

Evaluation of preoperative and perioperative operating room briefings at the Hospital for Sick Children

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Background: Wrong-site, wrong-procedure and wrong-patient surgeries are catastrophic events for patients, medical caregivers and institutions. Operating room (OR) briefings are intended to reduce the risk of wrong-site surgeries and promote collaboration among OR personnel. The purpose of our study was to evaluate 2 OR briefing safety initiatives, "07:35 huddles" (preoperative OR briefing) and "surgical time-outs" (perioperative OR briefing), at the Hospital for Sick Children in Toronto, Ont.

Methods: First, we evaluated the completion and components of the 07:35 huddles and surgical time-outs briefings using direct observations. We then evaluated the attitudes of the OR staff regarding safety in the OR using the "Safety Attitudes Questionnaire, Operating Room version." Finally, we conducted personal interviews with OR personnel.

Results: Based on direct observations, 102 of 159 (64.1%) 07:35 huddles and 230 of 232 (99.1%) surgical time-outs briefings were completed. The perception of safety in the OR improved, but only among nurses. Regarding difficulty discussing errors in the OR, the nurses' mean scores improved from 3.5 (95% confidence interval [CI] 3.2–3.8) prebriefing to 2.8 (95% CI 2.5–3.2) postbriefing on a 5-point Likert scale ($p < 0.05$). Personal interviews confirmed that, mainly among the nursing staff, pre- and perioperative briefing tools increase the perception of communication within the OR, such that discussions regarding errors within the OR are more encouraged.

Conclusion: Structured communication tools, such as 07:35 huddles and surgical time-outs briefings, especially for the nursing personnel, change the notion of individual advocacy to one of teamwork and being proactive about patient safety.

Contexte : En chirurgie, les erreurs d'intervention ou de site chirurgical et les méprises de patients sont catastrophiques pour les patients, les professionnels de la santé et les établissements. Les breffages de sécurité au bloc opératoire visent à réduire le risque d'erreur de site chirurgical et favorisent la collaboration au sein du personnel du bloc opératoire. Notre étude avait pour but d'évaluer 2 formules de breffage de sécurité au bloc opératoire, les «caucus de 07 h 35» (brefpages préchirurgicaux) et les «pauses chirurgicales» (brefpages peropératoires), au *Hospital for Sick Children* de Toronto, en Ontario.

Méthodes : Nous avons d'abord évalué par observation directe l'intégralité et les éléments des caucus de 07 h 35 et des pauses chirurgicales. Nous avons ensuite évalué les attitudes du personnel concerné vis-à-vis de la sécurité au bloc opératoire à l'aide d'un questionnaire à cet effet (*Safety Attitudes Questionnaire, Operating Room version*). En dernier lieu, nous avons procédé à des entrevues individuelles auprès du personnel du bloc opératoire.

Résultats : Selon les observations directes, on a complété 102 caucus de 07:35 sur 159 (64,1 %) et 230 pauses chirurgicales sur 232 (99,1 %). On a noté une amélioration de la sécurité perçue du bloc opératoire, mais uniquement chez le personnel infirmier. Au sujet de la difficulté à discuter des erreurs au bloc opératoire, le personnel infirmier présentait un score moyen de 3,5 (intervalle de confiance [IC] à 95 %, 3,2–3,8) avant l'instauration des breffages; la situation s'était améliorée après leur instauration, la mesure de la difficulté étant passée à un score moyen de 2,8 (IC à 95 %, 2,5–3,2) sur une échelle de Likert en 5 points ($p < 0,05$). Les entrevues personnelles ont confirmé que, chez le personnel infirmier surtout, les breffages préopératoires et peropératoires augmentent la perception de la communication au bloc opératoire, de sorte que les discussions au sujet des erreurs opératoires se trouvent favorisées.

Conclusion : L'application d'outils de communication structurés, comme les caucus de 07 h 35 et les pauses chirurgicales, surtout chez le personnel infirmier, transforme la perception d'une obligation individuelle en une mobilisation collective et encourage une attitude proactive vis-à-vis de la sécurité des patients.

Safety is a critical aspect of the quality of care in a complex hospital setting such as the operating room (OR). Wrong-site, wrong-procedure and wrong-patient surgeries are catastrophic events for patients, medical caregivers and institutions.¹ Surgical teams comprise medical caregivers who share a common goal of patient safety. However, caregivers may know little about one another and, in some cases, the unique needs of a patient or procedure.²

Communication in the OR is critical to patient safety and the working morale among medical caregivers in the OR. Communication breakdowns have been reported to be the cause of 60% of sentinel events reported to the Joint Commission on Accreditation of Healthcare Organizations.³ Prior research has shown that information transfers among OR teams are often nonstandardized and noninclusive, with great variability in how and what information is transferred among OR team members and disciplines.^{4,5}

The aviation industry, where breakdown of communication is a common origin of errors, has instituted specific initiatives such as “preflight cockpit checklists.”^{6,7} Operating room team members usually do not convene to discuss pertinent information before a surgery, or when information is exchanged, relevant team members may not be involved. Furthermore, the lack of communication further increases tension among OR personnel and, more importantly, may increase the risk of harm to the patients.⁸

To increase communication among OR personnel, preoperative and perioperative OR briefings have become common practice in ORs in North America.² Such tools provide OR teams with a structured and standardized approach to increase interdisciplinary communication in the OR, thereby promoting teamwork and creating a culture of safety. The expectation is that OR team members are encouraged to become more proactive about patient safety, speak up when an identified problem in patient care is discovered and improve patient outcomes.⁶

The Hospital for Sick Children (SickKids) in Toronto, Ont., initiated 2 OR safety initiatives: a “07:35 huddle” (preoperative OR briefing) and a “surgical time-out” (perioperative OR briefing). The objectives of our study were to determine the completeness of and the attitudes of OR staff toward the 07:35 huddles and surgical time-outs briefings, evaluate the attitudes of the OR staff regarding safety in the OR and determine whether OR briefings are discipline-specific with regards to their effectiveness in changing safety attitudes and morale.

Box 1. Elements of the 07:35 huddle

- a. Diagnosis
 - b. Equipment needs
 - c. Positioning of the patient
 - d. Special considerations (allergies/ blood products / antibiotics)
- TOTAL: 4 elements

METHODS

SickKids has 14 surgical rooms covering 9 surgical subspecialties, and it also functions as a level-1 trauma centre. In 2005, there were 11 811 surgeries performed at SickKids (23 435 OR hours).

Prior to 2005, there were no specific initiatives for communication among the surgical team members. On Sept. 1, 2005, SickKids introduced the “07:35 huddle,” which involves the anesthesiologist(s), surgeon(s) and the nursing team assembling in the OR at 07:35 am, before the 08:00 am start, to discuss the day’s patients. Team members introduce themselves and their roles and formulate a plan for the day by identifying key issues in a checklist fashion pertinent to each patient (Box 1). The initiative was discussed at all major departmental meetings before introduction.

A “surgical time-out” or “surgical pause,” introduced Jun. 1, 2006, involves the OR team convening after the administration of anesthetic but before skin incision for each patient to reverify the patient, procedure and site of surgery.⁹ At SickKids the surgical time-out consists of a 9-point checklist (Box 2). In all ORs there is a 1-page laminated poster highlighting the key components of huddles and time-outs to facilitate and guide the discussions.

We evaluated the 07:35 huddle and surgical time-out briefings using 3 separate methods: direct observations, questionnaires and personal interviews. A medical student (A.K.) rotated through the 14 SickKids ORs to directly observe the completion and participation of the 07:35 huddles and surgical time-outs among OR personnel from June to August 2007. Operating room caregivers and administrators were not blinded to the purpose of the direct observations or the role of the medical student. Although this unblinded observation might have favourably influenced OR caregivers’ behaviour, we believed that not informing OR staff would threaten the openness and trust essential to a safe working environment. This was a quality initiative and therefore did not require Research Ethics Board (REB) approval or informed consent; decisions about informing participants regarding observations followed different principles: namely, trust and openness in the workplace. The medical student used

Box 2. Elements of the surgical time-out

- a. Presence of the correct patient
 - b. Marking of the correct site and side
 - c. Correct patient position
 - d. Procedure to be preformed
 - e. Availability of correct implants / equipment
 - f. Correctly labelled radiographs / diagnostics
 - g. Antibiotic prophylaxis (if applicable)
 - h. Review past medical history / comorbid conditions / allergies
 - i. State that at any time during the procedure team members should raise any relevant concerns they might have
- TOTAL: 9 elements

standardized checklists to document completion of all the necessary elements of a 07:35 huddle and a surgical time-out (Appendix 1 and Appendix 2). The student collected no specific qualitative information during these observations.

We determined perceptions of safety in the OR using the Safety Attitudes Questionnaire (SAQ), Operating Room version. The SAQ has been used previously to gauge the perceived safety climate of the participant's clinical work environment.⁹ We administered the SAQ, OR version, among all OR caregivers: surgeons (staff only), anesthesiologists (staff only) and nurses (scrub, circulating, cardiovascular perfusionists and nurses' assistants). We administered the surveys by hand with unmarked sealable return envelopes to maintain confidentiality and anonymity. We recorded no identifying data except discipline (i.e., surgeon, anesthesiologist or nurse). Participants responded to statements on the SAQ using a 5-point Likert scale, where 5 indicated strong agreement and 1 indicated strong disagreement. We initially administered the SAQ in January 2006, after the implementation of the 07:35 huddles but before implementation of the surgical time-out. We readministered the SAQ in the summer of 2007. We added questions to the 2007 questionnaire to directly evaluate the attitudes of OR personnel toward the 07:35 huddle and surgical time-outs.

The medical student conducted individual confidential interviews during July and August of 2007. Individual interviews were an open-ended opportunity to capture information not available in a fixed-format questionnaire such as the SAQ. We recruited participants using email list serves. Respondent groups included surgeons (staff, fellows and residents), anesthesiologists (staff, fellows and residents) and nurses (scrub, circulating and cardiovascular perfusionists). We open-coded the responses using content

analysis.⁵ The student used a standard interview guide for the personal interviews (Appendix 3).

Statistical analysis

We performed analyses of variance (ANOVA) and Student *t* tests to test for differences in perceived safety, teamwork and communication among the 3 respondent groups. We performed all statistical analyses using SPSS version 14.0 (SPSS Inc.).

RESULTS

Direct observations generated 391 discrete event scenarios that provided a means to evaluate completeness and participation of 07:35 huddles and surgical time-outs briefings at SickKids. As shown in Table 1, observations generated 159 discrete 07:35 huddle event scenarios and 232 discrete surgical time-out event scenarios. In July and August 2007, the mean completion rate for the 07:35 huddles was 64.1% (102/159) among all services in SickKids ORs. On average, 3.2 elements out of the total 4 elements were discussed during these huddles. The most prevalent element missing from the discussion was the equipment(s) required for the procedure(s). Of the 57 07:35 huddles that occurred despite the absence of some health care providers, surgeons were absent 20 times (35.1%), anesthesiologists were absent 29 times (50.9%), both surgeons and anesthesiologists were absent 7 times (12.3%) and nurses were absent once (1.7%). The mean completion rate for time-outs was 99.1% (230/232) among all services. On average, 6.2 elements out of the total 9 elements were discussed during the time-outs. The most prevalent element missing from the discussion was the acknowledgement that at any time during the procedure team members should raise any relevant concerns they might have (Table 1).

We compared the responses to the SAQ administered in the summer of 2007 with responses to the SAQ administered in January 2006, which took place before the implementation of time-outs (Table 2 and Table 3). As shown in Table 2, in the January 2006 SAQ, the attitudes of surgeons and anesthesiologists differed significantly ($p < 0.05$) from those of the OR nurses, with nurses having less positive perceptions regarding difficulty discussing errors, speaking up about perceived problems with patient care and teamwork among physicians and nurses. As shown in Table 3 and Table 4, after the implementation of time-outs, opinions among physicians and the nursing staff started to become more congruent; although the nurses still had less positive perceptions than physicians, the differences had substantially narrowed, and nurses, more than physicians, indicated that they were encouraged by their colleagues to report their safety concerns.

The OR briefings were most accepted and appreciated

Table 1. Direct observations of 07:35 huddles and surgical time-outs in Hospital for Sick Children operating rooms

Service	07:35 huddles*		Surgical time-out†	
	No. completed / no. observed	Mean no. of elements discussed	No. completed / no. observed	Mean no. of elements discussed
General surgery	18/21	3.6	31/31	6.5
Cardiovascular	2/23	3.0	15/15	6.2
Neurosurgery	9/15	3.8	12/12	5.3
Plastics	12/16	2.9	27/27	6.5
Urology	13/16	2.8	31/31	6.2
Orthopedics	14/18	3.8	29/29	7.3
Dental	15/16	3.0	22/23	6.6
Ear, nose, throat	10/17	2.7	26/27	5.7
Ophthalmology	8/14	3.0	37/37	5.5
Total	102/159 (64.1%)	3.2	230/232 (99.1%)	6.2

*The element most frequently missing from the discussion was the equipment required for the procedure (54.3%).

†The element most frequently missing from the discussion was the acknowledgement that at any time during the procedure, team members should raise any relevant concerns they might have (63.9%).

by the nursing personnel within an OR team. Nurses differed significantly ($p \leq 0.05$) from physicians with respect to how they felt OR briefings enhanced safety within the OR. The nursing personnel felt that pre- and perioperative briefings increased OR safety significantly, whereas physicians (both surgeons and anesthesiologists) were only slightly positive on this topic (questions 15 and 16 on the SAQ). In addition, nurses felt that having a discussion with the OR team before procedures was very important for patient safety (question 13 on the SAQ); their responses to this question differed significantly from those of phys-

icians, who were less but still generally positive about the role and importance of preoperative discussions. Finally, nurses and anesthesiologists, in contrast to the surgeons, on average disagreed with the statement that “surgery and anesthesia worked well together as a coordinated team.”

During personal interviews with the nurses ($n = 10$), one nurse referred to 07:35 huddles and surgical time-outs as “the best thing that has happened to SickKids ORs since I started working here.” The consensus among the nursing personnel was that OR briefings have increased safety in the OR by allowing the team to focus on the patient at

Table 2. Safety Attitudes Questionnaire: results from SickKids operating room staff after initiation of the 07:35 huddle and before initiation of the surgical time-outs, January 2006 ($n = 84$)

Query	Staff; mean* (95% CI)			Univariate ANOVA	
	Surgeons ($n = 23$)	Anesthesiologists ($n = 12$)	Nurses ($n = 49$)	F	p value
1. I would feel safe for my child to be treated here.	4.9 (4.7–5.0)	4.9 (4.7–5.0)	4.8 (4.7–4.9)	0.64	< 0.53
2. In the OR it is difficult to discuss errors.	2.2 (1.7–2.8)	2.1 (1.5–2.7)	3.5 (3.2–3.8)	14.56	< 0.05
3. I am encouraged by my colleagues to report safety concerns.	3.7 (3.2–4.3)	3.8 (3.1–4.4)	3.7 (3.4–4.0)	0.01	< 0.99
4. The culture in the OR makes it easy to learn from errors of others.	3.4 (2.9–3.9)	3.6 (2.9–4.3)	3.4 (3.2–3.7)	0.17	< 0.84
5. In the OR it is difficult to speak up if I perceive a problem with patient care.	2.2 (1.7–2.7)	1.8 (1.1–2.4)	2.9 (2.6–3.1)	7.14	< 0.05
6. The nurses and physicians work as a well coordinated team.	4.2 (3.7–4.6)	4.3 (3.9–4.6)	3.7 (3.4–3.9)	3.23	< 0.05
7. I know the names of all the people I worked with today.	4.2 (3.8–4.6)	4.2 (3.3–5.0)	4.4 (4.1–4.6)	0.27	< 0.76
8. Communication breakdowns leading to delays are common.	3.4 (2.8–4.0)	3.8 (3.4–4.3)	4.1 (3.7–4.4)	2.54	< 0.09

ANOVA = analysis of variance; CI = confidence interval; OR = operating room.
*Data are represented as a mean score on a 1–5 scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree).

Table 3. Safety Attitudes Questionnaire: results from SickKids operating room staff after initiation of both the 07:35 huddle and the surgical time-outs, August 2007 ($n = 77$)

Query	Staff; mean* (95% CI)			Univariate ANOVA	
	Surgeons ($n = 17$)	Anesthesiologists ($n = 15$)	Nurses ($n = 45$)	F	p value
1. I would feel safe for my child to be treated here.	4.6 (4.3–4.9)	4.5 (4.3–4.8)	4.4 (4.2–4.6)	0.78	< 0.46
2. In the OR it is difficult to discuss errors.	2.4 (1.9–2.9)	2.5 (1.9–3.0)	2.8 (2.5–3.2)	1.49	< 0.23
3. I am encouraged by my colleagues to report safety concerns.	3.5 (3.0–4.1)	3.9 (3.7–4.2)	4.1 (3.9–4.3)	3.00	< 0.06
4. The culture in the OR makes it easy to learn from errors of others.	3.3 (2.8–3.8)	3.5 (3.1–3.8)	3.4 (3.1–3.6)	0.16	< 0.85
5. In the OR it is difficult to speak up if I perceive a problem with patient care.	1.9 (1.4–2.4)	2.2 (1.7–2.7)	2.7 (2.4–3.0)	4.90	< 0.01
6. The nurses and physicians work as a well coordinated team.	4.2 (3.8–4.6)	3.9 (3.7–4.2)	3.5 (3.3–3.8)	5.47	< 0.01
7. I know the names of all the people I worked with today.	3.8 (3.2–4.4)	3.9 (3.6–4.3)	4.2 (3.9–4.4)	1.08	< 0.34
8. Communication breakdowns leading to delays are common.	3.4 (2.8–4.0)	3.9 (3.6–4.3)	4.0 (3.7–4.2)	3.32	< 0.04
9. A preoperative discussion increased my awareness of the surgical site and side being operated on.	2.9 (2.2–3.6)	3.5 (3.0–4.1)	4.3 (4.1–4.5)	14.47	< 0.05
10. The surgical site of the operation was clear to me before the incision.	4.9 (4.7–5.0)	4.3 (3.9–4.6)	4.4 (4.2–4.6)	1.95	< 0.05
11. Decision-making used input from relevant personnel.	3.6 (3.0–4.1)	3.8 (3.5–4.1)	4.1 (3.9–4.4)	2.70	< 0.07
12. Surgery and anesthesia worked together as a well coordinated team.	4.1 (3.6–4.5)	3.7 (3.3–4.1)	3.7 (3.4–3.9)	1.62	< 0.21
13. A team discussion before a surgical procedure is important for patient safety.	4.4 (4.0–4.8)	4.7 (4.4–4.9)	4.9 (4.8–5.0)	6.63	< 0.05
14. Team discussions are common in the ORs here.	3.9 (3.4–4.4)	3.7 (3.3–4.1)	3.6 (3.3–3.9)	0.78	< 0.47
15. The 07:35 huddle has improved safety in the OR.	3.3 (2.7–3.9)	3.1 (2.3–3.9)	4.0 (3.8–4.2)	6.84	< 0.05
16. The “time-out” has improved safety in the OR.	3.3 (2.7–3.9)	3.1 (2.5–3.7)	4.2 (4.0–4.4)	12.79	< 0.05

ANOVA = analysis of variance; CI = confidence interval; OR = operating room.
*Data are represented as a mean score on a 1–5 scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree).

hand. However, nursing personnel also commented on the “lack of cultural shift from physicians” in the ORs. Comments like “we are moving in the right direction but we are not there yet” and “conceptually, staff physicians have accepted new initiatives but, practically, it is not there yet” were common among the nursing personnel. The nursing personnel felt that such patient safety initiatives were “more of an annoyance” than an aid to physicians in the ORs. One nurse commented that “staff physicians feel they are being overburdened with too many changes.”

Some surgeons ($n = 5$) and anesthesiologists ($n = 10$) expressed that the 07:35 huddle’s objective “has very little to do with safety.” Surgeons and anesthesiologists felt that “the primary objective of the huddle is not to increase safety in the OR, but rather to get procedures started by 08:00 am.” One surgeon also commented that physicians who do complete surgical time-outs in the OR suite would “just go through the motions of the huddle without believing it is valuable.” The OR briefings were viewed as more of a checklist than a safety tool.

DISCUSSION

Wrong-site or wrong-side surgeries are rare in most ORs. Prior to the institution of surgical time-outs, SickKids had about 1–2 wrong-site surgeries per year (8 over 3 years). Since the institution of surgical time-outs in June 2006, no wrong-site surgeries have occurred. Because a change in the incidence of extremely rare sentinel events cannot be used to evaluate the effectiveness of patient safety initiatives, the perception of safety by OR personnel becomes an important measure. Our study showed that the effect of preoperative and perioperative communication tools such as 07:35 huddles and surgical time-outs was discipline-specific. Prior to the implementation of surgical time-outs, the nursing staff felt that in the OR it was difficult to discuss errors and that it was difficult to speak up if they perceived a problem with patient care. In contrast, the surgeons and anesthesiologists felt that the culture in the OR was such that errors could easily be discussed and that personnel were encouraged to report safety concerns.

Since the implementation of surgical time-outs in June 2006, the nursing personnel’s perception of openness significantly improved; nurses also reported feeling less difficulty in discussing errors.

Despite completion rates of 64.1% for 07:35 huddles and 99.1% for surgical time-outs, surgeons and anesthesiologists did not shift their perceptions. We found that OR team members recognized the importance of verbalizing the operative plan during the briefings, but that the briefings were conducted in a “mindless and rote” manner by a few physicians; these few physicians saw the OR briefings as a checklist that needed to be completed rather than an opportunity to enhance team communication and be proactive about patient safety. Ideally, physician caregivers within the OR should view such initiatives as important for patient safety given their critical role in modelling behaviour for other physicians and residents within the OR.^{4,9} Even if the main benefit of the 07:35 huddle was to start the procedure on time, physicians failed to realize that rushing in itself substantially increases the risk of errors. If present, negative attitudes of surgeons and anesthesiologists are often recognized by nursing staff and this can interfere with team relationships.⁹ The individual interviews suggested that some nurses had perceived a lack of support for these safety initiatives among some physicians. This perception was also reflected in the SAQ responses, where nurses disagreed more often than physicians with the statement “the nurses and physicians work as a well coordinated team.” Exposing medical students, medical clerks, interns and residents to safety initiatives or incorporating such initiatives into their educational curricula may be another route to shifting the culture in the OR. The incorporation of OR briefings at the grass-roots level may serve to get more future surgeons “to believe in the importance of operative briefings rather than go through the motions.”

Strongly-held physician values such as autonomy, maximum productivity and craftsmanship may play an important role in preventing the creation of “an ultra-safe” clinical working climate and the acceptance of operative briefing tools.¹⁰ Physicians may view the time needed to perform OR briefings as a decrease in their productivity or

Table 4. Safety Attitudes Questionnaire: results from operating room nursing staff, January 2006 versus August 2007

Query	Time; mean* (95% CI)		t value	p value
	January 2006 (n = 49)	August 2007 (n = 45)		
1. I would feel safe for my child to be treated here.	4.8 (4.7–4.9)	4.4 (4.2–4.6)	3.86	< 0.05
2. In the OR it is difficult to discuss errors.	3.5 (3.2–3.8)	2.8 (2.5–3.2)	3.03	< 0.05
3. I am encouraged by my colleagues to report safety concerns.	3.7 (3.4–4.0)	4.1 (3.9–4.3)	-1.78	< 0.08
4. The culture in the OR makes it easy to learn from errors of others.	3.4 (3.1–3.8)	3.4 (3.1–3.6)	0.24	< 0.81
5. In the OR it is difficult to speak up if I perceive a problem with patient care.	2.9 (2.6–3.1)	2.7 (2.4–3.0)	0.71	< 0.48
6. The nurses and physicians work as a well coordinated team.	3.7 (3.4–3.9)	3.5 (3.3–3.7)	0.80	< 0.43
7. I know the names of all the people I worked with today.	4.4 (4.1–4.6)	4.2 (3.9–4.4)	1.09	< 0.28
8. Communication breakdowns leading to delays are common.	4.1 (3.7–4.4)	4.0 (3.7–4.2)	0.53	< 0.60

CI = confidence interval; OR = operating room.
*Data are represented as a mean score on a 1–5 scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree).

a limitation on their professional autonomy.¹⁰ Our results show that physicians are probably the most difficult group to change but that nurses respond positively to briefings. Sometimes nurses perceive themselves at the low end of the hierarchy⁹ and therefore are less likely to speak up in unsafe situations. Their shift in perceptions and expressed comfort in raising safety concerns may ultimately result in the greatest improvement in safety from OR briefings.

Our study has several potential limitations. First, our comparison of pre- and postimplementation perceptions of OR briefings did not include a control group. In addition, the administration of the first SAQ in January 2006 took place several months after the implementation of 07:35 huddles (but before the implementation of surgical time-outs). However, this timing may have reduced the overall effect on the pre- and postimplementation survey results. Second, OR personnel were not blinded to direct observations for participation in OR briefings. Although this may have favourably influenced OR caregivers' behaviour, not informing OR caregivers would have ultimately created distrust. It should be noted that no other patient safety initiatives were implemented during our study period.

Our results are congruent with those of previous studies that have shown that, compared with physicians, nurses, are more hesitant about speaking up within the OR and discussing potential errors and that nurses see communication as problematic whereas other staff may not.¹¹ The origin of these differences in attitudes among OR personnel is not well understood. It has been shown that there are "fundamental differences between nurses and physicians, including status, authority, sex, training and patient care responsibilities."¹² As shown by Sexton and Thomas,^{11,13} incongruent attitudes among health care personnel may be a "source of nurses' dissatisfaction with their profession," ultimately leading to a large job turnover. Altering the nurses' perceptions in a positive manner may be meaningful and beneficial, even in the face of not changing the perceptions of others in the OR. It is critical to encourage communication and openness from those on a team who may otherwise feel constrained to communicate (e.g., novices or less powerful team members who need to feel free to speak up when errors are perceived).¹¹

In conclusion, 2 structured communication tools, 07:35 huddles and surgical time-outs, function, especially for the nursing personnel, to change the notion of individual advocacy to one of teamwork and being proactive about patient safety.

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Contributors: Dr. Wright designed the study. Mr. Khoshbin acquired the data. All authors analyzed the data and approved the article's publication. Dr. Wright and Mr. Khoshbin wrote the article, which Dr. Wright and Dr. Lingard then reviewed.

References

1. Makary MA, Sexton JB, Freischlag JA, et al. Operating room teamwork among physicians and nurses: teamwork in the eye of the beholder. *J Am Coll Surg* 2006;202:746-52.
2. Makary MA, Holzmueller CG. Operating room briefings: working on the same page. *Jt Comm J Qual Patient Saf* 2006;32:351-5.
3. A follow-up of wrong site surgery. *Sentinel Event Alert* 2001;(24); Dec. 5. Available: www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_24.htm (accessed 2009 June 29).
4. Bohnen JM, Lingard L. Error and surgery: Can we do better? *Can J Surg* 2003;46:327-9.
5. Lingard L, Espin S, Whyte S, et al. Communication failures in the operating room: an observational classification of recurrent types and effects. *Qual Saf Health Care* 2004;13:330-4.
6. DeFontes J, Surbida S. Preoperative Safety Briefing Project. *The Permanente Journal* 2004;8:21-7. Available: <http://xnet.kp.org/permanentejournal/spring04/awardwin.pdf> (accessed 2009 May 27).
7. Degani A, Wiener EL. Cockpit checklists: concepts, design, and use. *Hum Factors* 1993;35:345-59.
8. Lingard L, Regehr G, Espin S, et al. Perceptions of operating room tension across professions: building generalizable evidence and educational resources. *Acad Med* 2005;80(10 Suppl):S75-9.
9. Makary MA, Mukherjee A. Operating room briefings and wrong site surgery. *J Am Coll Surg* 2006;204:236-43.
10. Amalberti R, Auroy Y, Berwick D, et al. Five system barriers to achieving ultrasafe health care. *Ann Intern Med* 2005;142:756-64.
11. Sexton JB, Thomas EJ, Helmreich EL. Error, stress, and teamwork in medicine and aviation: cross sectional surveys. *BMJ* 2000;320:745-9.
12. Thomas EJ, Sexton JB, Helmreich RL. Discrepant attitudes about teamwork among critical care nurses and physicians. *Crit Care Med* 2003;31:956-9.
13. Sexton JB, Makary MA, Tersigni AR, et al. Teamwork in the operating room: frontline perspectives among hospitals and operating room personnel. *Anesthesiology* 2006;105:877-84.

Appendix 1. Observation guide: 07:35 huddle

Date / time: _____

Operating room / service: _____

1. Did huddle occur and at what time? _____	<input type="checkbox"/> Y	<input type="checkbox"/> N
2. Who participated?	<input type="checkbox"/> Y	<input type="checkbox"/> N
3. Did the team introduce themselves to each other?	<input type="checkbox"/> Y	<input type="checkbox"/> N
4. What were the elements of the discussion at the 7:35 huddle?		
a. Diagnosis	<input type="checkbox"/> Y	<input type="checkbox"/> N
b. Equipment	<input type="checkbox"/> Y	<input type="checkbox"/> N
c. Positioning	<input type="checkbox"/> Y	<input type="checkbox"/> N
d. Special considerations	<input type="checkbox"/> Y	<input type="checkbox"/> N
e. Other	<input type="checkbox"/> Y	<input type="checkbox"/> N

Appendix 2. Observation guide: surgical time-outs

Date / time: _____
 Operating room / service: _____

1. Did time-out occur? Y N

2. Who called the time-out? _____

3. What were the elements of the discussion at the surgical time-out?

a. Presence of the correct patient Y N
 b. Marking of the correct site and side Y N
 NA, reason: _____

c. Correct patient position Y N
 d. Procedure to be performed Y N
 e. Availability of correct implants / equipment Y N
 f. Correctly labelled radiographs / diagnostics Y N
 g. Antibiotic prophylaxis (if applicable) Y N
 h. Medical history / comorbid conditions / allergies Y N
 i. State that at any time during the procedure team members should raise any relevant concerns they might have Y N

Appendix 3. Personal interview guide

Discipline: _____

1. Do you feel the Sick Kids OR is safe? Why or why not?
2. Do you feel leadership in the OR supports safety? Why or why not?
3. Do you feel the OR staff support safety? Why or why not?
4. Do you feel the 07:35 huddle has improved safety?
If yes, how? If not, why?
5. Do you feel surgical time-out has improved safety?
If yes, how? If not, why?
6. How could the OR be made safer?

OR = operating room.

CORRESPONDENCE • CORRESPONDANCE**CRITERIA FOR A DIAGNOSIS OF ABDOMINAL COMPARTMENT SYNDROME**

We read with interest the recent case note by Vikrama and colleagues¹ describing the percutaneous management of a patient with purported primary abdominal compartment syndrome (ACS). We congratulate the authors on their successful application of a less invasive technique for the management of this potentially life-threatening injury. However, the Executive Committee of the World Society of the Abdominal Compartment Syndrome (WSACS) would like to clarify several incorrect and potentially misleading statements in this case note.

The author's definition of abdom-

inal compartment syndrome (ACS) is incorrect. According to the International Conference of Experts on Intra-Abdominal Hypertension and Abdominal Compartment Syndrome, intra-abdominal hypertension (IAH) is defined as the sustained or repeated pathologic elevation of intra-abdominal pressure (IAP) greater than or equal to 12 mm Hg.^{2,3} Abdominal compartment syndrome is defined as a sustained IAP greater than 20 mm Hg that is associated with the development of new organ dysfunction or failure. The authors' description of their patient is consistent with IAH (IAP 26 mm Hg), but they fail to define the new organ dysfunction or failure that would qualify their patient for a diagnosis of ACS. In addition, such a diagnosis should

not be based upon a single IAP measurement but rather a sustained increase as IAP can be transiently elevated due to coughing, agitation or ventilator dyssynchrony. Further, whereas ACS is classically considered a disease of the traumatically injured patient, as illustrated by the authors, IAH / ACS may also be encountered in medical and pediatric patient populations. The presence of elevated IAP among critically ill patients is grossly underappreciated and represents a clinically important cause of potentially preventable morbidity and mortality.³

The authors state that the diagnosis of IAH / ACS is "difficult" and imply that radiologic testing should be used to identify the presence of elevated IAP. These statements are