With work, Dana-Farber learns from '94 mistakes

By Scott Allen, Globe Staff | November 30, 2004

Nurse Teresa Mazeika has known the woman knitting in the blue reclining chair for months. But she asks Carolyn Harlow her name and birthday anyway, as she approaches with chemotherapy for Harlow's blood cancer. Mazeika, a 17-year nursing veteran at Dana-Farber Cancer Institute, isn't taking any chances that she is about to give the drug to the wrong patient.

The name game is just one in a string of rituals Mazeika goes through before Harlow can have an injection that lasts all of five seconds: She reviews Harlow's treatment instructions on a computer to be sure the patient is getting the correct medicine; she checks the drug's concentration to be sure it's right for Harlow's size; she informs the pharmacist that Harlow shows no signs of side effects from previous treatments.

The abundance of caution is born of a hard lesson: 10 years ago, one patient died and another suffered irreversible heart damage at the Dana-Farber because the staff wasn't cautious enough. A young doctor accidentally prescribed four times the intended dose of breast cancer medication to Boston Globe health columnist Betsy Lehman and teacher Maureen Bateman, but none of the roughly 25 medical staff involved in their care noticed until weeks later.

"It was a pretty public humiliation," recalled Dana-Farber nurse Judith Prisby, expressing a view held by many staff members at the time. "My whole world changed in an instant."

A decade after Lehman's death, on Dec. 3, 1994, Dana-Farber has emerged as one of the most safety-conscious hospitals in America, with computers that trigger alarms at potential overdoses, a hypervigilant error-reporting system, and a top executive who pushes measures in pursuit of the old physician's promise to "first do no harm." Once a symbol of medicine's dark side, Dana-Farber's experience is now used in instructional brochures and videos.

But Dana-Farber's transformation is a daunting lesson for US hospitals as they struggle to improve a safety record in which perhaps one out of every 50 patients in their care is injured due to mistakes, according to the Institute of Medicine. The reforms at Dana-Farber have cost at least $11 million in upfront investments, not counting extensive training programs and the hiring of physician assistants and other employees to give doctors more time to meet with patients. The overhaul has also been extraordinarily time-consuming, requiring years of focused attention from top officials on such basics as convincing the staff that they won't be punished for admitting mistakes.

The hospital is measurably safer as a result, with no medication errors that caused permanent injury to outpatients in 10 years.

But staff members still make mistakes. Internal records released by Dana-Farber show 28 medication errors from 1997 to 2003 that either temporarily injured a patient or required heightened monitoring of a patient's health, including a chemotherapy burn that needed a skin graft and a patient who had to be hospitalized after getting an extra dose of chemotherapy.

Eight of the 28 errors harmed patients, a tiny number considering that Dana-Farber dispensed more than 800,000 doses of medications to outpatients over the period. But it is not zero, Dana-Farber's goal, and hospital officials know there is a larger number of "near misses," in which medication mistakes were corrected before they reached the patient.

"I have learned that our systems are too complex to expect merely extraordinary people to perform perfectly 100 percent of the time," said James B. Conway, the hospital's chief operating officer and top safety official. The key, he said, is keeping mistakes from hurting patients, which is why Dana-Farber hawkishly tracks errors, even those that result only in patient inconvenience, such as an extra night's hospital stay.

Few of the nation's 6,000 hospitals have invested nearly as much as Dana-Farber in preventing accidental patient injuries, but that may be partly because few hospitals have experienced such a searing and public mistake. Lehman's overdose became a symbol of an underappreciated danger in hospitals, mentioned in the very first line of the Institute of Medicine's seminal 1999 report on medical errors nationwide. Ultimately, the prescribing doctor, three druggists, and 15 nurses were disciplined by state regulators, and the hospital was sued by the two women's families and by one of the doctors it disciplined.

"I haven't spent a lot of time in my organization in our 10-year journey talking about the business case for safety," because everyone from the board of trustees on down understands the need to invest in safety, Conway said.

By contrast, patient safety advocates say that the issue of medication errors lacks urgency at many hospitals, most of which don't even know whether they are making more or fewer mistakes than they were a decade ago. While hospital officials talk a lot about the importance of patient safety, far fewer spend much to achieve it. For instance, only about 10 percent of hospitals have fully computerized drug-ordering systems, generally because the roughly $2 million price tag is too much for cash-strapped hospitals.

"Does everyone need their own galvanizing event before they turn to safety?" said Dr. Donald Berwick, president of the Institute for Healthcare Improvement in Boston. The group provides free software for detecting medication mistakes, intended to help administrators see that errors are more prevalent than they realize.

Before the 1994 overdoses, Dana-Farber officials believed their error prevention system was "very good for the time," said Sylvia Bartel, now the hospital's chief pharmacist. But the errors that led to Lehman's death and Bateman's heart damage cut through the defenses like a guided missile.

Instructions for the women's experimental treatment were ambiguous: "cyclophosphamide dose 4 grams/square meter (of body surface area) over 4 days." Did that mean 4 grams spread over four days or 4 grams each day? A young doctor at Dana-Farber on a fellowship, James Foran, decided the latter and, on Nov. 14, 1994, nurses began giving Lehman four times the intended dose for four consecutive days.

Lehman and Bateman, who received a similar overdose starting two days later, both became seriously ill: Lehman began to vomit intensely, and Bateman's heart became so unstable she had to be transferred to the intensive care unit at another hospital. However, both women's symptoms differed only in intensity from a normal adverse reaction to chemotherapy, so doctors and nurses did not immediately suspect a dangerous overdose.

The chief executive at the time, Christopher Walsh, took responsibility for the mistakes, personally briefing Bateman at her hospital bedside about what had gone wrong. Within months, both Walsh and Dana-Farber's chief physician had stepped down for unrelated reasons, making way for a new team, including hard-nosed David Nathan from neighboring Children's Hospital as chief executive. He immediately recruited Conway, a former Children's colleague, to overhaul safety programs.

Conway, who had moved on to a research job at MIT, saw medical errors that injure patients as a warning sign that hospitals don't have good enough systems to protect against human fallibility. With strong support from the hospital's board to spend the money and time it would take, Conway and the other Dana-Farber leaders began investing heavily in safety.

Today, an overdose of the type that occurred in 1994 is exceedingly unlikely for several reasons. First, the computer system won't allow a doctor to place drug orders that exceed the safe maximum, slapping a big red "WARNING: HIGH CHEMOTHERAPY DOSE" sign on the screen. The doctor must show the pharmacist new scientific results proving a higher dose might be safe and effective to override the computer. And pharmacists won't fill handwritten or verbal orders,

preventing doctors from getting around the system. Finally, junior doctors like Foran, who now practices in Alabama, no longer have authority to write prescriptions on their own.

But for hospitals looking to Dana-Farber as a role model, there is a caution: the task of creating a computerized drug-ordering system has proven daunting, involving 27 staff members who spend at least part of their work time on maintaining the computer system or updating its contents. In addition, a committee of doctors and other staff has met at least monthly for a decade to set policy for how the system works.

"We come from a culture in the old days -- decades ago, I hope -- where lots of things were unsaid" about what the doctor wanted, explained Dr. Lawrence Shulman, the hospital's chief medical officer. The job of the computer system, he said, is to make every step of the treatment explicit.

Dana-Farber also developed a state-of-the-art internal error tracking system, collecting verbal and written reports from staff on all lapses and sending out analysts to clinical units to find more mistakes. Analysts also investigate the root cause of every mistake that harms patients.

Dana-Farber also gave patients greater control over their care. Doctors and nurses now spend more time consulting with patients, made possible because the hospital increased the number of nurse practitioners and physician assistants from 12 to 45 over the decade. The hospital also adopted a full disclosure policy, promising to tell patients whenever a medical mistake affected their care.

In addition, Dana-Farber is one of only a handful of hospitals that have set up formal committees of patients to advise on everything from furniture in waiting areas to ways to improve care.

Outside observers such as Dr. Lucian Leape of the Harvard School of Public Health say Dana-Farber has come further than almost any other hospital in protecting patients from mistakes. However, Leape quickly adds, "they still have a ways to go."

Dana-Farber officials couldn't agree more. They are encouraged that the number of medication mistakes that harm patients has stayed at seven or less per year while the medication doses have tripled. Far from celebrating, though, Conway is looking for ways to increase the reporting of some errors. He is certain that many minor mistakes, such as giving a patient the generic brand of a drug when the doctor wanted a brand name, go unnoticed because the patient suffers no ill effects. But knowing about them is key to making sure small mistakes don't turn into big ones, he said.

For Jerry Bateman -- whose wife, Maureen, died from a recurrence of cancer 2 years after the chemotherapy overdose in 1994 -- the hospital's commitment to improving safety has provided some consolation. He said "the only positive thing" about his wife's misfortune is that it helped launch the patient safety movement.

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