Using Quality Measures in Health Care Management: Myths, Realities, and Possibilities

Proceedings of the Thirtieth Annual George Bugbee Symposium on Hospital Affairs, May 1988

CONDUCTED BY THE GRADUATE PROGRAM IN HEALTH ADMINISTRATION AND CENTER FOR HEALTH ADMINISTRATION STUDIES

GRADUATE SCHOOL OF BUSINESS
DIVISION OF BIOLOGICAL SCIENCES
UNIVERSITY OF CHICAGO

The Thirtieth Annual George Bugbee Symposium on Hospital Affairs conducted by the Graduate Program in Health Administration and Center for Health Administration Studies of the Graduate School of Business, Division of Biological Sciences, University of Chicago, was held at the McCormick Center Hotel, Chicago, on May 13, 1988. These symposia are a reflection of strong concern of the Graduate Program in Health Administration with complex current issues in health care management.

The topic for this, the Thirtieth Symposium, was chosen by a committee of the Alumni Association because of its relevance in this period of changing environment for health care institutions. These proceedings are published and distributed in the hope that they will prove useful to both practitioners and students of health care management.

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INTRODUCTION

RONALD ANDERSEN. Welcome to the 30th Annual George Bugbee Symposium. This symposium is sponsored by the Graduate Program in Health Administration at the University of Chicago and the Alumni Association of the Program. Our symposium each year is devoted to a topic selected by faculty and alumni for its relevance to current as well as longer-run health policy and management practice. We hope that our symposium will suggest approaches to improve viability and growth of health services organizations.

The symposium is directed toward alumni of the Program, colleagues and friends of the Program and the Center for Health Administration Studies, and students studying health services organization and finance. It is named in honor of George Bugbee, former director of the Program and Center. Among his many accomplishments, George ushered in the modern era of graduate education in health administration based on a blend of sound scholarship, health services research, and practical application in health management and policy. We hope to follow that formula in our symposium as well. The coordinator for the symposium is Odin Anderson, professor and former director of the Center, and our facilitator is Margarita O'Connell. Contributing members of our alumni council to this symposium include Richard Gifford, president of the Alumni Association; Paul Maddrell, and Charles Goulet, as well as participating faculty David Dranove and Lynd Bacon.

Our symposium topic this year is "Using Quality Measures in Health Care Management: Myths, Realities and Possibilities." All of us are aware in recent time of the increased emphasis on quality in health care and the trade-offs between quality and cost. We want to explore today how quality measures are being used and possibly misused for management and policy purposes and look at directions quality management is likely to take in the future. A talented group of speakers will explore these quality issues from different perspectives, including those of providers, consumers, regulators, and third-party payers.

We'll begin with an overview on the state-of-the-art of quality measures presented by Dr. Donn Duncan. Dr. Duncan is Chairman of the Board for Health Systems International in New Haven, Connecticut. He's also a practicing surgeon in Tucson, Arizona. His specialty training was done at Johns Hopkins University. He has been interested in health policy and its implications for many years. He served on the Board of Directors for the Health Planning Council of Southwestern Arizona and also for professional review organizations. He has been a hospital trustee and chief of staff for El Dorado Hospital, an HCA affiliate. Donn has been involved in the development of area-wide physician credentialing and has published in clinical research as well as in the areas of quality assurance and physician credentialing. We're pleased to have Donn as our lead-off speaker today.

DONN DUNCAN. This is, for me, a return to the city of my birth and the state of my youth. It's a privilege and a pleasure to be here and I want to thank Odin Anderson and Ron Andersen for an unusually well thought out and very timely topic that we're going to address today. For those of you who missed Dr. Robert's kick-off yesterday, it was a very stimulating experience to hear what is being addressed in the new areas of measurements in health care. I feel that it is significant that as academicians and regulators, consumers and payers, and administrators and physicians, we've accepted this invitation to come explore the concepts, the measurements and the imperatives of quality. What a different economy our auto manufacturers would have today had they accepted the invitation to quality from the Japanese in the 1950's and 1960's. But each of us in our various institutions has started on the track for quality. But, as Will Rogers said, "Even though we're on the right track, we'll get hit, if we just sit here." So let's look at what is quality and what are quality measurements, realizing that the purpose of these measurements is not only to evaluate, but to modify behavior.

Remember that during the last ten years more information has been collected about the world than during the preceding 10,000 years of mankind and medicine is included in this information explosion, but do not become pessimistic about the numbers of measurements and the task before us. When my family looked out in the backyard of our home in southern Illinois at the fruit trees with the copious fruit on them, trying to figure out what we were going to do with all the fruit, my father said, "Don't worry about it. Eat what you can, and what you can't eat, can." And that's what we need to do with all this information we're going to hear about today. So, let's see what we can digest.

When we talk about quality, we first need to have a definition and I carefully couched this with enough caveats to let me out of any stringent statistical observations. Being a physician gives me license for less rigid statistical constraints, and the second caveat, a practical approach, lets me define the terms. But if we are going to talk about quality, let's look at how some others have defined it. First with the industrial approach is "the insuring of conformance to requirements," which essentially states that we must have our standards. Williamson said that "quality is achievable, benefits not achieved," which is perhaps the lack of quality, but it does point out that we cannot have unachievable or too academic standards. It should be reasonable. And the AMA states that quality is "that which consistently contributes to improvement or maintenance of the quality and/or duration of life." Therefore, any definition of quality has to be linked to outcomes. Now, the Joint Commission defines quality as "the degree of adherence to generally recognized standards of good practice and achievement of anticipated outcomes." So we have our comparative profiles. And Deming states that "reliance on inspection for quality is both ineffective and inefficient," because when you find the defect, it's obviously too late, so the ultimate focus must be on prevention. Let us define quality as a conformance to agreed upon standards for the prevention of avoidable, adverse risks or outcomes. We will do this by the identification of failure to meet standards that have been set.

Historically, we look first at the structure in an institution. We ask, "Did we have in place the equipment, the personnel, the committees necessary that imply quality performances could occur?" We next looked at the process of care, the treatment protocols, the evaluation of aseptic techniques in the operating room, the timely reporting of x-ray findings, the innumerable audits. I'm not minimizing the process of quality, as it may represent a large portion of opportunity, but we now look at outcomes and question the accuracy of diagnosis, both clinical accuracy for real-time treatment intervention and coding accuracy for retrospective analysis and profiling.

We're all familiar with the publishing of statistics, especially on mortality, complications, and readmission. But we can now answer to those statistics with *case mix* and severity adjustment with more accurate reflection of those statistics. Resource measures such as cost and length of stay can be refined with acuity or severity measures which anticipate which patients will most likely become your cost or length of stay outliers, which means these measures allow us to manage rather than to react. We also have necessity measures, "Is that admission or surgery necessary?"

Patient satisfaction is normally analyzed in post-discharge surveys. This is appropriate, but when an adverse event occurs during hospitalization, immediate intervention is required. A large hospital group was able to change significant numbers of patient's attitudes following an adverse event. They did this with what is known as an ombudsman, an intervention team which went immediately to the patient. It tried to determine and ascertain what the adverse outcome was, and then immediately and appropriately, if possible, react to it. Before the immediate intervention program, only 50 percent of the patients queried would return to the same facility. But after the intervention program, approximately 95 percent stated they would return. Impressive statistic. We now see risk management programs expanded to evaluate both clinical and administrative incidents, from falls to malpractice. And the credentialing of physicians and all allied health care professionals now includes not only what did they do, right or wrong, such as complications, poor citizenship, or malpractice, but what specific diagnoses can they treat, what procedures can they do. This is our current direction of privileging. But perhaps the most rapidly expanding area of interest is now in clinical indicators, health status, and severity adjustment. We can now demonstrate which doctors' patients improve or deteriorate, and answer the question of premature discharge: Are patients being discharged quicker and sicker? I testified before Congress, trying to answer that specific question about quicker and sicker, and used as one of the examples the fact that 20 years ago, when we did a herniorrhaphy, the patient would remain in the hospital from two to three weeks. The patient would be sent home with his sutures removed, not requiring antibiotics or pain medication, and immediately returned to work. Now, that same patient if he were admitted, and most of them are done as outpatients, would obviously go home with his sutures, occasionally go home with antibiotics, and most patients go home with some pain medication. It certainly is quicker and most would contend sicker. I tried to point out that those patients rarely get nosocomial infections, pulmonary emboli, have atelectasis or pneumonia. So I think we have to very carefully define our terms and ascertain if this is really a change in practice patterns. The severity of illness concept is having a good reception by physicians, as this allows a physician to look at his or her patient mix with greater specificity, and we can objectively demonstrate whether patients are discharged sicker.

If we are to look at quality, we need a process, and if good quality is a conformance to agreed upon standards, we must first evaluate the standards to make sure they are clearly defined and relevant. Perhaps the key to this process is that the standards are agreed upon by your key medical staff, because they are the people who will have to communicate and gain the commitment of the entire medical staff. Those people in the institution who have the respect and the positions of responsibility must be the ones who will carry this commitment forward. When the deviations from the established standards are measured, they're evaluated to determine if they are disease-process deviations or truly adverse outcomes. Then, we take action and modify behavior. Monitoring, especially with the development of indicators, is the core of the prevention process. We periodically review standards, because the standards are changing dynamically in health care. Regulatory aspects are changing and technology is changing, so we have to periodically review these standards. Now, the Joint Commission is becoming more aggressive with a performance-oriented accreditation system with specific indicators, which are clearly defined, measurable, clinically relevant, and adjusted for severity. Since the clinical indicator is the core of the system, I'd like to take this opportunity to look in-depth at one of the systems.

A clinical indicator is defined as an occurrence with a significant probability of being associated with an adverse patient outcome. These are things that, when they occur in a hospital, have significance. The genesis of the clinical indicator is very interesting. It actually began in 1976 in California when the medical association, in response to a malpractice crisis, tried to create a system where they could compensate what they defined or described as potentially compensable events, or PCE's. They ranked them as deaths, a major permanent injury, major temporary injury, minor permanent, and so forth. Then, they tried to develop a compensation system. Something very interesting was derived from that system and that was the fact that prior to the adverse outcome incident, or a PCE, potentially compensable event, certain indicators were noted, such as an unplanned return to surgery, and then something happened to the patient, or an unscheduled transfer to a special unit, such as your intensive care unit, or something that happened or was happening or about to happen to the patient such as an acute MI during surgery. That was the first utilization of indicators, called generic outcome screens. This was the genesis of the clinical indicators we are now beginning to see and that the Joint Commission has brought forth and recommended.

Let us look at some of the Joint Commission indicators that have been recommended. First, there are hospital-wide indicators which may occur in any or many particular areas: developing or worsening of decubitus ulcers, the development of pneumonia in patients treated in special care units. They also have location-specific indicators, such as anesthesia indicators; e.g., cardiac arrests related to anesthesia care. There is an interesting story about this particular indicator. At a particular institution a patient had a cardiac arrest, and at the time of arrest, blood is frequently drawn for examination. The blood in this patient was drawn and it was noted that she had extremely low potassium, hypokalemia. It's known that with certain general anesthetics a very low potassium predisposes the heart to irritability, to arrhythmias and cardiac arrest. It is also known that many diuretics lower the potassium, and indeed this patient had received diuretics. The indicator now is: Patients receiving diuretics must have their potassium evaluated prior to a general anesthetic. This is a very exciting development. Discovery of the opportunity for preventing adverse events

is by any definition, better quality. Now, the Joint Commission will also recommend some specialty-specific indicators, such as in obstetrics and anesthesia.

If we have these indicators, we need a process to collect and evaluate them. When a clinical indicator occurs, record first what was the indicator, such as unplanned return to surgery, and we want to know when it occurred. There is the recent story of the ICU nurse who was injecting patients with a lethal substance. She was found by knowing when it occurred. It was on her shift that these patients were being mortally injured.

You want to know where it occurred—the location—and who is responsible for assessing whether the clinical indicator was the result of poor quality. Someone has to make that decision, and that person should be a person who is a peer of the person under consideration. The reason for that is, in addition to assessing the clinical indicator, there will have to be a judgment made whether that clinical indicator was indeed the result of poor quality.

If the clinical indicator is determined to be a quality problem, then you record what actually happened. Before we were discussing the CMIFS Study, *The California Medical Insurance Feasibility Study*, which gave us the generic screens. We derived from that study that the description of the actual impact on the patient would be death, major permanent, major temporary, and so on. An example of this: Major permanent injury could be blindness; major temporary, a paralysis that clears; minor permanent, scarring from a burn; minor temporary, a drug reaction. And then we should record the potential impact on the patient. When a potentially compensable event occurs, it does not always lead to an adverse outcome, such as a wrong medication given to a patient.

Then, we want to know the cause of the quality problem. Is it a performance problem? Delay? Did the patient rupture his appendix because the doctor always takes two hours coming to the operating room? And, we want to know who. Who is responsible for the quality problem? And lastly, the action taken to correct this problem. This information is then retained for profiling as it's an opportunity for credentialing your health care professionals.

Dr. John Smith is a surgeon. It is his time of reappointment. During this period of time, we have been collecting these quality indicators. This is just a condensed list of a long list of surgical indicators. We collect in the third column the volume or the number of those indicators. And, the next column, how many are a problem, and which of those were the physician's responsibility? Then, the average adverse effect. This is ranked—six would be death; five, major permanent effect. This is just one of the myriad of measurements one can use with this information.

What are the pitfalls and the problems that we're seeing with all these measurements? First, we discovered that a lot of the information that was being collected was not very accurate, but fortunately we now have systems which enhance our accuracy. First, make sure that we're getting good information. Without your commitment as leaders and that of your key medical staff, you will not have acceptance by your medical staff. You can't have a system and not have teeth in it, because their failure to act will lead to a loss of credibility with your medical and hospital staff. The standards must be attainable, must be

achievable. Failure to comply will expose the hospital to legal risk. If we fail to maintain the standards as the dynamics of medicine change, they will be inappropriate. I added another potential problem that may be the most important of all: the dehumanization of patients. We must not forget that all of these measurements are attached to somebody. See what happens to patients? They begin to become numbers.

Fortunately, these problems are not fundamental, and they can be solved. In fact, we're seeing a significant number of benefits, and this is the really exciting part. You increase hospital staff morale. People are eager to be talking about and involved in quality. By the nature of our expectations, higher quality institutions attract a higher quality medical staff. You can have greater specificity of evaluation and improve your credentialing process. You're prepared for a closed staff. You have good communication, and you have a "do it right first time" syndrome in which productivity improves with your commitment to quality.

I've responded somewhat to Ron Andersen's request. This is, if not puncturing a myth, at least swinging a needle at a balloon—and that is higher quality can lower cost. Be courageous. Higher quality *does* lower cost. We've just completed a study that shows that, on average, a nosocomial infection will double the cost of a hospital stay in patients with similar diagnosis, similar characteristics, matched DRGs. We're talking about the same patients, that on average, a nosocomial infection will double the cost of their hospital stay. We are now in what, I feel, is the most exciting part—what are the patient characteristics or the indicators that precede that adverse event, that infection? We're basically following and examining those patients regularly to determine what characteristics, which hopefully we will be able to ascertain on admission, they have that will identify them as at risk for this adverse outcome. Then prevention can occur.

When price is leveled, you can differentiate on quality and have an opportunity for increased market share. Improved quality decreases liability. You'll be better prepared for future reimbursement issues. You'll have greater negotiating strength with payers and HMOs and PPOs. You'll be prepared to respond to the regulators. What an enviable position to be in—to be your community leader based on quality.

It's appropriate to talk about the future. What are some reasonable predictions relative to these measurements? Before doing this, I always like to look at the track record of other prophet's predictions. "The world won't need more than six mainframe computers," Thomas Watson, a knowledgeable individual, 1944. "Japan will never be a threat to the U.S. auto industry," *Business Week*, 1956. And "I don't need a bodyguard," Jimmy Hoffa, 1974.

In spite of these, I feel safe with the following predictions. New quality measures will continue to be developed with increasing specificity, and with clinical indicators for each of our I-9 codes. QA activities will continue to improve the quality of care. Quality not only will become, but must become, a prime focus of hospital management. Quality measurement will not only identify the lack of quality, but will begin to define optimal quality. Not what went wrong, but reasonable expectations. And the emphasis of quality activities will change from review and evaluation to prevention. If you're an administrator, the most important aspect to your economic future, I do believe, is that the price paid for hospital care will in part be determined based on the hospital's performance on quality

measures. The hospitals that most effectively communicated the quality of their care will be the ones that succeed in the 1990's.

Statistics are necessary but insufficient to have quality. It takes commitment. What an opportunity we have. I would just like to recommend a book totally unrelated to health care, a non-medical book, that's a story of quality. It's my current airplane book, by the way. It's the story of Ray Kroc, founder of McDonalds, and his commitment to quality. Ray Kroc drove that industry by his commitment to what he called "QSC": "Quality, Service and Cleanliness." I believe that health care will be driven by QSC also, by quality, service, and communication—our ability to communicate our quality to our payers and to our consumers. To be successful, quality must be managed and quality must have top management commitment, not just involvement. Remember that leaders are just ordinary persons with extraordinary commitment. Management must be dedicated to the on-going improvement of quality. We must continue down the right track for quality, knowing that this is something we can impact—something as leaders and administrators that we can change. Not everything we can change. Sir Winston Churchill was at a reception—and those of you who read *Churchill* know that he liked his brandy, frequently to excess. And, he'd been drinking at this reception when a young woman came up and said, "Sir Winston, you're drunk." He said nothing, and she left. He continued to enjoy his brandy. She returned. She said, "Sir Winston, you're very drunk." Again, he said nothing. Again, she left. And again, he enjoyed more brandy. She returned. She said, "Sir Winston, you're really very drunk." He looked up and said, "Countess, you're ugly, Countess, you're very ugly, Countess, you're really very ugly. And tomorrow, I'll be sober." Tomorrow the emphasis on the importance of quality will still be with us.

QUESTIONS AND ANSWERS FOLLOWING TALK BY DR. DUNCAN

DONN DUNCAN. I neglected to mention the name of the Ray Kroc book. It's called *McDonalds: Behind The Arches*. It's written by John Love. It's a hard copy book, if you're interested in finding it at your bookstore.

QUESTION. The statement about higher quality resulting in lower costs seems almost too good to be true. You are all aware of the distinction between Cadillac and Volkswagen medicine and the general belief that Cadillac medicine's higher quality, but also includes higher costs. And I recall Edward Kennedy talking about his hope that all people would receive the same quality of care that his father received. It was extremely extensive and some of us wondered if that wasn't a bit unrealistic. And, I wonder how we reconcile this kind of optimistic relationship that you're observing with some of these past observations.

DONN DUNCAN. I knew you were going to ask that question, because I saw your eyebrows go up yesterday when one of your students said, "I think I know that higher quality lowers cost." And he said, "We want to think that, but where's the evidence?" I think part of the answer lies in that we have historically confused quantity of health care, because we never really talked much about quality. Because there's always been an attempt at good quality of health care. But now that we begin to feel we can measure or have measurements that we can use as surrogates for quality, we're beginning to talk about quality in its real sense and your example and the examples of unit costs are really more related to quantity. How many units of care are available? And more units of care cost more dollars. But we're talking about perhaps lessening the quantity through the methodology of improving the quality. For example, the nosocomial infection I gave as an example. The minute that infection is documented, then we start increasing the unit cost, because of the expensive antibiotics and probably the increased length of stay and the other things that are occurring. Because we didn't have quality measurements, we were confusing how much is available to the person. You know the old story that when the doctor's in, London went on strike, health care improved. That's reaching a little bit, but they have less quantity and perhaps better quality.

QUESTION. I get the impression that the quality concept is now after the patient is in the system. You also better include quality as to the growth of ease of access to the system for acute care particularly and also the convenience of access to the system. I mean, from here, you've heard, "See your doctor early." Now, they're seeing the doctor too early, at least by some allegations. Are you incorporating quality in access to the system?

DONN DUNCAN. Yes, and an excellent point. This happened to be one of the concerns when we were discussing quality of care issues with Congress. If Congress gives the wrong incentive to those people who control the institutions, where at least acute care is delivered in a hospital, and the incentive states that we're not going to pay you enough for your burn patients or your people with the leukemias—that is, the patients that appear to be insufficiently reimbursed for the resources that they consume, then we're giving a wrong message. And, I think it's very important that the people who are determining what these reimbursements will be are sensitive to that issue. There are other things we didn't touch

on. For example the severity system. If used appropriately, we will be able to objectively measure those which should have access to the system. Very critical. But I think your point's well taken, and I think it's in an area that we need to explore more.

QUESTION. I might add this also. I began to feel that the doctor and management will be entered into an almost unconscious collusion against the patient and all the determinations are professional and bureaucratic. And the patient, himself or herself, will have less and less control over what takes that person to the system.

DONN DUNCAN. That's a good point.

QUESTION. You spoke of quality. You spoke of management's role. I wondered if you'd speak a little bit towards government's role, particularly as they are looking at what indicators they can use to evaluate quality of health care, which they have responsibility to share.

DONN DUNCAN. Let me restate what I think was the question. You're talking about the example of the Joint Commission obtaining indicator information and how that will be used to assist or to determine regulations for management, is that the question?

QUESTION. What I'm looking at is the Board of Trustee level. What do you see as the future requirement for hospital board composition for quality care?

DONN DUNCAN. Thank you. Yes. I think we're going to see a necessity for a change in the composition of boards and this is always a sticky question in any institution. We've gone from the only person who was an administrator and a physician, to trained and skilled professional managers today. I feel that the number one role will have to include a significant number of physicians who can help that board have better understanding of these complicated issues. However, I've been impressed with the value of business people, lay people, sitting on boards who can make excellent decisions, because they understand the principles of good management, understand the principles in general of quality. You don't have to be a physician to understand valid measurements of systems. I would say that, if your board in general does not include physicians or those people who have some peer relationship for understanding these new measurements coming out, it will be a change that will be critical in the future. However, I've also been part of an institution that had virtually an all physician board, and I thought that was as inappropriate.

A PROVIDER'S VIEW—THE OTHER QUALITY INDICATOR: CORPORATE VALUES AND ETHICS IN A CHANGING HEALTH CARE ENVIRONMENT

RONALD ANDERSEN. Our second speaker is Richard Wade. He has been vice president of communications of the Maryland Hospital Association since 1979. Prior to this, he served as press secretary to various officials in the State of Maryland. In his career he's done extensive work in journalism and in television writing as well. He's a trustee of the Annapolis Opera and Colonial Theater. We're pleased to have Richard here to present the views of a provider organization, which is very much interested in other aspects of quality as well.

RICHARD WADE. Good morning. I'm from Maryland, a most unusual state, particularly in terms of the things that happen with regard to health care. Let me introduce Maryland to you. It's where the Chesapeake Bay is, as some of you know. It's the home of the "Star Spangled Banner." You can go out to Fort McHenry and see where an important event in our history actually happened. Babe Ruth was born there, and Edgar Allen Poe died there. Maryland is also the birthplace of a woman for whom a king of England once gave up his throne—Wallis Simpson. It has a city, Baltimore, which is rising from urban decay. If you have visited us, you have seen the enormous progress of the Inner Harbor. It's very impressive. And we have a baseball team that I won't even begin to discuss with you.

It is the land of fallen political heroes. Spiro Agnew was once our governor. Back in the 1970's, we seemed to have a continuing stream of political leaders who left public office and reported to a federal penitentiary in Pennsylvania. We're also a state with state level hospital rate regulation and believe it or not, hospitals support it. We also probably have more data available publicly about the financial and clinical performance of hospitals than anywhere in America. And while that may sound like an enormous pain in the neck for institutions, it's turned out to be a blessing in its way and it's an important part of the context of what I'm going to talk with you about today.

Perhaps no facet of the environment in which hospitals function has changed as dramatically as the effort to define quality and to measure it. Everybody's getting into the act. The Joint Commission is making some remarkable progress. Insurers are preparing to plunge in, as are other constituencies. I learned recently that the Health Advocacy Program of the AARP is eager to begin to study quality data and to do their own analysis of it. The Washington power of what is known as the "Grey Lobby"—Claude Pepper and AARP—means they will be extremely influential in helping people in their constituency determine their definition of quality.

All of this began as a spark. It flared a few years ago in highly regulated states such as Maryland, where data became public and an enterprising press pursued it into print. Just a few years ago on an August afternoon, I received a call from the *Washington Post*. The dialogue went something like this. *Post* Reporter: "I'd like your comments on the Nader report." MHA: "What Nader report?" *Washington Post*: "Oh, I just came back from a press conference. The Ralph Nader Public Health Research Group has released its report."

(I'll never forget it as long as I live.) *Post* again: "*Surgery in Maryland Hospitals 1979 and 1980—Charges and Deaths.*" What happened? The Ralph Nader Public Health Research Group had gone to the Maryland Health Services Cost Review Commission, our regulatory agency, and tapped into the extensive public data base there. It was a Maryland study because Maryland was the only state with so much data so public. It wasn't very subtle, but it was effective. And, it was more than a spark. It began to happen in other places around the country. The PROs evolved, but hospitals deflected, generally, charges of "quicker and sicker" discharges. The PROs were, after all, a cost-cutting, cost-saving mechanism. The sparks really turned to flame a couple of years ago when the HCFA began the public release of Medicare mortality data. That unprecedented action, and the behavior of hospitals and others it spawned, left much to be desired. That first wave of the release of the rawest kind of quality data—mortality data—drew resentment and defensiveness from hospitals and doctors. Some insulted the public and their patients and other constituencies by implying that such data and what it meant were none of their business. And the most pivotal action of all, perhaps, was when the old Joint Commission on the Accreditation of Hospitals secured a new name, a new leader and a new set of objectives—the Agenda for Change. If I wanted to graphically demonstrate the impact this is going to have on hospitals, I'd show you an old *New Yorker* cartoon of several years ago. There's a mountain and standing at the foot of the mountain is a grizzled, gnome-like man with a beard. He's dressed in skins and furs, and he has a yoke on his shoulders. And, on each side of the yoke is a huge bucket with steam pouring out of it. The caption: "Before the invention of the volcano, the hot molten lava had to be carried down the mountain by hand to pour on the sleeping villagers."

Now, think about that. Hospitals are the sleeping villagers and the HCFA, the Joint Commission and everybody else getting into the act are the volcanoes. An overstatement? Not by much. Health care professionals and others eventually will sort through the quagmire, arrive at better measures of quality. But how, then, will these perceptions of what constitutes quality affect reimbursement, competition, consumer choices and clinical decisions?

The debate over quality soon will leave the comfortable cocoon of research and theory, and enter a very dangerous, practical and political world. Now, as the one offering you today the provider's point of view, here is a brief, narrow perspective of how I think providers may handle the transition to this new era of quality measurement. The short answer is torturously. Hospitals, by their nature, their organization and their constituencies are designed, and created to be centers of conflict and contradiction. The educational and political tasks before us as institutions are enormous in getting through this transition. We haven't even begun to address that aspect of the transition. We still are finding a language. But let's begin with hospital boards of trustees. Not only boards today, but trustees of the future. As we prepare leaders from the community to be part of the hospital governance system, we have to begin to identify ways to get them to think about these kinds of quality issues. The old ways will not do and failure to meet the new challenge could seriously harm efforts to preserve the voluntary, historical roots of America's hospital system.

Remember when we used to have hospital administrators? They've vanished. Today, we have CEOs. We're very corporate. Can that hold in this era of transition? Hospital executives at every level may well be forced to rethink the shape of their role inside the

institution in this age of quality accountability. There'll be more than mere accrediting and regulatory standards. We're really looking at a change in the institutional way of life.

Hospitals must begin to invent a new language for talking with our very many publics. We've lately become enamored with the corporate way of talking to our publics. We have product-line management in our hospitals. We have business plans. We're diversifying. Can we afford to lose the public's trust? Is our candor important to the transition to the quality era? Do we have to begin to talk to our publics in a different way?

I'd like now to try to put quality into a larger context—with some other challenges facing hospitals. The next few minutes may be very depressing. But hospitals in America face an eroding public and political image overlayed on the already incredible economic pressures they face from every side. We have gone down the road of marketing advertising, joint venturing and the whole entrepreneurial package with little or no knowledge of or preparation for its effect. They are roads strewn with broken glass and potholes. Hospitals, as community institutions, are trying to cope with a breakdown of a series of historical relationships that—until probably this decade—helped us be strong, caring and right-minded places. Hospitals and doctors are at odds. Doctors in competition with hospitals, stealing their business and even their employees. Whole medical staffs in revolt. House staffs talk about unionization. Doctors, frustrated with a perceived loss of power in their ability to treat their patients as they would want to treat them, blame hospitals, not always the reimbursement system or other controls on them. They take it out on the only sure thing that's in sight: hospitals. Nurses and hospitals. Nurses and hospitals are staring at each other across a chasm today, and while we would like to think it's economic, there's more to it than that. Nurses are looking at the traditional center of their profession: hospitals and seeing institutions either unable or unwilling to shake off ancient stereotypes and become agents for change in their professions. Their work environment, their image, and the way they're treated by others are at issue and hospitals seem loathe to help. In Maryland, we created a Center for Nursing at our hospital association. As we went around the state, doing focus groups with nurses, one thing we heard time after time was the nurses' frustration that when they have ideas to improve quality or efficiency in their institutions, they more often than not fall on deaf ears. We don't listen.

And, for all the guest relations and marketing, I wonder: Is the distance between hospitals and their patients actually widening? Statistics on malpractice suits and the zeal with which new forms of regulation are dumped down upon us would seem to suggest strongly that no one trusts us anymore. Remember, I said this was going to be depressing. Are we getting high tech and low touch? Is that a quality issue?

On the political and general public fronts, everyone from members of Congress to county commissioners in Kansas are beginning to look at hospitals in a brand new way: as sources of tax revenue. This is an astounding development. Across America, the not-for-profit, tax-exempt status is under attack. Are we acting so differently today that the public is ready to treat us differently? If we behave like big corporations, society will treat us like big corporations. Are we viewing ourselves the way we want the public to view us?

Of course, we continue to be under attack from the federal government and others over costs—we're spending too much money...outpacing inflation. We're making too much

money from Medicare. We're wasting resources. We're operating on people unnecessarily and putting people in the hospital that don't need to be there. And we're discharging patients sicker and quicker. I'll end my depressing list of problems facing America's hospitals. The challenges are formidable and they go to the root of a broad definition of quality...not just care.

Coming to grips with the broader questions of quality—how we will define it and measure it at every level of our institutions, clinical yes, but governance, management, and much more. Of all the myriad challenges facing hospitals today, we must recognize that hospitals' organizational values and ethics or, in the current business parlance, our corporate values and ethics are on the line equally with our medical values and ethics. And how we manage and communicate this transition to a new era of quality accountability will be, in my view, the key to solving some of the other problems I mentioned earlier: our eroding relationships with doctors and nurses, the public's crumbling perception of us, as well as how we are viewed politically and ultimately how resources are distributed by those who reimburse us.

In Maryland, we have been concerned about corporate values and ethics and their link to quality.

First, let me give you a snapshot of the Maryland Hospital Association. Our governing body is made up of hospital trustees. The chief trustee leaders from our member institutions make up our Board of Trustees. Our policy process and much of our view of the world is tied to the voluntary character of community hospitals. Our current board chairman is a former United States Senator from Maryland. About 18 months ago, he viewed the horrible savings and loan scandal plaguing our state, the headlines about government and business ethics and asked: "Does the subject of corporate values and ethics have any relevance to hospitals and the environment in which they're operating? Does it have anything to do with the quality of care we're delivering to our patients?" He appointed a task force, chaired by a prominent hospital trustee, and including physicians and chief executive officers ...one of whom was a former chairman of the American College of Healthcare Executives. Their charge: to look at the issue of corporate values and ethics and its implications for a whole range of things hospitals were doing. The task force's first action was to come up with a definition of corporate values and ethics. Easy you might think. But actually, it took quite a while. Here it is: "A health care organization's corporate ethics are its values and standards in action as a caregiver, employer, buyer, seller, business partner, and member of the community it serves." With that statement in hand, they began a fascinating discussion and debate of some of the most critical issues facing hospitals. When they issued their report to the members of the Maryland Hospital Association several months later, they connected quality of care issues and corporate values and ethics in a dramatic way. Our corporate ethics and our medical ethics they said are entwined inextricably. They are the cornerstones of our public credibility and they are how we're going to be measured in the future—how we're going to be viewed, reimbursed, and even protected. We will be tested as community service organizations not against a standard of care, but against a standard of overall behavior.

Let me for a second digress to a brief description of what we're doing in Maryland on quality of care. You will see why the link was so direct to us. We have just received a Robert Wood Johnson grant to collect, analyze and research quality indicator data from our

hospitals. What began 18 months ago as a pilot project with a few hospitals has grown to an effort involving 46 Maryland hospitals. We are gathering data on ten clinical indicators. The goal: to give hospitals—boards of trustees, medical staffs, and executives—tools to measure and influence quality of care. I'll quickly list the indicators: mortality rates, perioperative mortality rates, surgical wound infection rates, readmission rates, readmissions to ICUs, unscheduled returns to the O.R., admissions following ambulatory surgery, newborn mortality rates, hospital-acquired infection rates and autopsy rates. Through a long process, hospitals came to a decision not only to submit such data, but to share it with other hospitals for comparison and trending by medical staffs, boards of trustees, and executives. This is research no other set of institutions in America is doing. And what is the goal? Changes in individual and organizational behavior affecting clinical outcomes.

Let's go back to that definition of corporate values and ethics and test the quality connection: values and standards in action—*first* as caregiver. Now let's look further into the report for other quality connections. Our committee zeroed in on 14 areas of hospitals' policymaking and activity that they thought were extremely sensitive to the institutions' values and ethics. They urged every Maryland hospital to review these areas in depth. Here are the fourteen; I think you'll find them interesting.

The first is very basic: the institution's *mission statement*. Does it give the community, the medical staff, employees, payers, vendors, and other providers a clear understanding of the institution's expectation of itself and, indirectly, of them?

Uncompensated care. In an era of financial squeeze and "patient dumping," is one measure of our quality of care to all the quality of care we give to those least able to pay for it?

Access to levels of care. Hospitals are often the gateway for many who seek medical care. In America today, for example, we're faced with a serious problem in obstetrical care for poor women. Some obstetricians, driven by professional liability and other concerns are telling hospitals, "There are some patients we're not going to care for, and you better figure out how they're going to get care." Hospitals are scrambling to come up with solutions. And it may not stop with obstetricians...it could well spread to other kinds of services. How we deal with those kinds of problems is a test of our commitment, not only to quality, but to our institutional values. How are we doing?

Necessity and appropriateness of care. While this issue is at the heart of our medical ethics, it also reflects our corporate value system. Do hospitals make organizational decisions which result in some people getting services they don't need—just because they can pay for it, while others are not getting services just because they can't? What about the decision to shut down a service that may be needed, but isn't profitable? Is there a quality implication there?

Advertising. Hospitals flushed a billion dollars down the media pipeline last year alone. What did we buy? Did we ever know what we wanted to buy? And what have we said to the public about our quality? Is it time to begin to use these kinds of resources for the long process of informing, educating and helping our many publics understand clearly what it is we can and cannot do, and be the advocate for our patients and those who care for them? My favorite advertising story revolves around a New York hospital—a fine Catholic

institution. It ran a touching series of ads in the *New York Times*—quarter-page, beautiful ads. No graphics, but the most warm, dramatic narratives about doctors, nurses, patients and the good things that happen in a hospital. Then, one day, another kind of ad from the hospital appeared. Its headline was, "Not our last ad, we hope." It was an appeal to the public. The hospital's advertising budget had run out and they were asking the public to contribute a quarter of a million dollars to a special fund administered by "Sister Margaret" to keep the campaigns going. It actually was two ads. The first one was titled, "In Search of Angels," seeking the funds. The second ad was "Not Our Last Ad," when the public had not responded. Just think what a quarter of a million dollars can buy for an institution.

The public release of clinical and other hospital data. How we react to the legitimate rights and needs of the public to know more about us will communicate more about us as value driven institutions than most anything else. In many states, even the most basic hospital cost data isn't available to the public. We're making a major transition to an era of quality—when the public will want to know much more than mortality data.

Conflicts of interest. Boards, management, medical staff and others. As we gain the tools to define and measure quality of care, we will be challenged to create new ways to be sure that quality is what our patients are getting. It's the interest of patients which must prevail. Yet, are there situations in hospitals where self-interest leapfrogs over the patients' interest? When a hospital offers physicians free offices, loans and business partnerships, are we always certain it's in the patients' best interest?

Purchasing, contracting, and vendor relations. On the surface another business issue. What about quality? A hospital on the East Coast suffered through a lot of bad publicity regarding the quality of their emergency room care. The hospital seemed unable to explain to the public what the quality problems were or how they were going to solve them. The inside story: the hospital was in the process of renegotiating their contract with their ER physician group when the story broke. The institution had a case of lockjaw. They couldn't talk to the public about quality when they were trying to talk to their doctors on economic issues. What was the public left to think about the quality of care in that ER?

Joint ventures. The hospital-physician joint venture is very common today and often a positive relationship for all: hospital, physician and public. But could a hospital's business relationship with another provider of care cause them to treat that provider differently in terms of quality oversight? For example, a hospital joint ventures with a physician group to open a magnetic resonance imaging center. It's a business relationship. Will that relationship cause the hospital to view those physicians differently as they practice inside the institution?

Medical staff, administration and appointments. Is credentialing in a hospital a business decision or a quality of patient care decision? Some hospital boards are having a tough time answering that question.

Network allegiances. Across America, hospitals are running for cover everywhere. They're merging, joining formal systems. They're clustering in less formal arrangements, such as the Voluntary Hospitals of America. The question: are these arrangements driven by the

institution's mission and its values? Are they affecting the efficiency and the effectiveness of patient care? For the better? If not, why not?

Competitive behavior in general is causing some troubling behavior with quality implications. Not long ago, a California hospital advertised its heart surgery mortality rate. It bought big ads in the Palm Springs newspapers and trumpeted its low mortality rate for open heart surgery, in comparison to the hospitals across town. It said, basically, "Come here. We'll do your open heart surgery and you'll have less chance of dying." The strategy made big headlines, but what were they saying to the public about the quality of care? Was it true?

Levels of profitability. A hospital's financial requirements can have an enormous impact, real and perceived, on quality of care. It is in no one's interest for the hospitals of America to starve financially. But it's probably in no one's interest either for the profit mentality to take hold. And frankly, the bottom-line mentality is gripping a lot of institutions. We'll never convince the public that more is always better. The current attacks on hospitals' tax-exempt status may be one way the public is answering: less is better.

There's more to the list of issues, but my time on the program is about up. Let me close by noting that the tests facing hospitals in the last decade of this century will transcend individual issues of reimbursement, rationing, the nurse shortage and others. I would bet those issues will be resolved if and when we are successful in dealing with the quality question. Clinical measures of quality of patient care, yes, but quality in the broader sense: quality of our caregivers, the quality of our mission, quality of our community-based governance, and quality and honesty of our communication. Are we doing the right things? Are we doing them well? The questions must be asked...in surgery and in strategic plans...in the MRI center and in materials management...at the bedside and in the boardroom.

QUESTIONS AND ANSWERS FOLLOWING TALK BY MR. WADE

QUESTION. What would be an efficient way for the public to find out more about hospital costs? Or, a way for hospitals to communicate that to the public?

RICHARD WADE. I think every hospital ought to make public its costs per admission on its ten most frequently performed surgical procedures every year. In Maryland, our Health Services Cost Review Commission issues its annual disclosure of hospital costs. Citizens can find out how much revenue the hospital took in, what its costs per admission were, how much charity care it delivered and how much its operating margins were. I cannot remember the last time I spent time on the phone with a reporter defending hospital costs in Maryland. It's so open and so often discussed, and so publicly regulated, that hospitals' comfort level is high. That's maybe one reason Maryland has moved beyond cost issues in some ways and looked at the quality issue. The process hasn't been easy for our hospitals, but I think they feel the institutions are better served when the public's expectation and understanding of us is more realistic. I think the most serious problems develop when that gap between what the public thinks we do and what we actually do is revealed. Our fig leaf falls. Hospitals must become much more accustomed to talking about these issues with their publics.

QUESTION. Could you spell out why you are in favor of explicit revelation of these costs, but you saw some problem with the hospital advertising its mortality rates compared to the hospital across town?

RICHARD WADE. I think using raw mortality statistics for something like open heart surgery and saying to the public, "We're a better hospital because of our mortality rate," is kind of a one-time, high-risk, dishonest claim. The next year your mortality data may look a lot different, but you won't take out the ad saying, "Oh, by the way, the other hospital across town now has a smaller mortality rate than we do. Go there." Using that kind of information to suggest to the public that it's somehow safer at one hospital based on one year of mortality data is in no one's interest. Cost information, when it becomes public, may cause patients to ask more questions of their physicians. But don't we always say: "Talk with your doctor"? Most patients have a tough time talking to their physicians about quality, much less costs. "Gee, doctor, why are you putting me in the hospital? Is there another hospital where you practice at which the length of stay may be less? Where the costs per admission may be less? Why am I here as opposed to somewhere else?" We say we want our patients to be more involved in health care decision-making, and yet, as institutions, we're reluctant to give them the very information to help them be more involved. We rely solely on the doctor-patient relationship to answer those questions. It's time to open the dialogue.

QUESTION. So, some information is appropriate to disclose and other information is not. Who decides what is appropriate and what is not appropriate?

RICHARD WADE. I think any information is appropriate, if it's in the proper context. The hospital that did the ad on the mortality rate of their heart surgery lacked context.

It didn't explain to the public what mortality data is, and how much weight should be on the mortality rate at that institution. I think eventually there's going to be so much information public that we're going to be involved less with the information than with context.

QUESTION. If costs are going to be published, what about charges? Should those be explained?

RICHARD WADE. Yes. I think the public ought to know what the operating margins of an institution are. What is the appropriate level of profitability for a non-profit institution? Most people in this room are going to work in non-profit institutions. What are the institutions' requirements for plowing back into services and technology? And beyond that, do you have a responsibility to give money back to the public if you make a great deal of it? There is a real value-based set of decisions there, and I think the public needs to be involved in them. Squealing about hospital costs in this country is not going to end anytime soon.

QUESTION. I'm really bothered by the belief that profitability in an institution is a bad thing when the institution is a hospital, but nobody ever objects to some corporation being the most profitable in the United States. And, I don't see what the difference is fundamentally. If you're doing something well, you ought to get a return for your efforts.

RICHARD WADE. Right. I hope you didn't think that I was saying that non-profit institutions shouldn't make a profit. They absolutely should. But, I think there's a real question about the appropriate level of profit. There's a hospital in Pennsylvania that made a 25 percent profit last year on Medicare. They plowed a lot of that money into their for-profit subsidiaries and start-ups for new business ventures—one was a travel service, I think. At some point, there's a value decision to be made here about what our community really needs and what our requirements are to meet those needs. That's what our bottom line should be. To sock away money for money's sake begins to put some wrong incentives into the system.

QUESTION. Are you suggesting that patients aren't able to make reasonable decisions about which institutions to choose based on price? In other words, when you're suggesting that this firm is making ridiculous monopoly profits and that it's bamboozling the people that are going there—are these people incapable of making reasonable decisions?

RICHARD WADE. Not incapable. We've invented a system of insurance around the public, which lulls them into not making decisions based on price. I don't know anybody here that can tell me when they were last in the hospital what the cost of their care really was. Some of them only know what their insurance company didn't pay. We've prevented the public from much of an understanding of price.

I think the community will let hospitals make solid profits if they can see that they're going back into serving community needs. There is a medical ethicist named David Thomasma. He teaches at the Loyola University Stritch School of Medicine right here in Chicago. He talks about the "Theory of Promise Making." An institution, by the virtue of its existence in the community, has made some promises to that community. A lot of the trouble that

hospitals are in is because we've forgotten the promises we hold out to the public just because we are.

QUESTION. Just to comment further on the price issue and why I think price becomes useless. Some of it is simply that everything's discounted in medical care now. You've got IPAs and EPOs and so forth. A hospital has a set price, and a buyer comes in and says, "I'll pay you a certain percentage, or I'll pay you so much per day, or I'll pay you so much per admission." So I think price probably has no more use than does the discount..."I'll tell you that this is what the price is on these tires, but we'll sell them to you for 75 dollars instead of 125 dollars." So, I don't think that price means much anymore, and it's not very useful to the public.

RICHARD WADE. Very true. In Maryland, the regulatory system has all but outlawed discounting. Their message to payers is that their discount is built into the system by virtue of public accountability.

A REGULATOR'S VIEW—A SYSTEMATIC APPROACH TO THE ASSESSMENT OF QUALITY OF CARE: THE EVOLVING PEER REVIEW ORGANIZATION PERSPECTIVE

RONALD ANDERSEN. Our next speaker is Dr. Henry Krakauer. Henry is with the Health Care Financing Administration, Office of Medical Review, Bureau of Health Standards and Quality in Baltimore. He also holds clinical appointments at the Medical College of Wisconsin and the University of Maryland. He has a varied background including a Ph.D. in chemistry, as well as his M.D. degree. He has worked with the National Institute of Allergy in N.I.H., and earlier he was a professor of chemistry at Washington State University. He's published widely in basic medical research and in more recent times has been very intimately involved in studies of outcome measures and mortality rates in hospitals. We're particularly anxious to hear his discussion in that area today.

HENRY KRAKAUER. The Health Care Financing Administration (HCFA), as manager of the Medicare program, is charged by statute with two responsibilities—to fund the provision and to assure the quality of the medical services rendered to its beneficiaries. A clear understanding of the effectiveness of medical services, that is of their impact on health, is central to the agency's ability to allocate prudently and rationally the resources placed in its charge. Services that are ineffective are wasteful. They are also damaging both directly and indirectly by absorbing the funds that otherwise would be available for effective services. However, the complexity of the physiological processes that underlie susceptibility to disease and give rise to variability in the response to treatment must also be recognized. As a consequence, we are frequently faced in medicine with competing diagnostic and therapeutic strategies and the task becomes one of determining which of the available alternatives best contributes to our ability to treat the patient.

Much of the difficulty in dealing with the quality of care results from our trying to view it simultaneously from three perspectives which really call for quite different strategies (Table 1). One of the three perspectives is the economic. From this perspective, the focus is on patient or, more realistically, payer satisfaction, and the criterion by which the patient judges the care is the extent to which it meets his expectations. It is clear, however, that the dominant expectations are those pertaining to the outcome of the care, although amenities often play a large role, at least on the surface. As a major payer, HCFA must take care that it does not intrude into this area in such a way as to put in place incentives which will call forth actions that will harm patients. Otherwise, patient satisfaction is a private matter, involving purely transactions between the provider and the consumer.

The second perspective from which quality of care can be viewed is the medicolegal. Here the focus is on the process of care, i.e., the detailed steps of patient management, and the criteria by which the process of care is judged are "accepted standards," i.e., practices which are believed to produce desired outcomes or, at least, to avert undesirable outcomes. It should be noted once again that outcomes are the critical consideration: they drive the determination of standards. HCFA is quite active in this area, principally through the Peer Review Organizations.

The third perspective is the biologic, in which the focus is on outcomes of care. Because the failure of care is marked by death (mortality), continuing or increasing illness (morbidity), the loss of the ability to function independently (disability), and the need to incur expenditures for medical care, outcomes of care are quite measurable. Indeed, from this perspective, what is to be measured is the effectiveness rather than the less tangible quality of care.

The Health Care Financing Administration possesses an array of resources that permit it to address many aspects of the problem of assessment of the effectiveness of medical services. These resources include a data base which describes the continuum of significant medical services rendered to Medicare beneficiaries. Thus, individuals can be followed over time and the consequences of specific interventions can be ascertained as they evolve in the context of related or unrelated medical conditions and interventions. While this longitudinal data base which covers the universe of Medicare beneficiaries is, in itself, quite powerful, its usefulness can be further enhanced by the agency's access to medical records through the review activities of the Peer Review Organizations. This makes possible the adding of a richness of clinical detail about the patient's condition and the treatment administered to the characterization of outcomes.

The Health Care Financing Administration has, therefore, undertaken a broad and systematic effort to ascertain the effectiveness of medical practices both to assist it in the discharge of its statutory responsibilities and, more broadly, to develop data that will be of use to the medical community in improving its ability to treat and to patients in making informed choices.

The assessment of the effectiveness of medical care is carried out in three steps:

(1) Monitoring. It is necessary to characterize the health of the Medicare beneficiaries and the outcomes of interventions and to monitor for beneficial or adverse trends. This must be carried out both at the level of the entire population of interest through cross-sectional analyses at successive points in time, e.g., year by year, and for specific interventions such as hospitalizations in general or for particular conditions. The Medicare data base is particularly well-suited for monitoring and is currently used for this purpose, with outcomes of hospitalization the focus of attention. Thus, for example, in the years 1983 to 1986, there has been a decline in the rate of hospitalization, the most marked drop having occurred between 1984 and 1985 (Table 2). There was, in addition, a continuing decrease in multiple hospitalizations per patient. The population-based mortality rate (deaths per Medicare beneficiary) was remarkably constant in this period whereas deaths per hospitalized beneficiary have increased, most especially between 1984 and 1985. This appears to have been due to a decline in the admission of the least severely ill, whose care may have shifted to other settings. In a more specific example of monitoring, coronary artery bypass grafting is being performed in increasing numbers (Table 3). There was a substantial increase in the post-surgical mortality between 1984 and 1985 with a reduction in 1986, but not to the 1984 level. This trend occurred concurrently with pronounced increases in the rate of coronary balloon angioplasty and clearly requires more detailed investigation. Monitoring of outcomes of care (mortality, morbidity, disability [through a surrogate measure, supportive care in Table 4], and expenditures) can be performed broadly and efficiently by analysis of Medicare data (Table 4). These outcomes can be ascertained

as they evolve over time subsequent to a therapeutic intervention or a diagnostic intervention performed either in or out of the hospital. In addition, these same measures can be used as markers of health in the overall Medicare population in either cross-sectional or cohort studies, with the cohort identified by means of demographic or geographic characteristics rather than by means of an index therapeutic or diagnostic event.

(2) Analysis of variations. Variations in the rates of performance of surgical procedures among geographic areas have been well-documented in the past two decades. Most probably, these variations are the result of differences of opinion in the medical community about the effectiveness and, hence, appropriateness of these procedures in specific circumstances (termed "medical uncertainty" by Dr. John Wennberg). To assess the significance of these variations in practice patterns, it is also necessary to ascertain the extent of variations in the outcomes of care. If substantial variations in outcomes of care for particular conditions exist, it may be reasonably inferred that no consensus exists concerning what is proper care and, more importantly, that inferior care is being provided in some locales and superior care in others. Thus, those conditions for which substantial variations in outcomes among locales are observed require further investigation, as do those locales with a marked excess of adverse outcomes. It is because of this that HCFA recently undertook to assess differences in mortality rates experienced at the various hospitals treating Medicare patients (Table 5). Similar analyses of variations should address the outcomes, morbidity, disability and expenditures, to provide a more complete view of variations in the effectiveness of care. Clearly, however, if variations in outcome are to be attributed to variations in the effectiveness of the care provided, variations in the condition of the patients at the time of admission (severity of illness) to the various hospitals must be corrected for. To do this adequately may require more detailed clinical data on the patient than are currently available in the Medicare data base. The extent to which analyses of variations in outcome are compromised by the lack of such clinical data is currently being evaluated. Population-based analyses of variations among geographic areas ("Small Area Analysis") which more directly address the issue of variations in health status are also currently underway under the sponsorship of the Health Care Financing Administration.

(3) Effectiveness of interventions. Once adverse trends or high variations in outcomes of treatment are identified, more detailed investigation of the causes is required. The trends and variations may be the result of differences in case-selection or in the effectiveness in the therapeutic procedures. Some insights into these matters can be obtained from the existing Medicare data base because it permits linking outcomes to patient characteristics (age, race, sex, additional diseases, prior history of medical treatment) and to diagnostic and therapeutic procedures coded on the bills. For example, initial estimates of the relative merits of open vs. transurethral prostatectomy, of single vs. two lead cardiac pacemakers, of carotid endarterectomy or extracranial-intracranial bypass surgery vs. medical management of patients with symptomatic carotid artery blockage, and of use of cyclosporine or conventional immunosuppressive therapy for renal transplantation have been obtained with data currently available.

Table 6 and Figures 1-3 present the results of a completed observational assessment of the effectiveness of a new medical technology, the immunosuppressant cyclosporine. The data used in this study were collected explicitly for the evaluation of practices in renal

transplantation and contain specifically relevant items such as the genetic compatibility of donor and recipient (HLA match), the causes of initial renal failure, and subsidiary immunosuppressive maneuvers (e.g., pre-transplant blood transfusions and splenectomy). After adjustment for these factors, the net effect of the use of cyclosporine is to reduce the probability of loss of the kidney graft by about one quarter. Figures 2-3 present forecasts of the medical and fiscal impacts of the adoption (or non-adoption) of cyclosporine, but not only in the domain of renal transplantation, but in the universe of the end-stage renal disease population, because the renal transplant population is drawn from the population on dialysis and, if a transplanted kidney fails, the consequence is usually return to dialysis.

However, as a rule, the dearth of clinical detail on the condition of the patient and on the specifics of the course of treatment will generally prevent estimates based on claims data from being accepted as persuasive. As a result, the Health Care Financing Administration is presently exploring a flexible and systematic process to collect clinical data in much greater detail in the normal course of case-review by the Peer Review Organizations. The process is being pilot tested by eight Peer Review Organizations in six conditions in which various pharmacologic interventions are being assessed.

- coronary revascularization, in which the relative merits of angioplasty and bypass surgery are being explored (Table 7);
- cholecystectomy, in which the usefulness of antibiotic prophylaxis is being examined;
- prostatectomy, in which open and transurethral approaches are being compared;
- acute myocardial infarction;
- congestive heart failure; and
- pulmonary disease.

The practicality of this approach will be greatly enhanced by the definition of a Uniform Clinical Data Base, analogous to the Uniform Hospital Discharge Data Set, to be collected by the Peer Review Organizations on the cases they review, both for the purpose of systematization and refinement of procedures for the identification of cases requiring detailed review by a physician, and to provide the base for the analysis of the effectiveness of interventions. To this point, analyses employ data collected retrospectively and available in either the Medicare data base or the medical record of the hospitalization. Such data may prove inadequate to resolve certain questions about the relative merit of competing interventions, particularly when an emerging medical technology is involved. Under those circumstances, prospective collection of data employing specifically designed data forms will be required. Such clinical investigation may take the form of observational clinical demonstrations, or, ultimately, of randomized clinical trials. However, when these latter are conducted in the context of assessments based on billing data, in the first instance, and data from the medical record, in the second instance, the second containing a subset of the

population in the former, and the populations in the prospective clinical demonstrations and the randomized trials also subsets of the preceding two, the problem of generalizability which so frequently afflicts randomized clinical trials will be overcome. Although what the specific role of the Health Care Financing Administration may be in the management of clinical demonstrations and randomized trials to resolve finally questions of relative merit of competing interventions, its need for data from such studies on a timely basis to help guide its decisions on coverage and the Peer Review Organizations in their evaluations of the appropriateness and quality of care is beyond question.

The Health Care Financing Administration has clear operational responsibilities in the management of the health care provided to Medicare beneficiaries. Consequently, it must also act to ensure that the information on the effectiveness of medical care developed by the mechanisms described above is made use of to improve medical practice and thereby improve the health of the Medicare beneficiaries. The simplest and frequently the most effective mechanism is educational feedback: physicians and other providers of care will use the most effective tools available to them once they know what they are. However, the agency is also required to impose disciplinary feedback through the Peer Review Organizations when there is willful disregard of proper procedures. In addition, although application thereto was not the reason the activities described above were initiated, the financial mechanisms implicit in coverage and reimbursement policy create substantial incentives. It is essential that the power inherent in the disciplinary and financial mechanisms available to the Health Care Financing Administration be wielded on the basis of the clearest knowledge of their impact on the health of the Medicare beneficiaries, and that is on the basis of clear data on the effectiveness of the medical interventions that it funds.

Table 1.

QUALITY OF CARE

Perspectives:	BIOLOGIC	MEDICOLEGAL	ECONOMIC
Focus:	Outcomes	Process	Patient (payor) satisfaction
Criteria:	Mortality Morbidity (need for medical care) Disability (need for physical assistance) Expenditures (consequences of failure of medical interventions)	Accepted standards (i.e. practices that are believed to produce desired outcomes and to avert harmful outcomes)	Expectations met (dominated by expectation of outcome)
Implementation:	Epidemiologic assessment -	PROs, malpractice - case-finding/case review	Outside purview of government-private transactions

HCFA

(1) Monitoring: time trends -- population-based (cross-sectional)
-- medical interventions (longitudinal)
(feasible with available billing and census data)

(2) Analysis of variations: -- population-based (e.g. small area analysis)
-- medical interventions (e.g. mortality post-hospitalization)
(feasible with available billing and census data)

decreasing sample size, from defined universe

(3) Effectiveness of interventions (longitudinal, to develop objective standards)
(a) monitoring, as in (1) (retrospective, based on billing data)
(b) use of data from medical records (retrospective, natural history)
Uniform Clinical Data Set - also for case-finding for PRO review (medicolegal)

increasing volume & specificity of data

NCHSR/HCFA

(c) clinical demonstrations (prospective, natural history, esp. for emerging technologies)

NIH/NCHSR/HCFA

(d) randomized, controlled clinical trials

HCFA

(4) Feedback - (a) educational
(b) disciplinary
(c) financial

Table 2.

HOSPITAL DISCHARGES FOR CALENDAR YEAR

Hospital discharges	11.37 M	10.96 M	9.97 M	9.83 M

CUMULATIVE MORTALITY RATES
FIRST ADMISSIONS IN THE CALENDAR YEAR

Days after admission	1983	1984	1985	1986
30	5.7±0.1%	5.9±0.1%	6.6±0.1%	6.9±0.1%
90	9.8±0.1	10.2±0.1	11.1±0.2	11.5±0.1
180	13.5±0.1	13.8±0.2	15.2±0.2	15.4±0.2
270	16.2±0.2	16.8±0.2	18.2±0.2	18.5±0.2
360	19.1±0.2	19.7±0.2	21.2±0.2	21.4±0.2

POPULATION BASED MORTALITY RATES FOR CALENDAR YEAR

	1983	1984	1985	1986
Medicare enrollees	30.03 M	30.46 M	31.08 M	31.75 M
Raw mortality rate	5.08%	5.08%	5.10%	5.07%
Age-adjusted mortality rate (ref. year = 1983)	(5.07%)	5.05%	5.06%	5.07%

MORTALITY RISK FACTORS
(COX PROPORTIONAL HAZARDS MODEL)

1985 vs 1984 Admissions	1.09 (P<.0001)
1985 vs 1984 Admissions, allowing for differences in demographic mix	1.07 (P<.0001)
1985 vs 1984 Admissions, allowing for differences in demographic mix and "Major Conditions"	1.02 (P>0.25)
1986 vs 1985 Admissions, allowing for differences in demographic mix and "Major Conditions"	1.00 (P>0.94)

Table 3.

USE RATES FOR MAJOR PROCEDURES
FOR CORONARY REVASCULARIZATION
(Medicare)

	1984	1985	1986
BYPASS only	66,600	72,600	79,900
ANGIOPLASTY only	11,700	22,300	35,200
ANGIOPLASTY AND BYPASS, in same admission	1,940 (14%)	2,760 (11%)	2,820 (7.4%)

(Numbers in parentheses give the percentage of all angioplasties with a bypass in the same stay.)

TIME TREND IN POST-ADMISSION MORTALITY RATES FOR
CORONARY ARTERY BYPASS (DRG 106/107)

	CUMULATIVE PERCENT DEAD		
Days after Admission	1984	1985	1986
30	4.7±0.4%	6.2±0.4%	5.3±0.4%
180	8.1±0.5%	9.9±0.5%	8.5±0.5%
360	9.3±0.6%	11.8±0.6%	10.1±0.6%

Table 4.
OUTCOMES OF CARE FOR THREE CARDIOVASCULAR CONDITIONS
ADMISSIONS DURING CALENDAR 1985

	HFS(1)	AMI	CAB
Percent of all patients hospitalized	6.15%	4.53%	1.03%
Patient Characteristics			
Age: Under 65 years	6.4%	7.1%	13.0%
65 - 74	32.7	44.6	70.7
75 - 84	38.9	36.2	15.9
84 and over	22.0	12.1	0.5
Sex: Male	42.7%	46.7%	70.4%
Race: White	86.6%	89.8%	93.7%
Black	9.9	6.2	2.4
Comorbidities (2)			
Malignancy	3.4%	1.5%	0.8%
Autoimmune Disease	1.0	0.7	0.4
Chronic Liver Disease	0.7	0.2	0
Chronic Renal Disease	5.3	2.5	1.1
Degenerative Cerebral Disease & Psychosis	1.7	1.2	0.3
Hypertensive Disease	14.5	17.5	19.1
Ischemic Heart Disease & Failure	-	-	-
Diabetes	9.4	8.6	5.6
Chronic Pulmonary Disease	17.3	9.2	6.4
Pattern of Mortality			
Cumulative Mortality			
Days After Admission			
30	13.7%	25.4%	6.2%
90	22.7	30.8	8.2
180	30.4	34.6	9.9
270	36.1	37.5	10.5
360	41.2	40.2	11.8
Relative Risk of Dying (3)			
Female vs Male	0.79	(0.96)	1.40
Black vs Other Races	0.84	0.88	1.68
Age, 80 vs 65 years	1.20	1.78	1.55
Malignancy	2.13	1.53	(1.23)
Autoimmune Disease	(1.16)	0.68	(0.82)
Chronic Liver Disease	(1.23)	(1.35)	-
Chronic Renal Disease	1.95	1.96	3.10
Degenerative Cerebral Disease & Psychosis	1.19	0.77	-
Hypertensive Disease	0.67	0.60	0.57
Ischemic Heart Disease & Failure	-	-	-
Diabetes	(1.01)	1.24	(1.00)
Chronic Pulmonary Disease	(1.01)	(0.95)	1.54

Table 4. (cont.)
OUTCOMES OF CARE FOR THREE CARDIOVASCULAR CONDITIONS
ADMISSIONS DURING CALENDAR 1985

	HFS	AMI	CAB
Pattern of Morbidity			
Duration of Hospitalization (4)			
Primary Admission (days)	7.8/6.3	9.3/ 7.6	84.9/12.9
All Admissions (days)	14.8/10.1	14.0/10.4	137.8/14.7
Proportions of Patients with the Speicified Number of Readmissions: (5)			
0	52.8%	55.8%	72.0%
1	26.5	27.0	19.6
2	11.3	10.2	5.5
3 or more	9.4	7.0	2.9
Causes of Readmissions (6)			
Pulmonary	11.3%	6.7%	8.5%
Cardiovascular	53.7	69.7	50.1
Gastrointestinal	7.9	6.0	11.2
Musculoskeletal	2.9	1.5	2.3
Genitourinary	5.0	2.9	4.9
Complications of treatment			0.8
Patients with Prior (6) Admissions	32.6%	21.8%	63.1%
Causes of Prior Admissions			
Pulmonary	18.0%	10.5%	2.0%
Cardiovascular	35.5	44.5	86.5
Gastrointestinal	9.4	11.1	2.8
Musculoskeletal	5.5	5.1	1.3
Genitourinary	5.9	6.2	1.9
Charges for Medical Care (4)			
Total, per patient	$11000/7000	$12500/8100	$34400/30200
Hospital Charges			
Primary Admission	4400	6300	24700
Primary and Readmissions	8700	10300	26800
Hospital-related Charges	1000	1300	6700
Ambulatory Care	880	630	810
Supportive Care (7)	360	190	160
Contributions to Charges (increment in dollars) (8)			
Female vs Male	(100)	(-60)	2400
Black vs Other Races	400	-400	5100
Age, 80 vs 65 years	-1100	-1700	3400
Malignancy	(-100)	(-600)	(3200)
Autoimmune Disease	(60)	(-30)	(300)
Chronic Liver Disease	1200	-1900	---
Chronic Renal Disease	2600	2100	18000
Degenerative Cerebral Disease & Psychosis	-700	(-300)	(600)
Hypertensive Disease	-200	(40)	-3000
Ischemic Heart Disease & Failure	---	---	---
Diabetes	1300	600	3600
Chronic Pulmonary Disease	1100	1300	2400

Notes (Table 4):

(1) HFS = congestive heart failure and shock
AMI = acute myocardial infarction
CAB = coronary artery bypass graft surgery

(2) Percent of patients within the diagnostic categories with the conditions specified as secondary diagnoses, as defined by the ICD-9-CM codes on the hospital bill.

(3) Relative risks were computed by means of the Cox proportional hazards model. The relative risk associated with a comorbidity is the ratio of the probability of dying for patients with that condition to that for demographically similar patients without the condition. Relative risks in parentheses differed from 1.00 with a probability less than 90% ($P > 0.1$).

(4) Where two values separated by a "/" are given, the first is the arithmetic and the second the geometric mean.

(5) The percentages are of patients at risk of readmission, i.e of those discharged alive.

(6) The causes were ascertained from the discharge Diagnosis Related Group coded on the bill.

(7) This consists of charges for Medicare-covered Skilled Nursing Facility and Home Health Agency services.

(8) These quantities were computed from linear regression analyses of the logarithms of the charges accumulated in calendar 1985 subsequent to the index admission. Additional covariates in the calculations resulting in the above data were: (1) number of beds in the hospital, (2) the ratio of interns to beds, (3) the 1984 HCFA wage index for the hospital, (4) whether the hospital was urban or rural. The base for the increments is the geometric mean of total charges. The increments in parentheses differed from 0 with a probability less than 90% ($P > 0.1$).

Table 5.

HOSPITAL A

DIAGNOSTIC CATEGORY	CASES	ACTUAL MORTALITY RATE	RANGE OF PREDICTED MORTALITY RATES
ALL CAUSES	532	14 %	10 TO 18 %
CA - CANCER	25	52 %	19 TO 56 %
CE - CEREBROVASCULAR ACCIDENTS	20	20 %	15 TO 55 %
GC - GASTROINTESTINAL CATASTROPHES	7	57 %	7 TO 67 %
GI - GASTROINTESTINAL DISEASE	51	2 %	1 TO 15 %
GU - UROLOGIC DISEASE	12	8 %	1 TO 42 %
GY - GYNECOLOGIC DISEASE	2	0 %	0 TO 100 %
HL - LOW-RISK HEART DISEASE	41	0 %	1 TO 17 %
HM - SEVERE CHRONIC HEART DISEASE	29	31 %	11 TO 42 %
HS - SEVERE ACUTE HEART DISEASE	14	57 %	19 TO 67 %
ME - METABOLIC/ELECTROLYTE DISTURBANCES	16	6 %	6 TO 47 %
OP - ORTHOPEDIC DISORDERS	21	0 %	0 TO 43 %
PN - PULMONARY DISEASE	81	27 %	11 TO 30 %
RN - RENAL DISEASE	8	13 %	4 TO 62 %
SE - SEPSIS	18	22 %	15 TO 59 %
TR - SEVERE TRAUMA	3	0 %	0 TO 94 %

HOSPITAL B

DIAGNOSTIC CATEGORY	CASES	ACTUAL MORTALITY RATE	RANGE OF PREDICTED MORTALITY RATES
ALL CAUSES	266	7 %	8 TO 18 %
CA - CANCER	2	0 %	0 TO 92 %
CE - CEREBROVASCULAR ACCIDENTS	12	33 %	11 TO 60 %
GC - GASTROINTESTINAL CATASTROPHES	6	17 %	4 TO 67 %
GI - GASTROINTESTINAL DISEASE	19	5 %	0 TO 30 %
GU - UROLOGIC DISEASE	21	5 %	1 TO 30 %
GY - GYNECOLOGIC DISEASE	3	0 %	0 TO 100 %
HL - LOW-RISK HEART DISEASE	23	0 %	1 TO 26 %
HM - SEVERE CHRONIC HEART DISEASE	12	25 %	5 TO 50 %
HS - SEVERE ACUTE HEART DISEASE	12	33 %	14 TO 65 %
ME - METABOLIC/ELECTROLYTE DISTURBANCES	39	3 %	5 TO 31 %
OP - ORTHOPEDIC DISORDERS	13	0 %	0 TO 94 %
PN - PULMONARY DISEASE	47	0 %	8 TO 32 %
RN - RENAL DISEASE	2	50 %	3 TO 91 %
SE - SEPSIS	2	50 %	2 TO 90 %
TR - SEVERE TRAUMA	1	0 %	0 TO 99 %

Table 6

Cox Model Analysis of Cs A Effects

All Cadaver-Donor Transplants, Graft Survival (Selected Prognostic Factors)

		Relative Risk		
Prognostic Factor (1)		All	Cs A	No CS A
Cs A		0.75(P=0.003)	-----	-----
Age (50 vs. 20 years)		1.15	1.11	1.16
Diabetic Nephrosclerosis (Y vs. N)		1.22	1.03	1.26
HLA-A, B match (4 vs. 0)		0.73	0.86	0.71
HLA-DR match (2 vs. 0)		0.79	0.89	0.76
Preservation time (30 vs. 5 hrs.)		1.11	1.05	1.11
Transplant Number (2nd vs. 1st)		1.36	1.34*	1.36
Black vs. White		1.21	1.05	1.26
Splenectomy (Y vs. N)		0.82	0.87	0.81
Transfusions (Y vs. N)		0.83	0.83	0.84
Experienced Centers:	A	0.94	1.02	0.88
	B	0.70	0.42	0.82
	C	0.95	0.64	4.57
	D	0.70	0.67	0.41
	E	0.59	0.49	0.80
Number of Cases:		8390	2073	6317

(1) The effects of all the prognostics factors listed were statistically significant ($P < 0.05$) in the aggregate group ("All"). In the group treated with Cs A, only the transplant number was statistically significant.

Table 7.

COMPARISON OF RISK OF DEATH FOLLOWING
ANGIOPLASTY or BYPASS

Relative Risk of Dying Following Angioplasty vs. Bypass	0.69 ($P < 0.002$)

(After adjustment for age, race, sex, comorbidities and whether the procedure was treatment for acute myocardial infarction)

Relative Risk of Dying Following Angioplasty vs. Bypass	0.98 ($P = 0.88$)

(After adjustment for 42 patient characteristics and clinical findings on admission - e.g. history of CHF, CABG, stroke or TIA, elevated creatinine, concurrent CHF, LV ejection fraction < 40%, hyperglycemia, wheezing, etc.)

LEGENDS FOR FIGURES:

Figure 1. Projections of the numbers of patients of all ages under treatment by dialysis or with functioning kidney transplants. The lines represent extrapolations of the results achieved with transplantation in 1974-1976 (▽, ◇), in all centers in 1982-1983 (×, +), or in the five centers experienced in the use of cyclosporine in 1982-1983 (△, □).

Figure 2. Projections of aggregate charges, in billions of dollars, for the provision of treatment by dialysis or for transplantation if the overall 1982-1983 performance level (+, △), or that observed in the centers experienced in the use of cyclosporine in that period (□, ◇) continued beyond 1982. The cost of cyclosporine is not included.

Figure 3. Projections of aggregate charges, in billions of dollars, for the care of the Medicare-eligible end-stage renal disease population, assuming cyclosporine is not used (▯), or is used and paid for for 6 months (+), 3 years (◇), or indefinitely (△) from the time of transplantation. It is assumed that cyclosporine may be discontinued at the times specified without loss of its beneficial effect.

Figure 1.

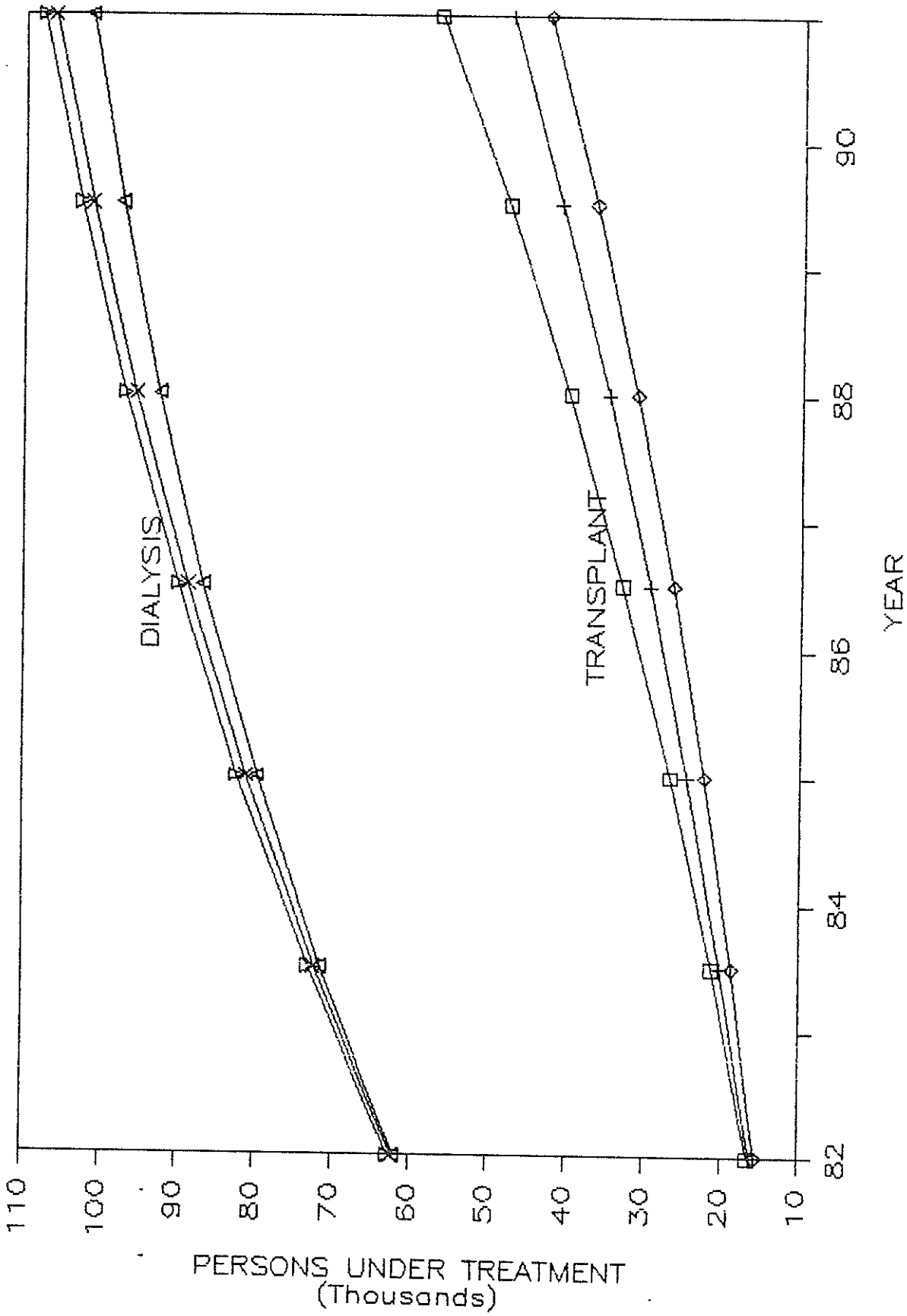

DIALYSIS
TRANSPLANT
110
100
90
80
70
60
50
40
30
20
10
82
84
86
88
90
YEAR
PERSONS UNDER TREATMENT
(Thousands)

Figure 2.

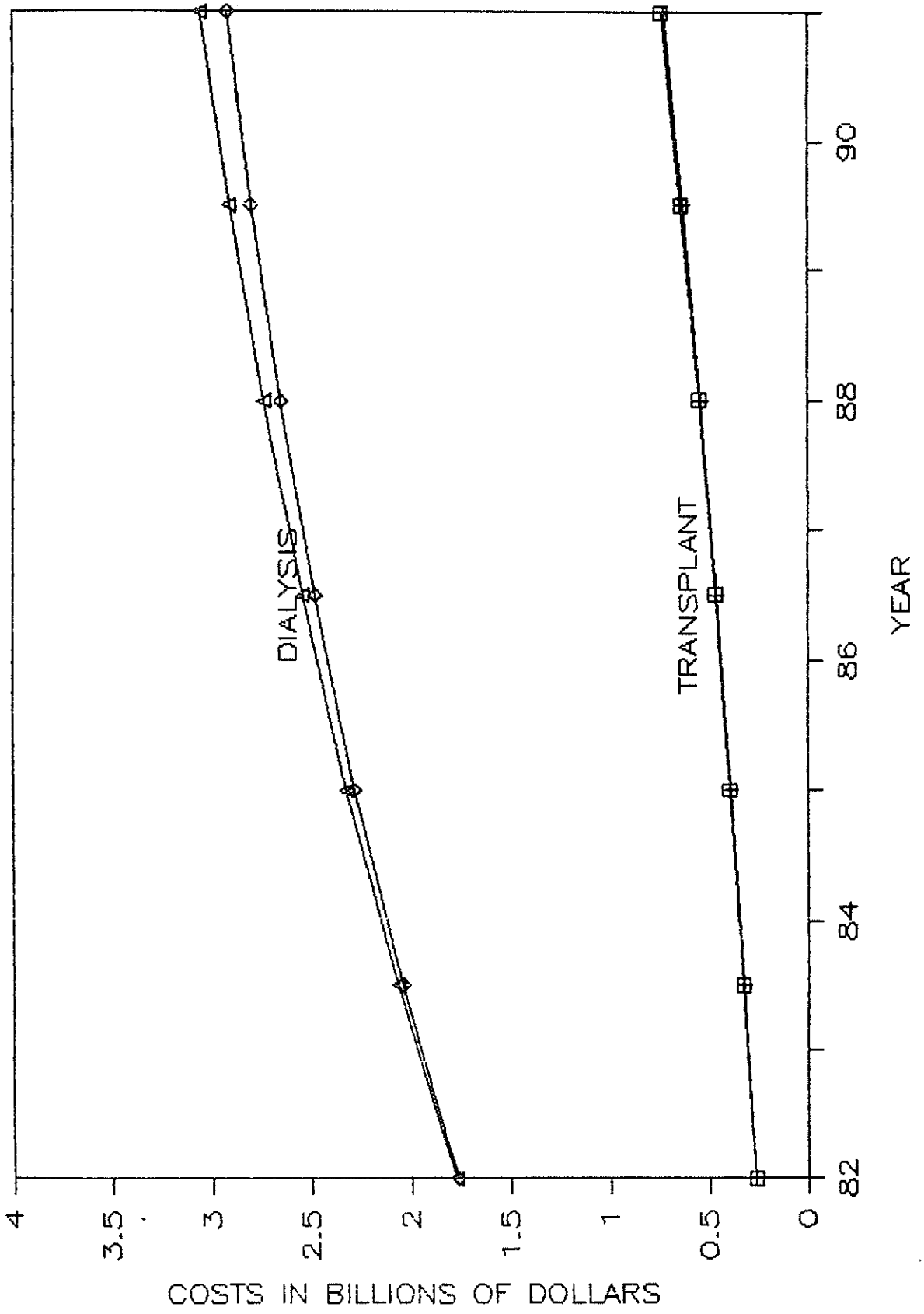
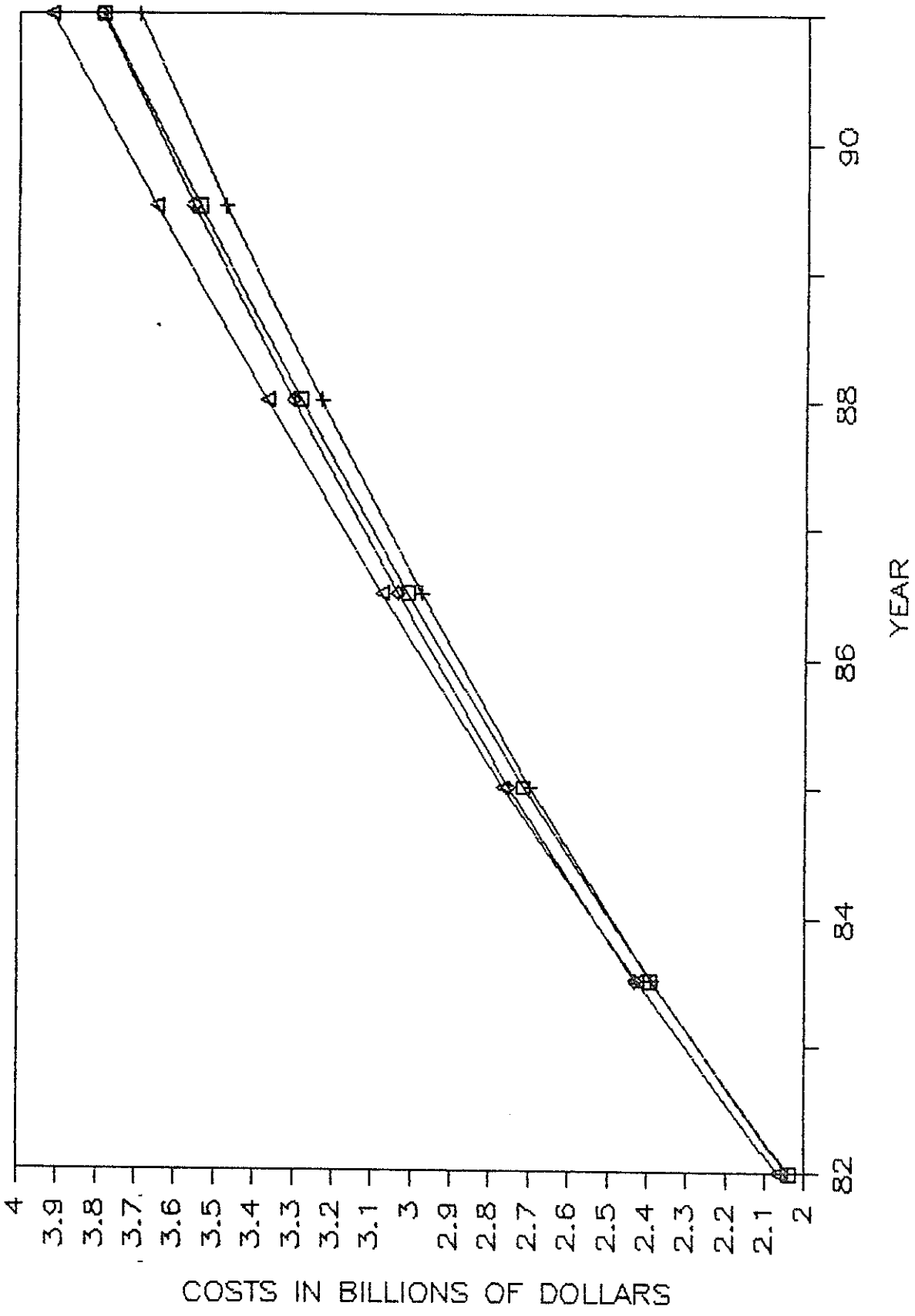

DIALYSIS
TRANSPLANT
COSTS IN BILLIONS OF DOLLARS
4
3.5
3
2.5
2
1.5
1
0.5
0
82
84
86
88
90
YEAR

Figure 3.


4
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
COSTS IN BILLIONS OF DOLLARS
82
84
86
88
90
YEAR

A CONSUMER'S VIEW—INTEGRATING THE CONSUMER PERSPECTIVE INTO QUALITY MEASUREMENT

RONALD ANDERSEN. Joyce Jensen is senior vice president of the National Research Corporation. Her major business is measuring behavior and opinions of various health care publics including hospitals and physicians, consumers, government, employers, insurance companies, and others. Joyce has done a lot of writing and testified before Congress concerning the attitudes and opinions of these various publics. She's a member of the American Marketing Association, the Academy of Health Services Marketing and the Planning and Public Relations Societies of the American Hospital Association. She's been involved in the development of many nationwide health care marketing research tracking systems. While many of the customers of her firm are hospitals, others of the actors on the scene that we've mentioned also are making use of her organization and her research. Her results have been reported in *Modern Health Care*, where she has written a column since 1983, as well as *American Demographics* and such popular press as the *Wall Street Journal* and *U.S.A. Today*. Particularly intriguing is a panel that she and her organization are developing of 100,000 consumers across the country. She also mentions that they'll be developing a health care marketing guide that is a proprietary publication: however, I think we'll hear enough about it today to whet our appetites for more.

JOYCE JENSEN. We in health care are joining virtually every other industry in now making quality our number one priority. From hospitals to physicians to employers to consumers, health care quality is definitely on the forefront. We've heard today about the regulator's view and the provider's view. We'll hear about the insurer's view, but what I'm going to bring to the party is the consumer perspective and how to integrate that consumer perspective into your quality measurement.

If quality is our major priority, our strategy for survival, how should we measure it? How do we know if we have it? Or how should we direct others to find it?

In a recent national study of physicians conducted by our company, physicians said that clinical outcomes were the way quality in health care should be measured. I doubt that many of us here would disagree with that viewpoint. However, outcomes are only the first step. Outcome statistics are only one step in the quality chain. Outcomes to those who use them will help them select a quality facility or a quality physician. Whereas we used to assume equal quality for all or for most, now we'll have information available which gives us like data on all providers. I'm going to make this very simplistic from a consumer standpoint. As we look at the quality statistics, we find that each hospital will fall into one of several different categories as far as high mortality and low mortality. We, as consumers, will look at the high mortality ones, and we'll grade them as we would in school, as F's. We'll look at the significantly low mortality hospitals, and we'll look at them as A+'s. That's very simple. If there's an A+ and an F in the market, the consumer will definitely be drawn to the A+. But let's look at a market like Chicago, where we'll have several A+'s and then we'll have some A-'s and some B+'s. Where are those hospitals going to fall when it comes time for the consumer to select a provider? Which A+ will they select? Or is an A that much different than an A+, or an A- that much different than

an A? I look at it as a funneling process. The outcomes will be very, very important and should be the first step. After that particular component is done, the consumer perception of quality will come into play, so we need to pay attention to those perceptions. Outcomes first. And then consumer perceptions of quality.

Now do consumers have enough information to make these selections? Do they really know anything about quality? We'll get into that in a little bit, but first of all we need to look at how this information on outcomes is going to be disseminated to consumers. Earlier today, Ralph Nader was mentioned. He's a popular guy today and so is his *Public Citizen Health Research Health Letter.* I, quite frankly, got a little bit of a kick out of it when I read it, until I realized how important it could become as far as the consumer's viewpoint and consumer selection. One sentence here which is quite interesting says, "HCFA recently took another major step toward eliminating the dangerous cloak of secrecy which surrounds hospital care in the United States." That's pretty scary in itself. But, to read this sidebar-(this is addressed to consumers)-it says, "If you had a heart attack and there were two hospitals the ambulance could take you to, one with a death rate of 60 percent, the other with a death rate of 18 percent, which one would you choose? So now, you need to find out the names of those hospitals in every major U.S. city with high or low death rates so that when something happens you know where to go." The *Health Letter* goes even further, listing the high and the low mortality rates for each one of the hospitals in each one of the states. In Illinois, for instance, the University of Chicago Medical Center comes out with significantly low mortality rates. St. Joseph's, St. Francis of Blue Island, Michael Reese and Evanston are also in this category. Looking at that subset, if I, as a consumer, need an ambulance to take me someplace—as I fall off the podium, I happen to have these particular hospitals in mind: now what am I going to do? I will have to make a decision based upon my perception of which hospital is best...which is of higher quality.

So, quality measurement can be more than outcomes. We need to look at more than outcomes; quality is going to be in the eye of the beholder, in the eye of the customer. To help consumers understand quality, hospitals need to define it through their perspective. In order to do this, we must have a system in place to measure quality. First of all, we must define quality from the consumer perspective. Then we must implement some type of measurement, which will track how well we are doing on these quality standards that we're setting, which take into account patient satisfaction and patient perceptions. Once we do that, we must communicate those quality attributes to the market, so they know what quality is from our standpoint combined with their standpoint and additionally, how well we're doing according to their perceptions. After that, we must continue to track and measure changes, and, above all, implement those changes or those perceptions that we've found back into the organization, so improvement can definitely be made. Above all, we must make sure that quality implementation starts at the top—with management—so it's part of the operating philosophy and included in the policies relating to quality and departmental standards. We also must be quite sure that patient satisfaction are implemented into this whole process to the point where the high priority is actually on the end user, the patient.

If we're going to understand quality from the consumer viewpoint, we need to look at how consumers are defining quality and also some of their attitudes on quality. Who can judge

quality? We recently did a national study where we asked consumers, physicians and employers, "What is quality?" Not everyone can answer that question. Consumers can define it much less so than physicians or employers. However, consumers are defining it, so we must look at what those definitions are. Definitions range from image factors to patient relations factors, technical and staff. If you contrast the different populations—consumers, employers, and physicians—there's a real disparity as far as what the different publics' perceptions of the components of quality care are. Patient relations is much more important to the consumer and the employer; courtesy and the attention of the hospital staff are much more important to the consumers, the employers and also to the physicians. However, the technical aspects and the teaching affiliation are more important to the physicians, who feel that they are more likely to be able to judge clinical quality. But when we are talking to our publics about quality, when we're talking to consumers, we must understand their vantage point. To a physician, high quality hospital measurement has a lot to do with the other physicians who are on staff. Well-known physicians or respected physicians on staff are a top priority followed by teaching facility, how often a procedure is performed, the equipment and so forth. When a physician is looking for a hospital for his patient, he obviously looks, number one, for the quality of care—how good the facilities are, what services are provided—ahead of the patient's decision of which hospital he wants to go to. However, the patient's decision is indeed being brought into play.

What is a high-quality physician, to physicians? The answer: a knowledgeable, competent physician who has training above and beyond what is considered adequate. And, it's also the progress of the patient. When consumers are asked that same question, "What is a high-quality physician?"—technical competency, training and knowledge all come into play. However, number one with a 9.61 mean score on a scale of one to ten is, "A physician who explains things to me, lets me know what my diagnosis means, helps me through the process. That's what I consider a high-quality physician. And that's why I continue to use a particular physician." A number of other things are important, but not nearly to the degree of "explaining, taking the time with me." We may think of this as a very high-touch factor. Not necessarily true, because if a physician is not taking time with his patient, obviously his follow-up care is not being conducted properly.

Some patients take this to the limit, 20 percent actually changing physicians each year due to dissatisfaction. A primary reason for dissatisfaction is with the relationship—the explaining things, the person-to-person, high-touch end.

Are people starting to take a greater role in their medical care? Are they starting to doubt the competency of physicians? Are they reading articles in publications that project "doom and gloom" in the health care industry? Yes, yes, and yes.

To support this opinion, we asked physicians in a nationwide study what the primary source of information was for their patients and they said it was the media, television and printed materials. And, only a quarter of their patients now see the physician as the primary source of health care information. According to physicians, "Patients select a hospital in only 6 percent of cases by themselves. Half the time, I recommend a hospital. I give several options in a quarter of cases. In two out of ten cases, I have to actually override the patient's perception of where they want to go or the patient's selection." However, we

can see a lot of interaction. It used to be that "doctor overrides" were more like 50 percent of cases with just a few of the selections being handled by the patient alone or as a joint decision. But selection of a hospital does differ. If we look back through a consumer decision process where we took patients back through their actual hospital selection for a number of reasons—for surgery, for illness, for accidents, for maternity services, and just for general tests and treatments—it does differ. And in some areas, patients are taking more of a role in selecting providers. They do need to know what quality is. They really are making judgments of hospitals based upon quality. In an accidental occasion, obviously, you're going to have more patient selection. In surgery you're going to have less. In O.B. you're going to have more than you would have in surgery. No, consumers are not selecting hospitals for brain surgery, but they are getting involved in the decision. They will not be overridden if they really believe there's a difference in quality. They have hospital preferences, because 80 percent of physicians said that their patients are more aware, they're asking more questions about their health and medical care and 40 percent of those patients actually prefer a hospital where they want to be treated. They've picked out a number one quality provider. And 20 percent request that hospital before the physician suggests where they should go.

This is change. Change, because there have been several revelations from the consumer standpoint. One, all health care providers are not of equal quality. Two, all physicians are not equally competent. And three, all hospitals do not have the same quality standards. Not every consumer is looking at hospitals and selecting them according to these quality standards. Most people who now do are early adopters. This is no different than in other types of industries where the early adopters tend to be young, more educated and have higher incomes—the type who will seek more information and utilize impersonal or non-traditional information sources. It isn't much different in health care. We're just getting past the early adopter stage now, with all the emphasis on quality, malpractice and standards. It's getting past this early stage and moving into the rest of the consumer population. That's because the more consumers know about the differences among providers, the more important those differences are going to become. If a consumer believes that high-quality medical care could not be provided in a hospital unless it has an MRI in-house, they would not go to a hospital that did not have an MRI in-house. One area where we see this is in hospital selection. I have identified three years in a row—from 1984 to 1986—the differences in mean scores for importance of different selection variables. Medical staff quality is very important, and—if you look at more recent data—it's becoming even more important. The availability of complete services is becoming a quality factor. Modern equipment is becoming a quality factor. Cost of care and convenience are becoming less important. What many companies purported as being the major hospital selection variable—closeness to home—is dropping down dramatically. The more technical aspects are rising, because consumers are being taught by us and others that quality has a lot to do with technical capabilities.

Consumer perceptions of quality differ by the different types of hospitals that are in the market. As far as chain influence, more than half of the market—six out of ten—don't see it as being negative or positive, just absolutely no influence. But 21 percent see chain influence as negative, and 16 percent see it as a positive. According to the staff, the negative influence for change is more likely to be seniors. The positive influence is more

likely to be the younger, early adopter category, as they see the economies of scale in the concept, not necessarily just the chain hospitals.

Type of hospital affiliation, type of hospital ownership has something to do with how consumers *perceive* the hospital; how consumers perceive the hospital as far as providing the best care. This also relates to consumer perceptions of costs. The V.A. hospital is perceived as the least expensive, followed by the county or city hospital. The not-for-profit is in the middle, followed by the religious and the chain hospital, which is considered the most expensive. Perceptions are not necessarily reality, but in the absence of a lot of quality and hospital pricing information, these are the perceptions that consumers have.

So, who holds the quality position? How do consumers look at hospitals as far as which ones have better quality than others? It differs. In some markets, more consumers see differences in hospitals as far as quality than in other markets.

Consumers aren't that ignorant about quality. Maybe we as consumers don't have that much information to judge, and we don't know what the clinical terms mean. We don't really know for sure if one doctor is better than another, and we don't really know if one hospital is better than another. However, when we asked 500 physicians across the nation what they consider to be the top hospitals in the nation and asked 100,000 consumers which hospitals they perceive to be of top quality, they listed the same hospitals. Some were in a little bit different order, but the hospitals were the same. About the same thing happened when we looked at individual markets. In Atlanta, the top hospitals, according to consumers, are: Emory, Piedmont, Northside Baptist and St. Joe's. However, Emory has significantly more perceptions of quality by consumers in that market than from those in the others. Take another market: Des Moines. Iowa Methodist, Mercy, and Lutheran. The top hospitals have a lesser number of consumers seeing them as high quality in Des Moines than the number who see Emory as high quality in Atlanta. In each market, this is a little bit different. I don't know how many of you are subscribers to *Modern Health Care*, but every two weeks they do a market focus where they show consumer perceptions of quality in a particular market based upon this data. This data, by the way, was from a study of 100,000 consumers we researched across the nation in the top 100 metro markets, with rural roll-ups. What this information says is, yes, there are quality perceptions, there are preferences. What they're based upon and how they differ from city to city, how they differ by demographic, socioeconomic, geographic and lifestyle characteristics. . . and as they start selecting more and more hospitals this is going to come into play. Let's look at number one heart hospitals in Chicago, Cincinnati, Indianapolis, Akron and Pittsburgh. They do differ in terms of quality attributes, by the different markets for heart care. Finally, let's look at something that is a little bit less high tech and more high touch: women's services at hospitals. In Chicago, what seems to drive this is the wide range of services and image. In the other markets, the caring nursing staff, the competency of the nurses and the actual care seem to be more of an indication. In Pittsburgh, only the care came out as the primary selection variable, as the primary quality component.

Higher quality costs more. This is what consumers think. Higher quality costs more money. When we asked them in numerous studies, dating from 1983 through 1988, how they viewed the quality and cost components of selecting hospitals, one-fourth of consumers equate low price with low quality. This implies that if you're going to be the low-priced

provider in the market, you'll immediately lose one-fourth of the people, at least as far as perceptions of quality. That doesn't mean they won't go there. But the low-priced provider has a low-quality perception. One-third of these consumers said that high price equals high quality. The rest of that group didn't really know how quality and cost related. Half of consumers would actually pay more money for high quality care. They would pay out-of-pocket—not insurance provided—from $50 to $300 to $500, depending on the market. We've done studies where we've asked, "Would you rather go to a hospital with a perception of good quality at medium price, or high quality with a higher price?" Each year they lean more toward the high quality/high price, because consumers are unsure about the quality of care being provided. And for some reason, the high price seems to equate more to high quality. But not everyone in the market will pay more for quality. Not everyone sees quality. Even if they do see quality, it doesn't necessarily mean that they will pay more for quality, or even prefer going to that particular provider. Each market must be profiled. How that market looks at quality. How that market perceives price associated to quality. And then segmented by those viewpoints. For instance, across the nation, approximately 10 percent of people are termed "quality buyers." These people see quality, and they will pay more for it. It's that important. Another 30 percent are "quality hunters." These people want quality, and they'd pay more if they could find it, but they simply don't know how to recognize it. They believe that it should be there. They even believe that it *is* there, but they don't know where or how to find it. This is an opportunity for a provider to show consumers that they definitely are of higher quality, since there's 40 percent of the market that can be captured, at least as far as preferences. Another 30 percent are "bargain hunters." They can see quality, but they don't want to pay for it. They don't think it's that important. And finally, the "commodity buyer" or K-Mart shopper who says, I don't see it and I don't care. These profiles go into a lot more depth, as far as ages, insurance and so forth. However, I've given an overall viewpoint of the different types of people, and how they're perceiving quality. Regardless of how people are looking at quality—we need to measure patient satisfaction. Because the patient can give us information we can't get from anyone else. The receiver of care has information that the provider, the family or the employer cannot provide. We need to measure patient satisfaction and put it back into our organization to implement change. We should be aware of the fact that quality ratings are sometimes affected more by what is lacking rather than what is there. Maybe the high-quality, technical care is there. Maybe the high-touch component is gone: therefore, quality perceptions will not be as high because of something that was lacking. Have you ever stayed at a hotel and received the questionnaires that say, "Tell us about your stay?" If something wonderful happens, you usually fill them out. If something bad happens, do you fill them out? Do you call the hotel hotline? I do. That information and perceptions are something that no one would know unless they are expressed—unless someone complains. Even though the rest of the stay may have been wonderful, that one thing is going to stand out and prevent a person from coming back to that hotel. Implementing patient definitions on quality, back into the organization can be done in several ways, through their administration, through the individual departments. It can be implemented into advertising. Finally, it can become part of team participation, getting everyone together within the organization to promote the quality image. Regardless of which way you're going to use quality in your institutions, as far as the patient perceptions, it must be integrated. It must go from one department to the next. It should not just be part of the advertisers' or public relations persons' job to say: "we're quality." It is a long process to move a market to perceive you as top quality. In every market, there

are several steps people go through to either select or not select an institution. They gain awareness and knowledge. They develop image. They have a preference. They finally use a provider. And in the end, they either advocate it or not. If awareness isn't there, knowledge can't be there either. If the knowledge isn't there, there's no way for preference to develop. Once there is preference and usage, if there's a bad experience organizationally or operationally, that provider will not be selected again because of lack of advocation.

Preference can be gained. Look at the Mayo halo. One hundred thousand consumers said that Mayo was number one as far as quality. It was voted number one in Chicago, Atlanta, Dallas, New York and San Francisco. It is possible.

Quality is dynamic. It needs to continue to be measured. It's not something we measure once. It's not something where we look at this data and say, "Well, that's how they look at quality, good or bad." We all need to implement that information into our organization. Six months from now, based upon what happens to those consumers—what they happen to read, what they happen to hear—those perceptions are going to change. And, we need to implement those perceptions and patient satisfaction back into the organizations. So, in the end, we can have some way to measure quality. We don't have to wait like we do with some of the outcome data. We can go ahead and start impacting this now.

QUESTIONS AND ANSWERS FOLLOWING TALK BY MS. JENSEN

QUESTION. You talk about the change of consumers being more concerned about the technical quality. I assume this is a time trend we're talking about. What specific measures are they focusing on to play out their concern about technical quality? And what should hospitals be emphasizing given these changes?

JOYCE JENSEN. The question is—with the consumers' change to start looking at technical quality as opposed to just the high-touch elements of hospital providers, what are they looking at to determine if a hospital is indeed of higher technical quality than others? It's a myriad of things. It's advertisements by the hospital on its capabilities: from heart and kidney transplants to sewing up knees. It's also the articles in different mass publications which may say that this hospital has research and development and it is continuing to try and find the answers. I don't believe consumers really know that one hospital is of higher technical quality than others. They're just looking at what they see. They are listening to what they hear and trying to equate that to what they believe technical quality is.

QUESTION. What's going on in Chicago, is it that consumers cannot differentiate the different quality providers?

JOYCE JENSEN. I believe it's just a very fragmented market. There aren't quite as many people who can differentiate quality overall. When they can differentiate it, there's still a number of different hospitals that provide quality. I believe that there are so many messages out in the market, and so many quality providers, that it's hard to find one that stands out as being better than the others. Consumers don't feel as if they can really pick one.

QUESTION. Where women are the primary decision makers, which is true, roughly, in anywhere from 55-67 percent of cases, depending on the market, how do their perceptions of quality differ than the male perception of quality?

JOYCE JENSEN. The female tends to go a little bit more toward the high-touch side. However, they do tend to be a little bit more interaction-related as far as quality than do males. It's not a huge difference, but that's the only way that it's skewed.

QUESTION. The data that's being distributed to the public tends to be highly statistical, something experts would understand, but perhaps the general consumer would not. With all this information being given to them, in that format, is it really going to make that much difference?

JOYCE JENSEN. In that format, I doubt if it really does a lot. However, a lot of different organizations are taking that information and putting it into a format that is much easier to understand for the consumer; whether it's AARP, insurance companies, the media. Some of these are discouraging, and they're not being presented in a way that we would

like. But that information is starting to be disseminated to the consumer in a manner that they can understand and react to.

QUESTION. How do people feel about the caring mode, the nursing end. I've seen a lot of buttons and a lot of attention to guest relations in hospitals all across the nation.

JOYCE JENSEN. The high-touch element is something that hospitals have focused on for a lot of years, sometimes even before the high-tech end of it came into play. And it's obviously a very important point. We have a lot of information on it. The information that I presented showed that some consumers actually saw high-quality providers being those that had a high-touch aspect. The caring end, the personalization, did represent those consumers who saw that as important.

A THIRD-PARTY PAYER'S PERSPECTIVE— DO THIRD-PARTY PAYERS REALLY CARE ABOUT QUALITY?

RONALD ANDERSEN. Our final speaker this morning is David Klein. David is senior vice president at Blue Cross/Blue Shield of the Rochester area. He's responsible for marketing and operations. Prior to his time in Rochester, he was vice president of Blue Cross/Blue Shield of Illinois for marketing services. From 1982 to 1984, he was with the National Blue Cross/Blue Shield Association as senior vice president of marketing and then planning. David received his MBA from the University of Chicago. We're pleased to welcome him back. He was a graduate of the Health Administration Program and also concentrated in finance. He's a member of the American College of Healthcare Executives and The Society for Hospital Planning and Marketing. Today he's going to talk to us from a third-party payer perspective. *Do Third-Party Payers Really Care About Quality*?

DAVID KLEIN. Do third-party payers really care about quality? Absolutely yes! In the long run, not caring about quality results in business failure. This is a general rule of business.

American business history has chronicled the decline of many companies which by managerial incompetence or perhaps by intention failed to deliver quality. A prominent example of the role quality plays in business success is found in the automobile industry. Note the Yugo's recent marketing failure. Its low price initially attracted buyers but when quality problems in both design and manufacturing were generally reported, sales fell off to almost nothing.

The converse of this rule is also true. Tom Peters' popular books on management, *In Search of Excellence* and *A Passion for Excellence* report a, if not the, key factor in determining a company's growth is whether it delivers high quality goods and services.

In fact, because of the value individuals place on health, as an ingredient for success, quality probably plays a more important role in health than in other industries. Thus, like other businesses seeking to sustain or grow their market share, third-party payers of health care services must care about quality.

In this paper, I will first review how quality assurance is becoming an element of competition among third-party payers. Then I will briefly comment on how quality assurance is becoming a legal issue for third-party payers. A taxonomy of third-party payers based on their provider reimbursement methodologies will then be presented. I will then discuss various approaches to quality assurance and I will close with a glimpse into the future.

Quality Assurance - An Element of Competition

Health care quality assurance is becoming an issue for many third-party payers today. While cost containment remains the central concern of most employers and the

government, questions are beginning to be posed about quality of care. Examples of employer interest in quality include:

- In a survey of 39 Blue Cross and Blue Shield Plans conducted in 1987, it was reported that 69 percent had received requests or inquiries from accounts about a quality of care program for non-capitated products. Here quality of care refers to consumer satisfaction (69 percent were interested), credentials of providers (53 percent were interested) and medical care processes and outcomes (54 percent were interested).

- General Motors and the United Auto Workers are using ABT Associates to develop quality of care indicators to monitor the performance of the 114 HMOs with which they contract.

- Merrill Lynch, working with Mercer Meidinger Hanson, one of the largest benefits consulting firms in the country, asked questions in their recent bidding of their health insurance about:

  - How does the carrier monitor patient satisfaction levels with PPOs and HMOs?

  - What criteria are used for selecting PPO and HMO physicians?

  - What are the malpractice records of physicians and hospitals participating in the PPOs and HMOs?

  - What are the nosocomial infection and iatrogenic disease rates in facilities used in the PPOs and HMOs?

- Allied Stores in their recent bidding of their health insurance asked similar questions including:

  - What are the quality assurance standards used in the insurance carrier's PPO network? How are they enforced?

  - In the last five years, have relationships with facilities in the network been terminated? If so, why?

  - Have any facilities lost malpractice cases? If yes, what were the circumstances?

  - In the last five years, have any practitioners or facilities in the network lost their license to practice?

Underlying these questions about health care quality assurance is a worry that cost containment incentives are adversely affecting quality. In this regard, cost containment approaches under scrutiny include:

- Payment Incentives - Are incentives created by the new third-party payment approaches causing needed care to be withheld? We are all very familiar with the "quicker and sicker" discharge arguments associated with the Medicare DRG based case payment approach implemented under PPS.

- Selective/Contracting/Channeling - Are the lower priced providers selected to participate in PPOs and HMOs more efficient, pricing at the margin or delivering an inferior product? Piquing interest is the recent and extensive media coverage which cited that selected, lower priced, high volume clinical laboratories are reporting excessively high false negative rates in their testing. The most negative publicity surrounded the processing of Pap smear tests in laboratories that paid their medical technologists on a high quota piece work basis. Similar concerns have been expressed about some doctors that participate in PPOs and HMOs requiring their PPO and HMO patients to endure excessive wait and call back times.

- Managed Care - Is the case management (that is, are the pre-admission certification, mandatory outpatient surgery, and length of stay review programs) being performed by third-party payers causing needed care to be withheld?

- Provider Target Income - Having a desire to produce a targeted income and recognizing the opportunity for supplier induced demand, providers sometimes deliver new services to replace lost revenue from their base business. Of particular note here is the growth of physician office based laboratories. Are these new services of high quality?

- Health Planning and Rate Review - Is there sufficient capacity and are there sufficient monies to meet bona fide need? Control of provider capacity through certificate of need and hospital rate review has been shown to be an effective means of containing health care costs. However, as reported recently in the *New England Journal of Medicine* and the *Wall Street Journal*, these approaches when stringently applied may also generate a lower quality of care as evidenced by higher mortality rates.

Third-party payers participating in health planning and rate review must confront quality issues related to access to care. Typical issues recently debated by third-party payers include: How many organ transplant centers should be created? How many dialysis centers? What should the dialysis centers be paid? How many ICU beds should there be? How many nursing home beds? The market is beginning to speak about quality.

Quality Assurance - A Legal Issue

In addition to the marketing issues, there are legal/product liability and regulatory issues for third-party payers related to health care quality assurance.

In *Wickline versus the State of California*, a Medi-Cal patient alleged that the state's medical review that is, continued stay review, decision to limit her hospital stay resulted in the loss

of her leg. A jury awarded her $500,000 on the theory that she suffered harm as a result of Medi-Cal's cost containment program.

The Court of Appeals reversed the award, finding that the patient's physician did not seek an extension of her hospital stay, that all of her attending physicians concurred with the discharge decision and that the attending physicians' decision met the applicable standard of care.

However, the case still stands for the proposition that third-party payers may be held legally accountable when medically inappropriate decisions result from defects in a cost containment program.

Regulators are also focusing on the quality assurance issue with many states using PROs to review the performance of HMOs and CMPs.

Clearly the health care quality assurance issue is becoming an element of competition and legal concern among third-party payers. In this regard, there is a growing admixture of approaches being employed to assure quality.

A Taxonomy of Third-Party Payers Based on Provider Reimbursement Methodology

Third-party payment for health care services can take many forms. An individual's health care bills can be paid by a variety of third-party payers including:

- The Government
- Blue Cross and Blue Shield Plans
- Commercial Health Insurance Carriers
- Third-Party Administrators
- PPOs
- HMOs

Rather than describe the quality assurance approaches employed by each of these types of third-party payers, I will categorize the third-party payers into two classifications:

- Those with no provider contract or with a contract that provides no or a modest economic incentive to withhold care.

- Those with a provider contract which provides a strong economic incentive to withhold care.

Typically falling into the first category—no or modest incentive to withhold care—are charge based or retrospective cost based payers. Included would be most commercial insurance companies, third-party administrators (TPAs) and many Blue Cross and Blue Shield Plans, especially those located in the South and the West.

Typically falling into the second category—strong economic incentive to withhold care—are prospective or capitation based payers and payers using managed care techniques to control

utilization. Included would be PPOs, HMOs, some commercial insurance companies and TPAs, many Blue Cross and Blue Shield Plans, especially those located in the East and Midwest, and the government. Because of the fast market share growth of PPOs, HMOs and managed care products, it is in the second category in particular that quality assurance is becoming an element of competition.

Certainly other taxonomies could be offered. However, for purposes of discussing health care quality assurance approaches this one is convenient.

Having classified third-party payers, I'll now describe for each category typical and cutting edge quality assurance approaches.

Approaches to Quality Assurance

Third-party payers falling into the first category—no contract or having contracts with no or modest incentives to withhold care—do very little quality assurance work. Generally, these types of payers rely on licensure and the professionalism of the provider. To the extent an explicit effort is made, it is usually limited to making sure a provider is only performing procedures allowed within the purview of their license.

Third-party payers falling into the second category—having contracts with strong incentives to withhold care—make use of some or all of four techniques to deliver high quality care:

- structural assurance - to ensure qualified staff, resources and protocols are employed by the providers.
- process reviews - to ensure care and treatments delivered are consistent with plans and protocols.
- outcome audit - to ensure patient expectations are met.
- economic incentives for rewarding positive or penalizing negative outcomes.

Certainly credit must be given to Professor Donabedian for loosely borrowing his taxonomy for measuring quality of care in developing the listing of the above four techniques.

The mix of the four techniques varies based on the interest and sophistication of the third-party payer and the nature of the relationship with their hospitals and physicians.

Let me now briefly discuss each of the four techniques.

Structural Assurance

Structural assurance refers to reviewing the conditions and the resources under which care is provided. Virtually all PPOs, HMOs and managed care program operators rely heavily on this technique. PPOs and HMOs require hospitals and physicians to have specified credentials and qualifications to participate. Similarly, registered nurses working in pre-

admission or concurrent review managed care programs often must present certain employment experiences and often must use formal written medical protocols in approving an admission or surgery or in extending a length of stay.

Evidence of the popularity of this approach is found in the 1987 Survey of Blue Cross and Blue Shield Preferred Provider Organizations.

Of 36 Plans responding and operating PPOs, 30 used formal written structurally oriented criteria in selecting hospitals and physicians to be part of their PPO. Characteristic of the credentials needed to be part of the PPO were:

- For hospitals, JCAHO accreditations - 44 percent requiring
- For physicians, privileges at a PPO hospital - 69 percent requiring
- For physicians, Board certification or eligibility - 32 percent requiring

As the Joint Commission expands its capacity to review Ambulatory Health Care, more third-party payers will add JCAHO accreditation to their standard list of structural assurance criteria.

Process Reviews

There are two types of process reviews: real time and retrospective.

Real time process review refers to determining and advising the provider if the proposed tests, procedures, site of care and other elements of the plan of treatment are appropriate for the diagnosis or condition. This occurs as a by-product of the managed care benefits management or utilization review process.

Evidence of a popularity of this approach is found in the 1987 Survey of Blue Cross and Blue Shield Managed Care programs.

Of 59 Plans responding and operating managed care programs, all conduct at least five of the following activities:

- pre-admission certification
- second surgical opinion
- admission review
- concurrent review
- individual case management
- pre-authorization of out of hospital services or procedures
- discharge planning
- re-admission review

Retrospective process review refers to an after the fact medical care evaluation. Retrospective medical care evaluations of hospitalizations have been performed routinely since the 1970's. Review of physician performance, in contrast, is just beginning.

In particular, on the cutting edge of quality assurance is the work being done in HMOs, especially IPA models, in monitoring primary care physician performance using retrospective process reviews.

At Blue Cross and Blue Shield of the Rochester area, my employer, we have a 220,000 member IPA Model HMO in which primary care physician performance is monitored through a retrospective process review.

Each month, ten primary care physician offices are visited and 40 charts are reviewed in each office. Ten charts are selected randomly and 30 are selected based on disease or condition. Diseases or conditions to be used in sampling charts are selected based on their high likelihood of presenting problems in quality of care.

Adult diagnosis or conditions typically used in chart selection include:

- Alcoholism and Alcohol Abuse
- Chronic Obstructive Pulmonary Disease
- Coronary Artery Disease
- Diabetes Mellitus
- Duodenal Ulcer
- Hypertension
- Low Back Pain
- Normal Pregnancy
- Urinary Tract Infection

Pediatric diagnoses or conditions typically used in chart selection include:

- Well Baby Care
- Well Child Care
- Gastroenteritis
- Urinary Tract Infection
- Chronic, Recurrent Otitis Media
- Chronic, Recurrent Bronchial Asthma

Each chart is reviewed for the standard of record keeping, completeness of history and physical, compliance with IPA protocols and evidence of patient education.

Examples of medical care protocol questions posed in the chart review include:

- For hypertension, was patient education conducted regarding the side effects of the medication?

- For well baby care, did the physician measure head circumference at each visit?

Primary care physicians showing problems in chart review are referred to the IPA Peer Review/Quality Assurance Committee for further action. At the outset, the IPA Peer

Review/Quality Assurance Committee is using an educational as opposed to a punitive approach in its follow-up actions.

Primary Care Reviews began in June, 1987 and to date 4,200 cases representing 105 physicians have been reviewed. Problems have been found in 11 percent of the cases.

Retrospective chart review on a profile or pattern analysis basis is also being conducted by third-party payers with a greater frequency. In the 1987 survey of Blue Cross and Blue Shield PPOs, it was reported that 50 percent of the responding Plans that operate PPOs regularly evaluate hospital and physician utilization data for patterns of under-utilization.

Outcome Audits

There are two types of outcome audits being performed by third-party payers:

- Satisfaction Surveys
- Review of Outcomes

Satisfaction surveys are conducted in two ways:

- Through a profile of grievances filed
- Through outbound direct response attitude research

Virtually all HMOs and most PPOs profile grievances filed. Most also conduct attitude research. Typical attitude research includes surveys of samples of new and existing members, emergency room utilizers and dis-enrollees. The research typically focuses on comparing expected to actual performance.

The review of outcomes includes the traditional inpatient care audits and the relatively new review of adverse ambulatory care outcomes.

The inpatient care audit seeks to identify patients receiving less than adequate care during an inpatient hospital stay. Cases are selected for further review of inpatient care if there is evidence of a problem developing subsequent to admission. In Rochester, in our IPA model HMO, cases are selected if there is:

- mortality (excluding terminally ill, massive CVA or MI or end stage chronic disease patients)
- surgical complication
- trauma suffered in the hospital
- medical instability at time of discharge
- nosocomial infection
- other injury
- no discharge planning

Most HMOs and many PPOs make use of this type of traditional inpatient care review. At Blue Cross and Blue Shield of the Rochester area, since October, 1986, 3,000 cases have been reviewed. About 2 percent presented clinical quality of care problems. Typical of the

problems found are pulmonary emboli following major surgery and pneumonia caused by nosocomial infections.

Typically, problems with hospitals and/or physicians providing less than adequate care are referred to a peer review process with again education being used before punitive intervention occurs.

The review of adverse ambulatory care outcomes is based upon the principle that *any* inpatient admission is a result of the failure of ambulatory care. Obviously, taken at the limit, this proposition is absurd. However, the approach can yield important information about possible omissions or commissions in the ambulatory management of illness which may have led to the hospitalization.

Blue Cross and Blue Shield of the Rochester area uses a review of adverse ambulatory care outcomes as part of its IPA model HMO quality assurance program.

We select for further review cases showing one of the following 19 conditions or diagnoses:

- Diabetic Coma or Acidosis
- Ruptured Appendix
- Hypertensive Crisis
- Bleeding or Perforated Ulcer
- Gangrene
- Low Birth Weight Infant
- Cancer of Breast, Cervix or Colon
- Re-admission for Same Condition within 14 Days
- Malunion of Fracture
- Cellulitis
- Bowel Obstruction
- Bleeding Secondary to Coagulation
- Hypokalemia
- Septicemia
- Pulmonary Emboli
- Complications of Medical Treatment
- Toxemia of Pregnancy
- Acute Asthma
- Medical Admission through Emergency Room

Condition or diagnosis specific protocols have been developed for investigating each admission or adverse outcome. These protocols consider patient history, physician case management (that is, use of follow-up visits, medications and/or patient education); patient compliance with therapeutic regimen; family support and socioeconomic factors.

Cases where adverse outcomes could have been prevented are reviewed with the attending physician for purposes of education.

In Rochester, generally, the review of adverse ambulatory care outcomes is coordinated with the primary care reviews discussed earlier so that a comprehensive assessment of a physician's approach to care management can be performed.

Blue Cross and Blue Shield of the Rochester area began its review of adverse ambulatory care outcomes in January, 1988 and has completed reviews of 500 admissions. Problems were found in 20 cases with mismanagement of asthma and diabetes being the most frequent cause of admission.

Economic Incentives

Perhaps one of the most interesting and innovative quality assurance initiatives occurring among third-party payers involves the use of economic rewards and penalties. Such innovation is also occurring in Rochester and is supported by Blue Cross and Blue Shield, Medicaid and the major competitor HMOs. However, before describing this innovation, some background on Rochester should be provided.

Since January, 1980, in Rochester, all nine area hospitals have been voluntarily participating by contract in a reimbursement experiment called the Hospital Experimental Payment Program or HEP. HEP is operated by RAHC—the Rochester Area Hospitals Corporation. RAHC is a private not-for-profit membership corporation of the nine area hospitals. RAHC was created in 1978 for the purpose of supporting cooperative hospital planning.

Under the terms of the HEP contracts that were in place from 1980 through 1987, payments for both inpatient and outpatient care have been constrained by a *community-wide revenue cap*. Through the end of 1987, *all sources of revenue* including Medicare and Medicaid were included in the cap.

The nine area hospitals are located in two counties, Monroe and Livingston, whose population is approximately 750,000 people. The hospitals have a total of 2,547 acute care beds and range in size from 72 to 741 beds. They include Strong Memorial Hospital, the principal teaching institution of the University of Rochester School of Medicine and Dentistry. The bed to population ratio is 3.4 per thousand compared with a New York State overall ratio of 4.4 per thousand. Hospital motivation to participate in the HEP experiment was found primarily in their desire to have self-control.

Prior to HEP in Rochester, and prior and since HEP elsewhere in New York State, hospitals were or have been beset by contradictory reimbursement policies and an inability to accurately predict income. Medicare until the advent of PPS paid on a retrospective cost basis. In contrast, Medicaid and Blue Cross paid on a formula based prospective per diem approach. Charges to other payers were also controlled. Invariably, the reimbursement policies caused hospital administrators reducing their cost of operations to be rewarded by also losing revenue.

HEP changed for the hospitals the "each payer for themselves approach" by securing waivers of Federal and State reimbursement policies and by implementing a new all payers

methodology which determined and guaranteed a hospital's revenue in a particular year, based on four factors:

- The hospital's revenue in the preceding year
- Inflation based on the costs of goods and services purchased by hospitals
- Number of patients treated
- The cost of new approved programs

The hospitals individually were provided this revenue guarantee from the major payers—Medicare, Medicaid and Blue Cross—in return for a guarantee from the hospitals collectively that overall expenditures across the nine hospitals in the community would be within a limit which approximates inflation plus 2 percent.

Through 1987, HEP has been a success. The rate of increase in hospital expenses has been less in Rochester than elsewhere in New York State. Further, hospital operating margins have been much better than elsewhere in New York State. Also, there has been no adverse effect on access or quality cited. Evidence of satisfaction with HEP is found in it being extended twice. It remains a reimbursement program which is very popular in the community.

With this as background, let me talk about the latest HEP extension.

The latest HEP extension is still being negotiated but will have an effective date of January 1, 1988. The latest extension is being called HEP-III. There will be a number of significant changes in HEP-III. Medicare will not be included.

To provide their waiver, the State of New York Health Department has demanded that a HEP-III extension use DRG based case payment as the means of paying hospitals for inpatient care and that a severity of illness/quality of care consideration be explicitly incorporated in payments. Use of DRGs is sought to bring HEP in sync with the remainder of New York State and the New York State Case Payment Law. The severity of illness/quality of care requirements were made to assist the State in learning more about the sensitivity of DRGs in forecasting appropriate use patterns and to provide quality assurance incentives.

In response, in the HEP-III proposal, RAHC has included DRG based case payment, a severity of illness measurement program and a program to reward or penalize hospitals based on the quality of care delivered.

Basically, the HEP-III quality assurance program is statistically driven and focuses on long stay patients that remain severely sick and on patients discharged dead. Short stay and normal stay cases are not being focused upon because patients are generally not discharged severely ill. Rather, they are kept hospitalized until they improve or die.

Recall that under a DRG based payment system, hospitals receive extra payments for long stay cases. In specific, payment is generally made for each outlier day, that is, each day after the beginning of the long stay threshold.

The HEP-III quality assurance program compares the quality performance of a hospital to other hospitals and then adjusts the long stay or outlier day payments to reward or penalize the hospital's performance.

For each hospital, a calculation is made of a quality indicator. The quality indicator is the percent of long stay cases where the patient was either discharged dead or was still severely ill after seven days of hospital care for medical patients or after seven days of post-operative care for surgical patients. This statistic, that is, the quality indicator is then compared to similar statistics from other hospitals. If a hospital's performance is close to the norm, there is no penalty or reward. If performance is worse than the norm, the outlier days are paid at less than the outlier per-diem rate. Conversely, if a hospital's performance is better than the norm, outlier days are paid at a greater than the normal outlier per-diem rate. The proposal also calls for rewards and penalties to increase or decrease as a provider's distance from norms increases.

The severity of sickness or illness is measured using the Medisgrps system developed by MediQual. Medisgrps classifies a patient's illness based on an assessment of key clinical findings which includes a patient's vital signs and the results of procedures, examinations, x-rays and lab tests.

In comparing a hospital to the norm, adjustments are made for case mix. Under HEP-III, 40 major disease categories will be used.

HEP-III calls for the implementation in 1988 of the data gathering apparatus to collect the information needed for the quality assessments. In 1989, hospitals can be penalized through reduced outlier day payments of up to 1 percent of the total inpatient costs. In 1990, the limit is raised to 2 percent. Monies lost through penalties can be redistributed to other hospitals whose quality of care is better than the norm. While the 1 percent and 2 percent limits protect each hospital's exposure, they are still of sufficient magnitude to capture the hospital's attention.

The Future

Earlier in my career, I was a planner. Among the tasks for which I grew to develop a special respect was forecasting. The more I did it, the harder it seemed to become. I attribute the increasing difficulty to learning as you grow older how much you don't really know. Nonetheless, let me offer you my best guess on what's next in terms of third-party payer interest in quality assurance.

Third-party payers will focus increasingly on quality assurance and begin to use it as a means of product differentiation. This focus will be intensified by the inevitable cost driven debate that will occur surrounding rationing of medical care.

There will be extensive growth in the use of JCAHO to accredit ambulatory care facilities and as a component of HMOs, physician offices.

There will be no major changes in the technology of quality assurance. However, as the data base grows and improves, there will be refinements in the use of outcome audits and

in providing economic incentives to providers to reward or penalize quality. In particular, there will be greater use of special and paid claims data bases to assess outcomes.

Third-party payers will routinely report to their customers the results of their quality assurance efforts. As a means of promoting their products, third-party payers will begin to calculate and report "the batting averages" of providers for major procedures such as coronary artery bypass graft surgery and coronary angioplasty. You might even see a *Consumer Reports* article on third-party payers quality assurance.

Let me close by again reminding you that the Yugo has not been a big seller and that quality will grow increasingly important.

DAVID DRANOVE. To help us accomplish the rather daunting task of integrating the five morning sessions, we have two very capable members of the University of Chicago faculty. Dr. John Schneider is an associate professor of medicine at the University of Chicago Hospitals and Clinics. He is also the Chair of the Medical Records Subcommittee and the Utilization Review Subcommittee. Dr. Schneider has lectured in several of our MBA courses, and has always been a welcome contributor to our students' education. Harry Roberts is a professor of statistics in the Graduate School of Business. Harry gave yesterday's workshop in Health Administration Studies, in which he presented a fascinating discussion of the applications of statistical quality control to health care organizations.

After John and Harry have spoken, we'd like to throw the floor open for your comments and observations. Hopefully we'll be able to leave today's symposium with a better understanding of quality control issues.

JOHN SCHNEIDER. Thank you very much. My association with issues of quality goes back probably 15 to 20 years, through participation with the activities of CHAS—the courses, the symposium, interactions with Ron and Odin and others. In a sense, the perspective that I'm going to provide for you is that of a passenger on a train. As you know, when you ride on a train and you look out the window, things change as the seasons change; things change year after year as buildings come and go and disappear. And in a sense, that's been my feeling about what's going on in the issue of quality and quality assurance. What I will discuss with you is really some of my observations, riding on a train and looking at what was presented today in light of what had been presented in the past—my understanding of it.

The first issue is that we tend to look at quality as a hospital function that concerns physicians in the hospital, but what about the community? It's a major issue now when we talk about access. It was addressed, in part, by some of the speakers because the issue becomes if you don't have any money, you'll have to go to a hospital that will take you. What about the function of a hospital and its responsibilities as identified when discussing the mission statement of the hospital—to provide care to the community in which it resides. Should the hospital be held responsible for the overall quality of medical care for people who live in the surrounding community? One thing which I find interesting is that people were very upset with mortality statistics recently published. The reason being because this was linked to hospitals and what hospitals were doing. Yet for years, we've had available in this country statistics on perinatal infant mortality. It varies from state to state. Illinois isn't very good. Chicago is even worse than the rest of the state. It's worse among blacks than whites. And in some areas of Chicago, perinatal infant mortality is as high as it is in underdeveloped countries. What impact has that had? Since it's related to other social factors, it hasn't reflected adversely on hospitals because, presumably, they are not responsible for it.

As we talk about quality, we should not just focus on what happens to the people who get care at the hospitals, but we also must reemphasize that the responsibility of the hospital

may well lie in being responsible for the community in which it exists and the quality of care received in that community. One of the problems is that sometimes we're talking about issues that relate to physicians, sometimes we're talking about those that relate to hospitals and sometimes we're talking about physicians in and out of hospitals. One major point is that in a very real sense it's not the patient who consumes hospital services. In a sense, it's the physician. At least we, as physicians, are blamed for all the consumption of hospital care, because we're responsible for ordering tests and admitting patients. Perhaps, some of the issues should relate to the hospital as a functioning facility to the extent that it meets a physician's needs, as well as to the extent that it meets and satisfies the patient's. What I think is most important in these discussions and in the discussions that were presented this morning was the fact that we need to get out beyond just looking at the hospital and hospital care. We need to look at what happens to patients before hospitalization, after hospitalization, and what are the factors that affect quality in these particular areas. This really poses the challenge for all of us, considering what has been worked out in terms of quality assurance indicators, process and structures—all very hospital specific. What is really unknown is whether one can take these same kinds of measures and generalize them to use outside of the hospital.

The first problem is that when you talk about hospital care, it's easy to talk about outcomes and link it to process, because something is going to happen in a short period of time. Something is done to a patient; they get better or worse within a few days. Once you begin to move outside of the hospital and start looking over longer periods of time, it becomes much more difficult to know whether something that you're measuring as an indicator has any real impact on what the outcome is one month, two months, five months or ten years later. This has always been an issue when one talks about preventative medical care and insurance coverage for certain items. One could raise the point that for a considerable period of time insurers have not been interested in paying for things that would be considered routine care, such as Pap smears, mammograms and so forth. The benefit from that wouldn't occur soon: it would occur many years later, and that insurer might not be responsible for providing the cost of care for that individual then.

The most important thing has come from the information that was shared with us on the data collection systems which are being developed by HCFA. We need, first of all, to get data in order to make sense out of what we call standards. The one thing which is most striking to me, in having attended this session and others in the past, is that, for the most part, we really don't know very much about what standards should be. We don't really know if a lot of things that we can call indicators have any real relationship to anything that's terribly important to outcomes or benefits of patient care. I'm sure this is an issue that we'll hear more of as we begin to look at evaluating and determining what sorts of indicators are appropriate. It's very easy to set up a standard and to find physicians that don't comply with it. Then we can educate them and say, now that you've been educated, you'll be better. However, we really don't know whether 3 percent nosocomial infections, after certain kinds of surgery, is an appropriate standard. Is 5, 6 or even 1 percent more appropriate? Or, how often can a pediatrician get by without measuring head circumference of a child without creating problems. We just don't know that. So, it is important to get data both at a given point in time, so that it provides you with epidemiological data, and also to be able to follow over time.

The most interesting thing, as we talk about all these standards and other issues in quality assurance, is that consumers seem to be concerned about other issues. That makes sense. It's very hard for a consumer to look at a lot of statistical data and try to determine whether they should or shouldn't have carotid artery surgery because they've had TIAs. Allow me to give some examples. At the University of Chicago we would have earned an A+ in treatment of patients with myocardial infarction. There was another category, which included patients with less severe heart disease that was also looked at in terms of mortality. In this category, we didn't get an A+; we didn't even get an A. We're probably down around a C. How would you, as a consumer, make use of that? The typical presentation of a heart attack is similar to a lot of other aspects of coronary artery disease, including angina and other causes of chest pain. Now, if you were to take these mortality statistics seriously, you'd say, if I know I've had a heart attack—now that I'm having chest pains—I ought to go to the University of Chicago because that's an A+ for treating me. However, if I don't have a heart attack and my chest pain is due to coronary artery disease or something else, maybe I should go somewhere else. I think this is one of the problems that consumers face with this kind of data.

Finally, the issue which I'm most concerned about is that hospitals—and I'm talking about the managers who run them as well as the physicians that work there—need to take the idea and concern of quality as a serious issue. And use it to look at what they're doing so that they can make things better. Unfortunately, and this is what is the greatest distress to me, I see quality being used as an external way of making hospitals and physicians do certain things. Typically, certain things that the payer wants them to do, whether it be the federal government or the insurance companies. Frankly, I just don't think it'll work that way. I think institutions will find ways to get around it. They'll come up with ways to satisfactorily provide information to several groups, to engage in P.R. and advertising that will slough over any problems. I think what we really need to do—as people involved in health care—is continuously examine what we do and how we can do better. Let's not put ourselves in the defense of saying, we're doing something wrong and we better hide it before somebody comes and finds it. But rather to say, yes we have opportunities to improve what we're doing. We appreciate the opportunities given to us by data made available from organizations such as HCFA and others. There's always been a commitment of physicians to clinical trials, randomized studies, etc., all of which are very difficult to do, and very time-consuming. However, they generate information. So, we need to make a commitment to more information about what we're doing and then to internally commit ourselves to using that information to address issues that lead to patient satisfaction, such as seeing patients in a timely fashion and explaining things to patients adequately. We should work at doing even small things better without a tremendous concern that somebody is going to punish us if we don't do what we should be doing. Of course, that leads to the final issue, and maybe this is for the next generation. Somebody must develop a system of quality assurance to assure us that the quality assurance we do really does do something to make quality better.

HARRY ROBERTS. The last three or four paragraphs of John Schneider's talk summarize my view of the subject, its challenges and the problems. When he said, "Make things better," that captures my view. I see statistical methods that can make things better, when properly used. When I say properly used, I mean used in the right way within an organization. Statistical methods can make things better, and I think that they work almost anywhere. That is an important focus for this discussion of health care. The work that was reported this morning was intensely interesting. It substantially enlarged my own view of this new field for me.

I want to comment on how each of the talks has contributed to my thinking. Donn Duncan came the closest to my personal concerns when he talked about the details of statistical strategies of data collection and analysis, of the movement toward much more specific proxies for outcomes and toward studies directed to specific problems. I felt that was extremely helpful. I hope that I can corral a copy of his slides to assimilate some of the details more fully, because a lot of the things he had to say applied to quality methodology and application in any circumstance.

Henry Krakauer's talk was also extremely interesting. I gained insight from the sophisticated approach that he is taking toward the use of measurements, and I feel much more secure that the measurements are likely to be well used. I have been concerned about this because of the danger that performance and outcome measures, improperly analyzed and digested, will lead to inappropriate actions. Worst of all, everybody could waste time arguing about the numbers and the report card system, rather than getting along with the task of making things better.

David Klein showed the use of quality ideas in getting information that is relevant from the third-party perspective.

Richard Wade was helpful in a respect that I hadn't much thought of: he talked about values and ethics. Here, I'm reminded of one of the main reasons for the success of the Brunswick Corporation. Jack Reichert, the president, has a statement of his values and goals, and they say just three things: (1) There's quality. We're going to be the best in the market. (2) There are customers. We've got to please the customers. (3) And finally, there are people, our employees. We have to do right by them. In that company, Reichert's values have set a tone over the last few years that have made possible a lot of concrete achievements—which appear on the surface to be merely technical advances—that are possible only within the environment of this value system. Reichert is very much aware that such a value system is essential. He knows that if the employees don't really believe that you're going to drive out fear (one of Deming's "14 points"), there's nothing much you can do to improve quality.

Finally, Joyce Jensen, on the consumer orientation, seemed to be going in a direction that's extremely important—which certainly has been true in industrial quality control. The customer is the starting point. You don't say that the customers ought to like this or that, or that they should appreciate what we're doing for them. You say rather, "Let's find out what they really want; what's important to them? Then it's our job to do it." I think more needs to be done along this line in health care. My own impressions are that the customers of health care institutions are extremely interested, and they have, in many cases, detailed

knowledge. A lot of the choices between physicians and hospitals are based on word of mouth, which in turn is based on direct experience. When I was taking a trip in an emergency vehicle after smashing a finger when I rode my bike over a fire plug, the paramedics asked me which of two emergency rooms I would prefer to be taken to. I had enough specific information that if they had said I had to go to emergency room A, I would have said, "I'll go home and fix the finger myself." But they did take me to B, where my finger was satisfactorily fixed.

That's the broad perspective. What I see, especially after hearing this morning's session, is that there are very exciting opportunities to make things better. If health care institutions, organizations, and physicians can learn and apply more of these ideas, they will have the great satisfaction of seeing quality improve in all dimensions even though it may not be easy to demonstrate the improvement in ultimate outcomes in any short period of time.

QUESTIONS FOR PROFESSOR ROBERTS AND DR. SCHNEIDER

DAVID DRANOVE. At this time, we'd like to open the floor for comments and discussion. You need not directly address your comments to Professor Roberts or Dr. Schneider, but they both reserve the right to interject their own observations.

QUESTION. As far as specific standards for specific illnesses, such as nosocomial infections, isn't it our understanding that the goal should be zero percent rather than any of the higher numbers that Dr. Schneider talked about?

JOHN SCHNEIDER. There's a difference between goals and what I view as a system to make changes and improve quality. For example, a very simple goal might be to never take out an appendix unless it's inflamed. What one knows is that sort of perfection isn't possible. If you always wait until you're convinced that a person has appendicitis, some people will have ruptured appendices and abscesses and will have problems. The same issue I think applies to such things as nosocomial infections and other events which may or may not happen to people who are sick in or in the hospital. What one really needs to get some feeling for, and this is where the information is necessary, is what is happening at the present time. Looking at it broadly across the nation or geographically gives you some idea of how your particular institution relates to the rest of the world. But that's only the starting point. My concern is that if you say your goal ought to be zero and you have 3 percent, therefore, you're bad, it doesn't provide the incentive to make some improvement in quality. If, on the other hand, one looks at it and says, "Okay, we're 3 percent and everybody else is at 5 percent, we're doing better." That makes us feel good; we must be doing something right. Now, you can get the group that are involved in it, whether it be nurses, physicians or whatever and say, we already figured out how to do better than most people; can we get even better? That's my reason for wanting to know what happens nationwide. What are you comparing yourself against? You can do the same thing with appendicitis, for example. You can look at the number of normal appendices that you remove in relationship to other hospitals. And then you can look at the number of cases of perforated appendices and abscesses and compare it with other hospitals. You, then, will have some idea of where you are. It gives you the information that somebody is capable of doing it better, and, therefore, maybe you ought to be capable of doing it better. And it gets it away from, you screwed up, you're a bad guy; lousy place, don't go there.

HARRY ROBERTS. I'd like to add a very brief comment to that. I agree with what John said. The arbitrary goal is one of the things that Deming is especially firm in warning about. That's why he thinks that the slogan "zero defects" is counterproductive. Obviously, everyone would like to have zero defects or 0 percent infections. But you've got to work with reality, and you've got to keep improving.

What seems to happen, at least in favorable circumstances, is that if people keep on improving, they may never get zero but they come within a few parts per million of zero. You don't achieve this by slogans or exhortation, however. In some zero defects programs, employees are asked to sign a pledge, that they will make no more defectives. As if that were the route to improvement!

QUESTION. The focus of the discussion today was around hospitals. But I didn't hear any discussion about the role of the government or insurance companies and their responsibility for providing those resources to the health care deliverer so that quality can be improved.

DAVID DRANOVE. Perhaps I can follow up on that comment with Professor Roberts. It always struck me that one of the reasons for the success of the Japanese companies has been the role of the Japanese government in facilitating technological development. Is that an appropriate role for the government?

HARRY ROBERTS. I find that a very hard question. Ed Deming was in Chicago just this week and he made the pitch that cooperation in Japanese industry was indeed one of the reasons for success. However, the cooperation consisted of exchange of information that would give them all a higher quality. The danger is expressed in Adam Smith's comment that when tradesmen get together, it's not long before they talk about finding ways to restrict entry, to rig prices, and to do all sorts of other things that are antithetical to quality. So, I think it's a tough choice. Certainly the Japanese government, in some ways, has been extremely helpful. I think, however, that the Japanese auto industry would have still done quite well even in the absence of that.

DAVID DRANOVE. While information may sometimes be overwhelming and, in addition, will not always be used correctly, patients will make as much sense out of that information as they can and will generally make better-informed decisions with more information than with less information. That leads to one of the themes for the symposium that our panel might address. John, you can respond first. One cannot predict on the basis of any information available to my knowledge, whether your probability for survival with a given illness is greater at one hospital than another, with 100 percent confidence. The information we have is not perfect. We know there are benefits of using...information but there surely are costs associated with using that information as well. Are there any guides as to how we can assess the benefits and costs, and whether we're at a point in time in which the information that we have available is useful and valuable information. Or, whether we should wait before we make decisions on the basis of this information?

JOHN SCHNEIDER. I think one of the things which I view as a problem is that, in particular, using hospitals is very much different than any other service or product. You don't plan on using a hospital. You can plan on buying a car. You can plan on buying a house. You can even give consideration, if you're going to write a will, as to what lawyer or what legal service to use. You can gather the information that is relevant to the particular product or service you want to purchase. Unfortunately, most of the things—and I guess I would say with the exception of pregnancy and delivery—that get you into the hospital, whether they're medical or surgical, tend to be unusual and abrupt. For example, hurting your finger after falling off your bicycle. I'm sure you didn't start the day saying, I know which hospital best can take care of my finger if I run into a fire hydrant. That's what I think creates the problem. I don't disagree with you that making more information available is a good idea. I just find it very difficult, when I put myself in a consumer's role, of knowing how I'm going to be able to use that information in a perspective fashion. This is particularly true when a patient enters a hospital with a diffuse problem, such as

abdominal pain. Hospital X is very good with the reproductive organs, and hospital Y has great doctors for the stomach and liver. Then there's Z which is excellent with the colon. But all I know is I've got abdominal pain. And I don't know which one to go to. If you carry it to the extreme, one can perceive this division of care happening as medical care becomes more regionalized and organized. Hospitals will begin to structure themselves much the way medical care has structured itself. There will be, what one would call, primary-care hospitals, much like primary-care physicians. You would go to one of these when you don't really know what your medical problem is. Facilities will be identified for certain things, such as heart transplants. If you needed one you would go to the place that really has the program and the quality measures that demonstrate it's a good program. If you have disease Z, you would go to another particular hospital. That potentially may happen. It requires structuring the way we provide care. Let's get back to the first issue I raised, community responsibility. At the present time, hospitals function as an independent business. If they don't have a mission commitment and an ethic to people in their community, they can ignore them. They may get business from somewhere else, because it's more profitable.

QUESTION. Generally, under cost constraints, you're forced to make trade-offs, such as selecting nurses' aides instead of nurses. How does one maintain quality in the face of cost pressures?

HARRY ROBERTS. I think the general answer is that in all but the absolutely tautest ships, you can get better quality at lower cost if you cut out what is called complexity: rework activity that is unnecessary or would be unnecessary if things were done right. Tim Fuller at Hewlett-Packard has written a beautiful paper on this. Consider a manufacturing operation where everyone is straining to the hilt, such as manufacturing computer boards for the Hewlett-Packard 3000. They're having trouble meeting the schedules and expediting things. Fifteen people doing all this. Fuller sees that most of the people are busy doing things that are essentially rework. As you improve quality, the rework becomes unnecessary. The first thing you know, instead of fifteen people, you've got seven. Instead of a factory floor cluttered with junk and partly assembled kits on racks, everything is clean and quiet. The bad thing about it is there's no more excitement. The people who loved to put out fires and meet crises no longer can do that because there aren't any fires and crises.

Fuller's insight has been most helpful to me because, I think, it applies almost anywhere. It applies indeed to our own personal lives, if we analyze how we behave and why we are running a rat race. A lot of it is complexity. We're looking for things we misfiled. So, I think that in almost any situation, except, as I say, the tautest ship where they already have near perfection, you can get better quality at lower cost.

JOHN SCHNEIDER. The same issue, in a sense, came up many years ago when nurse practitioners and physicians' assistants appeared. I'm sure many physicians would still argue that there's no way that these people with less training can do anything right. Yet, repeatedly, studies appeared and demonstrated that if you define jobs that you expect someone to do, they don't require lots of training to do that job. There are going to be certain jobs that require more training, and there are going to be certain managerial decision-making positions that will require certain individuals to do things that are beneath

them. At almost any hospital, including the University of Chicago, you'll find house staff members who complain that they have to do things that others should be doing—such as drawing blood and transporting patients. You'll hear much the same complaints from nurses and others. What has not happened are some of the applications that are being talked about in the business world, such as deciding what kind of training and person you need to accomplish certain things, and then have that person do it. And to use people who have more experience in training to do other sorts of things. Then, you don't need as many.

DAVID DRANOVE. I'd like to thank Professor Roberts, Dr. Schneider and all of you for your questions and observations.

ARE INDUSTRIAL QUALITY TECHNIQUES APPLICABLE TO THE HEALTH CARE SECTOR? A GENERAL REVIEW OF THEORY AND APPLICATIONS OF QUALITY CONTROL WITH SPECULATIONS ABOUT THE HEALTH CARE SECTOR

HARRY V. ROBERTS, Professor of Statistics

1. The New Quality Control: Quality and Productivity Improvement

In the 1980's there has been a great resurgence of interest by American industry in an approach to quality improvement based, in part, on the effective use of statistics. The earlier specialized field called "statistical quality control" has evolved into a new management philosophy called variously "quality and productivity improvement," "total quality control," or "company-wide quality control." The story behind this resurgence has often been recounted (see, for example, Walton [1986]), and I shall not give historical details here. It will suffice to say that although the immediate stimulus has come from the success of Japanese industry, with the consequent competitive challenge for many American companies, three of the intellectual leaders of quality and productivity improvement are the American statisticians W. Edwards Deming, Joseph Juran, and George E. P. Box, and the original pioneer of the 1920's and 1930's was Walter A. Shewhart of Bell Laboratories.

The key to quality and productivity improvement is the simple idea that bad quality is not inevitable. It need not be accepted fatalistically, like cold Chicago winters or hot Houston summers. A corollary is that extremely high quality is possible. In many industries, the Japanese have achieved quality levels that would have been deemed impossible a few years ago, and some American companies are moving in the same direction. Even castor oil has been improved: it is possible to buy castor oil that has been "palatized," that is, "highly refined to eliminate the usual taste and odor," and I can testify that the claim is valid! This example also carries a moral for health care: do not overlook the opportunities for improvements that are small in the big picture but important for many patients.

It is important to understand, however, that intense interest in quality improvement seldom appears to arise spontaneously in companies; it usually seems to be stimulated by competitive challenges, particularly challenges serious enough to threaten bankruptcy. As I understand it, the growing interest in quality of health care has come primarily from pressures for cost containment that have led to greater competition among health care providers.

We now consider some of the salient ideas of quality and productivity improvement as they have evolved in the business sector.

Continuing Improvement of All Processes (and Products)

A process is any collection of activities by which specific things get done. Examples are the manufacture of an expansion board for microcomputers, processing consumer complaints,

sending out the checks for a company payroll, or treating patients in the emergency room of a hospital. A process is not necessarily a manufacturing process; all the ideas of quality and productivity improvement apply to service organizations as well as manufacturing companies.

Companies can be thought of as interrelated collections of specific processes. A central aim of quality and productivity improvement is the never-ending attempt to improve the quality of processes, and hence ultimately to improve overall company performance. While major breakthroughs are desirable, the most impressive overall company accomplishments appear to represent the cumulative effects of a large number of small improvements.

Statistics is seen as one useful tool for process improvement, a tool that also provides a way of thinking about quality. But, as we shall see, process improvement entails much more than statistics.

Reliance on Data Rather than Unsupported Opinion

Improvement of processes is not achieved solely by inspiration, research and development projects, application of known scientific or engineering principles, or automation and capital investment, although any of these may contribute. It is necessary also to understand how the process is supposed to work, and how it has been performing. The latter requires data.

The Need for Measurement of Process Performance— Quality, Yield, etc.

If data are to aid in process improvement, they must arise from meaningful measurements of relevant aspects of process performance. Just as in the health care field, there is interest in outcomes. Sometimes the "ultimate" outcome can be measured, and contribution to profitability is the ultimate outcome in the business sector. Usually, however, it is necessary to use proxies for ultimate outcomes.

Customer satisfaction with the product is usually regarded as a proxy for contribution to profitability. In turn, performance evaluation must usually be focussed on proxies for overall consumer satisfaction, such as how easily and cleanly the doors on a car open and close. Often, ease of opening and closing doors must be translated into quantitative measurements of snugness of fit, that is, in terms of dimensional specifications. Actual performance in holding dimensions is thus substantially removed from the ultimate outcome, but it is a working assumption that quality can be improved by centering processes on dimensional targets and reducing variability around these targets.

In new product design, elaborate steps may be taken to consider consumer preferences systematically to ensure that these preferences are appropriately reflected in design specifications; this approach is called "quality function deployment." In Japan quality function deployment has been used to drastically reduce the time to develop a new automobile and the number of engineering changes after production has begun.

Use of Pre-statistical and Statistical Tools

Insightful statistical analysis of data is essential. Insightful analysis, however, does not always require great statistical sophistication. Often very elementary statistical tools have been effective in practice. Of course, sophisticated tools may also be helpful; for example, spectacular results have been obtained by design and analysis of statistical experiments in which many potential factors are simultaneously studied in order to sort out their effects on process responses.

In the following paragraphs, I briefly delineate the statistical tools that have played a role.

Elementary tools: Here we encounter such tools as checklists (to collect needed information systematically), Pareto charts (to distinguish the important few problems from the trivial many), flow diagrams (to understand how processes are supposed to work), cause-and-effect diagrams (to help to identify possible causes of substandard process performance), simple tables and cross tabulations, run charts (plot of data in time sequence) and control charts (run charts with limits of the normal range of process variation), histograms, and scatter plots.

Of all these tools, the control chart is central. It helps to single out special problems (special causes) from normal process variation, thus suggesting when special attention is needed and when it is not. It helps also to indicate when further process improvement can be achieved only by better understanding of the process (common causes).

Sampling methods: Tools for sampling of output for purposes of inspection and surveillance.

Design of experiments, evolutionary operation, and intervention analysis: Formal and informal statistical approaches to the evaluation of management interventions on process performance.

Time series analysis: Tools for interpreting process behavior when the assumptions underlying simple control charts are not satisfied.

Work sampling: Used to identify sources of complexity, that is, activities that would have been unnecessary if things had been done correctly the first time. The aim is to improve quality and productivity by reducing complexity.

Bayesian and empirical Bayes methods for pooling of information.

Decision theory and tools for dynamic, real-time process control based on feedback from the process.

The "new" management tools: Tabular methods for organizing management thinking about the development of new products, especially the translation of customer preferences into design features (quality function deployment).

Company-wide Commitment to Quality Improvement

The experiences of many companies suggest that fragmented efforts to improve quality are likely to achieve limited success at best. Coordinated, cooperative efforts by the whole company, or at least major divisions and plants, are needed. This entails involvement of all employees at all levels and in all departments, not just a group of quality specialists.

In Japan, government support has played a role in the emergence of companies dedicated to high quality, and there has been some cooperation for quality improvement by companies in a given industry. In the United States, on the other hand, relatively little of quality and productivity improvement has come from industry cooperation or from government, although joint ventures such as the Toyota-General Motors NUMMI plant in Fremont, California have occasionally been used, and agencies such as the National Bureau of Standards have contributed much to quality.

Team Projects to Attack Specific Quality Problems

Often, especially in the approach espoused by Joseph Juran, specially constituted task forces representing different levels and different areas of a company attack individual problems, starting with the highest priority problems. Many relatively small projects can lead to big improvements in the aggregate, and can create a company culture in which a pervasive problem-solving atmosphere replaces confrontation and defensiveness.

In addition to the task forces specially set up to solve particular problems, regular employee working groups can cooperate to apply qualities to the processes they are responsible for.

Management Philosophy

The use of statistical tools for improving processes is only part of quality and productivity improvement. There also is need for an organizational climate conducive to the use of statistical tools. A management philosophy oriented toward creation of such a climate has emerged. Some aspects of this philosophy are sketched below.

Long run perspectives. The basic goal is long term survival and profitability, not immediately visible results. Instead of thinking about results for next month or next quarter, managers must focus on results over a number of years. For this longer focus to be possible, sustained commitment and involvement of top management is needed, not rhetoric, lip service, cheerleading, and exhortation.

Pleasing customers. The primary focus is on pleasing customers, immediate and ultimate. (Immediate customers may be employees at the next stage of a process, such as those who assemble parts that are being machined at the current stage.) Pleasing customers requires not only finding out about consumer preferences to current products but anticipating consumer preferences for new or substantially modified products. Marketing research is central.

Cooperative effort. The stress is on employee cooperation; breaking down barriers between departments, and between management and workers. One of Deming's famous 14 points,

"Drive out fear," captures the essence. A corollary is the desirability of working together on problem solving rather than finding scapegoats for failure. An essential condition is job security as quality and productivity improve. Employees may be reluctant, for example, to help to achieve greater efficiency if jobs are lost as a result.

Cooperation also extends to close relationships with suppliers: a company and its suppliers work together to improve quality. The usual result has been a great reduction in the number of suppliers, often only one supplier for a particular product, and reduced reliance on competitive bidding focussed on the lowest price. In the 1980's, substantial movement in this direction has occurred in automotive supply, and the Automotive Suppliers' Institute has done much to develop and diffuse modern statistical quality techniques, such as experimentation.

It might appear that the movement away from competitive bidding to single suppliers would lead to higher than necessary unit price. In practice, however, the quality gains made possible by cooperation and stable relationships between manufacturer and supplier appear to lead to higher quality and lower unit prices in the long run.

Training and education. There is an extraordinary emphasis on training and education of all employees, ranging from careful instruction about the requirements of the current job or process to basic education and training in the skills needed to improve processes, such as statistics or even elementary engineering.

Dangers of traditional management by objectives. Although not all proponents of quality and productivity improvement agree on the proper role of traditional methods of management by objectives (MBO), there is great potential for tension between quality improvement and MBO. There are two dangers in MBO: First, the numerical targets of MBO may be arbitrary, unrelated to any evidence as to what is realistically achievable. Nothing is more demoralizing than to try to meet an unrealistic target and to be penalized for failure. Second, the numerical targets of MBO become ends in themselves, and employees find ways to make the numbers look better without improving the processes. In the health field, for example, there are many ways to reduce reported mortality rates without reducing underlying mortality.

Importance of process and product design. There is great emphasis on process design—and product design—which can bring improvements that cannot be made once design is frozen, and the use of statistical experimentation to improve design. The idea of robust design, associated especially with the name of Genichi Taguchi, is to design the product so that it can be easily manufactured and function well under adverse conditions. This idea, like others in quality and productivity improvement, applies outside manufacturing. In health care, for example, it might be adapted to diets, exercise programs, or physical therapy.

Reduced emphasis on final inspection. Final inspection by specialized inspectors does little or nothing to improve quality unless the findings can be related back to the production process. Hence inspection is de-emphasized, and self-inspection by workers is stressed. In the absence of final inspection, control charts can provide the necessary assurances of quality.

Limited reliance on capital investment and automation. Capital investment and automation are not a cure-all; in fact, they are regarded as serious alternatives only when it is apparent that all reasonable efforts have been made to get the best results from a process with present resources.

Reduce complexity. Here, "complexity" is defined to mean any activity that would have been unnecessary if things had been done correctly the first time. High priority is accorded to the reduction of complexity because reduction of complexity almost inevitably brings both cost reduction and enhanced quality because of the reduction of waste and rework.

Breakthroughs are not a full answer to quality problems. Although major breakthroughs (of process or product) are desirable, one cannot rely on them to avoid the need for continual small improvements.

Workers are an untapped resource for quality improvement. Those who are closest to processes usually possess unique knowledge about the process. Moreover, with proper training, workers can often perform much more difficult tasks than would ordinarily be believed. In this respect, health care has pioneered by training of paramedics.

Higher Quality May Bring Higher, Rather than Lower, Productivity

Quality improvement and productivity improvement are not necessarily incompatible. The same statistical tools are applicable to both. Moreover, quality improvement often brings higher rather than lower productivity, if only because the elimination of complexity can make for substantial economies.

On the other hand, high productivity attained by skimping on quality can be counterproductive. A deadline for shipment of product may be met, for example, but subsequent problems with returns and rework, along with consequent consumer disenchantment, may more than offset the gains from prompt shipment. Indeed, if the indirect costs of bad quality—lost customer good will, for example—are taken fully into account, extraordinary—even fanatical—efforts for quality improvement may be cost effective.

One reason for misunderstanding of this point is the common confusion of "quality" with "features." Other things equal, addition of a product feature will necessarily make the product more expensive, while improvement in quality of a given product may make it cheaper.

For these reasons, reductions in rates of defective output from parts per 100 to parts per million may be cost effective.

Quality and Productivity Improvement Are Relevant to Service Industries and Departments as Well as to Manufacturing

Indeed, it often appears that greater improvements may be achievable in service industries, simply because fatalism about poor quality seems to be more widespread than in manufacturing, where a lemon is recognized and resented by customers.

Separation of Common Causes and Special Causes

In managing any process, it is important to distinguish transitory problems stemming from *special causes*, which can often be fixed by immediate intervention, from pervasive problems stemming from *common causes*, which require fundamental study of the process for understanding and ultimate resolution. For example, if errors in filling out a form are traceable to a single employee who was ill on the day the form was explained, we have a special cause. On the other hand, if most or all employees contribute errors, we have a common cause—inadequate instruction in how to fill out the form. Workers generally can do little about common causes, which are the responsibility of management. It is therefore futile and demoralizing for managers to blame workers for problems stemming from common causes.

Intervention to correct supposed special causes that do not in fact exist—sometimes called "overadjustment"—can lead to greater process variability and poorer, rather than better quality.

Failure to study common causes means lost opportunities to make fundamental process improvements.

Accomplishments, Actual and Potential, of Quality and Productivity Improvement

To my mind the success of many Japanese companies convinces me of the fundamental soundness of the ideas of quality and productivity improvement. The Japanese have tried the ideas, and they work. Of course, many factors other than management philosophy and reliance on statistics and statistical thinking have contributed to the Japanese success. For example, many would say that cultural differences—homogeneity of population, excellence of elementary education, diffusion of the work ethic—are responsible. But the Japanese have duplicated their success in American plants staffed largely with the same American personnel who had previously worked in these plants when they had been substandard. One such plant is the Quasar plant in Melrose Park, Illinois, a suburb of Chicago.

Melrose Park is also the home of an American plant, Navistar—that has achieved great success through application of the same ideas. I infer that the ideas of quality and productivity improvement offer a promising approach to management and the potential for great improvement is widespread in the American economy.

I am in no position to generalize broadly about the overall success to date of quality and productivity improvement in the United States, but both direct observation and feedback from MBA students who are working in companies suggests that many companies are

taking the quality challenge seriously and are obtaining encouraging results. (I have had some opportunity to observe at first hand successes attained by the Brunswick Corporation under the leadership of the CEO, Jack Reichert.) It should also be said that the improvements do not come easy, not because statistical methods are hard to use but because fundamental changes in management philosophy are required.

Comments on the Economic "Crisis"

Many of the leading proponents of quality and productivity improvement see the loss of American competitive position in a number of industries as a national crisis, citing the trade deficit as additional evidence. I am not persuaded that the trade deficit reflects a deep economic malaise, and the evidence seems clear that the American economy as a whole continues to perform relatively well in international comparisons. Even in manufacturing, the overall American picture is not as bleak as painted, or even bleak at all (witness, for example, the Brunswick Corporation just mentioned).

But for many American industries and companies, the crisis is real. Essentially, a superior management technology is now available. Any company risks bankruptcy by ignoring the new technology while its competitors—domestic or foreign—are taking advantage of it. (These comments are directed at the business sector; I have no knowledge of superior management technology in health care in other countries.)

My personal concern about national crisis is mainly directed to organizations beyond the business sector, especially to government and education.

2. Similarities and Differences, the Health Care Sector versus Industry

I now offer speculations about the applicability of ideas of quality and productivity improvement to the health care sector. I have no special expertise in health care, but like everyone else, I have been a patient and the friend (relative or visitor) of many patients in health care institutions (civilian and military): clinics, hospitals, and nursing homes. That experience is helpful in creating the right frame of mind for making speculations. To that end, I begin by quoting from a letter received by a friend from the Patient Representative of a Medical Center. The friend was the wife of a stroke patient; she had recently responded to a sample survey about her husband's experiences during his hospitalization.

> Recently you were contacted as part of our ongoing survey of Medical Center patients. During that interview you mentioned several events during your husband's hospitalization which were unsatisfactory and upsetting to both of you.
>
> ...We agree that it must have been frustrating for you both, especially the delays you experienced on the day of admission, the fact that your husband did not get dinner trays for two nights, and that the type of food needed for someone in his condition was not addressed immediately. Especially frightening must have been the incident when the heparin regulator was disconnected and he received heparin too quickly which necessitated the administration of another medication to correct this error.

> At this point, I can only apologize for the frustration and anxiety you and your husband must have experienced, and assure you that your input will be used to make improvements in these areas...

Admittedly, this episode was extreme, but it captures the nature of health care quality problems that I have experienced, observed, or heard reliably reported. My impression is that quality failures are frequent. Even if most of them are frustrating rather than life-endangering, methods of reducing their incidence would be highly desirable.

I do not mean to blame people in the health care sector for quality problems that exist there, because problems of quality are likely to be inherent in the system. The problems cannot be solved by finding scapegoats; the system must be improved. As to the system, my experience as a university faculty member makes me sensitive to the problems of running an organization in which the key players are more like independent contractors than employees. In health care as in higher education, it is customary to think of two levels of activity, professional and everything else. The professionals themselves, professors or physicians, tend to regard professional activity—research, teaching, or medical practice—as central and to de-emphasize everything else. In my view the "everything else" is also important.

Is the Health Care Sector Different?

There is no obvious reason why the ideas behind quality and improvement should not apply to other kinds of organizations than business firms, and there have been some applications to organizations outside the business sector. Yet any speculation about the extensibility of the ideas to the health care sector should be made with awareness of any special circumstances that might create problems not encountered in business. There are several major possibilities:

1. The pervasive role of health care regulation, either direct or indirect. Regulation is an extreme form of management by objectives (MBO), and it poses the same dangers of harmful side effects in health care as in the business sector. A leading example is the system of diagnostic related groups (DRGs).

2. The special status of physicians, who are more like university professors than management or technical staff in the business sector. In health care, teamwork in quality improvement may be made more difficult because physicians, like professors, have a special status in the organization. It is not easy for me to imagine physicians working democratically with nurses, practical nurses, lab technicians, and administrators on project teams to improve scheduling of operating rooms or to reduce the incidence of infections acquired in a hospital.

3. Diversity of product. Because of product specialization, a company in the business sector can afford to devote major effort to study and improve almost any individual process, such as assembly of a fishing reel or the painting of a boat motor. Hospitals, by contrast, must cope with a very wide range of threats to health. An individual hospital cannot ordinarily study, on its own, the best way to treat congestive heart failure or sciatica. Individual hospitals are heavily dependent on the medical research infrastructure for

guidance in almost all key steps in diagnosis, medical care, surgery, and drug treatment. Here we have an important limitation of the potential scope of the quality program of any individual health care organization.

4. The problem of lagged responses to inputs. The ultimate responses to inputs to the processes of an automotive manufacturer are often immediately apparent, or can be assessed by accelerated testing. The ultimate responses to health care are often apparent, if at all, only after long delay, and accelerated testing is not possible except for experimentation with laboratory animals. It would be very expensive for an individual health care organization to engage in the follow-up studies that would be required to measure lagged responses. (Here again there is an analogy with higher education.)

5. Ethical limits on human experimentation. Non-experimental data present perplexing obstacles to inferences about causal relationships, yet some understanding of causal relations is essential for process improvement. Statistically designed experiments offer one major bypass of this roadblock, and have been extensively used in certain industries of the business sector, such as chemicals and automotive supply. In health care, experimentation on human subjects is highly regulated. Experimentation directed towards improvement of many hospital processes would have to be conducted under similar constraints.

6. Health care is sometimes perceived as a right, regardless of a patient's ability to pay, and there is a tendency to be more concerned with protecting patients against poor medical practice than with pleasing them. I am not criticizing this view, but it makes it harder to maintain the emphasis on pleasing customers that has been so important for quality and productivity improvement in the business sector.

7. The life-or-death side of health care is so dramatic that it is easy to overlook the importance of mundane logistical support, such as good meal service and accurate laboratory tests.

8. I perceive a certain lack of awareness of quality failures in health care, especially in logistical support, or at least fatalism about prospects for doing anything about them. (For example, I have never heard any convincing explanation of why hospital beds and pillows are so hard, why sleeping patients have to be wakened so frequently, or why loud talking, television, and smoking on hospital wards are not supervised more adequately.)

But it is easy to exaggerate the differences between the business sector and the health care sector, and to lose sight of the fact that the ideas of quality and productivity improvement have a universality deriving from the ubiquity of processes that potentially can be improved. The emphasis on pleasing of customers could be especially beneficial: the simple name change from "patient" to "customer" can work wonders, as I have found when I think of my students as "customers." The opportunities for substantial improvement in the logistics of health care are exciting.

Moreover, I see signs that fatalism about poor quality is being lessened by the same competitive pressures that have led to quality and productivity improvement in industry. For example, I have recently had two fantastically quick, effective, and inexpensive responses to health emergencies (shingles and broken ribs) at Suburban Heights Medical

Center SC in Chicago Heights, Illinois. Even the red tape of arranging for reimbursement of the fees was handled quickly and well by the Center. One can only hope that the future evolution of health care delivery will leave sufficient room for patient choice that organizations who please the customers will be appropriately rewarded.

Quality and Productivity in Medical Research and the Development of New Drugs

I pass lightly over medical and pharmaceutical research, which has important implications for the quality of health care and where the statistical tools of quality and productivity improvement are clearly applicable. Although I have the impression that these tools have not been used as widely or as well as they might have been, breakthroughs in research have repeatedly led to major improvements in the quality of health care.

Stress on Measurement of Quality of Health Care—Structure, Process, Outcome

In trying to learn about current work on the quality of health care, I have been struck by the emphasis on the *measurement* of quality and by the focus on patient outcomes as the most important measurement. Good measurements are the basis of all effective work in quality and productivity improvement. But like final inspection in factories, measurement of past outcomes does not, in and of itself, improve quality. I have the impression that measurement per se is currently taking up most of the available energies of quality assurance personnel in health care. I hope that this concentration on measurement will prove to be a transitional phase that will lay the foundation for future progress in process improvement. Papers at this Symposium, especially those of Donn Duncan, Henry Krakauer, David H. Klein, and Dennis S. O'Leary, gave me concrete reassurance that the current work in measurement can and will lead to substantial improvement. But the measurements must be *used* for improvement to occur.

The current emphasis on ultimate outcomes—for example, mortality and readmission rates—does not help immediately to improve the logistics of health care delivery. "Ultimate outcome" has a good ring to it, but proxies for ultimate outcome are essential. An automotive manufacturer's quality program would not advance very far if every detailed decision of product or process design had to be related statistically to a data-based estimate of the effect of the decision on net profit of the company. Proxies for ultimate outcomes, and proxies for proxies, are necessary. Again, papers at this conference gave me reassurance that work is proceeding along these lines.

Further, it is important to seek quality improvement within individual health care organizations as well as for the health care sector generally; here is the closest parallel to quality and productivity improvement in industry. Quality studies within health care organizations require measures that extend beyond those now being developed for large scale data bases. There is need for study and measurement of many contributory logistical processes within organizations, whether or not it is possible to track the connection between these measurements and ultimate outcomes.

For example, there is need for individual organizations to study the quality of meals for patients, accuracy of laboratory measurements, success in delivering treatments on schedule, the degree to which patients are made comfortable (recall the hospital beds), and progress made by patients in post-operative physical therapy. My own experiences as a patient suggest that there is substantial room for improvement in these mundane things, improvement that should be sought even if one cannot statistically demonstrate the connection with mortality or other measures of ultimate outcome. Continual improvement of processes in health care, as elsewhere, is achievable by many small improvements.

Medical Emphasis on Breakthrough—
New Drugs, New Procedures, New Diagnostic Technology—
May Provide a Bad Paradigm for Health Care Quality

There is no necessary conflict between breakthrough and continuing small improvement, but the breakthrough psychology may make it more difficult to make mundane improvements. For example, new diagnostic equipment may be acquired when existing equipment is not being used effectively.

3. Statistical Analysis of Health Care Measures: Inferences about Causation and Allowances for the Effects of Chance

The movement towards health care measurement has stressed high quality data on outcomes. Leaders in this movement recognize the need for skilled statistical analysis if the data are to be properly interpreted. For example, they emphasize the need to understand both "trends" and "outliers." Translated into the language of quality and productivity improvement, this means the need to understand common causes and special causes. They also emphasize the need for risk analysis, that is, statistical adjustment of quality measures to take account of such co-variates as diagnostic categories, severity of illness, co-morbidities, previous admissions, and demographic and socioeconomic factors. The basic tool here is multiple regression. Without such analysis, there is danger of unjust assignment of blame for those physicians or hospitals whose health care measurements appear to be substandard.

My concern is that even the best available statistical tools will prove incapable of supporting the causal interpretations that will be read into the quality measurements. The variables omitted from the multiple regression models may well be essential to the full picture: statistical studies are fragile instruments for digging out causation from nonexperimental data. In drawing causal conclusions from health-care measures, humility is needed but may not always be forthcoming.

A related, but partly distinguishable, problem is that of making proper allowance for the role of chance in evaluation of outcome measurements. This is the problem supposedly dealt with by tests of significance, but the results of tests are not very helpful for this purpose. In this section, I offer a simple analysis that may help substantially. A quotation from the *Wall Street Journal* of December 17, 1987 sets the stage for my discussion:

"It's possible and shortly will be easier to discriminate amongst the providers of health care services," says William Roper, administrator of the Health Care Financial Administration.

"Just as the Transportation Department is now informing people about which airlines are most often late, we're going to be informing people about the outcomes of health care services so people can make judgments for themselves."

I do not have health care data in the form needed to illustrate my analysis, but I do have some performance data on the airlines.

The following table shows percentages of on-time flights for 14 airlines for the months of November and October, 1987, the order of listing coming from the ranking of the airlines in November.

RANKING THE AIRLINES

RANK NOV	(OCT)		NOV87	OCT87
1	(1)	American	83.2	86.1
2	(2)	Southwest	82.7	85.2
3	(6)	United	79.8	80.7
4	(7)	TWA	77.6	79.4
5	(13)	America West	77.1	74.9
6	(5)	Eastern	76.6	83.0
7	(12)	Alaska	75.4	75.2
8	(8)	Pan American	74.7	79.2
9	(3)	Continental	74.5	84.4
10	(14)	Pacific Southwest	73.3	60.3
11	(10)	US Air	73.2	77.3
12	(4)	Piedmont	73.2	83.4
13	(11)	Northwest	73.0	76.5
14	(9)	Delta	70.1	77.5

Percent of airline flights reported arriving on time in October and November of 1987. "On time" means within 15 minutes of schedule. From the Wall Street Journal, 7 January 1988, page 19.

Some highlights in the news story by Jonathan Dahl will illustrate how data like these are likely to be interpreted—and misinterpreted.

AIR DELAYS TOOK TURN FOR WORSE IN NOVEMBER

The airline industry's performance record took a surprising turn for the worse in November.

According to the Department of Transportation, 76% of airline flights arrived within 15 minutes of schedule in November, down from 80% in October. Several carriers, including Continental Airlines—which had been crowing about its improved service—fell significantly in the standings....

A Continental spokesman blamed the drop on bad weather at the airline's hub airports in Denver and Newark, N.J.; he said 30% of the carrier's total delays were weather-related in November, compared to 10% in October. Still, analysts said Continental could face a serious public relations challenge.

"They've been advertising a lot how things were improving, and this could put a damper on that," said Paul Karos, an analyst with L.F. Rothschild Inc....

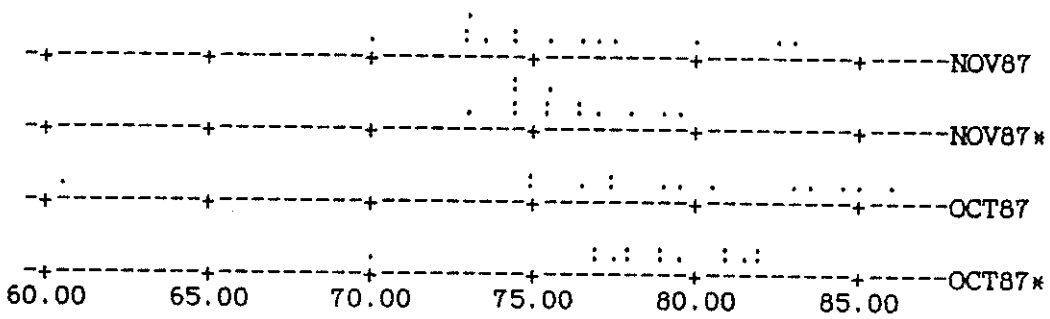
Delta Air Lines, which traditionally has received few complaints about bad service, posted the industry's worst record: only 70.1% of its flights were on time. Piedmont, meanwhile, dropped to twelfth in the standings from fourth.

Both carriers pinned the delays on weather and heavy traffic; Delta also continued to maintain that airlines have different reporting methods, and that could skew the results....

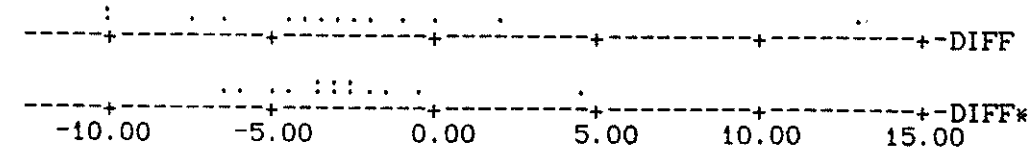
I shall bypass the overall changes of on-time percentages in both mean and dispersion from October to November and focus on the comparative performance of individual airlines. A simple statistical model can be used to estimate what the individual performances would be, aside from chance fluctuations. (The idea is that the regression prediction for each airline for the next month is an estimate of its "true" performance in the current month.) To remove the influence of changing *averages* from month to month, which may be irrelevant to the *relative* performance of individual airlines, one simply multiplies each airline's deviation from the mean of each month by the correlation coefficient between the two months, here 0.472, and adds the mean. (The rationale is that these numbers would be predicted values of percentage on-time flights in the next month, given only knowledge of the current performance and the correlation coefficient between airline performances in successive months, and assuming the current month's mean would obtain for the next month.) We call these estimates NOV87* and OCT87* in the table below:

RANK NOV	(OCT)		NOV87	OCT87	NOV87*	OCT87*
1	(1)	American	83.2	86.1	79.4	82.2
2	(2)	Southwest	82.7	85.2	79.2	81.8
3	(6)	United	79.8	80.7	77.8	79.7
4	(7)	TWA	77.6	79.4	76.8	79.1
5	(13)	America West	77.1	74.9	76.5	77.0
6	(5)	Eastern	76.6	83.0	76.3	80.8
7	(12)	Alaska	75.4	75.2	75.7	77.1
8	(8)	Pan American	74.7	79.2	75.4	79.0
9	(3)	Continental	74.5	84.4	75.3	81.4
10	(14)	Pacific Southwest	73.3	60.3	74.7	70.1
11	(10)	US Air	73.2	77.3	74.7	78.1
12	(4)	Piedmont	73.2	83.4	74.7	81.0
13	(11)	Northwest	73.0	76.5	74.6	77.7
14	(9)	Delta	70.1	77.5	73.2	78.2

The estimates NOV87* and OCT87* can be thought of as "shrinkage estimates"; the actual percentages NOV87 and OCT87 are "shrunk" 1-0.472 = 0.528 of the distance to the mean of each month. The result is of course a much tighter distribution of delay measures. For November, for example, the actual percentages vary from 70.1 to 83.2, a range of 13.1, while the shrinkage estimates vary from 73.2 to 79.4, a range of only 5.8. The dot plots below illustrate the picture graphically.



The changes from month to month are also of interest. Again, the actual differences of percentages reflect a substantial contribution from chance factors. Below we show dot plots of the actual differences, DIFF = NOV87-OCT87, and the differences DIFF* = NOV87*-OCT87* based on the shrinkage estimates.



The actual differences DIFF vary from -10.2 to 13.0, a range of 23.2, while the shrinkage estimates DIFF* vary from -6.3 to 4.5, a range of only 10.8. Continental Airlines actually declined from 84.4 to 74.5, or -9.9; the shrinkage estimates decline only from 81.4 to 7.53, or -6.1. And of the -6.1, -2.8 is accounted for by the average decline for all airlines, leaving only -3.3. I do not argue that Continental should be complacent about -3.3, but the problem can now be seen in much better perspective.

In the absence of analysis along these lines, the apparent capriciousness of the performance measures will be confusing to everyone and distressing to the airlines which, in a given month, get the most unlucky drawings from chance. Similar confusion has existed for decades in the interpretation of market share measurements for sales of branded products and share-of-audience measures for television and radio. I predict that the same thing will happen with health care measures.

The lesson from the example is that part of the performance measurements reflects noise. The measurements give the impression of much greater differences between airlines than actually exist. The shrinkage estimates clear out part of the noise, the part that can be

inferred from the joint distribution of performance measures in November and October. The shrinkage estimates themselves are, of course, still encumbered by sampling error; this error can also be estimated, though we have not done so here.

The shrinkage is proportional to 1 minus the correlation coefficient. For a correlation coefficient of unity, no shrinkage at all would be appropriate. For a correlation coefficient of zero, complete shrinkage would be appropriate. In the airline application, each airline would have received the mean for the 14 airlines in each of the months. This latter situation has been likened by Deming (1986) to a lottery; if compensation or recognition were to be based on the unadjusted performance measurements, "winners" and "losers" would be essentially determined by chance.

The methodology illustrated in this section can be extended to more than two time periods and to allowances for co-variates. When co-variates are available, even the rankings of the individuals being compared can be altered. (The same methodology is also relevant for attempts to infer causation when performance measures are available for successive time periods and some of the co-variates may be regarded as treatment factors.)

Moreover, when data are available for more than two time periods, an alternative approach to shrinkage may be appropriate. The model underlying the approach described above may be called an auto-regression model, because it assumes that the quality measures for each airline follow the same auto-regressive process through time. An alternative model, which may be called the random-effects model, assumes that observed quality measures for each airline vary randomly about a "true" level that may differ from one airline to another. It may happen, for example, that Northwest and Delta tend to be consistently below average. With more than two time periods, the data provide a basis for distinguishing the auto-regression model from the random-effects model. But my immediate message is that shrinkage of the current month's measurements will be appropriate under either model. The published outcomes should not be taken at face value.

4. Summary and Conclusions for Quality of Health Care

I have seen enough benefits from application of ideas of quality and productivity improvement in the business sector to believe that these ideas are applicable much more widely. There is no intrinsic reason why they would not have equal promise for the health sector, where there may be even more room for improvement than in industry.

There are, however, special problems in health care that are not encountered in the business sector. In the business sector, the combined effects of competitive pressure and consumer demand encourage companies to establish a favorable organizational climate for the application of quality ideas. A company that goes in seriously for improvement of quality, as quality is perceived by its customers, is likely to be rewarded by the market. My basic concerns about applications to the health sector are twofold: (1) The customers (patients) may have less freedom of choice; and (2) The quality measures perceived to be most important by professionals in the field of health care may give too much weight to the "strategy" of health care (e.g., choice of treatment of blocked coronary arteries) and too little attention to the "logistics" of health care (e.g., the quality of meals served to patients). But these concerns are grounds for caution, not pessimism.

I also have a concern about current approaches to quality improvement in health care. Quality improvement in industry is sought by continual improvement of *all* processes, even the most mundane, such as answering the telephone. To improve a process, one must make quality measures on the process. These quality measures are often common-sense proxies that will typically not have a rigorously demonstrable relationship to ultimate profitability. If a consumer survey suggests that the current package is hard to open, ease of opening the package can be operationally defined by common sense, aided by information provided by customers as to what they would regard as "easy to open." The package can be improved without measuring the precise contribution to profit that the improvement will bring.

Hence, in addition to the study of "strategic" processes of health care and the development of health care measures of ultimate outcomes such as mortality, I see need for study of "logistical" processes and use of proxy outcomes for these processes, such as the accuracy of laboratory tests, speed of filling prescriptions in the pharmacy, quality of meals served to patients, or care in helping post-operative patients to learn and follow the appropriate physical therapy. These proxies can help individual health care organizations to attain numerous small improvements, even though it may not be possible to trace the effects of these small improvements on mortality or readmission. These studies will not generally result in comprehensive data bases that can be compared across health care organizations. The data bases will often be collected for one specific problem, and often will not be maintained routinely after the problem has been solved.

Another way to view the picture is this. The present emphasis in health care places emphasis on report cards on outcomes for health care organizations and physicians. These report cards will focus needed scrutiny on the efficacy of strategies and tactics of health care. But unless the report cards on outcomes are supplemented by numerous small studies aimed at improvement of the logistics of health care, there will be little guidance as to how the report cards can be improved.

However, insofar as patients or their relatives make individual choices about health care based not only on published data on ultimate outcomes but also on word-of-mouth reports from friends and relatives who have experienced the health care system, health care organizations will have an incentive to improve the logistics, because patients will perceive the improvements. The danger is that patient flow to health care organizations will be increasingly influenced, directly or indirectly, by scoring systems based on measures of ultimate outcomes.

Two suggested applications of quality studies may convey my meaning more clearly, namely functioning of nursing homes and of the patient reimbursement system. From all impressions, it would appear that neither of these functions can be regarded as of generally high quality. Both functions are mainly logistical rather than strategic, since neither has much to do with the broader issues of best methods of medical diagnosis and treatment. Neither would be much benefited by the current thrust towards outcome measurement in health care. But both would appear to be amenable to very substantial improvement by the same methods that have been effectively used in the business sector.

SUGGESTIONS FOR FURTHER READING

George E. P. Box, William G. Hunter, and J. Stuart Hunter, *Statistics for Experimenters*, Wiley, 1978.

> Statistical experimentation is becoming an increasingly important component of the modern approach to quality control. This text provides a superb introduction to the important ideas of experimental design and analysis, and of statistics generally, with a good balance between theory and application.

W. Edwards Deming, *Out of the Crisis*, Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1982.

> The most comprehensive and insightful treatment of the role of statistics in quality and productivity improvement.

Masaaki Imai, *KAIZEN: the Key to Japan's Competitive Success*, Random House, Inc., 1986.

> The philosophy of improving quality by continuing small improvements as implemented in Japan, including recent developments such as quality function deployment.

Kaoru Ishikawa, *Guide to Quality Control*, Asian Productivity Organization, Tokyo, Second Revised English Edition, edited for clarity, 1986. (Available from UNIPUB, P.O. Box 1222, Ann Arbor, Michigan 48106 (800) 521-8110)

> Ishikawa is the Japanese counterpart of Deming, although his professional background is in engineering rather than statistics. This nontechnical manual gives the essentials of the traditional tools of statistical quality control. It also includes a number of very simple but useful procedures, such as cause-and-effect diagrams (invented by the author) and Pareto diagrams, not usually included in statistics texts.

Kaoru Ishikawa, *What Is Total Quality Control? The Japanese Way*, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1985.

> This book is entirely different from the previous book by Ishikawa. Here, Ishikawa provides a comprehensive treatment of what top managers need to know in order to implement quality and productivity improvement (or Total Quality Control) in their companies, including quality control of quality control, "the quality audit."

Joseph M. Juran, *Managerial Breakthrough*, McGraw-Hill, 1964.

> Organization of task forces to achieve major improvements.

George W. Snedecor and William G. Cochran, *Statistical Methods*, Seventh Edition. The University of Iowa Press, Ames, Iowa, 1980.

This classic text is a great general statistics book, one that I frequently refer to.

Mary Walton, *The Deming Management Method*, 1986, Dodd, Mead & Company, New York.

A compact yet comprehensive account of Deming philosophy, perhaps the best introduction for most readers with limited backgrounds in statistics.

Any of the above books can be purchased from the American Society for Quality Control, 310 West Wisconsin Avenue, Milwaukee, WI 53203. The toll-free phone number is 1-800-952-6587 (in Wisconsin, 414-272-8575). An ASQC Publications Catalog lists many other useful books.

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