

# Examining Transfer of Care Processes in Nurse Anesthesia Practice: Introducing the PATIENT Protocol

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*Human factors, such as inadequate situation awareness, have been associated with preventable accidents in anesthesia practice. Integral to developing situation awareness in the operating room environment is the safe and efficient exchange of essential information when the care of a patient is transferred from one anesthesia provider to another for circumstances such as breaks, meals, and the end of a scheduled work shift. An effective transfer involves the communication of critical information in an effort to preserve the quality and continuity of care.*

*This article describes a 2-phase, nonexperimental exploratory study with a purpose to (1) examine cur-*

*rent transfer of care practices of Certified Registered Nurse Anesthetists during the intraoperative period and (2) develop, implement, and evaluate a communication checklist tool designed to improve situation awareness.*

*Findings from this study have the potential to contribute to the understanding of current transfer of care practices, promote situation awareness in a swift and organized manner, and minimize variation in transfer of care processes that exist in practice today.*

**Keywords:** Awareness, checklist, handoff, situation awareness, transfer of care.

**H**uman factors, such as the lack of situation awareness (SA), have been associated with many preventable accidents in anesthesia.<sup>1</sup> It is essential, given the multitude and complexity of tasks for which they are responsible, that anesthesia providers possess SA, defined in this article as the ability to perceive all elements of the patient's condition and operating room environment, comprehend their meaning, and project their status into the near future.<sup>2</sup> An integral component of SA in healthcare involves the safe and efficient transfer of essential information when the care of a patient is transferred from one provider to another. An effective transfer involves the communication of critical information to preserve the quality and continuity of care. In its sentinel work, *Crossing the Quality Chasm*, the Institute of Medicine (IOM) reported that "it is in inadequate handoffs that safety often fails first."<sup>3</sup>

Although it may be ideal to have the same anesthetist care for a patient throughout the entire perioperative period, the unpredictable nature of operating room activities and schedules mandates that an incoming anesthetist must relieve an outgoing anesthetist for circumstances such as breaks, meals, and the end of a scheduled work shift. The transfer of care, sometimes referred to as the patient handoff, is a transfer of responsibility event (TRE) and can pose a major threat to patient safety in the operating room largely because of the lack of awareness on the part of the incoming anesthetist regarding the current patient, surgical, and operating room conditions.<sup>4</sup> To minimize potential crises attributed to the

transfer of care in the perioperative period, it is prudent to develop and implement a mechanism that systematically facilitates swift communication and requests action, if necessary, between providers, thereby promoting SA and creating an opportunity for improved patient safety.

Effective communication, characterized as clear, brief, accurate, and reliable, is theorized to contribute to SA in complex and dynamic environments, such as the operating room.<sup>2</sup> With an accurate mental model of the current situation, the incoming anesthetist may be more inclined to make decisions based on fact rather than assumption, to detect and solve problems efficiently, and to initiate requisite tasks with greater confidence. The use of an effective communication tool or checklist by anesthesia providers actively engaged in the transfer of care could enable the incoming anesthetist to adapt more readily to the new environment through a purposeful orientation directed at the salient components of the anesthetic and patient condition.

The use of checklists in healthcare has been suggested by The Joint Commission and others as a way to standardize and coordinate steps of a process to improve performance and safety.<sup>5,6</sup> The surgeon and noted international author, Atul Gawande,<sup>7</sup> has published *The Checklist Manifesto*, in which he presents a compelling argument that healthcare providers can improve patient safety by employing checklist types of resources in their practices. According to Gawande,<sup>7</sup> "the volume and complexity of what we know has exceeded our individual ability to deliver its benefits correctly, safely, or reli-

ably.” Medical checklists offer a nontraditional strategy designed to overcome some of the failures and complexities of the healthcare system and to reduce complications and avoidable deaths. Gawande<sup>7</sup> suggests checklists as tools to augment memory and attention, but emphasizes they cannot replace mastery of a profession or practical experience. Given the diverse and ambiguous nature of current anesthesia transfer of care processes, the development and institution of a checklist mechanism aimed to improve these processes is plausible and worthy of study.

The incorporation of mnemonics into checklist development can further add to a checklist’s utility and effectiveness.<sup>8</sup> Mnemonic strategies refer to a reconstruction of content that improves memory by allowing the learner to encode information in a manner that facilitates easy retrieval.<sup>8,9</sup> If transfer of care tasks can be practiced and made standardized through the use of a checklist tool built on a mnemonic phrase, anesthesia providers could then reserve higher-order cognitive processes for addressing newly encountered anesthesia events and unfamiliar patient conditions, thereby enhancing SA.

Despite the potential for error during the transfer of care of an anesthetized patient from an outgoing anesthesia provider to an incoming anesthesia provider, this process is not currently standardized, or even well defined. This article describes a 2-phase study to (1) examine current transfer of care practices of Certified Registered Nurse Anesthetists (CRNAs) as they manage patients during the intraoperative period and (2) develop, implement, and evaluate a communication checklist tool designed to enhance SA, thereby improving the quality and effectiveness of the anesthesia transfer of care. The central hypotheses of the study predict that in the study population, there will be no clear consensus on current transfer of care protocols and that a checklist to facilitate communication during the transfer of care will be viewed favorably by providers.

## Materials and Methods

• **Phase 1: Questionnaire About Transfer of Care.** Following institutional review board approval at Virginia Commonwealth University in Richmond, phase 1 of the study ensued with the development and electronic mailing of a questionnaire pertaining to transfer of care practices (Figure 1). The phase 1 questionnaire was developed to (1) gain a better understanding of current transfer of care processes, (2) identify components thought to be crucial to communicate in order to enhance SA during the transfer of care from one anesthesia provider to another, and (3) identify the need for a standardized tool for use during perioperative transfer of care events.

The phase 1 questionnaire was formulated with input from an expert panel of 2 academicians, 1 administrator, and 2 anesthesia providers. Employing conservative assumptions of variance, the survey was sent to a convenience sample of 1,000 CRNAs practicing throughout

the United States. The sample was derived from a population of CRNAs who were active members of the Virginia Association of Nurse Anesthetists in Richmond, as well as CRNAs from around the country who have attended regional continuing education conferences offered in the past 5 years by Nurse Anesthesiology Faculty Associates, part of Virginia Commonwealth University. The phase 1 mixed methods survey used a quantitative and qualitative approach for gathering data from practicing CRNAs.

The questionnaire contained 10 items designed to capture demographic data and explore current transfer of care processes. Additional items asked respondents to identify and rank the most important factors to communicate when transferring care of an anesthetized patient from one anesthesia provider to another, characteristics of a transfer of care process that would most likely lead them to adopt such a change in practice, and barriers that would most likely prevent them from adopting a systematic transfer of care process. Three open-ended questions followed each of the main survey items asking respondents to further elaborate on their responses to gain a better understanding of current transfer of care processes.

• **Phase 2: Checklist Development.** A transfer of care checklist based on results of the phase 1 survey was developed in phase 2 of this study. Mnemonic strategies were incorporated to improve the utility of the tool. Once the prototype checklist tool was established and a consensus among panel experts was achieved, the checklist, along with guidelines for use, was pilot tested. The pilot group consisted of a convenience sample of 74 CRNAs providing anesthesia in operating suites at each of 2 large community hospitals and 1 large teaching hospital in central Virginia. Given the number of surgical cases scheduled, the number of operating rooms open simultaneously, and the number of CRNAs employed at these facilities, together with the need for morning breaks, lunch breaks, and end-of-shift changes each day, it was estimated that a 2-week testing period at each location allowed for ample opportunities for data collection. To facilitate interrater reliability, the implementation process commenced with a 30-minute group orientation at each hospital to familiarize potential subjects with the methods and guidelines for using the transfer of care checklist tool. For reference, a 21.6 x 27.9-cm (8.5 x 11-in) laminated card containing the checklist was posted on the anesthesia machine in each operating room, and pocket-sized, bound tablets of paper illustrating the checklist were given to all subjects.

Immediately following the implementation stage, all subjects enrolled in phase 2 of the study were asked to evaluate the checklist on an electronic questionnaire, which also was developed by the expert panel.

## Results

• **Phase 1.** Three hundred two CRNAs responded to the survey, resulting in a response rate of 30.2% (302

1. How long have you been working as a Certified Registered Nurse Anesthetist?	0-5 years	16-20 years	31-35 years	6. Please suggest any "other" information you feel would be important to include in the anesthesia transfer of care event.
	6-10 years	21-25 years	Over 35 years	7. Which characteristics of a transfer of care process would most likely lead you to adopt such a change in practice? (Choose all that apply.)
	11-15 years	26-30 years		Brevity
2. On average, how many hours per week do you spend providing anesthesia care as a Certified Registered Nurse Anesthetist?	Less than 36 hours	More than 36 hours		Purposeful
3. Are you currently using a systematic process for communicating vital information during the transfer of care event (ie, when one anesthesia provider relieves another anesthesia provider for a break or end of shift)?	Yes	No		Utility (easy to use)
4. If so, please describe.				Organized (organizes salient elements of the case for easy retrieval)
5. Please choose what you feel to be the 7 most important factors to communicate when transferring care of an anesthetized patient from one anesthesia provider to another.				Comprehensive
Patient medical/surgical history				Conducive to memory
Procedure				Has a written component
Allergies				Improves patient safety
Status of paralysis (ie, train-of-four)				Encourages proper reconciliation of controlled substances
Information about narcotics that have been administered/narcotics left to be accounted for				Provides quick orientation to the ongoing case and patient condition
Information about ventilatory status (PIP, ETCO <sub>2</sub> , LMA vs ETT, ventilation mode, etc)				8. Please suggest any "other" characteristics of a transfer of care process that might lead you to adopt such a change in practice.
IV access and other invasive lines				9. What barriers would most likely prevent you from adopting a systematic transfer of care process?
Fluid administration/urine output/blood loss				There is nothing wrong with the way I am doing it now.
Information about temperature; warming or cooling the patient				I don't see the point.
Information on level of difficulty of ventilation/intubation				It would take too long.
Information on antibiotic administration				It would take my attention away from the patient.
Information of antiemetic administration				It would be difficult to police.
Information on type of anesthetic (inhalation vs IV)				None of the above; I would be willing to adopt a systematic approach to transferring care if it improved my practice and promoted patient safety.
				10. Please suggest any "other" barriers you feel would prevent you from adopting a systematic process for the transfer of care event in nurse anesthesia.

**Figure 1. Phase 1 Questionnaire**

Abbreviations: ETCO<sub>2</sub>, end-tidal carbon dioxide; ETT, endotracheal tube; IV, intravenous; LMA, laryngeal mask airway; PIP, peak inspiratory pressure.

of 1,000 responded). Descriptive statistics were used to analyze responses to multiple-choice questions. Qualitative methods were used to analyze responses to open-ended questions in order to identify common themes among responses.

- **Demographic Information.** Responses can be found in Table 1. The largest groups were those who had worked 0 to 5 years (n = 58, 19.3%) and 16 to 20 years (n = 58, 19.3%). The smallest group included those CRNAs who had worked 21 to 25 years (n = 18, 6.0%). Most subjects (n = 196, 64.9%) indicated that they spent more than 36 hours per week providing anesthesia care, whereas the remaining subjects (n = 105, 34.8%) indicated they spent less than 36 hours per week providing care. One subject did not respond to the full-time/part-time question.

- **Current Practices.** When asked whether subjects were currently using a systematic process for communicating vital information during the transfer of care event,

most subjects (n = 220, 72.8%) indicated that they did not currently have a systematic process in place. Survey item 4 asked subjects to describe their current process for transferring care during the intraoperative period. Of the 302 respondents, 82 (27.2%) offered explanations of the process they currently use during the transfer of care. Most of the responses included the terms *history*, *procedure*, and *allergies* as descriptors. *Procedure* was typically described as the type of surgical procedure, including any anesthesia-related information. In addition, SBAR (situation, background, assessment, and recommendation) was cited by 11% of those responding to item 4 (n = 9) as a method of transferring care. Table 2 provides the frequency in which survey respondents provided key terms.

- **Items Related to Development of a Systematic Process.** Survey item 5 asked respondents to select what they believed were the 7 most important factors to communicate when transferring care of an anesthetized patient from

No. of years worked	No. (%) of responses
0-5	58 (19.2)
6-10	46 (15.2)
11-15	45 (14.9)
16-20	58 (19.2)
21-25	18 (6.0)
26-30	28 (9.3)
31-35	27 (8.9)
> 35	22 (7.3)

**Table 1.** Phase 1: Number of Years Worked as Certified Registered Nurse Anesthetist (N = 302)

Key descriptor	Responses, %
History	28.0
Procedures	24.0
Allergies	21.0
Patient or surgery history	16.9
Verbal report	16.9
SBAR	11.0
My way or my own way	9.8
Airway	9.6

**Table 2.** Phase 1: Most Frequent Descriptors of Current Systematic Processes for Communication of Vital Patient Information During Transfer of Care

Abbreviation: SBAR, situation, background, assessment, and recommendation.

one anesthesia provider to another. Subjects were given a limit of 7 in an effort to keep the length of the checklist reasonable. Respondents were allowed to select multiple factors from a total of 13 provided factors. The 13 factors provided in the survey represented the consensus among the expert panel members as factors important to communicate. The factors selected most frequently were patient's medical/surgical history (n = 289, 95.7%), allergies (n = 269, 89.1%), and level of difficulty of ventilation/intubation (n = 252, 83.4%). Those factors selected least often were antiemetic administration (n = 26, 8.6%) and temperature (n = 9, 3.0%). Table 3 provides a ranking of the most important factors to communicate when transferring care based on responses to the phase 1 questionnaire.

Survey item 6 asked subjects to suggest additional information they consider important to communicate during the anesthesia transfer of care process. Of the 302 respondents, 113 (37.4%) provided suggestions for additional checklist content. Those items appearing greater than 1% of the time are shown in Table 4.

Subjects were then asked to choose, from a list of 10 characteristics, "Which characteristics of a transfer of care process would most likely lead you to adopt such a change in practice?" (item 7). The characteristic identified as most likely to lead to a change in practice was

Important factor	No. (%) of responses
Patient medical/surgical history	289 (95.7)
Allergies	269 (89.1)
Information on level of difficulty of ventilation/intubation	252 (83.4)
Fluid administration/urine output/blood loss	244 (80.1)
Information about narcotics administered	235 (77.8)
Procedure	227 (75.2)
IV access and other invasive lines	163 (54.0)
Information about ventilatory status	145 (48.0)
Status of paralysis (ie, train-of-four)	127 (42.1)
Information on type of anesthetic	78 (25.8)
Information on antibiotic administration	60 (19.9)
Information on antiemetic administration	26 (8.6)
Information about temperature (warming or cooling the patient)	9 (3.0)

**Table 3.** Phase 1: Most Important Factors to Communicate When Transferring Care

Abbreviation: IV, intravenous.

improving patient safety (n = 234, 77.4%). Following closely was its ability to provide a quick orientation to the case and patient condition (n = 222, 73.5%) and utility or ease of use (n = 218, 72.2%). These results are found in Table 5.

Other characteristics of a transfer of care process that may lead to a change in practice (item 8) were identified by 31 subjects (10.2%) and included the following keywords: *systematic* (n = 10, 32.3%), *standardized* (n = 8, 25.8%), and *patient safety* (n = 3, 9.7%). When asked what barriers would most likely prevent subjects from adopting a systematic transfer of care process (item 9), the overwhelming answer was "no barriers were perceived if it improved their practice and promoted patient safety" (n = 248, 82.1%).

Finally, respondents were asked to identify any additional barriers that would prevent them from adopting a systematic process for the transfer of care event. Fifty-five respondents provided suggestions in this area. The most frequently reported barrier to adopting a systematic transfer of care process was that not every anesthesia provider would comply unless the process was made to be a standard of care (n = 33, 60%).

- **Phase 2.** The second phase of this project included development and evaluation of the PATIENT checklist tool.

- **Checklist Development.** The PATIENT checklist tool (Figure 2) was developed as a result of feedback derived from phase 1 results. It incorporated professional standards of anesthesia practice as well as characteristics of effective checklists. The mnemonic PATIENT was chosen in consideration of the IOM's acknowledgment of patient-centeredness as 1 of the 6 dimensions of healthcare likely

Suggestion for additional checklist content	Responses (%)
Unexpected events during surgery	14
Postoperative status/plans	9
Status of surgery/surgical plans	8
Anesthetic history (patient response to anesthesia, medications, and BIS status)	7
Time of surgery	7
Hemodynamic issues	6
Attending anesthesiologist/surgeon	5
Surgeon's requests	5
β-Blocker administration	3
IV information/issues	2

**Table 4.** Phase 1: Suggestions for Additional Information to Be Included in a Transfer of Care Checklist

Abbreviations: BIS, bispectral index; IV, intravenous.

to reduce costs and improve quality.<sup>3</sup> A general description of each parameter of the PATIENT checklist to be communicated during the transfer of care is provided:

**P** = Patient (preoperative assessment and current condition) and positioning

**A** = Airway (level of difficulty, current management), antibiotics, allergies, and type of anesthetic

**T** = Temperature (including type of monitoring and warming and/or cooling adjuncts)

**I** = Intravenous (including type of access, invasive lines, infusions, blood products) and intake and output

**E** = End-tidal carbon dioxide (including ventilatory parameters such as respiratory rate, peak inspiratory pressure, oxygenation, and ventilation mode)

**N** = Narcotics (including those administered as well as those that the oncoming anesthetist is responsible for reconciling)

**T** = Twitches (including type of neuromuscular monitoring and degree of paralysis)

• *Evaluation.* Phase 2 of the study also involved the evaluation of the PATIENT checklist tool through the electronic administration of a 10-item mixed-methods survey questionnaire (Figure 3). The survey was completed by 30 of the 74 enrolled subjects, yielding a response rate of 40.5%.

Item 1 of the phase 2 questionnaire asked respondents "Over the past 2 weeks, how many times did you use, to some extent, the PATIENT transfer of care checklist intraoperatively when either giving or receiving report of an anesthetized patient?" Four CRNAs (13.3%) responded they had not used the checklist at all, citing they did not have the opportunity to do so (n = 2) or they forgot to use it (n = 2). Seventeen CRNAs (56.7%) indicated they used the checklist 1 to 5 times, 5 (16.7%) used the process 6 to 10 times, 1 (3.3%) used it 11 to 15 times, and

Characteristic most likely to lead to change in practice	No. (%) of responses
Improves patient safety	234 (77.4)
Provides quick orientation to the ongoing case and patient condition	222 (73.5)
Utility (ease of use)	218 (72.2)
Organized (organizes salient elements of case for easy retrieval)	214 (70.9)
Purposeful	174 (57.6)
Comprehensive	118 (39.1)
Brevity	115 (38.1)
Encourages proper reconciliation of controlled substances	89 (29.5)
Conducive to memory	85 (28.1)
Has a written component	38 (12.6)

**Table 5.** Phase 1: Characteristics of Transfer of Care Process Most Likely to Lead to Change in Practice

3 (10%) used the process more than 15 times.

Subjects were asked if they liked the idea of adopting a standardized transfer of care process for use when giving and/or receiving report of an anesthetized patient (item 2). Of the 30 respondents, 87% either agreed (n = 14) or strongly agreed (n = 12) with the use of a standardized tool.

In evaluating the PATIENT checklist tool itself, 90% (n = 27) of respondents believed that both the length and scope of content were appropriate and that the tool lent itself to memory (items 3, 4, and 5). All respondents either agreed (n = 18) or strongly agreed (n = 12) that the PATIENT checklist tool provided an effective way of organizing important information (item 6).

Items 7 to 10 gave subjects the opportunity to briefly comment about their experience using the PATIENT transfer of care checklist tool. Survey items and comments are summarized in Table 6.

## Discussion

The aviation industry has long been compared with other complex industries such as military and nuclear power operations and, more recently, the healthcare professions of emergency medicine, critical care, and anesthesiology.<sup>1</sup> More specifically, air traffic controllers (ATCs) experience transfer of responsibility issues similar to anesthesia providers in that, at certain times, controllers require relief from their duties while the very systems for which they are responsible continue to operate.

With respect to ATCs, Scarborough et al<sup>10</sup> reported that more errors occur in the 10-minute timeframe immediately following the TRE than during any other 10-minute timeframe and that nearly half of all operational errors occur within 30 minutes of the TRE. Durso and colleagues<sup>11</sup> studied shift-change procedures among ATCs and offered a theoretical framework to explore and codify essential components of the TRE in an effort

to reduce operational errors. Through an interview with a subject matter expert on air traffic control, they also learned that shift changes among ATCs happen in a systematic fashion and could be divided into 4 phases: end of shift, arrival, meeting, and taking post.

Phase 1 is described as the end of shift, which begins with the recognition by the outgoing controller that a shift change is approaching. For the outgoing controller, a key event in this phase involves maintaining control while preparing for the meeting (phase 3). For the incoming controller, the end-of-shift phase provides an opportunity to “learn what is going on,” often before arriving to the scene.<sup>11</sup> In anesthesia practice, this phase of the TRE is not well understood, if present at all. Incoming anesthesia providers may consider learning as much as possible about the case they are getting ready to manage before assuming care or even entering the room.

Phase 2 of the ACT TRE is called arrival. The arrival phase is characterized by the incoming controller arriving to the scene and engaging in a “sit-in” with the outgoing controller. During this phase, the incoming controller listens to the communications between the outgoing controller and pilots and makes mental notes of environmental cues while the outgoing controller continues to maintain control and prepare for the meeting. A main goal of the arrival phase is for the incoming controller to begin to gain SA by gathering as much information as possible through keen observation.<sup>11</sup>

A suggested change to the current process in anesthesia practice may include a review of the patient preoperative assessment by the incoming anesthetist immediately on arrival to the operating room but without engaging the outgoing anesthetist. The outgoing anesthetist could continue directing his or her undivided attention to the patient during this time. Once the incoming anesthetist

becomes familiar with the patient’s medical and surgical history, the “meeting” or verbal exchange of information could take place.

Phase 3 for ATCs, the meeting, usually lasts about 1 minute and presents the first opportunity for verbal communications between the incoming and outgoing controllers. The outgoing controller remains in control of operations while both controllers are responsible for the accuracy of the TRE report. It is during this phase that the Federal Aviation Administration mandates the use of a checklist, either by memory or display screen, for communicating essential information from one controller to the other regarding the conditions of the current

<b>P</b>	Procedure:
	Patient (quick scan): Position:
<b>A</b>	Anesthesia:
	Antibiotic:
	Airway: Allergies:
<b>T</b>	Temperature:
	IVs and other invasive lines:
<b>E</b>	ETCO <sub>2</sub> (ventilation):
	Narcotics:
<b>T</b>	Twitches:

**Figure 2. PATIENT Transfer of Care Checklist Tool<sup>a</sup>**

Abbreviation: IVs, intravenous lines.

<sup>a</sup> Developed, in part, from feedback from the phase 1 questionnaire.

1. Over the past 2 weeks, how many times did you use, to some extent, the PATIENT transfer of care process intraoperatively when either giving or receiving report of an anesthetized patient?			
0	6-10	15+	
1-5	11-15		
2. I like the idea of adopting a standardized transfer of care process for use intraoperatively when giving/receiving report of an anesthetized patient.			
Strongly Disagree	Agree		
Disagree	Strongly Agree		
3. The length of the PATIENT checklist is appropriate.			
Strongly Disagree	Agree		
Disagree	Strongly Agree		
4. The PATIENT checklist lends itself to memory.			
Strongly Disagree	Agree		
Disagree	Strongly Agree		
5. The PATIENT checklist is comprehensive.			
Strongly Disagree	Agree		
Disagree	Strongly Agree		
6. The PATIENT checklist provides an effective way of organizing important information.			
Strongly Disagree	Agree		
Disagree	Strongly Agree		
7. If you have used the PATIENT transfer of care process in the past 2 weeks, please briefly describe any positive aspects of the process.			
8. If you have used the PATIENT transfer of care process in the past 2 weeks, please provide suggestions for improvement/barriers to use.			
9. If you have chosen not to use the PATIENT transfer of care process over the past 2 weeks, please explain.			
10. Additional Comments:			

**Figure 3. Phase 2 Questionnaire**

**Item 7 – Describe positive aspects of the PATIENT checklist tool**

Excellent tool for report in PACU  
Helps organize information for easy retrieval  
Facilitates memory  
Succinct  
Comprehensive  
Reliable

**Item 8 – Provide suggestions for improvement/barriers to use**

Not a standard  
Add name of attending anesthesiologist  
Make small card to clip to ID badge  
Prioritize airway information first  
Need place for lab results  
Add antiemetics

**Item 9 – If you did not use the tool during the pilot period, please explain**

Forgot to use it  
Found it difficult to switch from my normal practice  
Attending gave me a break and already knew the patient

**Item 10 – Additional comments**

Easily remembered without the physical tool  
Specific for anesthesiologist to anesthesiologist transfer  
Important and very relevant to our everyday activities as CRNAs  
Report takes away from break time  
SRNAs should use this to organize their care  
Wouldn't be as helpful in a complex case  
Develop an iPhone (Apple Inc) app

**Table 6.** Phase 2: Summary of Responses to Open-ended Items Requesting General Information About the PATIENT Transfer of Care Checklist Tool

Abbreviations: app, application; CRNA, Certified Registered Nurse Anesthetist; ID, identification; lab, laboratory; PACU, postanesthesia care unit; SRNA, student registered nurse anesthetist.

aviation environment.<sup>11</sup> Communications, guided by the checklist, largely flow from the outgoing controller to the incoming controller but also allow for questions from the incoming controller.

Presently, few policy statements exist that serve to guide healthcare providers as to what constitutes optimal transitions of care.<sup>12</sup> In the anesthesia domain, the transfer of care occurs through verbal communications between the outgoing and incoming anesthesiologists, but there is little evidence to support this as a robust and systematic process. Based on the results of this study, the content of TREs in anesthesia appears to be loosely defined, and the goal of the transfer of care process may not be well substantiated across the discipline. By adopting a communication tool such as the PATIENT checklist, anesthesiologists may be able to minimize the variation

in the type of information that is communicated upon transferring care. By minimizing variance, the transfer of care process may be more reliable.

Finally, phase 4, named “taking post,” begins when the incoming ATC indicates that he or she has accurate awareness of the situation and assumes responsibility for managing the environment.<sup>11</sup> The outgoing controller maintains the responsibility of ensuring that the incoming controller has the essential information to perform well and may remain on the scene for a short time until he or she is comfortable with the way the environment is being managed. In contrast to phase 4 of the ACT TRE, the anesthesia transfer of care model may or may not hold the outgoing anesthesiologist responsible for providing essential information. Often the responsibility of this essential task is reviewed or questioned only in the case of an adverse event.

There is a paucity of research surrounding TREs in anesthesia. Hart and Owen,<sup>13</sup> in a study of anesthesiologists providing general anesthesia for cesarean delivery, demonstrated that when transferring care the use of a checklist similar to that used by pilots could improve anesthesia patient safety outcomes. Checklists can help compensate for lapses in human memory, especially in complex environments that confer a high cognitive load on its operators.<sup>9</sup> Additionally, it has been demonstrated that a mnemonic feature may serve as a reminder for well-learned information, assist with activities performed in particular sequences, anchor facts, organize thoughts, and serve as a guide when written resources are unavailable.<sup>14</sup> If users can remember a checklist, they may be more inclined to incorporate it into their practice.

In 2009, The Joint Commission, in partnership with 10 US hospitals, launched The Hand-Off Communications Project based on evidence that miscommunication contributes to nearly 80% of adverse events that occur when patient care is transferred from one provider to the other.<sup>15</sup> These adverse events include, but are not limited to, medication errors, delays in treatment, increased length of hospital stay, and patient injury and death. The Joint Commission reports that the transfer of care event is often defective and that caregivers are often dissatisfied with the transfer of care process.

The Hand-Off Communications Project proposes solutions to the issue of inadequate transfer of care practices through (1) standardization of protocols, (2) use of standardized tools, and (3) positive reinforcement of quality. Standardization of protocols and procedures has long been the feather in the cap for the aviation industry, an industry recognized as highly reliable. Standardization promotes automaticity, and automaticity is recognized as a contributing factor to achieving SA.<sup>2</sup> When information and processes are standardized, variation, and all of its unknown consequences, is minimized. This study identifies vital parameters that subjects agree are essential

to communicate when transferring care of the anesthetized patient from one provider to another. The Joint Commission advocates that tools, resources, and software systems should continue to be developed to support standardized transfer of care processes.<sup>15</sup>

Responses to the open-ended questions on the PATIENT checklist evaluation tool suggest that a change in current transfer of care processes may be met with resistance from some practitioners. Where any change in practice is concerned, positive reinforcement at the organizational level is essential. Industry and institutional leaders who embrace and show a strong commitment to high-quality transfer of care processes may be more likely to see a sustained change in practice.<sup>15</sup>

All nurse anesthetists are expected to follow established standards of practice as promulgated by the American Association of Nurse Anesthetists (AANA). These standards serve to advise and protect the public when receiving anesthesia services rendered by a CRNA. Practice Standard VII states that the CRNA must “transfer the responsibility for care of the patient to other qualified providers in a manner which assures continuity of care and patient safety.”<sup>16</sup> As predicated by the standard, nurse anesthetists must continuously assess the patient’s status and determine when it is safe to transfer the responsibility of care to other qualified providers, which include other anesthesia providers, during the intraoperative period. Additionally, nurse anesthetists must accurately report the patient’s condition and all essential information to the provider assuming the responsibility of care. The implementation of strategies and resources related to the transfer of care, such as the PATIENT transfer of care tool, could be incorporated into electronic charting systems and serve to support CRNAs in adhering to select standards of practice.

The discipline of anesthesiology has become a well-recognized leader in healthcare in advancing patient safety throughout the perioperative period. Despite this success, transfer of care events are not well understood and continue to present major opportunities for error and poor performance.<sup>17</sup> Findings from this study have the potential to contribute to the understanding of current transfer of care practices. The development of a standardized transfer of care communication tool can serve to promote SA in a swift and organized manner and may minimize existing variation in handoff processes.

Working in an environment characterized by the rapid expansion of complex technologies, a growing population of high-acuity patients, and an inordinate amount of data that must be accurately processed in a short amount of time, nurse anesthetists will continue to look for ways to communicate more effectively. Checklist tools, as components of standardized and systematic processes, have the potential to assist providers with identifying, organizing, and communicating important information

to overcome inevitable human fallibilities and improve performance.

## REFERENCES

1. Gaba DM, Howard SK. Situation awareness in anesthesiology. *Hum Factors*. 1995;37(1):20-31.
2. Endsley MR, Garland DJ. *Situation Awareness Analysis and Measurement*. Mahwah, NJ: Lawrence Erlbaum Associates Inc; 2000.
3. Committee on Quality of Health Care in America, Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academies Press; 2001:45.
4. Hudson C. Better outcomes seen with standardized handoff protocol. *Anesthesiol News*. 2011;37(8):53.
5. Joint Commission Resources. Creating effective checklists: ensuring that all steps are taken to keep patients safe. *Joint Comm Perspect*. 2006;6(9):3-8.
6. Haynes AB, Weiser TG, Berry WR, et al; Safe Surgery Saves Lives Study Group. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med*. 2009;360(5):491-499.
7. Gawande A. *The Checklist Manifesto: How to Get Things Right*. New York, NY: Metropolitan Books, Henry Holt and Co; 2010.
8. Jaeggi SM, Buschkuhl M, Jonides J, Perrig WJ. Improving fluid intelligence with training on working memory. *Proc Natl Acad Sci USA*. 2008;105(19):6829-6833.
9. Mastropieri MA, Scruggs TE. Improving attention and memory. In: *The Inclusive Classroom: Strategies for Effective Instruction*. 3rd ed. Columbus, OH: Prentice Hall; 2006:218-243.
10. Scarborough A, Bailey L, Pounds J. Examining ATC [air traffic control] operational errors using the human factors analysis and classification system. Federal Aviation Administration report No. DOT/FAA/AM-05/25. December 2005. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA460879>. Accessed January 15, 2012.
11. Durso FT, Crutchfield JM, Harvey CM. The cooperative shift change: an illustration using air traffic control. *Theor Issues Ergonomics Sci*. 2007;8(3):213-232.
12. National Transitions of Care Coalition (NTOCC), Case Management Society of America. Transitions of care measures: paper by the NTOCC Measures Work Group. 2008:1-9. [www.ntocc.org/Portals/0/PDF/.../TransitionsOfCare\\_Measures.pdf](http://www.ntocc.org/Portals/0/PDF/.../TransitionsOfCare_Measures.pdf). Accessed January 15, 2012.
13. Hart EM, Owen H. Errors and omissions in anesthesia: a pilot study using a pilot’s checklist. *Anesth Analg*. 2005;101(1):246-250.
14. Belleza FS. Mnemonic-device instruction with adults. In: Pressley M, Levin JR, eds. *Cognitive Strategy Research: Psychological Foundations*. New York: Springer-Verlag. 1983:51-73.
15. Blouin AS. The Joint Commission update: improving hand-off communications: new solutions for nurses. *J Nurs Care Qual*. 2011;26(2):97-100.
16. American Association of Nurse Anesthetists. *Scope and Standards for Nurse Anesthesia Practice*. 2010. <http://www.aana.com/resources2/professionalpractice/Documents/PPM%20Scope%20and%20Standards.pdf>. Accessed January 15, 2012.
17. McDonald KM, Sundaram V, Bravata DM, et al. Closing the quality gap: a critical analysis of quality improvement strategies. In: Vol 7, *Care Coordination Report*. Rockville, MD: Agency for Healthcare Research and Quality; June 2007. Report No. 04(07)-0051-7.

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