Making a better medical safety checklist

February 16 2010

In the wake of Johns Hopkins' success in virtually eliminating intensive-care unit bloodstream infections via a simple five-step checklist, the safety scientist who developed and popularized the tool warns medical colleagues that they are no panacea.

"Checklists are useful, but they're not Harry Potter's wand," says Peter Pronovost, M.D., Ph.D., a professor of anesthesiology and critical care medicine at Johns Hopkins University School of Medicine and a patient safety expert. "The science needed to best develop focused, unambiguous and succinct checklists for medicine's thousands of diagnoses and procedures is in its infancy, and there can be unintended consequences of reliance on simple tools."

In a review by Pronovost and other Johns Hopkins researchers recently published in the journal Critical Care, the authors say it's clear that use of aviation-like safety checklists based on scientific evidence can work, and that more hospitals should use them to help prevent errors and reduce costs associated with medical mistakes.

But says Pronovost, whose eponymous checklist is credited with preventing thousands of central-line infections at Hopkins, throughout the state of Michigan and elsewhere, they need to be accompanied by a "change in the culture of arrogance still widespread in medical care."

Culture change, he says, "insists," for example, that nurses are empowered to question doctors who don't follow the steps properly and that every single member of the health care team toss out long-held

beliefs that infections are an inevitable cost of being in the hospital.

"Just having a checklist on a piece of paper isn't going to be enough," he says.

In the *Critical Care* review, Pronovost and his colleagues took a step back and applied a rigorous scientific analysis of checklists, looking especially for which ones have the potential to work best in varying situations.

For example, some checklists are like grocery lists, a basic catalog of what needs to be accomplished by just one person in order for a process or procedure to be completed properly. In an operating room, the anesthesiologist has a checklist that assists her in making sure that every step is followed to ensure the anesthesia machine is working properly before a patient is put under.

"But that sort of checklist doesn't work in all cases," Pronovost says. "Central-line infection checklists work best, for example, when there is what we call a challenge and response, in which one person reads a series of items and a second person verifies that each item had been completed. With the check and balance of another person, the list is more likely to be completed properly."

Pronovost also warns of checklist overload. "Creating too many checklists — especially those that are not proven to improve patient safety — or using checklists where they are not truly needed can be distracting and time-consuming," he says, "and over-reliance on them can lead to a false sense of safety."

"Each step in the diagnosis, treatment and monitoring process poses risks for error that we need to defend against," the Johns Hopkins researcher says. "We do not know how many checklists are too many, when they

are most useful, when we have overloaded the checklist users or how strictly the benefits are being measured."

In fact, the Johns Hopkins team says, the underuse of checklists that do work is a problem in part caused by the paucity of scholarly research on how best to use them, how to build and implement them, how to measure their effectiveness in improving patient outcomes, and how they can best be sustained in a culture that is slow to change.

Pronovost's central-line safety checklist was created after reviewing the literature and guidelines on how to best prevent bloodstream infections in ICUs and selecting the five for which evidence showed they were most likely to accomplish that goal. The checklist was piloted in a small setting (one ICU at The Johns Hopkins Hospital) before undergoing a test on a larger scale (the state of Michigan's ICUs). After the work was published in the New England Journal of Medicine, he get calls from not only doctors asking him to design checklists for them, but CEOs, financial-industry executives and even a man who wanted a checklist for sailing a boat.

While standardization is at the heart of any checklist, Pronovost says checklists need to be continually assessed to be sure they are still accomplishing their goals — in this case, keeping bloodstream infection rates near zero. It is important not only to be able to tell patients that the checklist is being used, but to be able to answer the bigger question: Am I safe in the hospital?

"There's a lot more research to do and a lot of work to be done," Pronovost says.

Provided by Johns Hopkins Medical Institutions