

**Original Article**

## **Integrating Education into Primary Care Quality and Cost Improvement at an Academic Medical Center**

R. Van Harrison, PhD; Connie J. Standiford, MD; Lee A. Green, MD; and Steven J. Bernstein, MD

### **Abstract**

**Introduction:** In 1996 the University of Michigan Health System created the Guidelines Utilization, Implementation, Development, and Evaluation Studies (GUIDES) unit to improve the quality and cost-effectiveness of primary care for common medical problems. GUIDES's primary functions are to oversee the development of evidence-based, practical clinical guidelines for common medical conditions; measure and provide feedback on physicians' performance; and facilitate systemic changes to support appropriate care. Various methods are used to improve care, including evidence reviews, formal education, informal clinical "opinion leaders," feedback, reminders, and procedure changes. Twenty-four common medical conditions have been addressed through this process. More than 30 measures of clinical performance have been developed and reported.

**Methods:** This case study describes a systematic, multifaceted program to improve the quality and cost-effectiveness of primary care.

**Results:** Illustrative results for clinical performance are presented for 2 measures of chronic care, 2 measures of preventive care, and 2 measures of acute care. All 6 measures show general improvement in performance across years, with performance near or above the National Committee for Quality Assurance's 90th percentile for Health Plan Employer Data and Information Set measures.

**Discussion:** A systematic approach involving all relevant components of a health system integrates the synthesis of information, education about the information and how to implement it, and addressing operational barriers. Benefits include a curriculum that is shared across faculty, residents, and medical students and more uniform quality of care that faculty model for physicians-in-training.

**Key Words:** Continuing medical education, physician performance change, primary care, systems-based care, quality improvement, cost-effective care

### **Introduction**

How can an academic medical center integrate continuing medical education as a component of

a systematic, multifaceted program to improve the quality and cost-effectiveness of primary care provided by the institution? This case study at the University of Michigan Health System

*Dr. Harrison:* Departments of Medical Education and Office of Continuing Medical Education; *Dr. Standiford:* Department of Internal Medicine and Ambulatory Care Services; *Dr. Green:* Department of Family Medicine; *Dr. Bernstein:* Veterans Administration Center for Practice Management and Outcomes Research, and Department of Internal Medicine, University of Michigan Medical School, Ann Arbor.

Correspondence: R. Van Harrison, PhD, Department of Medical Education, G-1103 Towsley Center, Ann Arbor, MI 48109-0201; email: rvh@umich.edu.

- Describes the background that led to the creation of a program to improve primary care
- Explains methods used by the program
- Presents results concerning care performance that reflect the program's success
- Discusses factors related to the program, including implications for education as a

component of change efforts, and effects on the education of faculty, residents, medical students, and community physicians in our region.

The rapid expansion of primary care services at the University of Michigan Health System (UMHS) raised concerns about primary care education, clinical practice, and health care costs. By the mid-1990s the payer mix had shifted from fee-for-service to include managed care capitation. To address the shift toward managed care, UMHS more than tripled the number of primary care physicians in the system through hiring and private practice acquisition. Several new off-site primary care health centers were built. This expansion helped ensure an ongoing base of patients under managed care that would also utilize secondary and tertiary care components of UMHS. With the rapid expansion and wide geographic dispersion of primary care physicians, practice variation was substantial within and across primary care departments and in what faculty taught residents and medical students. Faculty with little experience under managed care had to learn and teach high-quality, cost-effective care practices, particularly for frequently treated conditions.

UMHS is somewhat unusual among academic medical centers in the extent to which it is an integrated health system owned by the University of Michigan (UM). Physicians are full-time employees under the Medical School's Faculty Group Practice. Facilities and other personnel operate under the UM hospitals and health centers. Most managed care is contracted through MCARE, the managed health care organization of UMHS.

To address concerns regarding variation in quality and utilization, in 1996 UMHS created the Guidelines Utilization, Implementation, Development, and Evaluation Studies (GUIDES) unit. Its mission was to improve the quality and cost-effectiveness of primary care for common medical problems. Its objectives include

- Obtaining institutional consensus on care through the development of evidence-based, practically oriented guidelines for common medical conditions
- Providing materials to allow uniform education for faculty, house staff, students, and patients
- Measuring performance by physician, health center, and department
- Improving quality by decreasing inappropriate variation in clinical practice across UMHS physicians and health centers
- Achieving system innovation through the introduction of new methods of care
- Decreasing cost through the efficient use of care resources
- Meeting requirements of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) for accreditation of hospitals and requirements of the National Committee for Quality Assurance (NCQA) for accreditation of managed care plans related to institutional care guidelines, performance measurement, and provider specific feedback
- Providing clinical leadership and sharing knowledge locally, regionally, and nationally

The GUIDES unit identifies, coordinates, and helps direct resources from all components of UMHS to advance the above objectives. The unit's primary responsibilities are to oversee the development of guidelines that embody institutional consensus on care, measure performance, and recommend changes in the system to facilitate appropriate care. Institutional funding for the GUIDES unit pays for 0.8 full-time-equivalent (FTE) faculty time (portions of 4 faculty), 2 FTE data analysts, and 0.8 FTE administrative support.

The GUIDES unit uses a systemwide framework to integrate formal education along with other activities in coordinated efforts to improve physician performance. From the evolving literature on physician performance change,<sup>1-8</sup> we

identified the following general processes (see Table 1) to improve care: identify appropriate care, educate physicians about that care, motivate physicians to provide that care, and provide supporting materials and systems. These processes parallel those reported by others.<sup>9</sup> Our methods to perform these processes are described below in the context of the GUIDES unit's 3 main activities: developing clinical guidelines, measuring performance, and facilitating performance improvement.

## Methods

### Study Population

GUIDES's primary focus is the 228 primary care physicians employed by UMHS, including 115 general internists, 56 family physicians, and 57 pediatricians. These physicians practice at 3 hospitals and 14 ambulatory care centers, usually in clinics organized by specialty within a larger health center.

**Table 1 Processes Implemented to Improve Care**

Process	Implementation
Identify appropriate care	<ul style="list-style-type: none"> <li>Involve relevant specialties (primary care and specialists)</li> <li>Conduct a formal evidence review</li> <li>Focus guideline content on practical issues</li> </ul>
Educate physicians about that care	<ul style="list-style-type: none"> <li>Discuss at grand rounds</li> <li>Circulate draft and final copies of guideline for comments</li> <li>Format guideline to highlight key points</li> <li>Design guideline for easy use and reference</li> </ul>
Motivate physicians to want to provide that care	<ul style="list-style-type: none"> <li>Build on physician's personal motivation to provide high-quality care</li> <li>Have respected colleagues ("opinion leaders") involved in developing the guideline, supporting care recommendations, and supporting change efforts</li> <li>Provide an opportunity to review and suggest changes</li> <li>Demonstrate acceptance by relevant institutional groups</li> <li>Provide individual feedback on performance with comparison to peers' performance</li> <li>Make performance a component of the annual job evaluation</li> <li>Relate to third-party "pay for performance" initiatives for some conditions (since 2005)</li> </ul>
Provide supporting materials and systems	<ul style="list-style-type: none"> <li>Provide convenient access to guidelines at the site of care (paper, Web)</li> <li>Append operational information (eg, phone numbers for services)</li> <li>Ensure patient education materials are consistent with the guideline</li> <li>Provide easy-to-use formulary-prescribing pocket cards</li> <li>Incorporate reminders in problem summary section of electronic medical record</li> <li>Institute operational changes to facilitate care</li> </ul>

### **Clinical Guidelines**

Clinical guidelines provide the basis for activities to identify appropriate care, educate, motivate, provide support, and improve systems processes for medical conditions,<sup>10</sup> but guidelines differ in the extent to which they emphasize conceptual reviews or practical application. Guidelines produced by national organizations often involve lengthy literature reviews that bring scientific knowledge together. They can be impractically long and poorly organized for quick reference when addressing practical problems at the local level. In addition, guidelines developed by specialists often focus on aspects of care that are less relevant to primary care. The UMHS guidelines build on the information on those guidelines and more recent evidence but purposely translate the information into condensed operational summaries in a consistent format for practical application and easy reference. This is particularly important for primary care. Specialists generally treat a much narrower range of medical conditions and can more easily follow the evolution of national care recommendations in the limited scope of practice.

The conditions selected for guideline development at UMHS have a high clinical volume and have been identified nationally (eg, HEDIS effectiveness-of-care measures<sup>11</sup>) or locally for importance in demonstrating care quality or reducing inappropriate clinical costs. UMHS has developed clinical guidelines for 24 common conditions in primary care (Table 2).

The process of guideline development and approval helps ensure that all relevant physicians and institutional units support the care recommendations. The team developing a guideline for a medical condition includes representatives of the primary care physicians and the specialists likely to be involved in providing substantial care for the condition. The inclusion of all relevant specialties ensures institution-wide agreement on expected clinical care practice and uniform expectations for clinical interfaces between primary and specialty care associated with referrals and continuing primary care for patients seen by specialists. For example, the team for acute low-back pain in adults included primary care representatives from family medicine, general internal medicine, and obstetrics and gynecology as well as representatives from

**Table 2 University of Michigan Health System Clinical Guideline Topics**

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Attention deficit-hyperactivity disorder	Knee pain
Allergic rhinitis	Lipid screening and management
Asthma	Low-back pain
Breast problems	Osteoporosis
Cancer screening	Otitis media
Constipation and soiling in children	Peptic ulcer disease
Depression	Pharyngitis
Diabetes mellitus	Prenatal care
Gastroesophageal reflux disease	Rhinosinusitis
Heart failure	Smoking cessation
Hypertension	Urinary tract infection
Immunizations for adults	Venous thromboembolism

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Note: UMHS clinical guidelines can be accessed through Web sites of the National Guideline Clearinghouse (<http://www.guideline.gov>) and the University of Michigan Office of Continuing Medical Education (<http://www.cme.med.umich.edu>) under self-study activities.

the specialties of neurosurgery, orthopedic surgery, and physical medicine and rehabilitation. Team members are nominated by the institutional leaders for the relevant specialties (eg, department chair, division chief), who typically identify faculty with relevant expertise and interest in care for the relevant medical condition.

The teams include a social scientist experienced in the process of guideline development. When judged useful, teams include individuals with relevant special expertise such as pharmacists. The team is led by a primary care physician to ensure that considerations reflect the types of patients and clinical settings of actual practice.

A guideline team begins by defining the scope of care (eg, medical condition, patient characteristics, care setting) to be addressed and by reviewing relevant evidence regarding that care. Team members are already familiar with most relevant major national guidelines produced by specialty societies and other groups. If the structured evidence search and summary of a previously published guideline is viewed as objective and acceptable, the team will use that evidence summary as a starting point. The scope of care is used to design a prospective search strategy for literature published since the search performed for the national guideline(s) and on topics of interest that were not addressed in the national guideline. Medical librarians perform the searches on MEDLINE and also check for relevant summaries produced by the Cochrane Collaboration and relevant clinical guidelines available through the National Guideline Clearinghouse. Searches are single cycle and are supplemented with recent clinical trials known to team members. Team members are assigned specific topics and review that evidence to identify recommendations for care based on the most rigorous research design available (eg, results of prospective randomized clinical trials take precedence over observational studies). In the absence of empirical evidence, team members developed recommendations based on their joint expert consensus. Four levels of evidence are

used for major clinical recommendations: randomized controlled trials; controlled trials, no randomization; observational trials; and opinions of expert panels.

Team members outline and develop the guideline text focusing on practical issues in application. Emphasis is placed on actions that have important effects on health outcomes and costs, with particular emphasis on any areas where inconsistent practice is thought to be widespread. A standard format is used for the guideline text. Key operational points for diagnosis and treatment are summarized in the first page. Algorithms and tables needed for application immediately follow. Information on cost and cost-effective care is noted, such as the costs of laboratory tests or the listing of drugs in a class by cost, starting with the least expensive. The rationale for recommendations is described in 5 to 8 pages, followed by some key references and sources of more detailed information, usually no more than 8 references in total. When appropriate, helpful tools for application are appended (eg, a 9-item screen for depression).

The development of the guideline continues with an extensive process of review and comments back to the guideline team to ensure that the final document reflects a consensus on care across individual physicians, relevant supporting units, and medical leadership. Each team member presents the guideline draft to faculty in their specialty for discussion and comment, usually as part of a grand rounds presentation, clinical conference, or other formal educational session. Relevant institutional units review drafts of guidelines (eg, Pharmacy Services reviews all prescribing recommendations). A standing Guideline Steering Committee comprising designated representatives of each primary care specialty, reviews each guideline. An MCARE panel that includes community physicians also reviews the draft so that any differences with community practice in our region are recognized and considered. The last step is institutional endorsement of the final



document by the UMHS Executive Committee on Clinical Affairs, which includes representatives from all major clinical components of the health system and that sets systemwide institutional policy regarding clinical care.

While developing the guideline, the team also identifies barriers to physicians providing recommended care. Most of the team members are directly involved in providing relevant care and have firsthand knowledge about local factors that result in them and their colleagues sometimes not providing that care. A wide range of barriers—lack of information, limits on ability to recall key information, lack of time, inadequately specified roles on the health care team—and operational changes that would overcome barriers and facilitate care are considered. The guideline team directly addresses information barriers through the guideline and information appended to it (eg, contact information for relevant services). Barriers beyond the control of the team are sent to other institutional units for action. Activities to improve care are addressed in more detail later (see the sections “Facilitating Performance Improvement” and “Education as a Component of Change Efforts”).

Guidelines are formally updated at least every 4 to 5 years, consistent with the policy of the National Guideline Clearinghouse to include only guidelines produced within the most recent 5 years. The formal update process goes through the steps described earlier, starting from the previous literature review to search for subsequently published national guidelines and relevant literature. The guideline text is updated and the series of formal reviews performed to arrive at an institutionally endorsed update. The update process provides an ongoing institutional educational curriculum for primary care physicians and relevant specialists of about 6 clinical topics per year. Team members follow current literature and initiate interim revisions or special notices to faculty should important practice changes occur between scheduled guideline updates.

## **Performance Measures**

The main activity of GUIDES has shifted to developing measures of care performance and ongoing reporting of results. Institutional priorities are to develop measures that reflect national quality-of-care criteria (eg, HEDIS clinical effectiveness measures), other important aspects of our clinical guidelines, and care reflecting excessive costs (eg, variation from preferred prescribing). The ongoing monitoring of performance has direct financial implications through recent pay-for-performance initiatives. Under these initiatives, third-party payers make payments to an organization providing health care partially contingent on the level of care that the organization demonstrates on relevant performance measures.<sup>12</sup>

Performance is measured by a physician's actions (eg, prescribing) and by patients achieving quality goals (eg, a diabetic patient with a low-density-lipoprotein cholesterol [LDL-C] level < 100 mg/dL). For measurement purposes, patients are assigned to the primary care physician seen most frequently in the previous 2 years. (The primary care provider designated for a patient in managed care records often does not reflect the physician providing the patient's care.)

UMHS has several electronic databases that contain information relevant to physician performance and patient status. For example, electronic medical records contain problem summary lists for each patient, the clinical data repository has laboratory results and radiology reports, billing records are used to identify physician and hospital services, and MCARE's claim files can identify services provided from non-UM providers and prescriptions filled by members who selected UM physicians as their provider. GUIDES uses these databases to assess care for more than 30 performance measures (Table 3). The creation of each measure involves a series of steps, including identifying relevant data elements from a variety of sources, assessing the accuracy of each element, developing a

**Table 3 Performance Measures by Type of Condition**

Condition Type	Measures
Preventive	Infections
Mammography rate	Pharyngitis: antibiotics
Pap smear rate	Pharyngitis: strep testing
Colorectal screening	Rhinosinusitis: antibiotics
Chlamydia screening, ages 16–20	URI: antibiotics
Chlamydia screening, ages 21–25	UTI: antibiotics
Flu immunization	UTI: phone triage
Pneumovax immunization	Otitis media: antibiotics
Diabetes	Coronary artery disease
Hemoglobin A <sub>1c</sub> testing	Beta-blocker post-MI
Hemoglobin A <sub>1c</sub> ≤ 9 mg/dL	Blood pressure measured
LDL-C testing	Blood pressure
LDL-C ≤ 130 mg/dL	Cholesterol management
LDL-C ≤ 100 mg/dL	ACE inhibitor use
Eye exam	Aspirin use
Foot exam	Other
Urine protein	Knee and back pain: COX-2
ACE inhibitor or ARB use	GERD: PPI use
Statin use	Depression: SSRI use
Aspirin use	

ACE = angiotensin-converting enzyme; ARB = angiotensin-receptor blocker; URI = upper respiratory [tract] infection; UTI = urinary tract infection; MI = myocardial infarction; COX-2 = cyclo-oxygenase 2; GERD = gastroesophageal reflux disease; PPI = proton pump inhibitor; SSRI = selective serotonin uptake inhibitor

format to report the data to physicians and other recipients, and assigning patients to physicians for each report.

Several types of performance reports have been developed to serve various functions within the system. Recipients of reports and the types of information they receive include the following:

- *Individual physicians*  
Patient listing by action needed to improve care  
Personal summary of own performance average, average by health center, or average for institution

- *Medical leadership of health centers and departments*  
Averages for individual physicians  
Averages by health center, by department, and overall institutional average
- *Institutional medical leadership*  
Averages by health center, department, and overall institutional average

Measures are typically reported at least annually and often semiannually for several special institutional initiatives (eg, diabetes care).

Physicians can use their feedback reports to manage individual patients (eg, have clinic

personnel contact all diabetic patients without a recent hemoglobin A<sub>1c</sub> test to come in to be tested) and to identify and examine areas of their overall performance that are below those of other physicians. Medical directors at health centers use the data to guide improvements as part of formal annual evaluations of the performance of physicians working there. Institutional leaders use overall performance scores to help prioritize initiatives and use of resources to improve care and reduce unnecessary costs. Institutional results also demonstrate the quality of our care to corporate purchasers of health care services.

### **Facilitating Performance Improvement**

GUIDES coordinates its activities with other UMHS units to facilitate appropriate care. Some activities focus on making the guidelines easily accessible. Health centers maintain printed copies of the guidelines in staff rooms used for teaching; electronic versions are available through the UMHS clinical Web page. Other activities reinforce recommendations made in the guidelines. To update and reinforce appropriate prescribing, the GUIDES unit works closely with Pharmacy Services to annually produce laminated pocket cards containing a list of commonly prescribed medications with costs and formulary coverage by different health insurance companies. Pharmacy Services also assesses physician-prescribing patterns and their relationship to UMHS clinical guidelines, produces e-mail messages monthly on pharmacy-related issues, and has pharmacists meet with physicians whose prescribing varies appreciably from expectations. The Patient Education Oversight Committee assures the availability of patient education materials that are consistent with the guideline. The GUIDES unit provides recommendations to the committee that oversees the design of the UMHS electronic medical record system regarding improvements in content and design that facilitate the provision of

recommended care. The UMHS is piloting a “reminder” system integrated with electronic patient records. On the day of a clinic visit, the system lists recommended care due to be performed for specified conditions.

Many system changes are specific to a medical condition and are part of the guideline implementation process. For example, for diabetes care, an option was added to the laboratory section of the electronic medical record that allows a physician to request “diabetes” results and see all relevant laboratory data tracked over time. Also for diabetes, disposable monofilaments to test for diabetic neuropathy (foot sensation) were stocked in each exam room. For asthma care, systems were changed so that spacers and peak flow meters could be dispensed at health centers, allowing physicians to demonstrate to patients how to use them properly. To facilitate the use of low-molecular-weight heparin for the treatment of deep venous thrombosis, several institutional units developed new clinical pathways to coordinate outpatient treatment and ensure its reimbursement.

### **Results**

Figures 1 through 3 present examples of UMHS performance on 6 HEDIS measures of effectiveness of care: 2 of care for a chronic condition, 2 of preventive care, and 2 of acute care. Results are presented for performance during several years, ending with the most recent year (2004) for which the NCQA has provided national data on HEDIS measures across all accredited managed health care plans.<sup>9</sup> (Note that in NCQA reports, data for care performed during 2004 are labeled by the year in which they were reported to NCQA, ie, the 2005 “reporting year.”) Starting with the 100,000 UMHS patients covered by MCARE, the results are for the subset of patients eligible for the specific measure. Illustrative sample sizes are presented in the legends of the figures.

Figure 1 presents results for 2 types of care for a chronic condition (diabetes): hemoglobin



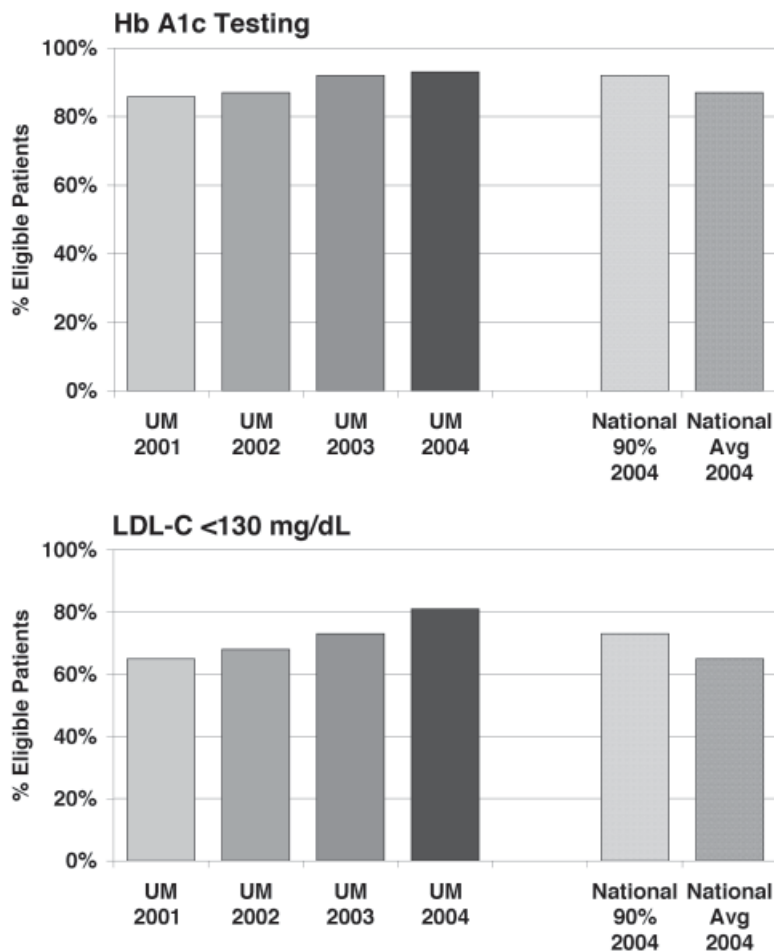


Figure 1 Care for chronic disease. Four years of UMHS performance for MCARE patients and comparison for the last year with HEDIS national 90th percentile and national average. Top graph, HbA<sub>1c</sub> testing: for patients age 18–75 with diabetes, 1 or more HbA<sub>1c</sub> tests conducted during the year (for UM 2004, *N* = 1,212). Bottom graph, LDL-C < 130 mg/dL: for patients age 18–75 with diabetes, the most recent LDL-C level < 130 mg/dL (for UM 2004, *N* = 1,212).

A<sub>1c</sub> (HbA<sub>1c</sub>) tested and LDL-C level <130 mg/dL. Over the most recent 4 years HbA<sub>1c</sub> testing has increased, the 2004 level (93%) being just above the HEDIS 90th percentile (92%). Similarly, the proportion of eligible patients reaching the LDL-C goal has increased, with the 2004 percentage (81%) appreciably above the HEDIS 90th percentile (73%).

Figure 2 presents results for 2 types of preventive care: breast cancer screening and cervical cancer screening. Over the most recent 4

years, the performance of breast cancer screening increased for 3 years, then decreased somewhat from 88% in 2003 to 83% in 2004. Performance in both years was above the HEDIS 90th percentile, which also decreased slightly from 83% in 2003 to 81% in 2004. The pattern for cervical cancer screening is similar but less pronounced. Performance increased for 3 years, then decreased slightly from 94% in 2003 to 91% in 2004. Performance in both years was above the HEDIS 90th percentile, which

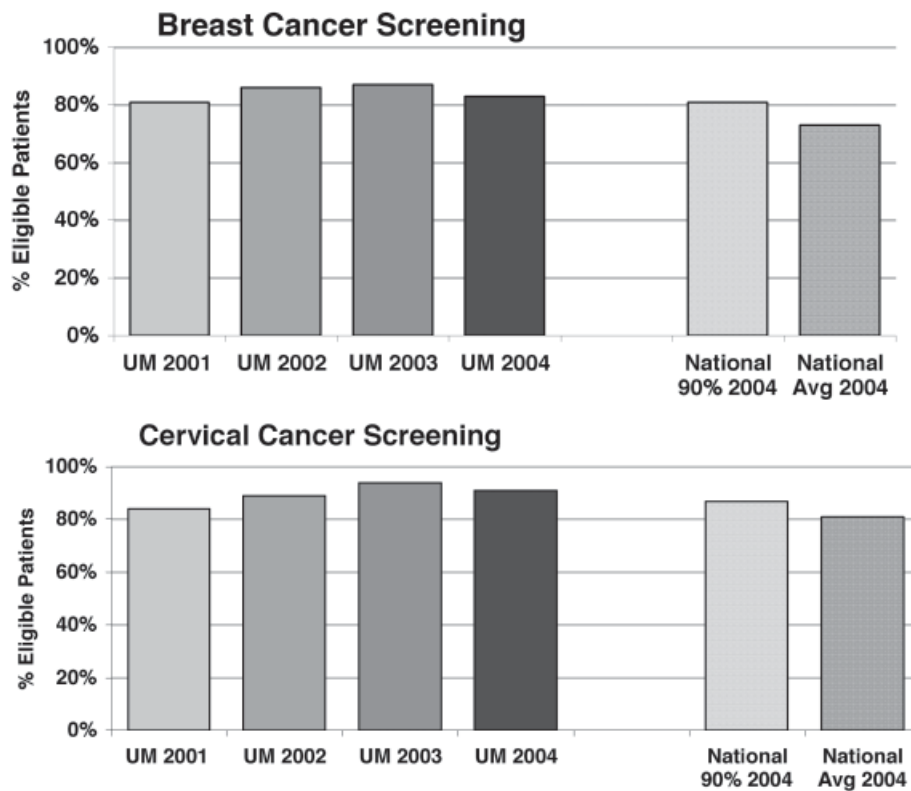


Figure 2 Preventive care: 4 years of UMHS performance for MCARE patients and comparison for the last year with HEDIS national 90th percentile and national average. Top graph, breast cancer screening: for women 52–69 years old, 1 or more mammogram(s) performed during the current or previous year (for UM 2004,  $N = 3,188$ ). Bottom graph, cervical cancer screening: for women 21–64 years old, 1 or more Pap test(s) during the current or previous year (for UM 2004,  $N = 10,750$ ).

also decreased slightly from 88% in 2003 to 87% in 2004.

Figure 3 presents results for 2 types of acute care in a pediatric population: upper respiratory [tract] infection (URI) with antibiotic not prescribed and pharyngitis with “strep” testing among patients who received an antibiotic. The data are for 3 years because 2002 was the first year these data were collected. Not prescribing antibiotics for URIs has stayed at high levels over the 3 years (93% or 94%). This is above the HEDIS 90th percentile of 90% for 2004, the first year in which HEDIS reported the information. Strep testing increased for pharyngitis across all

3 years. The 83% in 2004 is below the HEDIS 90th percentile of 88% for 2004, the first year in which HEDIS reported the information.

Across the 6 measures, the results demonstrate general ongoing improvements in care, with attention drawn to recent slight decreases in performance at our institution and nationally regarding the cancer screening measures. Another frequently seen pattern across the 6 measures is that improvements tend to be greater for measures in which the possible range for improvement is greater. Some care is not provided because of patient refusal and other factors that put a “ceiling” on performance that is lower than 100%.

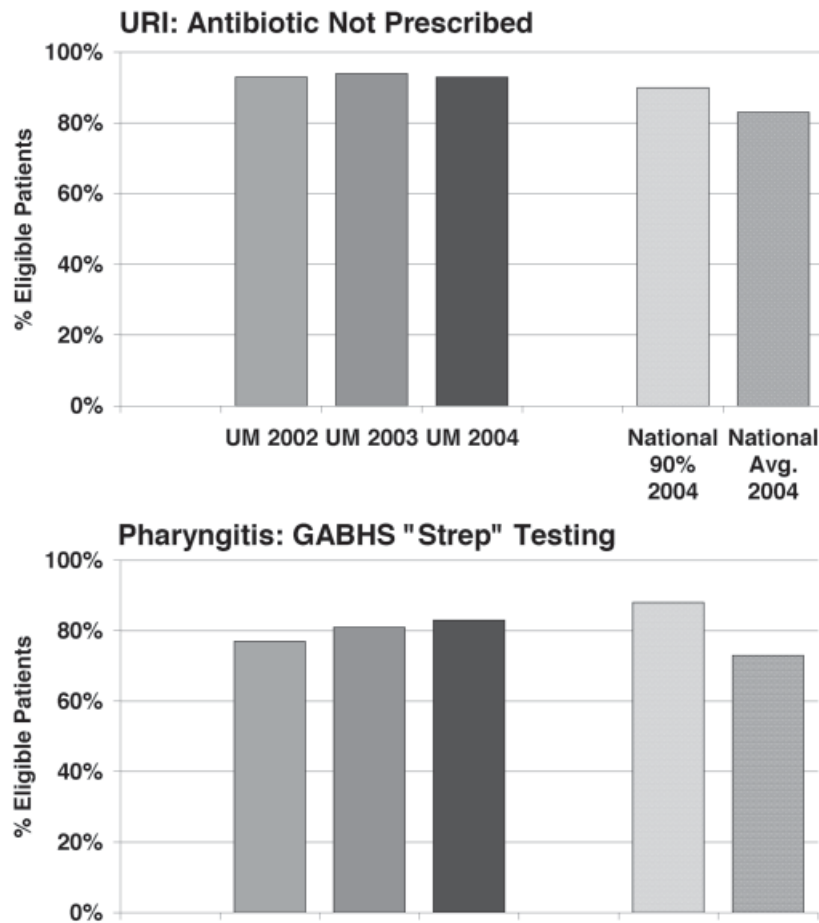


Figure 3 Acute care: 3 years of UMHS performance for MCARE pediatric patients and comparison with HEDIS national average. Top graph, URI treatment: for patients age 3 months to 18 years with a clinic visit having a diagnosis for a first seasonal episode of upper respiratory [tract] infection (URI), patients who did not fill an antibiotic prescription within 3 days after the visit (for UM 2004,  $N = 1,593$ ). Bottom graph, pharyngitis testing: for patients age 2-18 years with a clinic visit having a diagnosis for a first seasonal episode of pharyngitis and who filled an antibiotic prescription within 3 days of the visit, patients who were tested for group A beta-hemolytic streptococcus (GABHS) from 3 days before to 3 days after the visit (for UM 2004,  $N = 726$ ).

Once performance is above 90% (eg, HbA<sub>1c</sub> testing, cervical cancer screening, not prescribing antibiotics for URIs), performance increases little.

The ultimate success of the overall program is judged by the ongoing demonstration of improvements across many aspects of care. In addition to the results reported here, UMHS performance on 12 additional HEDIS measures is

reported elsewhere.<sup>13</sup> Results for those measures parallel the results presented here. UMHS clinical performance is typically near or above the national 90th percentile. Across years on all measures, the general trend is for care performance to improve. In the few instances where a decrease in performance is noted, care subsequently improves.

## Discussion

### Strengths and Limitations

Among several issues that could be discussed regarding our institutional program and description of its accomplishments, the following are noteworthy:

- *Limitations in attributing direct causality.*

The day-to-day operation of a broad system-based quality improvement program limits the extent to which activities of the GUIDES unit can be determined directly to cause change. Certainly many other influences affect UMHS performance. However, in addition to numerous anecdotal reports, evidence from several quantitative measures indicates that physicians are influenced by the unit's activities.

In 1999 UMHS primary care physicians were surveyed regarding the extent to which they used the UMHS guidelines for various purposes. Of the 191 primary care physicians sent surveys, 72 (38%) responded. On a 5-point scale (1 for "not at all," 2 "a little," 3 "somewhat," 4 "a lot," and 5 "extremely") addressing usefulness of the guidelines, mean responses were 3.7 in using the guidelines for teaching, 3.5 for patient care, 3.4 for personal CME, and 3.2 for quality-improvement projects.

In 2004 the UMHS Office of Clinical Affairs asked all UMHS attending physicians, fellows, and house officers to complete an online survey regarding the sources of information used to obtain additional information regarding clinical questions. Of the 1,867 physicians asked, 465 (24%) completed the online survey. The 7-point response scale had text "anchors" for the first and last point: 1 for "rarely use it," and 7 for "one of my first sources." The mean responses for UMHS primary care clinicians were 5.6 for Up-to-Date, 4.2 for MD Consult, 4.2 for UM clinical guidelines, and 2.8 for pocket guides.

We cannot monitor UMHS physicians' ongoing use of their personal copies of UMHS

guidelines or the use of the printed copies in staff rooms. However, on an ongoing basis, we monitor the frequency with which UMHS personnel electronically access UMHS guidelines through the UMHS internal clinical Web site. Across the guidelines, the average is about 200 "hits" per guideline per month.

Some of the observed improvement in performance across time probably reflects improvements in care documentation and in the use of secondary data for performance measures. A part of the feedback process is to educate physicians about appropriate documentation so that their clinical performance is accurately reflected. Improvements in data provide better information for prioritizing care improvement efforts.

- *Observational design.* The description of results and ongoing institutional evaluation of the GUIDES unit is based on a variety of specific observational studies that include audit and monitoring, developmental studies ("action research"), and descriptive case studies.<sup>14</sup> These observational designs provide estimates regarding success, but the estimates are imprecise. More precision in assessing the effect of a specific intervention on a specific population under a specific set of circumstances could be obtained through designs using randomization and control groups. While valuable for focused, controlled studies, these more constrained designs are less appropriate for the more complex, uncontrolled context of ongoing quality improvement in a large organization. In these circumstances, the primary focus is on continuing improvement across time, using whatever combination of methods seems most practical under the circumstances at a point in time. The primary focus is on demonstrating that improvements continue to occur in aspects of care that are targeted for improvement based on the most recent results of performance measures. The evolving context of care (eg, new care options, changing medical information systems, shifting reimbursement rules) and resulting changes in a

combination of improvement methods lower the value of obtaining more precise estimates for a particular time and circumstance.

- *Generalizability.* The strength of a case study is the detailed insight it provides into the internal dynamics of a change process. However, those dynamics occur in a specific context, which limits the direct generalizability of the change process to other organizations. A particularly noteworthy structural advantage for our performance-improvement program is the relative integration of our academic health system. Performance-improvement activities for high-quality, cost-effective care benefit all components of the health care system: medical faculty, health care facilities, and managed care contractor. All components contribute to the programmatic effort, providing faculty time, operational coordination, data, and financial support. Coordinating activities and obtaining support are likely to be more difficult in health care systems where the components are more independent operationally and financially. Individuals in those circumstances must address additional organizational barriers to programmatic efforts to improve the quality and cost-effectiveness of care.

Although the UMHS clinical guidelines may be useful to others, simply adopting them—or the guidelines of any group—is not likely to produce change. Local processes must still develop a consensus in accepting them and address their implementation in the local context.<sup>6</sup>

### **Effects of Pay-for-Performance Initiatives**

Various pay-for-performance initiatives link payment for care to the quality of care demonstrated in measures of specified aspects of performance. At UMHS the GUIDES unit is a key participant in a Physician Group Incentive Program sponsored by Blue Cross Blue Shield of Michigan and in a Physician Group Practice Demonstration Project of the Centers for

Medicare and Medicaid Services. These 2 pilot initiatives began in early 2005, resulting in increased attention, coordination, and institutional resources focused on efforts to improve care performance that is related to quality. For example, the performance of all physicians providing care for designated conditions is considered in determining payment standards. Therefore, the GUIDES unit has recently expanded performance reporting beyond primary care physicians: for example, diabetes reporting now includes endocrinologists, and heart failure reporting now includes cardiologists. If pay-for-performance initiatives prove successful, all health care organizations will be under increased pressure to develop internal programs to measure and change performance.

### **Education as a Component of Change Efforts**

The systemwide approach to improving physician performance illustrates the importance of taking a broad view when looking at the role of formal education as one of the processes for performance improvement.<sup>15</sup> The translation of new information into sustained performance can involve many steps as the information is synthesized, as educational activities explain how to apply the information in practice, and as operational and financial barriers are addressed. Failure to take a broad view has led to several misconceptions. One is that education by itself should generally be enough to produce performance change. Another is that because education is often not adequate by itself, education is not important in producing change. Yet another is to treat guidelines, education, feedback, reminders, and other activities as alternatives and try to determine the one approach that will work best in all situations.

Approaches to improving performance should be tailored to the particular circumstances associated with the medical condition. A meta-analysis has demonstrated that in some circumstances a simple educational activity can be



as effective as more complex efforts, whereas in other circumstances a combination of actions may be necessary.<sup>7</sup> A part of the role of guideline teams was to “diagnose” the problems in providing care for a particular medical condition and recommend appropriate “treatments.” The guideline team for pharyngitis considered the key issue to be physicians learning to use a simple scoring system for the probability of group A beta-hemolytic streptococcal pharyngitis (ie, strep throat) to guide testing and treatment. In contrast, the guideline team for venous thromboembolism identified a fairly complex series of medical and operational issues to address and about which physicians needed to be educated.

In several instances, further education is likely not the answer to performance improvement. In considering the somewhat decreased recent performance in breast cancer screening for 2004 (see Figure 2), we determined that the barrier was not knowledge: physicians here knew the screening guidelines well as a result of previous educational initiatives. Recent efforts have focused on incorporating reminders into electronic medical records. Even with reminders, an additional barrier is lack of time. Many clinical encounters are sufficiently rushed, with acute and chronic medical conditions to be addressed, that physicians do not have time to act on lower priority reminders. Another initiative currently under way is to send letters with referrals for screening mammography directly to patients, omitting the need for physicians to raise the issue with many patients. The slightly decreased performance for cervical cancer screening in 2005 probably reflects a change in recommended practice not yet reflected in the HEDIS measure. The HEDIS measure (screening every 2 years) was created when national recommendations were screening every 1 to 2 years. Relevant national and UMHS clinical guidelines have changed to screening every 2 to 3 years for women with 3 consecutive normal results. The unchanged HEDIS measure does not take into account women for whom

screening is now appropriately delayed to a third year.

### **Enhancing Physician Education**

The emphasis on practical and operational issues highlights an important shortcoming of much of the continuing education provided by academics. At academic medical centers, cultural values tend to focus educational activities on the biologic science of a medical condition. Equally important for change in practice is education and action about related operational and financial issues associated with applied social sciences.<sup>8</sup> Academic medical expertise in those areas can be more difficult to locate. We sought to have guideline teams led by pragmatically oriented primary care physicians who would give equal weight to operational issues, addressing them educationally and helping with system change.

The institutional focus on common conditions in primary care has purposely linked CME for UMHS faculty with the education of UMHS residents and medical students. The clinical guidelines and activities reinforcing them provide a shared curriculum in primary care across all 3 levels of medical education. For example, the guidelines that are presented for discussion and approval by faculty in grand rounds become the basis for presentations to residents at their noon conferences when that clinical topic is addressed. The primary care departments use UMHS clinical guidelines as resources in teaching evidence-based medicine and systems-based practice. Results show that UMHS primary care physicians increasingly provide recommended care, with this care more consistently provided by individual physicians, across physicians at different UMHS health centers, and across primary care specialties. As clinical teachers, UMHS primary care physicians provide more consistent modeling of high-quality, cost-effective care for residents rotating through different clinics and for medical students rotating through different primary care departments. More than

100 faculty have participated on guideline teams, significantly expanding the pool of faculty with formal experience in developing evidence-based guidelines and system changes.

The quality-improvement efforts within our institution have also enhanced educational activities that UMHS provides to physicians regionally and nationally. The clinical guidelines are the basis for live CME presentations and Internet self-study CME activities. The guidelines are available nationally and internationally through the National Guideline Clearinghouse. On average the NGC structured abstract of each guideline is viewed more than 6,000 times annually and the full guideline is downloaded more than 1,000 times annually. UMHS has granted permission to more than 2 dozen groups to use portions of the guidelines in other publications.

### **Developing and Sustaining a Change Program**

The contributions of the GUIDES unit to institutional improvements in care quality and cost-effectiveness have been important in maintaining ongoing direct and indirect institutional support for the change efforts. Although the specific circumstances in other organizations will differ, developing and sustaining a change program for physician performance involves the following groups:

- *Institutional leadership.* Senior leaders over all key components (physicians, hospital and health centers, important third-party payers) have to agree on the institutional objectives for the change unit and institutional cooperation in achieving them. (See the objectives for GUIDES presented earlier.) The objectives must significantly benefit each key component to ensure its ongoing support. The change unit must monitor the evolving priorities of senior leaders and adjust the change unit's priorities to focus on highly valued accomplishments. The change unit's accomplishments must be regularly

reported to senior leaders and the value of the unit demonstrated on an ongoing basis.

- *Physicians.* Physicians will support change efforts when the results are clearly evident in day-to-day improved quality of patient care, enhanced use of resources, and other benefits. The GUIDES unit operates administratively under the UMHS faculty group practice, ensuring the perception and actuality that the efforts are led by physicians for the well-being of individual patients and of the overall population of patients that we serve. All changes must be designed to assist physicians and be accompanied by communications that explain benefits and facilitate change.

- *Relevant departments and units.* With the support of senior leadership, the change unit must develop mutually beneficial working relationships with a variety of departments and other units likely to be involved in measurement and change efforts (eg, billing, laboratory services, nursing services, pharmacy, patient education). The change unit should look for ways to facilitate the work of those units as it works to improve institutional functioning. The contributions of all involved units should be recognized in reporting achievements, emphasizing systemwide collaboration.

- *Leadership of change unit.* Leading a change unit requires a combination of clinical, administrative, behavioral, and research or evaluation skills. For the GUIDES unit, leadership required a combination of skills from 4 individuals, each already possessing 3 of the above skill sets. Particularly important was the inclusion of 3 primary care physicians who could view all activities in the context of their ultimate value for practice and patients. All of them also had administrative appointments in other parts of the institution, facilitating ongoing monitoring of relevant institutional activities to be integrated with change efforts.

The ongoing updating of UMHS clinical guidelines provides a specific example of how the recognized benefits sustain performance-

improvement efforts. The reward to faculty for participating in developing and updating clinical guidelines is primarily intrinsic through improved personal knowledge, improved care for patients, and improved education for residents and medical students. Faculty who have been on a guideline team generally volunteer to continue on the team that updates a guideline. When a faculty member is no longer available to continue, other faculty volunteers have been readily identified. Faculty are acknowledged by the institution and recognized by their peers for their contribution, but no financial compensation is paid for participating on guideline teams. UMHS has recently determined that the clinical guidelines undergo sufficiently rigorous review to be considered peer-reviewed publications, reflecting their meaningful scholarly contribution to medical practice.

### **Summary**

In 1996 UMHS recognized a need to improve the quality and cost-effectiveness of primary care for common medical problems. The GUIDES unit was created to develop practical clinical guidelines, measure and provide feedback on physician performance, and facilitate needed system changes. Embedded in these activities are various methods to improve care through developing an evidence-based institutional consensus on appropriate care, educating physicians about that care, motivating them to provide care, and providing supporting materials and systems. Performance-improvement efforts have addressed 24 medical conditions. More than 30 aspects of performance have been measured. Measures of the quality of primary care show that UMHS performance is typically close to or above the NCQA's national 90th percentile on HEDIS measures of clinical quality. The activities provide a shared primary care curriculum across faculty, residents, and medical students. These activities also provide several other institutional benefits, including helping meet requirements for hospital accreditation by

### **Lessons for Practice**

- Identify priority areas for improving clinical care quality and cost-effectiveness.
- Develop consensus and measure performance on important aspects of care.
- Maintain a systemwide view of interrelated actions needed to improve performance.
- Tailor improvement plans to particulars of the medical condition.
- Educate physicians about practical and operational issues and biological science as one component of a comprehensive plan for change.
- Adapt CME and change activities for physicians into education and training for residents and medical students, providing feedback on important aspects of care to assess past success and to direct future change efforts.

JCAHO and for managed care plan accreditation by NCQA. The success of the program highlights the importance of starting with a systemwide view of the actions needed to improve performance and incorporate education as a component of a broader plan. Educational efforts should address both the biologic aspects of a medical condition and operational aspects of providing recommended care.

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