

# The Impact Of The Internet On Quality Measurement

Word-of-mouth advice about providers is gaining respectability through the Web.

by David W. Bates and Atul A. Gawande

**ABSTRACT:** Consumers are eager for information about health. However, their use of such data has been limited to date. When consumers do consider data in making health care choices, they rely more on word-of-mouth reputation than on traditional quality measures, although this information has not necessarily been readily accessible. The Internet changes the exercise of quality measurement in several ways. First, quality information—including reputation—will be more readily available. Second, consumers will increasingly use it. Third, the Internet provides a low-cost, standard platform that will make it vastly easier for providers to collect quality information and pass it on to others. However, major barriers still stand in the way of public access to quality information on the Internet as well as of having that access actually improve patients' care.

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**B**Y ALL MEASURES it matters where patients go for their medical care. However, beyond extreme generalities (for example, that teaching hospitals tend to have better outcomes than nonteaching hospitals, or that high-volume surgeons tend to do better than low-volume surgeons), patients have usually not had much guidance for making choices. Those who seek to choose carefully—and most do not—end up differentiating primarily by word-of-mouth reputation.<sup>1</sup>

Word of mouth has been strongly criticized as an unreliable measure of health care quality. Efforts to provide evidence-based information to guide consumers and providers have faltered, however. Critics question the value of the data provided, and few people have used them anyway. It is hoped that the Internet will change this state of affairs; to a great extent, it may already be doing so but not necessarily in the anticipated ways.

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## Changing The Content Of Reputation

The trouble with word-of-mouth reputation, critics argue, is that it is based on bad information. The problem is not merely that the friends and neighbors to whom people most often turn have only anecdotal experiences to share, but that even physicians may be ignorant of the specifics of care provided in their colleagues' offices.<sup>2</sup>

In a sense, then, the movement behind report cards and physician profiling is an attempt to change the content of medical reputation. For more than a decade health care institutions have sought to provide actual measures of performance to influence the reputations of plans, hospitals, and physicians—and thereby the behavior of both patients and providers.

The list of these quality measurement programs is now long. For health plan comparisons, the National Committee for Quality Assurance (NCQA) began publishing *Quality Compass* in 1996, based on the Health Plan Employer Data and Information Set (HEDIS).<sup>3</sup> Here consumers and purchasers can find ratings of customer service, access to specialists, preventive care, and other aspects of various health plans. For hospital comparisons, there are the Health Care Financing Administration's (HCFA's) hospital mortality reporting system; Cleveland Health Quality Choice, reporting patient satisfaction, mortality, and length-of-stay for selected conditions at Cleveland hospitals; Missouri Obstetrics, rating obstetric services at Missouri hospitals; the New York and Pennsylvania systems reporting risk-adjusted mortality rates for coronary artery bypass surgery, and others. The New York and Pennsylvania programs also provide mortality rates by individual surgeon.<sup>4</sup> States are increasingly providing information to the public on both the academic qualifications of physicians and disciplinary or legal actions against them. All of these efforts have had difficulties, however, and there is hope that the Internet can be used to remedy some of them.

## The Trouble With Report Cards

One major difficulty has been methodological weakness. Avedis Donabedian defined the basic requirements for appropriately measuring quality in medicine as a kind of three-legged stool.<sup>5</sup> One must examine the structure (the physical, human, and financial resources available), the process ("what is actually done in giving and receiving care"), and the outcome of care. No one "leg" is sufficient, and many view the information about process (Does a heart attack patient get an aspirin on time? Does the breast surgeon maintain a clean margin all the way around the cancer when removing it?) as the stool's sturdiest leg.

Most programs, however, focus on only one element, usually, outcomes. For much of medicine, outcomes are not easily or immediately measurable (for example, stroke rates for patients treated for high blood pressure, or survival after cancer surgery). When providers' outcomes are compared, it is often difficult to distinguish among them in any meaningful way except to identify extreme outliers, and the data are often outdated. What does one make, for example, of two-year-old outcomes from standard cardiac bypass operations when surgeons are now switching to off-pump and minimally invasive techniques? The NCQA's *Quality Compass* does report information on all three aspects of care, but the data are so broadly aggregated that the results may be of only limited value to consumers.

Another difficulty with report cards is that few people use them. Health care organizations are quite aware of their rankings and seem to respond to that information.<sup>6</sup> Some evidence suggests that the data may improve outcomes; for example, New York's cardiac surgery reporting system has been temporally correlated with a large decrease in mortality.<sup>7</sup> There is still debate, however, about whether the program caused the effect; another study found a similar decrease in Massachusetts, which did not have such a program, and a smaller overall decrease in national mortality.<sup>8</sup> Moreover, most studies suggest that report cards so far have not altered consumers' behavior. Eric Schneider and Arnold Epstein found that only 12 percent of patients who underwent cardiac surgery at Pennsylvania hospitals were aware of the state's performance report before surgery, and fewer than 1 percent knew the correct rating of their hospital or surgeon.<sup>9</sup> Likewise, Stephen Mennemeyer and colleagues found that press reports of single, unexpected deaths had far greater effects on patients' choice of hospitals than did the reports HCFA once issued on death rates at individual hospitals.<sup>10</sup>

There are a number of likely reasons for this. The information has been difficult to find (the Pennsylvania report, for example, was sent out in a single mailing). In addition, ordinary patients often cannot understand the data that are found.<sup>11</sup> Further, patients frequently are not in a position to make choices. (Most Americans have little or no choice of health plans, for example, and when they are acutely ill, few have the will or the opportunity to research their options.)<sup>12</sup> Finally, consumers appear to believe that available comparative information is not as useful or trustworthy as word of mouth.<sup>13</sup>

### **Internet Remedies: Access To Information**

The Internet is beginning to provide the means for making quality measurement more accessible, intelligible, and useful. Perhaps the most dramatic change has been in the availability of health informa-

tion to the public. According to a Harris poll, seventy million Americans went online to find health information in 1999; more than 17,000 health-related Web sites have sprung up to provide it.<sup>14</sup> Unlike traditional ways of getting information, such sites are free, are interactive, contain an incredible volume of information, and are accessible from anywhere at any hour. Most people sought advice on specific medical conditions rather than to compare sources of care. However, as the volume and quality of health-related content grow and use of the Web increases, U.S. consumers inevitably will become more comfortable finding and using comparative information.

■ **Self-promotion.** The most obvious, but least objective, way in which quality information is being provided to consumers is through advertising. In most industries, firms providing high-quality goods and services have advertised to distinguish themselves from their competitors. This has been much less prevalent in health care, in part because of the costs of advertising. The Internet, however, greatly lowers the costs, and health care organizations are now aggressively promoting themselves based on quality claims on their own Web sites and elsewhere.

Choosing a state at random, we analyzed Web sites for hospitals in Ohio listed on Yahoo. We found that thirty of thirty-seven made claims of superior quality based on comparative quality measures. Eleven touted outside rankings placing themselves, in some way, among the nation's top 100 hospitals. Others claimed local preeminence. Health plans, medical groups, and increasingly even individual physicians seem to be following a similar course.

■ **Report cards online.** More objective comparative information would clearly be preferable. Until recently, however, few reliable third-party sites comparing plans, hospitals, or physicians have been available. That appears to be changing rapidly. Most prominently, nearly all of the quality measurement systems we have mentioned have made their report cards accessible online. The New York and Pennsylvania cardiac surgery report cards are available online, for example. Health Care Choices operates a Web site, Health Care Choices, that centralizes links to these reports.<sup>15</sup>

■ **Interactive and customized sites.** Most Web sites simply make their paper information available online. However, some have taken advantage of the technology to make the information more intelligible and useful. The NCQA's site, for example, provides an easy-to-use Web page allowing patients (and other customers) to read customized plan comparisons.<sup>16</sup> Others go a step further to provide information from multiple sources that consumers cannot easily find or combine. For instance, HealthGrades, puts disparate, although rudimentary, information on physicians' years of experi-

ence, board certification status, and, for states that provide it, licensure sanctions.<sup>17</sup> HealthScope provides even greater detail on West Coast plans, hospitals, and provider groups.<sup>18</sup> This site was launched by the Pacific Business Group on Health (PBGH), a coalition of large employers, and has taken advantage of its members' market leverage to require all plans that contract with them to report standard quality-related information. Its Web site aggregates data on structure (such as a hospital's volume of experience with particular operations), process (rating medical group performance in checking cholesterol levels and controlling high blood pressure), and outcomes (providing survival rates after cardiac surgery, carotid artery surgery, and other operations) in an easily navigable format. Thus, with a few mouse clicks, one can find meaningful pieces of data—for example, that in 1999 Blue Cross of California received poor ratings on ease of getting a referral to a specialist.

A different approach is taken by the proprietary SelexSys site, which assists consumers in selecting a plan by allowing them to profile themselves at the time they are enrolling in their health plan through their employer.<sup>19</sup> This application takes into account the individual's health and preferences and helps them to select a plan.

■ **Better access to word of mouth.** Aside from information on plans, however, there is still nothing on the immediate horizon that appears likely to supplant patients' reliance on word-of-mouth reputation. Patients are still a long way away from finding evidence-based data that could tell them what they want to know: For example, if I need a hospital for delivering my baby, a surgeon to replace my hip, or a pediatric cardiologist to help with my daughter's heart defect, where today would be the best place for me to go? Despite the bad rap that reputation gets, it does appear to discriminate surprisingly well. Jersey Chen and colleagues' study of *U.S. News and World Report's* list of "America's Best Hospitals," which is compiled with a heavy weighting given to hospitals' reputations among relevant specialists, found that the hospitals ranked at the top in cardiology did indeed perform significantly better according to measures of structure, process, and outcome for patients with acute myocardial infarction.<sup>20</sup> Patients may not have been as wrong to rely on reputation as some critics have suggested.

Nonetheless, consumers have not had easy access to relevant information about physician and hospital reputations, either. Most diseases occur infrequently enough that many patients have trouble finding someone to turn to for advice. For more common experiences, like locating a good obstetrician or pediatrician, finding advice is easier, but it still may not be candid or informed. While everyone learns to judge how much weight to give the advice they

get, ideally one would be able to hear from a network of informants.

More than anything, this may be the way the Internet is changing quality measurement. Rather than transforming the content of reputation, it is providing wider access to information about reputation. The Internet's greatest concentration of in-depth health care information, including tips on whom to see or not to see for particular problems, is found in online communities—chat groups, e-mail list servers, bulletin boards, and Usenet newsgroups. Tom Ferguson has described the example of BRAINTMR, a brain tumor research and support list, set up by a Massachusetts Institute of Technology (MIT) student diagnosed with a brain tumor.<sup>21</sup> Through this group, people with brain tumors have found a knowledgeable community with advice about both therapies and therapists. Approximately a quarter of BRAINTMR's members are neurosurgeons, nurses, social workers, and others in the field.

The major barrier to broader use of such sites is that they are difficult to find. As yet there is no central, easy-to-use interface to allow people to quickly find the right group, although a few sites are making efforts along these lines (for example, Tile.Net).<sup>22</sup> Nonetheless, their use is flourishing, and it seems reasonable to anticipate that they will become increasingly accessible.

## **Internet Remedies: Improvements In Measurement**

Web site developers also are recognizing the potential for the Internet to increase the depth and breadth of health care quality measurement. As health care organizations are already discovering, the Internet greatly reduces the cost and ease of routine collection of quality data and provides for ready aggregation and dissemination of such information. Thus, for example, most hospitals routinely track length-of-stay by diagnosis-related group (DRG), and such data are increasingly generated and disseminated online within institutions. Brigham and Women's Hospital also has used online systems to monitor for adverse drug events and adherence to treatment guidelines.<sup>23</sup> Others are designing interactive interfaces to follow patients' courses of treatment, whether with routine care or after surgery.<sup>24</sup>

A number of e-commerce firms (for example, Abaton, Healtheon/WebMD, and XCare.net) seek to move beyond these focal innovations to create more complete electronic data interchange (EDI). Each is marketing proprietary systems that allow health care organizations to shift most, if not all, clinical and administrative functions from pen and paper to the Internet and then exchange the data within and outside their boundaries. Perhaps the biggest barrier to more rapid progress in this area has been the failure to establish standards in representation of data, although in many domains such

standards are now being fleshed out.

Even without full-fledged EDI, however, an infrastructure for Web-based quality reporting is already being established. For example, Aetna U.S. Healthcare, which communicates with a very large number of physicians regularly, recently challenged all of its contracting physicians to have an Internet connection in their offices by 1 January 2001.<sup>25</sup> The intention is not just to reduce the paper processing associated with claims submission, but also to provide a platform for a quality measurement and reporting system. Quality measurement reports—now delivered on paper—will be sent to physicians electronically. Some quality improvement and measurement will be possible that could not readily be done in the past. For instance, when a Food and Drug Administration (FDA) warning against a drug is issued, the system can now check electronic medication claims data for physicians who have prescribed the drug, generate an electronic notification to them, and then even follow whether prescribing behavior changed. With the infrastructure in place, the opportunity is created for use not just by providers but the public. Indeed, some organizations (for example, Group Health Cooperative) have already made quality-related data that they collect available to patients through their networks.<sup>26</sup> As yet, however, such efforts are unusual, and little ensures that the reporting is consistent and unbiased.

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### **Barriers And Policy Implications**

It remains to be seen whether in-depth, Web-based information on quality will become broadly available to the public. Several difficulties exist, some with important policy implications.

■ **Medical error reporting.** First, although the body of information is growing rapidly, public access to it has been largely restricted. Medical care occurs largely within private institutions, and thus the quality information generated has been kept largely private. Hospitals and physicians have great concern about how negative findings will be interpreted. Thus, they have strenuously opposed Internet release of, for example, the names of hospitals violating residency work-hour guidelines or physicians who have received licensure sanctions. Likewise, medical organizations have vigorously opposed making medical error reporting public or mandatory.

Some of the concerns are clearly legitimate. Public reporting of errors could easily drive discussion of errors further underground.<sup>27</sup> Likewise, if providers' rates of complications are released with either small sample sizes or inadequate case-mix adjustment, physicians will have strong incentives to avoid sicker patients.<sup>28</sup> Legislatures have been reluctant to require either disclosure or the use of

standard data elements that might allow for more comprehensive comparisons to be made across institutions. Only the rare purchaser coalition has had success along such lines.

Increasing the availability of meaningful quality information would require, at a minimum, public online access to information regarding the few providers who are greatly impaired or even dangerous. Only a handful of states now post disciplinary actions against physicians online. Having the other states and the National Practitioner Data Bank join this group is a first step, but it will have only a modest impact on overall quality. Demonstrations, perhaps through HCFA, to develop and test a modest, uniform, Web-based quality reporting system for hospitals would be an invaluable next step. This could include both process measures, such as newborn rehospitalization rates and volume of abdominal aortic aneurysm and other operations, and outcome measures, such as coronary artery bypass and carotid endarterectomy complication rates. This would ensure that organizations invest in quality measurement and motivate them to improve the care they provide.

■ **Patients' privacy.** Another difficulty is the problem of protecting the privacy of patients whose data are used to provide quality information. Laws regarding clinical information and security and confidentiality relate mostly to paper records and are hopelessly outdated.<sup>29</sup> Protecting patients' interests without making it impossible to transfer their data via the Internet or measure quality, however, is not straightforward. An enormous array of bills has been introduced to protect privacy, and it is not clear that any of them strikes the desired balance. In the end, we will face trade-offs between maintaining individual privacy and promoting the public good of quality measurement and reporting. From the public health perspective, it is critical that the new privacy laws allow meaningful quality measurement and ongoing health services research while providing adequate privacy safeguards. Some proposals would, for example, require individuals to consent each time their health care data were used for quality assurance purposes; this would have catastrophic effects.

■ **Potential for distortion.** In addition, online communities, in which people can exchange information openly and honestly and find guidance for health care choices, are facing unique challenges. Unlike with face-to-face encounters, it is more difficult to judge the biases of those providing information on the Internet. People with ulterior motives can easily bend discussions to their purposes. An example is the emerging evidence that fraudulent sellers on eBay, an online auction Web site, were orchestrating glowing testimonials for themselves on eBay's vaunted feedback system.<sup>30</sup> Because of such



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difficulties, successful health-related sites are increasingly moderated by physicians or other experts. However, moderators' biases can end up preventing or distorting frank discussions of physicians or hospitals. Indeed, some online discussion sites run by health plans censor discussants who share details about problems they have had with providers.

At the same time, sites that do not censor have reason to fear legal challenges by providers. The medical network management company PhyCor, for example, sued a Pennsylvania doctor for libel when he posted on a message board an angry remark that the company was “under review for purchase by the Ku Klux Klan, the Cuban government, and the Bank of Iraq.”<sup>31</sup> Although the Telecommunications Act of 1996 aimed to protect Web sites from being sued for unedited content, interpretation of the law is unsettled. Furthermore, it is unclear if Web sites can be compelled to reveal the identities of anonymous users. As courts visit and define these issues, ensuring that people can safely share information about their health care providers online may require further legislation.

■ **Providers' privacy.** Meanwhile, physicians and hospitals clearly can have legitimate concerns about dissemination of false information about them in online discussion groups. Some will have recourse either online or in the courts. However, many may be even more concerned about the dissemination of factual information about them, and it is not clear if there is any adequate recourse for that. Certainly, much of the information patients need to evaluate doctors is purely professional: training, decision-making style, time spent with them, and so forth. Some, however, is inevitably personal: for example, behavioral flaws or the existence of a drinking problem.

### **Problems Not Addressed By The Internet**

However much the Internet enables the dissemination of useful and accurate health care information in the United States, there are many constraints that this new technology cannot address. The reality remains that most Americans do not have an effective choice of health plans, that choice of hospitals is severely limited in many parts of the country, and that acutely ill patients are usually unable to make use of information. Also, the “digital divide” in access to the Internet—although narrowing—will remain a problem.

Thus, contrary to oft-spoken predictions, the Internet will not

reduce the importance of regulation, professionalism, and other traditional mechanisms of quality assurance. Nevertheless, Americans generally do have a choice of doctors (even if restricted), often of hospitals, and sometimes of plans. The choices matter, and the Internet will likely be the public's best source of information to guide those choices. Measures to broaden access—for example, providing high-speed Internet access in hospitals and senior citizens' centers—remain important.

If intelligible, reliable information on health care quality were widely available, many have held that consumers could “buy right,” as they now do with automobiles. But finding good health care, as many have pointed out, is far more complicated than finding a good car. Measuring quality is difficult, and presenting the data in a way that consumers can readily understand is also problematic. The Internet, however, is bringing down the barriers to collecting useful quality information and disseminating it to patients and others. Increasingly, the first thing people will do when looking for a doctor, hospital, or health plan will be not to call a friend but to log onto the Internet. The effects on consumers' and providers' behavior are already proving to be substantial. If these innovations are to improve public health, however, and to avoid distorting health care or harming individuals, careful crafting of both Internet and health care policy will be essential.

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## NOTES

1. C.J. Salisbury, “How Do People Choose Their Doctor?” *British Medical Journal* 299, no. 6699 (1989): 608–610; and S. Robinson et al., “Understanding the Quality Challenge for Health Consumers: The Kaiser/AHCPR Survey,” *Joint Commission Journal on Quality Improvement* 23, no. 5 (1997): 239–244.
2. J. Green et al., “In Search of America's Best Hospitals: The Promise and Reality of Quality Assessment,” *Journal of the American Medical Association* 277, no. 14 (1997): 1152–1155.
3. HEDIS 3.0 (Washington: National Committee for Quality Assurance, 1996); and J.W. Thompson et al., “The NCQA's Quality Compass: Evaluating Managed Care in the United States,” *Health Affairs* (Jan/Feb 1998): 152–158.
4. M.N. Marshall et al., “The Public Release of Performance Data: What Do We Expect to Gain? A Review of the Evidence,” *Journal of the American Medical Association* 283, no. 14 (2000): 1866–1874.
5. A. Donabedian, “The Quality of Care: How Can It Be Assessed?” *Journal of the American Medical Association* 260, no. 12 (1988): 1743–1748.
6. Marshall et al., “The Public Release of Performance Data.”
7. E.L. Hannan et al., “Improving the Outcomes of Coronary Artery Bypass Surgery in New York State,” *Journal of the American Medical Association* 271, no. 10 (1994): 761–766.
8. W.A. Ghali et al., “Statewide Quality Improvement Initiatives and Mortality after Cardiac Surgery,” *Journal of the American Medical Association* 277, no. 5 (1997):

379–382.

9. E. Schneider and A.M. Epstein, "Use of Public Performance Reports: A Survey of Patients Undergoing Cardiac Surgery," *Journal of the American Medical Association* 279, no. 20 (1998): 1638–1642.
10. S.T. Mennemeyer, M.A. Morrisey, and L.Z. Howard, "Death and Reputation: How Consumers Acted upon HCFA Mortality Information," *Inquiry* 34, no. 2 (1997): 117–128.
11. J.J. Jewett et al., "Comprehension of Quality Care Indicators: Differences among Privately Insured, Publicly Insured, and Uninsured," *Health Care Financing Review* 18, no. 1 (1996): 75–94; and J.H. Hibbard et al., "Can Medicare Beneficiaries Make Informed Choices?" *Health Affairs* (Nov/Dec 1998): 181–193.
12. A.A. Gawande et al., "Does Dissatisfaction with Health Plans Stem from Having No Choices?" *Health Affairs* (Sep/Oct 1998): 184–194; and C. Schneider, *The Practice of Autonomy: Patients, Doctors, and Medical Decisions* (Oxford: Oxford University Press, 1998).
13. N. Goldfield et al., "The Content of Report Cards," *Joint Commission Journal on Quality Improvement* 25, no. 7 (1999): 423–433.
14. H. Taylor, Harris poll no. 47 (New York: Harris Interactive, 5 July 1999).
15. Health Care Choices, <[www.healthcarechoices.org](http://www.healthcarechoices.org)> (5 September 2000).
16. NCQA, <[www.ncqa.org](http://www.ncqa.org)> (5 September 2000).
17. HealthGrades, <[www.healthgrades.com](http://www.healthgrades.com)> (5 September 2000).
18. HealthScope, <[www.healthscope.org](http://www.healthscope.org)> (5 September 2000).
19. SelexSys, <[www.selexsys.com](http://www.selexsys.com)> (5 September 2000).
20. J. Chen et al., "Do 'America's Best Hospitals' Perform Better for Acute Myocardial Infarction?" *New England Journal of Medicine* 340, no. 4 (1999): 286–292.
21. T. Ferguson, "Health Online and the Empowered Medical Consumer," *Joint Commission Journal on Quality Improvement* 23, no. 5 (1997): 251–257.
22. Tile.Net, <[www.tile.net](http://www.tile.net)> (5 September 2000).
23. A.K. Jha et al., "Identifying Adverse Drug Events: Development of a Computer-Based Monitor and Comparison to Chart Review and Stimulated Voluntary Report," *Journal of the American Medical Informatics Association* 5, no. 3 (1998): 305–314.
24. S.W. McRoy et al., "Interactive Computerized Health Care Education," *Journal of the American Medical Informatics Association* 5, no. 4 (1998): 347–356.
25. John Kelly, director, physician relations, Aetna U.S. Healthcare, personal communication, 30 June 2000.
26. Group Health Cooperative, <[www.ghc.org](http://www.ghc.org)> (5 September 2000).
27. T.A. Brennan, "The Institute of Medicine Report on Medical Errors—Could It Do Harm?" *New England Journal of Medicine* 342, no. 15 (2000): 1123–1125.
28. T.P. Hofer et al., "The Unreliability of Individual Physician 'Report Cards' for Assessing the Costs and Quality of Care of a Chronic Disease," *Journal of the American Medical Association* 281, no. 22 (1999): 2098–2105.
29. J.G.J. Hodge et al., "Legal Issues concerning Electronic Health Information: Privacy, Quality, and Liability," *Journal of the American Medical Association* 282, no. 15 (1999): 1466–1471.
30. J.H. Dobrzynski, "In Online Auction World, Hoaxes Aren't Easy to See," *New York Times*, 2 June 2000, A1.
31. V. Kopytoff, "Online Speech Hit with Offline Lawsuits," *San Francisco Chronicle*, 26 June 2000, B1.

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