

Measure, Learn, And Improve: Physicians' Involvement In Quality Improvement

Evidence that quality improvement still has not permeated the professional culture of medicine, although progress is evident.

by Anne-Marie J. Audet, Michelle M. Doty, Jamil Shamasdin, and Stephen C. Schoenbaum

ABSTRACT: Payers, accreditors, and consumers are using quality improvement (QI) methods, but little is known about whether physicians do so. The results from this 2003 national physician survey indicate that most do not. Physicians do not routinely use data for assessing their performance and are reluctant to share those data. They infrequently participate in redesign activities. Physicians in larger and salaried groups are more likely to be engaged in QI. The science of QI has been "institutionalized" but not yet "professionalized." Accelerating physicians' adoption of and participation in QI requires building the infrastructure to support quality and paying attention to professionalism, knowledge, and skills.

IMPROVING PATIENT CARE through quality improvement (QI) and measures of physician performance is of interest to several important stakeholders in the U.S. health care system: accrediting and licensing bodies, purchasers, consumer advocates, and medical and specialty societies. Nonetheless, there is some evidence that physicians have resisted full engagement in QI activities.¹

Historically, physicians have tended to react with skepticism to changes that directly affect the way they practice.² For example, when practice guidelines were first introduced, physicians resisted adopting them based on issues such as agreement, self-efficacy, and environmental factors.³ Barriers to the adoption of practice guidelines, such as increased costs, poor reimbursement, and insufficient staff support, also stand in the way of physicians' adoption of QI methods. Also, some have commented that the medical profession has failed to take on QI actions, because quality problems lack public visibility.⁴

The extent of physicians' resistance to QI is not well known. Few data exist to describe the degree of variation and the factors that might lead to greater buy-in from some groups of physicians. In an effort to close the data gap, this paper re-

Anne-Marie Audet (ama@cmwf.org) is assistant vice president in charge of quality improvement at the Commonwealth Fund in New York City. Michelle Doty is senior analyst, Jamil Shamasdin is program associate, and Stephen Schoenbaum is executive vice president for programs there.

ports the results of a survey designed to gain a better understanding of physicians' opinions about and involvement in QI and factors that are associated with their attitudes toward QI. The framework for the study consists of the basic QI model developed by W. Edwards Deming and Joseph Juran, which links measurement and feedback to learning that can lead to improvement—the so-called Shewhart Cycle or the plan-do-act cycle, which translated to fit clinical practice, becomes “practice-measure-improve.”⁵ We describe how physicians have implemented the “measure” part of the cycle—what kinds of data they have access to—and the “improve” part of the cycle—whether they engage in QI activities. Given the healthy but at times heated public debate about measures of performance, and given their close association to professional accountability, we also explore physicians' willingness to share these data with various parties.

Study Data And Methods

■ **Data source and study population.** Data are from the 2003 Commonwealth Fund National Survey of Physicians and Quality of Care conducted between March and May 2003. The self-administered questionnaire was mailed to 3,598 U.S. physicians, randomly selected from an American Medical Association (AMA) Physician Masterfile, a list including AMA members and nonmembers. All physicians in the sample were involved in direct care of adults and had been in practice at least three years after residency. Specialists unlikely to be involved in patient care long term (such as radiologists, anesthesiologists, pathologists, and dermatologists) were excluded. Identification of primary versus specialty care physicians was done using the AMA Masterfile. Data were weighted by sex, age, and practice setting to reflect the national distribution of physicians in the AMA Masterfile.

■ **Study variables.** We categorized physicians by number of years in practice; practice size (solo, small [2–9 physicians], medium [10–49], or large [50 or more]); mode of compensation (salaried or nonsalaried); hours per week involved in direct patient care; and routine or occasional use of electronic medical records (EMRs). The questionnaire surveyed physicians about access to practice-level data (physicians' patients); access to and sources of quality-of-care data (physicians' performance); involvement in redesign efforts; and views on sharing quality-of-care data (Exhibit 1).

■ **Data analysis.** We first present physicians' responses to questions by characteristics of physicians and practices, and we report chi-square tests using the .05 level as cutoff for significant differences. We also present results of multivariate logistic regression analyses that model the independent effects of the relevant physician and practice characteristics. We computed predicted probabilities for each explanatory variable, holding all else constant. For a more meaningful interpretation of regression results, these probabilities are expressed in percentage terms as “adjusted percentages.” All analyses were conducted using STATA version 7.0; the weighted survey estimator was used to adjust standard errors for clustering and stratification

EXHIBIT 1
Study Variables And Profile Of Physicians' Responses To Selected Survey Questions, 2003

Question	Percent responding
Access to practice-level data	
With the patient medical records system you currently have, how easy would it be for you (or staff in your practice) to generate the following information about your patients?	
List of patients by certain age groups (for example, all patients age 50 or older)	
Very/somewhat easy	49
Very/somewhat difficult	37
Cannot generate	14
List of patients by diagnosis or health risk (for example, diabetes or hypertension)	
Very/somewhat easy	44
Very/somewhat difficult	38
Cannot generate	17
List of patients by laboratory results (for example, patients whose hemoglobin levels indicate that they are anemic)	
Very/somewhat easy	16
Very/somewhat difficult	44
Cannot generate	39
List of patients by medications they currently take (for example, patients who are on multiple medications or patients on warfarin)	
Very/somewhat easy	15
Very/somewhat difficult	40
Cannot generate	44
Access to quality-of-care data	
Do you receive any quality-of-care data about the care you provide? (percent answering yes)	
Proportion of patients who receive recommended care (for example, percent of men age 50 and older who receive prostate exams)	20
Patients' clinical outcomes (for example, percent of diabetic patients with good glycemic control)	18
Patient surveys or experiences with care	25
Involvement in redesign efforts	
Some physicians have engaged in efforts to redesign office or hospital systems and procedures to better manage patients' clinical care. Examples include developing systems to ensure that all abnormal tests are followed-up on or that all patients receive beta-blockers following heart attacks. In the past 2 years, have you been involved in any such efforts?	
Yes	34
Views on sharing quality-of-care data	
To improve high-quality care in the U.S., which of the following do you think should have access to quality-of-care data about individual physicians?	
Medical leadership	
No, definitely/probably not	27
Yes, definitely/probably	71
A physician's own patients	
No, definitely/probably not	44
Yes, definitely/probably	55
The general public	
No, definitely/probably not	69
Yes, definitely/probably	29

SOURCE: 2003 Commonwealth Fund National Survey of Physicians and Quality of Care.

NOTES: Details of response rates for each response category, as well as responses to additional questions, are available in an online appendix, content.healthaffairs.org/cgi/content/full/24/3/843/DC1. Columns may not add to 100 percent because of rounding error.

involved in the survey design.

A total of 1,837 surveys were returned, for a response rate of 52.8 percent.⁶ The majority of physicians completed the survey by mail (91 percent); the remaining 9 percent completed it online. There were no statistically significant differences between respondents and nonrespondents by sex, age, solo versus other practice size, specialty, or years in practice.

Study Results

■ **Physician and practice characteristics.** The majority of respondents were male and under age fifty-five (Exhibit 2). The most common practice type was small group and the least common, large group. More than half of respondents had been in practice for more than sixteen years or more, and nearly two-thirds performed more than forty hours of direct patient care per week. Overall, four-tenths were salaried. The majority were specialists, and nine-tenths had been certified in their specialty. More than one-third had been recertified, and another 20 percent planned to recertify within the next two years. Just over a quarter used an EMR routinely or occasionally.

■ **Physicians' access to practice-level data.** Fewer than half of the physicians could easily identify patients in their practices by age group (Exhibit 1); 14 percent said that they could do that at all. Forty-four percent could easily generate patient registries—that is, lists of patients grouped by certain clinical diagnoses. More than four-fifths of physicians found it difficult or were unable to find out which of their patients have abnormal laboratory results or to identify patients taking certain high-risk medications (and who may require closer follow-up).

Physicians involved in fewer than twenty hours of direct patient care per week were found to be less likely to easily generate any practice data, compared with physicians doing forty hours per week or more ($p < .05$) (Exhibit 2). Size of practice is relevant too: half of solo physicians could easily generate those types of data, compared with 61 percent of physicians in large groups ($p < .05$). Physicians who used EMRs routinely or occasionally were more likely than those who did not to say that data about their practices can easily be generated ($p < .05$).

■ **Physicians' access to quality-of-care data.** Only one-third of physicians reported receiving any data (process, outcome, or patient surveys) about the quality of care they provide (Exhibit 2). The most common type of data received was patient surveys (25 percent) (Exhibit 1).

Physicians in larger practices and those who devote more hours per week to direct patient care reported being more likely than their peers in smaller practices or doing less direct patient care to receive quality-of-care data. About one-fifth of physicians in solo practice reported receiving data, compared with almost half of those who practiced in groups of fifty or more ($p < .05$). Also, salaried physicians were more likely than nonsalaried physicians to report having access to quality-of-care data ($p < .05$). Nearly half of primary care physicians reported getting

EXHIBIT 2
U.S. Physicians' Access To Practice-Level Data, Quality-Of-Care Data, And Involvement In Redesign Efforts, By Selected Characteristics, 2003

Characteristic	Total	Practice-level data	Quality-of-care data		Involvement in redesign ^d
		Access to any data ^a	Access to any data ^b	Internally generated ^c	
Total	100%	57%	33%	13%	34%
Sex					
Male	77	58	32	13	34
Female	23	53	35	14	36
Age (years)					
Under 55	67	59**	34**	14	37**
55 or older	33	52	29	13	30
Practice size (number of physicians)					
Solo (1)	27	50**	21**	6**	24**
Small (2-9)	41	58	34	11	35
Midsize (10-49)	17	61	36	20	43
Large (50 or more)	12	61	47	28	47
Years in practice ^e					
10 or less	23	56	35	15	34**
11-15	22	61	36	15	44
16 or more	55	56	31	13	31
Hours a week in direct patient care					
More than 40	62	61	35	14	37
21-40	30	50	29	10	31
20 or fewer	8	51**	28**	19**	23**
Salary status					
Salaried	41	55	38**	19**	41**
Not salaried	56	58	29	10	30
Physician type					
Primary care	29	54	49**	15**	42**
Specialist	71	58	26	13	31
Certified in specialty					
Yes	91	57	33**	14	35
No	9	52	24	10	32
Recertified in specialty					
Yes	38	56	37**	15	40**
No, but plan to in next 2 years	20	60	35	16	38
No, and don't plan to in next 2 years	40	57	30	11	28
Use electronic medical records					
Yes (routinely/occasionally)	27	62**	37**	21**	41**
No	73	55	31	11	32

SOURCE: 2003 Commonwealth Fund National Survey of Physicians and Quality of Care.

NOTES: N = 1,837. Columns may not add to 100 percent because of rounding error. Additional data on access to practice-level and quality-of-care data and on involvement in redesign can be found in Supplemental Exhibits S2, S3, and S4, online at content.healthaffairs.org/cgi/content/full/24/3/843/DC1.

^a Physicians responding that it is very or somewhat easy to generate a list of patients by any of the following: age groups, diagnosis or health risk, lab results, or medications currently taken, compared with those answering that it is very difficult or somewhat difficult or that they cannot generate such a list.

^b Physicians answering yes to receiving any process-of-care data, clinical outcomes data, or patient survey data.

^c Physicians responding that they receive quality-of-care data from internal sources about the care they provide to their patients.

^d Physicians answering yes to being involved in redesign efforts in the past two years.

^e Physicians' response to the question, "How many years have you been a practicing medical doctor?"

***p* < .05

quality-of-care data, compared with just one-quarter of specialists ($p < .05$).

Commercial insurance companies and health plans were by far the most common sources of data about quality of care: 25 percent of physicians reported receiving data from such groups.⁷ Thirteen percent reported generating their own quality-of-care data (Exhibit 2). Larger practices were more likely than smaller ones to generate performance data internally ($p < .05$). And nearly twice the percentage of salaried as nonsalaried physicians generated their own data ($p < .05$).

■ **Participation in quality improvement activities.** One-third of physicians reported having engaged in redesign efforts to improve the performance of the system of care in which they practice (Exhibit 2). Nearly twice the percentage of physicians in practices with more than fifty members said that they have engaged in redesign compared with solo physicians ($p < .05$). Salaried physicians also were more likely than nonsalaried physicians to be engaged in redesign, as were physicians who spent more hours providing direct patient care. Primary care physicians were engaged in redesign efforts more often than specialists were ($p < .05$).

■ **Sharing performance data.** Nearly three-quarters of physicians agreed (definitely or probably) that information about their clinical performance should be shared with the medical leadership of the health systems in which they work (Exhibit 1). Slightly more than half agreed that performance data should be shared with patients, but only 13 percent were in definite agreement. More than two-thirds said that the “general public” should probably or definitely not have access to such information. With the exception of willingness to share data with medical leadership, these opinions varied little by physician or practice characteristics.⁸

Results Of The Multivariate Analyses

■ **Factors affecting data access.** After all physician and practice characteristics were controlled for, three variables independently predict whether a physician can easily generate practice-level data: practice size, hours devoted to direct patient care, and salaried status (Exhibit 3). Physicians in practices of fifty or more were more likely than solo practitioners to generate such data easily (odds ratio = 1.68, $p < .01$); salaried physicians (OR = 0.79, $p < .05$), and physicians with twenty or fewer hours of direct patient care per week were less likely (OR = 0.59, $p < .01$).

Similarly, physicians’ ability to obtain any information on their quality of care was independently associated with practice size, specialty, and hours in direct patient care. Physicians in larger practices were more likely than those in solo practices to receive quality-of-care data (OR = 3.01, $p < .001$); specialists (OR = 0.33, $p < .001$) and physicians working 21–40 hours in direct patient care (OR = 0.68, $p < .01$) were less likely.

Practice size, hours in direct patient care, salaried status, and use of EMRs remained significant independent predictors of whether information about the quality of care is generated from internal sources. Physicians in large versus solo practices, who are salaried versus nonsalaried, and who provide more than 40

EXHIBIT 3
Multivariate Analyses: Effects Of Physician And Practice Characteristics On Access To Practice-Level And Quality-Of-Care Data, Physicians' Ability To Generate Quality-Of-Care Data Internally, And Physicians' Involvement In Redesign Efforts, 2003

Practice characteristic	Access to any practice-level data ^a (n = 1,757)		Access to any quality-of-care data ^b (n = 1,757)		Quality-of-care data internally generated ^c (n = 1,705)		Involved in redesign efforts ^d (n = 1,744)	
	Percent	OR	Percent	OR	Percent	OR	Percent	OR
Practice size (number of physicians)								
Solo (1) ^e	50		23		8		26	
Small (2–9)	58	1.40***	34	1.83****	10	1.37	34	1.46***
Midsize (10–49)	63	1.68***	34	1.80****	19	2.82****	40	1.92****
Large (50 or more)	63	1.68***	45	3.01****	24	3.78****	43	2.17****
Years in practice								
10 or fewer ^e	53		28		13		31	
11–15	60	1.38	33	1.28	14	1.07	41	1.54**
16 or more	56	1.17	32	1.21	13	0.94	31	1.00
Hours a week in direct patient care								
More than 40 ^e	61		34		14		36	
21–40	50	0.65****	27	0.68***	9	0.61***	29	0.70***
20 or fewer	48	0.59***	27	0.69	17	1.25	22	0.48***
Salary status								
Not salaried ^e	59		30		11		31	
Salaried	53	0.79**	33	1.16	15	1.55**	36	1.26
Physician type								
Primary care ^e	55		49		14		40	
Specialist	57	1.12	25	0.33****	12	0.83	31	0.64****
Certified in specialty								
Yes, not recertified ^e	58		31		12		31	
No	58	1.03	26	0.76	13	1.08	35	1.21
Yes, recertified	54	0.87	34	1.16	15	1.33	37	1.31**
Use of EMR								
Don't use ^e	55		31		12		32	
Routinely/occasionally	61	1.25	33	1.12	16	1.47**	37	1.26

SOURCE: 2003 Commonwealth Fund National Survey of Physicians and Quality of Care.

NOTES: OR is odds ratio. Models control for all practice characteristics listed in exhibit. EMR is electronic medical record.

^a Physicians answering that it is very or somewhat easy to generate any type of practice-level data, by either certain age groups, diagnosis, lab results, or medications, compared with those answering that it is very or somewhat difficult or that they cannot generate.

^b Physicians answering yes to receiving any process-of-care data, clinical outcomes data, or patient survey data.

^c Physicians responding that they receive quality-of-care data from internal sources about the care they provide to their patients.

^d Physicians answering yes to being involved in redesign efforts in the past two years.

^e Referent category.

p* < .05 *p* < .01 *****p* < .001

hours versus 21–40 hours of direct patient care per week were more likely to generate data internally. Physicians using an EMR were more likely than those who did not to get data from internally generated sources (OR = 1.47, *p* < .05).

■ **Factors affecting physicians' involvement in clinical redesign efforts.**

Factors that independently increased the odds of physicians' involvement in redesign efforts included larger practice size, being a primary care physician (as opposed

to a specialist), longer hours per week devoted to direct patient care, and being recertified in one's specialty. Physicians in practice for ten to fifteen years were more likely to be involved in redesign than those in practice for fewer than ten years or for more than fifteen years. Physicians in groups larger than fifty were more likely than solo physicians to have engaged in redesign (OR = 2.17, $p < .01$). Recertified physicians also were more likely than noncertified physicians or certified but not recertified physicians to be involved in redesign (OR = 1.31, $p < .05$).

Discussion

The 2003 Commonwealth Fund Survey of Physicians and Quality of Care suggests that as of mid-2003, physicians had not yet fully embraced QI principles and methods. Policies and proposals aimed at fostering the diffusion of QI must take into consideration the fact that the majority of U.S. physicians now provide care in the solo or small-group practice setting (2–9 physicians)—where, according to the results of our survey, the adoption of QI has been lowest.⁹

■ **Study limitations.** Our survey has some limitations. The response rate of 53 percent of physicians could bias the results. We did not find any basic demographic differences between respondents and nonrespondents; however, physicians who know more about or are more involved in QI might be more likely to respond than those who know less or are not involved. Data-driven physicians could more likely respond to surveys. On the other hand, physicians engaged in QI may have less time available to respond to surveys, compared with those who are not.

■ **Engaging the medical profession.** The medical profession's long-standing resistance to embracing QI is unmistakable.¹⁰ Ernest Codman said in 1917: "The science of medicine, however sophisticated it may now be, is always in an experimental stage. We are all in the business of continuous quality improvement."¹¹ Thus, it has taken close to a century for this science to diffuse into clinical practice, and the process is not yet complete. Based on the results of this survey, we propose that to accelerate the pace of physicians' involvement in QI, policies and incentives should focus on three areas: capacity, education, and professionalism.

System capacity and infrastructure. Collecting, analyzing, and transforming data into useful reports and then implementing changes require tools, staff, time, and money. Larger groups of physicians and those whose income is based on a salary might have more financial flexibility and access to capital and thus be in a better position to implement both the measurement and the improvement parts of the QI cycle. Organizational culture and management may play an independent role, given that large physician groups are more likely than solo physicians to have adopted a data-driven model of practice. More than a decade ago, the late John Eisenberg hypothesized that practice setting and an increased level of organization in health care delivery might affect the degree to which resources are dedicated to quality.¹² A variety of professional networks could help design practice models that support physicians' obtaining and using data for improvement, and

examples of such networks are being tested around the country.¹³

One hypothesis is that access to practice data would be easier for physicians who have invested in and used EMRs. In bivariate analyses, use of an EMR was found to be related to the ease of generating practice-level and quality-of-care data. But in multivariate analyses, EMR use was no longer a statistically significant predictor of the ease of generating practice-level data. Simply having an EMR does not mean that a physician can use it to its full capacity or reap all of the benefits it can bring regarding QI. Robert Miller and Ida Sim have shown that those who benefit most customize the EMR tool and reorganize workflow in their offices.¹⁴ And the extent to which those redesign efforts are possible might be different in solo practice compared with large groups.

Another surprising result is that after other practice characteristics were controlled for, the multivariate analyses revealed that nonsalaried physicians were more likely than salaried ones to have access to data about their own patients. Financial incentives might help explain these results. The incomes of nonsalaried physicians could be more closely linked to the volume of visits they generate. Thus, they might have greater incentives to monitor their patient panels more closely. In fact, nonsalaried physicians in our survey were significantly more likely than salaried physicians to send their patients reminders for follow-up appointments.¹⁵

For the great majority of the surveyed physicians, productivity remained the major factor determining compensation; clinical quality was cited as a major factor by less than 10 percent.¹⁶ Payment policies that appropriately reward quality or even involvement in QI work should be explored. It is encouraging that a number of performance-based payment programs are being implemented in the United States, and several of these are at the level of the individual physician. Ultimately, it will be important to evaluate their impact on quality.

The results indicate that one-quarter of surveyed physicians identified insurers and health plans as the most common source of their quality-of-care data. For many years, health plans have used the Health Plan Employer Data and Information System (HEDIS), a validated set of measures that assesses quality. But most data on performance, to date, have been measured at the hospital or health plan level. The National Committee for Quality Assurance (NCQA) is developing a set of measures that will target physician offices; the Centers for Medicare and Medicaid Services (CMS) has also launched a national project, "Doctor's Office Quality," that will measure quality of care of physicians and their offices.¹⁷ Also, according to our survey, primary care physicians have access to quality-of-care data more often than specialists. The National Quality Forum, NCQA, and CMS should thus pay more attention to developing measures of specialty care.

Education: building knowledge and skills. Midcareer physicians reported the greatest level of engagement in QI activities. This is possibly because physicians trained more than fifteen years ago were not exposed to QI principles and because those

just starting to practice have yet to implement them. Still, to accelerate the adoption of QI, it will be necessary to improve medical school curricula, residency training, and postgraduate medical education.¹⁸ The Association of American Medical Colleges (AAMC) has responded by appointing an expert panel within the Medical School Objectives Project (MSOP). Its charge is to make recommendations about QI within the context of undergraduate medical education.¹⁹ The AAMC aims to create ten medical school exemplars by year 2006 and sixty by 2009. In 1999 the American Council of Graduate Medical Education (ACGME) approved a new set of residency program training requirements, whereby residents need to reach competency in six areas, and two of these target quality improvement methods.²⁰

Professionalism. The Professionalism Charter of 2002 states that physicians should participate in “continuous improvement in the quality of health care.”²¹ Since 1998 the American Board of Medical Specialties has mandated a program of ongoing maintenance of certification.²² Our survey suggests that recertification programs may be having a positive impact. A number of professional organizations and specialty societies are also getting involved in spreading knowledge and fostering implementation of QI among physicians.²³

Nonetheless, the degree to which physicians are unwilling to share information about the care they provide is unequivocal. Although doctors may be wary of the use of performance data for grading or ranking, many measures can be used for QI. At a minimum, physicians should be willing to share information with their peers. Such information sharing could help physicians refer patients to the most appropriate specialist for the patient’s condition.²⁴ Also, physicians should let patients know that they have performance information and that they use it for improving care. One-third of all surveyed physicians said that their patients were more likely to ask them about the quality of their care than they were two years ago.²⁵

IF QUALITY IS TO BE REWARDED, it will have to be measured; and the data will need to be more accessible than they are now. Physicians should take the lead in making care more transparent. This will mean balancing issues of ethics, fairness, accountability, and confidentiality. Physicians can engender increased trust between the public and the profession by allowing greater openness about the quality of care they provide. Ultimately, transparency could lead key stakeholders to align and coordinate their own QI activities with those of others, maintaining QI cycles in motion toward better care and better health outcomes.

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