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Study: A Simple Surgery Checklist Saves Lives

By Maia Szalavitz

Sticks and stones may break your bones — but if you need surgery, the right words used in the operating room can be more powerful than many drugs. New research published today in the *New England Journal of Medicine* found that when surgical teams heeded a simple checklist — as pilots do before takeoff — patient-mortality rates were cut nearly in half and complications fell by more than a third.

The study — which included 7,688 patients in eight hospitals around the world — saw death rates drop from 1.5% before the checklist was instituted to 0.8% afterward. Serious complications fell from 11% to 7%. Study sites included Seattle, London, Toronto, New Delhi, and Ifakara, Tanzania. ([See TIME's A-Z Health Guide.](#))

"We were not anticipating such a dramatic reduction," said lead author [Dr. Atul Gawande](#), an associate professor at the Harvard School of Public Health and staff writer for the *New Yorker*. "We had initially planned the size of the study to pick up a 15% reduction in complications."

The checklist comprised 19 items to be carried out throughout surgery: seven before anesthesia is administered, seven just before the first incision and the rest before the patient leaves the operating room. The study focused on six checklist items, all involving basic safety issues, such as whether the identity of the patient, site and type of surgery were confirmed correctly, whether enough blood was readily available in case of excess bleeding and whether all the sponges used in surgery were accounted for after the procedure. ([See the top 10 medical breakthroughs of 2008.](#))

Although having the checklist on hand improved compliance by surgical teams — 57% of the teams involved in the study carried out all six checklist items, up from 34% before the study began — there were many teams that did not adhere completely to the list. That's why [Dr. Peter Pronovost](#), who won a MacArthur "genius" award for creating the concept of medical checklists and studying them in intensive-care units, remains skeptical of the study's remarkable results. "I wish checklists were Harry Potter's magic wand, but they're not," he says. "The behavior changed trivially, not enough for that reduction to be real. Like the stock market, if it sounds too good to be true, it probably is. That said, I think funding research to improve quality and safety has to be a priority."

Gawande disagrees with Pronovost's critique. "There's a synergy between the items on the checklist," he says. "Any one thing at any given time might not add up to much, but the net effect of all of it put together — especially making for more effective teamwork — matters."

Gawande believes his checklist has already saved at least one life in his operating room, where he performs eight to 10 procedures a week. Like many doctors, he resisted using it at first. "I thought, 'Oh, I've got to do this checklist because I designed the thing.' I didn't expect to see a difference."

However, in one case where he was preparing to remove an adrenal tumor, the anesthesiologist realized during the checklist rundown that extra blood might be required but was not on hand. The blood was delivered to the OR — and the patient did need it during surgery. "I'm convinced that the fact that the anesthesiologist caught that was what saved this man's life," Gawande says, adding that his team averts at least one potential problem via the checklist every week.

Whether these changes can be sustained over time is another question. Gawande and his colleagues note in the study that a phenomenon called the "Hawthorne effect" may be largely responsible for the checklist's success. The effect was named for a series of experiments designed to determine how to increase productivity at a factory in Chicago. All of the tactics implemented by the study leaders improved worker output during the experiments — but researchers realized that the effect they were really measuring was a boost in motivation among workers who knew others were watching.

"The checklist is kind of an effort to produce a consistent Hawthorne effect," says Gawande. "It is intended to make people aware that other people expect these things to be done." Researchers checked whether teams behaved differently when the researchers were present and when they were not and found no difference.

As a result of the findings, Gawande says, the U.K.'s National Health Service sent an alert to all of its hospitals, calling on them to use the surgical checklist. Five U.S. states — New York, Washington, North Carolina, South Carolina and Indiana — have endorsed it and plan to require hospitals to use it.

That's quite different from the initial federal response to Pronovost's lists. In 2003 Pronovost persuaded the state of Michigan to use three of his checklists in its intensive-care units. He worked with hospitals to overcome resistance from the staff to what appeared to be "more paperwork." He published the results of that study in the *New England Journal of Medicine*: a 66% reduction in infections and an estimated \$175 million saved by not having to treat them.

But the federal Office for Human Research Protections (OHRP) did not approve. After [Pronovost was profiled in the *New Yorker*](#) by Gawande in 2007, OHRP shut down data collection for the checklist study, claiming that it amounted to research being done without patients' informed consent. But the ensuing

media attention spurred Congress to intervene, and Pronovost's program was allowed to continue and expand.

Gawande and Pronovost agree that checklists can be faulty and that they need to be studied carefully before and during implementation. "Safety should be a patient's right," says Pronovost. "If you are going to ask doctors to give up their autonomy and accept these standards, they have to be based on sound science and implemented wisely."

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