

Build—don't break—communication during patient hand-offs

By Harold W. Rees, MD, and Norman A. Johanson, MD

“Breakdowns in communication” were cited as the second leading cause of medical errors in orthopaedic practice, according to a 2005 survey of AAOS members conducted by the Patient Safety Committee.¹ These communication lapses accounted for 26 percent of all reported errors.

Obstacles to good communication involve both individual and systemic problems. Orthopaedic surgeons can decrease overall medical errors—and improve the quality of patient care—by identifying where communication breakdowns occur most often and implementing systems to minimize those errors. Transferring patient care to another physician, for example, presents multiple opportunities for miscommunication and, thus, is an excellent place to start such an analysis.

Patient hand-offs

The resident 80-hour work week rule has increased the number of care transitions per patient, thus increasing the opportunity for errors in communication.² System problems include the lack of a formal sign-out or “hand-off” procedure, which may lead to errors if important information is omitted or is communicated in a confusing manner.² Individual factors, such as resistance to change, can create communication barriers as well. If a surgeon is unwilling to relinquish work responsibility to others, or feels uncomfortable handing off patients to higher-ranking physicians, communication errors can result.³

When addressing communication system errors—particularly during patient care transitions—both surgeon-to-surgeon communication and communication between surgeons and ancillary staff such as nurses, nurse practitioners, and physician assistants must be considered. Lack of communication between surgeons and nursing staff at sign-out provides another opportunity for missed information.

Tips for improving transitions of care

The following specific factors are identified with improved communication during transitions of care:⁴

- Providing a printed, up-to-date sign-out form at the time of hand-off
- Conducting face-to-face hand-off at multiple levels—horizontally, if possible (such as nurse-to-nurse or resident-to-resident)

- Signing out as a team, when possible
- Discussing all of the patients on the form
- Providing a separate “to do” list
- Recording overnight events on the sign-out form for delivery to the incoming team the following day

List management can be improved by implementing the following recommendations:

- Loosen restrictions on who may revise the information
- Print out patient data rather than hand-copying it
- Allow access to the data from anywhere, including from home via computerized systems⁴

Some institutions have successfully implemented some of these key factors by establishing various new practices, including the use of a formal morning report. This provides the opportunity for a team sign-out approach, as well as an educational opportunity for staff and residents. ⁵ Encouraging discussion and attempting to change expectations of junior team members can also lead to more open communication and better patient care. ³

Some institutions have implemented computerized sign-out systems to standardize data and to save time for those involved. ⁴ These systems can be accessed by all team members, including surgeons, nurses, and allied health staff. Errors are reduced, in part, because patient data is obtained directly from hospital computer systems, thus eliminating transcription errors. ⁶ The computerized systems can be further enhanced by the use of personal digital assistants (PDAs),⁷ which not only allow providers more time to complete other activities, but also reduce stress and decrease the potential for causing errors.

Our experience

Our experience on the orthopaedic service at Hahnemann University Hospital in Philadelphia illustrates some of the obstacles to communication, as well as some of the ways we resolved these problems.

First, our sign-out list is maintained in a word processing file on a single computer that is accessible to all members of the orthopaedic team. Although our system does not achieve the goal of being accessed from anywhere in the hospital, it is both low-cost and easily implemented. This system still relies on hand-copying data onto a form, but it provides everyone with a printed list with up-to-date patient data at the time of sign-out. Maintaining this list on a single computer allows all of the information to be collected in one location, which minimizes the potential for duplicate lists with erroneous information.

Another way we minimize problems is through a formal team sign-out in the morning and evening, as transitions occur. X-rays from new consultations are reviewed by the whole team, which allows for education of more junior team members and provides an opportunity for contributions to patient care from all team members. We are still attempting to develop a reliable means of communicating with nursing staff, beginning with an informal sign-out in the evening between the resident on call and the orthopaedic ward nurses.

Although no system is perfect, improving hand-off communication is possible and should be

attempted so that the overall rate of medical errors that hurt our patients is reduced.

Harold W. Rees, MD, is a PGY5 orthopaedic resident at Drexel University College of Medicine in Philadelphia. Orman A. Johanson, MD, is chairman of the department of orthopaedic surgery, Drexel University College of Medicine, and a member of the AAOS Patient Safety Committee and the AAOS Evidence-Based Practice Committee.

Additional References

1. Wong, DA, AAOS Member Patient Safety Survey: A First Look. *AAOS Bulletin*, August 2006.
2. Horwitz, LI, Krumholz, SM, Green, ML, Huot, SJ, Transfers of Patient Care Between House Staff on Internal Medicine Wards: A National Survey. *Arch Int Med* 2006;166:1173-1177.
3. Kellogg, KC, Breen, E, Ferzoco, SJ, Zinner, MJ, Ashley, SW, Resistance to Change in Surgical Residency: An Ethnographic Study of Work Hours Reform. *J Am Coll Surg* 2006;202:630-636.
4. VanEaton, EG, Horvath, KD, Lober, WB, Pellegrini, CA, Organizing the Transfer of Patient Care Information: The Development of a Computerized Resident Sign-Out System. *Surgery* 2004;136:5-13.
5. Stiles, BM, Reece, TB, Hedrick, TL, Garwood, RA, Hughes, MG, Dubose, JJ, Adams, RB, Schirmer, BD, Sanfey, HA, Sawyer, RG, General Surgery Morning Report: A Competency-Based Conference that Enhances Patient Care and Resident Education. *Curr Surg* 2006 Nov-Dec;63(6):385-390.
6. Sidlow, R, Katz-Sidlow, RJ, Using a Computerized Sign-Out System to Improve Physician-Nurse Communication. *Jt Comm J Qual Patient Saf* 2006 Jan;32(1):32-36.
7. Joy, S, Benrubi, G, Personal Digital Assistance Use in Florida Obstetrics and Gynecology Residency Programs. *South Med J* 2004 May;97(5):430-433.

June 2007 AAOS Now

<http://www.aaos.org/news/bulletin/jun07/clinical5.asp>

6300 North River Road Rosemont, Illinois 60018-4262 Phone 847.823.7186 Fax 847.823.8125

© 1995-2008 by the American Academy of Orthopaedic Surgeons. "All Rights Reserved." This website and its contents may not be reproduced in whole or in part without written permission. "American Academy of Orthopaedic Surgeons" and its associated seal and "American Association of Orthopaedic Surgeons" and its logo are all registered U.S. trademarks and may not be used without written permission.

From the cockpit to the OR

By Stephen A. Albanese, MD

Crew resource management: A model for orthopaedics?

Human beings make mistakes, but systems play a role as well. Poorly designed systems frequently lead people to make errors or—at minimum—fail to prevent them.

That was one of the conclusions of the 1999 Institute of Medicine report, *To Err is Human: Building a Safer Health System*, which raised awareness of the significant consequences of medical errors.

As in medicine, errors in the high-stress aviation environment can result in serious harm to the public. For this reason, successful error-prevention strategies implemented in the aviation industry are increasingly used as models in developing patient safety strategies in medicine.

Crew resource management

“Crew resource management” (CRM) training evolved out of a 1979 NASA workshop convened to evaluate the causes of aviation mishaps.¹ Human error was found to be the primary cause of most aviation accidents. Failures of interpersonal communication, leadership, and decision making in the cockpit were identified as significant contributing factors.²

CRM training, therefore, emphasizes the role of human factors in high-stress, high-risk environments. The training encompasses a wide range of knowledge, skills, and attitudes including communications, situational awareness, problem solving, decision making, and teamwork.

Various CRM models—all based on the same basic concepts and principles identified in the NASA workshop—have since been successfully adapted to different industries and organizations. Over the past 20 years, these principles have gradually been incorporated into various components of the healthcare system.

Striking parallels

So how do aviation-based safety practices apply to the healthcare setting? Many striking parallels exist between the cockpit and the operating room (OR) or emergency department (ED). For example, flight crews and physicians and other healthcare providers are highly trained professionals working in complex and technically demanding situations. In both settings, routine

decisions have life-and-death consequences, and team members are sometimes strangers. In both the cockpit and the OR, a lead professional sets the tone of the team's work. And in both places, fatigue and routine are the enemies of precision.

Teaming up for safety

In orthopaedics, the composition of the "team" may vary, depending on the specific environment and needs. In the OR environment, team members frequently include surgical technicians, nurses, anesthesiologists, and surgeons.

To be effective, the CRM model relies on a system of cross-monitoring by members of the healthcare team. Effective communication is essential if CRM is to improve patient safety. Any member of the team—regardless of his or her level in the organization—must feel comfortable raising questions or concerns without hesitation.³

When a team member's question or concern is obviously valid—as in the situation described in the accompanying sidebar—solutions can be implemented to address the identified concerns. When the best course of action remains in question, however, a mechanism for rapid conflict resolution is imperative, particularly in fast-paced, stressful environments such as ORs and EDs.

AAOS: A leader in patient safety

Over the past decade, CRM has been implemented in high-risk healthcare disciplines such as obstetrics, intensive care, and emergency medicine. The Joint Commission also recommends implementation of team training as part of patient safety education.

During this time, the AAOS has emerged as a nationally recognized leader in the advancement of patient safety. The "Sign Your Site" campaign led by former AAOS president **S. Terry Canale, MD**, has been embraced by the Joint Commission, which identified signing the site as one of its quality goals beginning in 2003.

The Academy also played a significant role in the Joint Commission's May 2003 summit to develop a "Universal Protocol" to avoid wrong-site, wrong-procedure, and wrong-patient surgery.⁴ Throughout his 2003-2004 term as Academy president, **James H. Herndon, MD**, promoted AAOS patient safety efforts and participated in the press conference announcing the endorsement of the Universal Protocol by more than 40 professional medical organizations.

Communication is key to patient safety

When addressing patient safety issues, the importance of effective communication cannot be underestimated. "Active involvement and effective communication among all members of the surgical team is important for success" is one of the principles endorsed by the Joint Commission in developing the Universal Protocol. In addition, the "time-out" that is required immediately before starting a procedure is completely dependent on effective communication among all members of the operating team. A breakdown in this system—including the reluctance of a team member to voice a concern—can result in significant negative consequences for the patient.

Although technologic advances such as computerized order entry systems have been effective in reducing errors, they tend to deemphasize the important personal communication aspects of healthcare delivery.

The principles of CRM are sound, but the extent to which the model should be formally

implemented in a healthcare system remains open to debate. The impact of process changes is difficult to measure. For example, the literature shows that formal training results in consistent improvements in communication, but the actual impact on patient outcomes is not as apparent. Any decisions regarding implementation of CRM concepts and training must be made collaboratively, involving the administrative lines of each environment.

The methods used to implement and evaluate workshops or training on CRM fundamentals must be tailored to the specific organization. In settings where formal training is not feasible, the basic concepts of CRM can easily be implemented to positive effect. Facilitating open communication among the team, for instance, creates a more pleasant work environment, encourages team members to be more invested in the outcome, and improves the organization's effectiveness.

Surgeons must take the lead

The CRM model does not in any way diminish the leadership role of the orthopaedic surgeon. In fact, it underscores the importance of that role. As in aviation, in which there is one responsible commanding officer, the physician is the ultimate decision maker in most clinical environments. This does not preclude increased involvement of other team members or the creation of a positive work environment that encourages the free exchange of concerns in a nonthreatening manner.

Crew resource management should help our profession achieve what is now being called "the high-reliability OR," in which the frequency of all types of adverse events is markedly reduced. The evaluation and, when appropriate, adoption of strategies to promote patient safety must remain a priority in the constantly evolving practice of orthopaedic surgery.

Dr. Albanese is the Council on Education representative to the AAOS Patient Safety Committee. He may be reached at albaness@upstate.edu.

Talking "up the chain"

Effective communication requires that any team member must feel comfortable in raising questions or concerns. Because a junior or subordinate team member may be hesitant to speak up, crew resource management expert Todd Bishop of the Error Prevention Institute developed the following five-step assertive statement process to help junior team members feel confident talking "up the chain of command."

- Get the person's attention: "Dr. Smith."
- State your concern: "I'm very concerned that we're preparing the wrong leg for surgery."
- State the problem as you see it: "The X-rays and your initials indicate the right knee, but the left knee is being scrubbed."
- Propose a solution: "I think we should call a time-out and verify the site."
- Obtain agreement (or buy-in): "Do you agree, doctor?"

References

1. Cooper GE, White MD, Lauber JK (eds): Resource management on the flight deck: Proceedings of a NASA/Industry workshop held at San Francisco, California, June 26-28,

1979. NASA Conference Publication 2120, March 1980.
2. Helmreich RL, Merritt AC, Wilhelm JA: The evolution of Crew Resource Management training in commercial aviation. *Int J Aviat Psychol* 1999;9:19-32.
 3. Oriol MD: Crew resource management: Applications in healthcare organizations. *J Nurs Adm* 2006;36:402-406.
 4. Joint Commission Web site (<http://www.jointcommission.org>). Accessed September 7, 2007.

September 2007 AAOS Now

<http://www.aaos.org/news/bulletin/sep07/managing6.asp>

6300 North River Road Rosemont, Illinois 60018-4262 Phone 847.823.7186 Fax 847.823.8125

© 1995-2008 by the American Academy of Orthopaedic Surgeons. "All Rights Reserved." This website and its contents may not be reproduced in whole or in part without written permission. "American Academy of Orthopaedic Surgeons" and its associated seal and "American Association of Orthopaedic Surgeons" and its logo are all registered U.S. trademarks and may not be used without written permission.

HRST Training: The next step in patient safety?

By Robert L. Brooks, MD, PhD, MBA

Team dynamics contribute to the highly reliable surgical team

Team dynamics should be part of the training for all operating room (OR) crew members, especially those who, like orthopaedic surgeons, have the responsibility to assume a leadership role. Last fall, the AAOS leadership discussed the concept of training surgeons in techniques that would enable them to better manage surgical teams to reliably achieve safety and excellence.

Thomas Barber, MD, secretary of the AAOS Board of Councilors; Paul Preston, MD, an anesthesiologist and regional patient safety educator for the Kaiser Permanente San Francisco Medical Center, and I delivered the message of surgical safety and “Highly Reliable Surgical Team” (HRST) training.

Leadership styles matter

Research performed on command structure in military patrols, and expanded in industries such as flight control where team performance is essential, has shown that certain leadership styles and techniques improve results, while other methods disrupt team function, possibly resulting in mission failure.

Poor communication, chaos, stress, and fatigue all contribute to adverse surgical events. Although these factors cannot be eliminated from emergency situations, their risks can be minimized by strategies to manage chaos, improve active communication, and cope successfully with fatigue and stress. The result is the HRST.

Crew resource management

The aviation industry introduced formalized training for flight crews more than 20 years ago. Later, the healthcare industry recognized the relevance of these principles, frequently called Crew Resource Management (CRM), to the practice of medicine.

Other industries and managerial schools have enlarged the principles into Highly Reliable Organizations (HRO), which decrease errors by training in “human factors” engineering. For more than 10 years, the Kaiser Permanente Medical Centers have been applying these team-training techniques in their labor and delivery suites. The Veterans’ Administration National Center for Patient Safety has produced a program, Medical Team Training, which has

been conducted at more than 54 facilities for more than 3,000 surgeons, nurses, and anesthesiologists. Many leading academic centers have recently made similar training a requirement for renewal of surgical staff privileges.

The impact on outcomes

Studies have demonstrated a direct correlation between OR teams that exhibit HRST behavioral markers and patient outcomes. A study conducted by Kaiser Permanente in Southern California revealed that communication and teamwork interrelated with surgical outcomes, especially during intermediate- and high-risk procedures. Since its implementation in 2002, the Perioperative Safety Briefing Project resulted in a statistically significant increase in the perception of safety climate in the OR by the staff as well as the physicians, and only one wrong-site surgery ([Table 1](#)). Effective implementation of such programs would definitely be a cost savings to institutions and/or practices.

Although creating HRO and Crew Resource Management programs have associated costs, the cost is minimal compared to the expensive ramifications of errors. For example, a study conducted by Agency for Healthcare Research and Quality found that surgical teams leave instruments inside patients 2,700 times per year—a total annual cost of \$36 million.

Surgeons must rely on teams to successfully help their patients. Most surgeons recognize that certain dysfunctional leadership behaviors can disrupt the smooth operation of a team and increase the chances for adverse events. Perceptions of teamwork, such as team members feeling that they are heard by leaders, can have tremendous impact on a team's functioning ([Table 2](#)). The study of team dynamics shows that methods of leadership behavior are learnable, and implementing improved behaviors increases reliable results, improves patient safety, and increases the professional satisfaction of the surgeon and every other team member.

Orthopaedic surgeons should be aware of this rising trend in surgical safety and discuss the possibility of implementing team training with other OR leaders in their institutions. By beginning with AAOS initiatives such as Sign-Your-Site, time-outs, and preoperative checklists and applying them more broadly to improve all OR safety, orthopaedic surgeons can make a clear contribution to building a highly reliable surgical team. As AAOS Past President **James H. Herndon, MD**, urged us, we can do one more "Turn of the Wrench" for the safety of our patients by advocating for surgical team training.

The role of the AAOS

The AAOS may also have a role in developing educational programs and material to support surgical team training. The provision of educational materials and programs would help decrease the number of surgical errors, infections, and malpractice lawsuits, while improving employee retention and adverse event reporting. Proposed topics include the following: how and why teams function or fail; the science of errors; shared "mental models"; communication techniques; situational awareness; management of fatigue, stress, and work load; and improving individual performance on teams.

Robert L. Brooks, MD, PhD, MBA, is chair of the AAOS Patient Safety Committee.

He can be reached at bobbrookster@gmail.com

February 2008 AAOS Now

<http://www.aaos.org/news/aaosnow/feb08/research5.asp>

6300 North River Road Rosemont, Illinois 60018-4262 Phone 847.823.7186 Fax 847.823.8125

© 1995-2008 by the American Academy of Orthopaedic Surgeons. "All Rights Reserved." This website and its contents may not be reproduced in whole or in part without written permission. "American Academy of Orthopaedic Surgeons" and its associated seal and "American Association of Orthopaedic Surgeons" and its logo are all registered U.S. trademarks and may not be used without written permission.