Hospital Infection Rates: Another Score on the Healthcare Provider Report Card

by

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Abstract

Purpose

This paper examines the evolving policy of publicly reported hospital infection rates as an indicator of provider quality.

Policy

The purpose of healthcare provider quality report cards is to provide consumers and large purchaser groups with information regarding the quality of patient care. Policy makers believe that publicly reporting quality indicators will improve the delivery of care, reduce medical errors, decrease costs, improve patient outcomes, and allow consumers informed choice. Recently, hospital infection rates have been identified as an important indicator of quality that should be included in the healthcare provider quality report card. As of November 2005 twelve states have passed legislation related to the public reporting of hospital infection rates. This legislative action has taken place in the absence of an infection surveillance and reporting system that allows for accurate and reliable comparisons of individual hospitals within states and across regions. Current surveillance systems that are based upon administrative data sources or CDC-based surveillance methodology are inadequate due to a lack of sensitivity, specificity and the ability for risk-adjustment of patient populations. It is not known what effect, if any, publicly reported hospital-acquired infections will have on patient outcomes.

Literature review

A search of the scientific literature found no publications in peer-reviewed journals that demonstrate the effects of publicly released hospital infection rates on individual consumer choice, large healthcare purchaser groups, provider market share, and provider performance. However, the effect of healthcare provider report cards has been studied. This review found these report cards have had very little influence on the healthcare market and provider selection and may actually have unforeseen, negative consequences such as increasing health disparities. They have been shown to increase quality improvement activities, especially in low-scoring hospitals.

Conclusion

Despite the lack of evidence that publicly reported hospital infection rates will improve health outcomes or, in general, that healthcare report cards have improved patient outcomes, the movement to publicly release hospital infection rates has proceeded. It is imperative that further legislative action be delayed until the development of infection surveillance and reporting methodology that avoids confusing and misinforming the public and that also accurately and reliably represents hospitals' "true" infection rates. The development of national standards for hospital-acquired infections through such bodies as the National Quality Forum can provide the structure for a national reporting system. Research is needed to determine the best method for infection surveillance and reporting, to improve the use and effectiveness of healthcare report cards, and to prove they in fact achieve their desired aim.

The rising cost of healthcare in the U.S. and the consumer's assumption of a greater share of their healthcare costs have driven policy makers, purchasers, and providers to identify methods for assessing the quality of care and providing this information to the consumer. The healthcare provider quality report card is based upon the assumption that publicly reporting measures of healthcare processes and outcomes will serve as an incentive for providers to improve the delivery of care as well as assist the consumer in choosing their provider. Increased quality should lead to a reduction of medical errors, reduce costs, and ultimately improve patient outcomes. Recently, consumers have sought to obtain information about hospital infection rates as another measure of the quality of care. Consumers feel they have a right to know this information and employers who pay for healthcare plans seek to use the information for their purchasing decisions. This evolving public policy is strongly supported by large consumer and healthcare organizations as well as politicians in all levels of government.

Key Stakeholders

Consumers Union

The Consumers Union's (CU) featured campaign, *Stop Hospital Infections,* aims to help consumers find the best quality of care by publicly reporting hospital infection rates. Using methods such as on-line petitions, model legislation, and legislative sponsors in each state, the CU has had considerable success. The CU reports that over half of the states have introduced bills related

to the public reporting of hospital infection rates with many based on the CU model (CU, 2005). As of November 2005, seven states require infection rates to be reported.

Association for Professionals in Infection Control and Epidemiology

The Association for Professionals in Infection Control and Epidemiology (APIC) supports the use of infection data to improve infection prevention programs in healthcare facilities but recognizes that there currently is no standardized surveillance system to compare infection data among hospitals (APIC, 2005). APIC convened a consensus conference in February 2005 to bring together key stakeholders and is working towards establishing national standards for infection reporting through a partnership with the National Quality Forum.

National Quality Forum

The National Quality Forum (NQF), a public-private partnership that includes government, healthcare, consumer, and employer organizations, has as its mission to improve American healthcare through endorsement of consensus-based national standards for measurement and public reporting of healthcare performance data (NQF, 2005). This positions NQF to lead the development of national performance measurements for hospital infection rates.

Society for Healthcare Epidemiology of America

The Society for Healthcare Epidemiology of America (SHEA) advocates for reporting systems to select as indicators existing outcome measures such as surgical wound infections and device-related infections (i.e., central catheter-associated bloodstream infection and ventilator-associated pneumonia) that

incorporate some risk-adjustment. However, SHEA states that there is currently no widely agreed upon, scientifically validated method for risk adjustment of hospital-acquired infection indicators (Wong, Rupp, Mermel, Perl, Bradley, Ramsey et al., 2005).

Healthcare Infection Control Practices Advisory Committee

The Centers for Disease Control and Prevention's (CDC) Healthcare Infection Control Practices Advisory Committee (HICPAC) believes there is insufficient evidence on the merits and limitations of a hospital-acquired infections reporting system and therefore HICPAC neither recommends for or against mandatory public reporting of infection rates. HICPAC recommends that reporting systems incorporate both process and outcome measures and that the outcome measures are risk-adjusted (McKibben, Horan, Tokars, Fowler, Cardo, Pearson, et al., 2005).

American Hospital Association

The American Hospital Association (AHA) supports using hospital infection rates as a quality indicator but recognizes the issues surrounding data collection, dissemination, and risk-adjustment. The AHA promotes the use of quality indicators as a driver for improving patient safety. Their rationale for supporting the public release of quality information is to allow for informed decision-making by the consumer, engage market forces, and spur more quality improvement activities by the provider (Foster, 2005).

Centers for Medicare and Medicaid Services

The Centers for Medicare and Medicaid Services (CMS), the largest payer of healthcare in America, supports the use of publicly released quality indicators. CMS is collaborating with the Agency for Healthcare Research and Quality (AHRQ), AHA, NQF, the Consumer-Purchaser Disclosure Group, and other national organizations to collect and report quality measures. This consortium of national organizations, referred to as the Hospital Quality Alliance, currently collects and reports infection prevention process data. Outcome measures such as hospital infection rates are under consideration (CMS, 2005).

Current Legislation

States Legislatures

Fueled by the publication of the Institute of Medicine's, *To Err is Human: Building a Safer Health System* (1999), consumer and purchaser organizations have turned to state legislatures to mandate the public reporting of hospital infection rates. In 2003, Illinois became the first state to require hospitals to report their infection rates for public disclosure. Illinois has since been joined by six other states that have enacted legislation mandating the reporting of infection rates. All but Nevada, where hospitals are required only to report their infection rates to the state government, will release infection data to the public. As of November 2005, only Pennsylvania and Florida have released hospital infection rate information to the public. Tables 1 and 2 provide select features of the state laws that require reporting of hospital infections. As can be seen in Table 1, there are important variations between the states including the type of infections

reported and data sources. Table 2 represents those states that have enacted bills to conduct a study to determine the feasibility, costs, risks, and benefits of the public reporting of hospital infections but do not mandate reporting.

Table 1. States that Mandate the Reporting of Infection Rates

State	Responsible Authority	Data Type	Infections Reported
Pennsylvania	Healthcare Cost Containment Council	Administrative (ICD-9-CM)	All infections in 14 categories that are identified through diagnostic and procedure codes and billing. As of January 1, 2004 hospitals report data on surgical site infections and all device-related infections.
New York	Department of Health	Surveillance data based on CDC criteria	Critical care units only: central line-related bloodstream infection, ventilator-associated pneumonia, surgical site infections. First year a pilot phase and not publicly reported.
Virginia	Board of Health	Surveillance data based on CDC criteria	To be determined by the Board of Health. Board may release data to the public by request.
Missouri	Department of Health and Senior Services	Surveillance data based on CDC criteria	Selected surgical site infections, central line-associated bloodstream infections; ventilator-associated pneumonia remains under consideration. Infections reported and methodology determined by an advisory panel.
Illinois	Department of Insurance	Administrative (ICD-9-CM)	Infection rates (not specified) to be included in the "Consumers Guide to Healthcare" for provider comparisons.
Florida	Agency for Healthcare Administration	Administrative (ICD-9-CM)	Hospital acquired infections as specified by rule making.
Nevada	Health Division of the Department of Human Resources	Not specified.	Surgical site infections, ventilator-associated pneumonia, central line-related bloodstream infection, urinary tract infections. Mandates only reporting to the state government.

Adapted from the Association for Professionals in Infection Control and Prevention's Government Advocacy website located at: http://www.apic.org/Content/NavigationMenu/GovernmentAdvocacy/MandatoryReporting/state_legislation/state_legislation.htm

Table 2. States that have Enacted Legislation to Study Publicly Reporting Infection Rates

State	Responsible Authority	Study Proposal
Texas	Department of Health Services	Establishes an advisory panel to study reporting of infection rates and process measures
Louisiana	Department of Health and Hospitals	Creates a task force to study reporting infection rates
Tennessee	Department of Health	Requires Department of Health to report on hospital infections after consultation with the Tennessee Improving Patient Safety Coalition
Indiana	Department of Health	Establishes a medical informatics commission to study healthcare information and technology. Requires the Dept. of Health to develop healthcare quality indicators including infection rates
Utah	Legislative Management Committee	A study to require hospitals to publicly report their infection rates.

Adapted from the Association for Professionals in Infection Control and Prevention's Government Advocacy website located at: http://www.apic.org/Content/NavigationMenu/GovernmentAdvocacy/MandatoryReporting/state_legislation/state_legislation.htm

Federal Government

While states have been quick to act upon mandating the reporting of hospital-acquired infections, the federal government has been relatively slow. Currently, federal activity is limited to a House Committee on Energy and Commerce investigation. To date, the investigation has consisted of expert interviews and a recent survey sent to nine large U.S. hospitals regarding surveillance and reporting of hospital-acquired infections.

Hospital-acquired Infections as an Indicator of Quality

For a measure to be considered an indicator of healthcare provider quality, it should be evidence-based and linked to improved patient outcomes. The potential use of hospital-acquired infections as quality indicators has been investigated. The Quality Indicator Study Group (1995), a collaboration of SHEA, APIC, and The Surgical Infection Society, compared the four most

commonly reported infections; pneumonia, urinary tract infection, surgical site infection, and bacteremia on several factors important for selecting indicator events. The investigators reviewed the existing literature for quality indicators and conducted expert interviews to determine how best to evaluate indicators. Using a scale of 1+ (least favorable) to 4+ (most favorable), they rated each type of infection on clarity of case definition, ease of specimen collection, ease of surveillance, impact on morbidity and mortality, potential for interventions to reduce rates, ease of stratification, and availability of denominator by devices. Only urinary tract and bacteremia were given a 4+ for clarity of case definition, an extremely important factor when selecting indicators. When rated for importance of the event on morbidity and mortality, urinary tract infection received only a 2+ and 1+, respectively, while bacteremia received a 4+ for both outcomes. If the goal of a good indicator is to improve patient outcomes, bacteremia may be the best infection-related quality indicator. Wenzel and Edmond (2001) estimated that hospital-acquired bacteremias rank within the fourth to thirteen cause of death in the United States.

Sedman et al. (2005) investigated the patient safety indicators (PSI) developed by the Agency for Healthcare Research and Quality when applied to the National Association of Children's Hospitals and Related Institutions Aggregate Case Mix Comparative Database for 1999-2002. They found that the PSI for infections attributable to medical care could be useful in identifying best practices in hospitals with the lowest rates.

Issues in Surveillance Methodology

The difficulty in providing meaningful hospital-acquired infection data is reflected in the current patchwork of state laws. As can be seen, some states use administrative data derived from mortality, morbidity, procedural, and billing codes while other states rely upon data collected by trained infection control professionals who review medical records using case definitions developed by the CDC. Policy makers need to recognize both the merits and the limitations of surveillance systems when developing a methodology for reporting of hospital infection rates.

Administrative data

Administrative data are frequently derived from: 1) the International Classification of Diseases (ICD) used to code and classify mortality data and 2) the International Classification of Diseases, Clinical Modification (ICD-9-CM) used to code and classify morbidity data from inpatient and outpatient records and physician offices. The use of administrative databases to compare hospitals' performances has been investigated. Roman, Chan, Schembri, and Rainwater (2002) compared hospital reported complications with independent recoding of the same records. In a retrospective, cohort study design, the records of 991 randomly sampled adults who underwent elective lumbar diskectomies at 30 nonfederal acute care hospitals in California in 1990 and 1991 were reviewed. Postoperative complications were specified by reviewing the medical literature and consulting clinical experts with each complication mapped to the appropriate ICD-9-CM. The researchers found that ICD-9-CM complications were

underreported among diskectomy patients with the weighted sensitivity, specificity, and positive and negative predictive values for reported conditions being 35%, 98%, 82%, and 84%, respectively. The weighted sensitivity was variable depending upon the complication with only reoperation, bacteremia/sepsis, postoperative infection, and deep vein thrombosis reported with at least 60% sensitivity. Results showed that hospitals that would have been publicly labeled as having more complications than expected, reported complications twice as thoroughly as hospitals that would have been labeled as having fewer complications than expected.

Wright, Huskins, Dokholyan, Goldmann, and Platt (2003) assessed the use of administrative databases to conduct surveillance for long-term central venous catheter (CVC) infections. Using a retrospective cohort design, the study population consisted of all members of a health maintenance organization and two teaching hospitals in Boston. Claims databases were searched for 10 Current Procedural Terminology (CPT) codes, 2 ICD-9-CM codes, and internal charge codes indicating central venous catheter insertion. Lists were compared with each other and with medical records for correlation and accuracy. The results showed wide variation in the CVC insertions identified in each database and they concluded that current administrative databases are not sufficient to be used for electronic surveillance of CVC-associated complications.

NNIS System

For over 30 years, the CDC National Nosocomial Infections Surveillance System (NNIS) has been the primary national surveillance system for hospital-

acquired infections. Using CDC-designated definitions of infection, trained infection control professionals manually review patient records and determine the presence or absence of a hospital-acquired infection. Participation in NNIS is limited to hospitals with 100 or more beds that have at least 1 full-time equivalent (FTE) infection control professional for the first 100 occupied beds and 1 FTE for each additional 250 beds (Richards, 2001). Approximately 300 U.S. hospitals submit their infection data to the CDC who then pools the data and provides device-associated infection rates (i.e., central venous catheter, ventilator, urinary catheter) that incorporates risk adjustment based upon type of ICU and device days. Selected surgical procedure rates are also provided that are risk-adjusted (NNIS, 2004). NNIS data do not represent a true cohort study population and participating hospitals are not randomly selected.

A validation study of the application of NNIS definitions for infection was conducted by Emori, Edwards, and Culver (1998) using patients in the intensive care units of nine NNIS hospitals. Phase one of the study compared the results of chart review for hospital-acquired infections conducted by trained external data collectors to the case findings of the local infection control professionals. In phase two, a sample of discrepant reported infections was reviewed by CDC epidemiologists. The researchers found that for bloodstream infection, pneumonia, surgical-site infection, urinary tract infection, and other sites, the sensitivity was 85%, 68%, 67%, 59%, and 30% respectively. Specificity across all categories was high, ranging from 97.7% to 98.7%.

NNIS infection rates have been used for benchmarking by individual provider hospitals and for research purposes. It has provided a structure for infection surveillance that reduces the incidence of hospital-acquired infections (CDC, 2000). Infection surveillance with feedback to clinicians is an essential component of infection prevention programs that has been shown to reduce hospital-acquired infections by 32% (Haley, Culver, White, Morgan, Emori, et al., 1985).

Laboratory-based Surveillance

Laboratory-based surveillance systems are used to identify those patients most likely to have a hospital-acquired infection. In lieu of reviewing all patient medical records, only the medical records of patients who have a positive laboratory culture are retrospectively reviewed to determine if the patient had a hospital-acquired infection. In a study by Laxson, Blaser, and Parkhurst (1984) a randomized retrospective review of 575 medical-surgical patient charts revealed 70 hospital-acquired infections in 41 patients. Review of microbiology records indicated positive cultures for 71% of the patients with hospital-acquired infections. In addition, a random selection of 100 positive cultures was accompanied by a medical record review of the affected patients. The researchers found that 48% represented hospital-acquired infections. The laboratory-based surveillance system was 84% sensitive and 48% specific for detecting hospital-acquired infections. The use of laboratory-based surveillance is further supported by evidence that retrospective surveillance is as accurate as prospective

surveillance in identifying hospital-acquired infection (Blake, Cheatle, Mack, 1980).

Data Mining

Recently, some hospitals have transitioned from using administrative databases or traditional chart review by trained infection control professionals to the use of electronic data mining. Data mining uses computer technology to integrate laboratory and patient profiles to identify infections and detect infection trends. Preliminary evidence has demonstrated the effectiveness of a data mining program in the early detection and control of infection outbreaks, (Church, Woodruff, 2004), (Halloran, 2003), (Gustafson, Gray, 2005), (Church, 2005). In a study conducted in 2 neonatal intensive care units to evaluate the use of computerized surveillance to detect hospital-acquired pneumonia, the computer-based surveillance system had a sensitivity of 71%, specificity 99.8%, positive predictive value 7.9%, and a negative predictive value of >99% (Haas, Mendonca, Ross, Friedmann, Larson, 2005).

The Effects of Publicly Reported Healthcare Quality Indicators

Controversial issues surrounding publicly reported measures of healthcare provider quality such as hospital-acquired infections include the potential effects on patient outcomes, consumer choice, business health plan contracts, and market share. In addition, it is important to recognize that there may be unintended, negative consequences for certain patient populations.

Effect on Patient Outcomes

The first venture into publicly releasing hospital specific outcome data was the Healthcare Financing Administration's (HCFA) 1987 release of hospital mortality rates. When Berwick and Wald (1990) surveyed a national sample of 195 hospitals to determine their reactions to the HCFA release of mortality rates, they found that all respondents shared a negative view of the accuracy, usefulness, and interpretability of the mortality data. Only 31% of respondents reported using the data for internal purposes and 20% reported that the data release had caused problems for the hospital.

In 1990, the New York Department of Health was ordered by the courts to release surgeon and hospital specific data on CABG mortality to *Newsday*. A review of the first five years experience by Chassin, Hannan, and DeBuono (1996), found that there was no movement of patients away from hospitals with high mortality rates or movement of patients to hospitals with low mortality rates. They also did not find any evidence of physicians avoiding surgery on high-risk patients in order to keep their mortality rates low. After the first three years, there was a 41% decline in risk-adjusted CABG operative mortality. Chassin et al. (1996) also reported that low-volume, high mortality surgeons either voluntarily stopped performing CABG surgery or had their hospital privileges restricted.

However, similar improvements in CABG outcomes have been achieved without a public report card. Gali, Ash, Hall, Moskowitz (1997) compared in-hospital mortality after CABG surgery in Massachusetts' hospitals to those rates reported for the same time period in New York. They found a comparable

decline, 35% in 1992 and 42% in 1994 (both relative to 1990), in mortality despite the absence of a statewide outcome-reporting program.

From 1991 through 1999, a voluntary partnership of businesses, hospitals, and physicians was formed in Cleveland. Called the Cleveland Health Quality Choice (CHQC), their objective was to institute a "healthcare market reform program that would reliably and objectively measure and compare outcomes and patient satisfaction", (Baker, Einstadter, Thomas, Husak, Gordon, Cebul, 2002). Baker et al. stated that the CHQC received national attention because of its rigorous methodology for data collection, analysis, and reporting. CHQC publicly released risk-adjusted in-hospital mortality rates for six medical conditions: acute myocardial infarction, congestive heart failure, gastrointestinal hemorrhage, chronic obstructive pulmonary disease, pneumonia, and stroke. These reports were published in the main local newspaper and made available in pharmacies and over the Internet. While this program was operational, a dramatic decline of in-hospital mortality was observed. However, when Baker et al. examined mortality trends for 1991-1997 using risk-adjusted in-hospital mortality and early post-discharge mortality (between discharge and 30 days after admission), they found that deaths shifted from in-hospital to the period immediately after discharge with little or no net reduction in 30-day mortality for most conditions. The 30-day mortality declined significantly only for congestive heart failure, 1.4%, and actually increased by 4.3% for stroke. The authors cautioned that policy makers should recognize that using mortality to monitor trends in quality of hospital care might lead to spurious conclusions.

Market Share

One possible effect of healthcare report cards is a shift in market share to the providers with the best scores. Baker et al. (2003) examined the Cleveland experiment to determine if publicly reporting quality data affected market share. In this study they reviewed hospitals' market share and risk-adjusted mortality from 1991-1997 for hospitals participating in CHQC. CHQC identified several hospitals with consistently higher than expected mortality. The five hospitals with the highest mortality tended to lose market share (mean change -0.6%, 95% CI -1.9-0.6) but this change was not significant. They also found that the only high-mortality hospital with a large decline in market share had a declining volume for 2 years before being identified in the report. They found no evidence that hospitals identified as high-mortality hospitals lost significant market share or that hospitals with better than expected mortality gained market share. The authors stated that their findings suggested that purchasers did not use the information from CHQC for selective contracting and did not create financial incentives for their employees to use hospitals with the best performance. The authors note that the CHQC report was complex which may have limited its use and that given the emergent characteristics of the conditions monitored, patients may have had little or no choice but to go to the nearest hospital.

Romano and Zhou (2004) studied all patients admitted to nonfederal hospitals designated as outside the normal range in reports for CABG mortality in New York, acute myocardial infarction mortality in California, and post-diskectomy complications in California. The authors found that any patient

volume shifts were modest and transient with any statistically significant change attributed to the report card disappearing within 3 months of release of the data. This study also demonstrated that patient volume changes might be limited to relatively advantaged populations (white, other races excluding Blacks and Hispanics) and those with Medicare coverage.

Mukamel and Mushlin (1998) analyzed market share in New York State after publication of the cardiac surgery mortality report. They found that hospitals and physicians whose patients had better outcomes experienced higher rates of growth in market share, however, the association tended to decline over time.

Hibbard, Stockard, and Tusler (2005) found no significant changes in market share in their investigation of the impact of a hospital safety public report card for twenty-four Wisconsin hospitals.

Avoidance of High-Risk Patients

Moscucci et al (2005) investigated the effects of healthcare provider report cards and physicians avoiding high-risk patients. Comparing patients included in a multi-center percutaneous coronary intervention (PCI) database in Michigan, a state that did not report provider mortality rates, to the PCI database for New York, that did report provider mortality rates, they found that there were significant differences in the case mix between patients undergoing PCI in Michigan and New York with marked differences in unadjusted mortality rates. Patients in Michigan had a significantly higher incidence of renal insufficiency, diabetes mellitus, chronic obstructive pulmonary disease, extracardiac vascular

disease, congestive heart failure, and previous PCI. Patients in New York were slightly older and had a higher frequency of hypertension. Unadjusted, in-hospital mortality rates for New York was significantly lower than in Michigan (0.83% vs. 1.54%, $p < 0.0001$). However, after adjustment for comorbidities, there were no significant differences in in-hospital mortality rates between the two groups. The authors proposed that the differences in case mix could be explained by physicians in New York not intervening on higher-risk patients out of fear of increasing their publicly reported mortality rates.

Additional evidence of physicians potentially avoiding high-risk patients is provided in a study conducted by Narins, Dozier, Ling, and Zareba (2005). In a survey of 186 interventional cardiologists practicing in New York (120 respondents, 65% response rate), 79% agreed or strongly agreed that publication of mortality statistics had influenced their decision regarding whether to perform angioplasty on individual patients. Among respondents, 83% agreed or strongly agreed that patients who might benefit from angioplasty may not receive the procedure as a result of the public reporting of physician-specific mortality rates.

The role of health provider report cards and health disparities has been studied. Werner, Asch, and Polsky (2005), investigated the impact of New York's CABG report card on racial and ethnic disparities in cardiac care. Citing research that demonstrated physicians perceive racial and ethnic minorities as less likely to comply with treatment, more likely to refuse treatment, adhere poorly to treatment regimens, and delay seeking care, the authors sought to examine if the surgeon-specific report card resulted in physicians avoiding such "high-risk" patients by

not providing CABG surgery for patients with acute myocardial infarction. Before the report card's release in New York, white patients received CABG more often than black patients (3.6% vs. 0.9%) but not Hispanic patients (2.9%). After release of the report card, the difference in CABG use between whites, blacks, and Hispanics increased (8%, 3%, 4.8% respectively). After adjustment for trends in comparison states, racial and ethnic disparities in CABG use increased by 2.0 percentage points (95% CI 0.7 - 3.4, $p = 0.006$) in white versus black patients and by 3.4 percentage points (95% CI 0.8 - 5.9, $p = 0.01$) in white versus Hispanic patients. It took nine years for disparities in New York to return to the levels they were at before the report card was released.

Use by Employers

One of the most frequently cited reasons for public reporting of healthcare quality is to assist employers with their healthcare benefits purchasing decisions. It is assumed that businesses will use the information and their purchasing power will improve healthcare quality through competition. Hibbard, Jewett, Legnini, and Tulser (1997) investigated how large purchasers use performance measures and what type of performance information they use. Selecting four regions of the U.S. where data were available, California, New York State, Pennsylvania, and the Cleveland metropolitan area, they examined large employers use of clinical outcomes data from hospitals, Health Plan Employer Data and Information Set (HEDIS) health plan reports, and consumer satisfaction data. Thirty three purchaser representatives were interviewed who were together responsible for 1.8 million covered lives. The researchers found that an average of 78% of

purchasers were aware of HEDIS data and 75% reported that consumer satisfaction data were available. For hospitals outcomes data, purchaser awareness ranged from 25% to 71%. Among those who reported that HEDIS data were available to them, 54% reported using HEDIS for choosing a plan. Of the HEDIS users, 85% also used consumer satisfaction data. The results for hospital outcomes data were not as positive. Of those who were aware of the data, only 25% said they used the information. Some of the reasons given for not using the hospital outcomes data were concerns about the measurement methodology and whether the data are timely and valid, some expected the managed care plans to monitor hospital quality, and the information was not packaged for their needs. Consumer satisfaction was listed as the most influential measure in their decision-making.

Longo (2004) surveyed 154 Boone County, Missouri businesses regarding their use of healthcare consumer reports. This study found that the majority of employers indicated that the healthcare provider report card would not have a direct effect on their healthcare purchasing decisions, however they felt the reports were worthwhile. They also indicated that they preferred consumer reports that compared local healthcare institutions rather than needing to review national averages to locate the information.

Use by Consumers

Perhaps the most frequently stated reason for performance report cards is to assist the individual consumer in selecting their healthcare provider. Researchers have investigated the public's use of healthcare provider quality

report cards. Schneider and Epstein (1998) surveyed 474 (70%) of 673 eligible patients who had undergone CABG surgery during the previous year at one of four hospitals listed in the *Pennsylvania Consumer Guide to CABG*. They found that only 12% of patients knew of the report and less than 1% knew the correct rating of their surgeon or hospital and reported that it had a moderate or major impact on their selection of provider.

Marshall, Shekelle, Leatherman, and Brook (2000) summarized the empirical evidence concerning public disclosure of performance data to identify the potential gains and areas needing further research. Their study was limited to reporting systems in the U.S. and to peer reviewed articles published between January 1986 and October 1999. Of 21 total publications identified, seven provided evidence regarding the use of performance data by consumers. Only one study (Mukamel, Mushlin, 1998) suggested that public disclosure had an effect on consumer decision-making by changes in market share.

Hibbard, Stockard, and Tusler (2005) studied the impact of the Wisconsin hospital performance report card, *QualityCounts*, a report card that was designed for easy consumer use and disseminated widely in the community. They found that only 4% of consumers who were exposed to the report card immediately after its release used it to recommend or choose a hospital and only 10% reported having done so in the next two years.

Additional evidence that individual consumers generally do not use healthcare provider quality information is provided by a 1996 telephone survey of 2,006 adults conducted by the Princeton Survey Research Associates and

designed by the Kaiser Foundation and the Agency for Healthcare Policy and Research (Robinson, Brody, 1997). The survey found that consumers value quality but quality indicators are likely to be only one of several factors considered in their decision-making. Of those surveyed, 39% reported seeing quality information comparing health plans and of those, only about one-third said they used the information to make decisions. Other sources used by consumers to make healthcare choices included their family, friends, and physicians.

Effects on Hospital Quality Improvement Efforts

There is evidence that healthcare provider quality report cards increase hospitals quality improvement efforts. Williams, Schmaltz, Morton, Koss, Loeb (2005) examined U.S. hospitals' performance on 18 quality indicators for acute myocardial infarction, heart failure, and pneumonia that were reported to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). JCAHO provides public access to hospitals performance scores via *Quality Check*, an Internet report card. This study's findings revealed a significant improvement in the performance of hospitals over a 2-year period for 15 of 18 measures and no measure showed a significant deterioration.

Hibbard, Stockard, Tusler (2003) used an experimental design to evaluate the impact of a Wisconsin public hospital performance report on subsequent hospital quality improvement efforts. The first treatment group was 24 hospitals that had their performance publicly reported in *QualityCounts*. The second treatment group consisted of 41 hospitals that received performance information privately (performance information was not made public). The control group

consisted of 46 hospitals that received no report. The researchers found that when the hospitals were assessed for quality improvement activities specific to the areas included in the reports, the public-report hospitals reported a significantly higher number of quality improvement activities than did the private-report and the no-report. Low-scoring public-report hospitals showed the highest level of quality improvement activities. In a follow-up study, Hibbard, Stockard, Tulsler (2005) assessed the hospitals' performance scores two years following the release of *QualityCounts*. They found that among hospitals with low scores in obstetric care at the baseline period, those that had their performance publicly reported were significantly more likely to have improved their scores than those in the private report and no report groups.

The ability of quality indicators to compare hospital performance was investigated by Jha, Zhonghe, Orav, and Epstein (2005). In this study, they reviewed quality indicator data collected by CMS and reported by HQA. Hospitals submitted data on 10 quality measures to CMS. The 10 quality measures addressed three major clinical conditions; acute myocardial infarction, congestive heart failure, and pneumonia. The investigators linked the HQA data set to the database of AHA to obtain information on hospital characteristics such as profit status, number of beds, region, and urban vs. rural setting. The authors found that quality of care varied greatly according to the indicator of quality and the condition. Academic hospitals had higher scores for acute myocardial infarction and congestive heart failure than nonacademic hospitals but lower scores for pneumonia. Not-for-profit hospitals had significantly higher scores for

all the conditions than did for-profit hospitals, and there were significant regional differences in scores for all three conditions, with the Midwest and Northeast outperforming the West and South. There was no consistent association between performance and the size of the hospital except for pneumonia with the smallest hospitals having the highest scores. They also found that a high quality score for acute myocardial infarction closely predicted a high quality of care for congestive heart failure but not for pneumonia. The authors concluded that these data do not provide support for "good" hospitals being easy to identify or consistent in their performance across conditions and that evaluations of hospitals performance will most likely need to be based on a large number of conditions.

Conclusions and Recommendations

In order to provide the public with meaningful information and to protect hospitals from misrepresentation, policy makers should refrain from any additional legislative activity until the development of a dependable hospital-acquired infection surveillance and reporting system. The current state by state reporting systems for hospital-acquired infections will lead only to confuse and misguide the consumer, a much greater disservice than no reporting system at all. An infection surveillance and reporting system must incorporate national performance standards that provide data collection and risk adjustment methodologies that are scientifically valid and reliable and consistently applied across hospitals to allow for accurate comparisons. Computer technology provides the opportunity for the development of a sensitive and specific surveillance methodology that can avoid detection bias and allow for risk

adjustment of patient characteristics. Additional research is needed to determine the cost effectiveness, sensitivity, and specificity of computer-based systems and their role in the public reporting of hospital-acquired infection rates for provider comparisons. In addition, further research is needed to determine if publicly reported infection rates could possibly lead to patients at high-risk of infection-related complications not being offered medical interventions as was demonstrated in the studies by Moscucci et al (2005) and Narins et al (2005). Risk factors for infection such as diabetes and immune deficiency are well recognized so the potential for such unintended, negative consequences exist.

Just as importantly, researchers need to determine why healthcare provider quality report cards have failed to be used by both consumers and businesses. Research is needed to identify what type of information they want to know and how to package it. For example, Hibbard, Harris-Kojetin, Mullin, Lubalin, and Garfinkel (2000) found in a controlled experimental study that a message about protecting oneself from possible risk had more impact on how the participants comprehended, valued, and weighed comparative performance information than did a message about a potential gain or benefit. Schauffler and Mordavsky (2001) reported that in studies using focus groups to identify useful indicators of quality, more than half of the respondents selected hospital-acquired infection rate as an important indicator. These studies suggest that reporting risk of infection may be of value to the consumer and could potentially increase their use of healthcare provider quality report cards. However, it is important to recognize that factors such as the emergent nature of the medical condition and

socio-economics are significant determinants of provider choice, regardless of the performance indicator or grade of the provider.

It is inevitable that hospitals will publicly report their infection rates and additional process measures related to infection prevention. Policymakers, researchers, and infection control professionals must move quickly and, most importantly, work collaboratively to achieve the shared goal of reducing hospital infections and improving patient outcomes.

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