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High-Profile Investigations Into Hospital Safety Problems In England Did Not Prompt Patients To Switch Providers

ABSTRACT Amid international concerns about health care safety and quality, there has been an escalation of investigations by health care regulators into adverse events. England has a powerful central health care regulator, the Care Quality Commission, which conducts occasional high-profile investigations into major lapses in quality at individual hospitals. The results have sometimes garnered considerable attention from the news media, but it is not known what effect the investigations have had on patients' behavior. We analyzed trends in admission for discretionary (nonemergency) care at three hospitals that were subject to high-profile investigations by the Healthcare Commission (the predecessor to the Care Quality Commission) between 2006 and 2009. We found that investigations had no impact on utilization for two of the hospitals; in the third hospital, there were significant declines in inpatient admissions, outpatient surgeries, and in numbers of patients coming for their first appointment, but the effects disappeared six months after publication of the investigation report. Thus, the publication and dissemination of highly critical reports by a health care regulator does not appear to have resulted in patients' sustained avoidance of the hospitals that were investigated. Our findings reinforce other evaluations: Reporting designed to affect providers' reputations is likely to spur more improvement in quality and safety than relying on patients to choose their providers based on quality and safety reports, and simplistic assumptions regarding the power of information to drive patient choices are unrealistic.

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Public reporting of performance measures for physicians, hospitals, and other health care providers has become an integral strategy to improve quality and reduce variations in care.^{1,2} More recently, public reporting has been linked to provider remuneration through pay-for-performance or “no pay for errors” programs.^{3–6}

In addition to these transparency and payment

initiatives, another important trend has emerged in many countries: high-profile public reports by health care regulators about hospitals that appear to have experienced major lapses in quality. This trend has occurred as regulation has been strengthened in response to failing quality in many health systems.⁷ Some data have emerged regarding the consequences of publicly reporting performance and pay-for-performance data. However, there are no data yet available

regarding how such widely publicized reports on hospital quality effect patient perceptions and choices.⁸⁻¹⁰

The Care Quality Commission, the central regulator of health care in England, undertakes occasional high-profile investigations into major quality lapses by individual hospital trusts. A trust is a single hospital, or group of hospitals, in a small geographical area that is operated by the same management team under England's National Health Service. The findings from these investigations are widely disseminated to the public through local and national online, broadcast, and print media.

Such investigations are primarily designed to prompt hospitals with deficiencies to improve under threat of regulatory sanctions. However, the public dissemination of critical reports also provides transparency that can prompt changes, including patients' choice of hospitals.¹¹ This study examines whether high-profile investigations into quality lapses at three National Health Service hospital trusts between 2006 and 2009 affected patients' choices.

Our hypothesis was that patients would respond to the publication and widespread dissemination of reports through the media by avoiding hospitals reported to have major lapses in quality. This response would result in decreased patient numbers and increased numbers of patients who scheduled, but did not show up for, their first outpatient appointment at a hospital and did not cancel the appointment in advance.

Study Data And Methods

SAMPLE Three hospital trusts were investigated by the Healthcare Commission (the predecessor to the Care Quality Commission) between 2004 and 2009; all hospitals continued to provide normal services both during and after the investigation.¹² Two investigations—the first at University Hospitals of Leicester Trust, and the second at Maidstone and Tunbridge Wells Trust—concerned the management of *Clostridium difficile*, an important pathogen in hospital-acquired diarrhea that is often associated with antibiotic therapy and lack of proper hygiene standards. The third investigation addressed the apparent high death rates among emergency admissions at Mid Staffordshire Foundation Trust.

The investigation of University Hospitals of Leicester was triggered by findings during a routine visit to inspect infection control procedures. The investigation findings, which were published in a March 2007 report, found infection control practices to be deficient in some areas. The release of the report also coincided with

several media reports—some of which carried sensational headlines such as “Superbug Claims 49 Lives in Top Hospital”—about *C. difficile* cases at the University Hospitals of Leicester.¹³ This particular trust is one of the largest and busiest in England, providing a wide range of services for the almost one million residents of Leicester, Leicestershire, and Rutland, in the East Midlands of England.

The investigation into Maidstone and Tunbridge Wells Trust was prompted by patient complaints and high death rates during two separate local outbreaks of *C. difficile*. The investigation findings, published in an October 2007 report, concluded that an internal surveillance system, which monitors the incidence and prevalence of infections in the hospital, and an infection control team were both managed poorly.¹⁴ This trust is based in southeast England and provides a full range of general medical services to approximately 500,000 people from two hospital sites.

The investigation into Mid Staffordshire Foundation Trust was triggered by high mortality rates among emergency patients. The investigation's summary report, published in March 2009, found evidence of inadequate staffing levels and governance.¹⁵ A follow-up public inquiry is ongoing.¹⁶ This trust manages two hospitals and serves approximately 320,000 residents in the West Midlands of England.

SELECTION OF COMPARISON PROVIDERS Because a patient has little or no choice of hospital when admitted in an emergency, we chose to examine changes in discretionary (elective or nonemergency) use of hospitals in the three trusts relative to four comparison groups. The first comparison group had a similar volume of nonemergency admissions at baseline (volume group). Fifteen trusts were identified using a Euclidean distance approach, which identified hospital trusts with levels of nonemergency utilization that were as similar as possible in the thirty months before the investigation reports were released.

The second comparison group (geographically proximate group) comprised the five nearest acute hospital trusts. The mean distance of these geographically proximate trusts from the investigated trusts was sixteen miles for Maidstone and Tunbridge Wells; twenty-two miles for University Hospitals of Leicester; and seventeen miles for Mid Staffordshire.

The third comparison group was all acute National Health Service hospital trusts in England for the time period. The fourth comparison group was all hospital trusts in the region of the investigated trust. There are ten National Health Service regions in England, with an average of fifteen hospital trusts per region.

The rationale behind using the geographical groups was to ascertain if patients were choosing local hospitals over those receiving negative publicity, while the rationale for the volume comparison group was to detect any differences in patient numbers among these hospitals and the most similar hospitals nationally. All of the hospital trusts included in our study are publicly financed and managed, provide general medical care to their local populations, and are free at the point of care.

DATA SOURCES We obtained monthly data from routine National Health Service utilization data reported in the national Hospital Episode Statistics up to March 2006 and the Secondary Uses Service from April 2006 onward. Reports included nonemergency hospital use at each trust of interest and their comparison trusts for thirty months before and twelve months after publication of the investigation report. However, the data sources were the same for both treatment and control groups before April 2006, and then afterward.

Hospital Episode Statistics is the national administrative database for hospital activity in England. It contains data on all admissions and outpatient appointments performed for the National Health Service, including patients whose treatment is funded by the service but performed in private hospitals.¹⁷ Because Hospital Episode Statistics data were not available for the whole study period, we used the identically sourced Secondary Uses Service for more recent data, applying the same data cleaning and quality checks that were performed on Hospital Episode Statistics data. This source provided the same data but without some additional derived fields not required for this study.¹⁸

OUTCOME MEASURES Our outcome measures were counts of overnight (inpatient) and day surgery (outpatient) admissions for planned, nonurgent medical and surgical procedures, and “did not attend” numbers for outpatient visits. *Did not attend* was defined as patients who scheduled but did not show up for their first outpatient appointment at the hospital, and who did not cancel the appointment in advance.

STATISTICAL ANALYSIS In our analyses we used difference-in-difference estimation, a quasi-experimental method commonly used for policy evaluations.¹⁹ This method compares the trusts of interest with those in each comparison group in terms of monthly discretionary (elective) activity. We controlled for a wide range of covariates, which are detailed below. We also include trust fixed effects and added monthly time dummies to increase the power of the estimators.

The main analyses included separate effects three months, six months, nine months, and

twelve months after publication of the investigation findings, which thus provided a picture of the short-term and long-term effects. Accordingly, the effects of interest for the main analyses are relative to the performance in the thirty-month period before the findings were published. The results presented give the percentage change in number of cases over the specified period because the dependent variables (overnight admissions, day surgery admissions, and “did not attend” numbers) were log transformed.

All analyses included the following additional covariates for both the “treated” or publicly reported trusts and the control trusts: mean waiting times relative to all hospitals; patient sex; ratio of day surgery (outpatient) cases to overnight (inpatient) cases; number of people on waiting lists; median length-of-stay for all discretionary admissions; mean age of patients; emergency admissions numbers; and number of day beds (available beds in wards open in the day only, not for overnight admissions) at each trust.

Several of these covariates were included because they affect a hospital’s capacity to perform planned operations. These were number of day beds, emergency admissions, median length-of-stay, and ratio of outpatients to inpatients. Some factors may allow trusts to compensate for patients canceling their operations, such as the number of people on waiting lists for surgery. Some of these factors may be related to willingness to choose a different hospital for an operation (age and sex).

The log of the number of emergency admissions and the log of day bed variables were used to achieve a better marker of hospital size, although using them untransformed did not result in any qualitatively significant differences.

Because waiting times may, to some extent, be correlated with hospital quality, the associated variable is potentially endogenous. We therefore instrumented the relative waiting time variable with the lagged mean waiting time, and the lagged total waiting time of all other trusts. This technique corrects the analysis for the fact that as well as influencing current demand for operations, current waiting times may in turn have been influenced by demand in the past. We used a separate equation to remove this potential influence and then used in the final analysis only the part of waiting times not influenced by this demand.

After including these instruments, we used a fixed-effects model using all of the covariates listed above and log transformed dependent variables. A full description of our main model can be found in Appendix Exhibit A1.²⁰

All of the instrumental variables were signifi-

cant at the $p < 0.1$ level and so were included. We further probed for endogeneity as a result of autocorrelation by using three-, six-, or twelve-month lags, as is standard practice.^{21,22} In our main models, we checked whether instruments were strong and potentially endogenous. Results are shown in Appendix Exhibits A2 and A3.²⁰

We analyzed whether control groups were adequate by investigating the trends of the dependent variables after normalizing for the mentioned covariates. Appendix Exhibits A4–A6²⁰ clearly indicate that treatment and controls followed similar trends giving evidence for the appropriateness of the chosen difference-in-difference approach. Appendix Exhibit A7²⁰ gives the means of covariates included in the model for the treatment (investigated) trusts and the four comparison groups.

SENSITIVITY ANALYSES We conducted additional analyses (presented in Appendix Exhibits A8–A10)²⁰ that included separate effects for the following three-month periods: nine months, six months, and three months before publication of the investigation report, with a baseline period of twenty-one months (thirty to nine months before report publication). The purpose of these analyses was to investigate whether information about poor hospital performance available before publication of the investigation report had an effect on patient numbers—and if so, what bearing this might have had on patient numbers after publication of the report.

LIMITATIONS There are a number of limitations that need to be considered when interpreting our findings. First, our sample is small because only three hospital trusts were subject to major investigations by the Healthcare Commission between 2004 and 2009 and continued to provide normal services after publication of the investigation report. Second, we used counts of utilization as a proxy for patient choice.

Third, although we examined changes in utilization relative to four comparison groups, we cannot be certain that reductions seen at one hospital trust were in fact the result of negative public reporting. More detailed information on family practitioner referrals, individual-level data on patient flows, and patient surveys would be required to determine whether the connection was causal.

We were unable to examine the impact of constraints that may have impeded patients from avoiding a failing hospital. These constraints may have included the role of local family practitioners, who act as gatekeepers in the English health system and provide all referrals for discretionary care.

The data available for this study did not include

patient resident postal codes, similar to US ZIP codes. Thus, it was not possible to calculate the distance of patients from specific hospitals to determine whether it would have been feasible for patients to choose a different hospital. However, because the mean distance between the failing hospital trust and those hospitals in the geographical comparison group was approximately twenty miles, it is likely that most patients had access to an alternative provider.

Finally, during the period covered by this work, there were major changes to the National Health Service, including a small increase in procedures that are provided free at Independent Sector Treatment Centres. However, it is unlikely that these changes would affect our findings, given the use of a difference-in-difference approach and the inclusion of four comparison groups. The difference-in-difference methodology is sensitive to the choice of comparison group, which is why four groups were used.

Study Results

INPATIENT ADMISSIONS Maidstone and Tunbridge Wells was the only hospital trust to show a significant reduction in discretionary inpatient admissions from baseline relative to hospitals with similar patient volume and to the geographical comparison hospitals. There were 12 percent fewer patients at three months and 14 percent fewer patients at six months than at the hospitals with similar patient volume, and 11 percent fewer patients at three months after publication of the investigation report at geographical comparison hospitals (Exhibit 1). There were no significant reductions in inpatient admissions at University Hospitals Leicester or Mid Staffordshire after publication of the report relative to any of the comparison groups.

Exhibit 2 provides a graphical representation of these trends for the thirty months before and twelve months after report publication. This is based on the percentage change from month to month in inpatient admission numbers for the “investigated” or publicly reported trusts and the national comparison groups. It shows relatively little change from 0 percent (no difference).

OUTPATIENT ADMISSIONS Day surgery (outpatient) admissions decreased significantly at Maidstone and Tunbridge Wells at three months (16 percent) and at six months (15 percent) after report publication, relative to the volume comparison group (Exhibit 3). There were no significant reductions in day surgery admissions at University Hospitals of Leicester or Mid Staffordshire relative to any of the comparison groups after publication of the report, apart from a reduction in day surgery admissions at Univer-

EXHIBIT 1

Percentage Change In Discretionary Inpatient Admissions For Hospitals With Publicly Reported Lapses

Trust	Effect 3 months post-report (p value)	Effect 6 months post-report (p value)	Effect 9 months post-report (p value)	Effect 12 months post-report (p value)	Number of observations	R ²
RELATIVE TO VOLUME COMPARISON GROUP						
Maidstone and Tunbridge Wells	-12% (0.003)	-14% (< 0.001)	0% (0.940)	5% (0.214)	754	0.719
University Hospitals Leicester	-5 (0.073)	-4 (0.230)	-5 (0.124)	-3 (0.269)	585	0.796
Mid Staffordshire	0 (0.967)	0 (0.977)	2 (0.637)	0 (0.924)	583	0.775
RELATIVE TO GEOGRAPHICAL COMPARISON GROUP						
Maidstone and Tunbridge Wells	-11 (0.002)	-6 (0.097)	8 (0.089)	12 (0.021)	200	0.876
University Hospitals Leicester	-5 (0.178)	-2 (0.588)	-2 (0.503)	3 (0.405)	217	0.842
Mid Staffordshire	-2 (0.507)	0 (0.982)	3 (0.413)	-4 (0.292)	228	0.814
RELATIVE TO NATIONAL COMPARISON GROUP						
Maidstone and Tunbridge Wells	-1 (0.888)	5 (0.477)	2 (0.766)	2 (0.728)	5,403	0.165
University Hospitals Leicester	1 (0.860)	5 (0.478)	3 (0.713)	7 (0.352)	5,399	0.166
Mid Staffordshire	-2 (0.829)	0 (1.000)	4 (0.629)	1 (0.907)	5,386	0.141

SOURCE Authors' analysis of Hospital Episode Statistics and Secondary Uses Service data.

sity Hospitals Leicester three months after report publication and a decrease in admissions at Mid Staffordshire nine to twelve months after report publication, relative to the geographical comparison group.

MISSED OUTPATIENT APPOINTMENTS Numbers of "did not attend" patients who missed their first outpatient appointment increased significantly at Maidstone and Tunbridge Wells in the first three months after report publication relative to both the volume (74 percent) and geographical comparison groups (37 percent). However, the numbers returned to prereport levels in the period four to twelve months after report publication (Exhibit 4). There were no significant increases in numbers of people who missed this appointment in the other two hospital trusts, relative to the comparison groups.

Appendix Exhibits A8–A10²⁰ show the results from our sensitivity analyses, including the effects of possible changes in patient numbers before these reports were published. These findings indicate some reduction in patient numbers in the period before publication of the investigation reports, but changes in patient numbers after reports were published were substantially unchanged from our main analysis. Appendix Exhibits A11 and A12²⁰ show the results compared to the regional comparison groups, which are similar to what was found in other analyses.

Discussion

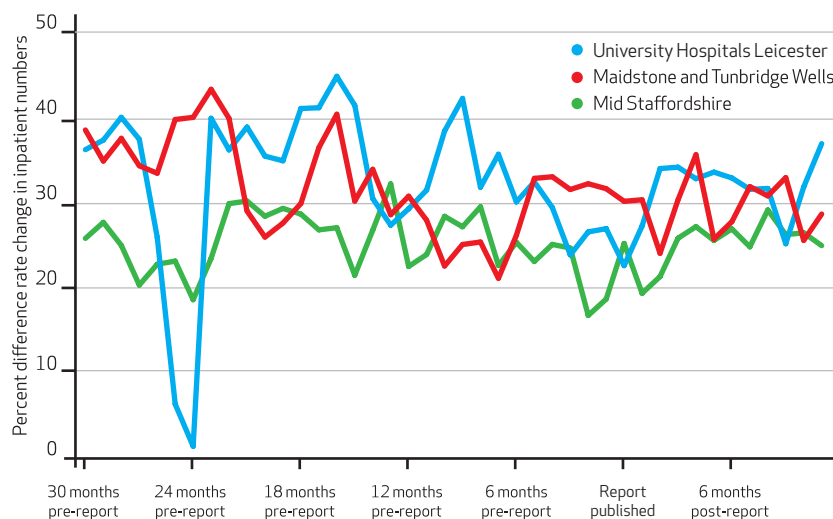
This is the first study we are aware of that examined the impact on patient behavior of high-profile critical investigations of hospital quality by a

health care regulator. Our results do not support our initial hypothesis that patients will avoid seeking elective care at hospitals that are subjects of widely disseminated and highly critical reports by the English Healthcare Commission. We identified a significant decline in utilization at only one of three hospital trusts studied, and this effect had disappeared six months after publication of the investigation report.

Previous work, mainly from the accounting literature, has highlighted the fact that the published material on organizational performance

EXHIBIT 2

Percentage Difference in Rate Change Of Inpatient Admissions Between Publicly Reported Trusts And National Comparison Group



SOURCE Authors' analysis of Hospital Episode Statistics and Secondary Uses Service data.

EXHIBIT 3

Percentage Change In Day Surgery Admissions For Hospitals With Publicly Reported Lapses In Quality

Trust	Effect 3 months post-report (p value)	Effect 6 months post-report (p value)	Effect 9 months post-report (p value)	Effect 12 months post-report (p value)	Number of observations	R ²
RELATIVE TO VOLUME COMPARISON GROUP						
Maidstone and Tunbridge Wells	-16% (< 0.001)	-5% (< 0.001)	-3% (0.469)	0% (0.966)	640	0.772
University Hospitals Leicester	-34 (0.050)	-20 (0.229)	-17 (0.293)	8 (0.623)	517	0.557
Mid Staffordshire	0 (0.960)	-2 (0.581)	0 (0.906)	-4 (0.337)	696	0.739
RELATIVE TO GEOGRAPHICAL COMPARISON GROUP						
Maidstone and Tunbridge Wells	-12 (0.001)	-6 (0.090)	9 (0.084)	11 (0.036)	200	0.847
University Hospitals Leicester	-3 (0.385)	-2 (0.688)	-3 (0.481)	2 (0.681)	217	0.858
Mid Staffordshire	-6 (0.132)	-5 (0.202)	-2 (0.572)	-9 (0.025)	228	0.839
RELATIVE TO NATIONAL COMPARISON GROUP						
Maidstone and Tunbridge Wells	-3 (0.596)	-1 (0.917)	0 (0.986)	0 (0.948)	5,396	0.530
University Hospitals Leicester	-4 (0.499)	-1 (0.854)	-3 (0.643)	0 (0.980)	5,394	0.479
Mid Staffordshire	-1 (0.816)	2 (0.645)	2 (0.645)	2 (0.703)	5,374	0.421

SOURCE Authors' analysis of Hospital Episode Statistics and Secondary Uses Service data.

must be novel to influence consumer behavior. For example, negative annual reports have been found to have limited effect on share prices if the market already realizes or suspects that a company's shares are already trading poorly.²³

Recent work in health care quality examined the relationship between publicly reporting quality of care measures for cardiac surgery and market share for those hospitals reported on. The research found that the effect of publicly releasing information or report cards on cardiac care varies depending on the perceived quality of hospitals before the reports were released.²⁴

Our sensitivity analysis found some evidence of a reduction in the number of patients seeking

care at the trust hospitals under investigation during the period before publication of the investigation report. This preinvestigation decline could reflect patient response to information about poor hospital performance. The impact on patients seeking care at investigated hospitals postreport was substantially unchanged from our main analysis.

Although the publication of highly critical and widely disseminated hospital performance reports by a health care regulator is quite separate from routine public reporting, it does share some similarities with more familiar transparency initiatives and may motivate changes in consumer behavior through comparable mecha-

EXHIBIT 4

Percentage Change In Numbers Of People Not Attending Their First Scheduled Meeting At Hospitals With Publicly Reported Lapses In Quality

Trust	Effect 3 months post-report (p value)	Effect 6 months post-report (p value)	Effect 9 months post-report (p value)	Effect 12 months post-report (p value)	Number of observations	R ²
RELATIVE TO VOLUME COMPARISON GROUP						
Maidstone and Tunbridge Wells	74% (0.006)	36% (0.179)	-7% (0.533)	-29% (0.284)	621	0.176
University Hospitals Leicester	-13 (0.715)	-20 (0.590)	-13 (0.718)	-18 (0.615)	489	0.592
Mid Staffordshire	-33 (0.135)	-43 (0.059)	-46 (0.042)	-49 (0.029)	634	0.335
RELATIVE TO GEOGRAPHICAL COMPARISON GROUP						
Maidstone and Tunbridge Wells	37 (< 0.001)	2 (0.687)	11 (0.146)	10 (0.171)	200	0.744
University Hospitals Leicester	-5 (0.543)	4 (0.678)	-1 (0.942)	8 (0.378)	217	0.362
Mid Staffordshire	-22 (0.015)	-40 (< 0.001)	-39 (< 0.001)	-45 (< 0.001)	223	0.659
RELATIVE TO NATIONAL COMPARISON GROUP						
Maidstone and Tunbridge Wells	3 (0.884)	-13 (0.522)	-15 (0.465)	-19 (0.342)	5,072	0.077
University Hospitals Leicester	3 (0.872)	-2 (0.911)	9 (0.665)	2 (0.938)	4,969	0.096
Mid Staffordshire	-8 (0.622)	-8 (0.641)	-14 (0.395)	-17 (0.312)	5,193	0.095

SOURCE Authors' analysis of Hospital Episode Statistics and Secondary Uses Service data.

nisms. Our findings suggest that policy makers who hope that critical public reports will motivate internal changes within health care organizations—in part through changes in patient choice—may be disappointed.

Of course, more traditional transparency initiatives—involving dissemination of standardized measures of quality and safety—may still have their desired effects, and institution-specific critiques may lead to improvements through other mechanisms such as fear of regulatory action.

Our findings highlight the fact that high-profile reporting of quality lapses may have limited effect on patient use of hospitals. However, such reporting may stimulate quality improvement through provider concerns about reputational damage and ongoing monitoring by the health care regulator.^{25,26} Both the United States and the United Kingdom are committed to releasing performance data, a commitment partly driven by a belief that patients have a “right to know” this information.

Nonetheless, our study shows that even in instances where there is a very clear quality message from public reporting, it may not have a large impact on the organizations’ patient numbers or market share. In this regard, our findings echo results from an evaluation of the New York Cardiac Surgery Reporting System, which found that although the release of performance data stimulated hospitals to improve, the market share of these organizations was not affected to any great extent.²⁷ That evaluation suggested that reporting designed to affect provider reputation may ultimately be more effective than reliance on patients’ choosing their providers, a suggestion supported by our findings.

In light of the commitments in both the United States and the United Kingdom toward increasing public reporting of quality, careful evaluation of these policies will be important to determine whether they achieve their stated objectives. The potential for unintended consequences—such as widening disparities in health care utilization and outcomes, noted by researchers in both countries—should be monitored.^{28,29}

Future research should help determine whether public reports lead to the desired internal quality improvements, even if they do not result in changes in market share. Studies should also examine whether reports such as those we analyzed—detailed investigations by a national regulator of a series of lapses in individual health care organizations—are more or less effective than other types of reporting. Examples of the latter would include statistical measures of quality, similar to those found on the Centers for Medicare and Medicaid Systems’ Hospital Compare and the United Kingdom’s National Health Service Choices websites.

Interestingly, although these detailed investigations of lapses in care are commonly performed in England by the Care Quality Commission, they are not a significant part of the health care regulatory landscape in the United States.

Finally, our finding that these highly publicized quality failings did not have a large or sustained impact on levels of health service use reinforces the view that simplistic assumptions regarding the power of information to drive patient choices are unrealistic.³⁰ Policy makers will need to bear this in mind before relying on such systems to motivate improvements by providers through market pressures alone. ■

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In this month's *Health Affairs*, Anthony Laverty and coauthors write about how highly publicized investigations of hospital lapses in quality and safety conducted by England's powerful health regulator, the Care Quality Commission, affected how and

where patients sought care. The authors found that there was no effect on the use of two of the hospitals that were investigated. In a third, a temporary decline in utilization had vanished six months after the release of the investigative report. The authors conclude that their findings reinforce the notion that "simplistic assumptions regarding the power of information to drive patient choices are unrealistic."

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