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ISSUE BRIEF

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Improving Quality and Preventing Error in Medical Practice

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A discussion featuring

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Improving Quality and Preventing Error

Front pages of major newspapers and lead stories of network newscasts had a startling common message just after Thanksgiving: medical mistakes are killing people! The genesis of the outcry was the release of a report by the Institute of Medicine (IOM), *To Err Is Human: Building a Safer Health System*.

The concerns expressed in the IOM report are not really news, since iatrogenic injury and therapeutic adverse outcomes are as old as medicine. Ernest Codman in 1910 proposed a system of tracking patient outcomes and studying those that were negative. Landmark studies by Lucian Leape, Troyen Brennan, and colleagues documenting "adverse events" in hospital settings were first published in 1991. The National Patient Safety Foundation at the American Medical Association (AMA) and the National Patient Safety Partnership brought together by the Department of Veterans Affairs (VA) were both founded in 1997. The National Health Policy Forum and the Joint Commission on the Accreditation of Healthcare Organizations both sponsored meetings on patient safety in 1999, while the Medicare Payment Advisory Commission also called for legislative and regulatory attention to reducing medical errors.[1]

Without doubt, however, the IOM report gave visibility to a problem that had largely been ignored—despite the fact that medical error is responsible for more deaths per year than motor vehicle accidents or breast cancer. Several legislators, as well as President Clinton, have recently signaled their intent to take action on the issue.

The IOM's specific recommendations are not without controversy. Should reporting of at least some kinds of errors be mandatory, and where would the line be drawn? How large a role should government play, at what level, and who will bear the costs? What level of investment will be required for data collection, protection, dissemination, and—of critical importance—analysis? Who will develop standards and definitions? How can a workable framework for apportioning responsibilities and promoting cooperation among all parties be determined? How can all health care facilities put into operation procedures such as computerized prescription entry that can be shown to save lives? What has prevented them from doing so?

While such questions may seem abstract, this Forum session will make them more concrete by looking at current efforts already under way at various administrative levels. To begin, Paul O'Neill, chairman and former chief executive officer of Alcoa, will describe how the vision of an injury-free workplace that he pursued and virtually achieved at Alcoa is being translated into a vision of a city free of medication errors and nosocomial (treatment-caused) infections. In fact, eradication of these errors is just one element of a health quality initiative O'Neill is spearheading in the greater Pittsburgh area. John Clough, M.D., will discuss the Cleveland Clinic's error reduction efforts, focusing on both internal and external challenges, obstacles, and stimuli.

Other speakers will address IOM recommendations more directly. Nancy Ridley, assistant commissioner for health quality management in the Massachusetts Department of Public Health, will relate her experience with the state's mandatory error reporting system. Kenneth W. Kizer, M.D., M.P.H., president of the National Forum for Health Care Quality Measurement and Reporting—also known as the National Quality Forum—and past under secretary of health in the Department of Veterans Affairs, will draw on his experience with the VA's error-reduction program and will comment on the National Quality Forum's role in setting national standards. John Eisenberg, administrator of the Agency for Healthcare Research and Quality (AHRQ), will speak about the creation of a Center for Patient Safety and the role of AHRQ in funding quality research.

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QUALITY IMPROVEMENT IN THE PRIVATE SECTOR

Just as the concerns about medical error have a history that antedates the IOM, so do efforts to address them. In addition to the public policy and cooperative group responses referenced above, individual institutions also have put programs into place. The Cleveland Clinic faces many of the same hurdles that other provider organizations have confronted; these include, as Clough has put it, "ten different databases, none of which communicate with each other." The clinic is working to systematize data collection. But at the same time that technical improvements are undertaken, the delicate process of cultural change proceeds. Clough sees three barriers to candor in any medical institution: fear of legal liability; managerial defensiveness (the initial impulse to shoot—or quietly bury—the messenger); and mistrust in the ranks of new programs billed (by management) as "constructive."

Desirable as intramural progress is, improved outcomes for a population require cooperation among institutions, for example, in agreeing upon and adhering to standards, benchmarking performance, and making quality-related information available to consumers. The record of such collaborations is ambiguous. The Cleveland Health Quality Choice (CHCQ) program collected hospital data for a decade, publishing comparative report cards. Some hospitals felt the expense of collecting CHQC data could be better spent more directly, criticized the measures, and saw little evidence that employers and consumers were using the report cards in selecting providers. The Cleveland Clinic system (with its nine hospitals) eventually pulled out, triggering the program's demise.

Pittsburgh hopes for greater success, both regionally and in building on the state's data analysis efforts. The Working Together Consortium's Healthcare Initiative (WTCHI) has brought employers, labor organizations, physicians, hospitals, health plans, and other stakeholders to the table to seek agreement on better ways to deliver and pay for health care. At this time, more than 75 leaders are working to make southwest Pennsylvania the nation's pacesetter in quality of clinical care and controlled costs through waste-free delivery. As a first step toward these goals, WTCHI members have committed to a campaign to eliminate medication errors and nosocomial infections in participating southwest Pennsylvania hospitals. The campaign embodies O'Neill's prescription for improvement: start by identifying a small number of goals that (*a*) are not debatable, and (*b*) require systemic change to accomplish.

The WTCHI charter illustrates the principle that error reduction, while a worthy goal in its own right, is only one step toward quality health outcomes for a population. O'Neill suggests that the organizing principle of a health system should be the individual patient and that the best system would be one in which the medical establishment withers away because the patient is healthy. Where medical intervention is required, it would be held to a recognized standard and, ultimately, judged by its impact on the patient.

Obviously, today's health care system is a long way from this nirvana. But O'Neill's ability to extrapolate from industry to health care is one of WTCHI's strengths. Health care is widely acknowledged to be well behind industries such as aviation and banking that invested early on in the information systems and training that have allowed them to perform more efficiently and effectively. Where leading manufacturers strive for "six sigma" quality (that is, fewer than 3.4 defects per million units), researchers such as Mount Sinai School of Medicine's Mark R. Chassin, M.D., have estimated that defect rates in some health care categories (such as diagnosing and treating depression or controlling hypertension) may reach 500,000 per million instances.[2]

BACKGROUND TO THE IOM REPORT

The final report (1998) of the President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry was titled *Quality First: Better Health Care for All Americans.* Among many recommendations, it included a chapter on reducing errors and increasing safety in health care.

Responses to the commission's report included various patient-protection bills modeled on the report's Consumer Bill of Rights and Responsibilities. Differing versions ultimately adopted by the House and the Senate are scheduled for conference. The bills share an emphasis on access and coverage issues, considering quality as a matter of whether beneficiaries in fact receive the services they believe they were promised.

The IOM in June 1998 established a Committee on the Quality of Health Care in America, under the chairmanship of William C. Richardson, Ph.D., and the staff direction of Janet Corrigan, who had filled the same role with the president's advisory commission. *To Err Is Human* is the first in a planned series of reports. Its focus is the actual delivery of medical care to patients who have access to and are using the health care system (though the authors acknowledge in passing

that, when someone needs medical attention, the worst quality is no care at all[3]).

The committee's research review revealed that medical error may account for as many as 98,000 in-hospital deaths per year, with a price tag of $17 billion to $29 billion attached to errors characterized as preventable.[4] How has such a dismal situation come to be? The IOM committee explains:

> A general lack of information on and awareness of errors in health care by purchasers and consumers makes it impossible for them to demand better care. The culture of medicine creates an expectation of perfection and attributes errors to carelessness or incompetence. Liability concerns discourage the surfacing of errors and communication about how to correct them. The lack of explicit and consistent standards for patient safety creates gaps in licensing and accreditation and lets health care organizations function without some of the basic safety systems in place. The lack of any agency or organization with primary responsibility for patient safety prevents the dissemination of any cohesive message about patient safety. . . . The external environment is not creating any requirement or demand for the delivery system to reduce medical errors and improve the safety of patients.[5]

It is this ignorance, fragmentation, and entrenchment that the committee hopes to combat with its recommendations.

Center for Patient Safety

The IOM committee believes that a focal point is needed for patient safety in health care, bringing together the various initiatives and mechanisms that now exist. Its report recommends creating a Center for Patient Safety within the Agency for Healthcare Research and Quality,[6] and says the center should

- set the national goals for patient safety, track progress in meeting these goals, and issue an annual report to the president and congress on patient safety; and
- develop knowledge and understanding of errors in health care by developing a research agenda, funding centers of excellence, evaluating methods for identifying and preventing errors, and funding dissemination and communication activities to improve patient safety.[7]

The center's mission would be two-pronged: helping to prevent mistakes via research and education and analyzing and making available the lessons to be learned from errors already made.

The committee chose AHRQ as the site of the proposed center in part because the agency already is involved in a range of quality-related activities, including patient safety. Indeed, the Healthcare Research and Quality Act of 1999, which reauthorized and renamed the agency, explicitly includes reducing errors in medicine among its required activities. AHRQ is also charged with linking research to practice improvement and identifying and disseminating information relating to the integration of quality information into purchaser and consumer decision-making. The IOM report observes that the agency's demonstrated ability to collaborate with other organizations, both public and private, is a strong argument in its favor.

Given the reauthorizing language, it does not appear that further legislative action would be required in order for AHRQ to establish a center for patient safety; however, funding is another matter. The IOM committee calls for initial annual funding of $30 million to $35 million, rising to $100 million over time. (This compares with an annual $200 million for the National Institute for Occupational Safety and Health, which conducts research and makes recommendations for the prevention of work-related illnesses and injuries.[8])

The committee also weighed creating a stand-alone center or locating it within NIH before settling on AHRQ. The stand-alone idea, while facing a number of philosophical and budgetary hurdles, would have the advantage of independence from the regulatory function. AHRQ does not itself regulate but is part of the Department of Health and Human Services, which does. Some have suggested that provider organizations might be more comfortable with an independent center, given the role envisioned for it in analyzing error reports, discussed below. It might be remembered that the Aviation Safety Reporting System (ASRS), so often invoked as a model for health care, was created within NASA because an earlier attempt to establish such a system within the Federal Aviation Administration was stalled by distrust and fear of reprisal for reporting mistakes.

Reporting Systems

To Err Is Human points out that one way to learn from mistakes is to establish a reporting system. Two important functions can be served by a reporting system: it can hold providers accountable for performance, or it can point the way to improved safety. Theoretically, it can do both; in practice, it may be difficult to find a balance. The IOM committee addressed this tension by recommending a two-tiered system.

Mandatory Reporting. The committee recommended the following:

> A nationwide mandatory reporting system should be established that provides for the collection of standardized information by state governments about adverse events that result in death or serious harm. Reporting should initially be required of hospitals and eventually be required of other institutional and ambulatory care settings.

The committee believes that mandatory systems should focus on identifying adverse events attributable to error that lead to serious patient harm or death. To be effective, such systems would need a common set of reporting standards, which would permit data to be tracked over time, compared across locale, and aggregated into national statistics. A commitment of resources adequate to enable systems to analyze what happened and follow up to ensure that appropriate steps are taken by the responsible health care organization is also critical to success.

The committee points to the National Quality Forum—another outgrowth of recommendations from the president's advisory commission—as the body best suited to develop and promulgate a core set of reporting standards to be used by states. As with AHRQ, its existing mission is compatible with this new role. The National Quality Forum already is charged with developing a measurement framework for health care quality and has appointed a framework board of health policy experts who have each committed 20 percent of their time to this effort. Federal legislation would be required to direct the group to promulgate national standards and encourage states to adopt them.

Error reporting is not a novel proposal. A survey conducted by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) in the spring of 1999 revealed that at least one-third of states had some form of adverse event reporting system in place. These systems vary in terms of being voluntary or mandatory, in volume of reporting, and in the types of facilities involved (several states focus mainly on nursing homes, for example.) Moreover, IOM follow-up has confirmed that few states aggregate data or analyze them to identify general trends. Reasons cited were a lack of resources to upgrade computer systems and inconsistency in reports submitted. A standardized format would address the latter concern. As to the former, the IOM calls on Congress to "provide funds and technical expertise for state governments to establish or adapt their current error reporting systems to collect the standardized information, analyze it, and conduct follow-up as needed with health care organizations."

Even if such assistance is forthcoming, there may be states that choose not to establish a mandatory error reporting system. In this eventuality, the IOM envisions the Department of Health and Human Services stepping into the breach. The department was also the fallback for states that chose not to implement the Health Insurance Portability and Accountability Act of 1996. When four states (including California) deferred to partial or full federal enforcement, the department had to assume the role of state regulator. It is unclear at this time what proportion of the country's error reporting responsibility might revert to department staff as well.

The call for mandatory reporting of serious error has drawn a mixed response from providers. All have championed the goal of error reduction, but the American Nurses Association's support for a mandatory system is offset by the AMA's misgivings. Former AMA president Nancy Dickey, M.D., raised the issue of malpractice, observing that what appears to be a straightforward step "actually engenders all sorts of problems with confidentiality and liability. . . . There are still insurance companies that would advise a physician not to say anything."[9] She added that the AMA is opposed to mandatory reporting.

The question of whether any reporting should be mandatory will be vigorously debated, but it is not necessarily the most significant issue involved in a national reporting system. It should be kept in mind, the IOM points out, that the purpose of such a system is not to collect and count reports. Analysis and communication are key. The limitations of state systems in these areas cause some to wonder why the IOM chose to recommend a network of state systems. Its report explains that flexibility is needed at this stage because no "best practice" has yet been identified. It is envisioned that the Center for Patient Safety would work with states to develop systems and that states would be able to choose to collect and analyze data themselves or to contract for these activities with an accrediting body or a quality improvement organization (QIO) (formerly known as a peer review organization (PRO), the entities that monitor utilization and quality of care under Medicare).

Some states have amassed considerable experience and expertise that a national system could draw on. An example is Massachusetts, where the Public Health Department's Division of Health Quality (DHQ) determines whether an error is a system problem or a practitioner problem. If the latter, it makes a report to the appropriate board of registration (nursing, medicine,

or pharmacy). If a systemic problem is indicated, DHQ performs extensive analysis. Teams write up their findings in a prescribed format and prepare a statement of deficiencies that cites specific state regulations and how they were violated. Other standards, such as Medicare conditions of participation, are incorporated by reference; for some diagnoses and procedures, DHQ has developed its own standards.

Voluntary Reporting. As the second tier of its reporting system, the IOM recommended that "the development of voluntary reporting efforts should be encouraged." An amalgam of voluntary systems, the second part of the reporting scheme is designed to address near-misses and cases of "very minimal patient harm."[10] The committee did not propose a national system in this case, noting that a number of "good efforts" are already in operation, particularly in the area of medications.[11] Among these efforts are the following:

- The FDA's Adverse Event Reporting System (AERS), a data base containing information about adverse drug reactions submitted directly to the agency or reported via the MedWatch system designed for use by health professionals.
- The Institute for Safe Medication Practice, which has campaigned for improvements in drug naming, packaging, labeling, and dispensing and which recently joined forces with the American Hospital Association in an initiative to reduce medication errors in hospitals.
- U.S. Pharmacopeia, which administers a voluntary medication error reporting system, including a component called MedMarx, which allows employees of subscribing hospitals to report error-related information anonymously via the Internet.

The committee also recognized that a national system like the aviation industry's ASRS would potentially be inundated with reports and that a wide range of expertise would have to be maintained (for example, an analyst who understands drug interactions is not necessarily conversant with device manufacturing or home care staffing). They suggested that a number of "mini-systems" for different types of problems might be effective, provided that the systems had the capacity to communicate among themselves about overlapping problems.

The intent of voluntary error reporting is to study and enhance safety, not to hold reporting institutions accountable. This message seems to resonate with policymakers. In a Rose Garden speech responding to the IOM report (and calling on federal agencies and contractors to institute safety programs) Clinton said:

> Now let me be clear about one thing—ensuring patient safety is not about fixing blame. It's about fixing problems in an increasingly complex system; about creating a culture of safety and an environment where medical errors are not tolerated. In short, it's about working together to zero in on patient safety, and zero out preventable errors."

Still, intent is one thing, and practical consequences another. Where data exists, there will be a corresponding interest in access to it—particularly on the part of plaintiffs and their attorneys in malpractice cases. The committee recognized that fear of legal discoverability or involvement in a legal process would contribute to underreporting of errors. Perhaps the central question for the success of a voluntary reporting system is confidentiality of the data reported. Thus, the IOM further recommended:

> Congress should pass legislation to extend peer review protections to data related to patient safety and quality improvement that are collected and analyzed by health care organizations for internal use or shared with others solely for the purpose of improving safety and quality.

The committee judged the peer review privilege to be "the most promising existing source for legal data on errors." Forty-nine states (excluding New Jersey, according to a JCAHO survey) have statutes protecting from discovery the records and deliberations of peer review committees. However, the significant variation among these statutes in scope and specifications suggests that a federal statute might be preferable. (This was also a recommendation made by the Medicare Payment Advisory Commission in its June report to Congress.) The IOM report points to statutes in Oklahoma and California that might serve as models and also notes that the federal Health Care Quality Improvement Act of 1986 (which established the National Practitioner Data Bank) establishes peer review immunity from damage suits when participants act in good faith in any peer review process that meets the act's standards for structure and fair process.

QIOs may investigate instances of possibly substandard care delivered to fee-for-service beneficiaries. In such cases, their case review records are protected from subpoena. This protection, modeled on in-hospital peer review privilege, was written into the 1972 statute creating professional standards review organizations (PSROs), and carried over as PSROs evolved into PROs and QIOs. Its preservation has drawn some criticism: while providers have welcomed confidentiality, consumer groups have

long protested what many perceive as a "cover-up" attitude.

One limitation of peer review privilege is that it may be lost when information leaves the confines of an institution. The committee wrote:

> Collaborative quality improvement efforts may be inhibited by the loss of statutory peer review protection that may occur when data are shared across institutions. Some form of protection appears necessary for each of the three components of an error reporting system: (1) the original reporters; (2) the various recipients of the information (including processors, investigators, de-identifiers, and analyzers; and (3) the reported information itself.[12]

POLICY ISSUES

The Bright Line

The IOM's incorporation of a "narrowly defined" mandatory system and a much broader voluntary effort into its two-tiered system requires that a line be drawn between errors involving serious harm and those causing minimal damage. Where, in one case, a patient dies as a result of an error and, in another case, an error is caught before medication is administered to a patient, assigning the two cases to the mandatory and voluntary reporting systems respectively is easy. But there are bound to be borderline cases. Is an extra day in the hospital serious? What about a wound infection that led to pronounced scarring? What if the wrong medication were administered, with side effects such as sleepiness or gastric distress?

Another concern is that it may at times be difficult to isolate the effects of an error from other medical complications. This is a weakness in the frequently invoked National Transportation Safety Board (mandatory)/ASRS (voluntary) parallel, as the effects of a plane crash are fairly easily distinguished from any symptoms passengers may have brought on board. Is modern medicine so complex that it may not always be possible to recognize error?

Putting the Horse Before the Cart

Some analysts have already voiced concern that the debate over mandatory versus voluntary reporting will be a sticking point for implementing safety-improvement proposals. They believe it may be more useful first to come to agreement on—and establish in the public mind—what any kind of a reporting system is intended to accomplish and how its various parts fit together to achieve an aim of improved safety and quality overall. What information is needed in order to define what good quality care is and whether care delivered in a particular case meets that standard? How can a process be designed to ensure collection of only data that will be used?

Error data collection and analysis now occurs primarily on an institutional basis (obviously with wide variation among institutions). Institutional data will need to be aggregated, used to develop comparison and benchmarking instruments, and interpreted so as to provide meaningful feedback. At the same time, the transfer of information from one level of a reporting system, such as a hospital, to another, such as a state, must not trigger legal liability if the overall system is to be effective.

Equally important is communication in the other direction. How will lessons learned by error analysis make their way through organizational layers to reach practitioners? How will entities at the same level (such as states) communicate amongst themselves, or must they rely on federal-level dissemination?

Another basic question is who will perform error analysis. In considering medical necessity determinations, review by a peer (be it another psychiatrist, a cardiologist, a family physician, or a nurse) has been a must-have for providers. Is it feasible that a team of analysts could replicate a group of hospital colleagues who are involved in a process that results in error?

The Role of the Individual

The IOM report focuses on the accountability of health care institutions, such as hospitals. Its proposed reporting systems posit error reports made by institutions once they have undertaken their own internal analysis. There is no mechanism for error reporting to an outside body by an individual, such as a nurse, within the institution, or by a patient who believes that he or she was harmed.

Like the IOM's proposal, JCAHO's sentinel event reporting policy focuses on institutions. Both expect an institutional response to an error (or a near-miss) to be part of the report. By contrast, the ASRS and the FDA's AERS make provision for reports from individuals. This may be a matter of where analytical emphasis is placed. The ASRS and the AERS, in accepting reports of problems from an airline pilot or mechanic on the one hand or from a prescriber or consumer of prescription drugs on the other, seem to place greater responsibility on their own analysts to unravel the problem.

A central issue in pending patient protection legislation is the ability of a patient to appeal—and perhaps ultimately to file suit over—a decision that he deems a wrongful denial of care. Some of the same questions with respect to patient empowerment are raised by error reporting proposals. What options should a patient have? Focusing on institutions underlines the systemic complexities to which experts attribute most medical error and avoids searching for an individual scapegoat. But does deflecting attention from individuals to systems deemphasize the individual patient as well? As the health care system continues to move from institutional settings to more ambulatory and home-based care, the role of the patient in care delivery grows even more critical.

Finally, what are the rights of the patient or the patient's family members to be notified that an error has occurred? To what extent should they be privy to the results of an ensuing investigation by the health care organization?

Purchaser Commitment

A complaint sometimes voiced with respect to existing quality-reporting programs, such as HEDIS, is that, after information is laboriously (and expensively) collected, it carries little weight in employers' contracting decisions. Jon Gabel and colleagues, in a study conducted for the Commonwealth Fund, found that just 5 percent of employers offering an HMO rated HEDIS information as very important in selecting a plan.[13] If safety-conscious organizations that are willing to learn from mistakes rather than conceal them are not rewarded by more patients and/or more advantageous contracts, error reporting loses the ability to drive change that the IOM envisions for it. Some large employers already are taking steps to factor patient-safety measures into their procurement processes. Medicare and Medicaid could have a powerful effect by following suit.

The Culture of Medicine and the Culture of Blame

It has been widely observed that a major challenge to creating a culture of safety is the existing culture of medicine, wherein physicians are schooled to believe that they should be in control. While one might think that it would be a relief to admit one's human fallibility or at least interdependency, the issue of blame acts as a strong deterrent. Medicine may be a culture of perfection, but 21st century America seems to subscribe to a culture of blame, the notion that "someone should pay" when harm is done. The IOM has tried to address this by recommending institutional accountability for serious harm and a parallel system of constructive, nonpunitive investigation and improvement. This is a delicate balance; whether fear of liability on one hand can co-exist with trust on the other remains to be seen.

Certainly the patient-safety advocates have been eloquent. Donald Berwick, president of the Institute for Healthcare Improvement and a member of the IOM committee, has said, "You don't get to safe systems that have human beings in them by yelling at them or asking them to try harder. You need to engineer the work environment so that normal human limits are respected."[14]

Some doctors, however, feel that looking to systems solutions is just another interference on the part of managed care. The chairman of medicine at a New York hospital recently profiled in the *New York Times* spoke to a group of interns about the importance of personal responsibility, warning them not to "ship the blame elsewhere—to a computer, to the next shift...to the system."[15]

THE FORUM SESSION

Key Questions

Among the questions to be addressed at this session are the following:

- What factors are critical in eliciting commitment to error reduction?
- Is the IOM's emphasis on error reporting as a central strategy the best way to proceed? What is the dynamic that will make a reporting system work as intended? How can information about medical errors and how to avoid (or correct) them be most effectively accumulated and disseminated?
- Should a Center for Patient Safety be created? Should it be part of a federal agency? Is AHRQ the right place for it? Should the center have any type of enforcement powers?
- Once error reports are made, who will analyze them? Just as active-duty pilots rotate through the ASRS, will practicing physicians and pharmacists rotate through state error-reporting systems? How will error systems counter probable physician complaints that they are not being evaluated by their peers?
- Is there a role for consumers in medical error reduction? What about provider professional societies?

- Why have not more institutions followed the lead of the Veterans Health Administration and implemented seemingly obvious safety procedures such as computerized prescription entry and bar-coding medications? What (or who) are the barriers to taking steps already known to reduce error?
- Is there a way to merge the two currents in patient protection? Can coverage appeals and other elements drawn from the Patient Bill of Rights and error analysis and practice improvement share common strategies?

Speakers

The five presenters featured in this Forum session are deeply involved in quality improvement and error reduction activities.

Paul H. O'Neill is chairman of Alcoa, having also served as the company's chief executive officer from 1987 through May 1999. Prior to joining Alcoa, he was president of International Paper Company. He was on the staff of the U.S. Office of Management and Budget from 1967 through 1977 and was named deputy director in 1974. He serves on a number of boards and as chairman of the RAND Corporation and the Working Together Consortium's Healthcare Initiative in Pittsburgh.

John D. Clough, M.D., F.A.C.P., is chairman of the Division of Health Affairs of the Cleveland Clinic Foundation. He joined the staff as a clinical rheumatologist in 1971, following three years at the National Institutes of Health. In 1979 he became chairman of the Department of Rheumatic and Immunologic Disease, a post he held until accepting his current position in 1991.

John M. Eisenberg, M.D., M.B.A., is administrator of the Agency for Healthcare Research and Quality, in the Department of Health and Human Services. Appointed to head the agency in 1997, he previously was chairman of the Department of Medicine and physician-in-chief at Georgetown University. He was a founding member of the Physician Payment Review Commission, which he chaired from 1993 to1995.

Kenneth W. Kizer, M.D., M.P.H., is the president and chief executive officer of the National Forum for Health Care Quality Measurement and Reporting. Prior to taking this position last year, he served for five years as the under secretary for health in the U.S. Department of Veterans Affairs. His professional experience includes practice as an emergency medicine physician and a variety of positions in academia, philanthropy, and state government.

Nancy Ridley, M.S., is assistant commissioner for the Bureau of Health Quality Management in the Massachusetts Department of Public Health. She has spent 20 years managing a variety of state public health programs. For two years, she has been an active member of the steering committee of the Massachusetts Coalition for the Prevention of Medical Errors.

ENDNOTES

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2. Mark R. Chassin, "Is Health Care Ready for Six Sigma Quality?" *Millbank Quarterly*, 76 (1990), no. 4: 587.

3. Institute of Medicine (IOM), *To Err Is Human: Building a Safer Health System* (Washington, D.C.: National Academy Press, 1999), 21.

4. IOM, *To Err Is Human*, 22.

5. IOM, *To Err Is Human*, 19.

6. At the time *To Err Is Human* was originally published, what is now AHRQ was still the Agency for Health Care Policy and Research.

7. IOM, *To Err Is Human*, 59.

8. IOM, *To Err Is Human*, 71.

9. Robert Pear, "Group Asking U.S. for New Vigilance in Patient Safety," *New York Times*, November 30, 1999.

10. IOM, *To Err Is Human*, 74.

11. IOM, *To Err Is Human*, 90.

12. IOM, *To Err Is Human*, 110.

13. Jon R. Gabel, Kelly A. Hunt, and Kimberly Hurst, "When Employers Choose Health Plans: Do NCQA Accreditation and HEDIS Data Count?" (New York: The Commonwealth Fund, September 1998).

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15. N. R. Kleinfield, "Life, Death, and Managed Care," *New York Times*, November 15, 1999.