Are We Making Progress In Cutting Medical Errors?

In November 1999, the Institute of Medicine (IOM) made the shattering pronouncement that medical errors accounted for as many as 98,000 deaths annually—equivalent to the crash of one jumbo jet each day—spurring healthcare providers, researchers and policymakers to seek solutions that would fill safety gaps.

The IOM's report, "To Err Is Human," lifted the veil on the scope and impact of medical errors in the U.S. healthcare system. Since its release, efforts to address the problem have drawn mixed reviews from patient safety experts.

A central achievement has been the recognition of errors as a problem that must be addressed. The IOM report initially stirred denial that medical errors posed a serious threat, says Dr. Lucian Leape, adjunct professor of health policy at Harvard School of Public Health in Boston. "We have moved beyond questioning whether to do something to how to do it," he says.

Success in medical-error reduction has been measured by advances in the development and use of electronic medical record systems, heightened awareness and understanding of how errors occur, and the redesign of targeted medical practices to improve safety.

A central achievement has been the recognition of errors as a problem that must be addressed, experts say. The IOM report initially stirred denial that medical errors posed a serious threat, says Dr. Lucian Leape, adjunct professor of health policy at Harvard School of Public Health in Boston and a member of the IOM panel that produced "To Err Is Human."

"We have moved beyond questioning whether to do something to how to do it," Dr. Leape says. "The conversation in hospitals and doctors' offices is what should we do and how should we do

it," as opposed to denying that a problem exists.

"Getting rid of denial was important," he adds. "It legitimized research in patient safety" and "mobilized resources." As a result, "we are poised to make [progress] a lot more quickly in the not-too-distant future."

Despite these gains and optimistic predictions for the future, the five-year anniversary of IOM's landmark report was greeted with broad acknowledgement that progress has been incremental, falling short of expectations for sweeping change.

"The IOM came out with expectations that we would reduce errors by 50 percent in five years," says Dr. Lee Hilborne, director of University of California Los Angeles's Center for Patient Safety and Quality. "We're not there, but that was overly ambitious."

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The pace of improvements is attributed primarily to the complexity of the challenge and the need to engage virtually every stakeholder in the healthcare system.

"Healthcare is probably the most complex industry in the world, not only in terms of what we do and the instruments, devices and equipment we use, but in terms of the relationships of people," says Dr. Leape.

Healthcare is the only industry in which the primary players—physicians—are often unaffiliated with an organization or large group. "Yet, they call on a broad array of services and people who may be scattered geographically," says Dr. Leape. "That's very complicated."

Furthermore, the "modern theory of safety" is that usually when things go wrong, it's due to a "breakdown in the system," he adds. "Even when an individual makes a straightforward mistake, there are ways to prevent it if you design systems better."

In healthcare, however, the challenge of designing new and better systems is "compounded by a long tradition of very authoritarian practice which has been shown to be inimical to safety," Dr. Leape says. "One barrier to improving safety is the way doctors relate to one another. What we're talking about is a ma-

jor cultural change, and culture change doesn't happen easily."

Uneven Progress Seen

Julie Morath, chief operating officer of Children's Hospitals and Clinics in Minneapolis/St. Paul, Minn., and a board member of the National Patient Safety Foundation in McLean, Va., describes progress as "uneven" throughout the healthcare system.

The pace of change has been "much slower than anticipated," with some organizations making "tremendous strides" and others working through the "awareness phase," says Ms. Morath, author of The Quality Advantage: A Strategic Guide for Health Care Leaders (Jossey-Bass, 1998).

"When you begin to dive into creating a culture of safety, you are driven by a new and very distinct body of knowledge and science that most of us who are educated and trained in healthcare have never been exposed to," she adds. "There have been lessons from other industries and those are beginning to migrate into healthcare, but have yet to be tested."

Progress Seen Difficult to Track

The National Healthcare Quality Report, developed by the Agency for Healthcare Research and Quality, documents progress and substantial gaps in patient safety, although they are difficult to track because of limited data. For example:

- Data collected on hospital-acquired infections from 1995-2002 show that some of the Healthy People 2010 targets for eliminating infections acquired in intensive care units (ICUs) have been met or nearly met.
- Data on adverse events due to medical care show that the rate of complications due to anesthesia is only 0.72 per 1,000 surgical discharges.
- Data on complications of care show that the rates for accidental laceration or puncture during a procedure rose from 2.4 to 3.4 per 1,000 discharges from 1994 to 2000.
- In terms of medication safety, 77.8 percent of people with a usual source of care in 1996 and 81.7 percent in 2000 said that their usual source of care asked them about other medication use in order to prevent drug interactions.

Source: National Healthcare Quality Report, U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, December 2003 (www.quality-tools.ahrq.gov).

Furthermore, in the past five years, patient-safety research and implementation have largely focused on acute-care settings and healthcare organizations with greater resources and infrastructure to support systemic safety initiatives than an independent physician practice, experts say. As a result, office-based care has been overlooked, and the role of primary-care providers has been marginalized.

It's difficult at that level of care to make a business case for sizeable investments in safety, such as information systems that can cost $50,000 or more, says Dr. Robert Wachter, chief of the medical service at the University of California San Francisco Medical Center and author of Internal Bleeding: The Truth Behind America's Terrifying Epidemic of Medical Mistakes (Rugged Land, 2004). Dr. Wachter, a pioneer in the hospitalist movement, also authored a report assessing medicine's progress in error reduction.

U.S. Health System Earns C+ for Patient Safety

In 1999, the U.S. Institute of Medicine (IOM) reported that 44,000 to 98,000 people die each year from avoidable medical errors. An analysis published on the fifth anniversary of that landmark study says that the United States has made "insufficient" progress to improve the safety of patients in hospitals, earning an overall grade of C+ from Dr. Robert Wachter, chief of the medical service at the University of California San Francisco Medical Center. Dr. Wachter analyzed and graded five major areas of activities and initiatives related to patient safety that marked the past five years:

- **Regulation, Grade A-.** The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has been "the most important driver of progress in patient safety," according to a survey of hospital leaders cited in Dr. Wachter's report. JCAHO now requires such safety measures as "read-backs" of patient names and oral orders and standardized approaches to certain procedures. Dr. Wachter characterized regulatory solutions as an "important early step" that was useful for "creating safe systems, standardization and redundancies."
- **Error-reporting systems, Grade C.** While many states and individual institutions require error reporting, there is no evidence that the reports are being used to educate providers or improve systems. The "flawed notion that reporting has any intrinsic value in and of itself" is the "Achilles' heel" of error reporting, Dr. Wachter said. "Reporting is an area in which new models, and far greater resources devoted to translating submissions into action will be needed."

Dr. Wachter's progress report, entitled "The End of the Beginning: Patient Safety Five Years After 'To Err is Human,'" published in the journal Health Affairs in November 2004, gave the highest marks to the areas of regulation, workforce training and information technology, while the malpractice system and other venues for accountability scored lowest (*see box on facing page*). Giving safety efforts an overall grade of C+, the report indicated that work to undo decades of practice patterns and reverse the forces that compromise safety is far from complete.

Safety challenges have mounted with the rising complexity of medicine, said the report. "When the tools of medicine were the doctor's intellect, the nurse's empathy and a few simple surgical procedures and potions, there was little price to be paid for absent safety systems and lack of coordination."

That price rose, however, as medical advances demanded heightened attention to safety. The advent of intensive-care units

- **Information technology, Grade B-.** Noting a "marked uptick in clinical information system implementations," the report said that while technology won't be the total answer to medical-error reduction, it will rank among the most critical solutions. "We may finally be nearing the time when institutions and providers will not be seen as credible providers of safe, high-quality care if they lack a strong IT backbone."
- **The malpractice system and accountability, Grade D+.** Calling the medical liability system "terribly broken," Dr. Wachter said it does a "poor job" compensating and protecting patients, and punishing negligence. Touted caps on pain and suffering miss the mark, the report said, as they don't effectively impact patient safety. A better approach, and one that could change the dynamics, would be a "no-fault" system for compensating victims of negligence, though it has not generated political support. Alternatively, "enterprise liability," directing lawsuits to organizations as opposed to individual providers, might be viewed more favorably and would provide "a powerful impetus for systems change," the report said.
- **Workforce and training issues, Grade B.** The high mark reflects growing recognition of the importance of workforce and a few key gains, including the emergence of hospitalists, who provide and coordinate care for inpatients. The picture is grimmer in ambulatory settings, due to a shortage of primary-care providers and the lack of time or capital in office-based practices to invest in patient safety improvements, especially information technology.

in the 1960s and 1970s, for example, introduced "an extraordinary array of breathtaking technologies and pharmaceuticals... each accompanied by an armada of skilled professionals to manage their use. A critically ill patient might be seen by a half-dozen different physician-specialists," in addition to an array of ancillary professionals, and receive "hundreds of medications and

Saving 100,000 Lives

The Institute for Healthcare Improvement (IHI) in Boston has issued a challenge to hospitals around the country: save 100,000 lives in 18 months.

Hospitals signing onto the campaign will agree to implement six quality improvements targeted by IHI.

Donald Berwick, president and chief executive officer of IHI, invited every healthcare facility in the nation to join the organization and its partners "to make these proven, life-saving techniques standard practice."

IHI predicts that by recruiting 1,500 to 2,000 participants to make the requisite changes, the ultimate goal of saving 100,000 lives can be met. A "remarkably few proven interventions, implemented on a wide enough scale, can avoid 100,000 deaths over the next 18 months and every year thereafter," IHI said.

Though the campaign is focused on hospital-based care, "everyone who works in healthcare has an important role to play," the organization said. Doctors can encourage hospital leaders to join the campaign, urge other physicians in the community to follow the interventions and develop standards of care around them, and incorporate the standards into their own practice.

The quality improvements embraced by the campaign have a proven record of saving lives, IHI said. The campaign, which starts in January 2005, is asking hospitals and other facilities to do the following:

■ **Deploy rapid response teams (RRTs).** Any staff member, regardless of his or her position, will have the authority to call in a specialty team to examine a patient at the first sign of decline. Criteria for calling the RRT may include acute change in vital signs, decreased urine output, altered mental function, or any staff member concern about the patient. The RRT may consist of an ICU doctor and nurse, or a nurse and respiratory therapist. The doctor could be a staff physician or resident. Austin Hospital in Heidelberg, Victoria, Australia, has reported a 65 percent drop in cardiac arrests and a 37 percent reduction in mortality after introducing RRTs. Baptist Memorial Hospital in Memphis has experienced a 28 percent drop in codes.

tests."

In the absence of a culture of safety and systems that focused on "flawless execution," it is not surprising that errors became problematic, said the report, which cited a study that found "the average ICU patient experiences 1.7 errors per day, nearly one-third of which are potentially life-threatening. Most involve com-

- **Deliver evidence-based care for acute myocardial infarction.** Consistently deliver key treatments, including early administration of aspirin and beta-blockers, that prevent patient deaths from heart attack.
- **Prevent adverse drug events (ADEs).** Implement medication reconciliation by making a list of all drugs a patient is taking and compare that to the physician's admission, transfer and discharge orders to ensure the patient gets the right medication at the correct dosage at every stage. According to IHI, 46 percent of all medication errors occur at transition points. Medication reconciliation ensures that patients receive only intended medications following transitions in care. The process "can virtually eliminate errors occurring at transitions in care," IHI said. Luther Midelfort-Mayo Health System, in Eau Claire, Wis., did just that in its telemetry/intermediate care unit. OSF Healthcare System in Peoria, Ill., reduced ADEs per 1,000 units of medication from 3.84 to 1.39.
- **Prevent central line infections.** Perform five steps, called the "central line bundle," consisting of hand hygiene, maximal barrier precautions, chlorhexidine skin antisepsis, appropriate catheter site and administration system care, and no routine replacement. According to IHI, there are about 5.3 central line bloodstream infections per 1,000 catheter days in ICUs, with a mortality rate of 18 percent, or about 14,000 deaths a year. ICUs that have applied interventions similar to the "bundle" described by IHI have nearly eliminated these infections, the organization said.
- **Prevent surgical-site infection.** This can be done by delivering the correct antibiotics, maintaining glucose levels and avoiding shaving hair at the surgical site. Surgical patients who develop these infections are twice as likely to die as other surgical patients, IHI said.
- **Prevent ventilator-associated pneumonia (VAP).** Perform five steps: elevation of the head of the bed to at least 30 degrees; daily "sedation vacation," daily assessment of readiness to extubate; peptic ulcer disease prophylaxis; and deep-vein thrombosis prophylaxis. VAP occurs in up to 15 percent of patients on mechanical ventilators, according to IHI. Mortality rate for these patients is 46 percent, compared with 32 percent for ventilator patients who do not develop VAP.

munication problems."

Dr. Wachter identified four key forces that have created opportunities for medical errors and limited medicine's ability to challenge them:

■ **A flawed mental model and collective inattention.** Medical professionals, regulators and the public have long attributed medical mistakes to "bad apples," blaming individuals rather than systems that allow errors to occur. Furthermore, as technology advanced and the complexity of care intensified, doctors and nurses often "came to think of medical errors as the unavoidable collateral damage of a heroic, high-tech war they otherwise seemed to be winning." The lack of open discussion about mistakes meant that each incident was "viewed in isolation, with little sense by providers or the public of the breadth of the problem and the recurring patterns," the report said.

Primary care is increasingly viewed as a critical hub for safety improvements, and office-based practices are drawing heightened attention from researchers as well as clinical and safety management experts. Professional societies are also taking a leadership role in educating physician members on the importance of patient safety and practical strategies for improvement.

■ **The reimbursement system and organizational dichotomy.** No incentives for error-free care exist in the current payment structure. In fact, mistakes have the potential to generate more revenue, Dr. Wachter said. In addition, the separation of physicians and hospitals creates "divergent bottom lines and incentive structures." The lack of a unified organizational structure is especially problematic at a time when doctors' leadership and participation in safety initiatives is crucial.

Like other industries, medicine has focused on "production or progress instead of safety," Dr. Wachter said. As a result, "the hard work and vigilance needed to ensure flawless execution always seem less exciting than progress, whether the product is a surgical procedure, a space shuttle launch, or national security."

Focus on Medical Offices

"The real problem," says Dr. Wachter, "is that an individual doctor in a small office is incredibly busy," he says. Practition-

ers don't have the "expertise, time or resources to focus on this."

According to Christel Mottur-Pilson, Ph.D., director of scientific policy for the Philadelphia-based American College of Physicians (ACP), hospitals have been the focal point because they are more likely to have databases that facilitate data gathering and analysis. In addition, there has been greater regulatory pressure on acute-care providers through the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), which has imposed safety requirements and practices as conditions of accreditation.

In the wake of an initial wave of error-reduction initiatives, however, emphasis is beginning to ripple out from the once-exclusive domain of hospitals, teaching institutions and expansive healthcare organizations. Primary care is increasingly viewed as a critical hub for safety improvements, and office-based practices are drawing heightened attention from researchers as well as clinical and safety management experts. Professional societies are also taking a leadership role in educating physician members on the importance of patient safety and practical strategies for improvement.

The need to engage primary-care doctors in the process of medical error reduction is critical, Dr. Mottur-Pilson says, because "this is where patients enter the medical care continuum. Their first stop is their personal physician."

Data published by the American Academy of Family Physicians (AAFP) show that well over 80 percent of patients with heart disease, hypertension, diabetes, asthma, COPD, cancer, stroke and anxiety/depression cite their primary-care doctor—an internist, family physician or pediatrician—as their usual source of care.

"If we are concerned about patient safety, this is where it should start," Dr. Mottur-Pilson says.

With that aim in mind, the ACP has launched a seven-module patient safety curriculum tailored to the needs and challenges of primary-care doctors. The modules were designed to dovetail with the priorities identified by IOM's recommendations for safety improvement in its 1999 report and a 2001 sequel, "Crossing the Quality Chasm." Each module covers a single topic, including medication errors, cognition, the role of patients, idealized

office design, communication, information technology and systems.

The standardized modules are packaged as slide presentations, each of which lasts about an hour, says Dr. Mottur-Pilson. Programs are structured around "case presentations that show how errors occur and how they could be avoided," she adds. The objective is to lead doctors to an "aha! experience," an epiphany during which they "intuitively link to that scenario" and begin to understand how to avoid that particular error in the future.

The curriculum includes a brochure of "take-home points," which are practical error-reduction tools and strategies that doctors can apply in their office without much fanfare or reliance on technology.

The IOM defined a medical error as "the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim." A less technical definition often cited by AAFP is "anything that happened in my office that shouldn't have happened and that I absolutely do not want to happen again."

ACP has rolled out the program through 75 regional chapters. From its headquarters in Philadelphia, the organization offers training to ACP state executives on how to present the material, and they in turn create programs for local chapters.

The response has been so positive that presenters at the local level "have gone shopping with them," Dr. Mottur-Pilson says. In addition to showings at local ACP chapters, the programs are used at grand rounds, local medical societies and, to some extent, even in hospitals. Trained presenters "have adopted a new social identity," she adds, seeing themselves not only as patient-safety experts, but as "ambassadors, trying to spread the word."

Sessions are compact, Dr. Mottur-Pilson says, to maximize their use and distribution. Many states have used three or four modules and, since its launch in 2002, the curriculum has reached an estimated 7,000 to 8,000 internists, she adds. All of the materials are available free of charge on ACP's Website (*www.acponline.org/ptsafety/*).

Identifying Errors in Medical Offices

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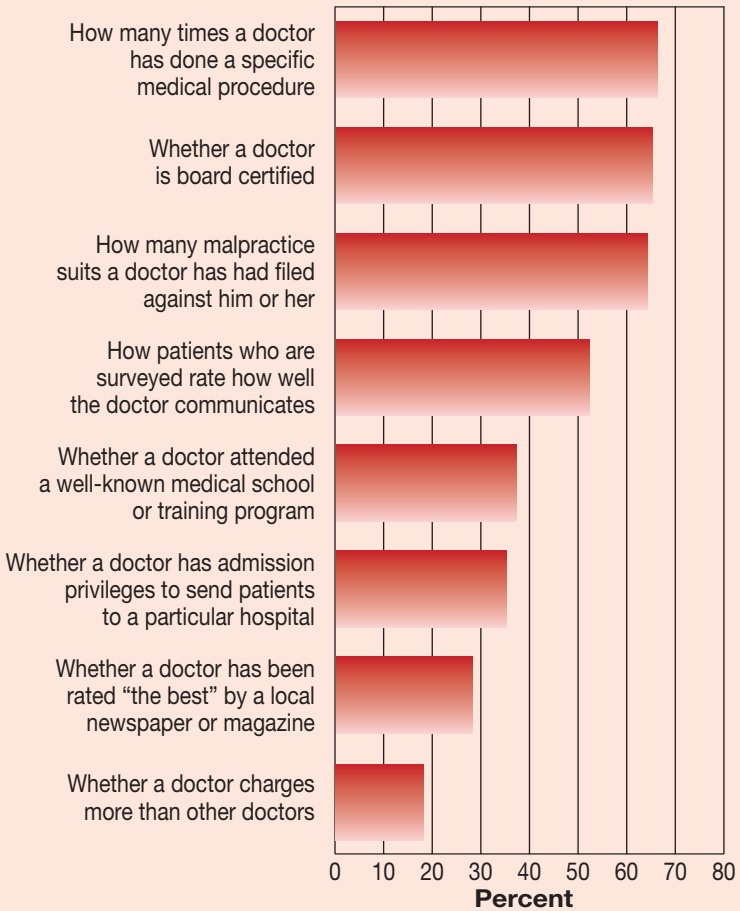
How Do Patients Determine Physician Quality?

Percent who say each would tell them "a lot" about the quality of a doctor



Source: Kaiser Family Foundation / Agency for Healthcare Research and Quality / Harvard School of Public Health National Survey on Consumers' Experiences with Patient Safety and Quality Information, November 2004 (Conducted July 7 - September 5, 2004).

to achieve an aim." A less technical definition often cited by AAFP is "anything that happened in my office that shouldn't have happened and that I absolutely do not want to happen again."

In the primary-care arena, data on medical errors are scarce. But studies that have been done suggest that errors in these settings have the potential for far-reaching impact.

Healthcare Takes Flying Lessons

In the quest for a safer healthcare system, few industries or professions emerge as natural models from which healthcare providers can readily draw lessons.

Manufacturing companies have led a revolution in quality management techniques, but their paradigms address business and assembly line procedures that differ in meaningful ways from healthcare, says Dr. Robert Wachter, professor of medicine and chair of the patient safety committee at the University of California San Francisco Medical Center. In manufacturing, something unexpected, "like a grenade," occasionally upsets the assembly line, he says. "But that doesn't happen often." Companies like Xerox and Toyota are showcases for quality programs within "systems that are predictable," he adds.

But healthcare professionals, who routinely contend with chaotic situations and emergencies, which are by definition unpredictable, don't easily relate to lessons from manufacturing, Dr. Wachter continues. When presented with these examples, doctors "bristle and say we do something more complex, with more moving pieces, and get thrown nasty curve balls we can't anticipate."

Healthcare's closest parallel and best model, Dr. Wachter says, is the airline industry, where unexpected, life-threatening emergencies do arise.

Airlines have "become remarkably safer in the last 20 to 30 years," with only one death on a commercial airline in the past couple of years. The industry's turnaround is the result of a concerted effort to unravel and remake the cultural norms which once compromised safety and undermined meaningful improvements, experts say.

At one time, idealized aviators were "top gun cowboys who broke every rule," says Dr. Wachter, who has studied the history and progression of airline safety. They exerted "tremendous autonomy" and led the exciting lives depicted in Tom Wolfe's book, The Right Stuff. But there was a catch: one in four of them died.

Combined data from a handful of studies worldwide, published in 2003 in the journal American Family Physician, showed the five most common mistakes in primary-care settings are:

- Prescribing errors, such as ordering contraindicated drugs and prescribing the wrong dose.
- Failing to get the right laboratory test done for the right patient at the right time. This includes cases in which the requested test

On the commercial side, aviation was "steeped in hierarchy," he says. Pilots were on top in the same way that doctors stand at the peak of the healthcare hierarchy, with subordinates reluctant to assert themselves or suggest changes, even when safety hangs in the balance.

The era of maverick aviators ended with a generation that took a scientific approach to safety. Spurred by a series of catastrophic crashes in the 1970s, commercial carriers succeeded in changing processes and culture by adopting checklists, protocols and teamwork and "dampening down hierarchies," Dr. Wachter says. Pilots, flight engineers, mechanics and flight attendants now work and train for emergencies as a team, interacting with and listening to one another as a matter of routine, Dr. Wachter adds. Everyone on the team is "comfortable speaking up, and pilots are comfortable listening,"

This cultural transformation "parallels the evolution medicine is undertaking today," Dr. Wachter says. It's not uncommon, for example, for operating room procedures to be tailored according to the preferences of individual surgeons. As a result, processes and set-up for the same surgery may change from doctor to doctor.

"That would be inconceivable in aviation," Dr. Wachter says. "Doctors don't recognize the consequences of that sort of autonomy, but from the standpoint of patient safety it's disastrous." Customization means nurses and others who work on teams with multiple doctors "can't anticipate next steps, and no one knows where anything is."

Taking away procedures and steps that can be systemized or computerized in no way diminishes the art of medicine, as physicians must still make a lot of judgment calls to provide the best care, Dr. Wachter says. "I don't think it's so interesting or worthy to have to remember when a patient is due for a flu vaccine, is allergic to a drug, or [is at risk of] an interaction between drugs," he adds. "I would love a computer system to do that for me." Doctors who feel that predictability—and the heightened safety assurances that go with it—makes their professional life more boring should "get a hobby," he adds.

wasn't done, the lab performed the wrong test or an abnormal result was not reported promptly.

- Medical records filing errors, arising from the use of the wrong file during an office visit or lost reports that are filed with the wrong patient chart.
- Dispensing mistakes, due to the wrong dose or drug being administered.
- Errors in responding to abnormal laboratory test results, such as the failure to recognize an abnormal result or interpret it in the context of the total clinical picture.

The findings were drawn from a database of 416 error reports by U.S. family physicians and 356 reports from general practitioners in other countries.

A study sponsored by the Robert Graham Center, published in a 2002 issue of Quality & Safety in Health Care, teased out the root causes of medical errors in family practice, and suggested that the task of researching errors in these settings and identifying prevention strategies may be even more challenging and complex than in acute care.

"We need to know the types of preventable errors that happen in primary-care settings so that we can launch appropriate and effective efforts to protect patients from the harm these errors may cause," the study said.

A review of the consequences of these errors found that 85 percent had at least one effect on patients and the healthcare system. They impacted patients' health and the care they received. In addition, they took more time and cost more money than error-free care. Health consequences occurred in 362 cases, or 47 percent of the total. These included putting patients and others at increased risk of harm, though no actual harm occurred; upsetting patients; subjecting patients to physical pain, and compromising a patient's health.

Care consequences, which arose in 301 cases, or 39 percent of the total, included delayed care or a hospital admission. In 20 percent of all cases, patients, providers or payers incurred additional financial and time costs.

While harm did not result from every reported error, all of the error types "did sometimes harm patients, place patients at risk of harm or add unnecessary costs to their care," said an analysis

of the data. "Moreover, all errors impacted healthcare providers, making the work of physicians, pharmacists, nurses and others involved in healthcare less efficient, more time-consuming and more wasteful of money than it could be."

Primary-care experts agree that the additional research is needed to better understand how errors occur in this arena, and their prevention.

"Progress is being made," says Dr. Robert Phillips, director of the Robert Graham Center: Policy Studies in Family Practice and Primary Care, a Washington, D.C.-based research center sponsored by AAFP. "But we are still scratching the surface."

Research Funds Lacking

Part of the problem is lack of funding, says Dr. Phillips, who also serves on the faculty of Georgetown University's family medicine department and practices in Fairfax, Va.

At the Federal level, most patient-safety research funds come from the Agency for Healthcare Research and Quality (AHRQ). The agency's budget, however, has failed to keep pace with rising research needs, observers say.

Since the IOM report, Congress has allocated about $50 million annually to patient safety, says Dr. Leape. "One disappointment is the lack of major governmental response," he adds.

In his report on patient-safety progress, Dr. Wachter said AHRQ's budget for safety was 1/500th of the Federal investment in medical progress through the National Institutes of Health.

"Although important research has come from AHRQ's early investment, its volume and impact have been limited by this underfunding," the report said.

Last year Friends of AHRQ, an umbrella group of more than 130 provider, consumer, research and employer organizations, urged lawmakers to boost AHRQ funding to $433 million in fiscal 2005, up from $304 million in fiscal 2004. President Bush proposed freezing the agency's budget, which had risen by only $4 million since fiscal 2002.

"The AHRQ budget has remained relatively flat for the past several years, despite increased momentum across the country for the healthcare solutions that AHRQ research provides," said a Feb. 3, 2004 press release from the Coalition for Health Ser-

vices Research (CHSR), which coordinates activities for the Friends of AHRQ. W. David Helms, president of CHSR, pointed out that President Bush stressed in his 2004 State of the Union address "the importance of ensuring patient safety, reducing healthcare costs and expanding access to coverage. However, the president's budget doesn't provide the support needed to address these pressing problems through research."

Though Congress is expected to give the agency a $15 million boost in fiscal 2005, the hike is still far short of the Friends' desired mark. Furthermore, a CHSR breakdown of the budget reflects limited flexibility for funding understudied areas, such as primary care. Spending on patient-safety initiatives would rise to $84 million, up from $80 million, but $60 million of that would be earmarked for health information technology and the development of clinical terminology.

Federal funding for patient-safety research is "drying up," Dr. Phillips says. "It's expensive to change a practice so that physicians have tools in place to do the right thing. It's even more expensive to study it."

Taxonomy Shows Breadth of Errors

A study sponsored by the Robert Graham Center and published in a 2002 issue of Quality & Safety in Health Care, teased out the root causes of medical errors in family practice and suggested that the task of researching errors in these settings and identifying prevention strategies may be even more challenging and complex than in acute care.

"Primary care is characterized by customized care that responds to individual patients' needs, values and preference across a broad spectrum of healthcare," said the study, conducted by a research team that included Dr. Phillips. "Its diversity, scope and variation in structure and infrastructure may offer more opportunity for error than more highly regulated and procedure-oriented hospital-based care."

Meaningful error-reduction efforts cannot stop at the hospital door, researchers said, because while acute care "exposes patients to certain types of errors that could cause substantial harm (such as wrong-side surgery), hospitals are also the least frequently used component of formal health systems for most people. Im-

portant opportunities for protecting patients from harm may exist in other settings."

The study, based on 344 error reports from 42 family doctors participating in AAFP's Network for Family Practice and Primary Care Research, found that 281, or 86 percent, were "process" errors. Researchers defined this category as errors attributable to administrative or investigative tasks. This category included the following:

- Filing, documentation or record management; management of patients through the healthcare system, and appointment and message handling. These sources accounted for 102 errors, or 31 percent of the total.
- Investigation of a patient's condition, including the ordering, handling, reporting and follow-up on laboratory, diagnostic or other investigative tests, which accounted for 82 errors, or 25 percent of the total.
- Treatment delivery, including medication ordering and dispensing, comprising 23 percent of errors in 76 incidents.
- Communication with patients and other providers, traced to 19 errors, or 6 percent of the total.
- Payment system problems, which led to 4 errors.

The new family practice model is based on two years of collaborative work by seven national family medicine organizations. The model reflects a range of objectives, including access to basic health services for all Americans; safe, high-quality care, and financial viability to ensure the future of family medicine and heighten its appeal to new physicians.

A second category of errors was defined as "knowledge and skills." These accounted for 46 errors, or 13.4 percent of the total, and included the improper performance of a clinical task, wrong or missed diagnoses and the wrong treatment decision.

Fourteen of the reports submitted by the doctors were deemed by researchers to be adverse events that were not caused by an error, and were therefore excluded from the breakdown. Of the errors that were analyzed, 10 resulted in a hospital admission, and one patient died.

Researchers found that most errors took time to be recognized. Only 11.6 percent, or 38 cases, were caught the day of the event, while nearly half were recognized within two weeks. The longest

time lapse was 141 days.

Most of the errors, 72 percent, were made and recognized in a doctor's office, but some of the errors were first discovered in other healthcare settings—including hospitals, emergency rooms, nursing homes, pharmacies and laboratories—or in the patients' homes.

Researchers described the "taxonomy" as a preliminary tool that suggested priority areas for error reduction in primary care, and identified opportunities for improvement. The tool is important due to the "dearth of patient-safety research in this setting," the study said. While further application of the taxonomy tool would be needed to capture and define the cause of all primary-care errors, this foundational effort revealed "a spectrum of medical errors that is different from the types of medical errors previously identified in hospital-based care."

For example, while medication errors are not uncommon in primary care, they are not as dominant as prior studies—most of them hospital based—have shown, researchers said. Instead, the major causes of primary-care errors are problems with "healthcare processes."

Basket of Services

Under the AAFP's "new model" for family practice, physicians will provide the following basket of services:

- Healthcare provided to children and adults.
- Integration of personal healthcare (coordinate and facilitate care).
- Disease prevention through the early detection of asymptomatic disease.
- Health promotion; primary prevention and health behavior/lifestyle modification.
- Patient education and support for self-care.
- Diagnosis and management of acute injuries and illnesses.
- Diagnosis and management of chronic diseases.
- Supportive care, including end-of-life care.
- Maternity and hospital care.
- Primary mental healthcare.
- Consultation and referral services as needed.
- Advocacy for the patient within the healthcare system.
- Quality improvement and practice-based research.

More than half of the reports, 56 percent, resulted in no harm to patients. Researchers underscored, however, than an event that seems trivial on one occasion may on another inflict severe harm.

"The data highlight the important role of administrative systems, particularly medical record systems, as a source of errors that matter to patients and doctors," the study said. The most serious consequence, for example, a patient's death, was traced to a mishandled message. In other cases, the risk of death was present. One doctor was unable to contact a patient whose skin biopsy detected melanoma because the record contained no contact information.

"Although most undelivered messages or missing data in patient records do not result in harm, these are such common and redeemable system failings that they deserve attention," the study said. "This attention will save lives."

New Family Practice Model Advanced

The American Academy of Family Practice in Leawood, Kan. is investing $8 million to create a New Model Practice Resource Center to support the transformation of family medicine and promote a practice model that incorporates key cornerstones of patient safety.

The new practice model is based on two years of collaborative work by seven national family medicine organizations, an effort called the Future of Family Medicine (FFM) project. The model reflects a range of objectives, including access to basic health services for all Americans; safe, high-quality care, and financial viability to ensure the future of family medicine and heighten its appeal to new physicians. The primary objective "was to recommend changes to the discipline so that family medicine can better meet the healthcare needs of patients in a changing environment," said FFM's final report.

"Any viable solution to the current crisis in American healthcare must have both a systems and a patient focus," said Dr. Michael Fleming, chairman of AAFP and a member of the task force that produced the report. "The new model has both."

In September, the Center will launch a two-year pilot program to test the model in 10 to 20 practice sites. Participating practices will agree to implement all components of the new model, and

each will receive free software, technology, training, support and evaluation services to support their efforts. In addition, they will be reimbursed for their participation.

AAFP says the transition will pose significant challenges and costs, as practices make dramatic changes. Under the new model, practices would serve the following purposes:

- **Serve as a personal medical home for patients,** becoming the focal point for acute, chronic and preventive care.
- **Provide a defined basket of services** (*see box on page 28*) directly through the practice or through arrangement with clinicians outside the practice. Outside services would be coordinated and integrated for the patient.
- **Implement an advanced information system,** including electronic health records (EHRs). The EHR would integrate information from multiple sources—hospitals, doctors' offices, long-term care facilities—and allow users to collect, analyze and report clinical decisions and their outcomes.

Technology's Role in Model Practice

Capabilities supported by model practice Electronic Health Record (EHR):

- Collection of wide-ranging demographic information about patients.
- Problem and medications lists.
- Documentation of patient encounters.
- Standardized data-sharing.
- Evidence-based clinical guidelines for conditions most commonly encountered by the physician.
- Order entry and referral tracking.
- Formularies specific to managed-care organizations.
- Chronic disease registries.
- Reminders for personalized and preventive services.
- Web-based interface for some level of patient access to the record.
- Integration with practice management and billing systems.
- Practice-based clinical research using electronic audits of the costs, processes and outcomes of care.
- Computerized decision support to help patients make informed healthcare decisions and help doctors explain options.
- "Just-in-time" systems allowing the rapid retrieval of timely clinical information at the point of care.

■ **Provide patient-centered care** based on a humanizing relationship between patients and doctors. Practices would meet and anticipate patient needs, and design services accordingly.
■ **Eliminate barriers to access.** Practices would use "open access," offering patients same-day appointments and flexible, expanded hours. Alternative communication links—including voice mail and e-mail—would be available for non-urgent conditions, with a 24-hour staffed phone line for urgent problems.
■ **Develop a team approach to care.** In addition to nurses and administrative personnel, the multidisciplinary team would include physician assistants, nurse practitioners, nutritionists, health educators, behavioral scientists and other professional and lay partners. Some staff would work part-time. The team would share in decision-making about care, and develop relationships with additional subspecialists.
■ **Offer whole-person care in a community context.** The focus of the practice would be comprehensive, integrated care to meet the complete range of patient needs. Doctors would consider not only what they can do for patients, but other resources and services available in the community. Optimal care would be provided regardless of a patient's socioeconomic status.
■ **Focus on quality and safety.** Model practices would document quality and safety by analyzing patient-care data and gathering patient feedback. The EHR would be a critical component of patient safety.
■ **Enhance practice finance.** Improved operating efficiencies would decrease practice expenses and improve margins.
■ **Design more functional offices.** New model practices would be designed to accommodate a broad group of health professionals working on-site as a team. Private spaces would be available for group visits with patients who share common health concerns. The waiting room would be replaced by a "patient resource center" with a library and computer stations to access on-line health education materials. Practices would be equipped with the technology, staff and supplies to provide on-site comprehensive diagnostic services and common therapeutic procedures.

The cost of transitioning to the new model would range from $23,442 to $90,650 per physician, according to estimates by FFM and financial models developed by the Lewin Group, a national

consulting firm. Cost would vary depending on the productivity loss from implementing an EHR system.

Physicians would recoup their share of new-model costs in one to two years, FFM contends, the result of revenue increases linked to efficiency gains. Annual compensation for family physicians in the new model would rise an estimated 26 percent. For the typical family practitioner, this would mean a hike to $210,288 in yearly earnings, up from $167,457. Furthermore, evolving changes to the reimbursement system, such as payment for e-visits, chronic disease management and quality-based incentives could boost compensation to as much as $277,800—a 66 percent increase above current levels, according to FFM's financing task force.

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According to the task force's financial models, features of the new practice that would impact revenue include the following: open-access scheduling, which has been shown to decrease the number of visits per patient while raising the intensity of services delivered in each encounter, resulting in about a 10 percent increase in reimbursement; electronic health records, which would contribute to the bottom line by facilitating more complete documentation of services provided and potentially lowering medical liability premiums; and group visits, lasting one to two hours, in which several patients with the same condition meet for an educational session, management of individual problems, screenings and other needed tests. Each attendee's insurer is billed for the visit and services provided.

"The new model of care should enhance healthcare while propelling the U.S. system toward improved performance and results that are satisfying to patients, healthcare professionals, purchasers and payers," said the task force report.

Ultimately, if every American used primary care as his or her main source of care, healthcare costs would drop by about 5.6 percent, for a national savings of $67 billion a year and improved

quality of care, the financing task force reported.

In 2006, the Practice Resource Center—a wholly owned for-profit subsidiary of AAFP—is expected to expand operations, offering technology through vendor partnerships and providing consultation and training products to facilitate adoption of the new model by small- and medium-sized practices around the country. A report on the demonstration project will be issued in 2007.