHRE events by 10%. Phase I focused on the development of team skills with the use of briefs, huddles, and debriefs, along with the completion of debrief forms.

A PSR is an electronic report completed when an event outside the normal standard of care occurs, such as deviation from policy and procedures, a process failure, an event that could potentially result in patient harm, or actual patient injury. Although every Norton Healthcare employee has the ability to complete a PSR, the healthcare provider that discovered, or was involved in the occurrence, should do it. An event that leads to patient injury is referred to as APHRE. Failure to report any of the above occurrences can result in disciplinary action.

Every inpatient and outpatient surgical procedure should be followed by a debrief during which the entire OR team verbally addresses the following three questions: (1) What went well? (2) What did not go well? and (3) What could be done differently? The circulating nurse is responsible for transcribing the answers onto a debrief form.

### Evidence-based Solutions

To decrease the potential for and prevalence of medical errors, the healthcare industry has drawn upon experiences from the aviation industry in order to identify pertinent strategies aimed at improving teamwork, team communication, and team skills. The aviation industry developed Crew Resource Management (CRM) to assist aircrews with the development of team communication techniques through the use of checklists and definitions of roles and responsibilities for each team member.<sup>8</sup> To assist with team training, some healthcare organizations have adopted CRM to train healthcare providers.<sup>9</sup>

Kao and Thomas identified several barriers to the adoption of CRM principles for OR teams, including regulatory structure, interpersonal relationships between professionals, leadership hierarchy, no defined beginning and end for surgical teams, multiple locations with different team members, rapid technology changes, and the complexity of the human body.<sup>10</sup> As a means of overcoming these challenges, the federal government developed **Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS)**.

#### *TeamSTEPPS*

The US Department of Defense's Patient Safety Program (DoD) and the Agency for Healthcare Research and Quality (AHRQ) worked collaboratively to develop the evidence-based TeamSTEPPS program to assist the healthcare industry with team training.<sup>11</sup> The program and all related web-based materials are available at no charge, along with free Master Training.<sup>12</sup> The initial Master Trainers should be trained at a National Implementation Center, whereby they benefit from a free detailed curriculum and multimedia tools for teaching others the five key TeamSTEPPS principles comprising of (1) team structure, (2) leadership, (3) situation monitoring, (4) mutual support, and (5) communication. TeamSTEPPS provides a toolkit to

Master Trainers with the resources needed to train other staff in their departments, who thus become TeamSTEPPS coaches.

### Project Methods

While the agency strongly recommends adhering to the AHRQ training format for TeamSTEPPS, it also encourages flexibility, making it possible to customize the content and delivery mode to meet the needs of individual hospitals. This stance recognizes that, while ideal, the traditional training format is not always feasible for a busy unit such as the OR, where staff would not be able to devote an entire day to training. In line with this view, this QI project and resulting materials were divided into four phases (see Table 1). Phase I was part of a previous Doctorate of Nursing Practice (DNP) project that began in the fall of 2013, focusing on the TeamSTEPPS principle of team building while Phase II, which commenced in fall of 2015, focused on communication. Both phases will be ongoing while Phase III and IV are implemented.

Table 1

#### *TeamSTEPPS Techniques Targeted for Phases I and II*

| <b>Phase</b> | <b>Tools</b>                 | <b>Activity</b>   |
|--------------|------------------------------|---|
| I            | Established the need         | Obtaining administration support  |
| I            | Introduced TeamSTEPPS        | Establishing a need and creating a sense of urgency with the OR staff                           |
| I-ongoing    | Briefs – Leadership          | Establishing daily departmental briefs  |
| I-ongoing    | Huddles –Leadership          | Introducing the time-out before incision, which occurs before every procedure                   |
| I-ongoing    | Debriefs –Leadership         | Developing debrief form and educating staff   |
| I-ongoing    | Debrief reports              | Posting a monthly percentage graph of completed debrief forms                                   |
| II           | TeamSTEPPS coaching workshop | TeamSTEPPS Master Trainers providing a 75-minute TeamSTEPPS Coach workshop to OR leadership and |

|   |  |  |
|---|--|--|
|   |  | volunteers from the OR unit-based council (completed in August 2015)   |
| II-ongoing  | SBAR – communication technique   | TeamSTEPPS Coach providing a 10-minute workshop at the OR staff meeting (completed in August 2015)   |
| II-ongoing  | Call-out – communication technique   | TeamSTEPPS Coach providing a 10-minute workshop at the OR staff meeting (completed in September 2015)  |
| II-ongoing  | Check-back – communication technique                                       | TeamSTEPPS Coach providing a 10-minute workshop at the OR staff meeting (completed in October 2015)  |
| II  | Merging and integrating the communication techniques                       | Playing a 30-minute game during the OR staff meeting (took place in November)  |
| Introduced in Phase II for the subsequent phases (III & IV) | Introduction to Situation Monitoring and Mutual Support (Phase III and IV) | Mandating the OR staff to review a TeamSTEPPS PowerPoint discussing all four QI project phases by December 31 2015 (accessible through the Norton Healthcare Learning Management System) |

Nursing administration provided full support for the project, thus facilitating participation for the entire OR staff in Phases I and II. At the beginning of Phase II, anesthesia staff requested permission to participate in the project as well, prompting a meeting introducing TeamSTEPPS, which was attended by 80% of the anesthesia staff. The Norton Healthcare Office Research, University of Louisville, and Bellarmine University’s Institutional Review Boards determined that the project could receive exempt status, as it did not meet the ‘Common Rule’ definition for human subject research.

### Implementation

Initiating Phase II, three Master Trainers worked with four OR leaders, six selective staff members, and two anesthesia providers, preparing them for the role of TeamSTEPPS coaches. TeamSTEPPS Master Trainers and coaches worked with OR and anesthesia staff throughout Phase II on SBAR, Call-out, and Check-back communication techniques noted in Table 1. When



presenting each communication technique at the monthly staff meeting, the coaches used Power Point Presentations, videos, and posters, all of which are the official TeamSTEPS tools. In addition, at the monthly staff meeting, the coaches reviewed staff sign-in sheets in order to monitor attendance.

The TeamSTEPS training videos (each of approximately 2-5 minutes in length) assist with the application of a specific communication technique. To facilitate training, coaches disseminated a video focusing on the communication technique of the month via department-wide email. To ensure that each staff had the opportunity to view the monthly video, a hyperlink was emailed to each staff member with a request for the sender to be notified when the email was read. This, along with an honor system for staff to sign a sign-in sheet for each video reviewed, allowed coaches to monitor training progress.

In addition, the coaches introduced two types of monthly posters focusing on the communication technique of the month, which were placed strategically around the department as a reminder to incorporate the recently learned communication technique into the daily workflow. The posters were interchanged throughout the unit on a weekly basis.

Master Trainers and coaches were on the front line with the OR and anesthesia staff to demonstrate the application of the communication techniques whenever possible. In addition, after the last communication technique was introduced, Master Trainers organized a department-wide competition, which took place during the monthly staff meeting. The staff members in attendance were divided into families for a TeamSTEPS version of the Family Feud game. The purpose of the competition was to review all of the TeamSTEPS communication techniques taught during Phase II.

Towards the end of Phase II, this DNP student and the department educator developed PowerPoint presentations, accessible through Norton Healthcare Learning Management System (NHLMS), to provide the staff an overview of the entire four-phase QI project and the TeamSTEPPS program. Viewing the presentation was mandatory for the OR staff, whereby an NHLMS-generated report facilitated efficient monitoring of the completion rate.

To further deepen the understanding of the TeamSTEPPS program, each staff member received a copy of the 2.0 TeamSTEPPS Pocket Guide, providing them with a concise overview of the entire program.<sup>13</sup> The communication section of this guide contains examples for each of the communication techniques addressed during the project. Usage of the OR staffing schedule for monitoring the Pocket Guide distribution ensured that all staff members received a copy.

As previously stated, daily briefs, huddles, and debriefs commenced in Phase I and continued into Phase II of this project. Daily briefs take place prior to the beginning of each shift, whereas huddles (Time-out) occur before every incision. Since 2014, this DNP student has been collecting the debriefs daily and transferring pertinent data into an Excel spreadsheet, along with the daily surgical volume. This allows the percentage of surgical cases with a completed debrief form to be calculated.

On the other hand, Norton Healthcare Risk Department is responsible for providing information and statistical data on PSRs, which is extrapolated from the current standalone safety-reporting database. This DNP student subsequently transferred the monthly total number of PSRs, along with the total monthly surgical volume, onto a spreadsheet, in order to calculate the percentage of surgical cases with a completed PSR.

The Norton Healthcare Risk Department also provided information and statistical data pertaining to APHREs, once again extrapolating it from the current standalone safety-reporting

database. In line with the above, this DNP student placed the monthly total number of APHREs and the total monthly surgical volume on a spreadsheet. However, it is important to note that, due to the sensitivity of this information, Norton Healthcare restricted the amount of information that can be released for this goal.

Phase II lasted for seven months, the first five of which were designated to the project implementation, which included educating the staff in TeamSTEPPS communication techniques, and were followed by a two-month measurement phase. The decision to measure debriefs, PSRs and APHREs was supported by findings of pertinent studies identifying communication failure as the leading source of APHREs.<sup>3,6,7</sup> As this project focused on the SBAR, Call-out, and Check-back TeamSTEPPS communication techniques, the QI team hypothesized that improved communication between team members would result in a decrease in APHREs.

### Results

As a part of this initiative, five monthly staff meetings addressing the TeamSTEPPS communication techniques were conducted, during which the Master Trainers and coaches reinforced all information presented during Phases I and II of the QI project. On average, 853 surgeries were performed each month, exceeding the typical NWKCH average. Monthly staff meeting attendance ranged from 27% to 68%, and the number of staff that downloaded TeamSTEPPS videos also varied monthly (see Table 2).

Table 2

#### *Education Compliance and Surgical Volume*

| <b>Date 2015</b> | <b>Topic</b> | <b>Number of Surgical Cases</b> | <b>Staff Meeting Participation</b> | <b>Video Participation</b> | <b>PowerPoint on Norton Healthcare Learning Management System</b> |
|------------------|--------------|---------------------------------|------------------------------------|----------------------------|---|
| August           | SBAR         | 815                             | 56%                                | 100%                       | N/A   |

|           |                         |     |     |     |     |
|-----------|-------------------------|-----|-----|-----|-----|
| September | CALL-OUT                | 812 | 68% | 46% | N/A |
| October   | CHECK-BACK              | 826 | 27% | 44% | N/A |
| November  | FAMILY FEUD             | 859 | 46% | N/A | N/A |
| December  | MERGING IT ALL TOGETHER | 957 | N/A | N/A | 67% |

Our Phase II goals were to increase the completion of PSRs and debrief forms by 10%, while decreasing APHRE events by 10%, when comparing 2016 Q1 with 2015 Q4. However, data analyses revealed lack of improvement in the PSR completion rate, which actually declined (see Figure 1). Due to the sensitivity of this data, Norton Healthcare does not permit the dissemination of actual results in a public document, thus limiting potential for further investigation into the causes of this adverse outcome.

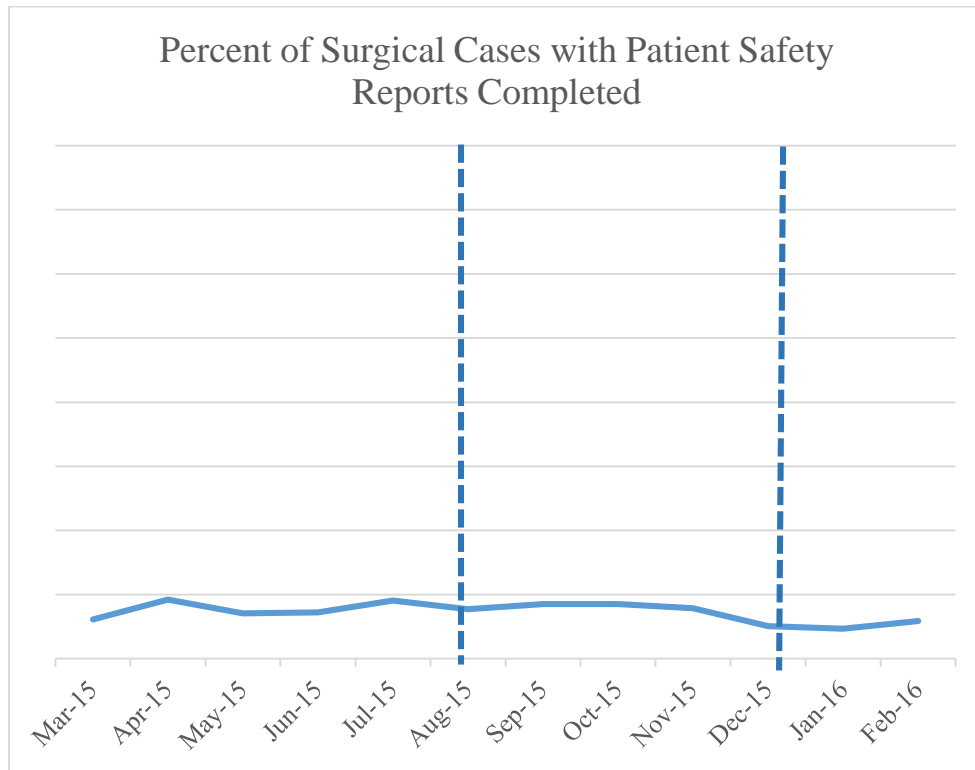


Figure 1. Percentage of completed surgical cases accompanied by patient safety reports (PSRs).

The average percentage (50%) of surgical cases with a completed debrief form remained consistent. The highest number of debriefs were completed during the months when the staff meetings focused on TeamSTEPPS and reminders were sent out by the TeamSTEPPS coaches. (See Figure 2).

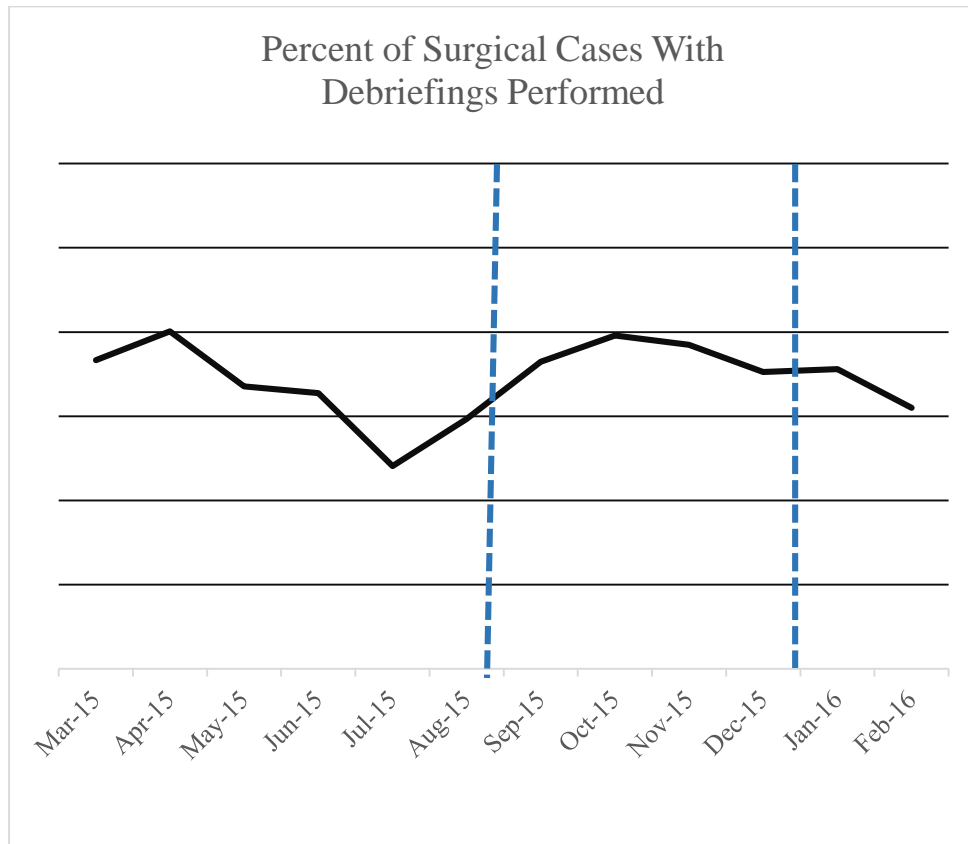


Figure 2. Percentage of completed surgical cases with debriefings performed.

Despite failing to meet other targets, APHRE decrease was sustained and surpassed the 10% goal. Due to the sensitivity of this information, Norton Healthcare restricted the amount of information that can be released regarding this goal.

#### Discussion

As noted above, the OR department met only one of the three QI project goals during Phase II. Failure to meet the PSR completion target during the seven months allocated for this

phase could be related to the increase in surgical volume, as completing a PSR takes extra time for the nursing staff. The increase in surgical volume creates the need to perform surgeries after normal business hours. The OR covers after hours with staff working on call, thus increasing the total number of working hours per day and week. As long hours can lead to memory fatigue, the PSRs that are not completed immediately can easily be forgotten.

The average percentage of surgical cases that were accompanied by a completed debrief form remained consistent at around 50%. Throughout Phase II, leadership has used information provided in these completed forms to make positive changes in the department, such redefining the role of ancillary staff to become more engaged in patient care, purchase of additional equipment, and redesigning the staff break schedule. Most of the staff members view these forms as a non-threatening way to bring issues to the attention of leadership.

Decreasing APHRE by 10% was the only goal the OR department met. Anecdotal evidence indicates that anesthesia providers played a significant role in this achievement. One TeamSTEPS coach specifically noted that, during surgical procedures, an anesthesia provider was instrumental in guiding the surgical teams while using TeamSTEPS communication techniques.

### *Lessons Learned*

In order to sustain any change, the project development phase should incorporate a plan for staff turnover and increased unit volume. Historically, the OR department has experienced a low staff turnover rate, however during the 7-months of Phase II, the growth of surgical volume necessitated hiring an additional 13 employees. The newly hired staff included a mixture of new graduates and those with 20 or more years of experience. Due to the pressing need to staff the OR, the orientation period was altered, especially for staff with previous experience. While every

new hire should receive the four-hour TeamSTEPS direct patient care training, the coaches did not adhere to this plan in all cases. In addition, not all of the new hires completed the PowerPoint presentation provided on the hospital's intranet or received a copy of the 2.0 TeamSTEPS Pocket Guide. In view of these omissions, management must develop a comprehensive plan for educating new employees on TeamSTEPS communication techniques before the project moves further into Phase III and IV.

Placing greater emphasis on patient safety requires a culture shift, which is a slow process that necessitates support from all key stakeholders. In addition, continual reminders should be implemented in order to ensure sustained staff focus on using TeamSTEPS techniques. Thomas and Galla identified the need to "re-dose" at regular intervals to keep the staff engaged with using TeamSTEPS.<sup>14</sup> In addition to planning training designated specifically for new employees, our comprehensive plan needs to address educational needs of the current staff, especially those who missed training.

In 2013 and 2015, NHC participated in the AHRQ Hospital Survey of Patient Safety Culture, which is a TeamSTEPS official measurement tool. This survey was offered to all staff across the NHC system to measure the perceptions of the culture of safety within the hospital.<sup>15</sup> This QI project did not incorporate the survey findings, even though these could have served as a baseline against which any changes in staff perceptions of the culture of safety due to the TeamSTEPS implementation could be measured. In our organization, the survey results were segregated for individual hospitals and departments. The surgical services department encompasses pre-operative, intra-operative, post-anesthesia care unit (PACU), urology outpatient surgery, endoscopy, and central sterile supply, which were combined into one department for data analyses. Within the surgical services department, only the intra-operative and endoscopy units

received TeamSTEPPS training. Owing to the inability to segregate the results pertaining to these units from those related to the remaining surgical services, the survey was not an adequate measurement tool for assessing the impact of TeamSTEPPS. Going forward, the team needs to re-evaluate the importance of this data and explore potential strategies for extracting information specific to the units using TeamSTEPPS.

### *Barriers*

Many potential barriers may have adversely affected our project outcomes, one of which was lack of surgeon involvement and a 50% turnover in OR frontline leadership. More specifically, TeamSTEPPS training did not incorporate formal instruction for surgeons; nonetheless, some surgeons expressed interest and actively participated in the initiative. In addition, during Phases I and II, the department experienced 50% turnover in the frontline OR leadership, with the majority of the change occurring during Phase II of this project. Both of these factors may have led to missed opportunities and lack of buy-in from the nursing staff.

Additional barriers encountered during the Phase II implementation included competing initiatives and a short measurement phase. In addition to TeamSTEPPS, the OR department participated in four system-wide and/or hospital-based initiatives, all of which were introduced immediately prior to and continued throughout the entire Phase II. It is thus likely that the staff may have been too overwhelmed with new leadership, staffing and new initiatives, in addition to increased surgical volume, to participate in educational activities and fully embrace TeamSTEPPS.

Finally, the two-month measurement phase did not allow sufficient time for gathering long-term data. A longer period, combined with reinforcement of communication techniques by Master Trainers and coaches, as well as stabilization of surgical volume, staffing and leadership,



would have likely led to improved outcomes. Beitlich, as well as Stead and colleagues, identified the need for a long-term commitment and well-defined process if TeamSTEPS implementation is to be successful.<sup>16, 17</sup>

Authors of other studies have reported similar barriers to those encountered during the project's implementation, confirming that they are not unique to this OR department. Thomas and Galla, as well as Ward and colleagues, cited the lack of physician engagement as a barrier to implementing TeamSTEPS, while Fores and colleagues identified high staff turnover as a limitation to implementing of TeamSTEPS.<sup>9,14,18</sup> Similarly, Sheppard, Williams, and Klein identified leadership transition and turnover as an obstacle for improvement after the implementation of TeamSTEPS.<sup>19</sup> Fores and colleagues, along with several other authors identified presence of competing organizational patient safety initiatives as a barrier to making a direct link between TeamSTEPS training and any positive outcomes.<sup>9,11,14</sup>

### Conclusion

Norton Women's Kosair Children's Hospital is facing the same patient safety struggles as the rest of the healthcare industry. The TeamSTEPS design incorporates pertinent aspects of similar military and aviation tools, which were adapted to the OR needs. However, available evidence confirms that changing the culture in the OR is a difficult and lengthy process, requiring dedication and full support of all involved. Hence, this project aims to infiltrate the culture, as a means of attaining sustainability. While none of the results reported to date could be statically tied to the implementation of TeamSTEPS, APHREs declined, which is one of the project goals. The overall aim of the entire project is to develop high-reliability teams as a means of decreasing the occurrence of APHREs during surgical interventions, which has already been achieved.

## References

1. Riley W, Davis SE, Miller K, McCullough M. A model for developing high-reliability teams. *J Nurs Manag.* 2010;18:556-566. doi: 10.1111/j.1365-2834.2010.01121.x
2. Coburn AF, Gage-Croll Z. Improving hospital patient safety through teamwork: The use of TeamSTEPS in critical access hospitals. *Flex monitoring Team Policy Brief 21.* [http://www.flexmonitoring.org/wp-content/uploads/2013/07/PolicyBrief21\\_TeamSTEPS.pdf](http://www.flexmonitoring.org/wp-content/uploads/2013/07/PolicyBrief21_TeamSTEPS.pdf)  
Published 2011 Accessed March 2016
3. Award SS, Fagan SP, Bellows C, et al. Bridging the communication gap in the operating room with medical team training. *Am J Surg* 2005;190(2005): 770-4. doi: 10.1016/j.amjurg.2005.07.018
4. National Center for Health Statistics inpatient surgery. Centers for Disease Control and Prevention Web site <http://www.cdc.gov/nchs/fastats/inpatient-surgery.html>  
Published March 2010. Updated April 29, 2013. Accessed March 2016.
5. National Center for Health Statistics US outpatient surgeries on the rise. Centers for Disease Control and Prevention Web site <http://www.cdc.gov/nchs/pressroom/09newsreleases/outpatientsurgeries.html>  
Published January 28, 2009. Updated June 11 2009. Accessed March 2016
6. Institute of Medicine. To err is human: Building a safer health system. <http://iom.nationalacademies.org/~media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20report%20brief.pdf>  
Published November 1999 Accessed March 2016
7. The Joint Commission. Sentinel event data root causes by event type. [http://www.jointcommission.org/assets/1/18/Root\\_Causes\\_by\\_Event\\_Type\\_2004-2015.pdf](http://www.jointcommission.org/assets/1/18/Root_Causes_by_Event_Type_2004-2015.pdf)  
Published 2016 Accessed March 2016
8. Joint Commission on Accreditation of Healthcare Organizations. Health care at the crossroads: Strategies for improving the medical liability system and preventing patient injury. [http://www.jointcommission.org/assets/1/18/Medical\\_Liability.pdf](http://www.jointcommission.org/assets/1/18/Medical_Liability.pdf)  
Published 2005 Accessed March 2016
9. Forse RA, Bramble JD, McQuillan R. Team training can improve operating room performance *Surgery.* 2011 Oct;150(4):771-8. doi: 10.1016/j.surg.2011.07.076.
10. Kao LS, Thomas EJ. Navigating towards improved surgical safety using aviation-based strategies. *J Surg Res* 2008;145(2):327-35. doi:10.1016/j.jss.2007.02.020

11. Mayer C, Cluff L, Lin W, et al. Evaluating efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units. *Jt Comm J Qal Patient Saf* 2011;37(8):365-74.
12. Agency for Healthcare Research and Quality & Department of Defense. *TeamSTEPPS<sup>®</sup> 2.0 Instructor's Manual*. Washington, DC: Author; 2014.
13. Agency for Healthcare Research and Quality & Department of Defense. *TeamSTEPPS<sup>®</sup> 2.0 pocket guide*. Washington, DC: Author; 2013.
14. Thomas L, Galla C. Building a culture of safety through team training and engagement. *Qual Saf in Health Care* 2013;22:425-34. doi:10.1136/bmjqs-2012-001011
15. Agency for Health Research and Quality & Department of Defense. <http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/index.html>  
Published 2016 Accessed April 2016
16. Beitlich P. TeamSTEPPS implementation in the LD/NICU settings. *Nurs Manag* 2015;45(6):15-8. doi:10.1097/01.NUMA.0000465404.30709.a5
17. Stead K, Kumar S, Schultz TJ, et al. Team communicating through STEPPS [Supplement]. *Med J Australia* 2009;190(11):S128-S132.
18. Ward MM, Zhu X, Lampman M, Stewart GL. TeamSTEPPS implementation in community hospitals. Adherence to recommended training approaches. *Intl J Health Care Qual Assur* 2014;28(3):234-44. doi:10.1108/IJHCQA-10.2013-0124
19. Sheppard F, Williams M, Klein V. TeamSTEPPS and patient safety in healthcare. *Am Soc Healthc Risk Manag AHA* 2013;32(3):5-10. doi:10.1002/jhrm.21099