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Surgery Checklist Lowers Death Rate

Teams Using Cheat Sheets Also Reduce Patients' Complications, Study Shows

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Surgical teams that followed a basic cockpit-style checklist in the operating room, from confirming the patient's name to discussing expected blood loss, reduced the rate of deaths and complications by more than a third, according to a year-long, eight-nation project being released today.

Surgeons, it seems, are discovering what airline pilots learned decades ago: The human brain can't remember everything, so it's best to focus on the complicated challenges and leave the simple reminders to a cheat sheet.

"You take something as complex as surgery, and you think there isn't a lot that can be done to make it better," said Atul Gawande, a Boston physician who led the study being published in the New England Journal of Medicine. "A checklist seems like a no-brainer, but the size of the benefit is dramatic."

The low-cost, low-tech intervention tested in eight hospitals around the globe could have enormous financial implications, as well. If every operating room in the United States adopted the surgical checklist, the nation could save between $15 billion and $25 billion a year on the costs of treating avoidable complications, according to calculations by the authors.

In the one-year pilot study involving 7,600 patients, the hospitals saw the rate of serious complications fall from 11 percent to 7 percent. Inpatient deaths declined by more than 40 percent overall, with the most drastic reductions occurring in hospitals with fewer resources.

More than 234 million surgeries are performed worldwide each year, with between 3 and 17 percent resulting in major complications such as a life-threatening infection. In the United States, the average surgical complication costs $12,000 to treat, though as many as half are preventable, according to several studies over the past 15 years.

Even as modern medicine becomes increasingly sophisticated, "we're not great at doing the simple things all the time," said Gawande, a surgeon at Boston's Brigham and Women's hospital and a medical writer for the New Yorker magazine.

For the study, which was prompted by the World Health Organization and co-sponsored by the Harvard School of Public Health, hospitals in eight countries adopted a 19-step checklist in non-cardiac surgeries. The project involved rural and urban hospitals with diverse populations in cities such as Seattle, London, New Delhi, Manila and Ifakara, Tanzania.

According to the checklist, before an operation begins, the team members introduce themselves, review the patient's name and the procedure to be performed. They discuss allergies, confirm that all equipment has been

sterilized and necessary antibiotics administered, and assess potential problems such as blood loss. After the surgery but before the patient leaves the operating room, the team returns to the checklist, labeling specimens and ensuring that all equipment has been removed from the patient.

Though the steps are routine, an astonishing number of doctors and nurses miss at least one, Gawande said.

"If you miss a few percent here and a few percent there, it adds up," he said. The central premise of a checklist "is making sure that nothing is missed. It's an all-or-none phenomenon."

"I cannot recall a clinical care innovation in the past 30 years that has shown results of the magnitude demonstrated by the surgical checklist," said Donald Berwick, the physician president of the Institute for Healthcare Improvement, which promotes high-quality advances in the delivery of care. "This is a change ready right now for adoption by every hospital that performs surgery."

Very few U.S. hospitals are using the surgical safety checklist, though Berwick aims to introduce it in the 4,000 hospitals participating in his institute's programs.

The major barrier to widespread adoption is physician attitudes, several experts said.

"If you ask surgeons, they'll say, 'Oh, we do this stuff,' " Gawande said. He himself was skeptical that the checklist would affect the eight to 10 operations he performs each week.

"I don't get through a week where it has not caught something," he said. Running through the list reminded him of one patient's allergy and prompted his anesthesiologist to prepare for an unusually large amount of blood loss, which could have been fatal.

One of the most effective ways to market the checklist to doctors is to collect data on their performance, said David Flum, a surgeon at the University of Washington Medical Center, which took part in the study. Once they see how they stack up against their peers, physicians are quick to adapt, he said.

A case in point: Doctors universally say they know the importance of monitoring a diabetic patient's blood sugar levels during surgery. Yet the easy but lifesaving check does not take place in 10 percent of patients, he said.

The few minutes it takes to read down a checklist "are well worth it in order to save a patient from having a horrible complication," Flum said.

Peter Pronovost, the father of medical checklists agreed but offered a cautionary note.

Checklists "aren't like Harry Potter's magic wand," said Pronovost, a Johns Hopkins physician who in 2001 devised a checklist to help prevent intravenous line infections. By using that checklist, 70 hospitals in Michigan have virtually eliminated those infections. Items on a checklist must be "evidence based," properly tested and followed rigorously, he said.

Operations today typically include a "timeout" to review safety measures, yet complications persist, he said. Even with the attention given the pilot project, "the omission of individual steps was still frequent," the authors of the WHO study acknowledged.

Pronovost was skeptical of the study's reported huge drop in post-surgery deaths, and observed that the study did not reveal equally dramatic improvements in sub-categories such as pneumonia.

"If something looks too good to be true, it may well be," he said in an interview.

But Gawande and Flum said they think the improvements came from the intangible benefits of having doctors and nurses work as a team, communicating every step of the way. "You can't really measure the benefit of having the surgeon and anesthesiologist talking to each other and coordinating care," Flum said.

Several nations and at least five states, including Washington, are launching programs to promote widespread use of a checklist. As Flum put it: "When I have an operation, please use a checklist on me."

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