

Patient Safety Tip of the Week

April 9, 2019 Handoffs for Every Occasion

Handoffs in healthcare (or, for that matter, in any industry) are periods of vulnerability. We’ve done many columns on handoffs but it’s been a while since we last did one and, since then, there have been a number of studies on handoffs in a variety of settings:

- The Intraoperative Handoff
- The OR to ICU Handoff
- The ICU to Ward Handoff
- Intensivist Handoffs
- Hospitalist Handoffs
- Structured Handoffs in General Surgery
- Transfer of Violent Patients from ED to Medical Units
- Resident Handoffs in the ED

The Intraoperative Handoff

One type of handoff we’ve seldom focused on **the intraoperative handoff**. In our January 6, 2015 Patient Safety Tip of the Week “[Yet Another Handoff: The Intraoperative Handoff](#)” we discussed a study by Saager and colleagues ([Saager 2014](#)) that showed an **8% increase in the composite of mortality and morbidity for each increase of one handoff**. For example, those with 2 transitions had a 17% increase in the composite. Moreover, the increased occurrence of complications with handoffs affected all the individual categories of the composite (cardiac, gastrointestinal, bleeding, infection). Their findings held up after adjustment for multiple potential confounding factors and in sensitivity analyses. The adverse effect of the handoffs was similar for attending anesthesiologists, directed residents, and CRNA’s. While the association does not prove causation, the association is nevertheless striking and implies the intraoperative handoffs were contributory factors to adverse outcomes. The Cleveland Clinic at the time of the study did not have a formal structured handoff process for intraoperative handoffs. The authors suggest adoption of formal protocols, including checklists, as a potential way to reduce the adverse impact of intraoperative handoffs on patient outcomes.

There have been a couple recent studies on the impact of such intraoperative handoffs on patient safety. The first study ([Jones 2018](#)) looked at over 300,000 adult patients undergoing major surgeries in Ontario, Canada. The surgeries were anticipated to last at least 2 hours and the patients were anticipated to have at least one night stay in the hospital. They compared outcomes in those cases in which a complete intraoperative

handoff of anesthesia care occurred vs. those in which there was no handoff. The primary outcome measure was a composite of all-cause death, hospital readmission, or major postoperative complications, all within 30 postoperative days. Only 1.9% of cases had a complete anesthesia handoff, though over the 6 year course of the study the percentage steadily increased, reaching 2.9% by the last year of the study. The primary outcome occurred in 44% of the complete handover group compared with 29% of the no handover group. After adjustment, complete handovers were associated with an increased risk of the primary outcome (adjusted risk difference 6.8%), all-cause death (aRD 1.2%), and major complications (aRD, 5.8%), but not with hospital readmission within 30 days of surgery. The authors conclude that the complete handover of intraoperative anesthesia care compared with no handover is associated with a higher risk of adverse postoperative outcomes and suggest limiting complete anesthesia handovers.

Another recent study at a tertiary academic medical center in the US ([Rostin 2018](#)) found a considerably higher percentage of handoffs between attending anesthesiologists (9.7%). Their primary outcome measure was a composite of 30-day mortality, readmission and major postoperative complications. Intraoperative handovers were associated with an increased risk of all postoperative adverse events (OR 1.11), 30-day readmission (OR 1.13) and major complications (OR 1.1). They also found that surgery of longer duration (>150 minutes) significantly augmented the effect. But high provider case volume (number of anesthesia cases by provider during the study period over 1106) mitigated the effect. Note that the Rostin study excluded patients if they underwent cardiac surgeries, had operations within 4 weeks prior to the index procedure, or had an ASA score >5.

Like the other studies, these authors conclude that intraoperative transitions of care between attending anesthesiologists are associated with adverse postoperative outcomes, especially when low case volume anesthesia providers are involved and in surgeries of longer duration (>150 minutes).

Point of interest: we require a second formal timeout when an additional surgeon becomes involved in a case (whether for a second procedure or just to participate in the original procedure). But most hospitals do not require a second formal timeout when other members of the OR team change during a procedure!

The OR to ICU Handoff

Researchers prospectively evaluated the effectiveness of standardizing operating room to surgical intensive care unit handoffs in a mixed surgical population ([Lane-Fall 2018](#)). The new standardized handoff protocol required bedside clinician communication using an information template. They examined omission of information across 13 topics contained in the handoff template. After standardization, information omissions decreased 21.3% (from 4.7 to 3.7). And, for new ICU patients, information omissions decreased 36.2% (from 4.7 to 3.1). Handoff duration increased after standardization from 4.1 to 8.0 minutes. ICU mortality and length of stay did not change postimplementation.

In our August 22, 2017 Patient Safety Tip of the Week “[OR to ICU Handoff Success](#)” we described a structured process for handoffs at the Oregon Health & Science University (OHSU) that resulted in a significant reduction in preventable patient complications ([Hall 2017](#)). They provide an [example template](#) for the handoff from the anesthesia provider to the critical care team.

The ICU to Ward Handoff

Two recent studies looked at ICU-to-ward transfers. One study ([Santhosh 2019](#)), from 3 academic medical centers in the US, compared process maps to identify similarities and differences between ICU–ward transfer processes across the three hospitals and also surveyed residents anonymously about such transfers. 87% of the residents responding to the survey recalled at least one adverse event related to communication failure during ICU–ward transfer. 95% agreed that a well-structured handoff template would improve ICU–ward transfer. Rehabilitation needs, intravenous access/hardware and risk assessments for readmission to the ICU were the most frequently omitted or incorrectly communicated components of handoff notes. Notes often omitted or miscommunicated pending results, active subspecialty consultants, nutrition and intravenous fluids, antibiotics, and healthcare decision-maker information. Though the process varied across the three sites, all process maps demonstrated flaws and potential for harm in critical steps of the ICU–ward transition.

A Canadian study ([de Grood 2018](#)) looked at with transfers from intensive care unit to hospital ward from the perspective of patient, family and provider. The researchers found 3 interrelated, overarching themes perceived as barriers or facilitators to high-quality patient transfers: resource availability, communication, and institutional culture. Bed availability could be either a barrier or facilitator for such transfers. They recommend implementing standardized communication tools that streamline provider–provider and provider–patient communication. Communication to facilitate timely, accurate, durable and mutually reinforcing information transfer should be multimodal. Procedures should also provide for managing delays in transfer to ensure continuity of care for patients in the ICU waiting for a hospital ward bed. They stress the importance of patient- and family-centeredness as a facilitator of high-quality ICU transfers.

One critical factor that should be part of every ICU-to-ward handoff should be verification that medication reconciliation has taken place. A recent study of almost 1000 ICU patients transferred to non-ICU locations ([Tully 2019](#)) found that 46% had a medication error occur during transition of care and, among patients with a medication error, an average of 1.88 errors per patient occurred. The most common types of errors were continuation of medication with ICU-only indication (28.4%), untreated condition (19.4%), and pharmacotherapy without indication (11.9%). Factors associated with decreased odds of error included daily patient care rounds in the ICU (odds ratio, 0.15) and orders discontinued and rewritten at the time of transfer from the ICU (odds ratio, 0.36). We have always been sticklers that all **orders should be discontinued and then rewritten on such transfers**. So, if you are using a structured format and/or a checklist

for the ICU-to-ward handoff, make sure one of your items is whether that process has taken place.

Intensivist Handoffs

A study from Brazil ([Dutra 2018](#)) found that diagnoses and goals of treatment are either not conveyed or retained 50–60% of the cases immediately after a handover. Daytime clinicians were more sensitive (65% vs 46%) but less specific (82% vs 91%) than nighttime clinicians in anticipating clinical events at night but the positive predictive value of both daytime and nighttime clinicians was low (13% vs 17%). Gaps in diagnosis and anticipation of events were more pronounced in neurologic diagnoses.

The authors conclude that clinicians have limited ability to anticipate events, and the expectation that anticipatory guidance can inform handovers needs to be balanced against information overload. Suggested improvements to benefit communication could include cognitive checklists, prioritizing discussion of neurologic patients, and brief combined clinical examination at handover.

Hospitalist Handoffs

A summary of interviews with several prominent hospitalists ([Fink 2019](#)) highlighted some key elements of successful handoffs for hospitalists. One is use of standardized, structured tools like I-PASS (see our several columns on I-PASS listed below). Vineet Arora from the University of Chicago emphasized the importance of succinctness in well-done handoffs.

Arora also suggested "chunking" patients into related groups. For example, one group might include the sickest patients, the ones who are likely to experience a change in condition during the subsequent shift. Another group might be patients who are doing well but require some simple follow-up. Another group could be stable patients with no foreseeable needs.

The importance of carving out a dedicated time and space was emphasized. Harvard's Stephanie Mueller pointed out that, at Brigham and Women's Hospital, there is a 1-hour overlap between scheduled physician shifts intended to be dedicated to the handoff.

Closing the loop by **readback** for important information is also a critical element.

Hospitalist schedules that improve continuity are also useful. For example, longer stretches of on-duty days (7 vs 5, for instance) increase the likelihood that the same two physicians (one day, one night) might manage a patient's entire hospitalization.

Structured Handoffs in General Surgery

The European working time directive, implemented in 2004, reduced the number of hours worked by trainees, thus increasing the number and importance of handoffs (or handovers, as they are called across the pond). In response, the Royal College of Surgeons of England produced guidelines on safe handover practice ([RCS 2007](#)). These guidelines recommended a minimum dataset for inclusion when handing over patients to incoming surgical teams. A recent study ([Jones 2019](#)) looked at the impact of a standardized handover sheet, developed in accordance with these guidelines and designed to encourage use of this minimum dataset. Striking differences were seen in the quality of information handed over after implementation. Significant increases were seen in the documentation of patient location (56% to 87%), documentation of important outstanding clinical tasks (45% to 89%), proportion of patients for whom the occurrence of a senior review was documented (28% to 85%), and documentation of blood results. Though the researchers focused on the impact of the structured handoff sheet, they note that post-intervention more detail was used in verbal handover, and incoming teams often wrote additional information in personal notes during such discussions.

Transfer of Violent Patients from ED to Medical Units

A study ([Larson 2019](#)) from the Mayo Clinic used one of our favorite tools, the **huddle**, to facilitate **transfers of violent patients** from the emergency departments to medical units and improve staff safety during such transfers. The ED nurse would initiate the huddle process by informing the admitting unit that a patient at risk for violence was being admitted. A huddle form is completed. The admitting care team would then call the ED team so that both teams participated in the handoff call together. They refined the process through iterative Plan–Do–Study–Act (PDSA) cycles. RNs from the ED and the six medical units reported feeling safe during the transfer process 100% of the time after implementation vs. 54.7% at baseline and ED staff satisfaction with the process improved from 53.3% to 75.0%. Given the increasing prevalence of violence to healthcare workers, this process is a welcome improvement.

Resident Handoffs in the ED

Things can slip through the cracks when emergency department physicians change shift. A recent study ([Milano 2019](#)) showed that use of a standardized sign-out checklist for emergency medicine residents to complete prior to sign out increased the frequency of discussion of critical tasks remaining for patient care, disposition status, and subjective assessment of quality of sign-out. The checklist included topics of diagnoses, patient care tasks to do, patient disposition, admission team, and patient code status. Compared to the status quo unstructured sign-out, implementation of a standardized checklist improved attendings' perception of the quality of resident transition of care, discussion of patient care tasks requiring completion, disposition confirmation, necessity for attending clarification, and shorter duration of sign-out process.

Read about many other handoff issues (in both healthcare and other industries) in some of our previous columns:

May 15, 2007	“Communication, Hearback and Other Lessons from Aviation”
May 22, 2007	“More on TeamSTEPPS™”
August 28, 2007	“Lessons Learned from Transportation Accidents”
December 11, 2007	“Communication...Communication...Communication”
February 26, 2008	“Nightmares....The Hospital at Night”
September 30, 2008	“Hot Topic: Handoffs”
November 18, 2008	“Ticket to Ride: Checklist, Form, or Decision Scorecard?”
December 2008	“Another Good Paper on Handoffs” .
June 30, 2009	“iSoBAR: Australian Clinical Handoffs/Handovers”
April 25, 2009	“Interruptions, Distractions, Inattention...Oops!”
April 13, 2010	“Update on Handoffs”
July 12, 2011	“Psst! Pass it on...How a kid’s game can mold good handoffs”
July 19, 2011	“Communication Across Professions”
November 2011	“Restricted Housestaff Work Hours and Patient Handoffs”
December 2011	“AORN Perioperative Handoff Toolkit”
February 14, 2012	“Handoffs – More Than Battle of the Mnemonics”
March 2012	“More on Perioperative Handoffs”
June 2012	“I-PASS Results and Resources Now Available”
August 2012	“New Joint Commission Tools for Improving Handoffs”
August 2012	“Review of Postoperative Handoffs”
January 29, 2013	“A Flurry of Activity on Handoffs”
December 10, 2013	“Better Handoffs, Better Results”
February 11, 2014	“Another Perioperative Handoff Tool: SWITCH”
March 2014	“The “Reverse” Perioperative Handoff: ICU to OR”
September 9, 2014	“The Handback”
December 2014	“I-PASS Passes the Test”
January 6, 2015	“Yet Another Handoff: The Intraoperative Handoff”
March 2017	“Adding Structure to Multidisciplinary Rounds”
August 22, 2017	“OR to ICU Handoff Success”
October 2017	“Joint Commission Sentinel Event Alert on Handoffs”
October 30, 2018	“Interhospital Transfers”

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Sample handoff template from the OHSU article.

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