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Public Reporting as a Quality Improvement Strategy: A Systematic Review of the Multiple Pathways Public Reporting May Influence Quality of Health Care

**A review for the series Closing the Quality Gap: Revisiting the State of the
Science**

Prepared for:

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions, and new health care technologies and strategies.

The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments. To bring the broadest range of experts into the development of evidence reports and health technology assessments, AHRQ encourages the EPCs to form partnerships and enter into collaborations with other medical and research organizations. The EPCs work with these partner organizations to ensure that the evidence reports and technology assessments they produce will become building blocks for health care quality improvement projects throughout the Nation. The reports undergo peer review and public comment prior to their release as a final report.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality.

We welcome comments on this evidence report. Comments may be sent by mail to the Task Order Officer named in this report to: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by e-mail to epc@ahrq.hhs.gov.

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Public Reporting as a Quality Improvement Strategy: A Systematic Review of the Multiple Pathways Public Reporting May Influence Quality of Health Care

Structured Abstract

Objectives: The goal of this review was to evaluate the effectiveness of public reporting of health care quality information as a quality improvement strategy. We sought to determine if public reporting results in improvements in health care delivery and patient outcomes. We also considered whether public reporting affects the behavior of patients or of health care providers. Finally we assessed whether the characteristics of the public reports and the context affect the impact of public reports.

Data Sources: Articles were identified through searches of the following bibliographical databases: MEDLINE, EMBASE, EconLit, PsychINFO, Business Source Premier, CINAHL, PAIS, Cochrane Database of Systematic Reviews, EPOC Register of Studies, DARE, NHS EED, HEED, Grey Literature Report database, and other sources (experts, reference lists, and grey literature).

Review Methods: We screened citations based on inclusion and exclusion criteria developed based on our definition of public reporting. We initially did not exclude any studies based on study design. Of the 10,800 citations identified through title and abstract triage, we screened and reviewed 1500 articles. A total of 82 quantitative and 92 qualitative were included, abstracted, and entered into tables and evaluated. The heterogeneity of outcomes as well as methods prohibited formal quantitative synthesis. Systematic reviews were used to identify studies, but their conclusions were not incorporated into this review.

Results: Overall the strength of the evidence available to assess the impact of public reporting was low to moderate. This was due in part to the methodological challenges researchers face in designing and conducting research on the impact of population-level interventions. Public reporting seems to lead to improvement in health care performance measures such as those included in Nursing Home Compare. Almost all identified studies found no evidence or only weak evidence that public reporting affects the selection of health care providers by patients or their representatives. More recent studies of health care providers' response to public reports suggest they do engage in activities to improve quality when performance data are made public. Characteristics of intervention and the context, which are likely to be important when considering the diffusion of quality improvement activities, are rarely studied or even described.

Conclusions: The heterogeneity of the outcomes and relatively low strength of evidence for many outcomes makes it difficult to draw definitive conclusions; however some observations are supported by research. Public reporting is more likely to have an impact on health care providers than on selection by patients or families. Quality measures that are publicly reported do improve over time. Although the potential for harms are frequently cited by commentators and critics of public reporting, they are more frequently the subject of speculation than research, but when they are studied are rarely confirmed in quantitative research.

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Executive Summary

The Effective Health Program was initiated in 2005 to provide valid evidence about the comparative effectiveness of different medical interventions. The object is to help consumers, health care providers, and others in making informed choices among treatment alternatives. Through its Comparative Effectiveness Reviews, the program supports systematic appraisals of existing scientific evidence regarding treatments for high-priority health conditions. It also promotes and generates new scientific evidence by identifying gaps in existing scientific evidence and supporting new research. The program puts special emphasis on translating findings into a variety of useful formats for different stakeholders including consumers.

The full report and this summary are available at www.effectivehealthcare.ahrq.gov.
Ahrq.gov/reports/final.cfm

Background

Research demonstrates that health care frequently fails to meet the current standards of quality care.^{1,2} Errors, suboptimal management, or control of disease, and overutilization or underutilization of services occur when high-quality, evidence-based health care is not provided. All these factors have potentially serious consequences for patients and their families, including higher mortality, increased morbidity, decreased quality of life, and higher cost of care. Additionally, low-quality care and inconsistencies in quality are linked to health care disparities.^{3,4}

In a quality improvement framework, making quality, safety, or performance data publicly available is a means of influencing quality. Three general approaches are hypothesized to address quality gaps: measuring quality, influencing quality, and improving quality.⁵ The underlying assumptions are: 1) given choices and information, patients and purchasers will choose higher-quality providers; and 2) health care providers will strive to provide high-quality care when information about their performance is publicly available to patients, their peers, policymakers, and the media.

The impact of public reporting on quality has been studied in a variety of settings including hospitals,^{6,7} nursing homes,⁸ postacute care,⁹ and home care.¹⁰ In general, the results were inconsistent. Today, Federal and State government agencies, community quality collaboratives, and other organizations are continuing to invest resources in public reporting as one possible intervention to bridge the gap between current and high-quality practice in health care and as a component of larger transparency initiatives. Significant changes have occurred in the scope and nature of public reporting since the last published review,¹¹ and this review addresses questions that remain regarding the extent to which public reports result in quality improvements.

Objectives

This evidence review about public reporting as a quality improvement strategy is one of eight reviews in a series *Closing the Quality Gap: Revisiting the State of the Science* (hereafter, CQG series). The CQG series aims to assemble the evidence about effective strategies to close the “quality gap”—the difference between what is expected to work well for patients based on

known evidence and what actually happens in day-to-day clinical practice across populations of patients.

Our definition of public reporting was designed to situate public reporting in the context of quality improvement in health care, and this definition shaped the scope of the review:

Public Reporting is data, publicly available or available to a broad audience free of charge or at a nominal cost, about a health care structure, process, or outcome at any provider level (individual clinician, group, or organizations [e.g., health plans, hospitals, nursing facilities, etc.]). While public reporting is generally understood to involve comparative data across providers, for purposes of this review we are adopting a broader approach to include findings in which one provider is compared to a national/regional data report on performance for which there are accepted standards or best practices.

The objectives of this systematic review were:

1. To determine the effectiveness of public reporting as a quality improvement strategy by evaluating the evidence available about whether public reporting results in improvements in health care delivery and patient outcomes (Key Question 1) and evidence of harms resulting from public reporting (Key Question 2).
2. To determine whether public reporting leads to changes in health care delivery or changes in patients' or purchasers' behaviors (intermediate outcomes) that may contribute to improved quality of care (Key Questions 3 and 4).
3. To identify characteristics of public reports and contextual factors that can increase or decrease the impact of public reporting (Key Questions 5 and 6).

The Key Questions correspond to these objectives:

Objective 1

Key Question 1

Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Key Question 2

What harms result from public reporting?

Objective 2

Key Question 3

Does public reporting lead to change in health care delivery structures or processes (at levels of individual providers, groups, or organizations [e.g., health plans, hospitals, nursing facilities])?

Key Question 4

Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Objective 3**Key Question 5**

What characteristics of public reporting increase its impact on quality of care?

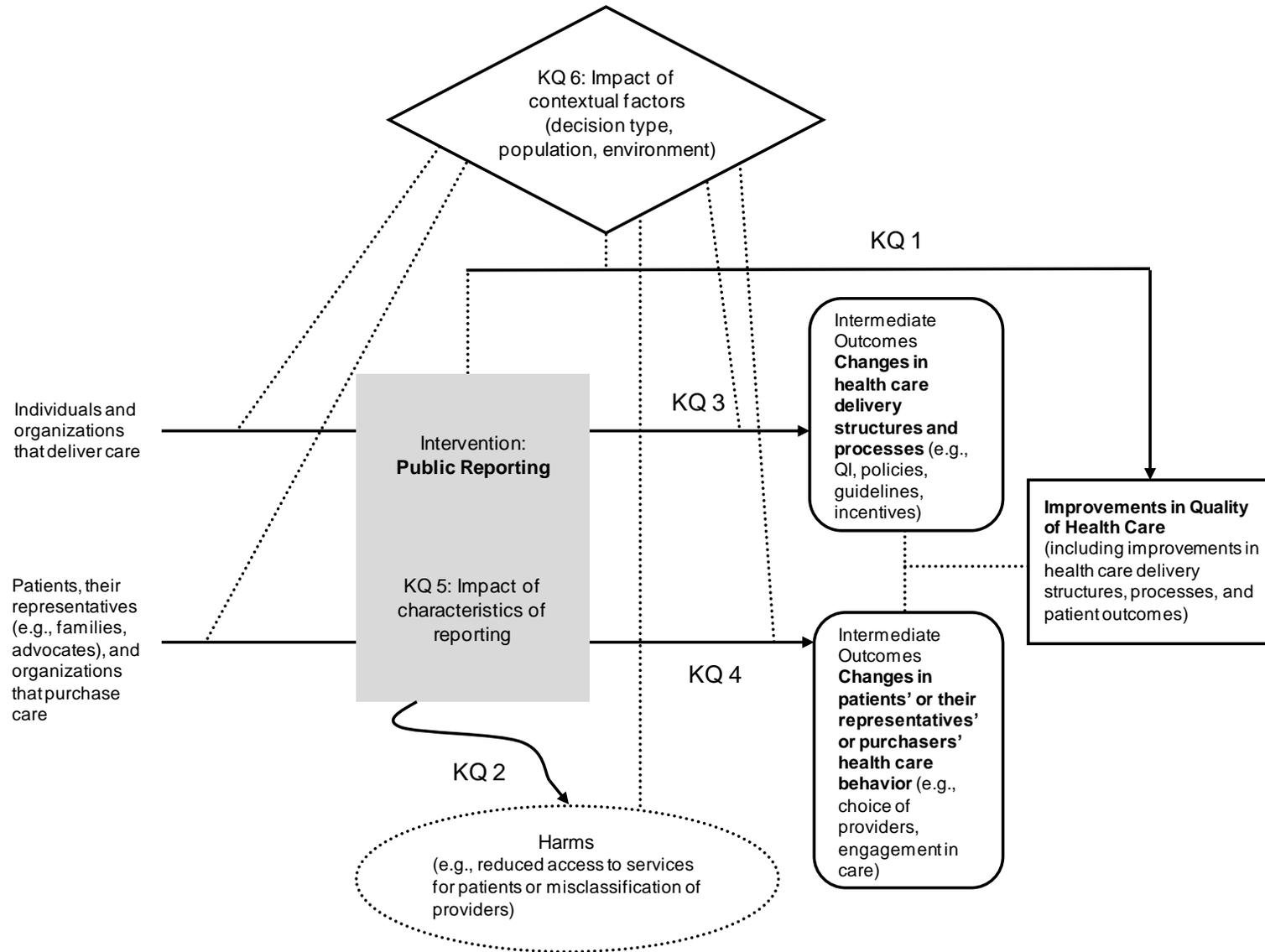
Key Question 6

What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Analytic Framework

The analytic framework in Figure A represents relationships among the Populations, Intervention, and Outcomes that are the focus of this systematic review and illustrates how these relationships translate into the key questions. The relationship between intermediate outcomes and the ultimate improvement in the quality of health care is included. It is represented with dashed lines and does not have corresponding key questions because this review will not explicitly evaluate evidence about these relationships. Rather the focus will be on whether public reporting results in either the intermediate outcomes or improvements in quality of care.

Figure A. Analytical framework



Methods

A Technical Expert Panel (TEP) for the public reporting evidence review was involved in refining the definition of public reporting to be used for this review and also contributed to developing and refining the key questions and reviewing the analytic framework. Experts in public reporting and decision making and individuals representing stakeholder and user communities were invited to provide external peer review of this CER; AHRQ and an associate editor also provided comments. The draft report was also be posted for public comment for 28 days.

We conducted literature searches for both reviews and individual studies in MEDLINE[®], EMBASE[®], EconLit, PsychINFO[®] Business Source[®] Premier, CINAHL[®] (Cumulative Index of Nursing and Allied Health Literature), and PAIS (Public Affairs Information Services). We also searched for systematic reviews and evaluations in The Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects (DARE), National Health Service Economic Evaluation Database (NHS EED), and Health Economic Evaluations Database (HEED). The Grey Literature Report database maintained by the New York Academy of Medicine and AARP Ageline were searched for additional studies and reports. The searches included studies published or reported between January 1980 and May 2011. Key word and index term searches were based on strategies used in previous systematic reviews and on words and terms used in selected recent articles. Public reporting does not map to standardized index terms in citation databases, so terms related to key concepts were used to identify search strings that were then combined to identify articles.

Research studies were included if they conformed to the definition of public reporting (see above, Objectives) and the Population, Intervention, Comparators, Outcomes, Timing, and Settings (PICOTS, see below) and addressed at least one of the key questions. Studies were excluded if:

- the data are not publicly available or have to be purchased for more than a nominal fee,
- data are only for one organization or individual and cannot be compared to others,
- the data are for services not directly health or medical related,
- the data is only about individual providers other than physicians and nurses,
- the study has no original data,
- the study was published before 1980, or
- no English abstract is available for a non-English language article.

At the title and abstract triage phase we did not exclude any study based solely on study design if it met other inclusion criteria. At the full text review stage, we identified the designs of the studies that met all other criteria, and trials and observational studies that contained empirical data on an outcome that corresponded to a stated key question were retained for both abstraction and quality assessment.

Title and abstracts were triaged by all reviewers for the first 300 articles then discrepancies and differences were discussed and reconciled. Another 200 titles and abstracts were submitted to dual review to confirm consistency. The remainder were divided among the reviewers and triaged with followup review of exclusions. Articles identified as potential inclusions for the review based on title and abstract were then advanced to full text review. At the full text stage all articles were reviewed by two of the three principal reviewers and inclusion/exclusion conflicts were resolved through discussion and consensus. Decisions made by reviewers were documented

at each stage. We retained data on excluded studies and documented the reasons for their exclusion.

Specifying the Population, Intervention, Comparators, Outcomes, Timing, and Settings (PICOTS) for a systematic review is an approach used to generate answerable research questions, to structure our literature search, to determine inclusion/exclusion criteria, and to organize reports. For our review of public reporting as a quality improvement strategy, the PICOTS are as follows:

- **Populations**
 - Individuals or organizations that deliver health care and make decisions about how to deliver care.
 - Patients (or their representatives) making health care decisions and organizations that purchase health care services.
- **Intervention**
 - The intervention is public reporting of performance data on patient outcomes or health care delivery. Public reporting for this review is defined in detail in the Scope and Key Questions in the Introduction section.
- **Comparators**
 - In most studies, public reporting of quality data is compared with situations in which the data are not available or not publicly reported. Occasionally comparisons are made across different reports, different contexts for public reports, or differences in content and formats of reports. This detail is provided in the Evidence Tables and the study descriptions included in summary tables and the narrative.
- **Outcomes (Specified for Each Key Question)**
 - **Key Question 1.** Improvements in quality of health care (includes improvements in health care-delivery structure or processes or patient outcomes).
 - **Key Question 2.** Harms included any negative consequence or adverse events for any members of the populations listed above that resulted from public reporting.
 - **Key Question 3.** Changes in health care delivery structures and processes.
 - **Key Question 4.** Changes in patient, or their representative, or purchaser health care behavior.
 - **Key Questions 5 and 6** focus on evidence that the outcomes listed above are affected by characteristics of the reports and contextual factors.
- **Timing**
 - No minimum duration of followup time from the availability of the public report to the measurement of the intermediate or ultimate outcome was required.
- **Settings**
 - Studies of public reporting in any level or setting for health care delivery including health plans, health systems, hospitals, outpatient services or practices, individual clinicians, hospice, home health care, or nursing facilities were included in this review.

Following full text review, we extracted the following data from all included studies:

- Type of health care setting or provider
- Study objective
- Geographic location
- Sample and groups or time period used for comparisons

- Study design
- Name or description of the public report
- Reported contextual factors (environmental characteristics, characteristics of the decision maker)
- Outcomes measured
- Findings for each key question.

Our assessments of the quality of individual studies are based on the recommendations in chapter titled “Assessing the Risk of Bias of Individual Studies when Comparing Medical Interventions” in the AHRQ *Methods Guide for Effectiveness and Comparative Effectiveness Reviews* (hereafter, *Methods Guide*).¹² We selected six criteria for quality assessment of individual included studies:

1. How adequate was randomization (for randomized studies) or how appropriate was selection of comparison group or time?
2. How similar are groups at baseline (or time periods) or how well did the analysis control for differences?
3. How well does the design or analyses account for important potential confounding?
4. How well does the study rule out any impact from an unintended exposure or a concurrent intervention that might bias results?
5. How well are all potential outcomes prespecified and are the prespecified outcomes reported?
6. How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?

These six criteria were used by two raters who independently assess rated each article on these six criteria and made an overall assessment of “good”, “fair”, or “poor” as based on definitions from the Methods guide cited above. After completing the ratings independently, ratings were compared and differences reconciled through discussion and input of a third rater when needed.

For data synthesis, we separated studies into four groups by the health care settings that were the subject of the public reports of quality. These four settings are hospitals, health plans, long-term care services (predominately nursing homes), and individual providers and outpatient group practices.

The strength of the body of evidence for each outcome and key question were rated according to the recommendations in the chapter “Grading the Strength of a Body of Evidence When Comparing Medical Interventions” in the AHRQ *Methods Guide*.¹² The assessment of the strength of the evidence was based on judgments about risk of bias, consistency, directness, and precision of the evidence for each outcome. The evidence for outcomes across the included studies was graded as high (high confidence that the evidence reflects the true effect; further research is unlikely to change our confidence or and the estimate of the effect), moderate (moderate confidence that the evidence reflects the true effect; further research may change our confidence or the estimate of the effect), low (low confidence that the evidence reflects the true effect; further research is likely to change our confidence and the estimate of the effect), or insufficient (evidence is unavailable or does not permit a conclusion). Assessments were performed for each key question by two raters.

The applicability of studies of public reporting depends on the user and the intended use of the report. Therefore, we abstracted data about the reports and the context when it was given and provide these to allow an assessment of applicability to different situations.

Results

Database searches returned 12,116 articles. In addition, 13 articles were selected for review based on expert recommendations and checking reference lists. After identifying duplicates, a total of 10,800 articles remained for abstract and title review. Of these, at least one of four reviewers identified 1500 articles that were possibly relevant. Ultimately, 174 articles were included for abstraction; 82 of which were quantitative articles and 92 were qualitative. Four articles reported separate outcomes for both individual providers and hospital settings. Therefore, they appear in both categories, but represent single articles. This is represented in Figure B, the study flow diagram.

The main findings from this review are summarized in Table A at the end of this section. The results in this table are presented by Key Question and then by health care setting and outcome. Determination of the strength of the body of evidence is indicated in the table as well. The number of rows in this table underscores the heterogeneity of the research literature about public reporting and health care public reports. Different outcomes have been used across studies, prohibiting quantitative or even qualitative synthesis. There is frequently insufficient evidence because only one study was identified for a given outcome in a given health care setting. Even if we attempt to synthesize across settings (e.g., examine the effect of market competition on the impact public reports have on mortality) for the same outcome (e.g. consider the impact of public reporting on market share for combined hospitals, individual providers, health plans and long term care) the trends are underwhelming. Even so, we have summarized below the findings across settings to the extent possible for each Key Question.

Key Question 1. Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

There is some evidence that public reporting has an impact on the quality of health care, but this is less evident in changes in mortality, which has been the subject of research in hospitals, and more evident in improvement in care processes that have been the subject of public reporting on health plans and long term care services. The evidence that supports this impact comes primarily from long-term care where there have been more studies of improvements in quality measures due to Nursing Home Compare and Home Health Compare and the strength of evidence is greater, though still moderate.

Key Question 2. What harms result from public reporting?

Harms are an important concern and they have been the subject of many commentaries letters to the editors writing by clinicians. Of the studies that examine harms, more find no evidence of the harm than evidence of harm. Harms directly related to access (e.g. cream skimming, cherry picking or other actions by providers to change ratings by changing patient populations) have not been found in studies that examined this harm. However some studies have confirmed increases in mortality and health care disparities, suggesting public reporting is not without negative effects.

In six studies of hospital cardiac care, four suggest harms occur while two do not. One

study of hospital non – Cardiac found no evidence that that public reporting leads to increases in inappropriate diagnosis or medication administration in order to improve ratings. Harm in studies of individual clinicians varied with one study finding public reporting appeared to increase disparities between Whites and Blacks or Hispanics in the receipt of CABG for nine years after public reporting began; while another found high-risk patients were more likely to have high-quality surgeons, which is counter to the hypothesis that public reporting might cause adverse selection. In studies of health plans and long-term care no declines in aspect of care not reported were found suggesting crowd-out does not occur.

Key Question 3. Does public reporting lead to change in health care delivery structures or processes (at levels of individual providers, groups, or organizations [e.g., health plans, hospitals, nursing facilities])?

More recent discussions of the theory and justification for public reporting have focused on its impact on providers. The suggestion is that the primary pathway from public reporting to improved quality is via the influence on provider behavior. Whether based in fear of losing patients or concern about reputation, the assumption is that health care providers will want to improve and will not want to appear to be negative outliers in relation to their peers. The lack of quantitative research on this topic may be due to a combination of timing and study design/resource allocation issues. This was not included in earlier studies of public reporting about hospitals and health plans in part because the issue had not been raised and the focus was on mortality. The processes that lead to mortality were a ‘black box’ that it was left to the providers to manipulate as they saw fit to get to the outcome. At issue is that fact that with this approach it is challenging to separate out the impact of public reporting from trends toward improvements in care or use of technology that occur simultaneously. The few studies that have addressed the impact of public reporting on provider behavior and care processes have been more recent. Additionally some of the stronger studies have included more or different data that are more costly to collect and raise the cost of research. For example, mixed mode studies that collect information on quality improvement activities via interviews or observations and then link this to administrative data require more funding, expertise in different types of research, and the ability to link information. All of these may be high hurdles to clear.

Key Question 4. Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

The idea that public reports affect the choices made by patients and families, or people acting as their agents, is at the core of the economics-based rationale for public reporting. Addressing asymmetries in the availability of information should encourage more efficient market function. The necessary step is that public reporting has to effect selection. As a core concept, selection has been more frequently studied than most other outcomes. While the strength of the evidence differs across setting, the conclusion is that public reporting has no or very little impact on selection. The most positive conclusion that could be made is that results are mixed, but it is hard to say more giving the weakness of most of the included studies.

The qualitative research provides insights into why this might be case. The primary reasons are: people are not aware that the quality information is available; the information provided in public reports is not what they need nor is it always available when they need it to make a decision; or the information is not presented in a way that is comprehensible. Much of the qualitative research has focused on how presentation and format could increase comprehension.

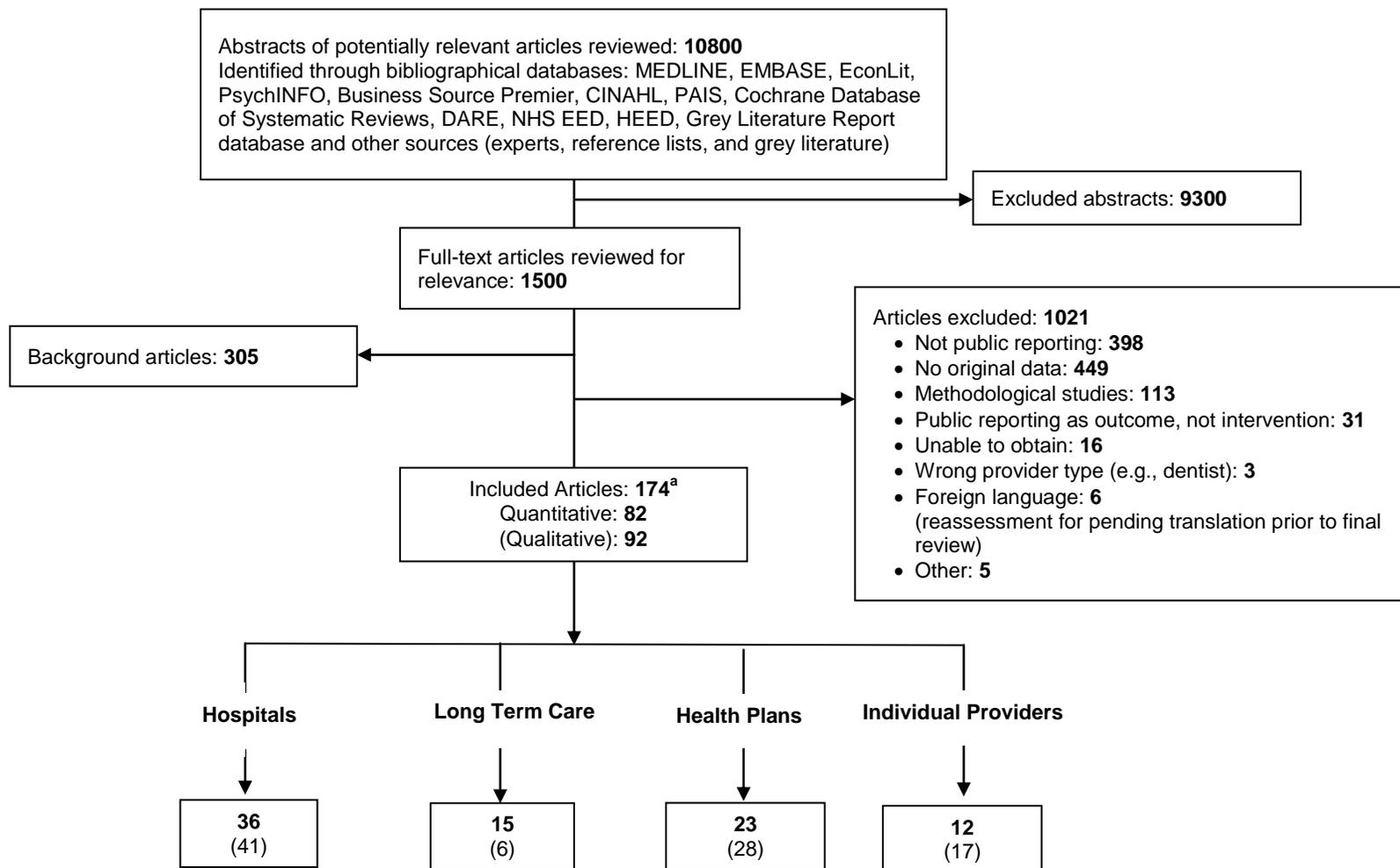
Key Question 5. What characteristics of public reporting increase its impact on quality of care?

While the literature on decision making and public reporting acknowledges that several different characteristics of the intervention are likely determine its effectiveness, this is rarely examined directly in quantitative studies, and it is even difficult to assess indirectly. We found only two studies that either varied in some characteristics or empirically examined the impact of existing variation. These included a study that look at responses to the tone of the messages used to inform patients about the public report and another study that looked at whether data were still useful even if there are substantial delays between data collection and public reporting. Assessing more characteristics indirectly would require having access to more comprehensive descriptions of the public reports and determining if selection characteristics are associated with variation in results.

Key Question 6. What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

The idea that context matters is reflected in the fact that some environmental factors are studied in relation to public reporting. The issue is that within settings there is not enough evidence to draw conclusions. The one exception may be market characteristics, specifically competition. The underlying economic model of public reporting suggests that in competitive markets the public reporting of quality information may have a greater impact. The idea is that public reporting allows health care providers to compete on quality, whereas when this data was not available, they had to compete on other factors like price and amenities. This has been studied for hospitals and long-term care; combining this research would allow a stronger conclusion supporting the link between competition and the impact of public reporting.

Figure B. Study flow diagram



^a Four quantitative studies address both individual providers and hospitals and therefore appear in both categories here. In addition, two articles reported the same results in one qualitative study addressing health plans.

Table A. Summary evidence table: Effectiveness of public reporting of health care quality as a quality improvement strategy

Key Question	Setting	Strength of Evidence	Conclusion
Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes?)	Hospitals	Low	<i>Mortality.</i> PR leads to a slight reduction or no change in hospital mortality.
		Moderate	<i>CAHPS (patient experience) and HEDIS (clinical process measures):</i> CAHPS and HEDIS ratings improve after PR.
	Individual providers	Insufficient	<i>Mortality.</i> In a single study mortality declined with PR.
	Health Plan	Low	<i>CAHPS (patient experience) and HEDIS (clinical process measures).</i> CAHPS and HEDIS ratings improve after PR.
	Long-term care	Moderate	<i>Quality Measures (Nursing Home Compare; Home Health Compare).</i> The majority of LTC quality measures improve after PR.
Key Question 2: What harms result from public reporting?	Hospital	Insufficient	<i>Inappropriate diagnosis and treatment.</i> In one study this harm was not realized.
		Insufficient	<i>Mortality.</i> In one study increase in mortality was attributed to PR.
		Low	<i>Access.</i> 3 studies produced conflicting results: 1 found a negative effect on access consistent with harm; 1 found no effect and 1 found an unexpected benefit of improved access for high risk patients.
	Individual providers	Insufficient	<i>Racial-Ethnic Disparities in Procedure rates.</i> One study found gap in access to procedures increased with PR and did not return to baseline difference for 9 years.
		Insufficient	<i>Adverse selection by race.</i> One study found minority patients were more likely to be operated on by a high quality surgeon after PR; counter to the potential harm.
		Insufficient	<i>Surgeon dropout.</i> One study found no evidence PR is motivating surgeons to leave practice.

Key Question	Setting	Strength of Evidence	Conclusion
	Health plans	Insufficient	<i>Crowding out quality on domains not measured.</i> One study found crowding out did not occur with PR.
		Insufficient	<i>Withdrawal from market.</i> One study found PR did not result in health plan withdrawal from market.
	Long-term care	Insufficient	<i>Cream skimming.</i> One study found Nursing Homes did not stop admitting complex patients due to PR.
		Insufficient	<i>Crowding out.</i> One study found quality indicators not subject of PR improved as well suggesting positive spill over rather than crowd out.
Key Question 3: Does public reporting lead to change in health care delivery structures or processes?	Hospitals	Insufficient	<i>Quality improvement activity.</i> In one study PR led hospitals to add services and change policies
	Individual provider	Insufficient	<i>Lower quality surgeons leave practice.</i> One study found surgeons who leave practice after PR are more likely to be lower quality
	Health plans	Insufficient	<i>No studies identified.</i>
	Long-term care	Moderate	<i>Administrator response to public reporting.</i> PR leads Nursing Home management to focus on improving clinical care
		Insufficient	<i>Influenza vaccination rates.</i> One study found PR had no impact on vaccination rates.
Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?	Hospitals	Moderate	<i>Volume and market share.</i> PR had a very small or no impact on selection by patients measured by volume or market share.
	Individual provider	Low	<i>Referral patterns, market share, or volume.</i> Five studies find no effect of PR on selection; four found that PR increased market share of high quality providers.
	Health plans	Moderate	<i>Health plan selection.</i> PR has no or only very little impact on the selection of plans.
	Long term care	Insufficient	<i>Occupancy rates.</i> One study found PR had no consistent impact on occupancy.
Key Question 5: What	Hospitals	Insufficient	<i>No studies identified.</i>

Key Question	Setting	Strength of Evidence	Conclusion	
characteristics of public reporting increase its impact on quality of care?	Individual providers	Insufficient	<i>Mode and tone of message.</i> One study found that mode effects use of PR, tone does not.	
		Insufficient	<i>Accuracy and usefulness.</i> One study found that PRs are accurate and useful for patient selection even if there is a delay between data collection and publication	
	Health plans	Insufficient	<i>No studies identified.</i>	
	Long term care	Insufficient	<i>No studies identified.</i>	
Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?	Hospitals	Insufficient	<i>Competition.</i> 2 studies found that competition increases impact of PR.	
	Individual providers	Insufficient	<i>Employment status/age.</i> One study found retirees were more likely to select providers based on quality after PR.	
		Insufficient	<i>State mandate for insurance coverage.</i> PR has a greater impact on provider selection when coverage is mandatory.	
	Health plans	Insufficient	<i>Importance of quality information.</i> Two studies showed variability in the importance of information to different subgroups of patients.	
		Insufficient	<i>Baseline performance.</i> Plans with lower quality at baseline are more likely to improve with PR.	
	Long-term care			<i>Variation in quality.</i> PR has a greater impact when quality varies across plans in market
		Low		<i>Competition/occupancy.</i> PR has a greater effect in high competition or low occupancy markets.
		Low		<i>Nursing Home Characteristics /Ownership status.</i> No consistent difference in the effect of PR on outcomes by characteristics such as for-profit status.
			Insufficient	<i>Baseline performance.</i> Plans with lower quality at baseline are more likely to improve with PR

Abbreviations: CAHPS, Consumer Assessment of Healthcare Providers and Systems; HEDIS, Healthcare Effectiveness Data and Information Set; LTC, long-term care; PR, public reporting.

Discussion

Public reporting quality information on health care is a population-level intervention designed to influence health care and ultimately outcomes by creating incentives that encourage the provision of high-quality care. Early (but not the earliest) public reports on cardiac surgery

outcomes in New York State and Pennsylvania publicized first hospital-level and then surgeon-specific mortality rates. These generated a significant amount of controversy and research. Studies of reports on health plans came after the public reports were created and were based on Healthcare Effectiveness Data and Information Set (HEDIS) and Consumer Assessment of Healthcare Providers and Systems (CHAPS) data. Their public release was first voluntarily, then later mandated by many states and the federal government for some programs. Most recently, the creation and release of quality measures for long-term care services (nursing homes and home health agencies) in 2002 and 2003 has been the subject of the bulk of public reporting research.

The main findings from this review are summarized in Table A above. The results in this table are presented by key question and then by health care setting and outcome. We have also assessed the strength of the body of evidence and this determination is included in the table. The number of rows in the table underscores the heterogeneity of the research literature about public reporting and health care public reports. Different outcomes have been used across studies, prohibiting quantitative or even qualitative synthesis.

There is some evidence that public reporting has an impact on the quality of health care (Key Question 1), but this is less consistent for changes in mortality, which has been the subject of research in hospitals, and more evident in improvement in care processes that have been the subject of public reporting on health plans and long-term care services. Harms (Key Question 2) that could result from public reporting are frequently discussed but infrequently and inconsistently studied. Even less frequently do the studies confirm that a suspected harm actually occurred.

More recent discussions of the theory and justification for public reporting have focused on its impact on providers (Key Question 3). The suggestion is that the primary pathway from public reporting to improved quality is via the influence on provider behavior. Quantitative research on this topic is limited which may be due to a combination of timing and study design/resource allocation issues. The few studies that have addressed the impact of public reporting on provider behavior and care processes have been more recent. Additionally, some of the stronger studies have included more or different data that are more costly to collect and raise the cost of research. For example mixed mode studies that collect information on quality improvement activities via interviews or observations and then link this to administrative data require more funding, expertise in different types of research, and the ability to link information. All of these may be high hurdles to clear.

The idea that public reports affect the choices made by patients and families, or people acting as their agents, is at the core of the economics-based rationale for public reporting (Key Question 4). While the strength of the evidence differs somewhat across setting, the conclusion is that public reporting has no or very little impact on selection. The most positive conclusion that could be made is that results are mixed, but it is hard to say more given the weak designs of most of the included studies.

While the literature on decisionmaking and public reporting acknowledges that several different characteristics of the intervention likely determine its effectiveness (Key Question 5), this is rarely examined directly in quantitative studies and it is even difficult to assess indirectly. The idea that context matters (Key Question 6) is reflected in the fact that some environmental factors are studied in relation to public reporting. The issue is that within settings there is not enough evidence to draw conclusions. However across setting there is a consistent finding related to competition. The underlying economic model of public reporting suggests that in competitive markets the public reporting of quality information may have a greater impact. The

idea is that public reporting allows health care providers to compete on quality whereas when this data was not available they had to compete on other factors like price and amenities. This has been studied for hospitals and long-term care and looking across the settings allows a stronger conclusion supporting the link between competition and the impact of public reporting.

The major limitations of this review are related to the nature of public reporting as an intervention. Specifically, public reporting is multidisciplinary and population-based. Additionally, it is often viewed as a policy, management, or educational activity that focuses on disseminating existing information rather than generating new knowledge. Each of these characteristics creates a challenge in adapting systematic review methods that have been developed primarily for comparing and evaluating medical interventions. Public reporting quality information in health care is an intervention based on theories in economics, decision science, psychology of behavior change, organizational sociology, and public policy and this list is not complete. While our search was not limited to only biomedical databases, it is likely there is literature from some relevant disciplines in social science, humanities, and disciplinary oriented databases that we did not search. Public reporting makes information available to anyone who wants it and may involve marketing and dissemination, but it is rarely given to individuals who are known to need it and we rarely know who actually receives the intervention or uses the information.. A final limitation we perceive, but cannot prove, is that there are studies of public reporting that exist but that have not been published in peer review journals or distributed through the grey literature sources that we were able to access. These studies may have been done as part of operations or program evaluations to meet the specific needs of a stakeholder such as the public report producer, a State agency, or an advocacy group. Most likely these studies are perceived as not adding to the body of knowledge, regardless of how useful they may be to the client, and do not result in accessible publications.

We identified a large number of studies in this review, but the return in terms of credible guidance on how to maximize the impact of public reporting on quality of health care is low. The reasons for this translate into ideas for future research. When the outcomes of the identified studies are examined by setting and key question, the impact of heterogeneity in this body of literature becomes clear. The research in this field appears to be ad hoc in the sense that few studies build on prior studies by addressing either their methodological or subject matter gaps. By grouping studies by setting and outcome within key questions and looking at the volume and results of research chronologically, we hope this review has helped address and identify some of these gaps.

Both our assessment of the quality of individual studies and our work on this systematic review have sensitized us to the need for more developmental research in methods. Study designs and analyses in individual studies were frequently not able to create adequate comparisons or adequately address important sources of confounding. Methods used in clinical studies (randomized controlled trials, large cohort studies) are often not practical approaches to reducing bias in health services, public health, or quality improvement research. However, an increasing number of the questions of interest to stakeholders including patients, clinicians, and policymakers are in these fields. Changes in technology and the increasing availability of large quantities of electronic data open up some possibilities, but data alone cannot improve the quality and ultimately the impact of research. The heterogeneity in the body of evidence on public reporting and the seemingly minimal evolution over time suggests that research syntheses might have an important role in focusing and driving future research.

Glossary

Abbreviation	Definition
AHRQ	Agency for Healthcare Research and Quality
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CQG series	<i>Closing the Quality Gap: Revisiting the State of the Science</i> series
HEDIS	Healthcare Effectiveness Data and Information Set
LTC	Long-term care
PR	Public reporting
TEP	Technical Expert Panel

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Introduction

Background

Research demonstrates that health care frequently fails to meet the current standards of quality care.^{1,2} Errors, suboptimal management or control of disease, and overutilization or underutilization of services occur when high-quality, evidence-based health care is not provided. All these factors have potentially serious consequences for patients and their families, including higher mortality, increased morbidity, decreased quality of life, and higher cost of care. Additionally, low-quality care and inconsistencies in quality are linked to health care disparities.^{3,4}

In a quality improvement framework, making quality, safety, or performance data publicly available is a means of influencing quality. Three general approaches are hypothesized to address quality gaps: measuring quality, influencing quality, and improving quality.⁵ Public reporting influences quality by providing incentives for change. The incentives may be for patients and families, other purchasers of services such as employers, or for the individuals and organizations that provide or arrange care including individual clinicians, hospitals, long-term facilities or services and health plans. The underlying assumptions are: 1) given choices and information, patients and purchasers will choose higher-quality providers; and 2) health care providers and organizations that arrange health care services will strive to provide high-quality care when information about their performance is publicly available to patients, health plan members, their peers, policymakers, and the media. It is assumed that patients are motivated by the desire to maximize the benefits they derive from health care. Providers may want to attract new patients or members and avoid losing existing ones. Providers may also be motivated by concern about their reputation among their peers or by professional and organizational commitments to providing high quality care. In some cases, public reporting efforts have been instigated by organizations

These assumptions are based on theories in economics^{6,7} and behavior change.⁸ According to economic theory, public reporting corrects asymmetries in information. Public reporting accomplishes this by making previously unobservable quality of health care more transparent so everyone involved can use the information. Behavior change models and quality improvement theories stress the importance of accessible information on measurable, actionable processes and outcomes as motivation for practice improvement. Public reporting in this context can provide data that translates to goals or targets for practice change and incentives to improve.

The modern history of public reporting dates to over 25 years ago when the Health Care Financing Administration (HCFA) in the United States released hospital mortality data in 1986. Dubbed the “death list”, this received media and public attention. Critiques in the health care community focused on both issues with the quality of the data and the appropriateness of public reporting overall, and in 1992 the program was suspended. Some other public reports have shared this fate and are no longer produced (e.g., the hospital report created by the Cleveland Health Quality Choice program) while others now have almost a two-decade history (e.g., the New York and Pennsylvania Coronary Artery Bypass Graft [CABG] reports and the Healthcare Effectiveness Data and Information Set (HEDIS).

The impact of public reporting on quality has been studied in a variety of settings and levels including health plans, hospitals,^{9,10} individual clinicians, nursing homes,¹¹ postacute care,¹² and home care.¹³ In general, the results were inconsistent. For example, some studies have reported improvements in specific health services, while other studies have documented unintended

negative consequences, including motivating providers to select lower-risk patients in order to improve their quality score. A review published in 2008 (including studies of health plans, hospitals and individual clinicians through 2006) concluded that although there is scant evidence that publishing performance data improves quality of care and that evaluation of public reporting systems is needed, some evidence suggests that public reports stimulate quality improvement activities at the hospital level.¹⁴

Today, Federal and State government agencies, community quality collaboratives, and other organizations are continuing to invest resources in public reporting as one possible intervention to bridge the gap between current and high-quality practice in health care. Public reporting is also a component of larger transparency initiatives of government agencies that may include more explicit decision-making procedures, open meetings, and the routine release of documents and data. A recent Agency for Healthcare Research and Quality (AHRQ) series on best practices in public reporting,¹⁵⁻¹⁷ along with conferences about creating and using reports and other decision-support tools to engage consumers and providers, demonstrates their continued interest in public reporting as a quality improvement strategy for a variety of types of health care organizations and individual providers.

This review was designed to be timely, given the significant changes that have occurred in the scope and nature of public reporting since the last published review,¹⁴ and the questions that remain regarding the extent to which public reports result in quality improvements. Medicare has substantially expanded its public reporting program and now provides quality data via sections of the Medicare.gov Web site that include Medicare Plan Ratings, Hospital Compare, Nursing Home Compare, Home Health Compare, and Dialysis Facility Compare. In the next year, Hospice Compare is planned and performance data will be added to Physician Compare. Additionally, health data from many more sources are now available with minimal restrictions to patients, health care providers, and purchasers. New technologies allow for innovative data collection (e.g., Global Positioning System tracking of asthma inhaler use), aggregating data from consumer feedback sites, customization of data with apps that simplify the combination of data from multiple sources, and accessing more data available in real time.¹⁸ These efforts and continuing commitments to transparency and patient-centered health care are likely to contribute to substantial increases in the amount of publicly available health care-quality data. Changes under the 2010 Affordable Care Act (Public Law 111-48) may also increase the availability of data and the number of people making decisions about health care services.

Definition of Public Reporting and Scope

Our definition of public reporting was designed to situate public reporting in the context of quality improvement in health care. We developed the definition based on the history of public reporting, prior reviews, our preliminary review of the literature, our initial research on current health care public reports, and our understanding of other transparency-driven initiatives in health care. An initial draft definition was refined based on input from the technical expert panel (TEP). The result of this process was the following definition that shaped the scope of this review. Additional detail is provided in the Methods section.

Public Reporting is data, publicly available or available to a broad audience free of charge or at a nominal cost, about a health care structure, process, or outcome at any provider level (individual clinician, group, or organizations [e.g., health plans, hospitals, nursing facilities, etc.]). While public reporting is generally understood to involve comparative data across

providers, for purposes of this review we are adopting a broader approach to include findings in which one provider is compared to a national/regional data report on performance for which there are accepted standards or best practices.

The contribution of this review to the consideration of public reporting as a quality improvement strategy is that available studies can offer insights not only into the effectiveness of public reporting for quality improvement, but they may also provide key information on such issues as when information is needed,¹⁹ how it is best formatted and presented, and what is perceived as useful by different audiences.²⁰ Our synthesis attempts to include these considerations and other characteristics of reports and contextual factors in order to inform decisions about the use and development of public reporting as a more effective quality improvement strategy.

Objectives and Key Questions

Given the resources devoted to public reporting and the desire to synthesize existing research knowledge to inform future public reporting efforts, the objectives of this systematic review were:

1. To determine the effectiveness of public reporting as a quality improvement strategy by evaluating the evidence available about whether public reporting results in improvements in health care delivery and patient outcomes (Key Question 1) and evidence of harms resulting from public reporting (Key Question 2).
2. To determine whether public reporting leads to changes in health care delivery or changes in patients' or purchasers' behaviors (intermediate outcomes) that may contribute to improved quality of care (Key Questions 3 and 4).
3. To identify characteristics of public reports and contextual factors that can increase or decrease the impact of public reporting (Key Questions 5 and 6).

The Key Questions correspond to these objectives:

Objective 1

Key Question 1

Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Key Question 2

What harms result from public reporting?

Objective 2

Key Question 3

Does public reporting lead to change in health care delivery structures or processes (at levels of individual providers, groups, or organizations [e.g., health plans, hospitals, nursing facilities])?

Key Question 4

Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Objective 3**Key Question 5**

What characteristics of public reporting increase its impact on quality of care?

Key Question 6

What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Methods

Topic Nomination and Development

This evidence review about public reporting as a quality improvement strategy is one of eight reviews in a series *Closing the Quality Gap: Revisiting the State of the Science* (hereafter, CQG series). The CQG series aims to assemble the evidence about effective strategies to close the “quality gap”—the difference between what is expected to work well for patients based on known evidence and what actually happens in day-to-day clinical practice across populations of patients.

The CQG series focuses on improving the quality of health care through critical assessment of relevant evidence for selected settings, interventions, and incentives. Topics for the eight CQG reviews were selected by staff of the Agency for Healthcare Research and Quality (AHRQ). The initial topic nomination was broad and did not include key questions or specific outcomes of interest.

Topics for the CQG series were solicited from the portfolio leads at AHRQ. The nominations included a brief background and context; the importance and/or rationale for the topic; the focus or population of interest; relevant outcomes; and references to recent or ongoing work. Among the topics that were nominated, the following considerations were made in selection for inclusion in the series: the ability to focus and clarify the topic area appropriately; relevance to quality improvement and a systems approach; applicability to the EPC program/amenability to systematic review; the potential for duplication and/or overlap with other known or ongoing work; relevance and potential impact in improving care; and fit of the topics as a whole in reflecting the AHRQ portfolios.

Topic development occurred during preliminary work with the lead Evidenced-based Practice Center (EPC) that is coordinating the series, the AHRQ Task Order Officer (TOO) for the series, and the investigators at the EPCs working on the other topics. Topic development then continued with the two TOOs for this specific review and a Technical Expert Panel (TEP). This second phase included refining the definition of public reporting to be used for this review and developing and refining the key questions. Both the definition and the key questions are presented in the prior section. Topic development also involved developing the analytic framework (see Figure 1) and setting the parameters for what studies are included in the review.

Search Strategy

Research on the public reporting of health care quality information spans multiple disciplines. For this reason we searched bibliographic databases covering psychology, economics, and public policy as well as health care. We conducted searches for both reviews and individual studies in MEDLINE[®], EMBASE[®], EconLit, PsychINFO[®], Business Source[®] Premier, CINAHL[®] (Cumulative Index of Nursing and Allied Health Literature), and PAIS (Public Affairs Information Services). We also searched for systematic reviews, studies and evaluations in The Cochrane Database of Systematic Reviews, The Cochrane Effective Practice and Organisation of Care Group (EPOC) Register of Studies, Database of Abstracts of Reviews of Effects (DARE), National Health Service Economic Evaluation Database (NHS EED), and Health Economic Evaluations Database (HEED). The Grey Literature Report database maintained by the New York Academy of Medicine and AARP Ageline were searched for additional studies and reports. Additionally in order to supplement our search for grey literature,

we contacted know public report producers through the Scientific Resource Center (SRC) of the EPC program. Individuals in organizations that had contributed reports to a clearing house or participated in community quality collaboratives were sent an email explaining the review and asking for any published or unpublished evaluations or data related to their public reports.

The searches included studies published or reported between January 1980 and May 2011. Two of the earliest public reports in the United States were the data on hospital mortality rates issued by the Health Care Financing Administration in 1986 and the mortality reports issued by the New York Cardiac Surgery Reporting System in 1989. Starting from January 1980 ensured that the entire contemporary history of public reporting was represented.

Key word and index term searches were based on strategies used in previous systematic reviews and on words and terms used in selected recent articles. Public reporting does not map to standardized index terms in citation databases, so terms related to key concepts were used to identify search strings that were then combined to identify articles. These concepts and terms are listed in Table 1. The search term lists were reviewed by librarians with expertise in both biomedical and social science literature searching and as well as the TEP and AHRQ TOOs for comments and suggestions. The actual search strings are included in Appendix A.

The search resulted in the identification of 12,116 citations and 10,800 articles after duplicates were removed. All citations were initially imported into an electronic database, EndNote X3[®], and then uploaded to Distiller[®], a specialized application for systematic reviews, for title and abstract triage, full text review, and abstraction.

Table 1. Public reporting concepts and corresponding search terms

Concept	Search Terms
Information dissemination and quality	Benchmarking/ or Information Services/ or Information Dissemination/ or Disclosure/ or Access to Information/ or Mandatory Reporting/ or Quality indicators, health care/ or Quality assurance, health care/ or Quality improvement/ or "process assessment (health care)"/ or "outcome assessment (health care)"/ or (quality adj2 indicator\$).ti,ab
Health care settings	exp Hospitals/ or exp Physicians/ or Nursing Homes/ or Home Care Services/ or Competitive Medical Plans/ or Health Maintenance Organizations/ or Managed Care Programs/ or Insurance, Health/ or Medicare/ or Medicaid/ or Hospices/ or Ambulatory Care/ or Skilled Nursing Facilities/ or Group Practice/ or exp Primary Health Care/ or Institutional Practice/ or Private Practice/ or Family Practice/ or Physicians, Family/ or Professional Practice/ or Allied Health Personnel/ or Outpatient clinics, hospital/ or Academic Medical Center/ or Health Care Sector/ or Hospital Administration/ or Public Health Administration/ or Long Term Care Facilit\$.ti,ab. or health care cent\$3.ti,ab. or health care provider\$.ti,ab. or (coronary or cardiac or cardiolog\$).ti,ab.
Patient/consumer and provider behavior	Consumer Participation/ or Consumer Advocacy/ or Consumer Satisfaction/ or Patient Satisfaction/ or Decision Making/ or Choice Behavior/ or Attitude of Health Personnel/ or Physician's Practice Patterns/ or Nurse's Practice Patterns/ or Professional Practice/ or Guideline Adherence/ or Patient Selection/ or Patient Participation/ or Hospital Mortality/ or (decision\$ or choice\$ or choos\$ or behav\$ or patient outcome\$).ti,ab.
Title abstract adjacency	((Dissem\$ or Disclos\$ or Profil\$ or Inform\$ or Indicator\$ or Metric\$ or Rank\$ or Compar\$ or Score\$ or Rating\$ or Rate\$ or data or measure\$ or criteria or standard\$ or account\$ or report\$ or release\$ or initiative\$ or Star) adj5 (Performan\$ or assessment\$ or evaluat\$ or quality or public\$ or consumer\$ or patient\$ or transparen\$ or provider\$)) or score card\$ or (quality adj2 report\$) or report card\$ or league table\$ or (star adj2 rating) or (Star adj2 performance)).ti,ab.
Known public reports Known public reports (con't)	(Medicare Compare or nursing home compare or Calhospital Compare or California State Report Card or California Hospital Outcomes or myhealthcareadvisor or Massachusetts Health Quality or (Pennsylvania adj3 coronary) or (Hospital Quality adj2 Safety Survey) or Home health Compare or Physician Compare or (New York

Concept	Search Terms
	adj2 Cardiac adj2 Report\$) or (New York adj5 surg\$) or Cleveland Health Quality Choice or (HCFA adj5 mortality) or (HCFA adj5 death) or Federal employee health benefit guide or QualityCounts or CAHPS or HEDIS).ti,ab.

Study Selection

Studies were selected from the identified citations through title and abstract triage followed by full text review. Research studies were included if they conformed to the definition of public reporting and objectives (see above) as well as the PICOTS (see below) and addressed at least one of the key questions. A variety of study designs were included, such as trials/experiments, nonrandomized experiments, observational studies, systematic reviews, and evaluation case studies. Studies were excluded if:

- the data are not publicly available or have to be purchased for more than a nominal fee,
- data are only for one organization or individual and cannot be compared to others,
- the data are for services not directly health or medical related,
- the data is only about individual providers other than physicians and nurses such as dentists or therapists,
- the study has no original data,
- the study was published before 1980, or
- no English abstract is available for a non-English language article.

The inclusion and exclusion criteria lists are included in Appendix B.

Title and abstracts were triaged by all reviewers for the first 300 articles then discrepancies and differences were discussed and reconciled. Another 200 titles and abstracts were submitted to dual review to confirm consistency. The remainder were divided among the reviewers and triaged with followup review of exclusions. Articles identified as potential inclusions for the review based on title and abstract were then advanced to full text review. In the full text review all articles were reviewed by two of the three principal reviewers and inclusion/exclusion conflicts were resolved through discussion and consensus. Decisions made by reviewers were documented at each stage. We retained data on excluded studies and documented the reasons for their exclusion (Appendix C).

At the title and abstract triage stage, most studies that were excluded were dropped because they were not about the right topic. Given our search strategy and the lack of precise terms, many of the retrieved titles and abstracts were not about public reporting of health care quality data. These studies were about some other aspect of health care quality or about measures not publicly reported. Other studies did not meet our definition of public reporting and were excluded. Specifically, studies were excluded if:

- The quality data were not publicly available or were unavailable to a large group such as all members of a health plan. Following the advice of our TEP we included studies of the impact of employer-provided data to employees about health plans because these data were made available to a large group even if they were not available to the general public. Studies in which the data were available to a limited number of stakeholders or to

a certain type of stakeholder for feedback, quality improvement, benchmarking, or internal organization operations were not included.

- The data were available but had to be purchased for more than a nominal subscription fee (e.g., a nominal fee would be a subscription to *Consumer Reports* or a similar publication or Web site).
- Data included in the report were only for one organization or individual and were not comparative, meaning the single organization or individual could not be compared to others directly or to data for a national, state, or regional group of organizations or of individuals.

Other studies that were excluded were articles about research that involved publicly reported health care quality data but did not correspond to our key questions. There were two categories of these studies. One category included studies in which publicly reported data were used as the outcome measure in an evaluation of a different health care intervention. In these cases the public reports were not interventions that affect actions by health care providers or patients and lead to better outcomes. Instead they were an easily accessible source of data to use in the evaluation of other interventions after a problem was identified and an intervention executed.

Another category of studies excluded were articles that considered methodological issues related to the creation of the public report or the specific quality measures included in the reports. Many of these studies analyzed the validity of the measures that were reported or the risk adjustment scheme used to facilitate comparisons. Other studies concerned the development of the surveys used to collect the data that are ultimately publicly reported. While it is important that quality measures that are publicly reported are credible, evaluating the quality measures or the research evidence about the measures were outside the scope of this review.

The remaining criteria used to exclude articles were:

- The public reporting was only about services that are not medical or directly health-related (e.g., food service, room décor).
- The public reporting was only about individual clinicians other than physicians and nurses (e.g., dentists, dieticians, therapists).
- The study population was not human.
- The study had no original data or was a commentary, an editorial, or a nonsystematic review.
- The study was published before 1980.
- No English abstract was available for a non-English language article.

If an English abstract was available for non-English language article, it was evaluated according to the same criteria as English language articles at title and abstract triage. At full text review, English articles were reviewed first and then a judgment was made as to whether the non-English article was likely to add significantly to the literature based on the English abstract, any data available in tables and preliminary translations of section headings and titles of tables or figures. Articles that were likely to make a significant contribution to the results were then considered for full translation.

PICOTS Framework

This review is about the public reporting of quality information as a quality improvement strategy in health care. It focuses on the impact of public reporting on quality of care as the

ultimate outcome of interest, and the behaviors of two populations: patients, families, and purchaser of care; and organizations and individuals who provide or facilitate the provision of health services, as intermediate outcomes.

Specifying the Population, Intervention, Comparators, Outcomes, Timing, and Settings (PICOTS) for a systematic review is an approach used to generate answerable research questions, to structure the literature search, to determine inclusion/exclusion criteria, and to organize reports.

For our review of public reporting as a quality improvement strategy, the PICOTS are as follows:

Populations

- Individuals or organizations that deliver health care and make decisions about how to deliver care.

These included health care providers in all settings (inpatient, outpatient, nursing facility, home care, etc.) and at all levels (health plan, facility, group practice, individual clinician, etc.) unless specifically excluded in the scope or exclusion-inclusion criteria (e.g., individual clinician include nurses and physicians in any specialty while other individuals such as dentists are excluded). Organizations such as hospitals and health plans have been the subject of many public reports as how they organize care and their policies have an impact on quality of care even though all care is ultimately delivered by individuals.

- Patients (or their representatives) making health care decisions and organizations that purchase health care services.

Patients included any person seeking or receiving health care services. Patients may also be represented by family or designated guardians in specific decisions or by advocacy groups that call for changes in care delivery. Purchasers or organizations that purchase care for patients were included in this population as they make choices concerning which individuals and organizations that provide care are available to patients or they promote the use of certain providers.

Intervention

The intervention is public reporting of performance data on patient outcomes or health care delivery. Public reporting for this review is defined in detail in the Scope and Key Questions in the Introduction section.

Comparators

In most studies, public reporting of quality data is compared with situations in which the data are not available or not publicly reported. Occasionally comparisons are made across different reports, different contexts for public reports, or differences in content and formats of reports. This detail is provided in the Evidence Tables and the study descriptions included in summary tables and the narrative.

Outcomes (Specified for Each Key Question)

- **Key Question 1.** Improvements in quality of health care

Improvements in care and patient outcomes may be combined in some studies and reviews under the heading of “clinical outcomes.” For this key question the focus was on improvement. Examples of potential outcomes in this category included decline in mortality for cardiac surgery patients, an increase in actual implementation of a guideline, or greater availability of service known to provide value. The actual improvements in care delivery and patient outcomes were the goals of quality improvement and public reporting when it was used as a quality improvement strategy.

Change in intermediate outcomes were included in Key Question 3, as it was not a given that all change will lead to improvement; furthermore, some studies may only measure the change in care processes or provider behaviors and not have sufficient data to determine the impact of that change.

Quality improvement in health care was the focus of the CQG series, and this review conforms to the definition for the series, which states that the “series aims to assemble the evidence about effective strategies to close the ‘quality gap,’” which simply refers to the difference between what is expected to work well for patients based on known evidence and what actually happens in day-to-day clinical practice across populations of patients. In this statement the implied definition of quality is “what is expected to work well,” which is similar to the Institute of Medicine definition, “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.”²¹ We applied this broad definition when determining if the public reporting in studies to be included were aimed at improving quality of care.

- **Key Question 2.** Harms included any negative consequence or adverse events for any members of the populations listed above that resulted from public reporting.

Harms could occur for patients and purchasers, or the individuals and organizations that provide care. Examples of harms could include:

- a. Reduced access to services if providers select patients or offer services in a different way (e.g., pull out of a market) in order to improve their publically reported quality ranking or score.
- b. Compromised data quality and reduced confidence in data if people attempt to manipulate the publicly reported data.
- c. Reduced patient engagement and/or negative outcomes if patients believe, based on a report, that they are receiving services from a high-quality provider and therefore do not need to be vigilant and involved in their own care; a report provides too much information and reduces comprehension; or the meaning of the data is not understood and therefore not used.
- d. Increased anxiety due to understanding that health care is not perfect and worrying about one’s own health condition or care.
- e. Misclassification of providers by the reporting resulting in negative impacts on their market share, contracting arrangements, or reputation.
- f. Public reporting that results in worsening of quality for any reason (including those listed above).

- Key Question 3.** Changes in health care delivery structures and processes.

This intermediate outcome, changes in health care delivery, may be of particular interest in this review. Individual providers or organizations might change processes (e.g., adopt guidelines, change policies, increase quality improvement efforts, or monitor individual providers) or structures (e.g., electronic ordering, automated reminders, and staff capacity) in an effort to improve their performance on the outcomes or indicators that are publically reported. However, this change in delivery may or may not necessarily lead to improvement in quality of care—the ultimate outcome of interest. Changes could result in improvement, no improvement, or worsening of outcomes or the study design may not include measures of the ultimate impact on quality of care.
- Key Question 4.** Changes in patient, or their representative, or purchaser health care behavior.

Patient and purchaser behaviors include but are not limited to their selection of health care providers or use of health services. Their behaviors may also include more general advocacy for higher quality of care and for better information and decision support. Patient behaviors are limited to those related to the reporting of quality data. Changes can be negative as well as positive. An example of a positive change would be increased comprehension of health information by patients. Negative changes could include patients becoming overwhelmed by data and dismissing all reports, relying too much on a rating and not becoming engaged in their own care, or not understanding reports and relying on less reputable sources of information. These negative changes could result in harms. Change in behaviors can also include information seeking and developing the ability to retrieve the information desired.
- Key Questions 5 and 6.**

These key questions focus on evidence that the outcomes listed above are affected by characteristics of the reports and contextual factors. This is particularly important given the quality improvement focus of this review, which makes the emphasis different from other reviews. Quality improvement requires consideration not just of what works but also of what works for whom and when. Understanding if the literature can tell us more about how the impact of public reporting varies across report characteristics and different contexts is important if the results of our review are to help inform future public reporting efforts. Particular attention was paid to these characteristics and factors as we abstracted information from the identified articles.

Timing

No minimum duration of followup time from the availability of the public report to the measurement of the intermediate or ultimate outcome was required.

Settings

Studies of public reporting in any level or setting for health care delivery including health plans, health systems, hospitals, outpatient services or practices, individual clinicians, hospice, home health care, or nursing facilities were included in this review.

Types of Studies

At the title and abstract triage phase we did not exclude any study based on study design if it would have been included based on the other inclusion and exclusion criteria. Public reporting is a public health, public policy, or educational intervention rather than a strictly clinical intervention. We wanted to identify and consider all types of evidence available as we proceeded with the review.

At the full text review stage, we identified the designs of the studies that met all other criteria and we refined our approach. Trials and observational studies that contained empirical data on an outcome that corresponded to a stated key question were retained for both abstraction and quality assessment. This included the rare randomized trials in this field. Most studies in this category are observational and differed predominately by whether there was a non public reporting group or time period for comparison. Many of the studies were time series, either interrupted time series or multiple measures post reporting only. For the study design terminology used in this review see Appendix D.

The search identified many qualitative studies and articles reporting outcomes that are necessary but not sufficient precursors to the outcomes in the stated key questions (e.g., awareness of reports, comprehension of content, attitudes toward public reporting including specific presentations, and intention to use) or hypothetical choices or decisions tasks. These types of studies may be particularly relevant to the Key Questions 5 and 6 about how the characteristics of the public reports and contextual factors affect the impact of public reporting on quality of care. For this reason they were retained, but they were not assessed for quality and their abstraction was abbreviated. In order to maintain the distinction between these two groups of studies, they are reported in separate evidence tables and the qualitative studies are summarized separately at the end of each results section for each health care setting.

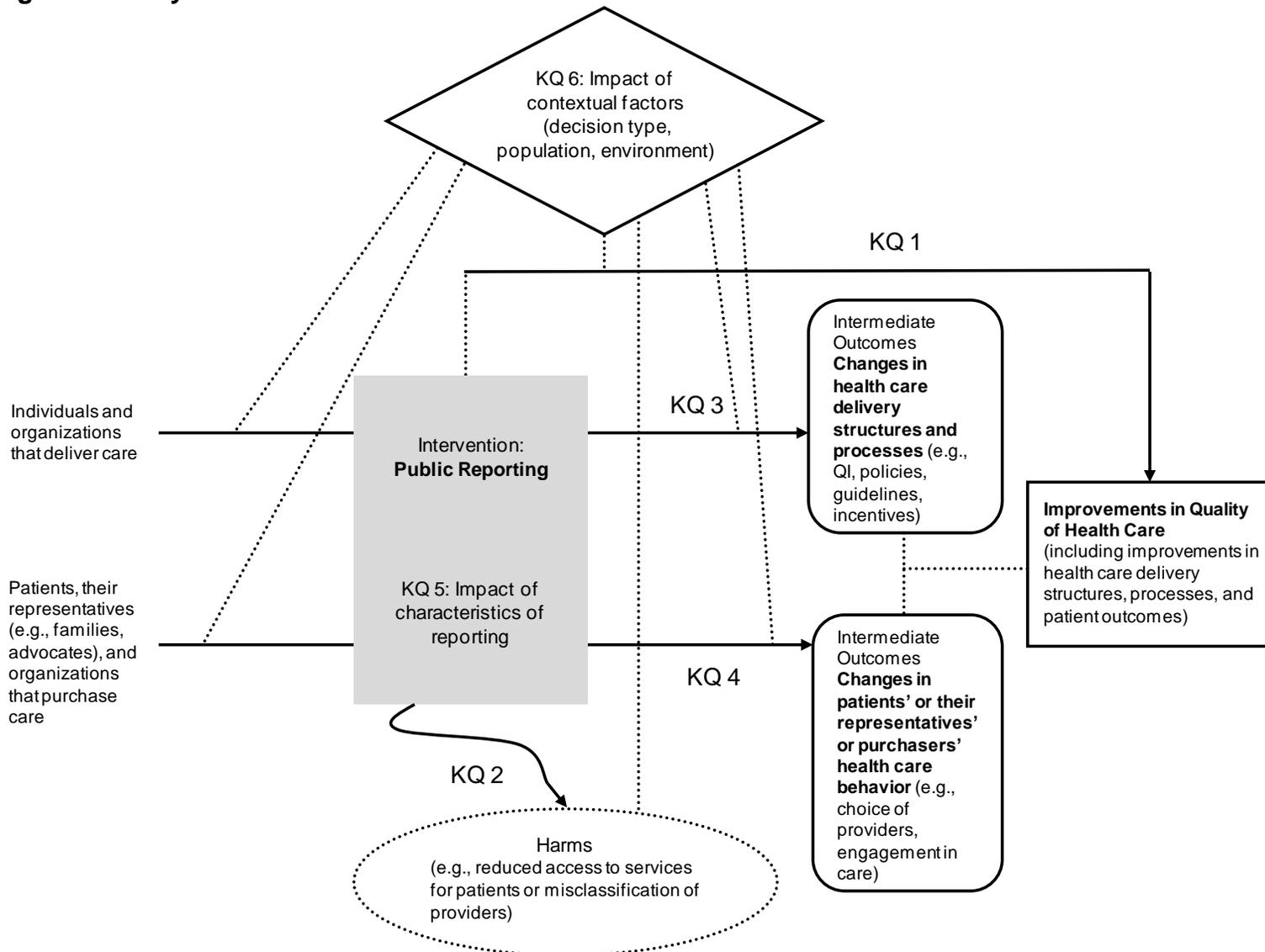
A few study types were excluded at this stage. These included:

1. Single case studies
2. Descriptive studies of implementation of public reports (which could have been excluded earlier for no outcomes)
3. Descriptive surveys or other qualitative studies that were predominately about another subject (not about public reporting) and contained one item or question about the public disclosure of data or a public reporting-related topic.

Analytic Framework

The analytic framework in Figure 1 represents relationships among the Populations, Intervention, and Outcomes that are the focus of this systematic review and illustrates how these relationships translate into the key questions. The relationship between intermediate outcomes and the ultimate improvement in the quality of health care is included. It is represented with dashed lines and does not have corresponding key questions because this review will not explicitly evaluate evidence about these relationships. Rather the focus will be on whether public reporting results in either the intermediate outcomes or improvements in quality of care.

Figure 1. Analytical framework



Data Abstraction and Management

Following full text review, we extracted the following data from all included studies:

- Type of health care setting or provider
- Study objective
- Geographic location
- Sample and groups or time period used for comparisons
- Study design
- Name or description of the public report
- Reported contextual factors (environmental characteristics, characteristics of the decision maker)
- Outcomes measured
- Findings for each key question.

All study data are presented by health care setting in the Evidence Tables in the Appendixes. These data were then used to generate the summary tables and narratives in the text. Since a number of public reports are the subject of multiple studies, descriptive information about these reports that were the subject of multiple studies is included in Appendix E. Ongoing accuracy of abstraction was monitored by randomly selecting articles abstracted by one abstractor to be checked by a second reviewer.

Quality Assessment of Individual Included Studies

Our assessments of the quality of individual studies are based on the recommendations in chapter titled “Assessing the Risk of Bias of Individual Studies when Comparing Medical Interventions” in the AHRQ *Methods Guide for Effectiveness and Comparative Effectiveness Reviews* (hereafter, *Methods Guide*).²¹ Our approach is summarized below and more detail is provided in Appendix F.

We pre specified six key criteria that could be applied to the various types of observational studies as well as the few studies that use random assignment to evaluate public reporting. We reviewed the types of bias and the corresponding suggested criteria discussed in this chapter and followed the recommendation that those most relevant to the topic and appropriate for the study designs be employed.

Based on this evaluation we selected six criteria for this review:

1. How adequate was randomization (for randomized studies) or how appropriate was selection of comparison group or time (for observational studies)?
2. How similar are groups at baseline (or time periods) or how well did the analysis control for differences?
3. How well does the design or analyses account for important potential confounding?
4. How well does the study rule out any impact from an unintended exposure or a concurrent intervention that might bias results?
5. How well are all potential outcomes prespecified and are the prespecified outcomes reported?
6. How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?

These six criteria were used by two raters who independently rated each article on these six criteria and made an overall assessment of “good”, “fair”, or “poor” as based on definitions from the Methods guide cited above.

Good/low risk of bias implies confidence on the part of the reviewers that results represent the true treatment effects (study results are considered valid). The study reporting is adequate to judge that no major or minor sources of bias are likely to influence results.

Fair/medium risk of bias implies some confidence that the results represent true treatment effect. The study is susceptible to some bias and the problems are not sufficient to invalidate the results (i.e., no flaw is likely to cause major bias). The study may be missing information, making it difficult to assess limitations and potential problems.

Poor/high risk of bias implies low confidence that results represent true treatment effect. The study has significant flaws that imply biases of various types that may invalidate its results; these may arise from serious errors in conduct, analysis, or reporting, large amounts of missing information, or discrepancies in reporting.

The overall assessment was not derived from a direct linear combination of the six criteria. Given the nature of public reporting as an intervention, the criteria corresponding to selection bias (criteria 1, 2, and 3 listed above), specifically how the comparison was structured, the degree of similarity at baseline and possible confounding, were of greatest concern when determining the level of confidence we could have in the result of each study. For this reason it is possible for a study to be given an overall assessment of “poor” even if some individual criteria were rated as “good”.

After completing the ratings independently, ratings were compared and differences reconciled through discussion and input of a third rater when needed. The quality assessment rating for all included quantitative studies are included in Appendix G. We did not assess the quality of the qualitative and lab-type experiments with hypothetical public reports. We also did not assess the quality of identified systematic reviews as they were used only to identify studies for inclusion and their results were not incorporated into this review.

Data Synthesis

We separated studies into four groups by the health care settings that were the subject of the public reports of quality. These four settings are hospitals, individual providers and outpatient group practices health plans, and long-term care services (predominately nursing homes). Public reporting has a different history for each of these settings and the public reports are different in terms of content and presentation. Abstracting the studies and synthesizing the evidence first by setting allowed patterns of evidence within setting to then be summarized by key question across all four settings.

Summary tables are included at the end of the sections on results by settings. These are the source of the results by key question across settings presented at the beginning of the result sections. The heterogeneity of outcomes precluded formal quantitative meta-analysis.

Rating the Body of Evidence for Each Key Question

The strength of the body of evidence for each key question was rated according to the recommendations in the chapter “Grading the Strength of a Body of Evidence When Comparing Medical Interventions” in the AHRQ *Methods Guide*.²¹ These assessments were performed for each key question by two raters.

The assessment of the strength of the evidence was based on judgments about risk of bias, consistency, directness, and precision of the evidence for each outcome.

The evidence for outcomes across the included studies was graded as high (high confidence that the evidence reflects the true effect; further research is unlikely to change our confidence or the estimate of the effect), moderate (moderate confidence that the evidence reflects the true effect; further research may change our confidence or the estimate of the effect), low (low confidence that the evidence reflects the true effect; further research is likely to change our confidence and the estimate of the effect), or insufficient (evidence is unavailable or does not permit a conclusion). Cases where only 1 or 2 studies were available for a specific outcome were labeled insufficient unless the studies were large or had particularly strong designs in terms of reducing risk of bias.

Applicability

The applicability of studies of public reporting depends on the user and the intended use of the report. Applicability may vary according to the characteristics of the population and to the characteristics of the reports. For example, national studies may be more generally applicable, whereas studies conducted in one geographic area may or may not be applicable to other geographic areas because of differences in their health care markets, particularly with regard to the availability of health care providers or health plans. Alternatively, national studies conducted in one country may be less applicable to other countries with health care systems that differ significantly. Characteristics of the specific populations studied (e.g., high education and health literacy, older age, etc.) may also limit the generalization of one study's findings to expected results in populations with very different characteristics. Differences in the data included in the public reports, their formatting, and their mode of delivery (e.g., paper, Web, apps, etc.) may limit the applicability of findings from studies of specific types of public reports to expected results from reports that are substantially different in form and content. For these reasons, we abstracted data about the reports and the context when it was given and provide these to allow an assessment of applicability to different situations.

An additional issue related to applicability concerns differences in health care decisions. Public reporting has been and continues to be used for a variety of settings and levels and, as in prior reviews, we have included all studies we could locate regardless of setting or level. However, to combine all studies would be implying that selecting a cardiac surgeon is the same as selecting a nursing home is the same as selecting a health plan for multiple types of needed care in the future. For this reason our first level of analyses and the reporting of our results are by four types of settings (Hospitals, Individual Clinicians, Health Plans, and Long-Term Care). Then in the results summary, overview and discussion we attempt to look for lessons across settings, but we are cognizant of the fact that such an approach may have limitations and mask the very real differences among health care decisions and the differential impact public reporting could have on different health care decisions.

Peer Review and Public Commentary

Experts in public reporting and decision making and individuals representing stakeholder and user communities were invited to provide external peer review of this CER; AHRQ and an associate editor also provided comments. The draft report was posted on the AHRQ website for 4 weeks to elicit public comment. We addressed all reviewer comments, revising the text as

appropriate, and documented disposition of comments in a report that will be made available 3 months after the Agency posts the final CER on the AHRQ website.

Results

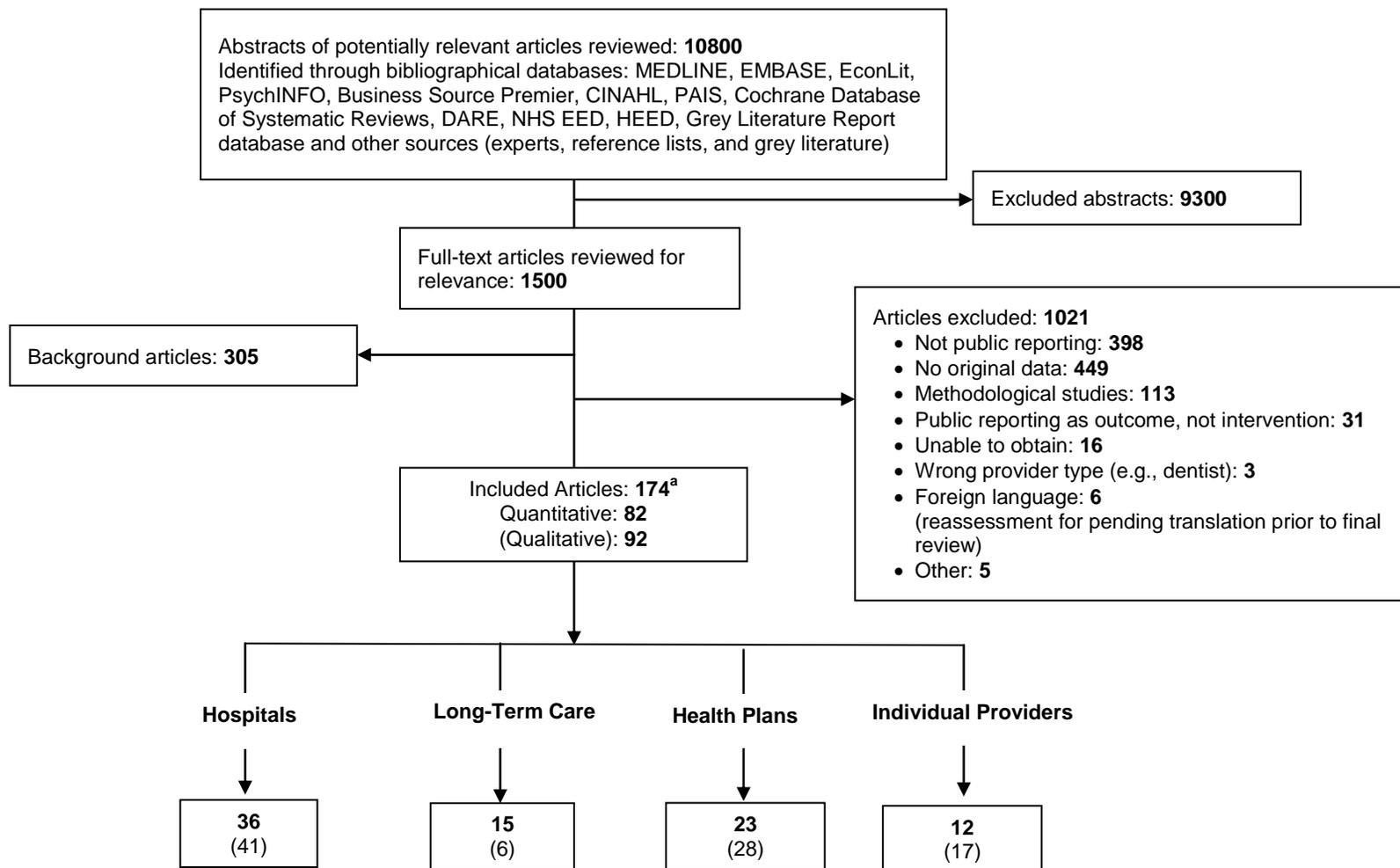
Organization

The results of this review are presented in this section. First the search results are summarized. This is done primarily through the study flow diagram, which shows how many articles were located and their disposition at each stage of the review. Next we provide an overview of the results by the key questions for the review. This is followed by detailed results by health care setting. The detailed analyses are divided by studies of public reporting concerning Hospitals, Individual Clinicians, Health Plans and Long-term Care Services. In these sections a brief introduction is followed by an overview of the findings for each setting. Then the identified studies are described. The results of quantitative studies are then discussed in detail and a table summarizing the study designs and results of these quantitative studies is provided at the end of the section. The results of qualitative studies are presented in a narrative and bulleted list by type of study and year. Evidence tables including all abstracted information for quantitative and qualitative studies are included in the appendices.

Search Results

A summary of the search results is presented in Figure 2. Database searches returned 12,116 articles. In addition, 13 articles were selected for review based on expert recommendations and checking reference lists. After identifying duplicates, a total of 10,800 articles remained for abstract and title review. Of these, at least one of four reviewers identified 1500 articles that were possibly relevant. Full-text articles were retrieved, and each was reviewed by two of three reviewers in order to determine inclusion for abstraction. Any discrepancies were resolved using a third reviewer and consensus. Ultimately, 174 articles were included for abstraction; 82 of which were quantitative articles and 92 were qualitative. Four articles reported separate outcomes for both individual providers and hospital settings. Therefore, they appear in both categories, but represent single articles.

Figure 2. Study flow diagram



^a Four quantitative studies address both individual providers and hospitals and therefore appear in both categories here. In addition, two articles reported the same results in one qualitative study addressing health plans.

Overview of Effectiveness of Public Reporting as a Quality Improvement Strategy

The following overview of the results is organized by Key Question and the discussion also seeks to identify cross cutting trends and implications. However this does not reflect how the analyses were done. Research studies of public reporting concern reports and the resulting changes in behavior and outcome for a specific setting. Our analyses follow the literature in this sense, but we also organized the detailed reporting of the results by setting because we believe that the inherent differences in the nature of the decisions (e.g., selecting a cardiac surgeon vs. selecting a nursing home) merit carefully consider and caution when attempt to judge effectiveness of public reporting by looking across the literature. It is possible that public reporting is more effective for some settings or decisions than others (e.g, more useful for picking a home health agency than a hospital) and that the impact of public reporting on patient outcome and provider behavior may also be different by setting.

Overall we found that both the number of studies and the results varied by key questions and outcome as well as by setting. This may be due in part to the evolution of public reporting and its spread across settings over time. But it may also be because public reporting as a quality improvement strategy is a better fit for some decisions than others. Whatever the reason for the differences, presenting the results both by key question as well as by setting allow consideration of the results using both frameworks. However, in each case the subdivision are included (e.g. results by key question is subdivided by setting and results by setting are subdivided by setting) as well and the primary category in order to underscore what is being combined and allow readers to judge if these combinations are appropriate.

Summary of Results by Key Question

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Patient outcomes were not always the outcome studied in research on the impact of public reporting. Mortality was often the focus in studies of hospitals and individual providers. Most of the studies find a decrease in mortality, though these results are not uniformly consistent and many questions about the appropriateness of the comparisons (both groups and risk adjustment methods) are an ongoing subject of debate. In studies of health plans and long term care, the outcomes studied are most often the quality measures for more specific outcomes such as pain, pressure ulcers, and satisfaction with care. In general these studies find that public reporting has a positive impact on the quality measures although some studies find that this varies across plans or subgroups of the patient population (e.g., short verse long stay nursing home residents).

Hospital Cardiac

- Mortality tended to improve (decrease) over time with public reporting about cardiac procedures (seven studies), although this finding was not consistent with other studies finding no difference (four studies).

Hospital Non - Cardiac

- Impact on mortality varied by reporting program.
 - Improvements in inpatient mortality identified in early studies of one regional public report (Cleveland, Ohio) were not found in later studies that examined trends or shifting of mortality to post discharge (three studies).
 - A long standing public reporting effort in Pennsylvania appeared to have reduced the odds of inpatient mortality for patients in Pennsylvania (two studies), where there was intensive public reporting effort when compared to patients in other states with limited public reporting (one study).
- Studies of changes in process measures (three studies) or patient experience (one study) found that public reporting leads to improvement in these measures.

Individual Clinicians

- Surgeon-specific mortality rates declined after rates were publicly reported (one study).

Health Plans

- Quality measures improved for almost all HEDIS and CAHPS domains studied after public reporting (5 studies).
- During the time period in which HEDIS measures were publicly reported by some plans but not others, plans that reported had higher-quality scores (two studies) even after controlling for differences in plans (one study).

Long-term Care

- Some quality measures (QMs), but not all, improved after public reporting.
 - Measures for short-stay residents of nursing homes showed improvement across studies more consistently than measures for long-stay residents.
 - For long-stay residents the measures that improved across multiple studies were physical restraints and pain while the rest of the measures had no improvement or mixed results.
- Public reporting for LTC is a national program which makes it challenging to design studies where the improvement can be attributed to the public report.
 - The one study that controlled for regression to the mean concluded that there was improvement above what could be explained by regression to the mean.
 - A few studies attempted to use prior periods and one attempted to construct a strong control group. However, many studies were “post only” designs that made it impossible to determine if the public report contributed to the change.

Key Question 2: What harms result from public reporting?

Harms are an important concern and they have been the subject of many commentaries letters to the editors writing by clinicians. In fact, the volume of speculation and discussion is greater than the volume of research. Of the studies that examine harms, more find no evidence of the harm than evidence of harm. Harms directly related to access (e.g. cream skimming, cherry picking or other actions by providers to change ratings by changing patient populations) have not been found in studies that examined this harm. However some studies have confirmed

increases in mortality and health care disparities, suggesting public reporting is not without negative effects.

Hospital Cardiac

- Six studies investigated harms: results of four suggest harms occur while two do not.
- One study found substantially higher hospital mortality rate for patients in New York compared with other states, suggesting a need for further investigation to either ally or address concerns.
- Differences in populations and time periods may explain conflicting conclusions about whether access to care is adversely affected by public reporting.

Hospital Non - Cardiac

- No evidence was found that public reporting leads to increases in inappropriate diagnosis or medication administration in order to improve ratings (one study).

Individual Clinicians

- Evidence about harms varied by the harm studied (three studies)
 - Public reporting appeared to increase disparities between Whites and Blacks or Hispanics in the receipt of CABG for nine years after public reporting began.
 - High-risk patients were more likely to have high-quality surgeons, which is counter to the hypothesis that public reporting might cause adverse selection.
 - Few physicians reported leaving practice due to the impact of the public reports.

Health Plans

- Two potential harms were examined in two of the included studies (crowding out quality in areas not measured and withdrawal of high-quality plans from the market). Neither study found evidence of harm.

Long-term care

- Two harms were examined (cream skimming and decline in quality of aspects of care not measured) and the studies concluded that overall the harms were not realized.
 - One study found some evidence that the number of patients admitted with pain declined among NHs that had low reported quality scores for pain and among for-profit and nonprofit NHs compared with government NHs, indicating some cream skimming.

Key Question 3: Does public reporting lead to change in health care delivery structures or processes

Providers, both individuals and organizations respond to public reports in some identified studies by making positive changes in their behavior. Studies found that hospitals were more likely to offer new services, policies were changed, surgeons with worse outcomes left surgical practice, and quality improvement activities increased. However, there is less research on this outcome and data are not available for all settings and for others it is based on a small number of studies.

Hospital Cardiac

- No studies were identified.

Hospital Non - Cardiac

- In surveys that were combined with outcomes analyses in evaluations of public reporting, hospital executives reported changing policies, offered new services, or increased quality improvement in response to public reports (two studies).

Individual Clinicians

- Surgeons who stopped performing CABG surgeries after surgeon-level data were made public were more likely to be poor performers (bottom quartile) (one study).

Health Plans

- No studies were identified.

Long-term care

- NH administrators reported in surveys that they were taking action in response to NH Compare.
 - Actions appeared to be motivated more by the administrators' belief that public reporting influences referral from professionals and the state survey process than by patient and family use of NH Compare in their selection of NHs.
 - Nursing homes that reported taking actions experienced improvements in quality measures.
 - Actions by nursing home administrators included investing more resources in clinical care.
- Improvement in one QM (influenza vaccination rates) improved after public reporting, but it increased even more among community dwelling elderly, supporting the idea that factors other than public reporting may be driving change.

Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

For this key question more than any other, there is more agreement across settings. Public reports seem to have little to no impact on selection of providers by patients and families or their representatives. When an effect was found it is for a subgroup (e.g., younger more educated patients) or for an indirect measure of selection such as market share, which may be influenced by other factors.

Hospital Cardiac

- Public reporting had no impact on hospital volume or market share (three studies).
- In studies where there was some impact on market share, the effect was small or did not persist over time (five studies).

Hospital Non-Cardiac

- Very small or non significant differences were found in market share in response to public reports (four studies).

- Public reports were more likely to affect the choices of younger and college educated patients (one study).

Individual Clinicians

- Results vary across studies (seven studies).
 - Three studies reported no effect of reporting on referral patterns, market share, or surgeon volume.
 - Three studies reported that market share or probability of selection increased for higher-quality providers after the data were publicly reported.
 - One study found that public reports led to decreases in volume for poor performing and unrated surgeons, but that there was no corresponding increase for high performing surgeons.

Health Plans

- Publicly reported or widely distributed quality information had little to no impact on selection of health plans by individuals.
 - Quality information had no effect on the choices made by employees of private firms (four studies)
 - In studies that used random assignment to distribute quality rating materials to some beneficiaries of public insurance programs and not others, the quality information had no impact on plan selection (three studies).
 - Other studies of choices of plans in public programs found limited effects such as reported ease in judging plans (one study) and greater impact of CAHPS compared with HEDIS measures of choice (two studies).
- Employers were more likely to offer employees health plans with higher HEDIS and CAHPS ratings (one study).

Long-term Care

- There was not enough evidence to make generalizations, as only one study looked at patient selection and it used a problematic outcome measure (occupancy rate) that may have limited variation and is likely to be caused by factors other than patient selection.

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Almost no quantitative studies examine whether report characteristics affect the impact of public reporting on any outcome. Two studies were identified for public reporting on individual clinicians, but none for other settings, making conclusions impossible.

Hospital Cardiac

- No studies were identified.

Hospital Non - Cardiac

- No studies were identified.

Individual Clinicians

- The mode (email vs. mail) and the tone of messages used to inform patients about the availability of physician performance data affected whether they accessed it or not.

- Publicly reported data was still accurate and therefore likely to be useful to patients even when there was a substantial delay between data collection and when it was made available to the public (one study).

Health Plans

- No studies were identified.

Long-term care

- No studies were identified.

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Some studies of contextual factors were found for all settings. Relatively consistent findings include that public reports have more of an impact in competitive markets and add that improvements are more likely in the subgroup of providers with lower scores in initial public reports.

Hospital Cardiac

- No studies were identified.

Hospital Non - Cardiac

- Limited evidence (two studies) suggested that hospitals that are not the only facility in a market or are in a competitive market are more likely to improve quality.
 - One of these studies also examined the financial position of the hospital and found that hospitals that were in worse financial situations were less likely to improve.

Individual Clinicians

- Employment status, likely a proxy for age, affected the likelihood that people would access comparative information about physicians (one study).
- The impact of public reports was affected by insurance coverage—when care was covered the public reports were more likely to influence selection (one study).

Health Plans

- Contextual factors were not frequently studied in research on health plans.
 - The only study of environmental characteristics found quality information was more likely to be used in plan choice in markets that included plans of varying quality.
 - Some variation in the importance of quality information to different subgroups of consumers was identified (two studies).
 - Plans that start with lower ratings were more likely to improve (two studies).

Long-term care

- Studies that examine the impact of two market characteristics, competition and occupancy rates (characteristics of the environment), found that publicly reported quality measures are more likely to improve in competitive markets and in markets with low occupancy rates (suggesting there are choices and providers much compete to fill beds).

- These finding supported the idea that public reporting provides information that influences market-based behavior.
- Ownership characteristics of NHs (e.g. for profit/nonprofit government, chain affiliation, hospital-based) did not have a consistent effect on the impact of public reporting.
- Nursing homes that started with lower publicly reported quality ratings were more likely to improve their ratings than those that started with higher scores, which is not surprising given the NHs with higher scores may not have had a problem to fix or there may a ceiling effort for the measure.

Effectiveness of Public Reporting by Health Care Setting

Hospitals

It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm.—Florence Nightingale

While Florence Nightingale likely deserves the credit for producing the first public reports on hospitals, modern public reporting started when the Health Care Financing Administration (HCFA, now Centers for Medicare and Medicaid Services [CMS]), released mortality statistics for United States hospitals 25 years ago. The HCFA report and other early efforts such as New York State Cardiac Surgery Reporting System (NYS CSRS) as well as the Cleveland Health Quality Choice (CHQC) program encountered resistance, and both the HCFA report and CHQC were short lived. However, these drove improvements in approaches to risk adjustment and established the foundation for many current public reports as well as larger transparency initiatives in health and hospital care.

Public reporting on hospitals has been the subject of prior systematic reviews. The most recent by Fung, et al.¹⁴ included more studies of hospitals²² than of health plans or individual providers. Our review is similar in that the largest group of studies concern hospitals.

We identified 36 quantitative studies and 41 qualitative studies that met our inclusion criteria and corresponded to our key questions. The quantitative studies are described and analyzed first. This is followed by a summary of the qualitative studies. Given the number of studies related to hospitals, this section differs from the others in that it is further subdivided into public reporting about cardiac care and non cardiac care. Information abstracted from the articles is included in the Evidence Tables in Appendix H and Appendix I.

Overview of Findings

Cardiac Public reports

Quality of Care (Key Question 1)

- Mortality tended to improve (decrease) over time with public reporting about cardiac procedures (seven studies), although this finding was not consistent with other studies finding no difference (four studies).

Harms (Key Question 2)

- Six studies investigated harms: results of four suggest harm while two do not.

- One study found substantially higher hospital mortality rate for patients in New York compared with other states, suggesting a need for further investigation to either ally or address concerns.
- Differences in populations and time periods may explain conflicting conclusions about whether access to care is adversely affected by public reporting.

Impact on Providers (Key Question 3)

- No studies were identified.

Impact on Patients or Purchasers (Key Question 4)

- Public reporting had no impact on hospital volume or market share (three studies).
- In studies where there was some impact on market share, the effect was small or did not persist over time (five studies).

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- No studies were identified.

Non Cardiac Public reports

Quality of Care (Key Question 1)

- Impact on mortality varied by reporting program.
 - Improvements in inpatient mortality identified in early studies of one regional public report (Cleveland, Ohio) were not found in later studies that examined trends or shifting of mortality to post discharge (three studies).
 - A long standing public reporting effort in Pennsylvania appeared to have reduced the odds of inpatient mortality for patients in Pennsylvania (two studies), where there was intensive public reporting effort when compared to patients in other states with limited public reporting (one study).
- Studies of changes in process measures (three studies) or patient experience (one study) found that public reporting leads to improvement in these measures.

Harms (Key Question 2)

- No evidence was found that public reporting leads to increases in inappropriate diagnosis or medication administration in order to improve ratings (one study).

Impact on Providers (Key Question 3)

- In surveys that were combined with outcomes analyses in evaluations of public reporting, hospital executives reported changing policies, offered new services, or increased quality improvement in response to public reports (two studies).

Impact on Patients or Purchasers (Key Question 4)

- Very small or nonsignificant differences were found in market share in response to public reports (four studies).

- Public reports were more likely to affect the choices of younger and college educated patients (one study).

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- Limited evidence (two studies) suggested that hospitals that are not the only facility in a market or are in a competitive market are more likely to improve quality.
 - One of these studies also examined the financial position of the hospital and found that hospitals that were in worse financial situations were less likely to improve.

Description of Quantitative Studies

The 36 studies of public reporting and hospitals were published between 1988 and 2011. Thirty-two were about hospitals in the United States, two were about Canadian hospitals,^{23, 24} and one was about hospitals in Northern England.²⁵ Over half these studies²⁶ were about public reporting related to outcomes of cardiac care in hospitals, predominately cardiac surgery. The other seventeen reported on 10 different hospital quality reporting initiatives concerning other specific services or general/overall hospital quality. The cardiac and noncardiac public reports are named in the intervention description below and the various public reports are described in Appendix E, Public Reports. In describing and summarizing the studies, the cardiac and noncardiac studies are addressed separately in this report for ease of comprehension and synthesis.

The *populations* in the included studies were most frequently hospitals as providers of health care services that were the subject of the public report. It was their response to public reporting that was expected to result in improved quality of care. An important related topic in the studies of hospital and public reporting is whether public reports create incentives for hospitals to change the type of patients they treat resulting in reduced access to appropriate services. Patients and their representatives were included indirectly as the population in some studies, as their selections from available hospitals were measured in terms of changes in volume or market share expected to occur when information about quality was made available through public reports. The measures and outcomes that correspond to these populations are discussed in more detail in the “outcomes” description.

In the cardiac studies, 10 of the studies evaluated public reports about hospitals in New York State²⁷⁻³⁶ and two evaluated New York State with Pennsylvania³⁷ or California³⁸ concurrently. One study evaluated hospital performance in Massachusetts, a state without public reporting at the time, by comparing it to New York State and Northern New England, regions that had public reporting about hospital cardiac care.³⁹ The six studies that did not involve New York State concerned hospitals in Pennsylvania,^{40, 41} California,⁴² Northern England,²⁵ and two studies about Ontario, Canada.^{23, 24}

The 17 studies of hospital quality reporting other than cardiac services included regional, State, and national public reports. Five studies assessed the impact of the CHQC program.⁴³⁻⁴⁷ Three studies were of hospitals in Wisconsin,^{9, 48, 49} one about Missouri hospitals⁵⁰ and two about Pennsylvania hospital reports.^{51, 52} The remaining six studies were of national public reporting initiatives in the United States.⁵³⁻⁵⁸

The public reporting *interventions* were dominated by public reports generated and distributed by State health departments. All of the previously mentioned 10 studies of hospital

cardiac care in New York State²⁷⁻³⁶ concerned the NYS CSRS of the New York State Department of Health. The NYS CSRS began reporting mortality rates for coronary artery bypass graft surgery (CABG) and later expanded to cover other cardiac interventions (see Appendix E). The studies that concurrently evaluated reports from other States examined Pennsylvania's State mandated report on cardiac surgery outcomes³⁷ that was later expanded to include outcomes for patients with acute myocardial infarction (AMI), and California's Hospital Outcomes Project (CHOP) that reported mortality for AMI and complication rates for cervical and lumbar discectomy.³⁸ A public report on CABG outcomes in California was published by the Office of Statewide Health Planning and Development and evaluated in one identified study.⁴² Pennsylvania also developed a CABG hospital report^{41,59} as did the Canadian Province of Ontario²³ which expanded its efforts to include process of care indicators for acute myocardial infarction (AMI) and congestive heart failure (CHF).²⁴ In England, public reporting by the National Health Service was preceded by reports produced by a commercial company (Dr. Foster), so a study of the impact of reporting prior to the National Health Service (NHS) program is based on this.²⁵ State involvement in public reports about other types of care that have been studied include a Missouri state report on hospital obstetrics,⁵⁰ a program of the Pennsylvania Health Care Cost Containment Council that began reporting AMI and CABG outcomes but quickly expanded to include multiple diagnoses and procedures.^{51,52}

The remaining studies involved public reports or public reports created by regional or national entities. Regional efforts included the CHQC reports which were part of a program of a voluntarily coalition of hospitals, physicians, and employers in Northern Ohio designed to promote selective contracting and quality improvement and were the most studied noncardiac reports.⁴³⁻⁴⁷ In Wisconsin the Hospital Association launched a website call CheckPoint that included several quality and safety measures⁴⁹ for hospitals in the State, while a report know as QualityCounts was produced by a large employer purchasing cooperative in Madison, Wisconsin.^{9,48}

National efforts comprised both the earliest and the most recent public reports. The HCFA created the first modern public report when it released hospital mortality data from 1986 through 1992. Dubbed the "death list", this report was the subject of two of the included studies.^{53,54} A long-standing program of registry-based reports on results of kidney transplantation dating from 1991 was revamped and starting in 2001 a university-based center with a US government contract released reports every six months via the internet.⁵⁵ One study⁵⁶ examined the impact of one of several measures of the national Hospital Quality Alliance (HQA), which included 98 percent of United States hospitals, and collected and publicly disseminated hospital performance measures. The two most recent studies of public reporting on hospitals assessed the impact of US government sponsored and directed efforts to make information public on patient experience thorough the hospital version of the Consumer Assessment of Healthcare Providers and Systems (HCAHPS) report⁵⁷ and the ongoing provision of process measure through Hospital Compare on a CMS website made possible by the HQA coalition.⁵⁸

The most common *comparator* in the studies of cardiac public reports is a time period prior to public reporting. Seven studies were interrupted time series^a,^{23,25,27,30,36,37} using multiple measures before and/or after the public report, while one study compared single pre and post test time periods.⁴² Several studies relied on data available only after public reporting was initiated including four "post only" time series^{31,33,38,41} and two single group post only studies.^{29,40}

^a For definitions of study design types used in this report, see Appendix D.

Comparison groups were less common; however one study compared patients from New York to patients from others state in a registry³⁵ and another compared all New York hospitals to eight hospitals in Michigan.³² Two studies compared multiple groups over time though their designs deviated from usual multiple group time series. One compared groups of patients treated at the Cleveland Clinic defined by place of residence in order to determine if the types of patients from New York changed after public reporting.²⁸ The other study compared trends in Massachusetts, a State without public reporting about cardiac services at the time, with trends in New York State and Northern New England after public reporting.³⁹ One randomized trial of public reporting for hospitals was conducted in Ontario, Canada and hospitals were assigned to receive publicly released data on their performance on AMI and CHF process measures either early or delayed (21 months later).²⁴

A time without public reporting was the most common comparator in the non cardiac hospital studies as well. Five studies were interrupted time series^{43, 44, 46, 54, 56} and two were times series post public reporting only.^{55, 58} Four studies analyzed pre and post reporting data for one group,^{49, 53, 57, 60} while two reported post public report information for one group.^{47, 51} Three studies (four out of the 17 articles) involved a comparison group: one comparison group interrupted time series tracked mortality over time and compared one area of Ohio to the rest of State⁴⁵ and another compared pre and post reporting outcomes for patients in Pennsylvania to patients in other States. In one study reported in two articles^{9, 48} a group of hospitals that voluntarily participated in public reporting were compared to the remainder of the hospitals in the State which were randomly assigned to receive either confidential feedback or no data.

The quality assessment of these studies was not based solely on study design, but was heavily weighted toward the consideration of the appropriateness of the comparison across groups and time periods and the ability of the study to address confounding. (For a description of the quality assessment criteria see Appendix F, for the ratings of studies see Appendix G). Fourteen studies were rated as good, 17 as fair, and four as poor.

The *outcomes* in the studies of hospital public reports about cardiac surgery and services have included mortality, volume or market share, and adverse selection or access. Mortality, usually in hospital though occasionally 30 day mortality, was the subject of many of the public reports and studies examining whether hospitals respond to the public reporting by changing practices that result in lower mortality (Key Question 1). This outcome was the focus in 11 of the 19 studies of cardiac public reports.^{25, 27, 30-33, 35, 36, 39, 42, 61} The next most frequent outcomes were changes in volume of discharges or market share, both intended to measure the impact of public reports on the selection or choice of hospitals. Volume or market share was the outcome in eight cardiac studies.^{27, 29, 31, 33, 34, 38, 40, 41} Six studies evaluated adverse selection and reductions in access which are frequently cited as possible harms associated with public reporting (Key Question 2). These studies examined whether hospitals changed their treatment patterns in order to improve their rating by not treating patients with higher risks of negative outcomes.^{25, 28, 30, 32, 35, 37}

Mortality was the most frequent outcome in the non cardiac hospital studies as well. In 12 of the 17 studies that examined the impact of hospital public reports on quality of care (Key Question 1), six focused on mortality^{43, 45, 46, 51, 52, 62} and two examined mortality as well as other outcomes.^{47, 48} Other studies reported on changes in obstetrics outcomes⁵⁰ or patient experience⁵⁷ or process of care measures.^{49, 58} Only one study addressed potential harms (Key Question 2) and in this case the outcomes were rates of pneumonia diagnosis and antibiotic administration. Provider behaviors were outcomes in two studies; in one it was changes in services offered by

hospitals⁶³ while in another the outcome was quality improvement activity.⁹ Four studies looked for public report impact on choice of hospital (Key Question 4) through occupancy rates,⁵³ volume of discharges,⁵⁴ or market share.^{46, 55} Two of these studies also analyzed whether outcomes varied by market characteristics^{50, 51} (Key Question 6).

Effectiveness by Outcome/Key Question: Detailed Analysis of Quantitative Studies

Cardiac Public Reports

The findings from 18 of the 19 studies of public reporting about hospital cardiac programs are presented in Table 2. The one study that does fit in the structure of the table is discussed separately under Key Question 1. The studies are listed in chronological order by year of publication and the results are presented in a reduced form to provide an overview. More details about the primary results can be found in the Hospital Summary Table (Table 3) at the end of this section, and in the full Evidence Table in Appendix H.

Table 2. Study findings: Hospital cardiac public reports

Author, Year	Report	Study Design	Outcomes		
			Mortality (KQ 1)	Volume - Market Share (KQ 4)	Access-Adverse Selection (KQ 2)
Hannan, 1994 ²⁷	NYS CSRS	Interrupted Time Series	↑	↔	NS
Hannan, 1994 ³⁶	NYS CSRS	Interrupted Time Series	↑	NS	NS
Foreman, 1995 ⁴⁰	PA HER & CABG	One Group Post only	NS	↔	NS
Omoigui, 1996 ²⁸	NYS CSRS	Multiple group time series	NS	NS	↓
Ghali ³⁹	MA with none, NYS CSRS and Northern NE	Comparison Group (s) Time Series Post Only	↔	NS	NS
Mukamel, 1998 ²⁹	NYS CSRS	One Group Post only	NS	↑	NS
Peterson, 1998 ³⁰	NYS CSRS	Interrupted Time Series	↑	NS	↑
Dranove, 2003 ³⁷	NYS CSRS and PA	Interrupted Time Series	NS	NS	↓
Cutler, 2004 ³¹	NYS CSRS	Time Series Post Only	↑	↑	NS
Romano, 2004 ³⁸	NYS CSRS and CA CHOP	Time Series Post Only	NS	↔ in CA ↑ in NY state limited time	NS
Moscussi, 2005 ³²	NYS CSRS	Comparison Group (s) Post Only	↔	NS	↓
Jha, 2006 ³³	NYS CSRS	Time Series Post Only	↑	↔	NS
Carey, 2006 ⁴²	CA CABG Report	One Group Pretest Posttest	↑	NS	NS
Guru, 2006 ²³	Ontario, CA Cardiac Reports	Interrupted Time Series	↔	NS	NS
Bridgewater, 2007 ²⁵	UK Reports: Commercial	Interrupted Time Series	↑	NS	↑

			Outcomes		
Author, Year	Report	Study Design	Mortality (KQ 1)	Volume - Market Share (KQ 4)	Access-Adverse Selection (KQ 2)
Dranove, 2008 ³⁴	NYS CSRS	Interrupted Time Series	NS	↑	NS
Apolito, 2008 ³⁵	NYS CSRS	Comparison Group (s) Post Only	↓ All pt. ↔ CABG and PCI	NS	↓
Wang, 2011 ⁴¹	PA CABG	Time Series Post only	NS	↔	NS

Abbreviations: CA, California; CABG, coronary artery bypass graft; CSRS, New York Cardiac Surgery Reporting System; KQ, key question; MA, Massachusetts; NY, New York State; PA, Pennsylvania; PCI, percutaneous coronary intervention; UK, United Kingdom.

(↑Improvement/Positive or Expected Impact; ↓Worse/Negative or Contrary to Expected Impact ; ↔No Change/No Difference; NS=Not Studied)

Key Question 1. Quality of Health Care

The one randomized study was not included in Table 2 as it examined outcomes not included in any other study. Tu, et al.²⁴ evaluated the impact of public reporting on composite indicators of quality of care for AMI and CHF that were derived from selected process of care indicators. The study found that improvement was not significantly different in the group randomly assigned to early release of data and the group assigned to public reporting after the collection of followup data. However, in exploratory analyses they found slight declines in 30-day mortality for subgroups of patients in the early reporting group that did not occur in the later reporting group.

The conclusion of this randomized study that public reporting has a limited, if any impact on health outcomes is echoed by the other quantitative studies of cardiac public reports. However, differences in comparisons, time periods, and populations make generalizations difficult.

Eleven identified studies analyzed the impact of public reporting on mortality. Seven of these reported declines in mortality (improvement), but in most this was small or limited to a subgroup: Hannan, et al. in two of the earliest studies^{27, 36} found that hospitals with higher mortality rates prior to reporting improved over the 3 years after reporting and Cutler³¹ also identified a trend toward improvement; Jha³³ found that hospitals that performed well at baseline when reports were issued tended to have high performance in future years; Peterson, et al.³⁰ found that mortality rates for Medicare patients in New York State were declining faster than the rest of the country; and Carey, et al.⁴² found a small decline for four cardiac procedures after reporting in California. Bridgewater²⁵ reported a substantial mortality decline for CABG in Northern England after public reporting.

Three studies found no change in mortality. These included an assessment that a similar mortality decline occurred in Massachusetts without public reporting as was reported in New York State and Northern New England where CABG mortality rates for hospital were reported, similar declines in Michigan hospitals (no reporting) compared to New York,³² while a study in Ontario, Canada found a significant drop in mortality after hospitals were given comparative information, but no further drop when the data was made public.²³

Apolito, et al.³⁵ compared patients from New York State with patients from the rest of the country that have acute myocardial infarction (AMI) complicated by cardiogenic shock included in a registry. The mortality rates for patient who received either CABG or percutaneous coronary intervention (PCI) were not significantly different, but overall mortality rates were higher,

suggesting patients may not be receiving these interventions in New York State, which is one of the harms that could result from public reporting.

Key Question 2. Harms

The mortality results in the study by Apolito, et al.³⁵ provided an example of the potential negative impact or harms that could result from public reporting. Six of the identified articles reported on studies that examined harms, and four of the six found evidence suggesting harms were occurring. The harms studied were all variations on the idea that public reporting will lead providers (hospitals and surgeons) to avoid high risk patients (adverse selection) and thereby reduce access to needed services. However, as in the studies of improvement in mortality, these studies were of different population subgroups and often involved comparisons that are not the most rigorous, limiting confidence in the results and making it difficult to draw conclusions across studies.

One study found that patients treated at the Cleveland Clinic, who were referred from New York State, were at higher risk and had a higher mortality rate than patients from New York State before public reporting as well as patients from other locations,²⁸ while a study of Medicare beneficiaries in New York State found that the number of CABG patients having surgery out of State declined.³⁰ This second study of Medicare beneficiaries³⁰ also looked at access to services and concluded that elderly New Yorkers were more rather than less likely to have surgery, and a study in England also found that high-risk patients were more likely to have surgery after public reporting.²⁵ These contradicted the findings of Moscucci,³² who found that New York patients were lower risk than Michigan patients despite similar rates of heart disease in the two States, and Dranove, et al.³⁷ who compared New York State and Pennsylvania patients before and after public reporting and identified declining illness severity after public reporting. The finding by Apolito, et al.³⁵ that New York State patients with myocardial infarction and cardiogenic shock were half as likely to have procedures and waited longer for surgery, but more importantly were 2.5 times more likely to die in the hospital than similar patients in other States, was the most alarming result, although it was tempered by the fact that this was a specific subgroup of patients and the number of patients studied was smaller (220 from New York, 325 from other States) than the other studies.

Key Question 3. Impact on Providers

We identified no studies that examined the impact of public reports on hospital cardiac services on provider behaviors.

Key Question 4. Impact on Patients or Purchasers

In eight studies of hospitals, the outcomes were market shares or volume of discharges as measures of the impact of public reporting on the selection of hospitals by patients or their representatives (e.g. referring physicians, health plans, employers, etc.). One of the primary theories underlying public reporting is the idea that given information about quality that was previously unavailable, consumers (patients) will chose higher quality providers. Therefore the expectation is that with public reporting hospitals with higher ratings will experience increases in market share, while those with lower rating should lose customers and see their market share decline.

The results of three studies support this hypothesis, while four found no difference, and one produced mixed results. The four studies that find no effect included an inquiry that found CABG volume across hospitals was stable during the early years of public reporting (1989-

1992).²⁷ Other studies also of CABG volume found no change in Pennsylvania following public reports^{41, 59} or in New York State.³³ One study with mixed results found no change in California for AMI while finding increases in CABG volume for low mortality hospitals one month after release of public reports and decreases in volume for high mortality hospitals after reports in New York State.³⁸

Even those studies that found public reports affected market share cautioned that the impact was limited. Mukamel, et al.²⁹ found that reports of increased mortality led to a decrease in market share for hospitals in New York State, but that all of this was accounted for by a decline in Upstate New York, while there was no effect in New York City. Other studies identified effects immediately after reporting but that did not persist over time in New York State³¹ or in California for CABG.³⁸ Analyses by Dranove and Sfekas found that public reports affected market share when they provided new information, but this was not symmetrical in that hospitals with lower than expected rankings experienced a significant decrease in demand but the market share of higher ranking hospitals did not change.³⁴

Hospital Public Reporting (Non Cardiac)

Seventeen studies were identified that evaluated public reporting about hospitals for either a wide range of services or for a specific non cardiac service. Like the cardiac public reports, most of these examined how public reporting influences quality of care (Key Question 1) with mortality the most common measure that was publicly reported and changes in mortality used to assess the impact of public reporting. Only one study in the group addressed harms and a small subset assessed the effect on providers or patients or the influence of context. These studies are listed and described below.

Key Question 1. Quality of Health Care

After the NYS CSRS, the most frequently studied hospital public report was part of the CHQC program from 1993 to 1998. Five articles reported the results of research on the impact of CHQC on quality of care and one looked at the impact on market share as well (discussed in Key Question 4). In the study published in 1997, Rosenthal, et al.⁶⁴ tracked mortality for eight diagnoses in thirty hospitals during the year prior to data collection, for one period in which the data was provided confidentially to the hospitals, and for two years after it was public. Risk adjusted in hospital mortality for all eight conditions combined declined from 7.5 percent to 6.5 percent but was not significant ($p=0.06$), while the separate analyses by condition found declines for CHF (7.1 percent to 5.6 percent) and pneumonia (11.1 percent to 9.9 percent) were significant. Later studies sought to better understand mortality trends in this region. Clough, et al.⁴⁵ compared the trends in the CHQC hospitals to those in the rest of Ohio and found the same trend of decline in mortality across the state, suggesting it was not result of this program. Baker, et al.⁴⁴ used Medicare data to examine mortality in the CHQC hospitals from 1991 and 1997 and determined that while in-hospital mortality declined, mortality in the days following admission increased. The net result was that mortality, in or outside the hospital but within 30 days of admission, did not significantly decline for three of six conditions, declined for CHF and COPD, and increased for stroke. In another study the same researchers used some of the same data but focused on individual market share and also reexamined trends in mortality.⁴⁶ In this analysis they found that only one hospital identified as an outlier (with higher than expected mortality) improved and had lower mortality consistently for the rest of the study period. One additional study of CHQC took a different approach and looked whether outcomes for disparate but all publicly reported outcomes (mortality, length of stay, caesarean and vaginal birth after cesarean

[VBAC] delivery rates) improved as a group indicating a systems approach rather than a selective approach to quality improvement⁴⁷. Their analyses suggested that hospitals that improve in one area tend to improve in others as well.

Another regional quality initiative with a public reporting component was the Alliance, an employer purchasing cooperative in Madison, Wisconsin that produced a report comparing 24 hospitals in the region. This report, QualityCounts, was evaluated by comparing the hospitals in the report to the remaining hospitals in the state. These other hospitals were randomly assigned to one group that confidentially received their data on the same indicators included in the report and another group that did not receive information on their performance^{48, 65}. An initial study reported on hospital attitudes toward the report and actions in response were based on a survey (see Key Question 3 for a summary of these results),⁹ while a later study compared performance across the three groups two years after the QualityCounts was distributed.⁴⁸ These analyses focused on two areas where there was variation in performance at baseline, obstetric and cardiac care, although the report covered several other domains. Comparisons of the number of hospitals that improved, as well as analyses that introduced more statistical controls, found a gradient across the groups with the public report group having the highest percentage of hospitals that improved, private reports in the middle, and the no report group having the fewest of hospitals that improved. This was significant for obstetrics and had the same trend in cardiac care though it was not significant.

Other identified studies of public reporting were evaluations of State or national efforts. State reports have been studied in Missouri, Wisconsin, and Pennsylvania. In 1993 the Missouri Department of Health issued a consumer guide to obstetrics services at hospitals in the State. Longo, et al.⁵⁰ evaluated the impact of this guide on clinical outcomes by estimating trends based on years prior to the report and comparing the actual post guide results to estimated value and found significant changes in ultrasound and cesarean rates but no significant change in VBAC rates.

The Wisconsin Hospital Association's public report, CheckPoint, was launched in March 2004 and a basic study of its influence cited high levels of compliance with recommended treatment measures at two points after it was made public.⁴⁹ Small amounts of improvement in care indicators for AMI, CHF, pneumonia, and error prevention occurred in the 2 years after reporting, but these differences were not subjected to any statistical tests or analyses.

Two studies published a decade apart considered the relationship of the Annual Hospital Effectiveness Report publicly disseminated in Pennsylvania with health care outcomes. In 1997 Evans, et al. published a study that found that Pennsylvania hospitals improved (decreased mortality and morbidity) but that this was achieved by not reducing length of stay at the rate common during this period, an action that could have financial implications.⁵¹ More than a decade later in 2008, Hollenbeck, et al. evaluated the same reporting system by matching patients in Pennsylvania with patients in other parts of the country characterized by intense or limited public reporting using propensity matching.⁵² Their analyses showed that patients in States or time periods with intense public reporting had significantly reduced odds of inpatient mortality compared with States or time periods with less public reporting. For example, for patients in Pennsylvania subject to intense public reporting in 2002 to 2003 compared with non Pennsylvania patients in States with limited reporting, the odds ratio for hospital mortality across six conditions ranged from 0.59 to 0.79 (all $p < 0.0001$).

The two most recent studies reported the results relative to hospitals of ongoing national initiatives in public reporting. Hospital Compare was one component of a CMS initiative to

disseminate information about the quality of health care services and promote quality improvement. Since 2005 CMS has made hospital performance rating and rankings available on a Web site. Werner and Bradlow⁵⁸ examined hospital performance in the 3 years following the initiation of Hospital Compare and found significant improvements ($p < 0.0001$) in individual and composite measures for AMI, heart failure, and pneumonia. They also demonstrated that improvement in these measures of process of care were associated with improvements in outcomes for AMI such as declines in mortality rates, length of stay, and readmission. Changes in outcomes for pneumonia and heart failure were smaller or not significant.

As a complement to clinical indicators and outcomes, CAHPS is an AHRQ project that has developed surveys and measures of patient experience that could be publicly reported. The first survey was developed for health plans, but a hospital version was developed (HCAHPS) and public reporting of results began in March 2008. Elliot, et al.⁵⁷ examined the HCAHPS data from March 2008 and March 2009 and found small, consistent, though not statistically significant improvements in eight of nine domains. The only domain with no improvement was doctor communication, while the largest improvement was in responsiveness of hospital staff (59.9 percent to 60.8 percent giving the most positive responses).

Key Question 2. Harms

The one study that addressed potential harms was designed to test concerns that publicly reporting a specific process measure, percentage of patients with pneumonia receiving antibiotics within 4 hours of arrival, would encourage premature diagnoses of pneumonia, overuse of antibiotics, and inappropriate prioritization of patients with respiratory symptoms in emergency departments (EDs). Analyses of data from a nationally representative sample of ED visits for 2001 through 2005 found no evidence of increase in any of these adverse outcomes after public reporting of the measure began in January 2004.⁵⁶

Key Question 3. Impact on Providers

In an evaluation of the 1993 Missouri Department of Health consumer guide for obstetrics services in addition to an examination of trends in outcomes, Longo, et al.⁵⁰ surveyed hospitals about their services and policies and any changes they made in response to the guide. They found that 39 percent of hospitals that did not have obstetrician-related services had added them or were planning to add them and that hospitals varied in whether they reported changing policies in response to the report (from a high of 34 percent reporting changes related to cesarean delivery to 8 percent considering changes in policy related to ultrasound use).

The evaluation of the QualityCounts public report on hospital performance included a survey of hospital executives in the three study groups (public report, confidential report, and no report).⁹ Respondents were asked about quality improvement activities, and responses about priorities and strategies did not differ across the groups. However, the public report hospitals reported more quality improvement activities related to the measure in the QualityCounts report than the confidential or no report hospitals.

Key Question 4. Impact on Patients or Purchasers

The two studies of the first modern public report, the HCFA hospital mortality report, both analyzed the impact of this data on choice of hospital and found no evidence of the intended effect. In 1988 Vladeck, et al.⁵³ reported the earliest results identified in this systematic review. Their research examined trends in occupancy rates for five quarters before and three quarters after the HCFA report release and compared hospitals in New York City identified as having

higher than expected death rates to those with lower than expected death rates, and found no significant differences. Almost a decade later in 1997, a study analyzed number of hospital discharges for a 9-year period that included years prior to the HCFA report release and all the years in which the report was made public.⁵⁴ These researchers did find that hospitals experienced a very small decline in discharges after being cited as a higher mortality hospital. Their estimate of the size of the effect is that a hospital with double the expected mortality would have 46 fewer discharges a year as a result of the public release of the mortality information.

One of the five studies about CHQC (the other four are described in Key Question 1 as they focus on mortality) examined discharges for six medical conditions as an indication of market share. The five worst hospitals (highest mortality) tended to lose market share but this was not significant and there was no relationship between when a hospital was identified as an outlier and subsequent market share.⁴⁶

A study of public reporting of patient outcomes for kidney transplants including patient and graft survival sought to determine if five reports issued over a 2-year period influenced patient choices of hospitals for their transplants.⁵⁵ The study included patients receiving living and deceased donor kidneys. The authors report that most major cities now have at least two transplant centers and patients chose after diagnosis in consultation with their nephrologist, although the choice may be constrained by insurers. Analyses of hospital choice as a function of outcome reports found no effect overall but some effect among younger patients (18 to 40) and patients with college degrees.

Key Question 6. Context

Two studies considered characteristics of the hospital's market in addition to other outcomes. Longo, et al.⁵⁰ in their study of the impact of an obstetrics public report in Missouri found that hospitals in communities with multiple facilities were more likely to change their policies related to measures included in the report than hospitals that were the single facility in a community. In a study of Pennsylvania hospital response to the Annual Hospital Effectiveness Report, Evans, et al.⁵¹ found that improvements in mortality were more likely in hospitals in competitive markets and less likely in hospitals reporting they were in worse financial condition.

Qualitative Studies

Description of Qualitative Studies

We identified 41 qualitative studies and lab-type experiments that focused on public reporting about hospitals and corresponded to at least one of this review's key questions. The studies were published between 1989 and 2010. Seventeen were conducted in countries other than the United States including five in Canada,⁶⁶⁻⁷⁰ four in England,⁷¹⁻⁷⁴ two in The Netherlands,^{75, 76} two in South Korea,^{77, 78} and one each in Scotland,⁷⁹ Germany,⁸⁰ France,⁸¹ and Iran.⁸²

Most of these studies were surveys or interviews (30 of 40). Twenty-one were surveys including 10 surveys of medical care providers and administrators (hereafter "professionals"),^{69, 70, 83-90} 10 surveys of patients/consumers,^{76-78, 81, 91-96} and one study that combined surveys of professionals and patients.⁸² Ten studies were based on interviews. One used patient interviews,⁹⁷ one interviewed patients and professionals,⁸⁰ and eight interviewed professionals.^{68, 72, 74, 98-102}

Four studies reported the content of focus group discussions, including three with patients^{71, 73, 103} and one with professionals.⁶⁶ Three studies combined focus group methods and interviews,

two of which were with patients^{67, 75} and one included both patients and professionals. Two studies were lab-type experiments in which participants were asked to evaluate materials, take tests, or complete decision exercises, and one study involved a series of case studies based on interviews and observations.¹⁰⁰

Summary of Qualitative Studies

Qualitative studies tend to focus on certain topics across different time periods and populations. These are: a) awareness, attitudes, and self-reported intention to use reports in the future; b) importance or relevance of specific topics or measures to people using the public report; c) reactions to format including comprehension; and c) the decision process used to evaluate and ultimately select hospitals. It might be expected that these would change over time as public reporting became more common and evolved. Given the relatively large number of interview and survey studies the descriptions of these studies are arranged by year of publication (included in parentheses below) both to impose an organizational framework and to allow an assessment of whether attitudes and use are changing as public reporting is no longer a new phenomenon.

Interviews and Surveys

Professionals. Ten of the 19 survey and interview studies of professionals assessed their awareness of or attitudes toward actual or planned public reports. These studies did not directly examine action by providers (Key Question 3), but as awareness and acceptance of reports is a precursor to action, we briefly summarize these studies here.

- A survey of executives selected to represent hospitals with different levels of mortality in the HCFA mortality report found the report was viewed very negatively regardless of the hospital's rating and that there was significant resistance to public reporting (1990).⁸⁹
- Cardiac surgeons and cardiologists were aware of the Pennsylvania cardiac report. Sixty-three percent of surgeons said they were less willing to operate and 59 percent of cardiologists said it was somewhat more difficult to find a surgeon for their patients due to the report (1996).⁸⁸
- A survey of New York State cardiologists during the initial years of the NYS CSRS found that 93 percent had reservations about the accuracy of the data and 62 percent said it had not affected their choices at all when referring patients for surgery (1997).⁸⁶
- Thirty-nine hospital administrators were surveyed and three quarters reported finding some aspect of the CHOP public report useful and most stated that they disseminated it in their hospital [exact percentages not reported] (1998).¹⁰¹
- New York State and California hospital administrators reported distributing State public reports and preferring those to the HCFA reports. Administrators at hospitals rated as "high mortality" in any public report remained critical of the public reports (1999).⁸⁵
- In response to a survey, Canadian cardiac surgeons endorsed the idea of publicly reporting mortality but also said they did not believe it influenced patients and reported no instances of patients asking about the rankings (2003).⁶⁹
- Thirty-five percent of stroke and cardiac care managers surveyed in Ontario, Canada were not aware of the existing public report (2003).⁷⁰

- Interviews with professional stakeholders in Canada about cardiac public reports found that public reporting was supported in principle but there was concern about the accuracy and the public's ability understand the data (2004).⁶⁸
- Administrators (n=61) at six sites in England answered they did not feel the "star ratings" were relevant and although they provided a basis for benchmarking local performance they were more concerned about dysfunctional responses such exclusive focus on what is measured and pressure to make targets (2005).⁷⁴
- Guru, et al. surveyed cardiac surgeons in Ontario, Canada and compared their results to previously published surveys of cardiologists and cardiac surgeons in Pennsylvania. The Ontario results were generally favorable: 51 percent supported hospital reporting, 26 percent supported surgeon-specific reporting; 84 percent believed it affected referrals, and 80 percent believed it affected patient choice. In contrast, the Pennsylvania results were negative (e.g. only 13 percent believed the public report affected referrals) (2009).¹⁰⁴

The nine remaining studies focused on whether the information in public reports was used to inform practice and quality improvement. These studies correspond to Key Question 3 in that they assess changes in practice by hospitals as organizations that provide health care services in response to public reporting.

- Seventeen public hospitals in California reported minimal use of the HCFA and CHOP report in a study published in 1996 (1996).⁸⁷
- Survey responses of hospitals in Pennsylvania and New Jersey (a State without public reporting) were compared and hospitals in Pennsylvania reported using performance information more frequently but the differences were not consistent across questions and public reporting was not well-defined (1998).⁹⁰
- Interviews and observations were used for case studies that characterized the responses of four hospitals to CHQC. All created interdisciplinary work groups to review practice and develop practice change in response to the public report (1998).¹⁰⁰
- Chassin, et al. found in interviews with key administrators and physicians at four hospitals identified as outliers (high mortality) that these hospitals took targeted actions and created QI programs to address the underlying issues (2002).⁸⁴
- Two similar studies conducted in the same program but at different time reported somewhat different results.
Interviews reported by Methrota, et al. with hospital executives and public report producers in 11 US communities concluded most public reports were not successful in that they did not prompt or increase QI (2003).⁹⁹
Three years later, Pham, et al. published the results of 111 interviews of hospital and association executives as well as public report producers in 12 United States cities in the same program and found: 1) hospitals participated in multiple reporting programs, and 2) although they did not believe these influenced patient choice, they believed they had led to improved quality by making physicians more open to performance measurement (2006).¹⁰²
- Interviews with hospital administrators in Rhode Island revealed that QI initiatives were started in response to a statewide public report (no interviews with hospitals not subject

to public reporting) in areas that both directly corresponded to reported measure as well as in other areas of clinical care and customer service (2006).⁹⁸

- The majority of 800 hospital executives surveyed in the United States answered that public reports lead to incorporation of QI in strategic planning (93.6 percent) and attention to quality by more staff (96.5 percent) (2007).⁸³
- Interviews with 24 National Health Service employees in England responsible for patient surveys at hospitals found that the survey results were generally well-received but were not informative for QI because they reported on the whole hospital and not on smaller units where changes could be implemented (2008).⁷²

Patients. One interview study and 10 surveys collected similar information on awareness of public reports and their impact on the decisions of patients or their representatives.

- A survey of 186 military health plan members and 200 non military respondents in New York State reported they would use government mortality data to judge hospital quality (yes: 67 percent military; 59 percent non military), but a smaller percent responded that they were very likely to use this information in selecting a hospital for surgery (34 percent and 30 percent) when asked this in a separate question (1989).⁹⁴
- A survey of patients who had CABG surgery in the previous year (n=474) revealed that only 20 percent were aware of the Pennsylvania Consumers Guide at the time of their surgery and only 4 percent had seen the report. Twenty-eight percent were not interested in the report and the major reason was that distance was an important factor in choice (1998).⁹³
- Outpatients at University of Missouri Medical Center (n=935) were provided a hospital public report and completed a questionnaire indicating that most people found it an effective way to compare providers (59.9 percent), but very few were likely to change providers based on the information (2003).⁹¹
- Randomly selected Medicare beneficiaries who had selected surgical procedures (n=510; 68 percent response rate) reported that decisions about where to have the surgery were largely influenced by doctors and family and only a few (11 percent) attempted to find comparative hospital information before their surgery. Forty-seven percent said they would use a list of best hospitals if this type of information was available in the future (2005).⁹⁶
- Masor, et al. showed 59 people a public report on health care acquired infection rates for hospitals and in interviews discovered that most people were not aware the hospital acquired infections (HAIs) existed. While the respondents were distressed to learn about them, they were unlikely to choose a hospital based on this alone (2009).¹⁰⁵
- Based on responses to a mail survey (n=201; 25 percent return rate), Masor, et al. evaluated formats for a public report on HAIs and found reports were generally easy to understand with the exception of the section that explained risk adjustment and confidence intervals; however HAI rate was not cited as likely to influence choice of hospital (2009).⁹⁵
- Researchers surveyed a total 381 people including inpatients, recently discharged patients, and visitors to a hospital in France about their knowledge about infection control and whether a report like the French mandatory report on infection control activity would influence hospital choice. Seventy-seven percent stated they were

interested in the report and it was ranked as the 6th most important reason to choose a hospital, but most people would seek advice about admission from their physician rather than refuse admission based on this report (2009).⁸¹

- Women in South Korea aged 20 to 49 were surveyed by phone (n=505; 57.3 percent completed of 882 eligible after random sampling) to determine if they were aware of the public reporting of cesarean section rates for Korean hospitals. Two-hundred twenty eight reported being aware of the report, and younger women and those with higher levels of education were more likely to know about the report (2008).⁷⁸
- Over 50 percent of outpatients surveyed at four general hospitals in South Korea (n=385) said they would use the hospital performance information from the National Health Evaluation Program but the average respondent rating of understanding the indicators was 3.15 (3=fair) (2009).⁷⁷
- Patients who had one of six selected procedures at three hospitals in The Netherlands were asked how they chose the hospital and what information they would use to choose if they needed similar care in the future. Hospital reputation was the primary reason for the past choice and previous experience was the most cited source of information for future choices, (25.3 percent) while quality information was rarely cited as important (2008).⁷⁶
- A survey of 104 patients or family members and 104 physicians in Iran verified that few people (7.7 percent of patients and 11.7 percent of physicians) were aware of the grading system and public report that exists for Iranian hospitals, that patients relied on suggestions from relatives, and that physicians considered their patient's economic situation first when referring patients (2010).⁸²
- Patients and physicians in Germany were asked to rank indicators currently included in a nationally mandated public report on hospitals as well and measures common in other hospital reports. The two groups agreed on the top 10, though the exact order differed. Both groups rated several indicators that reported on hospital structural characteristics such as ownership as unimportant to their decisions, which suggests they could be dropped in order to shorten the report (2007).⁸⁰

One study examined the use of hospital public reports by health plans for contracting decisions. It is included here as health plans are acting as representatives of patients in selecting the plans they offer.

- Health plan executives were surveyed and asked to rate the importance of factors that impact their contracting with hospitals. The top three factors were accreditation, location, and price while the average rating of the quality of care indicators ranged from 3.03 to 3.67 (where 5 is very important). Thirty-three percent reported conducting their own studies of comparative hospital quality (2003).⁹²

Focus Groups

Seven studies reported feedback obtained through either focus groups or a combination of focus groups and interviews. Two of these involved physicians and administrators while five focused on former or prospective patients.

Focus groups and interviews with hospital administrators, physicians, and health councils in Scotland found that public reporting of clinical indicators had raised awareness of issues but that reports were not disseminated within hospitals; while over three-quarters of physicians knew

about the reports, they could not recall seeing the most recent report and relied on other sources to assess hospitals; and health councils had received no inquiries about the hospital reports.⁷⁹ Another focus group study exclusively involved physicians and had them rate a long list of indicators for AMI (47 indicators) and CHF (34 indicators)⁶⁶. More than half of the indicators were considered acceptable for public dissemination, and of the rest all but three were rated as reasonable but requiring caution in interpretation. The three were considered unacceptable because they differed too much based on the needs of patients.

Focus groups of the general public were usually with people who had been in the hospital. Cardiac patients (n=91) in seven Canadian cities participated in focus group discussions about hospital public reports on cardiac procedures.⁶⁷ Participants agreed with the idea of public reporting but wanted reports that emphasized patient experience by including feedback from other cardiac patients, patient involvement in care, and communication as well as waiting times. Moser, et al. used two focus groups and interviews to ask 18 people in The Netherlands who had had total knee or hip replacement within five years what information they would use to choose a hospital if they needed a similar procedure in the future. A hospital public report was viewed as supplementary information that increased awareness of quality but that had to be interpreted in the context of personal, prior experience. The public report was viewed as too general and did not contain enough information that the participants considered important for it to play a larger role in the choice of a hospital. Six focus groups of people with recent inpatient experience in England were conducted by Magee, et al. just before the public release of National Health Services quality information.⁷³ One group was composed of family caregivers and another of ethnic minorities; however all the groups expressed suspicion of government ratings, did not like the idea of shopping around for health care, and preferred the format of a commercially produced report that had been publicly available. Sofaer, et al. used 16 focus groups that included people with similar health care coverage and hospital experience in the same group. In these groups first a general discussion of personal experience and then a review of a CAHPS report were used to identify important domains. Communication, responsiveness (e.g. responding to call buttons), and cleanliness were important to all participants regardless of background and the authors reported that participants viewed hospitals as responsible for the quality of services, in contrast with the author's prior experience with health plans, which were not held accountable.

One focus group study took advantage of this method to explore the decisionmaking process. Falso, et al. conducted seven focus groups with 44 people in England. An open discussion of how a hospital would be selected for future care was followed by an exercise that involved sorting 16 indicators in order of importance and selecting the top three, and then selecting a hospital from among three on a mock public report. Each of these steps involved individual rankings followed by group discussion. They found that preferences for different indicators were influenced by new information and discussion, suggesting that values are not set.

Lab-type Experiments

The two articles about lab-type experiments both examined the interrelationships among end-user skills, motivation, comprehension, and choice based on tests and questionnaires completed by the same 303 working age (18-64) adults.^{106, 107} The participants were randomly assigned to receive different versions of actual and reformatted public reports and were asked comprehension questions and decision exercises, as well as measures of health literacy, numeracy, and patient activation, which was defined as taking an active role in managing one's own health and health care. The analysis presented in Peters, et al.¹⁰⁷ concluded that formatting that reduces cognitive burden (ordered information, higher always better, and separation of types

of information) increased the likelihood of choosing the higher-quality hospital and improved comprehension for people with lower levels of numeracy. Hibbard, et al.¹⁰⁶ controlled for the variation in formatting, evaluated the impact of skills and activation on choices, and found that higher levels of activation had improved comprehension even with lower skill (numeracy and health literacy) levels, and higher activation increased willingness to trade other hospital characteristics for higher quality.

Table 3. Summary of evidence: Public reporting on hospitals

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Apolito 2008 ³⁵ (Good)	NYS CSRS	Compares management of patients with AMI complicated by cardiogenic shock using rates of cardiac catheterization and revascularization and in-hospital mortality in 11 NY state centers, where public reporting is present, to 12 non-NY state centers where there is no public reporting to investigate potential negative influences of NYS CSRS. N=545 eligible patients in SHOCK registry (N=220 NY state; N=325 Non-NY state)	1	↓ NY state patients were more likely to die while in the hospital compared to propensity matched non-NY state patients. Among patients who were not revascularized (no PCI or CABG), NY state patients were 2.12 times more likely to die in hospital (p=.01), ↔ but among those undergoing PCI/CABG, there was not a statistically significant relationship.
			2	↓ NY state patients were approximately half as likely as Non-NY state patients to undergo 3 of 4 cardiac procedures (angiography, PCI, or PCI and CABG). Odds ratios for CABG surgery alone were not statistically significant for NY state compared to non-NY state patients.
Baker 2002 ⁴⁴ (Fair)	Cleveland Health Quality Choice (CHQC)	Examines temporal RAMR trends using in-hospital, 30-day, and early, post-discharge mortality in Medicare patients between 1991 and 1997 in Northeastern Ohio hospitals for six medical conditions (AMI, CHF, gastrointestinal hemorrhage, COPD, pneumonia, and stroke)	1	↔ Overall: in hospital mortality declined, but early post discharge increased, resulting little impact on 30 mortality For six selected conditions In hospital mortality ↑4 of 6 decline in mortality Early Post Discharge ↓5 of 6 increase in mortality 30-day Mortality ↑ 2 of 6 decline in mortality CHF and COPD ↔ 3 of 6 no difference ↓1 of 6 increase in mortality for stroke
Baker 2003 ⁴⁶ (Fair)	Cleveland Health Quality Choice (CHQC)	Examines whether nonfederal hospitals in Cleveland area participating in CHQC that were identified as mortality outliers were more likely to gain or lose market share between July 1991 and December 1997	1	↔ Risk adjusted mortality did not significantly decline after reports for average or below average hospital. Only effect was one hospital had significant improvement after publication.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
		compared to those with average mortality. Also examines whether hospitals with higher-than-expected mortality rates improved 30-day mortality more than hospitals with average mortality rates. N=30 Hospitals; N=17 Outliers	4	↔ Market share did not significantly change for hospitals designated as outliers in terms of mortality.
Bridgewater 2007 (Good) ²⁵	Multiple Reports on named Surgeon and Hospital outcomes in UK	Examines changes in in-hospital mortality in Northwest England associated with coronary artery surgery and the number of very high risk patients undergoing coronary artery surgery in years before (April 1997-March 2001) and after publication (April 2001-March 2005) of cardiac surgery mortality data. N=25,730 patients	1	↑ Ratio of observed to expected mortality associated with coronary artery surgery decreased from 0.80 to 0.51 after public reporting.
			2	↑ Contrary adverse selection, the number of high risk patients that underwent surgery increased after public reporting (14.1% vs. 16.8%) p<0.001.
Carey 2006 ⁴² (Fair)	California Coronary Artery Bypass Graft Mortality Reporting Program	Assesses the impact of public reporting on changes in the incidence of PCI and CABG procedures and rates of in-hospital and 30-day mortality and readmission for repeat procedures in CA before and after public reporting. N=115 hospitals in both periods; Overall N~120 (6 stopped and 7 started performing at some point during study period)	1	↑ Observed to Expected mortality ratio declined after public reporting in all 4 procedures under (CABG, PCI, CABG+, Valve), but the effect was small (e.g. CABG mortality ORs were 1.17 pre vs. 0.97 post)--no test of significance

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Caron 2004 (Fair) ⁴⁷	Cleveland Health Quality Choice (CHQC)	Assesses whether hospitals in the Greater Cleveland area that improved over time in one clinical area also improved in other areas across a 5 year time span. Uses nonobstetric (AMI, CHF, and stroke LOS and mortality rates) and obstetric outcomes (total cesarean, primary cesarean, and vaginal birth after cesarean rates). N=27 hospitals for non obstetrics; N=20 hospitals for obstetrics.	1	<p>↑ 9 outcomes all improved over the 5 year period (Mortality and LOS for AMI, CHF, Stroke, and caesarean, VBAC and total caesarean)</p> <p>↑ Correlation suggest hospitals that improve in one area improve in others.</p>
Clough 2002 ⁴⁵ (Fair)	CHQC	Compares in-patient mortality rates from 1992-1995 in Cleveland area hospitals to hospitals in the rest of Ohio to determine whether the CHQC had an effect on inpatient mortality in Cleveland. N=30 hospitals in Cleveland	1	↔ after adjustments for differences in case mix, the rate of mortality decline in Cleveland (with reporting) did not differ from the rest of Ohio.
Cutler 2004 ³¹ (Fair)	NYS CSRS	Examines CABG surgery cases and RAMR in NY state hospitals between 1991 and 1999 to determine whether the NYS CSRS affected where patients went for bypass surgery and whether it led to improvements in medical quality in hospitals identified as high or low mortality outliers.	1	<p>↑ RAMRs at high-mortality hospitals dropped ~1.3% over 36 months. RAMRs at low-mortality hospitals rose slightly over 36 months.</p>
			4	<p>↑ In first year of being recognized as an outlier, high-mortality hospitals experienced reductions in CABG cases while in low-mortality hospitals CABG cases increased. After 12 months, growth and decline in CABG cases was not significant.</p>

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Dranove 2003 ³⁷ (Good)	NYS CSRS and PA CABG Guide	Analyzes patients in PA and NY state undergoing AMI and CABG procedures before and after the public release of information (1991 in NY state; 1993 in PA) to examine effects of public reporting in NY state and PA. Between 1987-94: N=1,770,452 AMI patients; N=967,882 CABG patients	2	<p>↓ Public reports led to selection by providers: Patients in receiving CABG in states with reports had declining illness severity</p> <p>↓ Public reports increased sorting of patients with more seriously ill patients going to teaching hospitals</p> <p>These two results could explain increase in wait time as selection and sorting take time</p> <p>Increase in costs and adverse health outcomes in states with public reports.</p>
Dranove 2008 ³⁴ (Good)	NYS CSRS	Assesses the effectiveness of the “news” that public reports provides to the market by analyzing hospital demand in 18 hospitals in the NYC metro area before (1989) and after public reporting (1990, 1991). N=23854 CABG patients from 1989-1991	4	<p>↑ Public reports have an effect on patient choice of hospital when they provide information that differs from prior beliefs, but this is not symmetrical</p> <p>↑ Hospitals with lower than expected rankings experience a statistically significant decrease in demand</p> <p>↔ higher ranking hospitals: public reports have no significant effect on market share</p>
Elliott 2010 ⁵⁷ (Good)	HCAHPS	Compares changes in patients' experiences with inpatient care at American hospitals since public reporting of HCAHPS. Analyzes hospital scores based on when they began participating in public reporting (original vs newcomers) and how many beds they have (<100 beds vs. >100 beds). Also looks at change in hospitals that reported in both 2008 and 2009. N changes depending on group and year. Overall N=3863 Hospitals	1	<p>↔ Marginal increase between 2008 and 2009 in % of positive responses on survey in 8 of 9 categories. None had decreases but all increases were .9% or less. Change in doctor communication was not significant.</p> <p>↑ Newcomers to public reporting outperformed hospitals originally participating in HCHAPS in 7 of 9 categories. 2 categories were not significant. More newcomers were smaller hospitals and smaller hospitals tend to perform better on CAHPS</p>
Evans 1997 ⁵¹	PHC4: HER	Examines responses of PA hospitals between 1990 and	1	<p>↑ Mortality and Morbidity both had statistically significant declines after reporting in trend analyses that controlled for regression to the mean.</p>

Author Year (QA)	Public Report	Study Overview	Key Question	Results
(Fair)		1992 to PHC4's HER by analyzing changes in mortality, morbidity, length of stay, and charges. N=134 hospitals	6	<p>↑Hospitals that performed poorly at base line improved in mortality</p> <p>↔ Hospitals that performed poorly at base line had no improvement in morbidity</p> <p>↑Hospitals in competitive markets had more improvement in mortality</p> <p>↔ Financial position and competition had no impact on morbidity</p> <p>↓Hospitals in lower financial position had lower levels of improvement in mortality</p>
Foreman 1995 ⁵⁹ (Poor)	Hospital Effective-ness Report (HER) Consumer Guide to Coronary Artery Bypass Graft Surgery (CABG Guide)	Uses two of PHC4's public reports (HER and CABG Consumer Guide) to examine whether PA hospitals that received high or low quality ratings in the first year of fully released data (1989 or 1990) experienced subsequent changes in patient admissions. N=156 Hospitals	4	↔ Identification of high and low quality hospitals in PA public reports did not lead to any significant change in patient growth in any of the 9 regions studied.
Friedberg 2009 ⁵⁶ (Good)	One of 10 Hospital-level performance measures reported by the Hospital Quality Alliance	Examines whether public reporting is associated with over-diagnosis of pneumonia, excessive antibiotic use, or inappropriate prioritization of patients with respiratory symptoms visiting EDs in the US before and after public reporting (Jan 2004).	2	↔ No evidence that public reporting increased anti-biotic use or inappropriate ED diagnosis. Waiting times for patients with and without respiratory symptoms increased slightly after public reporting, but expected overprioritization of patients with respiratory symptoms not evident.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Ghali, 1997 ³⁹ (Fair)	NYS CSRS and Northern New England	Compares CABG surgery mortality trends during 1990, 1992 and 1994 in Massachusetts where there is no public reporting to the decreases in mortality in NY state and northern New England where there is public reporting and outcomes feedback programs, respectively. N=12 hospitals Massachusetts Isolated CABG Procedures: 1990 N=5395; 1992 N=5,818; 1994 N=5,915	1	↔ Adjusted mortality rates for CABG cases in Massachusetts where there is no public reporting fell from 1990-1994 ↔ Massachusetts experienced similar reductions in the percent of in-hospital mortality as northern New England where an outcomes feedback program was in place. ↑ New York, where public reporting was present, had slightly larger reductions in unadjusted in-hospital mortality than Massachusetts.
Guru 2006 ²³ (Fair)	Ontario Cardiac Reports	Evaluates differences in 30-day mortality rates for patients undergoing isolated CABG surgery at Ontario hospitals during a transition from no reporting to confidential reporting to public reporting of CABG surgery outcomes (Sept 1991-March 2002). N=9 Institutions (no report: N=12,691; confidential report: N=32,272; public report: N=22,730)	1	↓ 30-Day RAMR in Ontario dropped by 29% after confidential reporting, but there was no significant change after reporting was made public.
Hannan 1994 ²⁷ (Good)	NYS CSRS	Examines impact of CSRS on changes in RAMR over time by dividing participating hospitals and surgeons into three groups (high, middle, and low) based on RAMR prior to public reporting. Also analyzes hospitals and surgeons based on outlier status. N=30 Hospitals; N=95 Surgeons	1	↑ Compared to 1989 baseline outlier status, all outlier groups experienced improved RAMR over the following three years. Reduction in RAMR was most profound in hospitals with higher than expected rates in 1989.
			4	↔ CABG volume percentage by hospital groups based on mortality remained relatively stable between 1989-1992 while total overall volume increased.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Hannan 1994b ³⁶ (Good)	NYS CSRS	Assesses changes in the relationship between hospital RAMR and average patient severity of illness and actual, expected and risk-adjusted mortality rates, and volume among 30 NY state hospitals performing CABG surgery on 57,187 patients from 1989, when data were first publicly released, through 1992.	1	↑ Despite increases in expected mortality rates, actual and risk adjusted mortality rates fell overall during the study period. In addition, volume increased yearly.
Hibbard 2003 ⁹ (Fair)	Quality Counts	Evaluates the impact of public reporting on quality improvement activities in obstetrics and cardiac care in Wisconsin hospitals by comparing QI activities in 24 hospitals with public reporting, and two groups of hospitals randomized to receive either private quality feedback reports (N=41) or no report (N=46). Total N=111 hospitals. Interviews were conducted with hospital CEOs, medical directors and/or quality improvement directors. (62% response rate).	3	<p>↑ Among hospitals identified as worse than expected in obstetrics, Quality Counts led to quality improvement activities in hospitals receiving public reporting more than 2x as much as hospitals with private reporting, which undertook QI activities slightly more than those with no reporting.</p> <p>↔ Public reporting was not associated with differences in cardiac QI activities among hospitals with worse-than-expected outcomes.</p> <p>↑ Hospitals participating in public reporting believed that public reporting would affect their image, with those with as expected and better-than-expected outcomes believing public reporting would enhance their hospital's image.</p> <p>↔ Similar beliefs among private and non-reporting hospitals were not significant.</p>
Hibbard 2005 ⁴⁸ (Fair)	Quality Counts	Compares Wisconsin hospitals receiving public reporting, private reporting, and no reporting to assess hospitals' change in overall performance and clinical measures two years following the release of Wisconsin's QualityCounts report. N=111 hospitals (24 public reporting, 41 private reporting; 46 no reporting).	1	<p>↑ Differences between improvements and declines in obstetric performance after public reporting were greater in the public reporting group than in private reporting and non-reporting hospitals with a third of public reporting hospitals making improvements.</p> <p>↑ Among hospitals with worse-than-expected baseline scores, public reporting hospitals improved more than other two groups.</p>

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Hollenbeak 2008 ⁵² (Good)	PA Hospital Effectiveness/ Performance Report	Compares associations between intensive public reporting and no reporting/limited reporting to in-hospital mortality in PA and other states with and without public reporting. N=168,104 Propensity-matched patient pairs	1	↑ During periods of intensive reporting, in-hospital mortality odds ratios for all 6 conditions studied were lower in PA than in states with limited or no public reporting.
Howard 2006 ⁵⁵ (Fair)	University Renal Research and Education Association semi annual reports on kidney transplant graph survival	Compares patient transplant registrations and live donor transplants at transplant centers in the United States over time (from Sept 1, 1999 to Oct 30, 2002) to assess the influence of URREA center-specific public reports. N=58,164 patients	4	↔ public reports had no effect on demand (choice) of transplant centers
Jha 2006 ³³ (Good)	NYS CSRS	Examines whether NY state hospitals and surgeons identified as having high or low RAMR in one year of the CSRS predicts future performance. Also analyzes effects of hospital and surgeon performance on patient market share in the following year and whether surgeon performance is associated with likelihood of ceasing practice.	1	↑ Moderate correlation between top performing hospitals at baseline on CABG mortality and high performance in subsequent years.
			4	↑ increase in demand for centers with better scores by younger patients and patients with college educations.
Longo 1997 ⁵⁰ (Fair)	ShowMe Buyers Guide: Obstetrical Services	Examines the impact of an obstetrics consumer report in Missouri (1993 ShowMe Buyers Guide: Obstetrical Services) on hospital behavior during the year following dissemination. N=82 Hospitals (Response rate to telephone survey = 93%; 82 out of 88 hospitals)	1	↑ Improvement in ultrasound and cesarean ↔ No significant improvement in VBAC
			3	30-50% of facilities that did not offer services such as car seats and follow up began after the public report. Some, but now all facilities reported changing or planning to change polices.
			6	Facilities in communities with multiple facilities were more likely to say they were going to change policy.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Mennemeyer 1997 ⁵⁴ (Fair)	HCFA mortality report	Uses pre-HCFA mortality report data (1983) as baseline to examine whether HCFA public reports led to changes in community hospital discharges in outlying hospitals (1 or more σ from mean) between 1984 and 1992. N=23,564 over 9 year period.	4	<p>↑Hospital discharges (used as measure of selection) declined in hospitals with higher mortality after reporting; however the effect was small: a hospital with double the expected mortality is predicted to have 46 few discharges a year.</p> <p>↓Another analysis found that media reporting of an untoward event had a much larger impact on discharges--a 9% reduction. This is based on a small number of incidents.</p>
Moscucci 2005 ³² (Fair)	NYS CSRS	Compares in-hospital mortality among 11,374 patients in a multicenter PCI database in Michigan which has no public reporting to 69,048 patients in a statewide New York PCI database where public reporting is present to determine the potential effect of public reporting on PCI case selection. N=34 NY state hospitals; 8 MI hospitals	1	<p>↔No difference in NY state vs. MI mortality when adjusted for comorbidities and volume</p> <p>↑Lower mortality in NY state with public reporting compared to MI for unadjusted and adjusted for age and gender.</p>
			2	<p>↓Difference in case mix in NY state vs. MI absent different levels of disease suggests New York is not treating higher risk patients.</p>
Mukamel, 1998 ²⁹ (Fair)	NYS CSRS	Examines whether NY state hospitals offering CABG surgery and surgeons with better RAMR in NYS CSRS experience increases in market shares and prices over time. N=30 Hospitals; N=114 Surgeons	4	<p>↑ Increases in RAMR on report led to a decrease in subsequent market share. In NYC change in market growth was not significantly associated with published RAMR, but published RAMR decreased growth in Upstate NY state by 8.8 percentage points.</p>

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Omoigui 1996 ²⁸ (Poor)	NYS CSRS	Examines whether NY state's decrease in RAMR for CABG surgery was due to high-risk CABG surgery patients in NY state being referred out of state to the Cleveland Clinic in Cleveland, Ohio. N=9442 isolated CABG operations at the Cleveland Clinic between 1989 and 1993.	2	↓increased mortality among NY state patients at Cleveland Clinic compared to patients from other locations and NY statepatients in prior period suggests public reporting is increasing referral of high-risk patients out of NY state.
Peterson 1998 ³⁰ (Good)	NYS CSRS	Analyzes the effects of NYS CSRS provider profiling on bypass surgery access and outcomes in elderly patients (Medicare) in NY state by examining data before and after public release in NY state to determine whether provider profiling increased the percentage of patients going out-of-state for bypass surgery, whether surgery following myocardial infarction (MI) changed, and whether bypass surgery outcomes improved more rapidly in NY state than in the rest of the nation between 1987 and 1992. N=39,396 NY state patients; N=662,675 non-NY state patients	1	↑ Mortality rates fell significantly in NY state and faster than in the rest of the country post reporting.
			2	↔ no evidence of harm: percentage of NY state residents having surgery out of state declined, and elderly people in NY state were more, not less likely to receive bypass surgery.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Romano 2004 ³⁸ (Good)	CHOP (CA) and CSRS (NY state)	Analyzes CHOP and NYS CSRS data from NY state and CA to determine whether hospitals identified as mortality outliers experienced volume changes after publication of CHOP and NYS CSRS.	4	In CA ↔ low mortality and high mortality outliers experienced no significant changes in volume for AMI ↑ Slight increase in volume for low mortality outliers for lumbar discectomy Strongest effects among white patients and patients with HMO coverage In NY state ↑ outliers experienced changes in CABG volume but for limited periods low mortality hospitals had increase in volume 1 month post publication high mortality hospitals had decrease in volume 2 months post publication Strongest among Medicare and white patients.
Rosenthal 1997 ⁴³ (Good)	CHQC	Analyzes changes in hospital mortality rates associated with eight diagnoses (AMI, CHF, obstructive airway disease, gastrointestinal hemorrhage, pneumonia, stroke, CABG, and lower bowel resection) before and after publication of the CHQC in Northeast Ohio hospitals. N=30 Hospitals (N=101,060 consecutive eligible discharges)	1	↔ In 8 medical conditions combined together, there was no significant change in RAMR after public reporting. ↔ No significant change in RAMR after public reporting for 6 of 8 medical conditions. ↑ Public reporting associated with RAMR reductions over time in CHF and pneumonia. ↑ Risk of in-hospital death decreased after public reporting in 5 of 8 medical conditions.
Shabino 2006 ⁴⁹ (Poor)	Wisconsin CheckPoint	Reports changes in Wisconsin state hospital averages on various quality measures over a two year period since the introduction of public reporting in the state. N=115 December 2004; N=117 September 2006	1	↑ All measures improved from Dec. 2004 (pre) to Sept. 2006 (post reporting). However some improvements were small (under 5 % points--no statistical test done, not listed below) Over 5 % point improvement ↑ AMI 1 of 6 ACEI/ARB Left Ventricular Smoking Counseling: 86% vs. 95% ↑ CHF 2 of 4 Smoking Counseling: 64% vs. 86% Discharge instructions: 53% vs. 64% ↑ Pneumonia 2 of 3 Pneumonia vaccine: 47% vs. 73% Smoking counseling: 61% vs. 83%

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Tu 2009 ²⁴ (Fair)	AMI and CHF Process Measures for acute care hospital	Evaluates whether public release of cardiac quality data stimulated Ontario hospitals to improve performance on process of care indicators and mortality related to AMI and CHF by randomizing hospitals to receive either delayed feedback or early feedback of quality reports. N=81 hospitals (42 early feedback; 39 delayed)	1	↔ Differences in AMI and CHF composite indicators between early and delayed feedback hospitals were not significant. ↔ Of 8 exploratory sub-group categories, analysis found only 2 (STEMI 30-day mortality and CHF and LV dysfunction 1-year mortality) differences were significant and lower in early feedback hospitals than delayed feedback hospitals.
Vladeck 1988 ⁵³ (Poor)	HCFA mortality report	Analyzes occupancy rates at NY state general acute care hospitals before and after release of HCFA mortality data. Splits hospitals into three groups based on mortality rate outlier status: Higher-than-expected (N=14), As-expected (N=47), and Lower-than-expected (N=9). Total N=70 Hospitals	4	↔ Release of HCFA mortality data did not affect occupancy rates in NY state hospitals in any of the groups.
Wang 2011 ⁴¹ (Good)	PA CABG Guide	Examines the impact of CABG public reports on volume trends from 1998-2006 in PA n=114,039 patients n=59 hospitals (varies by year)	4	↔ No statistically significant impact of the public report on hospital CABG volume over the study period. One year after being rated a high mortality hospital there was a significant drop in the volume of CABG cases of 15% on average due to a decrease in low severity cases, but the effect does not persist.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Werner 2010 ⁵⁸ (Good)	CMS Hospital Compare	Examines changes in hospital process performance on composite and individual measures in the first three years of Hospital Compare (2004 vs 2006) and tests whether changes in process measures correlated to changes in hospital mortality rates, length of stay, and readmission rates. N=3476 Acute care, non-federal US hospitals	1	<p>↑ Mean performance score on composite measures for AMI, heart failure and pneumonia all improved from 2004 to 2006. All individual measures also improved.</p> <p>↑ 10 point improvement on performance scores were significantly related to reductions in mortality, length of stay and readmission rates for AMI, to reductions in readmission rates for heart failure and for length of stay in pneumonia.</p> <p>↑ Low ranking and low-middle ranking groups at baseline improved the most in all categories between 2004 and 2006.</p> <p>↑ Based on group rankings at baseline, a ten point change in performance predicted a decrease in AMI and pneumonia mortality in all but the highest performing hospitals. AMI length of stay was also reduced for all but the highest performers.</p> <p>↓ Based on same group rankings, a ten point increase in hospital performance was associated with longer length of stay for pneumonia.</p>

Abbreviations: AHRQ, Agency for Healthcare Quality and Research; AMI, acute myocardial infarction; CA, California; CABG, coronary artery bypass graft surgery; CHF, congestive heart failure; CHQC, Cleveland Health Quality Choice; CMS, Centers for Medicare and Medicaid Services; COPD, chronic obstructive pulmonary disorder; CSRS, Cardiac Surgery Reporting System; ED, emergency department; HCAHPS, Consumer Assessment of Healthcare Providers and Systems Hospital version; HCFA, Health Care Finance Agency; HER, Hospital Effectiveness Report; MD, Maryland; MI, Michigan; NR, not reported; NS, not significant; NY, New York State; PA, Pennsylvania; PCI, percutaneous coronary intervention; RAMR, risk adjusted mortality rates; QI, quality improvement; US, United States; VBAC, vaginal birth after cesarean.

↑Improvement
↓Worse
↔No difference

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes? Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Individual Clinicians and Outpatient Clinics

Fewer studies are available of public reporting about the quality of individual clinicians. In part this is because public reporting of performance data at the individual level is controversial. The issues stem from both measurement concerns and different conceptualizations of health care, quality, and accountability. Accuracy of measurement and adequate risk adjustment are more difficult to obtain with the smaller number of cases available for individuals as opposed to health plans, hospitals, or nursing homes that treat from hundreds to hundreds of thousands of patients. Approaches to health care that are anchored in teams and systems responses to assure safety run counter to the idea that any one individual is solely responsible for outcomes, and individual providers resist public reporting about processes and outcomes they view as outside the scope of their control.

Studies of reporting on individual clinicians are dominated by those of the impact of the public reporting of mortality rates for cardiac surgeons in New York State. These data were collected to produce hospital public reports, but individual results were added to the NYS CSRS after a newspaper, *Newsday*, won a freedom of information lawsuit and obtained the individual data. Health plans, employers, and private entities have created physician public reports, but these are less common and less studied. This may change in the near future as CMS adds individual physician performance data to its nationwide public reporting initiative and “Physician Compare” joins Medicare health plans, hospitals, nursing homes, home health care agencies, and dialysis facility versions of “Medicare Compare” now available via the CMS Web site.

We identified 12 quantitative and 17 qualitative studies that evaluated public reporting and addressed at least one of this review’s key questions.

Overview of Findings

Quality of Care (Key Question 1)

- Surgeon-specific mortality rates declined after rates were publicly reported (one study).

Harms (Key Question 2)

- Evidence about harms varied by the harm studied (three studies)
 - Public reporting appeared to increase disparities between Whites and Blacks or Hispanics in the receipt of CABG for nine years after public reporting began.
 - High-risk patients were more likely to have high-quality surgeons, which is counter to the hypothesis that public reporting might cause adverse selection.
 - Few physicians reported leaving practice due to the impact of the public reports.

Impact on Providers (Key Question 3)

- Surgeons who stopped performing CABG surgeries after surgeon-level data were made public were more likely to be poor performers (bottom quartile) (one study).

Impact on Patients or Purchasers (Key Question 4)

- Results vary across studies (seven studies).
 - Three studies reported no effect of reporting on referral patterns, market share, or surgeon volume.

- Three studies reported that market share or probability of selection increased for higher-quality providers after the data were publicly reported.
- One study found that public reports led to decreases in volume for poor performing and unrated surgeons, but that there was no corresponding increase for high performing surgeons.

Public Report Characteristics (Key Question 5)

- The mode (email vs. mail) and the tone of messages used to inform patients about the availability of physician performance data affected whether patients accessed it or not.
- Publicly reported data was still accurate and therefore likely to be useful to patients even when there was a substantial delay between data collection and when it was made available to the public (one study).

Context (Key Question 6)

- Employment status, likely a proxy for age, affected the likelihood that people would access comparative information about physicians (one study).
- The impact of public reports was affected by insurance coverage—when care was covered the public reports were more likely to influence selection (one study).

Description of Quantitative Studies

We identified 12 quantitative studies about public reporting on individual providers. The studies were published between 1994 and 2011 and all were conducted in the United States. Ten of the 12 evaluated the impact of public reports about cardiac surgeons.^{27, 29, 33, 41, 108-113} The two studies about other services included ratings of fertility clinics¹¹⁴ and individual physicians.¹¹⁵ Four of the studies about the impact of cardiac surgeon public reports also included outcomes at the hospital level.^{27, 29, 33, 41} In these cases the results have been separated and are reported in the corresponding results section.

The *populations* in most of the studies were patients, families, or payers who needed to select a health care provider. These included: employees with health coverage selection, physicians,¹¹⁵ and prospective patients selecting a fertility clinic.¹¹⁴

In the studies of the cardiac surgeons, the populations were the patients and/or referring physicians that selected surgeons for CABG.^{29, 41, 112, 113} In two studies, the focus was on whether public reports influenced the contracting decisions of Managed Care Organizations (MCOs),^{110, 111} which function as patient representatives when they make contracting decisions. In one study with multiple analyses,³³ patients and surgeons were the populations of interest for different hypotheses. In the case of studies that evaluated improvement in quality of care²⁷ or potential harms,^{108, 109} the population was the cardiac surgeons who may change their practice in response to public reports.

The *interventions* were public reports of mortality data for cardiac surgeons. Eight of the studies were about the NYS CSRS^{27, 29, 33, 108-112} and two were about the Pennsylvania cardiac report, the Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery.^{41, 113}

The two studies not about cardiac surgeons included one study in which employees were referred to a Web site (Bridges to Excellence) maintained by a nonprofit organization that provided performance data about individual physicians.¹¹⁵ The other non cardiac public report was a Federally mandated report on success rates for assisted reproductive therapy (ART)

provided by fertility clinics that is published by the Centers for Disease Control and Prevention.¹¹⁴

As public reporting is about individual providers and is not pervasive, the *comparator* for studies of State reports on cardiac surgeons could be other States that did not produce these public reports. In one of two multi-group pretest posttest studies, referral patterns to cardiac surgeons in Pennsylvania where there was public reporting were compared to those in Florida (no public reporting) for a time periods before and after reporting started in Pennsylvania.¹¹³ The other study of this type estimated the differences in use of several cardiac procedures by race for patients in New York State before and after public reporting and compared this to patients in other States without public reporting for the same periods of time.¹⁰⁹

However, most studies did not incorporate a comparison group that does not experience public reporting, rather they examined one group with public reporting and the difference in designs were variations in the time periods included. Two studies used multiple years of data from the NYS CSRS and Medicare and were “time series post only” designs,^{29, 33} in that they looked at trends in data after public reporting. Another included data that predates the public report and multiple periods after, making it a one group interrupted time series.²⁷ Four studies were “one group post only”, including one study of patient volume and the Pennsylvania public report,⁴¹ an assessment of a potential harm associated with New York State reporting,¹⁰⁸ and two studies of managed care organization contracting practices,^{110, 111} all including only one data point after public reporting. Two studies were one group pretest-posttest designs and one data point before and after public reporting. In one of the non cardiac studies, the research about fertility clinics examined market share before and after public reporting, a one-group pretest-posttest study design.¹¹⁴ The other study with this design was a study of the choice of cardiac surgeons.¹¹²

The study of employee use of a Web site with physician performance data employed a randomized design. Employees were randomly assigned to receive information about physician ratings that differed in terms of form (email vs. mail) and tone (benefit vs. risk).¹¹⁵

See Appendix D for definitions of the study design terminology used in this report. The study design influenced but did not determine the quality assessment of the studies. Confounding and similarity across compared groups or compared time periods were given more weight than other criteria (see Appendix G for the quality assessment for these studies and Appendix F for a description of the quality assessment criteria) when assessing the quality of the studies in terms of their contribution to the evidence relevant to our key questions. Of these 12 studies, six were assessed as good and six as fair.

The *outcomes* in the studies varied. The one study in this group that assessed improvement in health care outcomes (Key Question 1) tracked risk adjusted mortality rates for surgeons as the *outcome*.²⁷ One study of potential harms (Key Question 2) estimated the likelihood that higher-risk patients have higher-quality surgeons for CABG.¹⁰⁸ The other study of harms compared percentages of patients undergoing the procedures by race across the time periods and States after adjusting for patient characteristics.¹⁰⁹ Another study³³ examined patterns of surgeons discontinuing practice and their reasons for doing so as outcomes.

The most common outcome in these studies was selection of providers. In five studies the outcome was the selection of providers by patients (Key Question 4) which is defined as the probability of selection¹¹² or measured through market share^{29, 33, 114} or volume.^{27, 41} One study took a slightly different approach and modeled the patient and referring physician possible surgeon choices defined by the regional market or surgeon affiliation with the hospital of

admission.¹¹³ In two studies the outcome was selection of surgeons by Managed Care Organizations (MCOs) for contracting^{110, 111} and one of these¹¹¹ also included interview responses by MCO executives to questions about the factors that influence contracting.

Two studies have outcomes that were not used in any other studies. In one study the outcome was an action that precedes the selection of the provider, in this case the use of a Web site with the physician ratings.¹¹⁵ Another study analyzed the relationship of surgeon quality at the time the data was collected to surgeon quality at the time it was made public (1 to 2 year delay). The ability of the earlier performance to predict future performance was used to determine if the data were likely to be valid in the time period they were most likely to be used by patients. This result is consider relevant to Key Question 5, as how old or current the report data are is a characteristic of the report (Key Question 5).³³

Effectiveness by Outcome/Key Question: Detailed Analysis of Quantitative Studies

Table 4 at the end of this section provides an overview of each included quantitative study and a summary of the findings organized by the key question they address. The complete abstracted data for each study is in the Evidence Tables in Appendix J.

Key Question 1: Quality of Health Care

Only one study of those identified addressed the impact of public reporting about individual providers on quality of care. Hannan, et al. tracked risk adjusted mortality rates (RAMR) for surgeons and found that mortality declined after the NYS CSRS was made public. The RAMR declined 7.06 percent for high-mortality outliers but reductions were seen across all terciles defined by baseline mortality rates.²⁷

Key Question 2: Harms

Public reporting about individual providers was controversial in part due to concerns that it may have unintended adverse effects, particularly that it may reduce access to care. Three studies address the potential for harms differently.

Werner, et al.¹⁰⁹ compared the percentages of White, Black, and Hispanic patients that received CABG, PTCA, and cardiac catheterization before and after the NY CABG public report was available. They also compared the trends in New York State to trends in other States for which discharge data were available that included race. Their findings identified increasing disparities with public reporting, counter to the assumption that public reporting may reduce disparities. They found that the disparity in the percentage of patients who received CABG by race increased from prior to post public reporting periods and that this disparity is greater in New York State than in 12 comparison States that had not released CABG public reports.

Use of other cardiac procedures did not increase to offset this difference. Nineteen percent fewer Black and Hispanic patients than White patients had CABG after the public report and the disparity did not return to its pre public report level until 9 years after the first public report.

Glance and colleagues analyzed all CABG discharges for New York State in 1997 through 1999 (after public reporting of surgeon mortality rates) and found that high-risk patients were more likely to have had high-quality surgeons (the observed to expected mortality ratio declined by 0.034 points for a 10 percent increase in patient risk of death).¹⁰⁸ This runs counter to the speculation that surgeons would avoid high-risk patients in order to improve their rating.

In one of several analyses of the NYS CSRS, the 31 physicians who discontinued performing CABG during the study period were identified and they were surveyed as to their reasons for leaving surgical practice. Two respondents out of 18 who completed survey said their decision was a reaction to pressure to reject high-risk patients; however 10 respondents said the CABG report had no influence on their decision.

Key Question 3: Impact on Providers

A potential effect of public reporting is that poor performing providers may be encouraged to leave practice. A study that identified surgeons who stopped performing CABG after the NYS CSRS began reporting surgeon-specific mortality rates found that 10 percent of the bottom-quartile surgeons discontinued performing CABG compared with 5 percent in the top three quartiles.³³

Key Question 4: Impact on Patients or Purchasers

The most frequently studied issue was whether public reports affected the selection of providers by patients or purchasers acting as their representatives. The results of this topic in the research on individual providers were not consistent.

Three studies concluded that public reports have had no effect. Epstein¹¹³ concluded the public report publication did not influence CABG referral patterns based on analyses of models and patterns of referrals before and after public reporting in Pennsylvania, and compared this to Florida, which did not have a public report. While there was a shift away from high-mortality surgeons and toward low-mortality surgeons in Pennsylvania after the report was released, a similar trend in Florida “cancels out” this change in a difference-in-difference analysis. One reason for this may be that referring physicians already knew the relative performance of surgeons without the public report. Jha and Epstein³³ reported that the NYS CSRS had no significant impact on market share for surgeons and Hannan, et al.²⁷ found no differences in surgeon volume in the first four years the NYS CSRS was available.

Two cardiac studies and one study of reproductive medicine clinics reported an effect that corresponded to the underlying theoretical model of public reporting: they found that information about quality led to an increase in selection of higher-quality providers. An evaluation of the early impact of NYS CSRS found that physicians with better outcomes had higher rates of growth in market share after public reporting.²⁹ In a later analyses of some of the same data, Mukamel, et al. reported that lower-quality (higher) RAMR lowered a surgeon’s odds of being selected by 7 to 8 percent.¹¹² Additionally, once public report data were available, the importance of price and surgeon’s years of experience on the decision declined. These researchers repeated their analysis with race as a variable and found that the disparity between White and Black patients’ selection of high-quality surgeons narrowed after the quality data was made public, which they interpreted as the public report helping to rectify a situation where White patients had more access to other sources of quality information. The public report did not affect referring physicians who tended to select surgeons who practiced at the hospitals where they admitted across all time periods.

Higher birth rates were associated with larger market share after performance of clinics offering assisted reproductive therapies were made public, while birth rate was not significantly associated with market share in a period before public reporting, even after analyses that controlled for other sources of information.¹¹⁴

Wang, et al. authored the one study that reported mixed results for selection. They found that the Pennsylvania cardiac public report had a mixed effect on surgeons' volume. Reports led to a decrease in volume for unrated and poor performing surgeons, but the volume of high-performing surgeons did not increase and modeling of matching between patients and surgeons suggested poor performing and unrated surgeons were avoided due to public reporting.⁴¹

Managed care organizations determine what surgeons are available to their enrollees. Two studies explored whether the NYS CSRS data on surgeon quality influenced contracting decisions. In the first study, interviews were combined with an analysis of provider lists to compare what MCOs say they do to their actual contracting patterns. While 60 percent of the plan representatives interviewed responded that quality was the most important consideration in selecting surgeons, analysis of actual contracting patterns showed weak and mixed effects. There was a statistically significant preference for high-volume and high-quality outlier surgeons, but there was no systematic selection by RAMR or low-quality outlier status.¹¹¹ Another analysis of the same contracting data¹¹⁰ modeled the likelihood of MCO-surgeon contract combinations and found that low volume status significantly reduced the likelihood of contracts (-35.3 percent in upstate New York and -13.6 percent downstate) while high-quality outlier status and excess RAMR only affected the probability of contracts in downstate New York. The authors concluded that regional and market differences are important in assessing the impact of public reporting.

Key Question 5: Public Report Characteristics

Quantitative analyses of the impact of specific characteristics of public reports or public reports were rarely identified. However, for this topic there were two studies that were unique in the issues they addressed.

One study evaluated use of a Web site with physician performance information provided by an employer to employees and retirees. Overall, 11.9 percent of the people given the information visited the site. Current employees who were randomly assigned to receive information about the site via email were 6.42 times more likely to register and use the site than those who received paper information by mail ($p < 0.001$). The difference in use by employees and retirees who received risk-focused compared with gain-focused was not statistically significant.¹¹⁵

In a study with multiple analyses related to the NYS CSRS, Jha and Epstein³³ demonstrated that surgeons' performance in the year the data were collected was predictive of performance in the year it was released (2-3 year delay) and most likely to be used. They concluded that the information is therefore more likely to be used and still be useful to patients selecting surgeons despite the delay.

Key Question 6: Context

Two studies included some contextual feature, one focusing on a characteristic of the decisionmaker (employed vs. retired) and one focusing on a characteristic of the environment (whether insurance coverage was mandated). Retirees were more likely than employees to use a Web site with physician performance information, perhaps because this information was more important to older adults.¹¹⁵ Public reports had a greater impact on market share in States that mandated insurance coverage for ART, perhaps because the insurer directed beneficiaries to higher-quality providers or because with coverage people were less likely to trade quality for price.¹¹⁴

Summary of Qualitative Studies

We identified 17 qualitative studies that focused on public reporting for individual physicians and one group practice. These studies were published between 1996 and 2011 and 10 were conducted in the United States, two in Taiwan,^{116, 117} and two in England.^{118, 119} Most of these studies were descriptive surveys including six surveys of physicians^{86, 88, 117, 120-122} and five surveys of patients.^{91, 116, 122-124} Other studies reported the themes from interviews,^{125, 126} focus groups,^{118, 127} and a 3-year program of focus groups, interviews, and observations.¹¹⁹ One study was a lab-type experiment in which people were asked to make a series of hypothetical choices between physicians based on public report ratings.¹²⁸ The results are briefly summarized below in chronological order by year of publication in order to allow the identification of changes in attitudes or trends over time.

Professionals: The surveys of providers cluster near the start of the Pennsylvania and NYS CSRS reporting on surgeons and document physician concerns and generally negative perceptions of this public reporting.

- Schneider and Epstein surveyed a 50 percent random sample of all cardiologists and cardiac surgeons living in Pennsylvania in 1994 and asked their views on the Pennsylvania CAGB guide. Six-hundred ninety seven (64 percent) surgeons responded. Eighty-two percent of cardiologists and 100 percent of surgeons were aware of the guide; 63 percent of surgeons said they were less willing to operate on high-risk patients, and 59 percent of cardiologists reported it was harder to find a physician for their high-risk patients (1996).⁸⁸
- A survey sent to all cardiologists (36 percent response rate) asked whether they discussed the NY CSRS data on CABG with patients when referring them to surgeon (78 percent replied “no”). Responses to items about accuracy and format were generally critical (e.g., 33 percent replied that the report was not at all accurate, 37 percent said the report was very misleading, while 46 percent said “somewhat” misleading) (1997).⁸⁶
- In response to a survey fielded in 1996, 88 percent of 1444 interventional cardiologists (28 percent response rate) said they would be somewhat or much less likely to treat high-risk patients if physician-level outcomes were publically reported (1999).¹²⁰
- All active cardiac surgeons were surveyed in New York State and 67 percent reported refusing treatment to at least one high-risk patient in the previous year. They also reported that their practice (30 percent) and the practice of their peers (37 percent) changed due to public reporting (1999).¹²¹
- Narins, et al. sent a mail survey to all interventional cardiologists included in a New York State public report about PCIs. Physician responses indicated that public reporting is perceived as influencing practice so that access to care is restricted: 83 percent agreed that patients who might benefit were not getting the procedure and 79 percent agreed or strongly agreed that knowing their data will be public had influenced their decisions about specific patients (2005).¹²²
- The one provider survey on a different topic was a mail survey of 236 (29 percent response rate) Taiwanese health care providers that collected data on doctors’ preferences for public report content, format, and frequency. Respondents preferred reporting that was updated yearly, was risk adjusted, provided detailed scores, and labeled charts so ranges of value could be identified as good or bad (2010).¹¹⁷

Patients: Patient reactions to public reporting was the subject of five studies that produced a range of results, potentially due to the fact that they surveyed very different populations.

- Schultz, et al. conducted a phone survey of employees who had the opportunity to a public report and select a “care system” group of practices. Forty-two percent of respondents with single coverage and 52 percent of respondents with family coverage recalled seeing the public report. Respondents found overall ratings most helpful and detailed ratings least helpful. Consumers who changed care systems were most likely to use the public report and found it useful while people happy with their current provider tended not to use the report (2001).¹²⁹
- A survey of outpatients at the University of Missouri Health Center asked for patient reactions to a report the medical center produced and distributed about its providers, and 59.9 percent said it was useful information but 30.2 percent thought it was hospital advertising. While few people were very or somewhat likely to change doctors or hospitals based on this data, more than half (21.9 very and 31.9 somewhat) were likely to use the information to decide where to have a procedure (2004).⁹¹
- In response to a phone survey based on random digit dialing almost half (49.6 percent) of the adult respondents (20 years old or more) surveyed in Taiwan reported they had compared doctors based on quality of care and 76.7 percent said they would change physicians based on quality information if their physician’s score was low (2004).¹¹⁶
- Patients likely to be looking for a primary care provider were provided access to web-based information about physicians and then asked about their physician choice and usefulness of the information. Seventeen percent visited the site (n=382) and of the 301 who completed the questionnaire, 51 percent said patient experience scores were the most important information and these respondents were more likely to pick a physician with high scores from the patient experience survey (2007).¹²³
- A survey of 467 people (66.8 percent response rate) conducted at outpatient clinics at a university medical center found that only 13 percent of respondents were aware of any Web sites on health care quality and only 2 percent reported the Web site was important in their choice of a provider. The most important factors in their choices were reputation and a trusted referral from another physician or family and friends (2011).¹²⁴

Interviews, focus groups, and lab-type experiments collected additional information on the perceptions and choices of physicians and patients.

- Marshall, et al.¹¹⁸ conducted 12 focus groups, four with patients, four with general practitioners, and four with clinical administrators in order to get their reaction to public reporting about general practice. Themes were similar across the groups with participants having an initial strong negative reaction to public reporting that became more positive over the course of the discussion. Patients felt “shopping around” was inappropriate for health care and were most concerned about location while providers and administrators worried that reports were politically motivated and that “good” practices would be swamped by new patients (2002).

- In a different study, Marshall and other colleagues used an action research-based approach and over 3 years conducted interviews, focus groups, observations, and presentations at four primary care organizations in order to develop an information source about primary care services. Participants included 104 members of the public, staff at 19 practices, and four managers. Their major findings were that the public wanted different information than the staff; they viewed performance information as a supplement to information from other sources; they wanted narrative descriptions as well as numbers, they disliked league tables, and they were not confident about the source of quality information (2006).¹¹⁹
- In an experiment that offered participants (n=301 adult volunteers) choices between two physicians and provided rating of technical and interpersonal quality, 66 percent of people selected the physician with higher technical quality three or more out of five possible times, leading the authors to conclude that technical quality is more important to potential patients (2005).¹²⁸
- Barr and colleagues interviewed 56 physicians and during the interviews they presented scenarios that varied in terms of patient age and diagnosis in which patients asked questions about a referral based on information from a public report. They categorized physician responses into four major themes: a) rely on existing physician-patient relationships; b) acknowledge and consider patient perspectives; c) take actions to follow up on patient concerns; and d) provide their perspectives on quality reports, and also reported that physicians were concerned about the methodological rigor of reports (2008).¹²⁵
- Stein, et al. conducted four focus groups in Pennsylvania with mental health care consumers who were Medicaid beneficiaries. Participants said they wanted information about providers, but specific items they valued such as flexibility in scheduling, ability to talk to the doctor, and shared decision-making were not the items available from public reports (2009).¹²⁷
- In Massachusetts, researchers interviewed 72 leaders of physician group practices that provided primary care about their awareness and use of a new physician group report on patient experience. Seventeen percent were not aware of the report and 22 percent used the report to focus on low performers, while 61 percent reported instigating group-wide improvement activities based on the results. The most common QI activities concerned access (57 percent), communication with patients (48 percent), and customer service (45 percent) (2010).¹²⁶

Additional information on the qualitative studies is included in the Evidence Tables in Appendix K.

Table 4. Summary of evidence: Quality of individual clinicians and outpatient clinics

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Bundorf 2009 ¹¹⁴ (Good)	Federally Mandated Report on success rates for fertility clinics maintain by the CDC.	Examines the effect of public reports on choice of fertility clinics before (1996-98) and after (1998-2003) public release. N=411 fertility clinics.	4	↑The differential effect of birth rates post- vs pre- public reports is positive and statistically significant, indicating that measured performance had larger, positive effect on choice when the information was publicly disseminated to consumers.
			6	↑The impact of public reporting was greater in states that mandate insurance coverage for ART than in states that do not.
Epstein 2010 ¹¹³ (Fair)	PA Cardiac	Examines the effect of public report on referral patterns to Cardiac surgeons in PA vs FL before (2001-02) and after (2002-03) publication of the CABG public report in PA. n=23655 for PA and 38164 for FL	4	↔There was a marginal difference in the probability of selection of lower mortality surgeons in PA vs. FL in pre vs. post public reporting in the direction expected, but it was not significant.
Glance 2008 ¹⁰⁸ (Fair)	NYS CABG Surgery Reporting System	Investigates the potential negative effect of public reports on access for high-risk patients vs low-risk patients between 1997 and 1999 in NY. n=51750 CABG surgery discharges	2	↑For every 10% increase in patient risk of mortality, the surgeon's Observed to Expected mortality ratio (predictor of quality) is significantly reduced by 0.034 points. ↑After adjusting for race and other hospital characteristics, this relationship is weakened by still significant. No evidence that high quality surgeons are avoiding high risk patients.
Hannan 1994 ²⁷ (Good)	NY CSRS	Examines the outcomes and volume of CABG patients before (1989-90) and after (1991-1992) public report among providers in NY. N=32 providers in lower tercile, 32 in middle tercile and 31 in lower tercile	1	↑All tercile groups experienced reductions in their RAMR, with the highest RAMR in 1989 being reduced from 5.90 to 3.26 in 1992. ↓Among outliers, only those who were the lowest outliers in 1989 (with an RAMR of .74) experienced a RAMR rise in 1992 (1.09). ↑The largest reduction in RAMR was among the high mortality outlying surgeons with 7.06% decrease between 1989-1990 and 1992.
			4	↔ No effect on surgeon volume
Jha 2006 ³³ (Good)	NYS CSRS	Examines the effect of public reports on whether surgeons continue to practice and market share post release of the public	2	↔ 2 of 18 surgeons surveyed (of 31 surgeons who discontinued practice during the study period) reported they left due to pressure to reject high-risk patients; however 10 of the 18 who responded to a survey said the CABG report had no influence on their decision to leave practice; 2 said minimal impact; and 6 moderate or more.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
		report Includes all cardiac surgeons practicing in NY from 1989 to 2000 (years data was collected; 1989 data was reported in 1991).	3	↑ 20% of bottom-quartile surgeons stopped performing CABG during the study period compared to 5% in the top three quartiles.
			4	↔ Performance had no significant impact on market share for surgeons.
			5	↑ Surgeons that have low RAMR when data are collected continue to perform well when data are released 2-3 years later. This suggests data are still useful despite the delay from data collection to public reporting.
Mukamel 1998 ²⁹ (Fair)	New York State report	Hypothesizes that high quality surgeons experience increase in market share and price in NY for 1990, 1991 and 1992 due to public reporting. n=74 surgeons with quality reporting and Medicare claims in study years	4	↓ The decline in market share growth rates for individual physicians due to an increase of 1 percentage point in mortality rate was 7 percentage points. For the median surgeon with 60 surgeries this would be a loss of 4.2 patients. ↔ There was no significant effect of published RAMR on price changes although this was expected (higher quality physicians raise prices).
Mukamel 2000 ¹¹¹ (Fair)	NYS CSRS	Determines the effect of surgeons' quality report on HMO, PPO or IPA contracting in NY by examining what they say and what they do in terms of using quality data in contracting with surgeons. N=31 of 53 (59% response rate) of MCOs in NY state completed interviews data from 42 of 53 (78%) on contracting with surgeons	4	What MCOs say about contracting with surgeons: ↑ 60% say quality is the most important consideration ↑ 64% have examined the NYS CSRS What MCOs do in contracting: ↑ Prefer high volume and high-quality outlier surgeons ↓ Do not choose based on low-quality outliers or RAMR ↔ No systematic bias for either higher or lower quality surgeons

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Mukamel 2002 ¹¹⁰ (Fair)	NYS CSRS	Evaluates the association between contracted by MCOs and the quality of surgeons n=42 of 53 MCOs in NY state (78%) 1,709 potential combinations of MCOs and surgeons (1,588 after dropping MCOs that contract with all surgeons)	4	<p>↑Low volume status significantly decreases the probability of contracts (-35.3% upstate and -13.6% downstate; p=0.00)</p> <p>↑High-quality outlier status results in a significantly higher probability of a contract but only in downstate NY (27.1%; p=0.00)</p> <p>↑ one standard deviation increase in excess RAMR results in a significant decrease in probability of a contract in Downstate, but not Upstate NY (-6.1% to -9.1% for different types of MCOs)</p>
Mukamel 2004 ¹¹² (Good)	NYS CSRS	Evaluates the effect of public reports on cardiac surgeons by comparing selection before (1991) and after (1992) public release in NY state. N=13,078 Medicare Fee for Service enrollees over 65 in NY state	4	<p>↑Higher RAMR (i.e. lower quality) significantly lowers the surgeon's odds of being selected by about 7 to 8 percent.</p> <p>↑Public report information increases the probability Black patients will select a high quality surgeon and reduced the magnitude of the difference between Whites and Blacks.</p> <p>↑The impact of price and surgeon's years of experience decline once the public reports are available.</p> <p>↔Public report information does not appear to change referring physicians' propensity to refer to surgeons at the same hospital where they admit.</p>
Ranganathan 2009 ¹¹⁵ (Fair)	Bridges to Excellence (created by a nonprofit; provides physician-level performance data)	Evaluates the effect of the mode (internet vs. mail) and the tone of the invitation to view a public report on physician performance on its usage and understanding in active and retired employees of GE, MA. N=3000 for mail, 2111 for email and 1500 retired (mail)	5	<p>Website received 789 hits (11.9% hit rate)</p> <p>↑Odds of registration was 6.42 times higher in email vs mail for active employees p<0.001</p> <p>↔There was a slight increase of odds of response to positive tone vs negative tone messages but it was not significant.</p>
			6	<p>↑Retired employees had 63% higher odds of registration than active employees p<0.001.</p>
Wang 2011 ⁴¹ (Good)	PA Cardiac	Examines the impact of CABG public reports on volume trends from 1998-2006 in PA n=114,039	4	<p>↑Public reporting led to significant decrease in volume poor (4.762 percentage points) performing surgeons.</p> <p>↑The volume of the high performing surgeons increases significantly for low-severity cases</p> <p>↔The volume of the high performing surgeons does not increase significantly for high-severity cases.</p> <p>↔The volume of unrated cases shows an increase of 21.9 percentage points but it is not statistically significant.</p>

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Werner 2005 ¹⁰⁹ (Good)	New York CABG	Examines the effect of public reports on racial disparities in receipt of CABG surgery before (1988-1991) and after (1992-1995) public reporting. n=310,412 NY patients and 618,139 other states' patients	2	<p>↓The disparity in CABG surgery between White and Black patients in NY is 2.0 percentage points higher than other states (p=0.006)</p> <p>↓The disparity in CABG surgery between White and Hispanic patients in NY is 3.4 percentage points higher than other states (p=0.01)</p> <p>↔The difference between White and Black and/or Hispanics in percentage of patients with AMI undergoing cardiac catheterization and PTCA in NY state is 0.4 percentage points lower than other states, but the results are not statistically significant.</p> <p>↓These results suggest public reporting contributes to worsening of racial disparities in care.</p>

Abbreviations: AMI, Acute myocardial infarction; ART, assisted reproductive therapy; CABG, coronary artery bypass graft; CDC, Centers for Disease Control; CSRS; Cardiac Surgery Reporting System; FL, Florida; HMO, Health Maintenance Organization; MCO, managed care organization; PA, Pennsylvania; PPO, preferred provider organization; PTCA, percutaneous transluminal coronary angioplasty; RAMR, risk adjusted mortality rates; NY, New York State.

↑Improvement
 ↓Worse
 ↔No difference

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes? Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Health Plans

Rating and reporting of health plans is linked to the growth of managed care in both the private health insurance market and public health insurance programs. Also important has been the active role employers and employer purchaser coalitions began to play as agents for their employees in the late 1980s and early 1990s. Businesses went from simple provision of health insurance to active involvement in creating and offering more options and models of health insurance and advancing a quality improvement agenda in health care. These changes were motivated both by the desire to control the rising costs of health care coverage and to assure a healthy and more productive workforce. At the same time public programs such as Medicaid and Medicare began offering and sometimes requiring enrollment in managed care plans.

Health plans are selected when people start a job or become eligible for a public insurance program. First they must assure their inclusion among the options offered by employers and public programs. Then health plans must appeal to employees and beneficiaries who select from among the offered options. People select health plans for ongoing and future health care needs, and can change plans once yearly during open enrollment periods or if their status changes (e.g., spouse loses coverage from another employer, newborn is added). Health plans may try to increase their market share by offering different combinations of quality of information, benefits, premium structures, and more or less restricted access to providers (physicians, specialists, hospitals, prescription drugs, etc.).

We identified 23 quantitative studies and 26 (reported in 28 articles) qualitative and lab-type studies about public reporting of quality information related to health plans that met our inclusion criteria and fit our analytic model. Information abstracted from the articles is included in the Evidence Tables in Appendix L and Appendix M.

Overview of Findings

Quality of Care (Key Question 1)

- Quality measures improved for almost all HEDIS and CAHPS domains studied after public reporting (5 studies).
- During the time period in which HEDIS measures were publicly reported by some plans but not others, plans that reported had higher-quality scores (two studies) even after controlling for differences in plans (one study).

Harms (Key Question 2)

- Two potential harms were examined in two of the included studies (crowding out quality in areas not measured and withdrawal of high-quality plans from the market). Neither found evidence of harm.

Impact on Providers (Key Question 3)

- No studies were identified.

Impact on Patients or Purchasers (Key Question 4)

- Publicly reported or widely distributed quality information had little to no impact on selection of health plans by individuals.

- Quality information had no effect on the choices made by employees of private firms (four studies)
- In studies that used random assignment to distribute quality rating materials to some beneficiaries of public insurance programs and not others, the quality information had no impact on plan selection (three studies).
 - Other studies of choices of plans in public programs found limited effects such as reported ease in judging plans (one study) and greater impact of CAHPS compared with HEDIS measures of choice (two studies).
- Employers were more likely to offer employees health plans with higher HEDIS and CAHPS ratings (one study).

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- Contextual factors were not frequently studied in research on health plans.
 - The only study of environmental characteristics found quality information was more likely to be used in plan choice in markets that included plans of varying quality.
 - Some variation in the importance of quality information to different subgroups of consumers was identified (two studies).
 - Plans that start with lower ratings were more likely to improve (two studies).

Description of Quantitative Studies

The 23 studies of public reporting and health plans are described and synthesized below. The studies were published between 1998 and 2010 and except for one about health plans in the Netherlands,¹³⁰ all were conducted in the United States. The public reports that are the subject of study are all versions or items from HEDIS or CAHPS, or similar items or domains that predate widespread use of HEDIS and CAHPS. (More detail on HEDIS and CAHPS is provided in the intervention description below and in Appendix E.

The *populations* in the included studies were most frequently employees or people eligible for public insurance programs. Nine studies examined health plan choices of employees of corporations, the US Federal government, one State government, and one university.^{19, 131-138} Three studies were of people eligible for Medicaid,¹³⁹⁻¹⁴¹ one was about parents selecting a State plan for children,¹⁴² and two were about Medicare enrollees.^{143, 144} One study examined how employers selected plans to offer their employees.¹⁴⁵ In the remaining studies the populations were the health plans and the focus on their responses to public reporting.^{130, 146-151}

The public reporting *intervention* in seven studies about choice of health plans was public reports or plan rating sheets produced by employers for use by their employees.^{133, 134, 136-138, 152, 153} In the other studies about choice of plans the public report was HEDIS,¹³² CAHPS,^{139-141, 143} or both.^{19, 142, 144, 145} The studies of health plan behavior also examined the effect of HEDIS,^{146, 148-151} CAHPS,¹³⁰ or both.¹⁵⁴ HEDIS was a set of clinically oriented measures developed by the National Council on Quality Assurance (NCQA) that included measures related to screening, prevention, care coordination, and treatment of specific conditions. HEDIS has been in use for over 20 years and is currently used by over 90 percent of managed care plans and an increasing number of preferred provider organizations (PPOs). It is required in 34 States for reporting on private and public health plans. CAHPS is a measure of member experience initially developed

by the Federal government for health plans in the United States. Several versions have been created and used in other countries¹³⁰ or health care settings.

The *comparator* in the majority of health plan studies was either a) time period during which the report was not available or b) groups that did not have the publicly reported information. However some studies did not have a true comparator as they measured only change over time after public reporting began.

HEDIS, CAHPS, and custom reports on the quality of health plans have been distributed and published in phases over time. This has allowed for use of a variety of study designs (see Appendix D for definitions of the study design terminology used in this report). The comparator and study design influence but do not alone determine the quality assessments of articles included in this review. Potential confounding as well as the strength of the comparison (similarity across compared groups or compared time periods) was given more weight than other criteria. (See Appendix G for the quality assessment for these studies and Appendix F for a description of the quality assessment criteria). Six studies were rated as good, 13 as fair, and four were poor according to these criteria.

Three studies of health plans used random assignment^{140, 141, 143} which is rare in studies of public reporting. These studies all examined the impact of CAHPS on plan selection by randomly assigning Medicaid beneficiaries to receive or not receive CAHPS information in their enrollment materials and then compared plan selection across the groups. In one case the random assignments were not recorded by the company responsible for the mailing and the investigators had to ask survey respondents to self-report whether they had received the CAHPS report in their materials.¹⁴³ Studies that included data only post public reporting were most common, with two “post only” time series,^{146, 147} five studies that reported data for one group post public reporting,^{19, 132, 133, 145, 149} and five studies that included a comparison group.^{130, 138, 139, 142, 148} Studies that included data collected prior to public reporting included one study that interviewed Medicare beneficiaries before various versions of plan information were mailed and compared their plan selections to beneficiaries who received the different mailings;¹⁴⁴ three studies that compared different groups before and after public reporting;¹⁵⁰⁻¹⁵² and four studies that analyzed data from one group of subjects pre and post reporting.^{134, 136, 137, 153}

The most common *outcomes* in these studies (16 out of 23) were the selection of health plans by employees, people eligible for public insurance programs, or employers (Key Question 4).^{19, 132-134, 136-145, 152, 153} This selection outcome was operationalized in several ways including the likelihood of selecting a plan conditional on its quality rating, the probability of switching plans, or the retention of members by plans. The outcomes of studies that analyzed the changes in health plan performance in response to public reporting were changes in the quality of care provided by health plans (Key Question 1).^{130, 146-148} Two studies tested potential harms (Key Question 2): in one the harm was that plans would focus on what was measured in HEDIS and quality would decline on unmeasured care;¹⁵⁰ and in the other it was proposed that plans with high scores would withdraw from the Medicare market because providing high-quality care is too costly.¹⁴⁹ None of these studies of health plans and public reporting examined other changes in health plan behavior (Key Question 3) or the impact of characteristics of the public report (Key Question 5). Six out of the 23 studies specifically addressed contextual factors (Key Question 6) in addition to other outcomes, including one study that examined the relationship between change in quality and the varying levels of quality of health plans available in the market¹⁴⁴ and four studies that reported differences by the characteristics of the decisionmaker.^{130, 136, 142, 146, 147}

Effectiveness by Outcome/Key Question: Detailed Analysis of Quantitative Studies

Table 5 at the end of this section provides an overview of each included empirical study and a summary of the key findings. The complete abstracted data for each study is in the Evidence Tables in Appendix I.

Key Question 1. Quality of Health Care

Of the five studies that examined health care outcomes for health plans, three reported the impact of public reporting on HEDIS measures. Lied and Sheingold¹⁴⁶ found that all four reported HEDIS measures (adult access to prevention, beta blockers following a heart attack, breast cancer screening, and eye exams for people with diabetes) improved significantly from 1996 to 1998. Bardenheier, et al.¹⁴⁸ reported that childhood immunization rates improved (from 65.7 percent in 1999 to 67.9 percent in 2002) and that plans that publicly reported their rates had significantly better rates than those who did not after controlling for several factors including enrollment size and minority status of enrollees. Jung¹⁵¹ used health maintenance organizations (HMOs) that did not publicly release their HEDIS data as a comparison group for those who did. After controlling for differences among the plans she concluded that public reporting led to improvements in the composite quality score from 1997 to 2000 and that this improvement occurred in three of four domains (chronic illness, maternity, and childhood immunizations, but not in screening tests). Bost¹⁴⁷ was the one study identified that examined changes in both HEDIS and CAHPS data. He found that plans that released their data for 3 years in a row (1997-1999) had significant improvements in three of eight HEDIS measures (adolescent immunization, breast cancer screening, and beta-blocker treatment) and seven out of ten CAHPS domains. Reporting plans performed better than those plans that did not report or started releasing their HEDIS data in 1998. The only non United States study followed scores derived from CAHPS for 3 years after they were released publicly for health plans in The Netherlands.¹³⁰ The study found improvement in four of seven quality aspects. The government also identified areas in need of improvement among the aspects of quality. The study found that his added attention by the government did not influence where health plan improvement occurred.

Key Question 2. Harms

Two studies investigated potential harms due to public reporting about health plans. Pham, et al. tested whether the claim that plans that perform well on HEDIS would be forced to withdraw from Medicare because high quality care cannot be sustained under Medicare payment policy. Results that included adjustment for several confounders found that withdrawal was five times higher among plans with low scores (20.5 percent vs. 4.5 percent) as opposed to high sources on six HEDIS indicators, counter to the expectation related to this proposed harm.¹⁴⁹ In a larger study of the impact of policy on breast cancer screening, Habermann, et al.¹⁵⁰ explored another potential harm by comparing the stage of cancer at diagnosis among women 65-69 for whom the rates of screening were reported in HEDIS to that for women 70-75 who were not included in the HEDIS measure. The stage at diagnosis did not differ across the age groups, suggesting quality of care on the unreported activity is not crowded out by focus on the reported measure.

Key Question 3. Impact on Providers

We identified no empirical studies that examined the impact of public reports on provider behaviors.

Key Question 4. Impact on Patients or Purchasers

The bulk of the evidence about public reporting and health plans focused on how public reporting effects the selection of plans by employees, people eligible for public insurance programs, and employers planning to offer plans to their employees.

Four studies analyzed the health plan choices of employees in private companies. One study of university employees found that the quality of information had little or inconsistent effects on plan selection.¹⁴⁹ Chernow and Scanlon,¹³² in a study of the choices for single coverage at one large firm, concluded that the information on six out of eight HEDIS measures distributed to employees had no effect on choices during the 1995 enrollment period. A superior rating on the Medical Treatment domain increased selection but only in one of four models and a superior rating on satisfaction was actually related to decreased selection. A similar study of choices for family coverage in one company¹³³ found no strong response to HEDIS based ratings. A third study of a single company was not able to model the impact of specific measures but identified that plans with below average ratings were less likely to be selected, while superior ratings did not increase the likelihood a plan would be selected.¹³⁴ Abraham, et al.¹³⁸ analyzed information from 16 firms and did not find a link between quality information and employees switching plans. Beaulieu examined the choices of Harvard University and found a small, significant effect with a 1-unit increase in quality resulting in a 10 percent increase in the odds of switching plans.¹⁴⁹

Four studies of State and Federal employees and retirees conducted during the same time periods had mixed results. In a study of Minnesota State employees in 1995, the choices of employees at locations who received a public report on available health plans were compared to those at locations that did not and the reports were found to have limited impact on health plan choice.¹⁵² Three studies involved Federal employees or retirees. Wedig and Tai-Seale¹⁵³ reported the odds that new hires use quality information in their choice increased 57 percent in 1996 when the public report was distributed compared with the year before. In another study of the distribution of satisfaction information to Federal employees during open enrollment, retention of health plan members declined compared with prior periods in which satisfaction materials were not distributed, suggesting the information inspired employees to drop plans. Jin and Sorenson¹⁹ analyzed the choices of Federal retirees in 86 counties with multiple plan choices and estimated that 99.3 percent of all choices would have been the same, but in the case where employees did change plans the information was important.

The six studies of plan choices in Medicaid and Medicare programs similarly find no or limited impact of public reports on choice of plans. Three of these studies use random assignment to distribute the quality reporting materials and create control and intervention groups. Farley, et al. conducted studies in New Jersey¹⁴⁰ and Iowa¹⁴¹ in which the intervention groups received Medicaid enrollment materials that contained CAHPS information while the controls received standard enrollment materials. Enrollment data was combined with phone interviews to assess the impact of the CAHPS report. In New Jersey half of the people who were mailed the CAHPS data reported receiving it and there was no difference in HMO selection across the groups. In Iowa the difference in the odds of switching or staying with the assigned plan were the same in the CAHPS and the control group. Furthermore, switching from a low-rated HMO to a higher rated HMO was the same in the two groups, suggesting this choice is based on information from another source. McCormack used a similar design to test the impact of quality information on Medicare beneficiaries.¹⁴³ Medicare beneficiaries in 1999 were randomly assigned to receive different versions of program information, one of which contacted

a CAHPS report. The different information did not have an impact on switching health plans although it did increase the confidence of experienced beneficiaries in their choice.

Women newly eligible for Medicaid in Kansas were also sent materials with and without CAHPS reports in a study by Fox, et al.¹³⁹ The distribution of the materials was not tracked so they had to depend on survey self reports of respondents as to whether they received the CAHPS materials or not. Those who reported receiving the report said it made it easier to judge plans and they were less likely to be most influenced by a doctor or nurse in their choice. Lui, et al. studied the impact of HEDIS and CAHPS on the choices made by parents enrolling their children in a State insurance program in New York State.¹⁴² They found that a 1-unit increase in the CAHPS score resulted in a 2.5 percentage point increase in the probability of plan selection while the HEDIS scores had not impact on choices. Dafny and Dronove¹⁴⁴ sought to determine the relative importance of quality scores and other sources of information for people selecting Medicare HMOs. They found that Medicare enrollees were switching to high-quality plans independent of public reports. The public report had an effect above this existing switching which was in response to the single item from CAHPS, while the single HEDIS item had no effect.

Finally, one study analyzed the health plan choices employers made to offer to their employees. Looking at large employers in 2000, Chernew, et al.¹⁴⁵ found that employers were more likely to offer plans with better HEDIS and CAHPS ratings.

Key Question 5. Public Report Characteristics

We identified no empirical studies that examined the impact of public report characteristics on the effectiveness of public reporting.

Key Question 6. Context

Five studies examined outcomes by contextual factors including characteristics of the environment and the decisionmaker.^b One study examined the HMO market for Medicare beneficiaries and found that the quality information was more likely to contribute to plan selection when the market included plans with varying quality.¹⁴⁴

Two studies specifically examined characteristics of the people selecting health plans. In a study of university employees Beaulieu¹³⁶ confirmed that older people and people selecting family coverage had stronger preferences for quality while younger people and people selecting single coverage were more sensitive to price. Lui, et al.¹⁴² determined that parents of children with special needs were more influenced by quality ratings than other parents when choosing from plans offered by a State-sponsored agency.

In two studies, improvement in the quality ratings was attributed more to plans that started with lower ratings. Lied and Sheingold¹⁴⁶ documented that most of the improvement in health plan performance on HEDIS measures from 1996 to 1998 could be attributed to improvement by plans with poor performance in 1996. In the one non United States study, for six out of the seven quality aspects measured for Dutch health plans, the improvement in performance of below-average plans outpaced improvement by plans that had average or above-averages scores at baseline.¹³⁰

^b Studies often include contextual factors as part of their major analyses in which they serve as control variables, allowing a sensitivity analysis or tests of robustness for the primary comparison. Studies were included here if the contextual factors were the subject of a subgroup analysis or produced different results.

Summary of Qualitative Studies

We identified 26 qualitative studies and lab-type experiments reported in 28 articles that focused on public reporting about health plans and corresponded to at least one of our key questions. These are included in the evidence table in Appendix M. All were conducted in the United States and published between 1996 and 2009. The year the studies were published are included after the summary of the results in order to allow identification of any trends over time.

Five studies were descriptive surveys,¹⁵⁵⁻¹⁵⁹ 11 articles reported on nine studies that used focus groups alone,¹⁶⁰⁻¹⁶⁵ or in combination with interviews and questionnaires,¹⁶⁶⁻¹⁷⁰ two summarized interviews,^{171, 172} and nine were lab-type experiments in which participants were asked to evaluate materials in terms of format or applicability to future decisions.¹⁷³⁻¹⁸¹

End Users

Two of the five descriptive surveys asked end users (people selecting health plans in the future) about their experience with CAHPS and the evaluations were generally positive.

- Sixty percent of health plan members in Washington State reported that CAHPS was easy to understand and 30 percent selected it as the more useful source of information when selecting a plan.(2000)¹⁵⁵
- Similarly, in evaluation surveys in five States, 10 percent to 40 percent (varied by State) reported that CAHPS had a lot of influence on their choice although fewer than half of intended recipients remember receiving the information.(2002)¹⁵⁷

Employers

Two surveys asked employers about how they selected plans to offer their employees.

- One reported that 58 percent of employers used some source of quality information when making their decision(2001).¹⁵⁶
- Another found that just over half considered HEDIS and CAHPS ratings when selecting plans to offer and that this did not vary by company size.(2007)¹⁵⁸

Health Plan Leadership/Sponsors

- One study combined interviews and focus groups conducted over 3 years with representatives of managed care plans who were subject to public reporting of CAHPS about their Medicare plans. Credibility of the report increased and concerns decreased over time and participants reported increasing QI efforts in response to low scores as well as a reluctance to share best practices with others due to competition for better ratings.(2001)¹⁶²
- Similarly, interviews with leaders at 24 plans in six States found that despite having issues with the cost of collecting HEDIS information and the specificity of the information, 77 percent of reported QI activities were identified as a response to performance measurement, with 37 percent attributed directly to HEDIS and 6 percent to CAHPS.(2001)¹⁷¹
- Interviews with public agencies and business coalitions that sponsored CAHPS found that sponsors were invested in producing and disseminating reports annually (80 percent or 20 out of 25 interviewed) and were using various media (Web, 100 percent; written materials, 96 percent).(2007)¹⁷²
- One additional survey asked medical directors of health plans if they changed policies and practices in response to HEDIS measures and 54 percent reported they revised guidelines and 62 percent reported that they began measuring screening rates.(2008)¹⁵⁹

The remaining focus group studies were all with end users of different types. Two studies conducted in multiple cities identified numerous barriers to use of quality information by people with Medicaid, Medicare, and private insurance.

- Twenty-two focus groups in eight locations found that the information was perceived as marketing and that most people did not understand the indicators or expect health plans to be able to influence the results.(1996)¹⁶⁰
- Results of focus groups in six cities that focused on format reported that most issues were common sense such as consumers wanted short, clear information and guidance on how information should be used, but that most existing health plan quality materials do not meet these criteria.(2001)¹⁶⁹

Two were specifically constructed to develop and test Medicare materials that included CAHPS quality information.

- Harris-Kojetin(2001)¹⁶¹ reported the results of seven focus groups in which participants reported finding CAHPS generally easy to understand but interpreting the report as “pushing HMOs” as only HMOs are included.
- Goldstein(2001)¹⁶³ used focus groups, cognitive interviews, and mall-intercept surveys to ask Medicare beneficiaries about the meaningfulness of CAHPS domains and the format. Participants chose getting needed care and getting care quickly as more important than customer service and office staff; results were mixed on format preferences with some confused by star ratings and others by bar charts.

Three focus group studies included people with different types of health care coverage and focused on format and comprehension. Three articles reported different aspects of the results of 15 focus groups, supplemented by followup questionnaires that focused on comprehension and interpretation, and included people with private insurance and Medicaid as well as those uninsured. Participants were unable to generalize from specific indicators to overall assessments of quality and did not understand ratings of undesirable events.(1996)¹⁸² Participants stated that patient rating and desirable events were most important to them. But when they chose plans they chose those with better scores, that is, fewer undesirable events because these were viewed as aspects of care they cannot control that could have dire consequences.(1996)¹⁶⁷ Another analysis of these group responses found that participants rated the indicators that they better comprehended as most important while those they did not understand were given less weight.(1997)¹⁶⁸

Two focus group studies asked people with disabilities(2007)¹⁶⁵ and mobility issues(2002)¹⁶⁴ about their information needs. In focus groups in five States, people with disabilities were shown actual public reports from California, Maryland, Michigan, and Texas. Comments on format were not surprising: most wanted shorter public reports with numbers and visuals and some did not understand star ratings or composite scores. In addition to disability-specific information they were interested in ratings on care coordination and the physical accessibility of facilities.(2007)¹⁶⁵ In focus groups that discussed CAHPS, participants rated the CAHPS domains as important but also asked for this additional information as well as more on access to specialists, rehabilitation, and equipment.(2002)¹⁶⁴

An evaluation of the California Quality of Care Report Card used focus groups and interviews and web site tracking to evaluate the report from the perspectives of consumers, health plans, and other stakeholders. Most visitors to the Web site visited the summary page with the star charts, but did not click through to the more detailed pages. All of the HMO executives

and all but one of the medical group directors interviewed were familiar with the report. Forty-seven percent of medical groups and 13 percent of health plans reported undertaking QI efforts in response to the report.(2005)¹⁷⁰

Lab-type experiments explored the impact of both format and choice options. Included studies concluded that changes in format can increase ease of use and knowledge;(2006)¹⁷⁹ that using graphics such as bar charts or stars can increase comprehension but the results varied by subgroup;(2001)¹⁷⁵ that framing quality in terms of risk increased comprehension more than framing as benefits;(2000)¹⁷⁴ and that people need evaluative labels such as good, fair, and poor when evaluating performance.(2009)¹⁸¹ Lab-type studies have also been used to assess the potential impact of quality information on a decision. One study found that CAHPS increased perceptions of the availability of information on plan performance(2002)¹⁷⁸ and another study of family members or agents for Medicare beneficiaries found that people say they want more information but time constraints and the increased cognitive burden decrease the likelihood it will be used.(2007)¹⁸⁰

Other lab-type experiments explore the tradeoffs people are willing to make when selecting plans. In one study HMOs and PPOs were given different CAPHS ratings and costs and people were more likely to pick the scenario where the plan with the higher CAPHS rating cost less but covered less.(2000)¹⁷³ In scenarios including quality information and the choice between HMOs and traditional Medicare, the quality information did not increase HMO selection over traditional Medicare, but did impact choices among HMOs.(2002)¹⁷⁶ In a study that examined the impact of specific indicators on people's willingness to accept plan restrictions, the researcher found this varied by indicator, with people more likely to accept restrictions if the rating was high for members being extremely satisfied with care.(2002)¹⁷⁷

Table 5. Summary of evidence: Public reporting on quality of health plans

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Abraham 2006 ¹³⁸ (Poor)	Performance results booklet containing member satisfaction survey results awards for quality.	Examined health plan choices of employees of 16 firms that distributed or did not distribute quality information and whether performance information leads to switching plans. N= 651 single employees	4	↔Quality information does not have an impact on switching plans ↑Employees are more likely to be aware of quality information when booklet is distributed to all employees or available on request then when booklet was not distributed by employers
Bardenheier 2007 ¹⁴⁸ (Fair)	HEDIS	Examined the effect of HEDIS reporting on childhood immunization rates in health plans that publicly reported their data compared with the non publicly reporting health plans. N=423 plans in 1999, 383 plans in 2000, 371 plans in 2001 and 332 plans in 2002.	1	↑Public reporting results in a statistically significant increase in immunization (p<0.009) controlling for accreditation, enrollment size, years in business, region, minority status of enrollees and purporting of enrollees who had a primary care visit.
Beaulieu 2002 ¹³⁶ (Fair)	Plan profiles provided by employer (Harvard)	Examined whether quality information affects health plan choice in Harvard University employees from 1994 to 1997. N=11,500 employees	4	↑Employees were slightly but significantly more likely to switch from a low-quality plan than a high quality plan (p<0.01). ↑One unit increase in quality resulted in a 10% increase in odds of switching plans (p<0.01).
			6	↑ Families and older individuals have stronger preferences for quality; younger and single are more sensitive to price
Bost 2001 ¹⁴⁷ (Poor)	HEDIS and CAHPS	Evaluated the impact of public reporting of HEDIS for 1996, 1997 and 1998, and 1999 on HEDIS and CAHPS scores. N=421 health plans	1	For plans that publicly reported, all 8 HEDIS measures improved over time. ↑ 3 out of these 8 measures improved significantly over the 3 years (p<0.01) ↑ 7 out of 10 CAHPS measures were better for reporting plans compared to non reporting and new reports. (p<0.01)
Chernew 1998 ¹³² (Fair)	HEDIS	Analyzed the impact of plan performance rates on employee health plan choices of single coverage at one company. N=5795 employees	4	Relationship between ratings and choice is inconsistent ↔no effect 6 out of 8 measures ↑Superior rating on medical treatment related to increased selection but only significant in 1 of 4 models. ↓Superior rating on satisfaction is related to lower likelihood of choosing a plan.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Chernew 2004 ¹⁴⁵ (Fair)	CAHPS and HEDIS	A cross sectional comparison of plans offered by employers in the United States by those not offered in terms of quality measures. N= 855 employer/MSA combinations	4	↑ Employers are more likely to offer plans with better HEDIS and CAHPS scores. Also more likely to offer low-cost plans and plans that are non-profit, established and part of national chains.
Dafny 2008 ¹⁴⁴ (Fair)	One HEDIS measure (mammogram rate) and one CAHPS measure (first communicate, then best care) included in the <i>Medicare and You</i> brochure.	Examined the association between public reports and switching behavior by comparing Medicare beneficiary responses before and after receiving mailed information including one HEDIS and one CAHPS indicator. The focus was on separating responses due to learning about quality from other sources from these. N=8212 plan-county-year combination	4	↔ Medicare enrollees were switching to high quality plans independent of the public reports during the period. ↑ A response to the public report is still found controlling for switching already happening. This effect is due to the CAHPS measure about best care, not the HEDIS measure. ↑ Switching is within HMOs, not from traditional plans to HMOs and is small (1.24% of beneficiaries in 2002 estimated through simulations).
			6	↑ Impact of public reports greater in markets that have providers of varying quality levels.
Farley 2002a ¹⁴⁰ (Good)	CAHPS	Assessed the impact of CAHPS health plan performance information on plan choices by New Jersey Medicaid beneficiaries randomly assigned to receive or not receive the CAHPS information. N= 1763 intervention and 787 control	4	About 1/2 of people mailed CAHPS report say they received and read it ↔ No difference in HMO selection across groups ↑ Group that said they read it was more likely to pick a high quality HMO than control, but only if they did not pick the dominate HMO in market
Farley 2002b ¹⁴¹ (Good)	CAHPS	Examined the impact of CAHPS on the health plan choice of lowan Medicaid beneficiaries randomly assigned to receive or not receive CAHPS information. N=13,077 new beneficiaries	4	↔ The odds of switching vs staying in an assigned HMO in CAHPS vs No CAHPS group was not statistically significant. ↑ Participants were significantly more likely to switch from a low-rated HMO to a high-rated HMO than from a high- to a low-rated HMO, independent of the CAHPS information, suggesting this is based on other information.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Fox 2001 ¹³⁹ (Poor)	CAHPS	Evaluated the impact of CAHPS report vs. no CAHPS in selecting a managed care plan by Medicaid enrollees in Kansas in May 1998. N= 698 new enrollees	4	↑Ease of judging quality of care was rated easier by in CAHPS report group vs no CAHPS p=0.01 ↓Making Informed Choices: Odds of choosing most influenced by doctor or nurse was 30% lower in CAHPS groups vs No CAHPS group. People self-reporting receiving report: 39.4% said it influenced their choice of plan a lot; 31.7% a little.
Habermann 2007 ¹⁵⁰ (Fair)	HEDIS	Examined the effect of HEDIS measures on reported and unreported quality care, which is assessed by comparing stage of breast cancer for women 65-69 years old (reported) and 70-75 years old (not reported). N=30,857 Women ages 65-74 diagnosed with breast cancer from 1994 – 2002	2	↔ lack of difference in stage across age groups reported and not reported in HMOs and the persistent of the difference between Fee for Service and HMO across the two age groups suggests there is not crowding out and may be spill over to the older group not included in the HEDIS measure.
Hendricks 2009 ¹³⁰ (Poor)	CAHPS version	Analyzed whether health plan quality improved in The Netherlands after the introduction of public reporting. N= 30 plans in 2005 and 32 in 2006, 2006, and 2008	1	↑Improvement on 4 of 7 quality aspects (General rating, health plan information, access to call center, transparency of copay requirements). Improvements were small. Identification of areas as important by the government did not influence which areas experienced improvement.
			6	↑6 of 7 quality aspects the performance of below-average scoring health plans increased more than the performance of average and/or above-average scoring health plan.
Jin 2006 ¹⁹ (Good)	HEDIS and CAHPS	Estimated the impact of public reports of quality on choice of plan for retirees covered by the Federal Employee Health Benefit Plan separate from the impact of quality information they can obtain without the report. N= employees in 86 counties with the greatest number of plans	4	↔99.3% of enrollment choices would have been the same with or without the information. ↑The impact of public information on choice of plan is 2.63 percentage points increase in likelihood of choice with one standard deviation increase in reported score.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Jung 2010 ¹⁵¹ (Good)	HEDIS	Examined the impact of voluntary information disclosure on quality of care in HMO markets in the United States by comparing HEDIS scores for disclosing and non disclosing HMOs. N= 797 discloser and 265 non disclosing HMOs	1	↑Public reporting leads to an increase in the composite quality score after controlling for differences in plans. ↑in 3 of 4 domains (chronic illness, maternity, childhood immunizations) ↔ on 1 of 4 domains: screening tests
Knutson 1998 ¹⁵² (Fair)	SEGIP (employee group insurance) produced report	Tested effect of public report vs. no public report on the knowledge, attitudes, and choice of health plan by Minnesota State employees. n=385-431 for different types of employees Total N=3573	4	Limited impact of public reports ↔5 out of 8 outcome measures showed no significant difference in either single or family coverage groups. 3 significant findings ↑Knowledge in single coverage intervention group improved significantly but not in family coverage group. ↑Relative importance of cost and quality of health plan significantly improved in family coverage intervention group but not in single coverage. ↑Single coverage intervention group switched more frequently than control.
Lied 2001 ¹⁴⁶ (Fair)	HEDIS	Estimated improvements in four HEDIS measures from 1996 to 1998. N= varies by measure from 55 to 167	1	1 All improved over study years; within year comparisons varied ↑All 4 outcome measures improved between 1996 to 1998 statistically significantly (p<0.05) . ↑2 out of 4 outcomes increased statistically significantly between 1996 to 1997. ↔2 of the 4 outcomes changed but not significantly between 1996 to 1997. ↑All 4 measures increased between 1997 to 1998 where 3 were significant and 1 was not.
			6	↑ the plans with poor performance in 1996 accounted for most of the improvement.
Liu 2009 ¹⁴² (Fair)	CAHPS and HEDIS	Examined whether parents of children enrolled in the New York State Children's Health Insurance Program chose managed care plans with better quality and whether this differs across subgroups such as special needs and income. N=2644 parents of new enrollees	4	One unit increase in CAHPS score increase probability of plan selection by 2.5 percentage points ↔HEDIS scores had no significant association with plan choice.
			6	↑CAHPS had a larger impact on choice by parents of children with special needs ↔Impact was not significantly different by education or income

Author Year (QA)	Public Report	Study Overview	Key Question	Results
McCormack 2001 ¹⁴³ (Fair)	CAHPS	Examined the impact of CAHPS vs. no public report on the choice and attitudes of Medicare beneficiaries in 1998-1999. N= 1156 experienced beneficiaries (62% response) N=951 new beneficiaries (58% response)	4	↔Use of information for health plan switching did not vary ↑Experience beneficiaries who received CAHPS info were more confident in plan choice p<0.01 ↓New beneficiaries less likely to use mailed materials to chose plan in the group that received the CAHPS p<.01
Pham 2002 ¹⁴⁹ (Good)	HEDIS	Assessed whether high performance on quality indicators by health plans was associated with withdrawal from Medicare. N=2310 Contract-County Units	2	↔The hazard of withdrawal is higher in low-quality health plans vs. high-quality health plans. All results were statistically significant. This is contrary to the suggested harm that high quality plans would withdraw.
Scanlon 1999 ¹³³ (Fair)	HEDIS-based ratings created by employer	Analyzed of the impact of HEDIS-based ratings on one company's employee selection of plans for family coverage. N= 96 plans available to sampled employees	4	No evidence of strong response to ratings ↔no effect 4 out of 5 domains. ↓Superior rating on surgical care is related to lower likelihood of choosing a plan, which may be due to correlation among items.
Scanlon 2002 ¹³⁴ (Good)	GM Public Report + HEDIS	Examined the impact of HEDIS on health plan choice in GM employees. N=29,000	4	↔ Modeling of impact of specific domains on choice was not successful ↑Plans with below average ratings were less likely to be selected. Impact of below average rating is large compared to impact of price. ↔Superior ratings did not increase likelihood of choice.
Tai-Seale 2004 ¹³⁷ (Fair)	OPM	Explored the link between distribution of satisfaction information and retention of members in health plans among Federal employees. N=250 plans	4	↑Distribution of satisfaction information appears to have an impact in that it is associated with lower retention, suggesting the information induced people to withdraw from plans.

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Wedig 2002 ¹⁵³ (Fair)	Public report created by Office of Personnel Management for Federal employees.	Tested the hypothesis that publicly reported quality indicators impact the choice of health plans in Federal employees between 1995 where public report distribution was limited and 1996, where public report was widely disseminated. N=4299 in 1995 N=4863 in 1996	4	↑In 1996, the odds of using quality information for choosing a plan was 57% higher for new hires and 21% higher in existing employees, compared to 1995 hires.

Abbreviations: CAHPS, Consumer Assessment of Healthcare Providers and Systems; HEDIS, Healthcare Effectiveness Data and Information Set; HMO, health maintenance organization.

↑Improvement
 ↓Worse
 ↔No difference

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes? Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Long-Term Care Services

Prior reviews (e.g., Fung,¹⁴ Marshall¹⁸³) of public reporting predate major national initiatives in public reporting of quality measure for long-term care. The Centers for Medicare and Medicaid Services (CMS) began posting quality data on their Nursing Home Compare Web site in 2002 and on Home Health Compare in fall 2003. Hospice Compare is scheduled to begin voluntary reporting in Fall 2011, and reporting will become mandatory in October of 2012.

Selecting a long-term care (LTC) service may be substantially different than selecting other health care services. Decisions about LTC are likely to involve family members. They may be made during a hospitalization to expedite discharge with the involvement of discharge planners or social workers. Alternatively people may be admitted from the community when disease progression and functional impairments require more than outpatient management. Nursing homes (NHs) (alternatively referred to as nursing facilities or skilled nursing facilities) and home health agencies admit people from hospitals and the community. Nursing homes provide post acute care to people who are expected to improve (referred to as short-stay residents), as well as care for long-stay residents with degenerative or debilitating conditions who are likely to need care for an extended period. Similarly, home health agencies provide post acute care and also admit people from the community with chronic care needs.

Long-term care organizations, individuals that provide care (providers), and quality improvement efforts might also differ from acute care and health plans. As the market areas are different for LTC, the choices may be greater since there is some substitution among types of services (NH, home health, assisted living, etc.). The choices may also be more limited when only one provider is available in a geographic area or a location near family is more important than any other consideration. Many LTC service providers are for-profit and public payers (Medicare and Medicaid) are major sources of revenue. For this reason and due to a history of financial crime, unsafe conditions, and abuse, these services have traditionally been heavily regulated. Combined with the need to serve two very different populations, short-stay and long-stay residents, these factors create a challenging environment. While the underlying theory of how public reporting may lead to quality improvement is the same across settings, the different environment and history may affect its potential impact on long-term care.

We identified 16 observational studies and six qualitative studies that met our inclusion criteria and corresponded to our Key Questions. The observational studies are described and analyzed first. This is followed by a summary of the qualitative studies.

Overview of Findings

Quality of Care

- Some quality measures (QMs), but not all, improved after public reporting.
 - Measures for short-stay residents of nursing homes showed improvement across studies more consistently than measures for long-stay residents.
 - For long-stay residents the measures that improved across multiple studies were physical restraints and pain while the rest of the measures had no improvement or mixed results.
- Public reporting for LTC is a national program which makes it challenging to design studies where the improvement can be attributed to the public report.

- The one study that controlled for regression to the mean concluded that there was improvement above what could be explained by regression to the mean.
- A few studies attempted to use prior periods and one attempted to construct a reasonable control group. However, many studies were “post only” designs that made it impossible to determine if the public report contributed to the change.

Harms

- Two harms were examined (cream skimming and decline in quality of aspects of care not measured) and the studies concluded that overall the harms were not realized.
 - One study found some evidence that the number of patients admitted with pain declined among NHs that had low reported quality scores for pain and among for profit and nonprofit NHs compared with government NHs, indicating some cream skimming.

Impact on Providers

- NH administrators reported in surveys that they were taking action in response to NH Compare.
 - Actions appeared to be motivated more by the administrators’ belief that public reporting influences referral from professionals and the state survey process than by patient and family use of NH Compare in their selection of NHs.
 - Nursing homes that reported taking actions experienced improvements in quality measures.
 - Actions by nursing home administrators included investing more resources in clinical care.
- Improvement in one QM (influenza vaccination rates) improved after public reporting, but it increased even more among community dwelling elderly, supporting the idea that factors other than public reporting may be driving change.

Impact on Patients or Purchasers

- There was not enough evidence to make generalizations, as only one study looked at patient selection and it used a problematic outcome measure (occupancy rate) that may have limited variation and is likely to be caused by factors other than patient selection.

Public Report Characteristics

- No studies were identified.

Context

- Studies that examine the impact of two market characteristics, competition and occupancy rates (characteristics of the environment), found that publicly reported quality measures are more likely to improve in competitive markets and in markets with low occupancy rates (suggesting there are choices and providers must compete to fill beds).
 - These finding supported the idea that public reporting provides information that influences market-based behavior.
- Ownership characteristics of NHs (e.g. for profit/nonprofit, government, chain affiliation, hospital-based) did not have a consistent effect on the impact of public reporting.

- Nursing homes that started with lower publicly reported quality ratings were more likely to improve their ratings than those that started with higher scores, which is not surprising given the NHs with higher scores may not have had a problem to fix or there may be a ceiling effect for the measure.

Description of Quantitative Studies

We identified 16 observational studies about public reporting on long-term care services (see Evidence Tables in Appendix N and O) and report on the results of 15. One study was not included after inconsistencies were identified in the reported results.¹⁸⁴ All these studies were published between 2005 and 2010. One study was about home health care services¹³ and the rest concerned NHs. All studies were conducted in the United States and used national data or a sample based on national data.

The *populations* in the studies were both organizations that provide care (nursing homes and home health agencies) and patients/families/payers. Nursing homes or home health agencies are assumed to respond to public reporting by improving care practices that lead to improvements in the reported quality measures as well as other health care outcomes. Patients or payers are assumed to respond by selecting higher quality NHs or home health agencies. However, selection was not measured directly in any of these studies. In the one study where patient choice was the outcome of interest, occupancy rate was used to represent selection.¹⁸⁵

The public reporting *intervention* in almost all of the identified studies was Nursing Home Compare. Eleven of the studies concerned public reporting of quality measures for both long-stay and short-stay nursing home residents. Of these, nine studied some aspect of the impact of NH Compare,¹⁸⁵⁻¹⁹³ while one focused on a designation given by CMS to facilities with chronically poor quality (Special Focus Facilities [SFFs])¹⁹⁴ and one analyzed state survey deficiency and staffing level information that was made public prior to existence of quality indicators on NH Compare.¹⁸⁵ Three studies were about NH Compare but limited their scope to the quality measures for short-stay residents.^{12, 195, 196} We identified one study about Home Health Compare.¹³

Nursing Home Compare and Home Health Compare are nationwide public reporting programs that include almost all nursing home and home health agencies certified by Medicaid and Medicare. Only those agencies that accept solely private payments and those with small numbers of patients/residents were excluded. This affected what *comparators* and study designs were possible (see Appendix D for definitions of the study design terminology used in this report). This also influenced the quality assessment of the studies and is the reason confounding and similarity across compared groups or compared time periods were given more weight than other criteria (see Appendix G for the quality assessment for these studies and Appendix F for a description of the quality assessment criteria). Five studies were assessed as good quality, nine as fair quality, and two as poor quality in terms of their ability to rigorously address our key questions.

The most common type of study we identified was “interrupted time series” (six studies), in which data on quality measures from periods prior to NH Compare were compared with periods after NH Compare was made public in 2002.^{185, 189, 192, 195, 197, 198} Six other studies included data from periods only after the quality data were made public: two were “time series post only” studies that examined change and trends after NH or Home Health Compare;^{13, 186} three were “one group post only” that quantified a change from one time period to another after NH compare;^{187, 188} and one “comparison group post only” study compared NHs in counties with and

without a NH designated as chronically poor quality by CMS – a SFF – after these facilities were publicly identified.¹⁹⁴ Two studies are cross sectional and based on survey data.^{190, 193} Other studies with pre and post NH Compare data included one “multiple group interrupted time series” that compared multiple time periods before and after NH Compare for a small group of NHs not required to report and a subset of smaller NHs that were required to report,¹² as well as one “one group pre post” study in which MDS data was used to calculate the values of the quality measures before they were publically reported compared with 12 months after they were publically reported by NH Compare.¹⁹⁶

The most frequent *outcomes* in these studies were changes in the publicly reported quality measures reported in eight articles (seven studies), either overall (Key Question 1) or compared across provider or market characteristics (Key Question 6). Two studies examined potential harms (Key Question 2), but each focused on a different harm so each had a different outcome. One harm was that NHs might choose not to admit people who could negatively impact their quality rating. The outcome was characteristics of admission cohorts before and after public reporting. The second harm was that providers will focus on improving the publically reported measures to the detriment of other aspects of care. In this case the outcome was quality measures that were not publically reported. Three of the five studies that reported on changes in health care delivery (Key Question 3) used survey responses by NH administrators about actions they have taken in response to public reports. The other two examined whether NHs increase clinical expenditures and one other looked at changes in vaccination rates in response to public reporting. The only study that looked at changes in patients’ or purchasers’ behavior (Key Question 4) used occupancy rates as the outcome measure. None of these studies of long-term care services examined the impact of characteristics of the public report (Key Question 5). Nine studies specifically addressed the impact of context, such as market characteristics or characteristics of the NHs or their administrator, on the effectiveness of public reporting. Market characteristics studied included competition, occupancy rates, and the presence of chronically poor-quality nursing homes. Provider characteristics examined in identified studies included ownership (for profit/not for profit/government ownership), chain affiliation, and high or low rating on QM in prior periods or at baseline.

Table 7 at the end of this section provides an overview of each included study and a summary of the finding.

Effectiveness by Outcome/Key Question: Detailed Analysis of Observational Studies

The results for each key question are discussed below.

Key Question 1: Quality of Health Care

All five studies that examined health care outcomes for long- or short-stay NH residents analyzed changes in the quality measures (QMs) reported in NH Compare. Improvement was noted in some QMs and others had no significant change, while for a few, quality worsened during the period of study. At its launch NH Compare included 10 QMs, but items were dropped and added during the first few years (see superscripts in Table 6). Four of the five studies examined all the measures available at the time of the study period for their population of interest. One study¹⁸⁹ was restricted to five QMs as these could be reliability constructed from prior data for a pretest/posttest comparison.

Table 6. Study findings: change in Nursing Home Compare quality measures

Quality Measure	Zinn, 2005 ¹⁸⁶ (Fair)	Mukamel, 2008 ¹⁸⁹ (Good)	Castle, 2008 ¹⁸⁸ (Fair)	Werner, 2009 ¹²⁷ short-stay only (Good)	Werner, 2010 ¹⁹⁶ short-stay only (Good)
Long-Stay Residents					
Increased help with daily activities	↔	↔	↓	NR	NR
Pain	↑	NR	↑	NR	NR
Pressure sores ^a	↔	↓	NR	NR	NR
Pressure sores risk adjusted ^a	↔	NR	NR	NR	NR
High-risk with pressure sores ^b	NR	NR	↑	NR	NR
Low-risk with pressure sores ^b	NR	NR	↑	NR	NR
Physically restrained ^c	↑	↑	↑	NR	NR
More depressed ^b	NR	NR	↑	NR	NR
Lose control of bowel or bladder ^b	NR	NR	↓	NR	NR
Catheter ^b	NR	NR	↑	NR	NR
Infection ^a	↔	↔	NR	NR	NR
Most time in bed or chair ^b	NR	NR	↔	NR	NR
Worse ability to move around ^b	NR	NR	↓	NR	NR
Urinary tract infection ^c	NR	NR	↓	NR	NR
Lose too much weight ^b	NR	NR	↓	NR	NR
Short-Stay Residents					
Delirium	↑	NR	↑	↑	↔
Delirium risk adjusted ^a	↔	NR	NR	NR	NR
Pain	↑	↑	↑	↑	↑
Pressure sores ^b	NR	NR	↑	NR	NR
Walking ^a	↔	NR	NR	↑	↔

↑improvement; ↓worse; ↔ no change; NR, not reported.

^a Included only in 2002 and 2003.

^b Added in 2004.

^c Added in 2003.

Table 6 demonstrates that four QMs consistently showed improvement across studies while the results for most other QMs were mixed. Some of the QMs that were dropped after 2003 (e.g., infection) or added in 2004 (e.g., lose too much weight) have not been reported in enough studies to identify a pattern. Pain and physical restraints in long-stay patients as well as pain and delirium in short-stay residents have been reported since 2002 or 2003 and multiple studies have found improvement.

The one identified study of Home Health Compare¹³ found that QMs for patients' ability to manage four activities (bathing, transferring, taking medications, and walking) and pain improved after the publication of Home Health Compare. Changes ranged from a 7.1 percent improvement for transferring to a 18.9 percent improvement for ability to walk around. Need for urgent care remained stable while hospitalizations increased (interpreted as worse quality) during the study period.

Key Question 2: Harms

Two studies examined two different potential harms that could result from public reports about LTC.

Mukamel et al.¹⁹¹ analyzed the characteristics of NH admission cohorts to determine if NHs responded to the public report by changing their admission policies. Specifically, they examined whether NHs admitted less sick or frail people in order to improve their publicly reported quality ratings. This is referred to as “cream skimming.” They examined six characteristics of admission cohorts and found that four (ADLs, diabetes, incontinence, and stage 2 or higher pressure ulcers) did not decline in people admitted post NH Compare, suggesting there was no cream skimming. For these four admission characteristics in which there was no decline, a decline was also not found in stratified analyses by NH types, suggesting the overall analyses were not hiding cream skimming by specific types of NHs. For two characteristics, pain and memory loss, there were small declines; a 13 percent decline in admissions related to the prevalence pain and 0.7 percent decline in admissions for memory loss. For pain the evidence of some cream skimming was seen across the subgroups by NH ownership and initial quality with no differences by chain affiliation or region. For profits and non profits were more likely to cream skim than government-owned NHs and but the strongest association was that NHs with poorer quality scores at initial publication were more likely to cream skim. For memory loss, the subgroups with more cream skimming were for profits and NHs with chain affiliation.

The second harm investigated in the identified studies was that NHs will invest their resources in improving what is reported and the quality of other unreported aspects of care will deteriorate. The idea is that with limited resources, improvement in the reported measures will ‘crowd out’ improvement in the unreported activities or outcomes. To investigate this Werner et al.¹⁹⁵ compared quality indicators for short-stay nursing home residents that were publically reported to other indicators that were developed but not included in the public reporting. Data were available for both indicators prior to, as well as after, the release of NH Compare. This allowed analyses of the trend before and after public reporting as well as point estimates of the change. All three of the reported QMs improved (pain, delirium, and walking) while the nine unreported measures were split with five showing improvement (improvement in pain, locomotion, shortness of breath, incontinence, and respiratory function) and four worsening quality (UTI, ADLs, mid-loss ADLs, and early-loss ADLs). The QMs that worsened were trending downward prior to 2002 when NH Compare was released. While that might suggest the decline was not caused by NH Compare, it does not negate that possibility that focusing on the reported QMs preempted QI on these. However, stratified analyses found that facilities that scored highest on the reported QMs were more likely to improve on the unreported measures. This suggests that “crowding out” is limited and that the difference may be in the capacity of the NHs to implement QI.

Key Question 3: Impact on Providers

Five studies of public reporting explored the impact of the NH Compare on behaviors of organizations and individuals who provide care.^{189, 192, 193, 198, 199}

Three of the studies used surveys to collect information from nursing home administrators on their specific responses to NH Compare. Zinn, et al.¹⁹⁰ and Mukamel, et al.¹⁸⁹ used data from the survey that was mailed in May and June 2004 to a 10 percent sample of administrators of nursing homes that were included in the first publication of NH Compare. Of the 1,502 surveys sent, 724 were completed (48.2 percent). Zinn¹⁹³ conducted another survey with different questions in

2007 that was also mailed to 10 percent random sample of administrators of NHs included in NH Compare in 2006. This second survey was sent to 1,407 administrators and returned by 538 (38.3 percent).

In the first survey Zinn¹⁹⁰ asked administrators if they took any of seven actions in response to NH Compare, had the administrators complete items to identify their strategic orientation using an existing typology, and then assessed whether differences in strategic orientation were associated with different responses to NH Compare. Administrators identified as the strategic type most likely to change frequently and to value innovations were most likely to take four actions: response immediately, investigate reasons for the score, revise job descriptions, and change priorities for QI. The administrators who were of the strategic type that focused on core services were more likely to say they took no action. For two actions, talking to families about NH Compare and purchasing new equipment or technology, no differences were found among the administrators.

Mukalmel, et al.¹⁸⁹ used the same survey and merged the results with the data on the QMs for the NHs the administrators directed prior and post NH Compare. These data were first used to identify trends in improvement (reported above) and then used to determine if improvements were linked to actions by the nursing home administrators. An analysis of the number of actions taken suggested that when more actions are taken, the quality of NHs improves more, but that the marginal improvement decreases, indicating diminishing returns. Comparing different actions with improvement in specific QMs revealed no consistent associations, suggesting there were different routes to improvement.

The second survey by Zinn, et al.¹⁹³ collected information on perceptions of NH administrators on the influence of NH Compare on referrals, choice of facility, and the state survey process. The main outcome was the association of these perceptions with the likelihood an administrator would take one of six actions that required a significant investment in resources (hiring more clinical staff or new nursing or medical director, increasing wages, initiatives to hire and retain staff, and purchases of new equipment or technology). Administrators took the most actions when they thought NH Compare influenced the survey process but took only one action (hired additional staff) when they thought NH Compare influenced selection of facility.

Using a different approach, Mukalmel, et al.¹⁹⁸ studied the ratio of clinical to hotel (room and board) expenditure by NHs before and after public reporting based on the theory that NH Compare made visible clinical quality that was once invisible and motivated greater investment in clinical care. The ratio of clinical to hotel expenditures was stable for 2 years prior to NH Compare then increased in the 4 years after NH Compare. This increase persisted, though it decreased in magnitude when the difference in growth in the prices of clinical and hotel services was added to the analysis. Subgroups expected to be more sensitive to public reporting (e.g. those in competitive markets, lower occupancy, for profit, and chain-owned) shifted more resources to clinical services.

Focusing on the provision of one service, Cai¹⁹² examined whether the state rate of flu vaccination in NHs changed after this was added to NH Compare in 2004. Vaccination rates increased (5.46 percent for short-term residents and 1.67 percent for long-term residents) for two flu seasons after NH Compare compared with what they were the flu season prior to the public release of the data. However, immunization rates also increased 6.41 percent in community dwelling elderly, suggesting the increase may not be due to public reporting. Facilities that had low baseline rates were more likely to increase their vaccination rate than facilities that had high rates when the information was first made public.

Key Question 4: Impact on Patients or Purchasers

One study used occupancy rates as a proxy for choice of NH. Stevenson¹⁸⁵ examined whether public reporting of deficiencies from state surveys and staffing levels that predated NH Compare reporting of QMs resulted in changes in occupancy rates. All of the alternative models supported the hypothesis that public reporting has an impact on selection of NH, but the effect sizes are extremely small: An increase in 10 deficiencies would result in 0.4 percent decrease in occupancy and doubling of nursing staff would be needed to increase occupancy 0.5 percent.

No other studies empirically examined the impact of public reporting about NHs on patients or purchasers.

KQ5: Public Report Characteristics

We identified no empirical studies that examined the impact of characteristics of public reports on quality of care.

KQ 6: Context

Several studies of public reporting of LTC focused on contextual factors.^c Two common characteristics of the environment or the market included in studies were the amount of competition and the occupancy rate. The underlying idea was that public reporting is a market-based intervention and that public reports will have a greater impact on provider behavior, selection of providers, and ultimately the quality of care in markets where there is more competition or a lower occupancy rate.

Two studies focused specifically on the impact of competition and occupancy rates. Castle, et al.¹⁸⁷ found that five out of 14 QMs were significantly better in markets with higher competition while eight out of 14 QMs were better in markets with lower occupancy rates based on data from 2002 to 2004. The same group of researchers continued to study this question using different data (2004 to 2006) and incorporating a control for regression to the mean.¹⁸⁸ The results were similar with or without this control. Eight out of 15 QMs were significantly better in markets with higher competition while 10 out of 15 QMs were bettering markets with lower occupancy rates. The overall quality differences were also higher in high competition and low occupancy markets.

We identified one study of a less commonly studied market characteristic: the presence of a chronically poor quality facility in the NH market. Castle, et al.¹⁹⁴ examined a small number of extremely poor performers that were publicly given the designation of SFF by CMS. They then separated all other NHs based on whether they were in the same county as a SFF and analyzed whether being in a county with a SFF had an impact on quality. The underlying assumption was that being in proximity to a facility receiving extra attention for a history of poor quality might motivate quality improvement. Little evidence of this spillover effect was found with only four of 22 quality indicators significantly better among NHs in the same county as a SFF.

Other studies considered characteristics of NHs or Home Health agencies such as for profit/nonprofit, chain affiliation, or hospital-based/free standing either separately or in

^c Studies often include contextual factors as part of their major analyses in which they serve as control variables, allowing a sensitivity analysis or supplement for the primary comparison. When this was the case in the studies identified for this review, the results were discussed in the section on the key question addressed by the primary outcome. Studies were included here if the contextual factors were the focus of the study.

combination with market characteristics. In one of the early studies of NH Compare, Zinn, et al.¹⁸⁶ looked at the change in QM over the first five reporting periods (see results under Quality of Health Care above). For those QMs in which a change was found, the change was examined by NH characteristics. Few differences were found by facility characteristics. A difference was found in the rate of change, but what type of facility had the better score did not change.

In the only Home Health Compare study, Jung, et al.¹³ found that nonprofits, hospital-based agencies, and agencies with longer Medicare tenure improved more from 2003 to 2007. Nonprofit agencies started with lower scores than for profits on some QMs, but had higher scores on all by the end of the study period.

Another characteristic of NHs and home health agencies included in several studies were their QMs at baseline. Zinn, et al. reported that NHs with low QM scores are three times likely to make investments;¹⁹³ Jung, et al. reported that agencies with lower baseline scores experience greater improvement;¹³ and Cai found that NHs that started with low influenza vaccination rates were more likely to improve.¹⁹² Whether these types of results represent regression to the mean or a ceiling effect for those providers with high scores requires more in-depth investigation.

Summary of Qualitative Studies

We identified six qualitative studies that focused on public reporting for NHs and addressed at least one of our key questions. Two were surveys of NH administrators,^{11, 200} two were surveys of consumers,^{201, 202} and two were lab-type experiments used to test comprehension and preferences for alternative formats.^{203, 204} The studies were published between 2005 and 2010 and one was conducted in the Netherlands²⁰³ while the rest were conducted in the United States.

Administrators

The two surveys of administrators described awareness and self-reports of actions taken in response to NH Compare (KQ3).

- Castle, et al.²⁰⁰ mailed a survey to a 30 percent random sample of NH administrators in two states without a state NH public report (Maryland and Pennsylvania) and two states with a state NH public report (Connecticut and Tennessee). Three hundred and twenty-four were completed out of 477 mailed, a 68 percent completion rate. The survey asked administrators first for their own ratings on content, then for their opinion on consumers' perspective on comprehension, navigation, and decision process related to NH Compare. The survey was conducted in January 2003. At that time 33 percent of administrators had used NH Compare in their facility and 51 percent planned to in the future. Administrator ratings of NH Compare were relatively high for themselves and lower for residents/families. Most ratings were not statistically different for two states with prior NH public report than for two states without prior NH public reports. (1998)
- The second survey used a 10 percent random sample of all US NH administrators in May and June of 2004 and had a response rate of 42 percent (n=724).¹¹ Eighty-two percent of administrators had reviewed NH Medicare Compare and 60 percent believed that quality of care influences the reported QMs (though high percentages also attributed the QM scores to coding, case mix, and unusual events). Sixty-three percent reported taking actions that could lead to improvement in quality of care such as investigator reasons for scores, 41.6 percent reported changing priorities for QI, and 36.3 percent reported changing care protocols. NHs with more QM scores in the bottom 20 percent of their state reported more actions in response to NH Compare. (2007)

Consumers

- A survey of consumers also asked about awareness of NH Compare and how it was used in the selection of a NH (KQ4). The two studies reporting surveys of consumers had overlapping samples. One included a sample of family members of people recently admitted to one of 200 randomly selected NHs.(2008)²⁰¹ The second survey combined this NH sample with a survey of family members of people admitted to 25 randomly selected assisted living facilities in Pennsylvania and a survey of elders living to in 25 randomly selected senior high-rise housing buildings.
 - The survey of family members of newly admitted NH residents received 4754 responses, a 59 percent response rate. Respondents were asked about use of the internet and NH Compare in looking for information about NHs. Thirty-one percent reported using the internet and 12 percent specifically recalled using NH Compare. Respondents were then provided with a hard copy of NH ratings from the site and they were asked a series of comprehension questions. The comprehension scores were high (mean of 5.56 with 8 being the maximum score).
 - In the study that combined the survey of families of NH residents with family members of assisted living residents (496; 61 percent response rate) and elders in high-rise buildings (1252; 63 percent response rate), internet use was also high (53 percent for Assisted Living family and 23 percent for community elders).(2001)²⁰² The rates reporting that they looked at a public report on NHs were 29 percent for NH family members, 47 percent for assisted living family members, and 15 percent for community elders. The most frequent actual use of the public reports was to find the location (35 to 49 percent). Respondents examining quality information ranged from 29 percent to 47 percent.

Two lab-type experiments were relevant to KQ5 as they tested different formats for NH public reports and explored what characteristics of public reports are most likely to result in their use. One study recruited 90 volunteers in two US cities to view seven different formats for NH Compare information.(1999)²⁰⁴ Participants were asked closed-ended questions to assess their comprehension and ability to interpret the information, followed by probes about why they responded as they did, and questions about their preference for a format as well as ease of use. Key findings are that 1) people preferred an evaluative table with words (Better, Average, Worse) or stars to a bar graph; 2) a major barrier to understanding is the use of a negative direction (lower numbers are better), which people find confusing in spite of the labels and directions on report; and 3) people prefer to be able to compare several NHs on one page.

The second lab-type experience was conducted in the Netherlands with three different samples in order to test a prototype of an internet public report about NHs.(2005)²⁰³ The samples included 181 members of a consumers-of-care organizations (63 percent out of 300 invited), 38 university students (91 percent out of 42 invited), and 59 NH managers and staff (66 percent out of 70 invited). All were given one practice case and then randomly assigned six cases where the public reports differed in one component. They were asked questions about the quality of the NH presented in each case, whether they would choose that nursing home, and about the content and format of each public report. Overall rating of the public reports were high and did not differ across the three types of respondents, however care consumers rated the public reports lower on completeness and whether they were understandable. Participants selected the consumer satisfaction section as the most important of their decisions and interpreted missing information

as a sign of low quality. When asked what else should be included, participants ask for more explanation of the terms used in the report and more information about the opinions of relatives, informal caregivers, and volunteers.

Table 7. Summary of evidence: Long-term care services

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Cai 2010 ¹⁹² (Fair)	NH Compare	Compared state vaccination rates for three flu seasons (2005-2006, 2006-2007, 2007-2008) after the publication of vaccination rates in NH Compare. Rates for NH residents compared with rates for community dwelling elderly. N=51 (all states and DC).	1	State vaccination rates change with NH Compare ↑ Vaccination rate: Short-stay and long-stay residents ↔ Larger increase in community-dwelling elderly than in NH residents
			6	↑ More improvement among NHs with lower base line rate ↓ Slight decline among NHs with higher base line rate
Castle 2007 ¹⁸⁷ (Fair)	NH Compare	Compared publicly reported QMs for US NHs in markets with high competition and low occupancy rates to NHs in markets with low competition and high occupancy rates in 2003 and 2004. N=14,554	6	<u>Higher Competition</u> ↑ 5 out of 14 QMs and overall Long Stay: ADLs, low risk pressure sores; short stay: delirium, pain, pressure sores ↔ no significant effect: 9 out of 14 QMs <u>Lower Occupancy</u> ↑ 8 out 14 QMs and overall Long stay: ADLs, low risk pressure sores, catheter, ability to move around Short stay: delirium, pain, pressure sores ↔ no significant effect: 7 out of 14 QMs
Castle 2008 ¹⁸⁸ (Fair)	NH Compare	Examined trend in improvement post public reporting adjusted for regression to the mean for US NHs from 2004 to 2006. Subgroup comparisons by market characteristics. N=14,224	1	↑ 9 of 15 QMs Long stay: pain, high risk PU, low risk PU, restraints, depressed, catheters Short stay: delirium, pain, pressure sores ↓ 5 of 15 QMs Long stay: ADLs, incontinence, move about, UTI, lose too much weight ↔ 1 of 15 QMs Long stay: mostly in chair or bed

Author Year (QA)	Public Report	Study Overview	Key Question	Results
			6	<p><u>Higher Competition</u> ↑ 8 out of 15 QMs and overall Long stay: ADLs, high risk pressure sores, depressed, most time in bed or chair, UTI, lost too much weight Short stay: delirium, pain</p> <p>↔no significant effect: 7 out of 15</p> <p><u>Lower Occupancy</u> ↑ 10 out 15 QMs and overall Long stay: ADLs, low risk pressure sores, restraints, depressed, incontinence, UTI, ability to move around, lost too much weight Short stay: delirium, pressure sores</p> <p>↔no significant effect: 7 out of 14 QMs</p>
Castle 2010 ¹⁹⁴ (Fair)	Special Focus Facility designation by CMS (on Nursing Home Compare)	Compared all US NHs divided by whether they are in counties that had one or more special focus facility in 2007 (n=135) compared with NHs in counties where none had this designation. (N=14,1553)	6	<p>Impact on quality measure of SFF in same county ↑4 out of 22 QMs High-risk PU, low-risk PU, UTI, short-stay PU ↓2 out of 22 QMs Any deficiency, quality citations ↔ 16 out of 22 QMs</p> <p>↑8 out of 22 QMs when only facilities below the median level of quality are analyzed</p>
Jung 2010 ¹³ (Fair)	Home Health Compare	Described change in quality measures from 2003 to 2007 (yearly measures) and change by Home Health Agency Characteristics. N=8,679 agency with at least 2 years of data.	1	<p>Change in QMs post HH Compare ↑7 of 7 functional measures</p> <p>Number of QM for which agencies changed quality indicator scores ↑ 6 of 7 more agencies improved ↓ 1 of 7 more agencies worsened</p>
			6	<p>↑ Nonprofit started lower than for profits on some QM, but had greater improvement and ended with higher scores on all QMs ↑ hospital-based had greater improvement ↑ longer Medicare tenure had greater improvement ↑ lower baseline QMs increased more</p>

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Mukamel 2008 ¹⁸⁹ (Good)	NH Compare	Compared quality scores for all US NHs. Pre Public Reporting(4th Q 2001 to 4th Q 2002) and Post Public Reporting: (1st Q 2003 to 4th Q 2003). Merged with survey responds for 10% sample of administrators. 724 completed survey (48.2%)	1	↔0 of 5 for time trend ↑2 of 5 for change in level after public report: physical restraints, short-stay pain ↓ 1 out of 5: pressure ulcers (in non demonstration states) ↔2 out of five: ADLs, infection and PU in demo states.
			3	Change in QMs with number of actions taken ↑ With increase in actions: Physical restraints, short-stay pain ↓ With increase in actions: Pressure Ulcers ↔ With increase in actions: ADL and Infections
Mukamel 2009 ¹⁹¹ (Fair)	NH Compare	Compared NH admission cohorts for all US nursing homes for periods pre and post reporting as well as after changes in 1st Q 2004. Pre Reporting: 1st Q 2001 to 4th Q 2002. Post Reporting: 1st Q 2003 to 4th Q 2005. N=16,745	2	↔ No significant change in admission cohorts indicating no cream skimming ADL, diabetes, incontinence, PU stage 2 or higher ↓ Decrease indicating cream skimming Pain and memory Loss
			6	Change in admission cohorts by NH characteristics ↔ADL, diabetes, incontinence, PU stage 2 or higher Reduced admissions ↓ Pain: for profit and non-profit reduced admissions, government NH did not Memory loss: for profit and chain reduced admissions
Mukamel 2010 ¹⁹⁸ (Fair)	NH Compare	Compared ratio of clinical to hotel expenses by NHs for 2 pre report-card years and 4 post-public report years including 10,022 NHs over 6 years from 2001 to 2006 (54,235 observations).	3	↑ by 5% in the ratio of clinical to hotel expenditures post public report Magnitude of effect reduced significantly by controlling for differential growth in costs.
			6	↑ Ratio for NH with: Lower-quality scores Lower occupancy For profit, Chain owned More competitive markets

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Stevenson 2006 ¹⁸⁵ (Poor)	Nationally posted Deficiencies and Staffing Levels for NHs	Compared Pre Reporting: 1996 - Oct. 15, 1998 (1996, 1997, 1998) to . Post Reporting Years: (1999, 2000, 2001, 2002).	4	Change in occupancy rate as measure for patient selection Post quality rating: ↑ Increase in occupancy with fewer Prior deficiencies, with fewer prior serious deficiencies with more LPN/RN staff ↓ Decrease in occupancy with more aide staff (contrary to hypothesis)
Werner 2009a ¹² (Good)	NH Compare for Post Acute care	Compared all NHs with residents with post acute stays of at least 14 days pre 2002 NH Compare launch vs. post NH Compare and compared these to small nursing homes not included in NHC. N= 8,137 in NH Compare; 2,777 small NHs	1	↑ 3 of 4 QMs Pain, delirium, walking ↓ 1 of 4 QMs Preventable rehospitalization Incorporation of secular trend ↑ 3 of 4 QMs Pain, smaller magnitude Delirium: no change in magnitude Walking: slight increase in magnitude ↓ 1 of 4 QMs Preventable rehospitalization Slight worsening, then stable but did not improve.
Werner 2009b ¹⁹⁵ (Good)	NH Compare for Post Acute care	Compared all US NHs using MDS data pre NH Compare and post NH Compare on post acute care measures on NH Compare. N=13,683	2	Change After NH Compare ↑ 3 of 3 publicly reported QMs Pain, delirium, walking Not publicly reported QMs for same period ↑ 5 of 9 QMs Pain, locomotion, shortness of breath, incontinence, respiratory infection ↓ 4 of 9 UTI, ADLs, mid-loss ADLs, early-loss ADLs Non publicly reported for NHs with high score on publicly reported ↑ 6 of 9 QMs Pain, locomotion, shortness of breath, incontinence, respiratory infection, UTI ↓ 3 of 9 QMs ADLs, mid-loss ADLs, early-loss ADLs ↓ Nurse staffing decline less for high score than low score on reported measures

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Werner 2010 ¹⁹⁶ (Good)	NH Compare for Post Acute care	Compared all NHs reporting post acute measures twelve months before Public Report to twelve months after launch of NH Compare. Disaggregates change into portions due to QI, market share and residual N=8,137	1	Post acute care measure change post NH Compare ↑ Pain overall ↑ Pain due to QI ↑ Pain due to market share ↓ Pain due to residual ↔ Delirium overall ↔ Delirium due to QI ↑ Delirium due to market share ↓ Delirium due to residual ↔ walking overall ↑ Walking due to QI ↑ Walking due to market share ↓ Walking due to residual
Zinn 2005 ¹⁸⁶ (Fair)	NH Compare	Assessed quality improvement using NH Compare quarterly reports from November 2002 (first publication) through January 2004 for all NHs reporting. (N=over 13,00 for long-stay resident measures, over 9,000 for short-stay resident measures)	1	Post NH Compare: ↑ Long stay: pain, physical restraints Short stay: delirium, pain ↔ Long stay: daily tasks, PU, PU risk adjusted, infection Short stay: delirium risk adjusted, walking
			6	Characteristics compared on rate of improvement. End level was still higher even though improvement is faster for NH with characteristics (the trend lines do not cross) Long Stay Residents ↑ Pain higher rate of improvement in hospital-based vs. not hospital-based Short Stay Residents ↑ Delirium higher rate of improvement with low occupancy rate vs. high ↑ Pain higher rate of improvement in non chain vs. chain NH
Zinn 2008 ¹⁹⁰ (Good)	NH Compare	Cross-sectional comparison of response to NH Compare by different types of strategic orientation: Prospectors changed frequently and valued innovation and flexibility. Defenders focused on core services and emphasize	3	37% took immediate action due to NH Compare; 30% took no action Found differences in responses by strategic type of administrator <ul style="list-style-type: none"> • Respond immediately: Prospectors • Take no action: Defenders • Communicate with families about public report: No strategic type • Investigate reasons for scores: Prospectors and analyzers • Revise job descriptions: Prospectors • Invest in equipment of technology: No strategic type

Author Year (QA)	Public Report	Study Overview	Key Question	Results
		operating efficiencies. Analyzers blended characteristics of the first two. Reactors lacked a strategy. Survey responds for 10% sample of administrators. 724 completed survey (48.2%)	6	37% took immediate action due to NH Compare; 30% took no action Characteristics of NH more like to take these actions: <ul style="list-style-type: none"> • Respond immediately: Nonprofits, high competition • Take no action: Poor initial quality, low competition • Communicate with families about public report: High competition, chain • Investigate reasons for scores: Poor initial scores • Revise job descriptions: Poor initial scores • Invest in equipment of technology: different by no NH characteristics
Zinn 2010 ¹⁹³ (Fair)	NH Compare	Likelihood of investing resources to response to NH compared by administrator perceptions and NH characteristics. 10% random sample of NH administrators at all facilities with at least one quality measure reported on NH Compare in 2006. 538 responses from 1407 contacted (38.3%)	3	Likelihood of resource intensive changes in response to perceptions of NH Compare influence Believe NH Compare Influences Referrals ↑4 out of 6 actions ↔ 2 out 6 Believe NH Compare Influences Choice of NH ↑1 out of 6 actions ↔5 out 6 Believe NH Compare Influence State Survey ↑5 out of 6 actions ↔1 out 6 Have Managed Care Contract ↓ 3 out of 6 actions ↔ 3 out 5
			6	↑3 out of 6 actions More likely if NH had low-quality scores as opposed to high-quality scores and is in a highly competitive market

Abbreviations: ADL, activities of daily living; CMS, Centers for Medicare and Medicaid Services; NH, nursing home; PU, pressure sores or ulcers; QI, quality improvement; QM, quality measure; SFF, special focus facility; US, United States; UTI, urinary tract infection.

↑Improvement
↓Worse
↔No difference

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes? Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

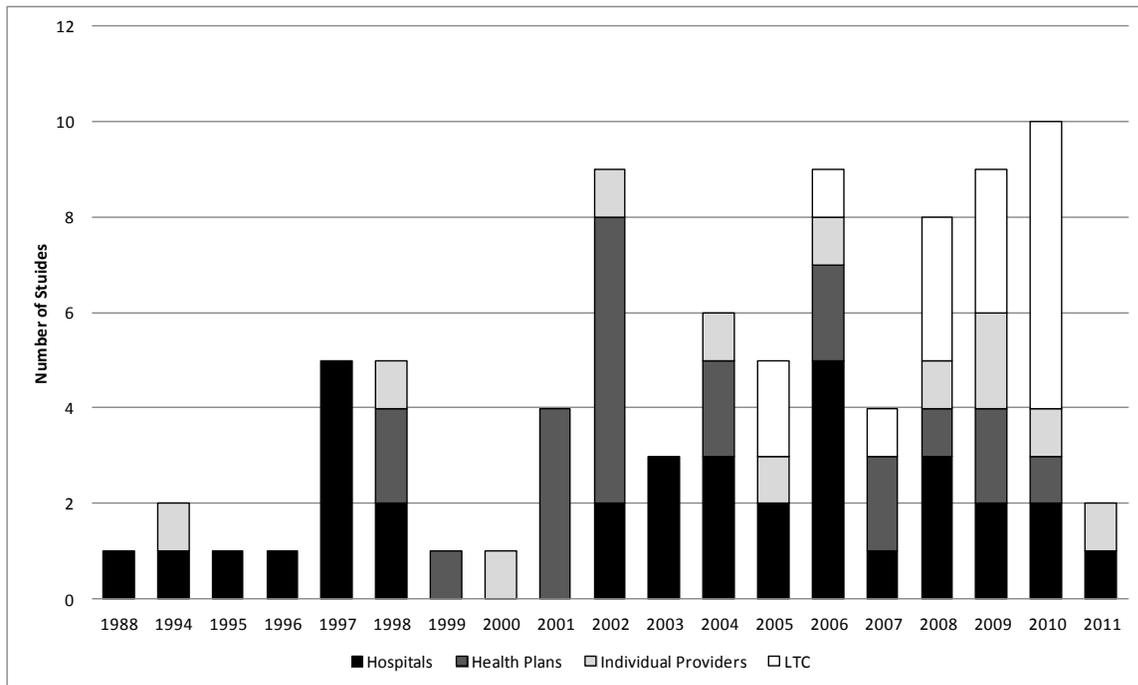
Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Discussion

Public reporting quality information on health care is a population-level intervention designed to influence health care and ultimately outcomes by creating incentives that encourage the provision of high-quality care. Public reporting, often in the form of health care report cards, has a 25-year modern history that began in the United States but has gained traction in other countries as efforts to use market mechanisms and transparency to promote quality improvement and the provision of high-quality health care services have become increasingly popular.

Early (but not the earliest) public reports on cardiac surgery outcomes in New York State and Pennsylvania publicized first hospital-level and then surgeon-specific mortality rates. These generated a significant amount of controversy and research. Studies of reports on health plans came after the public reports were created and were based on Healthcare Effectiveness Data and Information Set (HEDIS) and Consumer Assessment of Healthcare Providers and Systems (CHAPS) data. Their public release was first voluntarily, then later mandated by many states and the federal government for some programs. Most recently, the creation and release of quality measures for long-term care services (nursing homes and home health agencies) in 2002 and 2003 has been the subject of the bulk of public reporting research. Figure 3 below presents the number of quantitative studies identified for this review by publication year and by health care setting in order to demonstrate these trends in research production.

Figure 3. Number of studies by year and health care setting



Note: 2011 include data only through May. It will include data for the entire year when the literature review is updated for the final version of this report.

The main findings from this review are summarized in Table 8 at the end of this section. The results in this table are presented by key question and then by health care setting and outcome. We have also assessed the strength of the body of evidence and this determination is

included in the table. The assessment of the criteria that contributed to these determinations are in Appendix P. The number of rows in the table underscores the heterogeneity of the research literature about public reporting and health care public reports. Different outcomes have been used across studies, prohibiting quantitative or even qualitative synthesis. There is frequently insufficient evidence because only one study was identified for a given outcome in a given health care setting.

Even if we attempt to synthesize across settings (e.g., examine the effect of market competition on the impact public reports have on mortality) for the same outcome (e.g. consider the impact of public reporting on market share for combined hospitals, individual providers, health plans, and long-term care) the trends are underwhelming. As the specifics are presented in the table and in the narrative results sections, we attempt to summarize across settings here.

There is some evidence that public reporting has an impact on the quality of health care (Key Question 1), but this is less consistent for changes in mortality, which has been the subject of research in hospitals, and more evident in improvement in care processes that have been the subject of public reporting on health plans and long-term care services. The evidence that supports this impact comes primarily from long-term care where there have been more studies of improvements in quality measures due to Nursing Home Compare and Home Health Compare and the strength of evidence is greater, though still moderate.

Harms (Key Question 2) that could result from public reporting are frequently discussed but infrequently and inconsistently studied. Even less frequently do the studies confirm that a suspected harm actually occurred. The two cases where the harm was found were serious and warrant future study. Both concerned the NYS CSRS, and one attributed significantly increased mortality among New York State patients with AMI complicated by cardiogenic shock to public reporting and the other identified an increase in racial and ethnic disparities in access to services that increased after public reporting and that persisted for 9 years.

More recent discussions of the theory and justification for public reporting have focused on its impact on providers (Key Question 3). The suggestion is that the primary pathway from public reporting to improved quality is via the influence on provider behavior. Whether based in fear of losing patients or concern about reputation, the assumption is that health care providers will want to improve and will not want to appear to be negative outliers in relation to their peers. The lack of quantitative research on this topic may be due to a combination of timing and study design/resource allocation issues. This was not included in earlier studies of public reporting about hospitals and health plans in part because the issue had not been raised and the focus was on mortality. The processes that lead to mortality were a “black box” in that it was left to the providers to manipulate as they saw fit to get to the outcome. At issue was that fact that with this approach it is challenging to separate out the impact of public reporting from trends toward improvements in care or use of technology that occur simultaneously. The few studies that have addressed the impact of public reporting on provider behavior and care processes have been more recent. Additionally, some of the stronger studies have included more or different data that are more costly to collect and raise the cost of research. For example mixed mode studies that collect information on quality improvement activities via interviews or observations and then link this to administrative data require more funding, expertise in different types of research, and the ability to link information. All of these may be high hurdles to clear.

The idea that public reports affect the choices made by patients and families, or people acting as their agents, is at the core of the economics-based rationale for public reporting (Key Question 4). Addressing asymmetries in the availability of information should encourage more efficient

market function. The necessary step is that public reporting has to effect selection. As a core concept, selection has been more frequently studied than most other outcomes. While the strength of the evidence differs somewhat across setting, the conclusion is that public reporting has no or very little impact on selection. The most positive conclusion that could be made is that results are mixed, but it is hard to say more given the weak designs of most of the included studies.

The qualitative research provided insights into why this might be case. The primary reasons were that people are not aware that the quality information is available; the information provided in public reports is not what they need nor is it always available when they need it to make a decision; or the information is not presented in a way that is comprehensible. Much of the qualitative research has focused on how presentation and format could increase comprehension. Perhaps if all producers of public reports followed the resulting recommendations on format and presentation, the impact of public reports on selections of providers would increase. However, this is not a given. Neither the design of most public reports, nor the design of studies of public reporting adequately consider that health care decisions are complex and that consumer preferences may differ significantly from those of health care providers and policymakers. To effectively influence the selection of providers public reporting would need to be significantly redesigned to address these issues in addition to changing format and presentation.

While the literature on decisionmaking and public reporting acknowledges that several different characteristics of the intervention likely determine its effectiveness (Key Question 5), this is rarely examined directly in quantitative studies and it is even difficult to assess indirectly. We found only two studies that either varied on some characteristics or empirically examined the impact of existing variation. Assessing this indirectly would require having access to more comprehensive descriptions of the public reports and determining if selection characteristics are associated with variation in results. This is discussed in Future Research below in more detail.

The idea that context matters (Key Question 6) is reflected in the fact that some environmental factors are studied in relation to public reporting. The issue is that within settings there is not enough evidence to draw conclusions. However across setting there is a consistent finding related to competition. The underlying economic model of public reporting suggests that in competitive markets the public reporting of quality information may have a greater impact. The idea is that public reporting allows health care providers to compete on quality whereas when this data was not available they had to compete on other factors like price and amenities. This has been studied for hospitals and long-term care and looking across the settings allows a stronger conclusion supporting the link between competition and the impact of public reporting.

Table 8. Summary evidence table: Effectiveness of public reporting of health care quality as a quality improvement strategy

Key Question	Setting	Strength of Evidence	Conclusion
Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes?)	Hospitals	Low	<i>Mortality</i> . PR leads to a slight reduction or no change in hospital mortality.
		Moderate	<i>CAHPS (patient experience) and HEDIS (clinical process measures)</i> : CAHPS and HEDIS ratings improve after PR.

Key Question	Setting	Strength of Evidence	Conclusion
	Individual providers	Insufficient	<i>Mortality.</i> In a single study mortality declined with PR.
	Health Plan	Low	<i>CAHPS (patient experience) and HEDIS (clinical process measures).</i> CAHPS and HEDIS ratings improve after PR.
	Long-term care	Moderate	<i>Quality Measures (Nursing Home Compare; Home Health Compare).</i> The majority of LTC quality measures improve after PR.
Key Question 2: What harms result from public reporting?	Hospital	Insufficient	<i>Inappropriate diagnosis and treatment.</i> In one study this harm was not realized.
		Insufficient	<i>Mortality.</i> In one study increase in mortality was attributed to PR.
		Low	<i>Access.</i> 3 studies produced conflicting results: 1 found a negative effect on access consistent with harm; 1 found no effect and 1 found an unexpected benefit of improved access for high risk patients.
	Individual providers	Insufficient	<i>Racial-Ethnic Disparities in Procedure rates.</i> One study found gap in access to procedures increased with PR and did not return to baseline difference for 9 years.
		Insufficient	<i>Adverse selection by race.</i> One study found minority patients were more likely to be operated on by a high quality surgeon after PR; counter to the potential harm.
		Insufficient	<i>Surgeon dropout.</i> One study found no evidence PR is motivating surgeons to leave practice.
	Health plans	Insufficient	<i>Crowding out quality on domains not measured.</i> One study found crowding out did not occur with PR.
		Insufficient	<i>Withdrawal from market.</i> One study found PR did not result in health plan withdrawal from market.
	Long-term care	Insufficient	<i>Cream skimming.</i> One study found Nursing Homes did not stop admitting complex patients due to PR.

Key Question	Setting	Strength of Evidence	Conclusion
		Insufficient	<i>Crowding out.</i> One study found quality indicators not subject of PR improved as well suggesting spill over rather than crowd out.
Key Question 3: Does public reporting lead to change in health care delivery structures or processes?	Hospitals	Insufficient	<i>Quality improvement activity.</i> In one study PR led hospitals to add services and change policies
	Individual provider	Insufficient	<i>Lower quality surgeons leave practice.</i> One study found surgeons who leave practice after PR are more likely to be lower quality
	Health plans	Insufficient	<i>No studies identified.</i>
	Long-term care	Moderate	<i>Administrator response to public reporting.</i> PR leads Nursing Home management to focus on improving clinical care
		Insufficient	<i>Influenza vaccination rates.</i> One study found PR had no impact on vaccination rates.
Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?	Hospitals	Moderate	<i>Volume and market share.</i> PR had a very small or no impact on selection by patients measured by volume or market share.
	Individual provider	Low	<i>Referral patterns, market share, or volume.</i> Five studies find no effect of PR on selection; four found that PR increased market share of high quality providers.
	Health plans	Moderate	<i>Health plan selection.</i> PR has no or only very little impact on the selection of plans.
	Long term care	Insufficient	<i>Occupancy rates.</i> One study found PR had no consistent impact on occupancy.
Key Question 5: What characteristics of public reporting increase its impact on quality of care?	Hospitals	Insufficient	<i>No studies identified.</i>
	Individual providers	Insufficient	<i>Mode and tone of message.</i> One study found that mode effects use of PR, tone does not.
		Insufficient	<i>Accuracy and usefulness.</i> One study found that PRs are accurate and useful for patient selection even if there is a delay between data collection and publication
	Health plans	Insufficient	<i>No studies identified.</i>
	Long term care	Insufficient	<i>No studies identified.</i>
Key Question 6: What contextual factors (population characteristics, decision type, and environmental)	Hospitals	Insufficient	<i>Competition.</i> 2 studies found that competition increases impact of PR.

Key Question	Setting	Strength of Evidence	Conclusion
increase the impact of public reporting on quality of care?	Individual providers	Insufficient	<i>Employment status/age.</i> One study found retirees were more likely to select providers based on quality after PR.
		Insufficient	<i>State mandate for insurance coverage.</i> PR has a greater impact on provider selection when coverage is mandatory.
	Health plans	Insufficient	<i>Importance of quality information.</i> Two studies showed variability in the importance of information to different subgroups of patients.
		Insufficient	<i>Baseline performance.</i> Plans with lower quality at baseline are more likely to improve with PR. <i>Variation in quality.</i> PR has a greater impact when quality varies across plans in market
	Long-term care	Low	<i>Competition/occupancy.</i> PR has a greater effect in high competition or low occupancy markets.
		Low	<i>Nursing Home Characteristics /Ownership status.</i> No consistent difference in the effect of PR on outcomes by characteristics such as for-profit status.
		Insufficient	<i>Baseline performance.</i> Plans with lower quality at baseline are more likely to improve with PR

Abbreviations: CAHPS, Consumer Assessment of Healthcare Providers and Systems; HEDIS, Healthcare Effectiveness Data and Information Set; LTC, long-term care; PR, public reporting.

Limitations of the Review

The major limitations of this review are related to the nature of public reporting as an intervention. Specifically, public reporting is multidisciplinary and population-based. Additionally, it is often viewed as a policy, management, or educational activity that focuses on disseminating existing information rather than generating new knowledge. Each of these characteristics creates a challenge in adapting systematic review methods in health care that have been developed primarily for comparing and evaluating medical interventions.

Public reporting quality information in health care is an intervention based on theories in economics, decision science, psychology of behavior change, organizational sociology, and public policy and this list is not complete. While our search was not limited to only biomedical databases, it is likely there is literature from some relevant disciplines in social science, humanities, and disciplinary oriented databases that we did not search. The large number of articles we triaged and reviewed, combined with input from experts with significant experience limits, does not negate the possibility that we missed significant studies or other types of relevant research. Also, although we included qualitative literature in our narratives, our review is not a true qualitative review. While we did not exclude studies based on study design, our search was not tailored specifically to identify qualitative studies. We summarized these studies and drew on them to form our conclusions, but we did not employ qualitative synthesis methods that usually

involve iterative cycles of review, synthesis, and revision of the study questions until saturation is reached.

Also we believe, but cannot prove, that there are studies of public reporting that exist but that have not been published in peer review journals or distributed through the grey literature sources that we were able to access or identify despite searches and a targeted email request for unpublished research sent to identified producers of public reports. This belief is based on discussion with our expert panel, as well as other indications. For example, in one of the qualitative studies we identified, 50 percent of public report sponsors reported in interviews that they had evaluated their public report initiatives,¹⁷² but there were not corresponding research publications in the literature we searched. The likely reason is that these studies are done as part of operations or program evaluations to meet the specific needs of a stakeholder such as the public report producer, a State agency, or an advocacy group. Once these needs are met, there may be no motivation to publish the results, particularly in non academic settings. Even if academics are involved in the evaluation, if the study is designed for a narrow purpose or specific use, the researcher and/or journal editor may not be interested in publishing the results if they are not perceived as adding to the body of knowledge, regardless of how useful they may be to the client.

Limitations of the Research on Public Reporting

Public reporting is a population-based intervention that more closely resembles public health activities like putting fluoride in drinking water or smoking bans than it resembles clinical medical or health care interventions which treat specific individuals. Public reporting makes information available to anyone who wants it and may involve marketing and dissemination, but it is rarely given to individuals who are known to need it and we rarely know who actually receives the intervention or uses the information. This makes designing studies and conducting research challenging because there are almost always many potential sources of confounding. Collecting outcomes data and identifying appropriate comparisons is often difficult. The fact that conducting rigorous studies in this field is challenging is mirrored in the challenges we faced in assessing individual studies and the body of evidence based on tools and interventions rooted in the evaluation of clinical research. The focus on randomized controlled trials and observational designs common in clinical research is understandable given that clinic medicine is the basis of evidence-based practice and early comparative effectiveness research. However, the result is that there is limited consensus about how to systematically assess evidence for questions in health services, public health, and quality improvement. While we attempted to adapt the methods recommended by the Agency for Healthcare Research and Quality (AHRQ) Effective Health Care Program, our approach is only one of several that may be equally or more valid..

Future Research

We identified a large number of studies in this review, but the return in terms of credible guidance on how to maximize the impact of public reporting on quality of health care is low. The reasons for this translate into ideas for future research.

When the outcomes of the identified studies are examined by setting and key question, the impact of heterogeneity in this body of literature becomes clear. As is emphasized in the conclusion, there are few outcomes for which it is possible to draw a conclusion by setting, and even looking at outcomes across settings does little to improve this situation. The research in this field appears to be ad hoc in the sense that few studies build on prior studies by addressing either

their methodological or subject matter gaps. There are some researchers who individually have conducted several studies in the field and it is possible to see how their approach has become more sophisticated with time, perhaps due to increasing experience or availability of data. However, these few cases are not enough to create a pattern in the complete body of literature. Future research needs to build on what came before with an eye toward advancing understanding and focus on developing the science rather than repeating past approaches that have had a relative low yield. This review may help by uniting more literature in one place than has ever been done before on this topic. However, it may be unrealistic to expect a coordinated approach given that most research is driven predominately (though not completely) the availability of data.

Both our assessment of the quality of individual studies and our work on this systematic review have sensitized us to the need for more developmental research in methods. Study designs and analyses in individual studies were frequently not able to create adequate comparisons or adequately address important sources of confounding. Methods used in clinical studies (randomized controlled trials, large cohort studies) are often not practical approaches to reducing bias in health services, public health, or quality improvement research. However, an increasing number of the questions of interest to stakeholders including patients, clinicians, and policymakers are in these fields. Changes in technology and the increasing availability of large quantities of electronic data open up some possibilities, but data alone cannot improve the quality and ultimately the impact of research. By the same token, systematic review and comparative effectiveness research methodology has been predominately developed for the synthesis of research on clinical interventions. The heterogeneity in the body of evidence on public reporting and the seemingly minimal evolution over time suggests that research syntheses might have an important role in focusing and driving future research. The chances of success are lowered when the tools used for the synthesis are adaptations that seem to be trying to let us wedge square pegs in round holes.

Finally, considering the research on public reporting in a quality improvement or comparative effectiveness framework requires an understanding of the how the characteristics of the intervention and the context impact whether public reporting leads to higher quality of care. We do not just want to know if it works (efficacy), we want to know who it works for and in what situations (effectiveness). While this may seem obvious, it is not consistently reflected in either the information available in most currently published quantitative research or in the research questions studied. Most quantitative research articles provided very little or no information about the public report or quality public report that is the subject of study or about the context in which the intervention was implemented and studied. This lack of specification of the characteristics and components of public reports and the context makes it difficult to think about how to apply the research results in the future. Often, the reason for this lack of detail in descriptions has been attributed to journal policies on article length and content. However, with the use of supplemental Web materials and the creation of clearing houses and databases on interventions, insufficient space is no longer an acceptable excuse. Future research should include finding a way to document, share, and preserve this vital information. Additionally, useful research needs to go beyond simply describing intervention characteristics and context to direct examination of the impact of public report characteristics and context on their ability to improve quality of care. Our review found very few quantitative studies that tried go beyond simple description to answer the important questions about what works best when and for whom. More frequently these topics were addressed in qualitative research. This supports the idea that integrating qualitative and quantitative evidence in systematic reviews may lead to more

meaningful results. One promising approach that has been suggested is to use qualitative research to develop a list of important intervention characteristics from patients' perspectives, and then assess the quantitative research in terms of whether the interventions incorporate these characteristics and whether there is a pattern of positive quantitative results when this is the case.²⁰⁵ Unfortunately, the lack of descriptions of the public reports and context in the published literature precludes this approach in our review of public reporting. Implementing this approach would require primary data collection on the characteristics of the reports, which is beyond the scope of this review. Our approach was to categorize the qualitative research and provide narrative summaries of the main results. Development of additional approaches would benefit future reviews.

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Abbreviations and Acronyms

Abbreviation/Acronym	Definition
ADL	Activities of daily living
AHRQ	Agency for Healthcare Research and Quality
AMI	Acute myocardial infarction
ART	Assisted reproductive therapy
CABG	Coronary artery bypass graft surgery
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CDC	Centers for Disease Control
CHF	Congestive heart failure
CHOP	California's Hospital Outcomes Project
CHQC	Cleveland Health Quality Choice
CMS	Centers for Medicare and Medicaid Services
CQG series	<i>Closing the Quality Gap: Revisiting the State of the Science</i> series
CSRS	Cardiac Surgery Reporting System
ED	Emergency department
EPC	Evidence-based Practice Center
HAI	Healthcare acquired infection
HAI	Hospital acquired infections
HCFA	Health Care Financing Administration
HEDIS	Healthcare Effectiveness Data and Information Set
HER	Hospital Effectiveness Report
HMO	Health Maintenance Organization
HQA	Hospital Quality Alliance
LTC	Long-term care
MCO	Managed care organization
NH	Nursing home
NHS	National Health Service
PCI	Percutaneous coronary intervention
PPO	Preferred provider organization
PTCA	Percutaneous transluminal coronary angioplasty
QI	Quality improvement
RAMR	Risk adjusted mortality rates
SFF	Special focus facility
TEP	Technical Expert Panel
TOO	Task Order Officer
VBAC	Vaginal birth after cesarean