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Cameron and Fritzie Burkett are suing Advocate Health and Hospitals Corp. after their infant son, Genesis, died because of a sodium chloride overdose attributed in part to data incorrectly entered into a computer.

# When technology puts patients at risk

The tragic death of a premature baby reveals the potential danger involved in the use of computerized data by health care providers

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The medical error that killed Genesis Burkett began with the kind of mistake people often make when filling out electronic forms: A pharmacy technician unwittingly typed the wrong information into a field on a screen.

Because of the mix-up, an automated machine at Advocate Lutheran General Hospital prepared an intravenous solution containing a massive overdose of sodium chloride — more than 60 times the amount ordered by a physician.

When the nutritional fluids were administered to Genesis, a tiny baby born 16 weeks prematurely, the infant's heart stopped, and he died, leaving behind parents stunned by grief.

Although a series of other errors



Genesis Burkett when he was 40 days old. The infant was improving despite being born 16 weeks prematurely.

contributed to the tragedy, its origin — a piece of data entered inaccurately into a computer program — throws a spotlight on safety risks associated with medicine's advance into the information age, a trend being pushed aggressively under health reform.

The federal government is aiding the shift with \$23 billion in incentives

to medical providers who buy electronic medical records or computerized systems that automate drug orders and other medical processes. The hope is that these technologies will enhance access to vast amounts of information tucked away in paper files and meaningfully improve medical care.

Doctors should be able to see test results quickly and communicate more easily with each other, for example. And electronic safeguards can remind physicians about recommended medical practices or alert them to harmful interactions between medicines.

Yet with these sizable potential benefits also come potential problems. Hospital computers may crash or software bugs jumble data, deleting information from computerized records or depositing it in the wrong place. Sometimes, computers spew forth a slew of disorganized data, and physicians can't quickly find critical information about patients.

Meanwhile, different electronic

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systems used in hospitals may not be able to communicate, and the alerts built into these systems are often ignored because they are so frequent and often are not especially useful, physicians and other experts report.

Technology vendors tend to dismiss incidents like the death that occurred at Advocate Lutheran General in Park Ridge as arising from human errors, not product deficiencies. But other experts say health information technologies can lead to mistakes when they aren't in sync with the way medical providers work.

"We see problems much more often than we would like" because many health information systems are poorly designed and difficult for doctors and nurses to use, said Dr. Rainu Kaushal, chief of the division of quality and medical informatics at Weill Cornell Medical College in New York.

Exactly how often safety concerns arise is not known. The U.S. Food and Drug Administration in December acknowledged getting 370 reports of problems involving health information technology since January 2008, including several dozen patient injuries and deaths, but those numbers are likely to be low because such reports are voluntary. Some examples:

- A patient died after a computer network problem caused delays in transmitting a critically important diagnostic image.
- Vital signs from patient monitors disappeared from electronic medical records

after being viewed by hospital staff.

■ A patient died after getting therapy meant for someone else after a wrong name was entered electronically on a scan performed by radiologists.

■ Data about patients' allergies were eliminated from medical records during an automatic computer update.

"(These) technologies can be enormously helpful, but what is emerging is that when implemented poorly, they can be harmful," said Dr. Ashish Jha, associate professor of health policy at Harvard University's School of Public Health and a member of an Institute of Medicine committee appointed late last year to study safety concerns associated with health information technology. That panel's recommendations are expected to be issued in 2012.

Carla Smith, executive vice president of HIMSS, the industry's largest trade group, based in Chicago, said that "safety concerns are on our radar screen" and "we want to make sure we have checks and balances in place (in vendor systems) to prevent unintended harm."

The story of Genesis Burkett's death at Advocate Lutheran General in October underscores the potentially devastating consequences of a single wrong piece of data put into a software system.

The infant's parents, Fritzie and Cameron Burkett, of Chicago, said they were overjoyed when their son, born four months early and weighing 1 pound, 8 ounces, survived and began to im-

prove under the hospital's expert care.

For about six weeks, the Burketts and other family members said, they were at the baby's side, singing Christian music softly at his bassinet.

Having endured two previous miscarriages, the couple said they named the baby Genesis, signifying a new beginning.

Genesis emerged from a heart operation Oct. 15 without any clear complications, said the Burketts' attorney, Patrick Salvi. Yet

## "To some degree these systems talk to each other, but mostly they don't."

— Ross Koppel, a sociologist who studies health information technologies

later that day, Fritzie Burkett said, she got a call from the hospital telling her to come in immediately. When she arrived, Burkett said, medical staff were performing CPR on Genesis, and about 40 minutes later they pronounced him dead.

"I lost all self-control; I didn't know what to do," Burkett recalled. Dr. Lee Sacks, chief medical officer for Advocate Health Care, the Chicago area's largest health care system, said the hospital's investigation revealed that a pharmacy technician had entered information incorrectly when processing an electronic IV order for the baby, resulting in a massive sodium chloride overdose in the solution.

The problem could have been identified by automated alerts on the IV

compounding machine, but those were not activated when the customized bag was prepared for the baby, according to the hospital. Asked why, Sacks cited ongoing litigation and declined to elaborate.

Advocate's investigation also found that the outermost label on the IV bag administered to the baby didn't reflect its actual contents, Salvi said. And while a blood test on the infant had shown abnormally high sodium levels, a lab technician assumed the reading was

would oversee the safety of these technologies, bringing vendors, hospitals, doctors and others to the table.

The Burketts filed a lawsuit in April against Advocate Health and Hospitals Corp., alleging that the hospital's actions led to their son's death and asking for an unspecified amount of money. Hospital officials said they are pursuing a settlement.

"It has been really hard to move on," said Fritzie Burkett, wiping tears from her eyes. "This didn't have to happen."

For their part, Advocate officials apologized to the Burketts for the errors that killed Genesis while vowing that similar mistakes would not happen again.

Since last year, staff have activated alerts for similar

IV compounding errors used in the system's hospitals and strengthened "double check" policies for all medications leaving pharmacies, among other measures. Having poured \$100 million into health care technology over the last decade, the system plans to use federal stimulus funds to institute a host of upgrades to electronic systems over the coming months.

The Burkett's case remains a "humbling" reminder that "we've got more work to do," Sacks said.

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Electronic communication gaps are common at large hospitals, which typically use upward of 50 to 100 different information systems at their facilities, with different technologies used in emergency rooms, labs, pharmacies and other medical departments, said Ross Koppel, a sociologist at the University of Pennsylvania who studies health information technologies.

"To some degree these systems talk to each other, but mostly they don't, so hospitals have to design custom-made software 'bridges' to make this happen," Koppel said. With each jury-rigged software solution comes the potential for new software bugs, transcription errors and other problems.

The lack of so-called interoperability between computer systems is a "huge problem" in hospitals and a significant contributor to potential safety issues, said Marc Probst, chief information officer at Intermountain Healthcare, a 23-hospital system in Salt Lake City and a member of the Health Information Technology Policy Committee, a federally appointed group. What's needed, he suggested, are better, more uniform national standards.

Other experts have called for more oversight by the FDA, which currently doesn't review new health information technologies or study their safety or effectiveness; mandatory reporting of adverse events to a national database; or the creation of an independent body like the Federal Aviation Administration that