GIH

ADVANCING QUALITY THROUGH PATIENT SAFETY

ISSUE BRIEF NO. 9

BASED ON A GRANTMAKERS IN HEALTH ISSUE DIALOGUE

WASHINGTON, DC

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Foreword

As part of its continuing mission to serve trustees and staff of health foundations and corporate giving programs, Grantmakers In Health (GIH) convened a select group of grantmakers and national experts who have made a major commitment to improving patient safety by reducing medical errors. This roundtable – held on February 28, 2001, in San Diego, California – explored various factors that contribute to medical errors, and featured public and private sector initiatives to promote patient safety. The session also highlighted the current activities of – and future opportunities for – foundations in the area of patient safety.

This Issue Brief synthesizes key points from the day's discussion into a background paper prepared for roundtable participants. It includes quantitative and qualitative background information on medical errors as well as profiles of public sector, private sector, and grantmaker strategies for promoting improvements in patient safety.

Special thanks are due to those who participated in the Issue Dialogue but especially to presenters and discussants: Sharon Dalton, program officer at the Aetna Foundation, Inc.; Suzanne Delbanco, Ph.D., executive director of The Leapfrog Group; Jennifer Eames, program officer at the California HealthCare Foundation; Karen Wolk Feinstein, Ph.D., president and CEO of the Jewish Healthcare Foundation; David M. Gaba, M.D., director of the Patient Safety Center of Inquiry at the VA Palo Alto Health Care System; Gregg S. Meyer, M.D., M.Sc., director, Center for Quality Measurement and Improvement at the Agency for Healthcare Research and Quality (AHRQ); and Michael Rothman, senior program officer at The Robert Wood Johnson Foundation. Lauren LeRoy, Ph.D., president and CEO of GIH, moderated the session.

Katherine Treanor of GIH's staff planned the program and wrote the initial background paper. Larry Stepnick of The Severyn Group, Inc. synthesized the background paper with key points made at the meeting. Anne Schwartz and Leslie Whitlinger of GIH also contributed to the final report.

GIH gratefully acknowledges The Robert Wood Johnson Foundation for its support of this program.

About GIH

Grantmakers In Health (GIH) is a nonprofit, educational organization dedicated to helping foundations and corporate giving programs improve the nation's health. Its mission is to foster communication and collaboration among grantmakers and others, and to help strengthen the grantmaking community's knowledge, skills, and effectiveness. Formally launched in 1982, GIH is known today as the professional home for health grantmakers, and a resource for grantmakers and others seeking expertise and information on the field of health philanthropy.

GIH generates and disseminates information about health issues and grantmaking strategies that work in health by offering issue-focused forums, workshops, and large annual meetings; publications; continuing education and training; technical assistance; consultation on programmatic and operational issues; and by conducting studies of health philanthropy. Additionally, the organization brokers professional relationships and connects health grantmakers with each other as well as with others whose work has important implications for health. It also develops targeted programs and activities, and provides customized services on request to individual funders. Core programs include:

- **Resource Center on Health Philanthropy.** The Resource Center monitors the activities of health grantmakers and synthesizes lessons learned from their work. At its heart are staff with backgrounds in philanthropy and health whose expertise can help grantmakers get the information they need and an electronic database that assists them in this effort.

- **The Support Center for Health Foundations.** Established in 1997 to respond to the needs of the growing number of foundations formed from conversions of nonprofit hospitals and health plans, the Support Center now provides hands-on training, strategic guidance, and customized programs on foundation operations to organizations at any stage of development.

- **Building Bridges with Policymakers.** GIH helps grantmakers understand the importance of policy to their work and the roles they can play in informing and shaping public policy. It also works to enhance policymakers' understanding of health philanthropy and identifies opportunities for collaboration between philanthropy and government.

GIH is a 501(c)(3) organization, receiving core and program support from more than 175 funders annually.

Table of Contents

Introduction

Despite the most sophisticated medical care in the world, each year more Americans die at the hands of our health care system than from some of life's deadliest diseases. So says the Institute of Medicine's (IOM) 1999 report, *To Err Is Human: Building a Safer Health System,* which estimates that between 44,000 and 98,000 lives are lost annually as a result of preventable medical errors – more than from car accidents (43,458), breast cancer (42,297), or AIDS (16,516).

Worse, these estimates are conservative since they only consider incidents with hospitalized patients. Figures for medical errors occurring in outpatient or other institutional settings – where the majority of today's health care is actually delivered – are not included. If they were, the estimated death count could rise significantly.

The good news is that medical errors are preventable. They are primarily the result of correctable system failures, not individual mistakes.

The bad news is that while errors can be prevented, doing so is not easy. They occur in all sectors of health care and in the provision of all types of care. As such, there is no single solution to the problem of medical errors. Rather, it is a complex issue requiring a multifaceted approach involving health care providers and administrators; federal, state, and local governments; advocates and consumers; employers and purchasers. Medical errors should not be studied in isolation, but as part of a larger quality agenda.

To address the crisis, the IOM developed a broad series of recommendations, several of which are being adopted while others continue to be studied and discussed. It also set a national goal of reducing medical errors by 50 percent over the next five years. This goal is achievable, but only if there is a comprehensive, coordinated approach employed throughout the health care system. The IOM's approach to solving the problem of medical errors encompasses public and private actions, combined with market and regulatory strategies that are implemented both within health care organizations and in their external environment (IOM 1999). These recommendations seek to influence and improve the complex systems through which health care is delivered in the United States.

In light of the momentum generated by the IOM's report and current work on medical errors, Grantmakers In Health (GIH) convened an Issue Dialogue, *Advancing Quality Through Patient Safety,* on February 28, 2001. The meeting's objectives were to stimulate grantmaker involvement in and explore a coordinated response to the medical errors crisis. Although a number of grantmakers are already involved, many may not be fully aware of the roles that they can potentially play. The Issue Dialogue highlighted how grantmakers working at the national, state, and local levels can contribute to advancing quality through reductions in medical errors and improvements in patient safety. The meeting brought together government representatives, researchers, providers, purchasers, and grantmakers for a day of discussion and strategy exploration.

This Issue Brief brings together information from a background paper written in preparation for the Issue Dialogue with the presentations and discussion that took place at the meeting. It is organized into three sections. The first makes the case for why the industry should focus on medical errors and patient safety. The second section explores public and private sector strategies and initiatives aimed at

It's not only errors and deaths and things of that sort that grab people and are quantifiable, but it's the whole range of suboptimal care and unnecessary care that costs the health system hugely.

DONNA REGENSTREIF, THE JOHN A. HARTFORD FOUNDATION, FEBRUARY 2001

reducing medical errors and improving patient safety, including work by the government, purchasers, and medical professional organizations. Where appropriate, it also highlights potential opportunities for grantmakers to become partners in these efforts. The third section reviews five different value-added roles that grantmakers can play in promoting improvements in patient safety: convening stakeholders, promoting system improvements, educating consumers, influencing public policy, and funding research. Within each of these five areas, current efforts by grantmakers at the national, state, and local levels are highlighted.

Why Focus on Medical Errors and Patient Safety?

The United States health care system is unacceptably unsafe, with medical errors identified as a "major public health problem that warrants immediate and decisive action" (Kizer 2000). This section provides background information on this problem, beginning with a definition of the issues, followed by a review of how medical errors and patient safety fit into the broader quality agenda.

Defining Medical Errors, Adverse Events, and Patient Safety

The IOM (1999) defines 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." The Federal Quality Interagency Coordination Task Force (QuIC) further acknowledges the broad scope of errors, noting that they can occur in practice, products, procedures, and systems. QuIC also emphasizes that not all poor outcomes are caused by medical errors – patients may not be cured of an illness or disability even when they receive state-of-the-art care (2000).

Adverse events are injuries resulting from medical management. Given the current state of medical knowledge, not all adverse events are preventable. The subset of adverse events that are preventable are considered to be "medical errors" because they are caused by a medical intervention, not an underlying patient condition. To illustrate, the IOM (1999) uses the following example:

> If a patient has surgery and dies from pneumonia he or she contracted postoperatively, the death is an adverse event. If

analysis of the case concludes that no error occurred, then the patient would be presumed to have had a difficult surgery and recovery (not a preventable adverse event). If, however, the analysis reveals that the patient contracted pneumonia because of inadequate hand washing or instrument cleaning techniques, then the adverse event was preventable (attributable to an error of execution).

Patient safety is defined by the IOM as "freedom from accidental injury." Again, expanding upon the IOM's work, QuIC views patient safety as including "initiatives designed to prevent adverse outcomes from medical errors" (2000). Patient safety is thus achieved through a focus on the interactions of components within our health care system – it is not just the successful avoidance of a specific adverse outcome and preventable error (National Patient Safety Foundation 2000).

Many types of errors exist. The IOM (1999) characterizes those that can result in patient injury, including:

- *Diagnostic:* error or delay in diagnosis, failure to employ indicated tests, use of outmoded tests or therapy, or failure to act on results of monitoring or testing;
- *Treatment:* error in the performance of an operation, procedure, or test; error in administering treatment, in the dose or method of using a drug; avoidable delay in treatment or in responding to an abnormal test; or inappropriate care;
- *Preventive:* failure to provide prophylactic treatment, or inadequate monitoring for follow-up of treatment; and
- *Other:* failure of communication, equipment failure, or other system failure.

Efforts to understand the root causes and possible solutions to medical errors do not necessarily begin with the errors themselves. Instead, the focus may be on the links between medical errors and such factors as the type of service provided, the severity of the resulting injury, the type of health care setting, or the type of health care professional involved (QuIC 2000). Errors also may be examined from a systems perspective, taking into account the interactions among health professionals, between human beings and technology, and the complex organizations in which health care services are delivered.

Medical Errors and Patient Safety: One Key Component of Quality

Quality health care encompasses the efficacy of care, the efficiency of care, the responsiveness of the system (e.g., scheduling times for appointments, waiting times in offices, telephone response times), and service quality (e.g., communication skills). Medical errors and patient safety represent one important element within this broad notion of health care quality. In preparing *To Err Is Human,* the IOM's Committee on the Quality of Health Care in America identified three components of quality, the first of which is safety. Because of the complexity of medical care, a single patient may have hundreds of encounters with multiple medical professionals during a hospital stay, and quality problems can occur at any point during the treatment process (Eisenberg 1999). Patients may receive unnecessary care (overuse), or could fail to receive needed care (underuse). Both overuse and underuse can result in serious quality problems for patients. Patient safety may also be compromised due to misuse, which occurs when diagnoses are missed or delayed and when mistakes with medications or treatments occur (California HealthCare Foundation 2000a). Errors may also encompass events such as patient falls due to a lack of restraints or high salt content meals given to a patient on a low sodium diet.

The key thing about safety is we're trying to eliminate the ways in which our care actually hurts patients. It's so easy for that to be missed as we pursue all those other goals of efficacy and cost effectiveness.

DAVID GABA,
VA PALO ALTO
HEALTH CARE SYSTEM,
FEBRUARY 2001

There is no one whom I've ever talked to who believes that patient safety is a hospital issue. But because that's where the data is, that's where we've looked . . . that is not to say that patient safety issues in the ambulatory setting, long-term care setting, and home health care setting aren't of equal or greater importance.

GREGG MEYER,
AHRQ,
FEBRUARY 2001

Enhancing patient safety and reducing medical errors are among the most pressing quality issues facing the industry today. As Kizer (2000) states, errors are "especially important since ensuring patient safety is an ethical imperative for health care professionals individually and collectively . . . providing a safe, therapeutic environment is an essential attribute of and foundation for high quality care."

Scope of the Problem

The most important argument for focusing on medical errors is that too many people die or are seriously injured within the health care system because of safety problems each year. As early as the 1960s, research showed that patients were frequently injured by medical errors. The most extensive study of adverse events is the 1984 *Harvard Medical Practice Study* which examined more than 30,000 discharges from 51 hospitals in the state of New York. Results revealed that 58 percent of adverse events were attributable to errors. The most common types of adverse events were drug complications (19 percent), wound infection (14 percent), and technical complications (13 percent) (IOM 1999). More recently, a 1992 study of 15,000 hospital discharges in Colorado and Utah corroborated these results. In this study, 53 percent of adverse events in each state were found to be preventable (IOM 1999). While both studies reported that more than half of adverse events resulted in only minor injuries, 13.6 percent of adverse events in New York led to death, while 6.6 percent did so in both Colorado and Utah (IOM 1999).

In extrapolating the results of these two important studies over the 33.6 million hospital admissions in the United States in 1997, the IOM (1999) estimates that between 44,000 and 98,000 people die in hospitals each year as a result of preventable medical errors. Using the more conservative estimate of 44,000 deaths annually, medical errors are the eighth leading cause of death in the United States. Using the higher rate of 98,000 makes medical errors the fourth leading cause of death (Berwick 2000). And as mentioned previously, the actual number of deaths due to medical errors is likely to be higher, since the IOM estimates only cover errors that take place in the inpatient setting.

The estimated total cost of adverse events is between $37.6 billion and $50 billion annually in the United States (IOM 1999).[1] Of this amount, those that are preventable adverse events are estimated to cost between $17 billion and $29 billion. Errors are also costly in terms of opportunity costs, such as the cost of treatment to counteract adverse drug events or increased future insurance costs because of services that would not have been necessary if proper care had been provided. Errors also result in a loss of trust in the health care system by patients, as well as in decreased satisfaction by both patients and providers (IOM 1999).

Another way to gauge the magnitude of the safety issue within health care is to evaluate the relative risk of receiving health care versus other activities considered risky, such as flying on an airplane or driving in a car. This analysis shows that consumers are far more likely to die unnecessarily in a hospital than they are to die on our nation's roads or in the skies. In fact, the risk of unnecessary death in a hospital is orders of magnitude higher than the risk of dying from an automobile accident caused by recalled Firestone tires (Figure 1).

[1]Total national costs include lost income due to injury, lost household production, and disability, as well as health care costs. Health care costs account for more than half of the total national expenditures associated with adverse events.

Medication errors are one of the most common types of medical errors. They are also one of the most preventable. Medication errors alone, both in and out of the hospital, account for approximately 7,000 deaths annually. In fact, recent research reveals that about 2 out of every 100 hospital admissions results in a preventable adverse drug event, resulting in an increased cost of $4,700 or $2.8 million annually for a 700-bed teaching hospital. Nationally, such events add approximately $2 billion annually to hospital costs (IOM 1999).

Strategies for Reducing Medical Errors

This section reviews public and private sector initiatives designed to reduce medical errors. It begins with a review of two critical components that are the backbone of any successful error-reduction strategy – taking a systems point of view and fostering a culture of safety within an organization. It then highlights the experiences of other industries in reducing errors, with an eye towards pulling out key lessons for health care. Finally, it describes public and private sector initiatives – including those of the provider community – to reduce medical errors.

The Keys to a Successful Error Reduction Strategy

Initiatives that are successful in reducing errors rarely focus on individual conduct but rather on entire systems. In particular, these initiatives are often designed to foster a culture of safety within an organization.

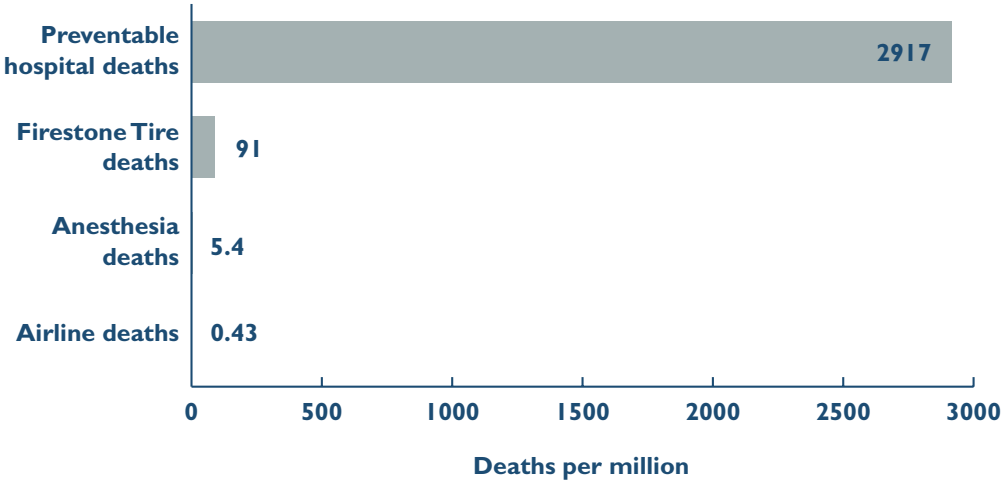
Taking a Systems View

Medical errors are rarely the result of individual misconduct; they are caused by failures in health care systems and organizations. In fact, Berwick (2000) suggests that approximately 95 percent of medical errors are systems errors: characteristics of the procedures, equipment, job designs, and communication systems that support safe health care work. Because errors are the result of the complex interplay between multiple factors within and among systems, the key to making health care safer is to focus on improving the systems of delivering care (Leape 2000b). The challenge, however, is broad implementation of what we know, coupled

I have not yet met anyone who won't agree with a simple statement – the number of medical errors is too many and something should be done about it.

GREGG MEYER,
AHRQ,
FEBRUARY 2001

Figure 1. *Mortality Risk in Hospitals and Other Industries*



Source: Michael Rothman, The Robert Wood Johnson Foundation, February 2001.

We have systems that take people who went into the business of healing and create error-prone activity . . . we have interviewed all kinds of health professionals and they are tormented by the fact that they're often in situations where there's a recipe for disaster.

KAREN WOLK FEINSTEIN, JEWISH HEALTHCARE FOUNDATION, FEBRUARY 2001

PATIENT SAFETY, MEDICAL ERRORS RESONATE WITH THE PUBLIC

Patient safety and medical errors resonate with the public. As Gregg Meyer noted at the Issue Dialogue, "People listen to this issue because it is accessible to them, because they have a personal experience with it, and they understand it." As a result, programs that seek to address these issues may be a good first step in a broader effort to improve the quality of the nation's health care system. Data from the National Patient Safety Foundation indicates that 42 percent of Americans believe they, a close friend, or a relative have been involved in a situation where a medical mistake was made. When receiving either general health care or hospital care, nearly one-half of the public is "very concerned" about an error resulting in injury happening to them or a family member. This figure is significantly higher than similar concerns about flying in an airplane or eating food purchased at a supermarket (Kaiser Family Foundation/Agency for Healthcare Research and Quality 2000).

And while all ethnic groups express high levels of concern, African Americans appear to be especially concerned about the potential of becoming a victim of a medical error (Kaiser Family Foundation/Agency for Healthcare Research and Quality 2000). This finding may be of particular interest to foundations that seek to address issues of racial and ethnic disparity in health care.

with sustained efforts to identify, understand the causes of, and correct remaining errors.

Medication errors are an excellent example of preventable adverse events caused by system failures. The prescription and delivery of a medication to a hospital patient requires several distinct activities: the physician makes the decision to order a drug and then, typically, writes a prescription by hand; a pharmacist dispenses the medication; a hospital aide transports the drug to the patient's hospital unit and then it is administered (Eisenberg 1999). Research conducted by the Agency for Healthcare Research and Quality (AHRQ) in 1993 found that 78 percent of adverse drug events were due to system failures. Some, as simple as misreading a handwritten prescription, can cause egregious errors (Eisenberg 1999).

Fortunately, system problems can often be addressed. In fact, system improvements have been shown to substantially reduce error rates and improve the quality of health care. In many cases we already know how to improve systems and make health care safer. For example, among the improvements undertaken by the U.S. Department of Veterans Affairs (VA) Patient Safety Improvement Initiative was a requirement that all VA hospitals put in place a bar-coding system for dispensing drugs by June 2000. An evaluation, conducted at two VA hospitals, found the bar-coding systems dramatically reduced medication errors, with error reduction rates of 70 percent over five years (Luciano 2000). Similarly, LDS Hospital in Salt Lake City, Utah, reduced antibiotic drug complications in hospitalized patients by 30 percent following the installment of a computer-assisted decision support system for physicians. In addition, the average antibiotic cost per treated patient decreased from $123 to $52 (Berwick 1998). As evidenced at LDS Hospital, reducing error rates can yield substantial savings.

Many system-level changes require minimal resources. For example, instituting a policy

where pharmacists always read back the prescription to the prescribing physician could help to eliminate errors due to poor handwriting, as could an effort to train patients to confirm initial dosages and dosage changes when speaking with their physicians. And even those system-level changes that do require large upfront investments typically produce a full payback in a relatively short period of time (Leape 2000b). In fact, one hospital in Boston, Massachusetts, reported savings of between $5 million and $10 million annually after installation of a computerized physician order entry system.

Fostering a Culture of Safety

Health care is a complex industry in which many players must communicate and cooperate in order to effectively and safely treat patients. It is important, therefore, that a culture of safety permeate all levels of our health care system. According to Kizer (2000), such a culture "identifies safety as a priority and aligns organi-

THE "SWISS CHEESE" MODEL OF SYSTEM ACCIDENTS

System-related errors are typically the result of a whole series of problems rather than an isolated misstep. British philosopher James Reason dubbed this phenomenon the "Swiss cheese" model of system accidents. Reason suggests that while there are a whole host of barriers to prevent a given mishap from resulting in an error, there are also "holes" in these barriers. Errors and accidents occur only when the initial mistake is compounded by a series of other mistakes, thus causing the system to break down.

For example, the Three Mile Island accident occurred because of faulty design of the pressure gauges and the control panel, coupled with faulty maintenance (e.g., the safety backup system had been disabled), faulty management, unrealistic workloads, inadequate training, and demanding production schedules. A recent plane crash at the Taipei airport occurred not because of pilot error (as was originally reported), but rather because of a series of system failures – construction equipment inadvertently left on the runway, the control tower turning on lights on the wrong runway, and systematically inaccurate weather reports because of a lack of staff in the weather station.

Similarly, a medication error such as a patient taking a mistaken dosage can occur only after a series of missteps, such as the physician using poor handwriting to write the prescription, the pharmacist failing to verify the prescription with the physician, and the patient taking the dosage as written even though the dosage differs from the physician's verbal instructions to the patient. Each step along the way was an opportunity to prevent the error.

The key is to look for opportunities to plug "holes" in as many of the pieces of Swiss cheese as possible. As Gregg Meyer noted, "Each step along the way, each slice of Swiss cheese, is an opportunity to plug a hole. And the approach to patient safety is to make the Swiss cheese denser."

In other words, errors can be reduced by building redundancies and double-checks into the system. The automobile industry has taken this approach, and that is why it has designed features that prevent potential errors, such as a bell ringing if the headlights are on when the ignition is turned off, doors that lock from the outside only with a key, air bags that inflate automatically in a collision, gas gauges that light up when there are only three gallons left, and transmissions that shift from park into drive or reverse only when the brake is pressed.

We're not talking about gizmos, gadgets, and rocket science here. We're talking about implementing some relatively straightforward practices that we know work.

GREGG MEYER,
AHRQ,
FEBRUARY 2001

zational objectives and rewards accordingly . . . In a culture of safety, there is an open acknowledgment that modern health care is a high-risk activity and that everyone in health care has a responsibility for risk reduction and error prevention."

Traditionally, a naming and blaming tactic has been used to address errors in health care organizations. Such an approach not only is counterproductive, but has led to an environment where mistakes and close calls are not discussed because of the fear of individual blame (QuIC 2000). Additionally, this culture prevents the system examinations needed to discover and correct the causes of errors (Leape 2000b).

Reducing errors in our health care system will require a sustained effort at all levels. Health organizations' leadership is a critical component of reducing errors and establishing a culture of safety. As explained by Kizer (2000), trustees, hospital executives, and other administrators will need to make substantial commitments to making patient safety a key priority, placing it on par with financial performance, market share, and strategic planning. Efforts to promote patient safety should become a defined executive responsibility and should be a component of all managers' responsibilities. In short, patient safety needs to become a core value within the institution.

The IOM's report calls for a cultural change in health care that encompasses organizational leaders, providers, employers, and the public. Specifically, it recommends that health care organizations and facilities make continuous patient safety improvements a declared and serious aim and implement proven medication safety practices. Although strong leadership is important, if a culture of safety is to take hold among providers, a number of other steps must take place to create a supportive environment that has safety as a core value. For instance, standardization and simplification can be built into health care jobs to reduce individual reliance on memory, effective team functioning can be promoted, and a learning environment can be created.

To illustrate how a leader can help stimulate this type of cultural change, Gregg Meyer of AHRQ shared the story of an Air Force general who on his first day on the job summoned to his office a mechanic who had made a mistake on an airplane. When the mechanic walked through the door, the general shook his hand and had the base photographer take their picture. And the general said to the mechanic, "because of you, our pilots are safer."

Creating a Nonpunitive Reporting Environment

Fostering a culture of safety requires establishing a nonpunitive environment in which health care professionals can report and learn from adverse events and near misses (Kizer 2000). Medical errors should be recognized as opportunities for exploration of why and how adverse events occur, as well as for identification of possible solutions. In *To Err Is Human,* the IOM calls for the creation of a nationwide mandatory reporting system for the collection of standard data on adverse events that result in serious patient harm. Such reports would be kept confidential. The IOM also urges development of federal and state laws that encourage voluntary reporting systems within health care organizations for near misses and errors that result in minor injuries. Reporting errors accomplishes three objectives: making health care organizations more accountable, providing data to identify causes of and solutions to errors, and informing patients and families when a serious error has occurred (QuIC 2000). Current systems, however, are greatly hindered by fears of individual blame and that data will be discovered in liability law suits.

There is significant debate surrounding mandatory error reporting systems, particularly in terms of patient privacy and use of information in law suits. The public seems to favor mandatory public reporting of serious medical errors (Kaiser Family Foundation/AHRQ 2000). Although a number of states require hospitals to report serious adverse events, typically a case is confidential unless formal action is taken against the health care institution. Nonetheless, less than 1 percent of errors are currently reported (Berwick 2000). Bovbjerg (2000) asserts, "Health care professionals are reluctant to report on themselves or colleagues unless they have a reasonable expectation of confidentiality . . . . Fears of legal and other repercussions are very strong."

Lost in this debate may be the tremendous opportunity that voluntary reporting holds, particularly for less serious errors. In fact, one of the important recommendations from the IOM report relates to voluntary reporting for near misses and errors that result in minor injury. Every accident or error is a potential opportunity to learn. Yet a mandatory reporting system for serious errors will pick up only a small fraction of the accidents or errors that actually occur. In fact, in his pioneering book *Industrial Accident Prevention: A Scientific Approach,* author H.W. Heinreich (1931) estimates that for every major injury caused by an error, there are 29 minor injuries, and 300 no-injury accidents. Systems that encourage the confidential, nonpunitive reporting of these minor injuries and no-injury errors will enjoy that many more opportunities to learn.

To highlight the value of this approach, Gregg Meyer shared a story at the Issue Dialogue of one hospital's transfusion service unit. This unit implemented a voluntary reporting system. After holding an orientation with workers on the new approach, the number of events reported increased dramatically, as illustrated in Figure 2. As Gregg Meyer commented, this increase in reported errors in no way suggests that the hospital suddenly became less safe. In fact, it became more safe. Previously unreported errors are now available to be used by hospital staff as a way to learn from their mistakes, and to implement new systems designed to prevent future recurrences.

> *In the very end, all reporting is voluntary. If they (providers) think it's going to be used to punish them, it's not going to happen. If they think it's going to provide an opportunity to learn . . . the system will work.*
>
> GREGG MEYER,
> AHRQ,
> FEBRUARY 2001

Figure 2. *Event Report Rate from a Hospital Transfusion Service*

Source: Gregg Meyer, AHRQ, February 2001.

Aviation didn't have this imposed from the outside. They came up with most of the issues and solutions on their own, knowing what it took to fly planes efficiently and safely, with a little bit of prodding and help from the government side.

DAVID GABA,
VA PALO ALTO
HEALTH CARE SYSTEM,
FEBRUARY 2001

Lessons from Other Industries' Error-Reduction Efforts

Experience from other industries suggests that safety in health care can be greatly improved. A number of industries have made dramatic strides in reducing error rates. One successful model to which the health care industry can look is aviation. A growing awareness of safety and the need to improve performance in the 1940s and 1950s led to the development of comprehensive strategies including research to build a substantial knowledge base, dissemination of information throughout the industry, and creation of a national focal point for leadership (IOM 1999). Leadership within the aviation industry is focused in two agencies, the Federal Aviation Administration (FAA) and the National Transportation Safety Board (NTSB). The FAA is charged with regulatory oversight and ensuring safety, while the NTSB is responsible for research and exploration of accidents.

As a result of these strategies, the United States aviation fatality rate decreased by 80 percent – from 1.18 deaths to 0.27 deaths per million departures – between 1950 and 1990 (Berwick 1988). This decline occurred despite a huge increase in volume. The decrease was accomplished by employing measures that examine and improve the system, but that do not blame individuals.

Fortunately, a number of these basic elements for fostering safety enhancements are also in place in the health care industry, including research, dissemination, and regulatory oversight. There is no cohesive effort, however, focused on improving health care safety (IOM 1999).

Another error reduction strategy – developed by Motorola and utilized by corporations such as General Electric – that can be applied to health care is Six Sigma Quality. This approach sets reliability goals for the manufacturing of products and related services. According to Chassin (1998), adopting Six Sigma means "setting tolerance limits for defective products at such high levels that fewer than 3.4 defects occur per million units (or opportunities)." These tolerance limits are set to include all observations within six standard deviations of the mean. For example, in applying this approach to health care, each "unit" could be defined as the number of toddlers who are not fully immunized or the percentage of health plan enrollees with depression who are not diagnosed and treated. Within health care, defect rates are estimated to be as high as almost 800,000 per million opportunities (Chassin 1998). For example, research has revealed that 79 percent of eligible patients do not receive beta blockers following a heart attack, amounting to a defect rate of 790,000 per million or less than 1 sigma. The defect rate for antibiotic use is somewhat better – estimated to be 21 percent (210,000 per million) or about 2.5 sigma (Chassin 1998). If the antibiotic defect rate were applied to other industries, airline fatalities would increase one thousandfold, and banks would deposit 36 million checks in the wrong accounts (National Health Care Purchasing Institute 2000).

A third lesson from other industries comes from Paul O'Neill, former CEO of Aluminum Company of America (better known as Alcoa). His approach demonstrates the value of applying the IOM-endorsed strategy to reduce error rates. Under his leadership, Alcoa put in place sophisticated error reporting and tracking systems that were used to identify the root causes of errors. Using a systems approach, Alcoa staff developed solutions that avoided placing blame on individuals, but rather sought to teach individuals to be safer in the future. Over time, a culture of safety began to permeate the organization, to the point that safety became a prerequisite to the operations at the company. In other words, safety became a "given" at Alcoa. As a result of

these initiatives – which involved a significant commitment of financial resources – Alcoa has come close to meeting Mr. O'Neill's stated goal of having zero lost days of work due to errors across the company's 40,000 employees.

Error Reduction in Health Care: Public and Private Initiatives to Improve Safety

Policymakers, health professionals, public and private organizations, researchers, and many others are actively engaged in reducing medical errors and improving patient safety. Some of the activities have been under way for several years, such as work by the Anesthesia Patient Safety Foundation. Other initiatives are more recent and were undertaken in response to the IOM report and its recommendations.

Federal Activities

The federal government is involved in the patient safety issue on a number of fronts. Much of the effort began in 1999 when President Clinton established the Quality Interagency Coordination Task Force (QuIC) in direct response to the IOM's call for a patient safety center within AHRQ to set national goals for medical error reduction and tracking patient safety progress. QuIC has evaluated the IOM's recommendations and responded with an action plan to implement a host of federal-level activities. While AHRQ serves as the lead agency, QuIC includes all federal agencies involved in purchasing, providing, regulating, and examining health care, including the U.S. Department of Health and Human Services, the U.S. Department of Labor, the U.S. Department of Veterans Affairs, the U.S. Department of Defense, and the U.S. Office of Personnel Management. This structure helps to meet one of QuIC's primary goals, which is to allow all of these agencies to operate in a coordinated fashion. Other goals include providing beneficiaries with information to assist them in making appropriate choices about their care and in developing the infrastructure necessary to improve our health care system (QuIC 2000).

Since its founding, QuIC has embarked on a number of initiatives designed to improve patient safety, as outlined below.

- QuIC established the Center for Quality Improvement and Patient Safety (CQuIPS) at AHRQ, with the charter of integrating patient safety into the broader quality framework, conducting research into medical errors reduction, converting research findings into improved practices, and educating patients about safety.
- QuIC held a series of national meetings on patient safety, the first of which occurred in September 2000. This first national summit explored opportunities for public and private research in areas such as health care purchasing, consumer behaviors, and broad-based system approaches. Two additional national summits are planned for fall of 2001, one sponsored by the Food and Drug Administration (FDA) on drug and device safety and a second sponsored by the VA on patient safety practices.
- QuIC has published written materials related to patient safety, including a patient fact sheet entitled *Five Steps to Safer Health Care* and a publication called *Doing What Counts for Patient Safety* which lays out 101 action steps for providers. The fact sheet is now included in booklets that are distributed to all federal employees.
- QuIC is working with the Quality Forum (a private sector initiative) in its work to select safety measures that should be a part of any reporting system and to urge the public disclosure of provider use of proven patient-safety practices.

Aside from its lead role within QuIC, AHRQ embarks on other activities within the realm of

Other industries do much better. Companies like Alcoa, General Electric, Toyota, and Motorola have set a much higher bar for quality.

MICHAEL ROTHMAN,
THE ROBERT WOOD JOHNSON FOUNDATION,
FEBRUARY 2001

In health care, safety should be a given. It is something that should be the first step in quality health care.

GREGG MEYER,
AHRQ,
FEBRUARY 2001

patient safety. AHRQ is the federal agency charged with supporting research designed to improve the quality of health care, reduce its costs, and address patient safety and medical errors. The agency has explicitly dedicated $50 million of its fiscal 2001 budget of $270 million to safety improvement activities. This work will include activities to further the understanding of when, how, and under what circumstances errors occur; identification of the causes of errors; development of tools, data, and other resources needed to advance a national strategy to improve patient safety; and working with public and private partners to apply evidence-based approaches to the improvement of patient safety.

In February 2001, AHRQ announced the third in a series of six requests for applications (RFAs) on patient safety research. The first two RFAs, announced in 2000, will develop centers of excellence for patient safety research and practice and will establish up to 10 developmental centers for evaluation and research in patient safety. Under the most recent RFA, up to 13 cooperative agreements will be established for demonstration projects assessing the effectiveness of methods of collecting and using information to reduce medical errors. The agreements will support work to evaluate error reporting systems, analyze data to identify risks in patient safety, and develop methods of disseminating this information. Future RFAs will focus on research related to the use of informatics to promote safety, the effect of working conditions on safety, and safety research dissemination and education.

In March 2000, AHRQ also hosted a User Liaison Program Workshop for senior state policy officials. This workshop, conducted in partnership with the National Academy for State Health Policy (NASHP), examined the IOM's recommendation for a nationwide mandatory error reporting system. Since state governments would be responsible for collecting data on adverse events that result in serious harm or death, the workshop focused on the information that states will need to implement reporting systems. It also highlighted strategies for balancing the advantages of these systems – such as improving accountability and stimulating quality improvement – with the disadvantage, namely, concern about disclosing information and fears of increased malpractice litigation.

Outside of the activities of QuIC and AHRQ, other individual agencies within the federal government are sponsoring programs related to safety. For example, the Health Care Financing Administration (HCFA) will publish regulations requiring that hospitals participating in Medicare have an ongoing medical errors program in place. The U.S. Office of Personnel Management (OPM) is requiring that all health plans that participate in the Federal Employees Health Benefits (FEHB) program seek accreditation that includes evaluation of patient safety and programs to reduce errors. This information will be provided to consumers. The VA and Department of Defense continue to lead the provider industry by example; for instance, they are leaders in the use of computer-based order entry systems that are proven to be effective in reducing errors. The VA, in partnership with the National Aeronautics and Space Administration (NASA), also recently announced development of a voluntary error reporting system.

State Activities

Work is also being done at the state level to improve patient safety. Some states – including California, Oregon, South Dakota, and Washington – have passed legislation to reduce medication errors. For example, Oregon requires pharmacists to include a physical description of the drug and the name of its manufacturer or distributor on all prescription labels (National

A ROLE FOR GRANTMAKERS: ENHANCING FEDERAL ACTIVITIES

Grantmakers can play an important part in supporting the safety-related activities of the federal government. One role is through participation in working groups, federal hearings, and/or other types of meetings. For instance, a number of private funders – including the California HealthCare Foundation, The Commonwealth Fund, Jewish Healthcare Foundation, The Robert Wood Johnson Foundation, and The Henry J. Kaiser Family Foundation – as well as GIH were among the panelists to hear testimony at the first QuIC national summit. A second potential role is to work with QuIC and AHRQ on an ongoing basis to help shape the federal research agenda; many of the organizations that attended the first national summit are presently working in this capacity.

Foundations can also assist in rolling out model programs and other QuIC initiatives to a broader audience. The California HealthCare Foundation, for example, is translating the QuIC patient fact sheet, *Five Steps to Safer Health Care,* into five or more Asian languages in an effort to help reach more patients. Foundations can also assist by working with hospitals to implement medical error programs that will be mandated by HCFA as a requirement for Medicare participation.

Finally, grantmakers can support federal research. For example, the California HealthCare Foundation and The Robert Wood Johnson Foundation are working with AHRQ on research designed to identify what is and is not working well within state reporting systems.

Conference of State Legislatures 2000a). States are also developing, implementing, and replicating medical error reporting systems. According to a recently released NASHP (2001) study, 15 states require mandatory reporting from hospitals of adverse events and 6 states have voluntary reporting of medical errors or adverse events. New York, for example, mandated error reporting by hospitals in 1985. More than 1,000 facilities, including 260 hospitals and approximately 800 free-standing surgical clinics, are required to report, amounting to about 20,000 reports annually. New York's current system, implemented in 1998, is completely computerized, reducing the administrative burden on health care facilities (National Conference of State Legislatures 2000b). According to the NASHP study, states with reporting systems most frequently use data to identify trends, administer sanctions, assure corrective actions, and issue public reports.

The IOM's recommendations place considerable responsibility on the states in this area, calling on them to collect standardized information on adverse events that result in serious death or injury as part of a nationwide mandatory reporting system. The IOM also urges federal and state lawmakers to develop policies encouraging voluntary reporting by all health care facilities.

Provider and Medical Professional Society Error-Reduction Activities

Health care providers, including administrators and professionals, are using a number of strategies to make health care safer. Some health care institutions and medical professional organizations have been working on patient safety improvement for many years. Others are taking action in response to the IOM report and the heightened sense of urgency surrounding medical errors.

One of the most comprehensive efforts comes from the U.S. Department of Veterans Affairs (VA), which has taken a systems approach and has fully committed to a culture of safety. Through its National Center for Patient Safety, the VA is implementing systemwide changes in areas such as administrative procedures, nurse training, technology support, and contracting throughout its 172 medical centers. The VA has also developed and implemented a computer-assisted adverse event reporting and analysis system that provides data about how to avoid preventable errors (Luciano 2000).

Another VA initiative, the Patient Safety Center of Inquiry at VA Palo Alto Health Care System, is exploring safety issues as they relate to the performance of health care practitioners, as well as systemic and organizational factors within health care. The center also provides expert advice and recommendations to the VA Palo Alto Health Care System regarding patient safety improvement (Patient Safety Center of Inquiry 2001). A number of activities are conducted at the center including simulation-based crisis management training activities for the operating room, intensive care units, and delivery room (see box for more details). Other areas of exploration and research at the center include the theory of organization safety, safety cultures, effect of fatigue on clinicians, event reporting and analysis, human factors design and human-machine interaction, and the safety of human subjects in research.

Individual provider organizations have also implemented their own error-reduction programs. For example, Brigham and Women's Hospital in Boston, Massachusetts, drastically reduced error rates and saved millions of dollars by implementing a computerized physician order entry (CPOE) system. In the early 1990s, approximately 56 percent of adverse drug events at Brigham were found to have occurred because of errors at the time of ordering (Roessner 2000). All of the hospital's physicians now write treatment and medication orders using computers. In the case of prescribing drugs, the computer system provides physicians with a menu of medications and offers a list of appropriate dosages. Physicians must then enter dosage, method of delivery, and frequency into the system before the order is accepted. After the entry is made, the system checks the order for errors, including drug interactions. If an error is found, the physician receives an alert from the system. Finally, the medication is sent to the pharmacy, where it undergoes a second check for errors. Recently completed research at Brigham revealed that this order entry system has reduced serious medication errors by 55 percent and saved the hospital between $5 million and $10 million annually (Roessner 2000). Although adverse events related to medications can be greatly reduced through CPOE, fewer than one in three hospitals in the United States has such a system. Furthermore, only about 1 percent of those hospitals require physicians to use the system (Callahan 2001).

In rare instances, an entire discipline has embarked on a coordinated effort to enhance patient safety. For example, anesthesiology was recognized in the IOM's report as one of the few medical disciplines to have taken effective steps to reduce medical errors and improve patient safety. Anesthesiology has demonstrated that a properly designed system can successfully prevent mistakes from occurring as well as prevent those mistakes that harm patients. Surgical anesthesia reduced its error rate from 2 deaths per 10,000 anesthetics administered to 1 death per 200,000 to 300,000 in the early 1980s (IOM 1999). This translates into a 10- to 20-fold reduction in errors for patients receiving anesthesia in the hospital and in surgicenter operating rooms. A number of strategies contributed to this dramatic decline, including collection of data

PATIENT SIMULATION AS A MEANS TO REDUCE ERRORS

Health care professionals perform complex tasks within a complex working environment, using their cognitive skills to make quick decisions, often as part of teams of professionals. To perform well in this environment, workers need not only good technical skills, but also sound behavior within a team setting. Professionals must know their environment, anticipate and plan, and use all available information to make the best decision possible in a timely manner. They must also understand how to work and lead in a team environment, including how to communicate effectively with others, distribute the workload among team members, and recognize early when it is necessary to call for help.

Naturally, training can assist health care professionals in preparing for their job. Too often, however, training focuses exclusively on the skills and tasks required, paying little or no attention to the behaviors needed to succeed. As David Gaba noted at the Issue Dialogue, "We (health care professionals) all get very well educated. What we don't do as well as other high-hazard industries is focus on really training people to do exactly what they're going to do, as individuals, and as teams and systems."

To help address this issue, the Patient Safety Center of Inquiry at VA Palo Alto Health Care System has put in place a patient simulation program that allows health care professionals to learn on the job during lifelike simulations of critical events that can occur during patient care. With no risk to an actual patient, professionals who engage in simulations can be presented with a large variety of scenarios, including uncommon but critical events, such as cardiac arrest or an allergic reaction. They can participate in these events, using real equipment and as part of a real team. A one-way mirror and recording equipment allow both observers and (after the fact) participants to watch this intense, interactive snapshot of clinician performance. These rare events can be presented to different teams to see how different decisions and reactions will play out. By watching videotapes and debriefing, participants can learn from their mistakes by discussing potential alternative behaviors and courses of action, all without causing actual injury to a patient.

The IOM report recommends simulation training in a number of critical care areas, as it is viewed as a good strategy for reducing errors over the long term. In fact, the cumulative impact of allowing a large percentage of the health care workforce to go through such training should be quite substantial. To date, more than 200 simulation systems are used worldwide for a variety of purposes, including to enhance safety. Unfortunately, however, only a few thousand practitioners around the country have ever participated in a simulation. While this number is growing, significant expansion will require a long-term commitment of funding, so that both novices and experienced clinicians enjoy the benefits of simulation as a regular part of their ongoing training, just as experienced and inexperienced airline pilots in most developed nations routinely must undergo crew resource management (CRM) training.

allowing systems analysis of errors, teamwork, practice guidelines, procedure simplification, and standardization of many functions. But most importantly, perhaps, safety became a part of the culture within anesthesia, and remains so today.

The Anesthesia Patient Safety Foundation (APSF), founded in 1985, has played an important role in spearheading these successes. In collaboration with the American Society of Anesthesiologists and other anesthesia professional societies, ASPF has developed a common

The basic concept behind Leapfrog is that there is power in numbers . . . sometimes it takes a big force to convince the trustees that they need to make the kind of investments necessary to protect patients.

SUZANNE DELBANCO, THE LEAPFROG GROUP, FEBRUARY 2001

goal: maximum safety for all patients undergoing anesthesia. With an emphasis on research and education, the APSF seeks to elevate patient safety to "coequal status with more traditional concerns, such as determining the molecular mechanisms of anesthesia, developing specialized drugs, or managing critically ill patients" (Anesthesia Patient Safety Foundation 2000). To that end, the APSF has awarded between two and five research grants annually for studying patient safety, funding more than 45 research projects since 1987. One important area of research supported by NPSF has been the development and use of patient simulation for training and education. Future research may focus on the administration of anesthesia in ambulatory settings, such as physicians' offices.

The IOM report calls upon medical professional societies and health care licensing bodies to follow anesthesiology's lead by focusing greater attention on patient safety.

Health Care Purchaser Initiatives

Purchasers of health care are using their collective power to drive improvements in patient safety and enhance the overall quality of health care. They also see improvements in patient safety as a way to control health care costs. Perhaps the best example of this approach can be seen in the activities of The Leapfrog Group, a national coalition of 69 large employers and other large purchasers that collectively cover more than 25 million Americans and purchase more than $40 billion in health care services each year. Members include employers and employer coalitions such as General Motors, GE, US West, the Pacific Business Group on Health, the Buyer's Health Care Action Group, as well as public purchasers such as OPM.

Leapfrog members believe that enhancing patient safety makes good business sense. With health care costs increasing rapidly, one effective strategy for reducing costs – or at least minimizing the increase in costs – is to get the defects out of the system, so that employers are no longer paying for care that should not happen in the first place, or for mistakes that lead to duplicated services and unnecessary hospital admissions.

Medical errors not only raise costs unnecessarily, they can also can result in the loss of key personnel for employers. After the IOM report came out, General Motors calculated what the national statistics on medical errors meant for the GM family. With 1,250,000 enrollees, GM representatives estimate that 500 GM enrollees die each year due to mistakes in hospitals. In their minds, this was a crisis.

Recognizing that the health care industry falls well below obtainable levels of safety and that large purchasers have the clout to do something about it, Leapfrog has launched a voluntary program aimed at mobilizing purchasers to recognize and reward safe, high quality health care organizations. The group's members have agreed to base their health care purchasing decisions on principles that encourage more stringent patient safety measures. In particular, Leapfrog members have focused on three concrete measures that providers can take that will collectively result in a significant "leap forward" in patient safety. These three initiatives, which have the potential to save nearly 60,000 lives and prevent more than 500,000 medication errors each year, are outlined below:

- use of CPOE, which has been shown to reduce prescribing errors by more than 50 percent (e.g., by eliminating errors due to poor handwriting);
- referral of patients seeking certain complex medical procedures (e.g., high-risk deliveries, open-heart surgery) to high-volume hospitals where survival rates can be up to 30 percent higher; and

- use in the intensive care unit (ICU) of physicians who are certified or eligible for certification in critical care medicine, which early evidence suggests could significantly reduce mortality rates.

These initiatives were chosen because there is overwhelming evidence that they will significantly reduce preventable errors; they can be implemented in the near term; consumers can readily appreciate their value; and outsiders (including health plans, purchasers, or consumers) can easily determine whether a provider does or does not use them.

In an effort to convince providers of the "business case" for improving safety, the group's members have all agreed to reward providers who implement any or all of these initiatives. Specifically, Leapfrog members plan to educate and inform enrollees about the importance of comparing health care providers (particularly with respect to the presence or absence of these three initiatives) and to recognize and reward those providers who make major advances in protecting patients through "Blue Ribbon" awards, increased reimbursement, and/or the creation of financial incentives for employees and dependents to go to "safer" providers. Leapfrog members have also committed to holding health plans accountable for implementing these same purchasing principles, and to building support among benefits consultants and brokers to utilize and advocate for these purchasing principles with their clients.

In fact, Leapfrog purchasers are already implementing these principles in their purchasing practices. For example, in April 2000, OPM released a request for proposals informing health plans that they would be expected to implement the Leapfrog Group's three safety initiatives by January 2001. Health plans will also be required to provide members with consumer information and education regarding patient safety and to work with providers, accreditation agencies, and other groups to implement safety programs (Callahan 2001).

It's hard to walk up to a CEO and say, "Hey, do you guys have a culture of safety?" It's much easier to be able to ask if you have a computerized physician order entry system.

SUZANNE DELBANCO, THE LEAPFROG GROUP, FEBRUARY 2001

HOW CAN GRANTMAKERS WORK WITH HEALTH CARE PURCHASERS?

Grantmakers can assist The Leapfrog Group and other health care purchasers in achieving their objectives. For example, potential roles in support of The Leapfrog Group are listed below:

- In communities where Leapfrog members exist, act as a neutral party to convene key stakeholders in an effort to get commitments to Leapfrog purchasing principles and safety initiatives.
- Help to customize enrollee educational materials to the unique characteristics of a local market.
- Develop an understanding of what incentives will be necessary to encourage hospitals to change. These will vary by local market; in some markets, a "Blue Ribbon" award will be enough, while in others meaningful financial incentives will be needed.
- Collect data on the extent to which hospitals are putting in place the key initiatives being promoted by Leapfrog. This step could involve working with purchasers to encourage self-reports by hospitals and auditing these self-reports.

Grantmaker Activities and Opportunities

Grantmakers can play a vital role in reducing medical errors and improving patient safety. While the mission statement of most grantmaking organizations will not explicitly refer to the promotion of patient safety, activities designed to improve the quality of health care will fall squarely within the mission of most health care foundations. And as noted previously, medical errors and patient safety are an important element of health care quality. In fact, efforts to enhance safety and reduce errors may be an excellent place to begin a broader quality improvement initiative, since the issue resonates so well with the public at large. Early successes could become a catalyst for more comprehensive initiatives in the future.

A number of grantmakers have already begun to work on reducing medical errors and improving patient safety. They are also working extensively within the broader context of quality improvement. This work takes place at all levels of the health care system, including hospitals, ambulatory care centers, nursing homes, and physician offices.

Foundations of all types and sizes – large and small, national and local, new and more established – are making a contribution. Whether through small, local grants of several thousand dollars or large national initiatives involving millions of dollars, grantmakers have positioned themselves to play a crucial role in reducing medical errors throughout our health care system and improving patient safety in all aspects of medicine.

This section describes five value-added roles that grantmakers can play with respect to improving patient safety: convening stakeholders and mobilizing communities into action, improving health care systems, supporting consumer education and advocacy efforts, informing and influencing policymakers, and funding and disseminating research into the causes of and solutions to the problem of medical errors. Each of these efforts can be undertaken at the local, state, or national level.

Convening Stakeholders

Grantmakers are uniquely positioned to play an important role as the convener of key health care stakeholders at the national, state, or local level; they can provide a venue in which providers, policymakers, employers, consumers, and advocates can explore medical errors and develop strategies to improve patient safety.

National Initiatives

At the national level, the W.K. Kellogg Foundation awarded a $99,943 grant to Harvard University in 1999 to develop a comprehensive and integrated approach to the reduction of medical errors and improvement of patient safety by convening and mobilizing leaders from industry, academia, government, the media, and consumers throughout the country. The Robert Wood Johnson Foundation has funded the American Association for the Advancement of Science in Washington, DC, to develop two conferences on key issues relating to errors occurring in health care organizations. In 1996, a two-day national conference, "Examining Errors in Health Care: Developing a Prevention, Education, and Research Agenda," laid the groundwork for initiatives aimed at finding solutions to the problem of medical errors. Three topics were covered at the conference: diagnosing and measuring organizational errors; identifying the factors that cause or contribute to the commission of errors; and strategies for preventing and reducing errors. The second meeting, a follow-up conference entitled "Enhancing Patient Safety

and Reducing Errors in Health Care," was held in November 1998. This covered a range of approaches for improving patient safety and gave participants a firsthand look at cutting-edge research in the field. Conference participants identified a number of strategies to reduce errors, such as making greater use of computer and Internet technology to reduce the risk of medication errors, including pharmacists on patient-care teams, and providing increased sleep for physicians. The proceedings of this second conference were published by the National Patient Safety Foundation.

Statewide Initiatives

At the state level, the California HealthCare Foundation's Quality Initiative brought together consumer health leaders from across the state of California in February 2000. Quality experts and advocates shared strategies for consumer groups to work together to improve quality of care and to facilitate communication and collaboration among consumer advocacy leaders. Among the topics covered during the meeting were purchaser, provider, and consumer use of data and other tools to improve quality. One such quality improvement strategy is reduction of medical errors. Key findings and recommendations from *To Err Is Human* were presented at the meeting with emphasis placed on the message that the traditional health care culture seeking to assign individual blame for mistakes is not an effective way to handle the crisis of medical errors (California HealthCare Foundation 2000b). Three challenges to identifying and preventing medical errors were also identified: inadequate measurement systems, slow technology adoption, and malpractice system barriers. The California HealthCare Foundation also awarded a $25,000 grant to the National Academy of Sciences in 1999 to convene an IOM workshop on communications with the public about the quality of health care. The workshop addressed how resources can best be used to inform the public and other stakeholders about the large variations in quality that exist in the United States and the difference between what is known about effective practice and usual practice. A communications report was produced and distributed following the workshop.

A Community-Based Initiative

Bringing stakeholders to the table to discuss medical errors and explore strategies for improving patient safety can lead to coordinated initiatives with strong support throughout a community. The Jewish Healthcare Foundation in Pittsburgh has played this convening role with respect to the Pittsburgh Regional Healthcare Initiative (PRHI), which has become a community-wide partnership among 30 major purchasers and 28 hospitals to address the problem of quality of care – including patient safety and medical errors – by aligning players in the health care system and building on their strengths.

The origins of PRHI go back several years to a time when Alcoa Chairman Paul O'Neill, Jewish Healthcare Foundation President Karen Wolk Feinstein, and other concerned leaders in the area began to notice that the health care industry, the largest sector of the region's economy, was missing from the region's economic development strategy. The industry was facing bankruptcies, operating losses, consolidation, and layoffs. The civic body charged with devising a new regional economic development strategy decided to launch PRHI – with O'Neill and Feinstein at the helm – to serve as a catalyst to a consensus planning process with the leaders of major stakeholder groups, including hospitals, physicians, insurers, business, and labor. Staffed by the Jewish Healthcare Foundation, PRHI consists of a variety of committees that focus on key quality issues under the leadership of the key stakeholders.

Much of what ails health care is about constructive interaction . . . that means that everybody comes to the table and no one is blaming.

KAREN WOLK FEINSTEIN, JEWISH HEALTHCARE FOUNDATION, FEBRUARY 2001

Safety and quality are beyond competition . . . we're not here to compete, we're here to share.

KAREN WOLK FEINSTEIN, JEWISH HEALTHCARE FOUNDATION, FEBRUARY 2001

A year of benchmarking and study led to the inescapable conclusion that quality was not all that it could be within the region's health care system. Recognizing that safety and quality are areas that must be considered outside the bounds of competition, PRHI reached a consensus goal of having the region's health care systems exceed all other regions in reputation for quality and value, and to be distinguished in their ability to measurably improve outcomes. Medical errors fit squarely within these goals, with PRHI also committing to the goal of becoming as close to an "error-free" health care system as possible.

Working with the key stakeholders in a very collegial manner, the Jewish Healthcare Foundation helped to forge consensus on three key quality improvement strategies for PRHI:

- improving health care outcomes in five common hospital procedures, in part through release of reports that highlighted hospital and individual physician performance;
- creating safer hospitals by eliminating medication errors and hospital-acquired infections; and
- discouraging excess hospital service capacity that hinders the quality of clinical care.

But because success within each of these areas required full participation and commitment to change among providers, insurers, and purchasers, the Jewish Healthcare Foundation and PRHI continued working with key stakeholders to gain commitment to the principles embodied in two community charters that lay out concrete expectations for each key stakeholder. Each charter defines specific actions that health care organizations and employers will take to reduce medical errors, increase patient safety, and improve overall health care quality. For example, in the area of patient safety, health systems and plans are expected to create and participate in task forces on medication errors and infections, to implement proven methods for reducing medication errors and hospital-acquired infections (e.g., CPOE, intensivists in the ICU), and to develop systems to recognize and support hospitals that achieve breakthrough levels of performance. Similarly, employers commit to helping to find funding for these initiatives (including direct funding of safety initiatives), to streamline administrative processes in order to free up funds for improvement, and to highlight to employees those hospitals that make progress. Over time, employers may also ask human resource managers to restructure contracts with hospitals to require them to implement, among other things, specific safety measures.

To demonstrate support for these strategies, 16 of Pittsburgh's leading health care systems and health plans, along with 11 major regional employers, including Alcoa, have embraced the two community charters. As part of its commitment to promote collaboration between the public and private sector as a means to improve quality, The Robert Wood Johnson Foundation has provided a $1 million grant to support PRHI.

Improving Health Care Systems

As discussed earlier, medical errors are frequently the result of system failures, not individual negligence. Thus, one important role for grantmakers is to fund initiatives designed to improve the health care delivery system. To that end, The Robert Wood Johnson Foundation has announced a $20.9 million initiative called Pursing Perfection: Raising the Bar for Health Care Performance. The goal of this program, which will be run by the Institute for Healthcare Improvement (IHI) under the leadership of Don Berwick, M.D., is to help hospital and physician organizations dramatically improve the quality of the care they provide. More specifically, this two-phase program is designed to encourage organizations to strive

toward the accurate and correct delivery of all indicated services at the right time, to avoid delivering services that are not helpful or reasonably cost-effective, to eliminate safety hazards and errors, and to respect the unique needs and preferences of individual patients. Phase I will help up to 12 organizations develop detailed business plans for pursuing perfection in their health care processes. Phase II will provide major grants and significant technical assistance for up to six of the Phase I organizations to implement these plans. Successful applications will exhibit strong leadership commitment, a demonstrated capacity for quality improvement, and a sound implementation strategy that addresses "business-case" issues and incorporates the entire continuum of care. All qualified applicants, whether or not they are selected, will be eligible to participate in a virtual learning network.

A second example of promoting improvement in the health care system comes from The Commonwealth Fund, which awarded a $151,497 grant to Health Research and Educational Trust (HRET) to help hospitals adopt safer medication practices. A self-assessment tool, jointly developed by HRET and the Institute for Safe Medication Practices, was distributed in the spring of 2000 to all hospitals and health systems in the country. Follow-up with a sample of 1,000 hospitals will take place to determine whether the institutions have used the tool, to encourage those that have not conducted a self-assessment to do so, and to collect information on the state of medication safety practices nationwide. This project is cofunded by the American Hospital Association. Additionally, the Fund awarded a $323,336 grant to The Picker Institute for a patient survey on health care experiences. A complementary survey of physicians and other hospital staff was also developed. The surveys will provide information on quality of care and will identify specific actions that can be taken to improve care in areas such as patient-doctor communication, coordination of services, shared decision making, and the physical environment of the hospital. In addition, the project developed methods for rapidly collecting and reporting patient-centered care information back to hospitals as part of continuous quality-improvement activities.

A third example can be seen in the work of The New York Community Trust, which provided a one-year, $75,000 grant to support a United Hospital Fund initiative to promote patient safety and improve the quality of care in New York City hospitals. The initiative will include a literature review on the extent and significance of medical errors, how health care professionals and organizations respond to errors, and rules and regulations used by federal and state agencies as well as national accreditation organizations to enhance patient safety. The initiative will also examine how consumer groups and large purchasers of health care perceive and deal with medical errors. Findings will be reported and disseminated to the New York City health care community and consumer groups. Finally, the initiative will convene health care leaders and provide a forum for sharing strategies developed to promote patient safety.

A fourth example comes from the California HealthCare Foundation. In an effort to inform health care providers and administrators, the foundation awarded a $120,404 grant to the University of California at San Francisco to both educate a broad medical audience on the process of medical error analysis and to promote quality of care improvement through the development and publication of *Quality Grand Rounds.* Case studies of patients suffering adverse medical outcomes are presented in the publication, with expert analyses of the systems and human factors that placed patient safety in jeopardy and that are amenable to improve-

What we're trying to do is show that dramatically better quality is possible in the typical health care organization . . . We think we've been pursuing health care at the margins and our hope is that we can show, with the help of the people in this room, that health care can produce quality that rivals any other industry.

MICHAEL ROTHMAN,
THE ROBERT WOOD JOHNSON FOUNDATION,
FEBRUARY 2001

ment. The foundation also put together a primer on CPOE that was sent out to hospitals in the state. And after feedback indicated that the primer was "too much" to absorb, the foundation began working on a toolkit that will assist hospitals in implementing specific programs for enhancing patient safety (e.g., bar coding) on a modular basis. The goal is to assist hospital management in determining which specific initiatives make the most sense, and to aid in the implementation of these initiatives.

Educating Consumers

A natural role for grantmakers is raising awareness and educating consumers about the quality of care provided by health care organizations and professionals. The Henry J. Kaiser Family Foundation, recognizing the increased public concern about medical errors and patient safety, is focusing on consumer education and protection. Educating consumers, for example, on the types of questions to ask health care providers and informing them on provider quality empowers consumers to become positive mechanisms for improving patient safety. One recently completed project was a survey of Americans as health care consumers, conducted in conjunction with AHRQ. Survey findings revealed increased public awareness of medical errors due to recent media attention, with medical errors becoming a leading measure of health care quality for consumers. Survey results suggest the opportunity for policymakers and others to make valid and reliable quality information more readily available.

The California HealthCare Foundation's Quality Initiative coordinates quality measurement research and outreach projects. The initiative fosters the development and dissemination of publicly reported data about the quality of care across all settings; stimulates, promotes, and evaluates efforts to increase consumer and purchaser use of data to choose and use health care; and accelerates quality improvement and public accountability by encouraging collaboration among consumer organizations, the health care industry, purchasers, and policymakers. Within the initiative, the foundation is developing a strategic plan to address patient safety, with a particular focus on medication errors (which represent the single biggest opportunity for reducing errors) and technology solutions. Work in this area has included a collaboration with AHRQ to translate a patient fact sheet providing practical advice on avoiding medical errors into several Asian languages. Looking ahead, the Quality Initiative plans to inform the public about patient safety by highlighting the use (or nonuse) by providers of easily understandable indicators of patient safety (such as use of CPOE).

The Robert Wood Johnson Foundation awarded a $45,617 grant to the 21st Century Consumer – a California nonprofit organization whose mission is to advance health and quality of life through research and consumer engagement – for developmental research that can be used to create educational programs to help reduce the number of injuries and deaths due to preventable errors during hospitalization. The 21st Century Consumer intends to develop and help institutionalize the approach of actively engaging consumers, where appropriate, as partners with providers to advance patient safety and outcomes. The grant also funded a review of research work on patient safety and quality of medical care, along with interviews with experts in that area, including health care consultants, doctors and nurses, employee benefits managers, and researchers from several medical schools. Twenty-three former hospital patients or family members were also asked to share their experiences and suggest ways to improve patient safety.

Influencing Public Policy

Because of their extensive experience in the field of public policy, grantmakers are well positioned to address public policy concerning medical errors and patient safety. Grantmakers have extensive experience working in the field of public policy. They generate and disseminate information to policymakers, research and analyze options for new regulations and policies, and implement demonstration programs and replicate those that work best. For example, as a funder of *To Err Is Human,* The Commonwealth Fund has helped to bring medical errors and patient safety to the forefront of the nation's health care debate.

In addition, Commonwealth – in conjunction with the California HealthCare Foundation and The Robert Wood Johnson Foundation – worked with the National Academy of State Health Policy to publish a comprehensive report on state-level reporting systems. It began with a survey sponsored by the California HealthCare Foundation. As a follow-up to this initiative, The Commonwealth Fund and AHRQ cosponsored a series of case studies looking at what is and is not working within these state reporting systems. The resulting report examines how eight states with mandatory reporting requirements for hospital incidents administer, oversee, and enforce their requirements. The report is based on interviews with state and hospital officials, professional boards, providers, consumer representatives, and purchasers. It places mandatory reporting within the context of current state and federal hospital oversight activity and provides detailed information about how state-based mandatory hospital reporting requirements came into existence, how such requirements are operationalized, the legal issues associated with them, and finally, other state-based initiatives aimed at improving the quality of health care.

Funding Research

Although there is a growing body of research documenting medical errors, there is a paucity of research on how and why errors occur, and the development and evaluation of strategies to track and reduce errors. Such research will be imperative to reducing the rate of medical errors throughout the health care system. Grantmakers are positioned to take advantage of the momentum generated by the IOM's report by funding a broad spectrum of research.

To that end, Aetna U.S. Healthcare and the Aetna Foundation, Inc. awarded $840,000 in grants to researchers at five leading academic medical centers to examine topics related to patient safety and medical errors, with an eye toward reducing preventable medical errors and improving safety through cost-effective solutions that could be applied broadly in real-world settings. The funded projects include initiatives looking at medication errors, adverse drug reactions, improving safety for surgical patients, and controlling infection in long-term care facilities. The studies commenced October 1, 2000, and are being funded for a maximum of two years. The grants are administered by the Academic Medicine and Managed Care Forum. Founded by Aetna U.S. Healthcare in 1996, the forum is an alliance of 51 academic medical centers/teaching hospitals and 8 pharmaceutical companies dedicated to collaboratively improving the quality of medical care in the United States. Since 1997, more than $26 million in research grants have been awarded. In the year 2000 alone, 28 grants totaling $7 million were awarded.

Another example comes from the Blue Cross Blue Shield of Michigan Foundation, which issued a request for proposals to encourage action-oriented research, demonstration, and evaluation projects designed to reduce the occurrence of medical errors in acute care hos-

Approaching patient safety requires a public/private partnership. This is not work for any one of us. We need to work together, and we can't afford not to work together.

GREGG MEYER,
AHRQ,
FEBRUARY 2001

pital settings. The Foundation plans to award $500,000 in several multiyear grants to Michigan investigators to conduct research and disseminate information on this topic. They are seeking applications from academic and clinical practitioners and researchers based at universities, academic medical settings, community hospitals, and health systems. Proposed studies will be considered in two areas: (1) research on reducing medical errors, including epidemiological research, action-oriented applied research, demonstration and evaluation projects, and new technology demonstration programs; and (2) strategies to disseminate information on best practices related to medical error reduction, to be disseminated in statewide conferences, workshops, training classes, and publications.

In a third example, Jewish Healthcare Foundation awarded a $95,000 grant to the University of Pittsburgh School of Public Affairs to conduct an assessment of current levels of knowledge, experience, and use of health information technology among consumers, physicians, researchers, and other health professionals. The community profile produced by this project will provide a basis for designing systems to connect people to the right information to support high-quality, evidence-based medicine, and informed health decision making. The foundation also awarded a $150,000 grant to the University of Pittsburgh School of Pharmacy to support a one-year research and demonstration project involving patients admitted to the internal medicine service of the University of Pittsburgh Medical Center-Montefiore. An interdisciplinary team approach will be developed that will use a structured medication review and discharge program to enhance communication among the pharmacist, physician, nurse, and patient to improve patients' knowledge of their pharmacotherapy. The project's goals include development of a collaborative management approach to provide patient education on medication use and to determine whether collaborative management results in improved quality of care for pharmaceutical use.

Conclusion

Medical errors and patient safety are relatively new areas of funding for grantmakers, but as the momentum continues, grantmakers will continue to find new opportunities to make a difference. Local and regional foundations can leverage their strong ties within the community, as well as their in-depth local knowledge, to serve as a neutral third-party bringing together key stakeholders, and to disseminate and translate information to make it relevant and understandable to consumers in local communities. Grantmakers can also work to address disparities (broadly defined) with respect to patient safety, and can work with the provider community to identify and disseminate best practices, including both large and small initiatives that have been shown to be effective in reducing errors and improving safety.

While the IOM report focused on safety issues within the hospital setting, there is widespread acknowledgment that medical errors occur in other settings as well. Since grantmakers work within virtually all aspects of the health care system, they are able to advance patient safety into ambulatory care and other settings, and to reach out to both providers and the public. Grantmakers can also draw on knowledge from numerous resources, including other industries such as aviation, that have already been successful in reducing errors. Experience has shown that action brings successful results.

Improving patient safety represents an agenda that clearly will benefit from collaboration – both formal and informal – with roles for philanthropy, government, and private sector organizations. Much of the work, however, must take place at the local level. Specific interventions can be supported by both national and local grantmakers funding research and demonstration programs, and through the development of a policy framework to which foundations can contribute through the analyses they fund. Challenge funding, such as that offered under the new Robert Wood Johnson Foundation Pursuing Perfection Initiative, may be a particularly effective way for large, national foundations to raise the bar with respect to patient safety. Partnerships with federal agencies such as AHRQ can also be important, particularly in those areas such as dissemination and education where AHRQ may have a limited ability to develop programs that are effective at a local level.

The issue of medical errors is complicated and multifaceted; yet it presents real opportunities and challenges for grantmakers. By working to reduce medical errors and improve patient safety, grantmakers can move forward a universal quality agenda and raise public understanding of and appreciation for quality health care.

Sources

Agency for Healthcare Research and Quality, *Translating Research Into Practice: Reducing Errors in Health Care* <www.ahrq.gov/research/errors.htm> July 31, 2000.

Agency for Healthcare Research and Quality, *Medical Errors: The Scope of the Problem* (Rockville, MD: February 25, 2000).

Agency for Healthcare Research and Quality, "AHRQ Issue Third in a Series of Requests for Applications on Patient Safety Research," Press Release (Rockville, MD: Agency for Healthcare Research and Quality, February 2, 2001).

Anesthesia Patient Safety Foundation, *APSF Response to the IOM Report* (Pittsburgh, PA: Anesthesia Patient Safety Foundation, February 22, 2000).

The National Journal, "Medical Errors: New Medicare Policy Mandates Disclosure," *American Health Line,* January 2, 2001.

BNA's Health Care Policy Report, "Employers Seek to Harness Power As Health Purchasers to Address Safety," 8(46) (Washington, DC: The Bureau of National Affairs, November 20, 2000).

Berwick, Donald M., testimony before joint hearing of the Subcommittee on Health and Education and the Subcommittee on Oversight and Investigation, U.S. House of Representatives, February 9, 2000.

Berwick, Donald M., *As Good as It Should Get: Making Health Care Better in the New Millennium* (Washington, DC: National Coalition on Health Care, September 1998).

Bodenheimer, Thomas, "The American Health Care System: The Movement for Improved Quality in Health Care," *The New England Journal of Medicine,* 340(6): 488-492, February 11, 1999.

Bovbjerg, Randall R., joint hearing of the Subcommittee on Health and Education and the Subcommittee on Oversight and Investigation, U.S. House of Representatives, February 9, 2000.

California HealthCare Foundation, *Health Care Quality in California: A Primer* (Oakland, CA: 2000a).

California HealthCare Foundation, *Health Care Quality Retreat 2000: Summary of Proceedings,* San Diego, CA, February 8-10, 2000b.

Callahan, Sarah, *Executive Brief: Purchasers Focus on Patient Safety* (Washington, DC: National Health Care Purchasing Institute, January 2001).

Chassin, Mark R., "Is Health Care Ready for Six Sigma Quality?" *The Milbank Quarterly,* 76(4): 565-591, 1998.

Coye, Molly J., and Don E. Detmer, "Quality At A Crossroads," *The Milbank Quarterly,* 76(4): 759-768, 1998.

Delbanco, Suzanne, The Leapfrog Group, Remarks at Grantmaker In Health Issue Dialogue, *Advancing Quality Through Patient Safety,* February 28, 2001, San Diego, CA.

Eisenberg, John, Gregg Meyer, and Nancy Foster, "AHRQ Update: Medical Errors and Patient Safety: A Growing Research Priority," *Health Services Research,* 35(3): xi-xv, August 2000.

Eisenberg, John M., testimony before the Appropriations Subcommittee on Labor, Health and Human Services, and Education, U.S. Senate, December 13, 1999.

Feinstein, Karen Wolk, Jewish Healthcare Foundation, Remarks at Grantmaker In Health Issue Dialogue, *Advancing Quality Through Patient Safety,* February 28, 2001, San Diego, CA.

Gaba, David M., VA Palo Alto Health Care System, Remarks at Grantmaker In Health Issue Dialogue, *Advancing Quality Through Patient Safety,* February 28, 2001, San Diego, CA.

Heinreich, H.W. *Industrial Accident Prevention: A Scientific Approach* (New York, NY: McGraw-Hill, 1931).

Institute of Medicine, *To Err Is Human: Building A Safer Health System* (Washington, DC: National Academy Press, 1999).

Kaiser Family Foundation/Agency for Healthcare Research and Quality, National Survey of Americans as Health Care Consumers. An Update on the Role of Quality Information. December 2000 (Conducted July 31-October 13, 2000).

Kizer, Kenneth W., testimony before joint hearing of the Subcommittee on Health and Education and the Subcommittee on Oversight and Investigation, U.S. House of Representatives, February 9, 2000.

Kotzin, Allison, "The Business Case for Value-Based Purchasing," *Health Care Purchaser* (Washington, DC: National Health Care Purchasing Institute, December 2000).

Leape, L., "Institute of Medicine Medical Error Figures Are Not Exaggerated," *Journal of the American Medical Association,* 284(1): 95-97, July 5, 2000a.

Leape, L., "Can We Make Health Care Safe?" in Steven Findlay, ed., *Reducing Medical Errors and Improving Patient Safety: Success Stories from the Front Line of Medicine,* (Washington, DC: National Coalition on Health Care and Institute for Healthcare Improvement, February 2000b).

Luciano, Lani, "A Government Health System Leads the Way," in Steven Findlay, ed., *Reducing Medical Errors and Improving Patient Safety: Success Stories from the Front Line of Medicine,* (Washington, DC: National Coalition on Health Care and Institute for Healthcare Improvement, February 2000).

Meyer, Gregg S., Agency for Healthcare Research and Quality, Remarks at Grantmaker In Health Issue Dialogue, *Advancing Quality Through Patient Safety,* February 28, 2001, San Diego, CA.

McDonald, Clement J., Michael Weiner, and Sui L. Hui, "Deaths Due to Medical Errors Are Exaggerated in Institute of Medicine Report," *Journal of the American Medical Association,* 284(1): 93-95, July 5, 2000.

National Conference of State Legislatures, State Health Policy Brief: Medical Errors (Washington, DC: National Conference of State Legislatures, September 2000a).

National Conference of State Legislatures, *State Health Notes: Medical Errors: Is A State-Run Reporting System an Answer to Preventable Deaths?* (Washington, DC: National Conference of State Legislatures, March 27, 2000b).

National Health Care Purchasing Institute, "Era of Errors," *Health Care Purchaser* (Washington, DC: National Health Care Purchasing Institute, May 2000).

Patient Safety Center of Inquiry at VA Palo Alto Health Care System, *Summary of PSCI's Track of Activity* <www.pkpd.icon.palo-alto.med.va.gov> February 2, 2001.

Prager, Linda O., "Initiatives Begin to Chip Away at Error Rate," *American Medical News* <www.ama-assn.org/med-sci/npsf/amnews/news3.htm> November 17, 2000.

Quality Interagency Coordination Task Force, *Doing What Counts for Patient Safety: Federal Actions to Reduce Medical Errors and Their Impact: A Report to the President* (Rockville, MD: February 2000).

Regenstrief, Donna I., The John A. Hartford Foundation, Inc., Remarks at Grantmaker In Health Issue Dialogue, *Advancing Quality Through Patient Safety,* February 28, 2001, San Diego, CA.

Roessner, Jane, "Making Doctors Computer Literate" in Steven Findlay, ed., *Reducing Medical Errors and Improving Patient Safety: Success Stories from the Front Line of Medicine,* (Washington, DC: National Coalition on Health Care and Institute for Healthcare Improvement, February 2000).

Rosenthal, J., M. Booth, and T. Riley, *Current State Programs Addressing Medical Errors: An Analysis of Mandatory Reporting and Other Initiatives* (Portland, ME: National Academy for State Health Policy, January 2001).

Rosenthal, J., T. Riley, and M. Booth, *Medical Errors and Adverse Events: A Report of a 50-State Survey* (Portland, ME: National Academy for State Health Policy, April 2000).

Rothman, Michael, The Robert Wood Johnson Foundation, Remarks at Grantmaker In Health Issue Dialogue, *Advancing Quality Through Patient Safety,* February 28, 2001, San Diego, CA.

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