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# State-Sponsored Public Reporting Of Hospital Quality

Sameer Sheth

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# State-Sponsored Public Reporting Of Hospital Quality

A Thesis Submitted to the  
Yale University School of Medicine  
In Partial Fulfillment of the Requirements for the  
Degree of Doctor of Medicine

By  
Sameer D Sheth

2012

## **ABSTRACT**

The prevalence of state public reporting initiatives, and overlap with federal efforts, is not known. We systematically reviewed state-sponsored publicly reporting programs focused on clinical aspects of hospital quality and performance for adults, surveying the 50 U.S. states and the District of Columbia. We found that while identifying information about programs was frequently a challenge, twenty-five states had programs that reported about hospital quality. Information varied considerably from state to state, by health condition, and by process and outcome measures reported. We examine the implications of these findings for future state initiatives.

*The findings from this research project were previously published as a manuscript in Health Affairs in December 2010.*

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## **INTRODUCTION**

Public reporting, the objective measurement and public disclosure of physician and hospital performance, is now a critical strategy among efforts to improve healthcare quality. The success of public reporting programs is based on its capacity to leverage three broad mechanistic pathways (1) to influence hospital quality improvement: regulation, professionalism, and market forces (2).

First, public reporting establishes standards for practice by objectively measuring and reporting on care. Second, public reporting provides performance feedback that is expected to fuel professional desire to improve care and improve quality either out of concern for public image or in an effort to maintain professional norms and standards of self-governance. Finally, public reporting facilitates informed choices by health care consumers, including patients, insurers, and even physicians and hospitals, which can in turn drive quality improvement in order to increase (or maintain) market share (3, 4).

### **History of Public Reporting**

In 1978, Avedis Donabedian argued the need for measuring quality of healthcare and outlined some methods for assessing and monitoring the quality of care. He stated that precise and operative definitions of quality must be used containing specific criteria and standards (5). Donabedian classified quality measurements as being related to health care structure, process, or outcomes, and these standards have been adapted to the framework for quality of care assessment today.

There are a number of factors for ideally measuring quality of care including the need for evidence-based best practices, easily measurable metrics given the data, and the creation of easy to use information profiles for health care providers (6). A proposed roadmap for measuring quality of care begins with clinical evidence and/or clinical practice guidelines. This can be used as the basis for subsequent steps in the roadmap which include: quality indicator development, reporting, performance reports to drive continuous improvement efforts (6). To achieve success, this roadmap must create meaningful change that can drive quality improvement.

### **Quality of Healthcare**

The objective of public reporting in the United States is to improve the quality of health care delivered to patients (3). Yet, there is no comprehensive study looking at the quality of care given to the average person in the country. Most studies in the past have examined quality at the level of a single condition, and indicator of quality, or insurance type (7). Furthermore, the scope of care has been limited to specific geographic areas, segments of the population, or limited number of topics.

McGlynn and colleagues (8) reported results from the Community Quality Index (CQI) study in 2003 that monitors changes in the health care markets in the US. They found that participants in the study received about half of the recommended processes involved in care for such conditions as diabetes, hypertension, and coronary artery disease. They concluded that to improve the substantial gap in quality of health care delivered to the public, there needs to be routine availability of information on

performance, along with a national baseline to assess performance and improve quality at all levels (8).

### **Background on Public Reporting**

Evidence-based performance measures are important to identify specific deficiencies in processes of care, allowing for improvement in clinical outcomes. The United States is not alone in reporting performance data on clinical indicators as it becomes increasingly utilized in Europe and Canada by government health systems to follow quality of healthcare. There has been a gradual improvement in the clinical performance measure rates for US hospitals (9) that began before public reporting efforts were in place but continues with such efforts underway.

Research shows that changing the system is often dependent on the perceptions of the individuals who implement changes, but the perceptions of the hospital staff regarding public reporting and its subsequent influence is unknown (10). Hafner and colleagues (10) performed structured interviews at twenty-nine randomly selected hospitals to assess these perceptions. They found common themes revolving around increased involvement, accountability, awareness, and focus and concluded that publicly reporting data was an integral part of motivating and energizing an organization to improve or maintain performance success.

Others have suggested that public reporting efforts are only effective when the information becomes “embedded” in the everyday decision-making routines of users and



disclosers (11). Most recently, it was suggested that for public reporting to have an impact, the system needs to have potential to inflict reputational damage by producing information that is reliable, robust to criticism from the hospitals being assessed, understood in broad terms by the public, and published and widely disseminated (12).

### **The Effects of Public Reporting**

According to the Institute of Medicine, public reporting of provider performance will increase transparency, accountability, and quality (13). One way in which hospital care can be improved consists of allowing patients to choose more high-quality hospitals than they would have without public reporting. Also, hospitals respond to concerns about reputation, market incentives, and reasons of altruism or professionalism (2). Whichever pathway leads to quality improvement, it is important to consider the accurate identification of high- and low-performing hospitals (14).

In an effort to study the effects of public reporting, Hibbard and colleagues (15) designed a controlled experimental design that produced strong evidence for the effectiveness of public reporting on quality improvement. In the study, the group looked to evaluate questions around quality improvement with public reporting, hospital reputation, consumer choice, and market share.

The methodology of the study revolved around assessing the results from Quality Counts, a widely disseminated hospital performance report produced by a large employer-purchasing cooperative in Madison, Wisconsin. In an effort to increase the

impact on consumers, the data was presented in a way that made it easy to differentiate high- and low-performing hospitals. The report was also widely distributed by way of newspaper, website, and hard copies to generate public interest.

There were two intervention groups consisting of the “public report” group made up of 24 hospitals in the Quality Counts and the “confidential group” containing 41 hospitals that were randomly assigned. The control group consisted of 46 randomly assigned hospitals that received no information. The hospitals then received a follow-up survey nine months after the release of the reports and the results were analyzed.

The results showed that hospital acceptance of the report’s accuracy, appropriateness for public use, and quality improvement potential varied by group with the “public report” group being most negative and the “confidential group” being most positive. And as expected, hospitals that performed poorly were most critical of the validity of the results. Overall the quality improvement activities among the three groups were not significantly different. Public reporting did impact the focus of quality improvement as low-performing hospitals focused more on the measures presented in the report. In conclusion, the study suggested that public reports on hospital performance provided independent stimulus for quality improvement beyond private reports.

### **The Negative Effects of Public Reporting**

Public reporting provides consumers with objective, measurable data to select providers rather than choosing based on characteristics such as cost, word-of-mouth, or

referral practices. Report cards are often used to measure these outcomes or process measures. There have been studies showing that performance data can improve healthcare quality when feedback is given to providers (16, 17), but public reporting of this data could have unintended negative consequences.

There have been common misunderstandings around the language of report cards leading to mistrust. This leads consumers to rely on friends, family, and physicians more often than reviewing data presented in report cards (18). Even physicians do not trust the information suggesting that report cards may not influence physician referral patterns. Using quality indicators to rate performance may not be the best method because it may lead to physicians screening and treating all patients regardless of need in order to achieve target rates of treatment. Report cards may thus lead to excess use and unnecessary interventions (19).

It is necessary for report cards to adjust for case-mix, severity, co-morbid illnesses, socioeconomic status, and race to prevent penalizing physicians who care for the underserved. While there is debate around the efficacy of public report cards, it is commonly accepted that public reporting on health care quality is important as it allows the public to hold healthcare providers accountable for the quality of care delivered (19).

There has been an expansion of public reporting, yet there are still many concerns that public reporting may unintentionally lead to a reduction in quality. There are methods by which providers can “game” the system to look like high-quality performers

such as intentionally avoiding sicker patients or providing excess care to low-risk patients to improve quality metrics. For example, it has been proposed that cardiac surgeons may be reluctant to accept high-risk patients for fear of reprisal through public reports (20). It is important to consider that the cost of improving performance in areas may take away resources allocated for other clinical areas that are not publicly reported. Inappropriate allocation of quality-improvement resources can be detrimental to hospitals (14).

CMS collects data and provides quality measures for more than four thousand hospitals through its website Hospital Compare, allowing public access to data on performance and quality metrics (21). However, there are many core measures that do not assess care for all patients. In the case of processes of care for acute myocardial infarction, physicians are able to exclude patients with potential contraindications to measured treatments. Thus, discretionary exclusions by physicians may undermine the quality of care metrics used for public reporting (22).

A study performed by Bernheim and colleagues (22) examined the effects of rates of relative contraindications on the interpretation of quality metrics. The results demonstrated that older patients with AMI are more likely to be excluded for publicly reported process of care measures due to coexisting conditions that may present potential contraindications to treatment. In conclusion, if a large number of patients are excluded from quality indicators, this may raise concern about the strength of quality measurement.

Finally, public reporting is made more effective if it is able to influence consumers' selection. But for this to occur, the consumers need to first be aware of the reports, understand them, believe them, and then use this data to guide the choice of hospitals (23). Studies can often be filled with jargon and statistics that make them difficult to interpret. There is also inequality in accessing the reports along with the inability to act on the reports among certain populations and this disparity may only grow larger in the future. Along with consumers, providers and hospitals must also believe the reports are valid. If this occurs, there may be momentum for quality improvement, which along with public reporting may provide competition that further increases response to public reporting (14).

### **Public Reporting and Disparities**

As health care quality improves at a modest rate, health care disparities associated with race, ethnicity, and socioeconomic position persist in this country. Healthcare reform has recently accelerated efforts to achieve high-quality care by focusing on public reporting and transparency, while introducing new incentives to achieve success. Public reporting, as mentioned, can be used to drive improvement and allows patients to choose higher performing hospitals over lower performing ones. But if minorities have less choice than whites, larger disparities in care can be created (24).

An initiative such as “pay for performance” has been introduced to counter the slow rate of change. This financial incentive makes payments to physicians and hospitals dependent on improved quality (25). Yet, this model could worsen already present

disparities. For example, poor neighborhoods with worse performing hospitals could become poorer under strict performance guidelines. Ho and colleagues (24) argue that there needs to be creative solutions, such as pay for improvement, to enable providers near the bottom an incentive for reductions in disparities. In the end, all pay for performance policies need more data on racial and ethnic minorities to effectively track disparities. Ultimately, we will need to examine these new measures over time to determine if they can improve quality while also reducing disparities in our system.

### **Hospital Report Cards**

Despite expectations that public reporting could improve healthcare quality, prior research has shown that public and professional responses to report cards can range widely between being functional, such that reduced information asymmetry leads to better healthcare choices and improved quality, and dysfunctional, such that report cards exacerbate already existing informational inequalities in care (26). Further, any such response is derived from the report card's validity, comprehensiveness, comprehensibility, relevance, reasonableness, and functionality (26).

Hospital report cards are produced by organizations including popular magazines, federal and state agencies, non-profits, consulting companies, and insurance companies. Krumholz and colleagues (27) examined the validity of the reporting system used by HealthGrades.com. This website publicly reported hospital performance data using Medicare Part A billing data without any peer-reviewed statistical model. HealthGrades.com developed "Hospital Report Cards" to provide accurate and objective

ratings to allow consumers to compare quality information, and this was accomplished through the calculation of risk-adjusted mortality rates for different conditions (28).

The aim of the study was to determine if the ratings provided to consumers accurately discriminated between hospitals based on performance and outcomes. The design of the study involved comparing data from the Cooperative Cardiovascular Project (retrospective medical review of Medicare beneficiaries) to ratings from HealthGrades.com. They examined quality indicators of AMI care, including use of acute reperfusion therapy, aspirin,  $\beta$ -blockers, angiotensin-converting enzyme inhibitors, and 30-day mortality. The results showed that patients at higher-rated hospitals, on average, received recommended medications at higher rates and had a lower mortality, but there existed marked heterogeneity within/across rating groups and overlap of hospitals across rating strata for mortality and process of care (27).

The danger in misclassification of hospitals can be great as hospitals providing high-quality care may be labeled as poor with significant potential negative consequences. Thus, these report cards should not rate hospitals without access to their methodology. Recently, HealthGrades.com has published the 2012 quality ratings with an available methodology section on the website. Even then, the function of the report cards should be quality improvement rather than hospital comparison.

## **Reporting Hospital Mortality Rates**

Hospital performance profiling did not figure prominently in U.S. health care policy until 1986, when the Health Care Financing Administration (HCFA, now known as the Center for Medicare and Medicaid Services, or CMS) began to publicly report hospital-specific mortality rates for numerous medical and surgical diagnoses (29). Ultimately, this program was discontinued, but in the late 1980s hospital outcome measurement was revisited as policy through development of large clinical registry databases for cardiac surgery by two states (New York State and Massachusetts)(30, 31) and by the Society of Thoracic Surgeons (32).

A closer look at the state of New York shows that by publishing annual data on risk-adjusted mortality following coronary artery bypass graft surgery (by hospital and surgeon), the mortality rates fell statewide by 41 percent in the period from 1989-1992 (20). As the first large registry in the country that continues to publicly report data, New York served as a model for quality improvement. The success centers on the broad regulatory power of the state health department that requires reporting from all hospitals, regular audits, close oversight, and analysis by a neutral third party. In the end, the data drove physician and hospital administrators to improve upon their surgical care (20).

Similar initiatives followed in the Department of Veterans Affairs (33-37), Pennsylvania (38), Northeastern Ohio (Cleveland area)(39), and California(40). However, after a decade of measurement and reporting, programs remained focused



predominantly on cardiac surgery patients, until a relatively recent shift began to examine care for older adults.

### **Public Reporting and Pay for Performance**

While traditional strategies to improve health care include regulation and marketplace competition, public reporting of hospital quality and pay for performance are two of the most widely used methods for accelerating quality improvement. As mentioned, the importance of public reporting lies in stimulating providers to become interested in quality by appealing to their professional ethos (2). On the other hand, pay for performance appeals to the business side by rewarding high performing centers for excellence in patient care and quality improvement (41). Recently, even Congress has supported financial incentives by developing hospital “value based purchasing” for CMS.

Lindenauer and colleagues examined the effects of pay for performance combined with public reporting compared to public reporting alone. They found that, after adjusting for several factors such as baseline performance and condition-specific volume, hospitals with public reporting initiatives that were offered a bonus for high-level performance had greater improvements in quality than those hospitals that did not receive any financial incentives (42). Thus, the results suggested that financial incentives might be a way to stimulate quality improvement in hospitals with public reporting.

This article brings up important questions about the use of financial incentives in the healthcare system. There needs to be important debate concerning the design of the

system to prevent harm to the safety net hospitals (43). For example, should bonus payments be made to top performing hospitals, those with the greatest improvement, or those meeting performance thresholds? As with any new program, the costs of pay for performance may be greater than the costs of public reporting. In the end, it needs to be determined if this strategy is financially feasible and can improve quality and outcomes.

### **Public Reporting Expanded**

Beginning in the early 2000s, CMS began developing a large public reporting program, initially measuring process measures of quality care for acute myocardial infarction (AMI), heart failure (HF), pneumonia, and general surgery. That effort was followed by measurements of nursing home quality, known as Nursing Home Compare. Now, the CMS Hospital Compare public reporting program has been further expanded to include thirty-day risk-standardized mortality and readmission rates for AMI, HF, and pneumonia, along with patient satisfaction and use of medical imaging.

Quality measurement and public reporting has increasingly focused on national efforts led by CMS, while little attention has been paid to the continued growth and development of state-level initiatives. Accordingly, our objective was to systematically review and describe any state-sponsored publicly reporting programs focused on hospital quality and performance, in addition to describing the ease of accessibility of the information from state public reporting programs.

## STATEMENT OF PURPOSE, SPECIFIC HYPOTHESES, SPECIFIC AIMS

### Statement of Purpose

To systematically review and describe any state-sponsored publicly reporting programs focused on hospital quality and performance, specifically the presence of process of care, outcome, and readmission measures. To describe the difficult task of accessing the information from state public reporting programs.

### Specific Hypotheses

1. A state with a public reporting program will involve an extensive web search.
2. A greater number of states will *not* be involved in public reporting compared to the number of states with established public reporting programs.
3. A majority of states that publicly report hospital quality information will report outcomes measures (specifically mortality data) rather than process of care or non-clinical aspects of hospital quality.

### Specific Aims

1. To determine the number of states with public reporting programs and categorize these programs by developing a standardized extraction instrument (see **Exhibit 3**).
2. To examine the extent of information available including: processes of care, outcomes, volume, costs, and any other data reported by states.
3. To develop policy recommendations that can improve public reporting efforts across the nation.

## **METHODS**

### **Study Sample**

We surveyed the public health programs of the 50 U.S. states and the District of Columbia during July and August of 2009 to determine the existence and extent of any independent state government or affiliated agency programs designed to publicly report hospital quality for adult patients, apart from the information provided by CMS through its hospital compare program.

To be included, the state program needed to be focused on at least one clinical aspect of hospital quality, specifically process and outcome measures of care. Our survey was conducted in two steps. First, we searched state government websites to identify public reporting programs, regardless of whether the information from such programs was reported directly on the Internet or as a print-report. If state government websites referred to a state-sponsored, -mandated, or -affiliated program operated through an outside agency, we searched that affiliated agency's website for the same information.

Next, we contacted state officials by telephone within each state government, calling the person or official on the state public reporting website identified as working on data collection and analysis. If no contact person was listed, we called the contact phone number from the website, explained the survey, and asked to be connected with someone who would be able to answer our questions, persisting until we contacted a person able to provide the required information. If there was no state public reporting

website, we called the State Department of Health Official responsible for public health data and statistics and followed the above procedure.

Telephone calls were intended to confirm that no state public reporting program existed when we could not find information pertaining to such from their website or to ask questions or clarifications about the state public reporting program we identified from their website. For officials not immediately reachable by telephone, we followed up with a maximum of five telephone calls and emails.

We developed a standardized instrument to perform a detailed abstraction of the information made available in state government or affiliated-agency websites by consulting with experts in systematic reviews, as well as quality measurement and public reporting, preparing an instrument for their review, and piloting the abstraction tool, making modifications as necessary.

## **Analysis**

The variables in our assessment included report frequency, accessibility, and rating system; data source; and analytic strategy, including use of risk standardization and methods for low-volume hospitals. Other variables were number and type of health conditions or interventions reported and type of measures reported. The reported measures could be structural, such as volume; process, such as delivery of a specified treatment for a specific condition; or outcome. An example of a process measure is rate

of aspirin delivery to patients admitted for acute myocardial infarction. An example of an outcome measure is mortality within thirty days of hospitalization.

All information extracted from state government or affiliated agency websites was confirmed by Dr. Ross. Disagreements about assessment and data extraction were resolved by consensus.

Descriptive statistics were used to report on the frequency of state public reporting programs. All analyses were performed using JMP version 7 (SAS Institute, Inc., Cary, NC). Because we examined and collected factual information that was publicly available, our study was determined to pose no risk and the protocol was approved by the Yale institutional review board.

## RESULTS

### Accessibility of State Program Information

Identifying information about state public reporting programs was frequently a challenge. Programs were rarely advertised and different departments managed the information within each state. For instance, some states placed their program within the Department of Public Health, others in different government departments or independent hospital guide websites. Moreover, obtaining hospital performance reports or reaching a website that allowed comparison of hospital performance frequently required at least a half-dozen steps through sequential Internet pages. Finally, nearly all states used graphics and tables, as opposed to text alone, to present hospital performance data.

### State Public Reporting Programs

For all fifty U.S. states and the District of Columbia, we reviewed websites and contacted a state official with knowledge of public reporting initiatives. There were state public reporting programs in twenty-five states (49%; **Exhibit 1**). In addition, Illinois passed legislation in 2009 to initiate a program, Louisiana had legislation mandating a state public reporting program but no information was yet available. Wisconsin has an active public reporting program operated by the Wisconsin Hospital Association, but it is neither mandated nor affiliated with the state government. Programs appeared to cluster along the East and West coasts of the country (**Figure 1**).

Although all programs updated their public reports at least annually, they otherwise varied in their format: seven (28%) issued paper reports whereas eighteen

(72%) provided information directly on their website, and many different reporting systems for outcomes measures of care were used, including tiers (n=11), numerals (n=10), and stars (n=3). Twenty-one of the state programs (84%) were mandated by law.

State programs varied in their approach to collecting the data used for public reporting. Twelve states (48%) required data to be submitted to the state, three states (12%) required data to be submitted to an affiliated-agency, six states (24%) collected the data independently from the hospitals, and four states (16%) had an affiliated-agency collect the data.

Regardless of the approach used, three-quarters of state programs (n=19, 76%) used administrative data, with or without the additional use of chart-abstracted data or other clinical registry data collected by hospitals. Three states (12%) only used data abstracted from medical charts, and three others (12%) used a case-finding approach that was specifically relevant only for the reporting of hospital infection rates. Seventeen of the states (68%) audited the data collected for public reporting (**Exhibit 1**).

### **Reporting Processes of Care**

Only nine states with a public reporting program (36 percent) focused on clinical aspects of hospital-provided data on processes of care (**Exhibit 2**). Eight of them (**Figure 2**) provided information on processes of care for acute myocardial infarction, heart failure, and pneumonia hospitalizations, whereas three states provided additional information on surgical care, such as administration of an antibiotic before surgery as a



preventive measure against infection. Only California reported on use of the internal mammary artery for coronary artery bypass graft surgery as a surgical process of care not related to the prevention of infection.

Additional care measures reported included processes for stroke hospitalizations, hand hygiene, and influenza vaccination rates among hospital staff, as well as composite measures integrating these individual process measures. All eight states reporting on processes of care for acute myocardial infarction, heart failure, and pneumonia used the methodological approach developed by CMS. But they also broadened the population on which the reporting was based to all adults, and used independently collected data.

### **Reporting Outcomes of Care**

The vast majority of states with a public reporting program focused on clinical aspects of hospital quality provided data on hospital outcomes (n=24, 96%). Eleven states (44%) provided information on hospital-acquired infection rates, four (16%) on readmission rates, and fifteen (60%) on hospital mortality rates (**Exhibit 2, Figure 3**). Only Florida, Pennsylvania, and Virginia publicly reported all three of these outcomes. In addition, Ohio and Rhode Island provided information on hospital-acquired pressure ulcer rates.

Among the 4 states publicly reporting hospital readmission information, the median number of conditions for which readmission was reported was 8.5 (range: 4-25). The most commonly reported readmissions after hospitalization were for heart failure

(n=4), coronary artery bypass graft surgery (n=3), stroke (n=3), pneumonia (n=3), hip fracture (n=3) and hip replacement surgery (n=3).

Among the 16 states publicly reporting hospital mortality information, the median number of conditions for which mortality was reported was 10.5 (range: 3-32). The most commonly reported were mortality after hospitalization for coronary artery bypass graft surgery (n=15), percutaneous coronary intervention (PCI) (n=14), AMI (n=13), heart failure (n=12), stroke (n=11), pneumonia (n=11), and hip fracture (n=11).

Among the states publicly reporting mortality information, twelve provided information on in-patient mortality, two on 30-day mortality, and one on both in-patient and 30-day mortality, all of which risk-adjusted their estimate of hospital mortality rates for patient demographic and clinical characteristics.

Finally, eleven states used the methodological approach developed for the Inpatient Quality Indicators (IQI) program by the Agency for Healthcare Research and Quality (AHRQ) to calculate hospital mortality rates. Nine states required a minimum volume of cases to report hospital mortality rates. Eight states required 30 cases and one state required 25 cases.

### **Additional Observations**

Although our survey of state public reporting programs was focused on clinical aspects of hospital quality for adult patients, specifically process and outcome measures

of care, many states also publicly reported information on non-clinical aspects of hospital quality, including additional states which had not reported on clinical aspects of hospital quality. Among the non-clinical aspects of hospital quality reported, the most commonly reported were hospital length of stay (n=21), volume (n=26), and costs (n=26), which included both hospital-wide costs (n=16) and condition-specific costs (n=19).

## **DISCUSSION**

In our systematic review of state-level hospital quality publicly reporting programs, specifically focused on clinical outcomes for adult patients, we found that just half of states were engaged in public reporting of hospital quality. These programs varied in content, as only a third provided data on hospital processes of care, whereas nearly three-quarters provided data on hospital outcomes, including acquired infection, readmission, and mortality rates.

The reporting programs also varied in clinical focus. Many reported on care for cardiac surgery patients and for adults hospitalized for acute myocardial infarction, heart failure, and pneumonia. Others variably reported on care for less common causes of hospitalization, including gastrointestinal hemorrhage, carotid endarterectomy, and craniotomy. Finally, it is important to note that identifying information about and from state programs was challenging, making it unclear how useful the information currently is to patients and communities.

### **Complementary State Efforts**

Public reporting of quality and performance has become increasingly common, and national public reporting efforts by CMS are only expected to expand. In this context, it is important to note that the vast majority of state public reporting programs were found to provide hospital quality information that was complementary to, rather than redundant with, the information currently publicly reported by CMS.

States providing data on hospital processes of care were all focused on the same clinical conditions that are currently reported on by CMS, specifically care processes during hospitalizations for acute myocardial infarction, heart failure, and pneumonia. Yet their reporting was not limited to Medicare fee-for-service beneficiaries aged 65 years or older. State reports included younger adults and older adults insured through private plans and Medicare-affiliated health maintenance organizations.

Similarly, states providing data on hospital outcomes of care focused on mortality for the same clinical conditions currently reported on by CMS – acute myocardial infarction, heart failure and pneumonia – in addition to other causes of hospitalization. However, states predominantly reported in-patient mortality estimated using the AHRQ IQI methodology as opposed to 30-day mortality. This approach differs from that of CMS in its focus on inpatient mortality; death during the course of hospitalization, as opposed to thirty-day mortality; and death at any time within thirty days after hospitalization, including the time after the patient has been discharged. The CMS approach, using a uniform thirty-day period for outcome assessment, is preferable because inpatient performance estimates favor hospitals with shorter lengths-of-stay, since the hospital course is shorter (44).

### **Policy Suggestions**

Given the number and breadth of the state public reporting programs we identified policy makers should consider three initiatives that may further improve and facilitate the availability of hospital quality information.

*Set Up a Single Website:* First, state reporting efforts could improve accessibility by using a single, easily navigable Internet site that includes information from each state's public reporting program. Ideally, this Internet site would integrate, or at least include information from the CMS public reporting program. Information from state reporting programs was difficult to find. Using a single site for all state public reporting programs would make existing information more accessible. However, such a site would face bureaucratic challenges with respect to negotiating responsibilities for site coordination, production and development, and payment. Therefore, it may be better to establish a federal website with links to each state website, which would be designed similarly and contain all available data for the individual state.

*Convene Administrators:* Second, given these likely challenges, state public reporting program administrators should increase efforts to meet, either in-person or remotely, to share stories of successes and failures in their programs. There were many similarities across state efforts, particularly in clinical focus, suggesting that states could have much to learn from one another's experiences.

*Conduct Systematic Evaluations:* Third, the state public reporting programs require rigorous, systematic evaluation in order to ensure that the information being made available is being used by patients, physicians, or hospital administrators to inform healthcare decisions and that it is valid, comprehensive, comprehensible, relevant, reasonable, and functional (26). The impact of state public reporting programs on

clinical outcomes should also be assessed. There may need to be federal legislation to mandate states to report outcomes data for all populations. Measuring and reporting of quality information is a public good that promotes transparency and accountability, but programs are not without cost and should be evaluated to ensure they are of sufficient value to the community.

### **Limitations**

There are several limitations to our methodological approach. First, we conducted our survey during the summer of 2009, and state public reporting initiatives are changing rapidly. We are aware of several states that have implemented changes to their programs during 2010. Maryland and Ohio have launched expanded programs. In Oregon, data on hospital acquired infection rates are now available. Some states, including New Jersey, are now reporting the new surgical care improvement score, which focuses on antibiotic and blood clot prevention before and after surgery.

Second, we focused on state government or affiliated agency programs designed to publicly report hospital quality. We identified one other program, in Wisconsin, that was not affiliated with the state government but that measured and reported similar information on hospital quality. It is possible that there were additional non-governmental state programs that we did not identify, as well as programs sponsored by insurance plans or other organizations that we did not capture in our review. In addition, despite using a systematic approach to identify state programs, given the challenges we

identified in finding information, there may have been state public reporting programs that we did not find.

Third, we focused on programs measuring clinical aspects of hospital quality for adult patients. Several other states also reported nonclinical aspects of hospital quality, such as costs, volume, and length-of-stay. In addition, our review captured neither programs measuring clinical aspects of hospital quality for pediatric patients nor programs measuring clinical aspects of ambulatory care quality.



## CONCLUSIONS

Our systematic review of state public reporting programs that focus on hospital clinical outcomes found that identifying information about state programs was challenging. About half of the states were engaged in public reporting of hospital quality. However, state public reporting programs provided hospital quality information that was complementary to, rather than redundant with, the information currently publicly reported by CMS.

Nevertheless, there were clear differences among states in their investment in public reporting. There also was no standardized approach to data collection, analysis, and presentation. Future research should focus on what public reporting efforts have achieved.

## REFERENCES

1. Devers, K.J., Pham, H.H., and Liu, G. 2004. What is driving hospitals' patient-safety efforts? *Health Aff (Millwood)* 23:103-115.
2. Marshall, M.N., Shekelle, P.G., Leatherman, S., and Brook, R.H. 2000. The public release of performance data: what do we expect to gain? A review of the evidence. *Jama* 283:1866-1874.
3. Hibbard, J.H., Slovic, P., Peters, E., and Finucane, M.L. 2002. Strategies for reporting health plan performance information to consumers: evidence from controlled studies. *Health Serv Res* 37:291-313.
4. Marshall, M., and Davies, H. 2001. Public release of information on quality of care: how are health services and the public expected to respond? *J Health Serv Res Policy* 6:158-162.
5. Donabedian, A. 1978. The quality of medical care. *Science* 200:856-864.
6. Brien, S.E., Dixon, E., and Ghali, W.A. 2009. Measuring and reporting on quality in health care: a framework and road map for improving care. *J Surg Oncol* 99:462-466.
7. Jencks, S.F., Huff, E.D., and Cuerdon, T. 2003. Change in the quality of care delivered to Medicare beneficiaries, 1998-1999 to 2000-2001. *Jama* 289:305-312.
8. McGlynn, E.A., Asch, S.M., Adams, J., Keesey, J., Hicks, J., DeCristofaro, A., and Kerr, E.A. 2003. The quality of health care delivered to adults in the United States. *N Engl J Med* 348:2635-2645.
9. Williams, S.C., Schmaltz, S.P., Morton, D.J., Koss, R.G., and Loeb, J.M. 2005. Quality of care in U.S. hospitals as reflected by standardized measures, 2002-2004. *N Engl J Med* 353:255-264.

10. Hafner, J.M., Williams, S.C., Koss, R.G., Tschurtz, B.A., Schmaltz, S.P., and Loeb, J.M. 2011. The perceived impact of public reporting hospital performance data: interviews with hospital staff. *Int J Qual Health Care* 23:697-704.
11. Weil, D., Fung, A., Graham, M., and Fagotto, E. 2006. The Effectiveness of Regulatory Disclosure Policies. *Journal of Policy Analysis and Management* 25:155-181.
12. Bevan, G. 2010. Performance Measurement of 'Knights' and 'Knaves': Differences in Approaches and Impacts in British Countries after Devolution. *Journal of Comparative Policy Analysis: Research and Practice* 12:33-56.
13. Institute of Medicine (U.S.). Committee on Quality of Health Care in America. 2001. *Crossing the quality chasm : a new health system for the 21st century*. Washington, D.C.: National Academy Press. xx, 337 p. pp.
14. Robinowitz, D.L., and Dudley, R.A. 2006. Public reporting of provider performance: can its impact be made greater? *Annu Rev Public Health* 27:517-536.
15. Hibbard, J.H., Stockard, J., and Tusler, M. 2005. Hospital performance reports: impact on quality, market share, and reputation. *Health Aff (Millwood)* 24:1150-1160.
16. Jha, A.K., Perlin, J.B., Kizer, K.W., and Dudley, R.A. 2003. Effect of the transformation of the Veterans Affairs Health Care System on the quality of care. *N Engl J Med* 348:2218-2227.
17. Ferguson, T.B., Jr., Peterson, E.D., Coombs, L.P., Eiken, M.C., Carey, M.L., Grover, F.L., and DeLong, E.R. 2003. Use of continuous quality improvement to increase use of process measures in patients undergoing coronary artery bypass graft surgery: a randomized controlled trial. *Jama* 290:49-56.

18. Gibbs, D.A., Sangl, J.A., and Burrus, B. 1996. Consumer perspectives on information needs for health plan choice. *Health Care Financ Rev* 18:55-73.
19. Werner, R.M., and Asch, D.A. 2005. The unintended consequences of publicly reporting quality information. *Jama* 293:1239-1244.
20. Chassin, M.R. 2002. Achieving and sustaining improved quality: lessons from New York State and cardiac surgery. *Health Aff (Millwood)* 21:40-51.
21. Jha, A.K., Li, Z., Orav, E.J., and Epstein, A.M. 2005. Care in U.S. hospitals--the Hospital Quality Alliance program. *N Engl J Med* 353:265-274.
22. Bernheim, S.M., Wang, Y., Bradley, E.H., Masoudi, F.A., Rathore, S.S., Ross, J.S., Drye, E., and Krumholz, H.M. 2010. Who is missing from the measures? Trends in the proportion and treatment of patients potentially excluded from publicly reported quality measures. *Am Heart J* 160:943-950 e941-945.
23. Hibbard, J.H., and Peters, E. 2003. Supporting informed consumer health care decisions: data presentation approaches that facilitate the use of information in choice. *Annu Rev Public Health* 24:413-433.
24. Ho, K., Moy, E., and Clancy, C.M. 2010. Can incentives to improve quality reduce disparities? *Health Serv Res* 45:1-5.
25. AHRQ. 2006. Pay for Performance: A Decision Guide for Purchasers.
26. Gormley, W.T.J., and Weimer, D.L. 1999. *Organizational Report Cards*. Cambridge, MA: President and Fellows of Harvard College.
27. Krumholz, H.M., Rathore, S.S., Chen, J., Wang, Y., and Radford, M.J. 2002. Evaluation of a consumer-oriented internet health care report card: the risk of quality ratings based on mortality data. *Jama* 287:1277-1287.
28. HealthGrades.
29. Vladeck, B.C., Goodwin, E.J., Myers, L.P., and Sinisi, M. 1988. Consumers and hospital use: the HCFA "death list". *Health Aff (Millwood)* 7:122-125.

30. Massachusetts Data Analysis Center. 2006. MASS-DAC.
31. New York State Department of Health. 2006. New York State Hospital Profile.
32. Society of Thoracic Surgeons. 2006. STS National Database.
33. Demakis, J.G., McQueen, L., Kizer, K.W., and Feussner, J.R. 2000. Quality Enhancement Research Initiative (QUERI): A collaboration between research and clinical practice. *Med Care* 38:117-25.
34. Doebbeling, B.N., Vaughn, T.E., Woolson, R.F., Peloso, P.M., Ward, M.M., Letuchy, E., BootsMiller, B.J., Tripp-Reimer, T., and Branch, L.G. 2002. Benchmarking Veterans Affairs Medical Centers in the delivery of preventive health services: comparison of methods. *Med Care* 40:540-554.
35. Feussner, J.R., Kizer, K.W., and Demakis, J.G. 2000. The Quality Enhancement Research Initiative (QUERI): from evidence to action. *Med Care* 38:11-6.
36. Kizer, K.W. 1999. The "new VA": a national laboratory for health care quality management. *Am J Med Qual* 14:3-20.
37. Kizer, K.W., Demakis, J.G., and Feussner, J.R. 2000. Reinventing VA health care: systematizing quality improvement and quality innovation. *Med Care* 38:17-16.
38. Pennsylvania Health Care Cost Containment Council. 2007. PHC4: Pennsylvania Health Care Cost Containment Council.
39. Center for Studying Health System Change. 2000. Community Report: Cleveland, Ohio, Fall 2000. Washington, DC: The Center for Studying Health System Change.
40. California Healthcare Foundation. 2007. CalHospitalCompare, Rating Hospital Quality in California.
41. Epstein, A.M., Lee, T.H., and Hamel, M.B. 2004. Paying physicians for high-quality care. *N Engl J Med* 350:406-410.

42. Lindenauer, P.K., Remus, D., Roman, S., Rothberg, M.B., Benjamin, E.M., Ma, A., and Bratzler, D.W. 2007. Public reporting and pay for performance in hospital quality improvement. *N Engl J Med* 356:486-496.
43. Vladeck, B.C. 2004. Ineffective approach. *Health Aff (Millwood)* 23:285-286.
44. Drye, E.E., Normand, S.L.T., Wang, Y., Ross, J.S., Schreiner, G.S., and Krumholz, H.M. 2009. Comparison of Hospital Risk-Standardized Mortality Rates using Inpatient and 30-Day Models: Implications for hospital profiling. In *AcademyHealth Annual Research Meeting*. Chicago, IL.

**Exhibit 1:** Characteristics of state public reporting programs that measure and report on clinical aspects of hospital quality and performance for adult patients.

State	Program Reports		Data Source			Data Audited
	Paper	Electronic	Administrative	Chart Abstracted <sup>a</sup>	Case-Finding <sup>b</sup>	
CA		X	X	X <sup>c</sup>		X
CO		X	X			X
CT	X			X		X
DE	X				X	X
FL		X	X			X
GA		X		X		
IN		X	X			
KY		X	X			
ME		X	X	X		
MD		X	X	X		X
MA		X	X			
MO		X			X	X
NV		X	X			X
NJ		X	X	X <sup>c</sup>		X
NY		X		X		X
OH	X		X	X		X
OK	X		X	X		
OR		X	X			

<b>PA</b>	X	X	X
<b>RI</b>	X	X	X
<b>SC</b>	X		X
<b>TX</b>	X	X	X
<b>UT</b>	X	X	X
<b>VT</b>	X	X	X
<b>VA</b>	X	X	X

**Note:** The following states had no state public reporting programs: AL, AK, AR, AZ, DC, HI, IA, ID, IL, KS, LA, MI, MN, MS, MT, NC, ND, NE, NH, NM, SD, TN, WA, WV, WI and WY. However, Illinois passed legislation in 2009 to initiate a program, Louisiana had legislation mandating a state public reporting program but no information was yet available, and Wisconsin has an active public reporting program operated by the Wisconsin Hospital Association, but it is neither mandated nor affiliated with the state government.

<sup>a</sup> Data for process of care measures is necessarily abstracted from charts.

<sup>b</sup> Case-finding approach specifically relevant only for the reporting of hospital infection rates.

<sup>c</sup> California and New Jersey use chart-equivalent registry data to calculate coronary artery bypass surgery mortality rates.



**Exhibit 2:** Clinical aspects of hospital quality and performance for adult patients that are measured and publicly reported by state public reporting programs.

State	Clinical Aspects of Care Reported			
	Processes of Care	Outcomes of Care		
		Mortality (No. of Conditions)	Readmission (No. of Conditions)	Acquired Infection
CA	X	X (11)		
CO		X (11)		X
CT	X			X
DE				X
FL		X (12)	X (10)	X
GA		*		
IN		X (3)		
KY		X (12)		
ME	X			X
MD	X		X (7)	
MA		X (8)		
MO				X
NV		X (14)		
NJ	X	X (14)		

<b>NY</b>		X (4)		X
<b>OH</b>	X	b	b	
<b>OK</b>	X			
<b>OR</b>		X (10)		
<b>PA</b>		X (32)	X (25)	X
<b>RI<sup>c</sup></b>	X			
<b>SC</b>				X
<b>TX</b>		X (14)		
<b>UT</b>		X (8)		
<b>VT</b>	X	X (4)		X
<b>VA</b>		X (4)	X (4)	X

**Note:** The following states had no state public reporting programs: AL, AK, AR, AZ, DC, HI, IA, ID, IL, KS, LA, MI, MN, MS, MT, NC, ND, NE, NH, NM, SD, TN, WA, WV, WI and WY. However, Illinois passed legislation in 2009 to initiate a program, Louisiana had legislation mandating a state public reporting program but no information was yet available, and Wisconsin has an active public reporting program operated by the Wisconsin Hospital Association, but it is neither mandated nor affiliated with the state government.

<sup>a</sup> Georgia publicly-reported composite facility quality scores that were calculated using procedure and mortality rates and other measures of patient safety.

<sup>b</sup> Ohio and Rhode Island also reports rates of hospital-acquired pressure ulcers.

**Exhibit 3: Data Abstraction Form**

State \_\_\_\_\_

Report Frequency	<input type="checkbox"/> Annually <input type="checkbox"/> Biannually	<input type="checkbox"/> Quarterly <input type="checkbox"/> Other :
Accessibility	<input type="checkbox"/> Webpage <input type="checkbox"/> Paper Report	<input type="checkbox"/> Private Report <input type="checkbox"/> Other :
Rating System	<input type="checkbox"/> Tiered Rating <input type="checkbox"/> Star Rating <input type="checkbox"/> Numeral Rating	<input type="checkbox"/> Actual Rate Provided <input type="checkbox"/> Other : <input type="checkbox"/> N/A
Participation	<input type="checkbox"/> State Legislation <input type="checkbox"/> Agency Regulation	<input type="checkbox"/> Voluntary <input type="checkbox"/> Other :
<i>Authorizing Language:</i>		
Copy of Language Obtained?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Funding	<input type="checkbox"/> State (Discretionary Funds) <input type="checkbox"/> State (Agency Funds) <input type="checkbox"/> Other :	<input type="checkbox"/> Hospitals <input type="checkbox"/> Insurance Companies
Data Collection	<input type="checkbox"/> Collected by State <input type="checkbox"/> Collected by Organization <input type="checkbox"/> Other:	<input type="checkbox"/> Submitted to State <input type="checkbox"/> Submitted to Organization
Type of Data	<input type="checkbox"/> Administrative Claims Data <input type="checkbox"/> Hospital Registry Data <input type="checkbox"/> Insurance Company Data	<input type="checkbox"/> Chart Review Data <input type="checkbox"/> Other :
Data/Medical Records Audited	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Outcome Measures: Mortality Rates**

Total Number of Conditions Reported (Mortality Rates) \_\_\_\_\_

Minimum Number of Cases per Hospital (Mortality Rates) \_\_\_\_\_

Exclusions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Conditions	Mortality Data		30-Day Mortality Rate			Inpatient Mortality Rate			Began	Recent
	<u>Yes</u>	<u>No</u>	<u>30-Day</u>	<u>RSMR</u>	<u>Crude</u>	<u>Inpatient</u>	<u>RSMR</u>	<u>Crude</u>	<u>Date</u>	<u>Date</u>
CABG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
PCI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
AMI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
HF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Stroke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Pneumonia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
GI Bleed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hip Replment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hip Fracture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
CEA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Craniotomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Risk Adjustment of any Mortality Rate Yes No

IF YES,

Patient Characteristics Yes No  
 Variables Adjusted For :

Physician Characteristics    
 Variables Adjusted For :

Hospital Characteristics    
 Variables Adjusted For :

Risk Adjustment Model Account for Clustering of Observations (HLM or GEE)  Yes  No  
 HLM  GEE

**Outcome Measures: Readmission Rates**

Readmission Rates  Yes  No

IF YES, what conditions?

CABG	<input type="checkbox"/> Yes	<input type="checkbox"/> No
PCI	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AMI	<input type="checkbox"/> Yes	<input type="checkbox"/> No
HF	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Stroke	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Pneumonia	<input type="checkbox"/> Yes	<input type="checkbox"/> No
GI Bleed	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Hip Replment	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Hip Fracture	<input type="checkbox"/> Yes	<input type="checkbox"/> No
CEA	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Craniotomy	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Outcome Measures: Infection Rates**

Hospital Acquired Infection Data  Yes  No

**Process Measures**

Process Measures  Reporting CMS Data  Independent Process of Care Measures

AMI	<input type="checkbox"/> Yes	<input type="checkbox"/> No
HF	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Pneumonia	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Stroke	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Surgical Procedures	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other :	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Cost and Utilization Measures: Costs of Care**

Financial Data	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
State Costs	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Hospital Costs	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Condition Costs	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No

**Cost and Utilization Measures: LOS**

Length of Stay Data	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
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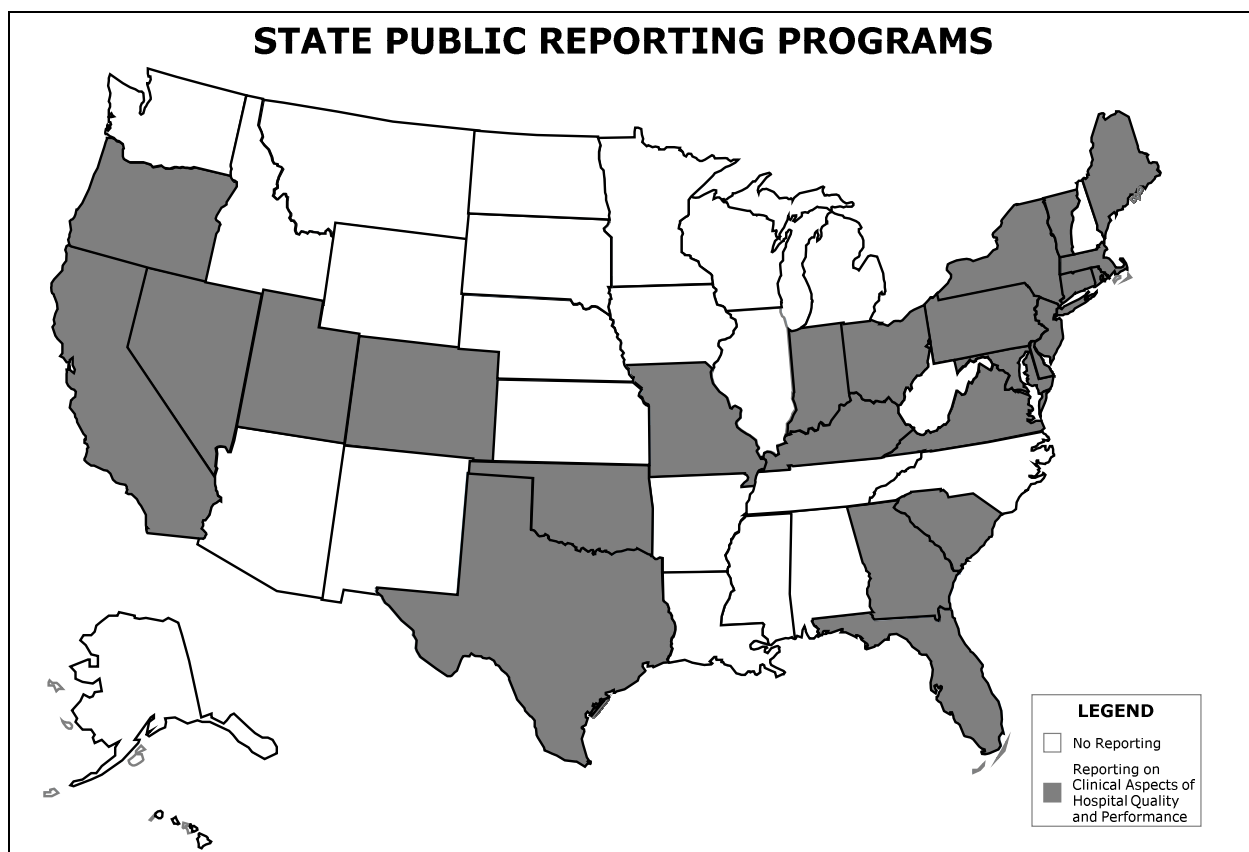
**Cost and Utilization Measures: Volume**

Hospital Volume Information	<u>Yes</u>	<u>No</u>
	<input type="checkbox"/>	<input type="checkbox"/>

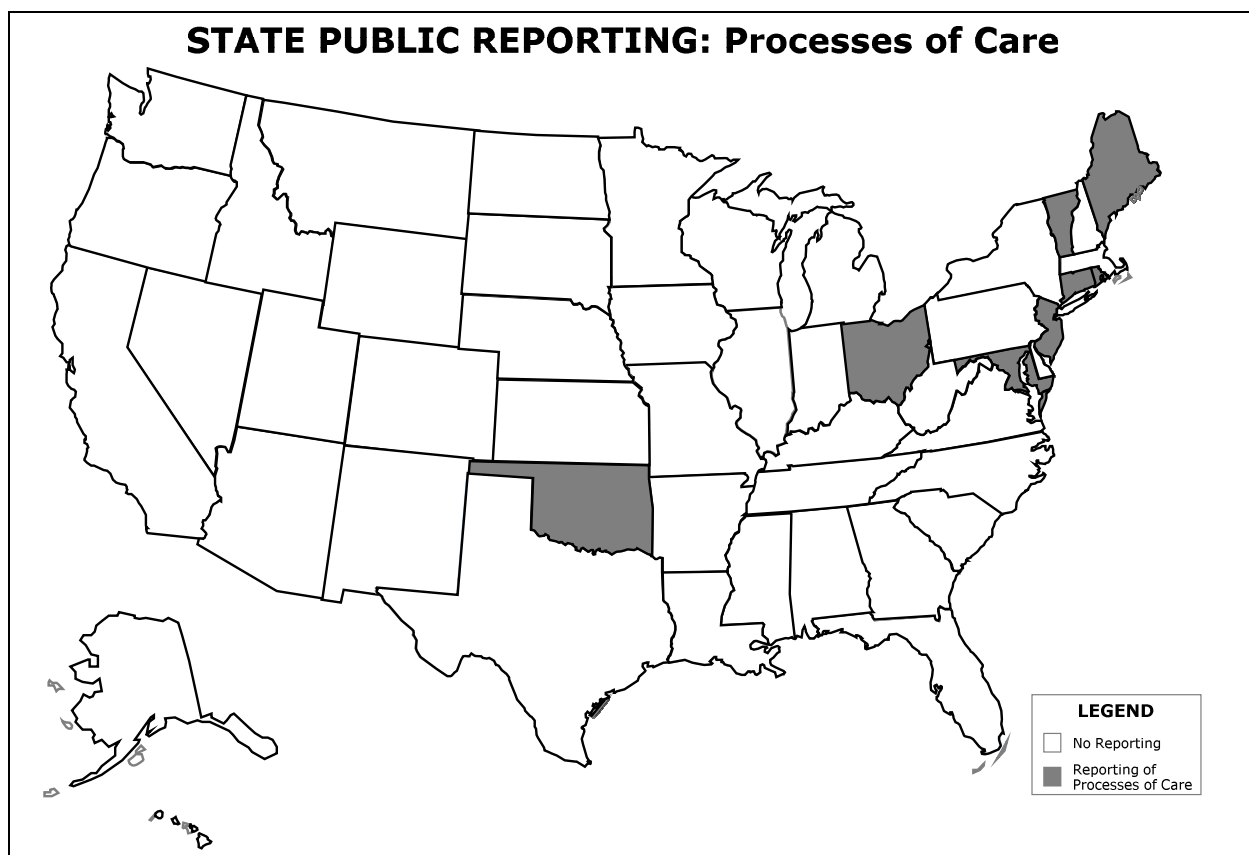
IF YES,

Threshold Volume	<u>Yes</u>	<u>No</u>
Actual Volume	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

**Figure 1:** United States map of state public reporting programs that measure and report on clinical aspects of hospital quality and performance.



**Figure 2:** United States map of state public reporting programs that measure and report on hospital processes of care.





**Figure 3:** United States map of state public reporting programs that measure and report on hospital mortality and readmission outcomes.

