Reducing Medical Errors: An Organizational Approach

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The issue of medical errors and patient safety has received a great deal of attention since November 1999, when the Institute of Medicine (IOM) released its famous report, To Err Is Human: Building a Safer Health System. A medical error, as defined in the IOM report, is “the failure of a planned action to be completed as intended or the use of a wrong plan to achieve the aim.” The report stated that approximately 44,000 to 98,000 people die in hospitals each year as the result of medical errors. Although the actual number of deaths has been debated, most health care leaders agree the number, whatever it is, is still too high and represents a significant public health risk in the U.S.

THE IOM’S RECOMMENDATIONS

In its report, the IOM made several important recommendations to address this situation. Foremost among them were (1) to establish a national focus on the issue, (2) to develop a nationwide, mandatory error-reporting system, (3) to raise standards through oversight organizations, and (4) to create safety systems within health care organizations.

Significant progress has been made toward implementing the first three items. For example, the Pennsylvania Medical Care Availability and Reduction of Error Act (MCare Act) contains safety provisions requiring medical facilities and physicians to report serious events and incidents to the recently created Patient Safety Authority. Other leadership programs (legislative, administrative, and private), such as the National Quality Forum, the Leapfrog Group, and the Pittsburgh Regional Healthcare Initiative, have increased awareness of the issue of patient safety and have provided important information in an effort to raise standards and expectations for improvement. The Agency for Healthcare Research and Quality has been a major force in promoting the development and dissemination of safe medical practices.

For all concerned, however, there is still an urgent need to focus on the IOM’s fourth recommendation: creating safer systems of patient care within the delivery systems themselves. This effort is sometimes referred to as “establishing a culture of safety.” How to best establish that culture, improve the reporting of potential errors, and eliminate them within any organization remains to be determined.

Dr. Lucian Leape, a Harvard health policy expert whose work greatly inspired the IOM report, stated that most medical errors are not caused by the carelessness of physicians, nurses, or other hospital personnel but, instead, are the result of poorly designed systems. According to Dr. Leape, people will always make errors, despite their best intentions; a good system is one that will compensate for those errors so that adverse outcomes do not result. The key to reducing errors, therefore, is to shift attention away from the caregivers toward the system itself, because finding fault at the individual level only obscures the underlying source that unwittingly allows these errors to occur.

We have developed an organizational structure within an academic tertiary hospital that continuously addresses those educational gaps and infrastructural deficiencies that present a repeated danger to the patients under our care. This structure is not much different from any hospital’s administrative effort to address problems such as facility cleanliness, environmental safety, patient transport, and finances. What is unique is that the focus is on all aspects of patient safety.

Academic health centers have an important role to play in reducing medical errors and in improving patient safety. They are ideally positioned in this regard, given the multiple dimensions of their missions of education, research, and clinical care. In fact, long before the IOM published its ground-breaking report, the University of Pittsburgh Medical Center Health System (UPMC) had already made patient safety its highest priority. Our work in this area has resulted in several effective strategies designed to reduce errors.

ROOT-CAUSE ANALYSIS OF MEDICAL ERRORS

To begin, we adopted the useful policy of many safety systems, such as the one used in the aviation industry. All reports of errors, from all sources, are channeled through my office; in my role as medical director, I chair the patient safety committees. These committees provide a means of analyzing the event, and they help to direct process-improvement efforts designed to eliminate the root causes of errors with the goal of reducing the likelihood of similar events in the future.

At UPMC, we have found that the most effective way to identify and address medical errors is through a well-researched procedure called root-cause analysis. This procedure is used to determine appropriate remedies by identifying the factors most likely to put patients at risk. UPMC has categorized these risk factors into the following domains:

- human
- non-human (e.g., equipment, technologies, and so forth)
- controllable or uncontrollable
- information management
- environmental

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Reducing Medical Errors

- leadership
- communication

The Joint Commission on Accreditation of Healthcare Organizations advocates this process to analyze sentinel events, and we employ it for adverse outcomes of all types: deaths, adverse drug reactions, medication errors that do not result in serious outcomes, events reported to the risk management department, and incidents discovered “through the grapevine.” The investigation is not designed to be punitive; until the root causes are elucidated, we do not accept the veracity of the initial report. Great pains are taken to maintain a “blame-free environment.”

In addition to investigating these routine sources, we conduct root-cause analyses on all “Condition C” crisis situations. Procedures for reacting to Condition C were instituted several years ago at UPMC as a standardized response to a medical emergency. The response is identical to that used in cases of cardiac arrest, at which time a critical-care team is summoned immediately to the patient’s bedside. In contrast to the standard approach to patient crises at teaching hospitals, whereby a chain of command often delegates responsibility to the least experienced members of the care team (i.e., interns), Condition C allows anyone, regardless of stature or reason, to call for help without the fear of blame or penalty.

To encourage and facilitate a standardized call for clinical help, UPMC developed a set of criteria for initiating Condition C. The criteria include an acute loss of consciousness; new-onset difficulty in breathing; sudden collapse; seizures; and sudden loss of movement of the face, arm, or leg. These criteria were published on laminated cards and were repeatedly distributed to all hospital personnel. After Condition C was implemented, the number of fatal cardiac arrests dropped from 2.6 per 1,000 admissions to 1.6. On average, 33 deaths have been prevented annually.

**TAXONOMY OF ROOT CAUSES**

The implementation of the Condition C criteria has helped to convert some potential deaths to near-misses; just as important, it has allowed for a case-based analysis of the root causes of these near-misses so that we can implement changes and begin to make process improvements. The following flexible taxonomy was developed in an effort to understand the fundamental reasons behind medical errors reported at UPMC and to determine the types of interventions that would most effectively address the antecedent causes of these events. A number of such taxonomies in the literature address the cognitive psychology of errors in general and medical errors in particular. We have found it useful to develop our own system in order to communicate better with the local health care delivery team. Our ability to recall errors of a similar type in the local environment is helpful in educating individuals about the repetitive nature of errors and the need for systemic corrective measures. Our taxonomy is presented as follows:

1. Bad things happen to sick people. Many life-threatening errors, including medication mistakes, improper procedures, and incorrect diagnoses, become evident when the clinical courses of the sickest patients are examined. Because the consequences of these errors are more severe than with healthier patients, the incentives to correct them are made more obvious.
2. The climactic event is the result of a chain of errors. Usually, there is no single cause of an accident; the problem often results from a series of accidents. For example, an error in decision-making, such as a misread x-ray, might set in motion a chain of occurrences that lead to an adverse event.
3. The most experienced clinician is not at the bedside. We have noticed that medical errors often occur at night, when the hospital is typically staffed by the least experienced physicians, who are often overworked and sleep-deprived; this can lead to impaired judgment in unexpected crisis situations. Our analysis of a number of such events has led us to establish the presence of several groups of skilled specialty physicians and surgeons in the hospital at all times.
4. Patients are not monitored during transport. Patients are often transported without being monitored, without their medications, or without adequate oxygen supplies in the portable tanks.
5. Procedures are hindered by dither and delay. Inexperienced physicians sometimes do not know when to call for help, which can result in inappropriate care or in delayed access to the proper care. Even the act of calling for help can use up valuable patient care time. Prompt responses by the crisis team and establishing the Condition C criteria have partially reduced the incidence of delayed responses in medical crises.
6. Distress in patients is not diagnosed. Health care providers are often inadequately prepared to recognize the various types of distress in patients. For example, many nurses have not been trained to identify respiratory distress, and physicians do not always diagnose major depression or the underlying physiological changes responsible for confusion or delirium. Educational programs directed at these deficits in training have been effective in reducing errors stemming from a lack of knowledge.
7. Bedside procedures are performed inadequately. Procedures performed at the patient’s bedside (e.g., inserting central venous lines, placing small-bore feeding tubes, and placing chest tubes) are often hindered by a lack of training, credentialing, supervision, and equipment. We have established credentialing and privileging criteria for most bedside procedures in addition to developing a training program that uses computerized manikins as simulators rather than live patients.
8. Patient “hand-offs” are poorly coordinated. Errors can occur when nurses’ shifts change or when patients are moved from one unit to another, leading to gaps in coverage by the staff and in loss of patient information.
9. Equipment design and maintenance are faulty. Medical errors can result from faulty or poorly designed defibrillators, bronchoscopes, oxygen tanks, and other devices. For example, standard oxygen tanks carry an insufficient supply for most patients who are undergoing diagnostic studies at unmonitored sites within the hospital, such as in the radiology department.
10. Medications are improperly prescribed or dispensed. According to the IOM report, more than 7,000 Americans...
Reducing Medical Errors

die each year as a result of medication errors, which include the prescribing or dispensing of the wrong drugs. Of particular concern are narcotics and other drugs that are administered via patient-controlled analgesia (PCA) pumps, which can cause serious harm to patients when used incorrectly. A miscalculation of a morphine dose, for example, can be lethal. Computerized ordering, dispensation, and administration systems can partially solve these problems. The Institute for Safe Medication Practices provides a monthly inventory of avoidable errors.5

STRATEGIES TO ADDRESS POTENTIAL ERRORS

Several approaches have been developed at UPMC to address the identified risk factors underlying medical errors. For instance, programs have been implemented to educate caregivers in areas such as how to diagnose respiratory distress and delirium. Appropriate training is provided as needed, such as guiding transport personnel to monitor oxygen delivery systems. UPMC has also developed best-practice protocols for various diseases, set criteria for escalation, provided ready access to computerized patient data, standardized treatment policies, and instituted risk-reduction teams to assist in areas where known problems exist, such as the performance of bedside tracheostomies.

HOW TO ENSURE THAT ERRORS DO NOT RECUR

Despite our own best efforts, we must assume that even with policies and procedures in place to prevent the recurrence of medical mistakes, certain errors are likely to happen repeatedly. To address this issue, we have implemented an auditing system to discover more about the repetitive nature of these errors so that we can identify effective system-based changes to reduce their frequency.

Having an organization in place within the hospital to examine past errors, to troubleshoot inadequate policies, to revise guidelines, to provide opportunities for supplementary education, and to monitor one-time and recurring errors is essential for achieving maximum patient safety. Achieving the goal of universal nonpunitive reporting requires the investigation of adverse events in real time, so that the importance of the event is stressed. Only then will the need to improve the processes of care become ingrained in the caregivers who participate in these activities. Thus, positive changes in the culture can be achieved and the adverse outcomes caused by problems inherent in the care system itself can be reduced.

REFERENCES