Handoffs: What ORs can learn from Formula One race crews

Hospitals are taking lessons from the high performance of Formula 1 racing pit-stop crews and applying them to handoffs between the OR and the ICU.

“The hand-off is like a pit stop: surgery is the first section of the race, the second part is intensive care, and the handoff is in the middle,” says Ken Catchpole, PhD, senior postdoctoral scientist in the Quality, Reliability, Safety and Teamwork Unit at the Nuffield Department of Surgical Sciences at the University of Oxford in England.

“You have to do lots of different things under time pressure, and if you make a mistake, it can have consequences down the road.” In a race, for example, a wheel not tightened correctly can fall off and cause an accident.

Catchpole worked with 2 physicians who were inspired by watching pit-stop crews in action on television to explore what lessons could be applied to handoffs between surgery and the ICU. Pit-stop crews excel at what they do: It takes them only about 7 seconds to change tires and refuel the car and, more importantly, no Formula 1 driver has died behind the wheel since 1994.

“What they were doing was incredibly reliable, but what we were doing in health care was far less reliable,” says Catchpole, who points out that all safety efforts involve people. “People working in health care and in racing are all human, and humans make similar mistakes.”

Based on conversations and videotaping, Catchpole’s team created a new transfer protocol for the Great Ormond Street Hospital (GOSH) for Children in London. The change paid off. A study in *Pediatric Anesthesia* in 2007 found that implementing the new handoff protocol significantly reduced the number of omissions of information and technical errors in patients transferred from the OR to the ICU.

**Spreading the word**

Other countries, including the US, have adapted the GOSH model. The University of California San Francisco Medical Center (UCSF) has been using the model for about a year, according to Marilyn Irovando, RN, patient manager of the pediatric cardiac ICU and pediatric interventional cardiology.

“Root cause analysis showed us errors occurred because the postop plan wasn’t known to everyone.” she says. “The new protocol has all members integral to the transfer and receipt of information present at the point of patient transfer from OR to ICU care.” The team, which includes either the primary surgeon or his designee, the anesthesiologist, the medical ICU attending physician, and the primary receiving RN, then discuss management strategies for the next 12 to 24 hours.

At Children’s Hospital Boston, Patricia Hickey, PhD, MBA, RN, FAAN, VP of cardiac and critical care services, says the GOSH model has helped “break down the traditional barriers between disciplines.” Previously, the OR nurse and anesthesiologist “would give separate reports, which caused gaps and people hearing the information differently,” she says. “Now the entire team (surgeon, anesthesiologist, and OR and ICU nurses) is present so questions are answered in real time.”
Lessons from behind the wheel

Research published in *Quality and Safety in Health Care* reports health care professionals can learn 3 primary lessons from Formula 1 teams:

- proactive learning with briefings and checklists to prevent errors
- active management using technology to transfer information
- post hoc learning from the storage and analysis of electronic data records.

Catchpole adds, “Processes help a team work better. Even if you have a less effective team but an effective process, you will do relatively well. Of course, you want to have both.”

An effective team communicates well and anticipates problems. In addition to teamwork, it’s important to have leadership training, identify task sequences, and implement checklists.

Before making any change, however, Irovando says, “You need to gain consensus that a change is necessary, that it facilitates patient safety, and that it won’t negatively impact workflow.”

As with most change, a multidisciplinary approach is key, says Hickey. The new model was discussed at the ICU practice committee meeting, and the OR manager sat on the subcommittee that formalized the plan.

Catchpole says developing an effective handoff protocol includes reducing variabil-

Example: OR-to-ICU transfer

**Purpose**

To improve continuity of patient care through effective communication during transition from the cardiovascular OR (CVOR) to the cardiac ICU (CICU).

**Procedure**

Prior to patient transfer:

- CVOR nurse will complete the Nurse-to-Nurse Report Form and give verbal telephone report to the CICU nurse accepting the patient transfer.
- CVOR nurse, cardiac anesthesia attending and fellow, and cardiac surgery fellow will transport patient to CICU.

**On arrival to the CICU**

- CICU nurse will connect patient to monitors.
- CICU attending and fellow, respiratory therapist, and charge nurse will be paged to the patient bedside.

- Once the patient has been connected to the monitors, the cardiac anesthesia attending is satisfied the patient is in stable condition, and all clinical disciplines are represented, a structured sign-out will occur in the following order:
  - Anesthesia fellow or attending will describe pre-bypass management of the patient including preoperative medication, induction of anesthesia, airway management, and events.
  - Cardiac surgery fellow or attending will describe the surgical findings and repair including assessment of repair, potential concerns and complications, transesophageal echo findings, and hemodynamic data.
  - Cardiac anesthesia attending/fellow will describe the post-bypass course including hemodynamic stability and support, ventilatory management, and any additional concerns such as dysrhythmias or bleeding.
  - CVOR nurse will describe any additional patient or family concerns and confirm the last dose of antibiotics and blood product availability.
  - The CICU attending or fellow will provide a feedback summary of report and discuss the plan for patient care to close the communication loop.

*Courtesy of Children’s Hospital Boston.*
Reducing variability

“Every cardiac surgery patient is different, but the care each receives should be similar,” he says. “It’s important to know why differences occur so variability can be reduced.” He compares it to purchasing a car—the buyer can specify different items, such as the color or number of doors, but the car is still the same brand.

That doesn’t mean variations are eliminated. “You need to know when you are deviating from the standard and make that decision consciously,” says Catchpole. For example, a patient with several comorbid diseases may require more intensive care than one with one primary problem.

To reduce variability, Children’s Hospital Boston, uses a form that outlines the specifics of what is needed in the handoff report. “There isn’t a set structure,” says Patti Galvin, MSN, RN, CNOR, manager of the cardiac OR. “All the elements of patient care are listed, and each discipline goes through its part. It breaks down the silos.”

The anesthesiologist covers topics such as the anesthesia induction and any arrhythmias or blood pressure problems, while the surgeon reports on the surgical procedure that was done.

“The OR nurse covers any piece that’s left out,” says Galvin. That might include antibiotics, blood products, or family concerns. The ICU team documents what was said and reads it back to verify it is correct.

UCSF’s OR-to-ICU handoff protocol states that the surgeon reports on the surgical procedure and significant intraoperative events, and the ICU nurse follows specific instructions such as minimizing nonessential bedside conversation and holding blood draws until after report. The anesthesiologist gives a detailed report on specifics, ranging from the patient’s preoperative history to intraoperative medication administration. Questions from the bedside RN and the ICU fellow and attending physician are included as part of the process.

Identifying tasks and assigning responsibility

Developing the GOSH model meant each handoff task had to be identified, says Catchpole. “We looked at what is required for each task, who should be doing it, and when it should happen in the process.”

He notes that like pit-stop crews who break down tasks into individual movements, such as taking the wheel off and putting it back on, clinicians need to delve into that level of detail.

Identifying task sequences can be particularly helpful. “We found the patient would come in (to the ICU), and everyone would be busy connecting the monitors, so no one was listening to the doctor giving report,” says Catchpole. The new protocol delayed the verbal report until the patient was placed on the monitors.

“Everyone has an individual job in a pit-stop crew,” Catchpole notes. This helps avoid confusion and task omission. Before the new protocol, “No one was sure who should do what, and some tasks, like plugging in the infusion pump, had 2 people.” When 2 people are responsible, each might think the other is doing the task, resulting in a task left undone.

The ‘lollipop man’

A key leadership role is similar to the “lollipop man,” the person at the pit stop who makes the decision whether to delay the car going back on the track.
“That job is critical,” says Catchpole. “They don’t physically do anything, but they are the most important member of the team.” At GOSH, the lollipop man in the OR/ICU handoff is the surgeon.

At Children’s Hospital Boston, an OR nurse accompanies the patient to the ICU to give report. “Another nurse starts the next case so we don’t hold up the OR schedule,” says Galvin. In the ICU, 2 nurses, the charge nurse, and the surgeon admit the patient.

Providing education and resources

Staff and surgeons need to learn about the new handoff process along with other communication tools. Simulation can help accomplish those goals.

“We have used simulation for team training and communication,” says Galvin. “One of the (simulation) cases is transferring a patient to the CVOR.”

The entire OR team, including nurses, surgical and perfusion technologists, surgeons, and anesthesiologists, completes simulation training twice a year.

Catchpole recommends having a clinician-oriented resource that goes through the entire process. “Then we added a checklist to fill in the critical information that is needed,” he says. “If the nurse wasn’t told a piece of expected information, such as how long cross-clamping occurred, she would be prompted to ask.”

Catchpole cautions that checklists can “make more work.” To avoid that problem, at GOSH, the checklist is the admission entry for the patient, so nurses don’t have to reenter information.

Measuring results

Measuring results helps demonstrate what is working and demonstrates to staff the value of the change. “It was apparent that the new protocol was easier to do instead of the way they had been doing it,” says Catchpole.

Of course, adaptation is key for the entire process. “What we did worked for us,” says Catchpole. “People might take those ideas and use them in different ways.”

Crossing the finish line

“About 50% of process improvement is not what you do but how you go about it,” says Catchpole. “We took time to get the experts involved to learn the right lessons and to talk through what we were learning with the people who were doing the work. It’s about how you work with other professionals to change the way they work.”

“What it comes down to is that we need to understand how to help people perform better,” he adds.

Using a pit stop analogy “brings everyone together and makes the patient the center of the activity,” says Galvin. “It is an exemplar for a healthy work environment.”

—Cynthia Saver, MS, RN

Cynthia Saver, a freelance writer, is president, CLS Development, Inc, Columbia, Maryland.

References
