Study shows for first time decrease in mortality associated with physician order entry system

May 3 2010

Researchers at Lucile Packard Children's Hospital and Stanford University School of Medicine have shown for the first time that a significant decrease in hospital-wide mortality rates can be associated with implementation of a computerized physician order entry system.

The system, launched at Packard Children's in 2007, was correlated with a 20 percent decrease in mortality rates at the hospital over an 18-month period, according to a new study to be published online May 3 in *Pediatrics*. Researchers noted that other patient care initiatives at the hospital may also have contributed to this important change.

With CPOE, doctors and other medical staff can prescribe medications, tests and other treatments electronically, making the instructions instantly and remotely available to all authorized hospital staff, even when off-site. CPOE is part of the hospital's electronic medical record, which also provides on screen the latest images and test results. All physicians need to do is boot up a computer, punch in a password and the heartbeat of a child in the neonatal intensive care unit will trace across the screen, or a brain scan can be viewed.

The study arrives as a debate rages over the benefits of CPOE and electronic medical records. While many proponents, including the Obama administration, see these new technologies as critical to improving the quality of our health-care system, critics contend their

value has yet to be proven, particularly as some past research has shown negative consequences, including one site that witnessed an increase in mortality.

"Prior to our report, no hospital or medical institution has shown that CPOE can be implemented and actually have an associated decline in mortality," said lead author Christopher Longhurst, MD, medical director of clinical informatics at Packard Children's and assistant clinical professor of pediatrics at Stanford. "But what we found is that CPOE implementation was statistically correlated with fewer patient deaths. As you can imagine, this is very meaningful." Longhurst was part of a team of eight researchers from Packard Children's, Stanford and Harvard University involved in the study.

Mark Del Beccaro, MD, a pediatrics professor and vice chair for clinical affairs at Seattle Children's Hospital, who was not involved in this study, said he welcomed the new findings. Seattle Children's Hospital implemented CPOE in 2003. "Three years later a study of the effects showed mortality rates at our institution held steady," Del Beccaro said. "As the evolution and maturity of these systems and their benefits are being realized, there has been soft evidence that they improve patient safety. The Packard Children's report is the first I am aware of to show that you can potentially affect mortality by putting CPOE in place. This is an important study, and we hope others can realize these benefits."

Longhurst emphasized that the new results show a correlation, not a cause and effect. "Our implementation of CPOE was executed superbly, but in addition, we were simultaneously making other advances in patient care," he said. "These included process and workflow changes, adjustments in ICU staffing, the rollout of Rapid Response Teams, the implementation of a nursing residency and more, all in the face of rising acuity in the hospital."

To determine if a change in mortality rates occurred, Longhurst and his colleagues reviewed nearly 100,000 discharges from Packard Children's from Jan. 1, 2001, through April 30, 2009. They compared the observed mortality with the expected mortality, which was generated from a database of 42 tertiary-care, not-for-profit pediatric hospitals similar to Packard Children's.

The result of their analysis was a finding of two fewer deaths per 1,000 discharges at Packard Children's in the period after CPOE was implemented, a total of 36 lives over 18 months.

There are many ways CPOE can have a lifesaving impact. With CPOE, crucial data and suggestions that can help guide clinical decisions pop up on the screen as the doctor types in orders and other information about the patient. There will be, for instance, a friendly electronic nudge if a dosing calculation appears to be in error. And it can improve efficiency. "We've seen a 20 percent improvement in the time from order to administration for 'stat' [immediate] medications," noted Longhurst. "This can have lifesaving consequences."

Still, it's important to remember that CPOE, and electronic medical records in general, are simply technology tools that support or "hard-wire" best practices into the work environment. "Simply purchasing a fancy and expensive electronic medical records system in and of itself is not likely to make much of a positive impact on quality or patient safety," said Paul Sharek, MD, MPH, medical director of quality management and chief clinical patient safety officer at Packard Children's. "What provides the real opportunities for improving care is using this technology to support best practice, such as displaying relevant blood test results at the time physicians are ordering medications, or allowing practice guidelines to be immediately available to physicians at the time of order entry." Sharek, who is an assistant professor of pediatrics at the medical school, is the study's senior author.

Longhurst concluded: "We believe our experience is proof that CPOE is here to stay. However, to be successful, it takes an unwavering commitment to implementation. Our staff was very supportive, seeing it as a critical part of a hospital-wide commitment to continuous improvement in patient care. This approach gave us a better chance to determine if CPOE really has an impact in a hospital setting."

Provided by Stanford University Medical Center