Practicing Effectively in Today’s Health System: Teaching Systems-based Care

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Background and Objectives: The Institute of Medicine and the new Accreditation Council for Graduate Medical Education General Essentials have focused attention on the Undergraduate Medical Education for the 21st Century (UME-21) core content area of systems-based care. Through teaching systems-based care, medical students can learn how physicians effectively deliver and coordinate care within the health system. While medical students can be introduced to the organization, financing, and delivery of the health care system through lectures, the principles and practice of systems-based care must be reinforced through structured learning experiences during the clinical (ie, third and fourth) years. The purpose of this article is to define the undergraduate clinical content and experiences in systems-based care offered by the eight UME-21 partner schools. Methods: The eight partner UME-21 schools exposed third- and fourth-year medical students to a variety of clinical experiences outside the traditional teaching hospital in such settings as physician offices, skilled nursing facilities, the patient’s home, hospice, and public health departments. They also taught systems-based care skills such as care coordination, performance assessment, and quality improvement. Results: Based on surveys of graduating students, the UME-21 programs were successful in exposing students to the aforementioned topics, though there was variability among schools. Discussion: The experiences of the UME-21 schools in teaching about systems-based care, as discussed in this paper, may be useful to those involved in medical school curricula planning.

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The Institute of Medicine’s (IOM) two recent landmark publications, To Err Is Human: Building a Safer Health System1 and Crossing the Quality Chasm: A New Health System for the 21st Century,2 focused national attention on health system performance. The IOM reports concluded that “fundamental changes are needed in the organization and delivery of health care” to “reduce the burden of illness, injury, and disability and to improve the health and functioning of the people of the United States.” The IOM Committee proposed six specific goals for improvement—that health care should be safe, effective, patient centered, timely, efficient, and equitable—and a national agenda and budget for health system restructuring and performance assessment. To attain these goals, the IOM advised that health care organizations need to redesign care processes, make effective use of information technologies, manage clinical knowledge and skills, and develop effective teams. They also need to coordinate care across patient conditions, services, and settings over time and incorporate performance and outcome measurements for improvement and accountability. Numerous reports3-7 and articles8-14 have underscored the need for health system improvement and the essential contribution of physicians to this effort.

The Accreditation Council on Graduate Medical Education15 (ACGME) recently endorsed a new set of general competencies for residents in six areas. One of these new general competencies is systems-based practice. To demonstrate competency in systems-based practice, the ACGME has stated that residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Specifically, residents are expected to (1) understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice, (2) know how types of medical practice
and delivery systems differ from one another, including methods of controlling health care costs and allocating resources, (3) practice cost-effective health care and resource allocation that does not compromise quality of care, (4) advocate for quality patient care and assist patients in dealing with system complexities, and (5) know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance.

During the next several years, the ACGME’s Residency Review and Institutional Review Committees will incorporate systems-based practice and the other general competencies into their “Requirements” affecting all specialties. Residency programs are being asked to define the specific knowledge, skills, and attitudes required and provide educational experiences as needed for their residents to demonstrate these competencies.

Given this attention, systems-based care was, arguably, one of the most important of the nine core UME-21 competencies. This article summarizes the learning objectives, content, and clinical experiences for teaching systems-based care to third- and fourth-year medical students, based on an analysis of the eight UME-21 partner school reports.

**Methods**

The UME-21 schools exposed third- and fourth-year students to the components of the health care system and the principles and practices of systems-based care (Table 1). Clinical experiences addressed such tasks as ordering a consultation, performing home or skilled nursing care visits, and evaluating and improving office practice. Short-term projects typically involved a variety of student-selected activities, such as educating high school students about the dangers of tobacco use; developing a program to improve treatment of diabetes, heart failure, or other common chronic conditions; or describing what diseases are reportable to and investigated by the health department. Site visits were generally discrete half- or full-day visits to a particular component of the health system (e.g., health department, health plan, hospice agency, etc.) available to a portion of the class during a specific clinical rotation. These varied experiences were often incorporated into or added onto the third-year primary care clerkships and followed by small-group sessions facilitated by the clinical faculty to allow for student and faculty dialogue.

There was a rich variety of third- and fourth-year clinical experiences (Table 1) in systems-based care developed through UME-21. The highlights of these experiences are discussed here.

**Coordinating Care Through Consultations**

At the University of Pittsburgh, third-year students selected experiences in settings where referred patients were evaluated and treated by a multidisciplinary team of consultants, including specialists in geriatrics, women’s health, substance abuse, disabilities, and rehabilitation. Medical students learned about the referral and consultation process and how a multidisciplinary team coordinates the patient’s care with the primary care physician.

At the University of Wisconsin (UW), third-year students learned how to order an effective consultation. Students completed a form summarizing a patient’s clinical presentation, posed a specific question for the consultant, and determined the urgency of the request. Students then evaluated the completeness and usefulness of the consultation. Student feedback indicated that the exercise helped beginning third-year students coordinate care through consultations.

**Discharge Planning**

UW students learned that they must begin discharge planning at the time of inpatient admission and about the use of nurses and social workers to arrange ongoing care in skilled nursing facilities, acute rehabilitation facilities, hospices, or at home. The evaluation indicated that medical students gained appreciation and

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### Table 1

**Learning Objectives and Content for Systems-based Care**

- Describe the collaborative roles of primary care physicians, specialist consultants, nurses, pharmacists, social workers, and other health care providers in the health care system.
- From participating in patient care in the following health care settings, describe the services provided in skilled nursing and acute rehabilitation facilities, home health, pharmacy, hospice, public health departments, social service agencies, dialysis centers, and geriatric and other facilities.
- Describe the characteristics of an effective physician’s office practice, including how to adhere to practice laws and regulations, maintain medical records, monitor and improve key clinical outcomes and patient satisfaction, appropriately code and bill for services rendered, and refer and coordinate care with different facilities and health professionals within the health system.
- Discuss with patients (and their families as appropriate) their ongoing health needs and help them coordinate their care among different health professionals and settings.
- Describe what insurance plans (Medicare, Medicaid, HMOs) commonly cover and what are health benefits, formularies, preauthorization, appeals, disease management, and quality improvement.
- Describe how physicians take into account medical evidence, health care costs, and patient preferences to provide quality and affordable health care with high patient satisfaction.
- Describe how evidence-based clinical guidelines for preventive, acute, and chronic care can be used to monitor and improve a physician’s, medical group’s, or health care system’s performance.
- Demonstrate respect for other members of the health care team and an understanding of how to function as primary care, consultant, and inpatient care attending physician.
- Demonstrate a sense of responsibility for factoring in health care costs, quality, and patient preferences while coordinating a patient’s care.
respect for their medical colleagues and learned how
best to use their expertise.

University of Nebraska medical students had the
option to visit a skilled nursing facility, acute rehabili-
tation facility, or home care setting. They visited the
facilities and observed the care that nurses, therapists,
and other health professionals provide in these settings.

Hospice Care
Third-year UW students participated in a day-long
session on communication skills and end-of-life care.
An interdisciplinary hospice team faculty included psy-
chiatrists, oncologists, and primary care physicians.
They used lectures, videotape case scenarios, and small-
group skill sessions to teach students how to discuss
advance directives, help patients and families cope with
end-of-life care, and refer appropriately to hospice.

Laboratory Testing and Reporting
Fourth-year UW students were offered an elective
to learn where laboratory testing is provided, how lab
results are transmitted to the physician’s office, and how
the patient is informed about test results. They also iden-
tified what systems were in place to ensure that import-
ant information is reported, tracked, and stored to mini-
mize reporting errors by both the laboratory and order-
ing physician.

Public Health and School Health Care
Third-year University of Miami (UM) students
learned about the interface between medicine and pub-
lic health through several experiences. Through a day-
long site visit to the Miami-Dade County Public Health
Department, students learned about the services pro-
vided by health departments and the responsibilities of
practicing physicians to meet public health require-
ments, such as reporting infectious diseases. In addi-
tion, students were prepared in clinical counseling skills
before spending a week in public school-based health
clinics counseling adolescents about healthy behaviors.
Finally, UM students learned to present a smoking pre-
duction program to Miami-Dade County
middle school students.

How Health Plans Operate
Third-year UM students spent a day at the admin-
istrative offices of AvMed Health Plans. Moming didac-
tic presentations described how health plans operate
and provided time for dialogue among health plan phy-
sicians, UM faculty, and students. In the afternoon, stu-
dents rotated for 30-minute periods through each of four
health plan departments: disease management,
preauthorization, member services, and physician ser-
dices. The evaluation of this experience demonstrated
increased student knowledge and attitudes about how
health systems operate and improve health care quality. On

request, AvMed Health Plans replicated this site visit for
the University of Florida third-year medical students.

Similarly, University of Nebraska medical students
spent 3 hours in a health plan observing its operations
in the call center, preauthorization, case management,
utilization review, and credentialing departments. Stu-
dents learned how health plans operate and how physi-
cians can interact most effectively with health plans.

Improving Office Practice
Third-year UM students performed a quality assess-
ment of a primary care physician’s office practice. The
office assessment instrument was derived from criteria
used by NCQA (National Committee for Quality As-
surance), JCAHO (Joint Commission for the Accredi-
tation of Healthcare Organizations), and HEDIS (Health
Plan Employer Data and Information Set). The instru-
ment also assessed compliance with office safety stan-
dards, the adequacy of medical records, and other as-
pects of an effective office practice. After completing
the survey, the medical students met in small-group
sessions to discuss the results with their faculty pre-
ceptors and with their primary care physician precep-
tor. Students learned what elements are important for
effective office practice.

Systems-based Chronic Disease Care
During the third-year primary care clerkship,
Dartmouth medical students learned how to design sys-
tems for managing chronic diseases. Through lectures,
patient interviews, and interaction with health and so-
cial services organizations, the students learned what
services were available to help physicians care for pa-
thents with chronic conditions. Students also carried out
population-based health care projects. In these projects,
they assessed the health care in the community and
collected and analyzed population data to examine
variations in clinical care for specific diseases. They
also used personal digital assistants (PDAs) (eg, Palm
Pilots) to record and analyze their clinical encounters.

During the AvMed Health Plans site visit, UM med-
cal students learned how health systems help physi-
cians provide state-of-the-art care to populations of
patients with common chronic conditions. Through di-
dactic presentations, they learned how health systems
used hospital, laboratory, and physician databases to
identify high-risk patients and used evidence-based
guidelines to develop “best practices” for each chronic
condition. They participated in a group exercise to de-
vlop a program to increase mammography screening
rates among eligible women. The medical students then
visited the disease management department to observe
the health plan’s congestive heart failure, diabetes, and
asthma programs. They observed how nurse care coor-
dinators use early-warning patient alerts and tracking
systems to help physicians ensure their patients are re-
ceiving the evidence-based care for their specific chronic conditions.

**Quality Improvement and Patient Safety**

Third-year UW students received a 4-hour workshop on “Medical Mistakes,” taught by physicians, patient advocacy representatives, attorneys, and ethics experts. Students viewed two videotapes (“Beyond Blame” and “Do No Harm”) involving a series of patient care mistakes in health systems. The panelists discussed with the students how to design a systems-based approach to enhance patient safety in the office, hospital, and health system.

Fourth-year UW students also could choose to interview their preceptor or another health professional about systems to reduce medical errors. Students identified systems in the physician’s office or hospital to reduce adverse drug interactions, ensure that patients received appropriate medications, and to track and report abnormal laboratory results.

**Systems-based Care in Integrated Health Systems**

To understand systems-based care, third-year medical students at the University of California, San Francisco, participated in a longitudinal, 6-month experience working a half day a week in one of three local integrated health systems: Brown and Toland Medical Group, the City and County of San Francisco’s Community Health Network, and Kaiser Permanente Medical Group. Students worked a half day a week for 6 months in one of a variety of settings ranging from hospital-operated clinics to primary care physician offices.

The longitudinal experience provided students an opportunity to develop a long-term relationship with a preceptor and to follow the care of patients over time within the entire health care system. Students learned about office operations by talking with billing and operations staff, attending office meetings, and accompanying their preceptor on community and home visits. In small-group discussion sessions with health system medical directors, physicians, and other health professionals, students were taught communication skills, conflict management and resolution, and quality improvement. After the longitudinal clerkship, students better understood the physician’s role and the requisite knowledge and skills to practice effectively within a health care system. Students felt that patients received high-quality care in such integrated systems.

**Results**

The UME-21 Supplemental Questionnaire, which surveyed graduating seniors from each of the eight UME-21 schools from 1999 to 2001, provided a limited tool from which to evaluate systems-based care teaching among the eight UME-21 project schools. Graduating senior scores suggest variability in medical student experiences among the eight UME-21 schools (Table 2). For example, 2001 senior student reports of experiences conducting utilization review or chart audits ranged from 11%–76%, while senior student reports of experiences reviewing quality benchmarks (eg, immunization goals) ranged from 24%–76%. This variability appears consistent with the observation that some schools provided a diverse array of systems-based care experiences in the third and fourth years, whereas others did not. The eight schools, in aggregate, increased student exposure to some of the key elements of systems-based care. For example, 10% or more seniors in 2001, compared with 1999, reported

<table>
<thead>
<tr>
<th>Experience</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>Change 1999 to 2001(%)</th>
<th>Range of School Scores in 2001(%)</th>
<th>Change Among Schools 1999 to 2001(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rounds with nursing or social worker</td>
<td>84</td>
<td>77</td>
<td>83</td>
<td>-1</td>
<td>70 to 95</td>
<td>-9 to 11</td>
</tr>
<tr>
<td>Interviewing office administrative staff about managing patient care</td>
<td>44</td>
<td>55</td>
<td>54</td>
<td>10</td>
<td>40 to 75</td>
<td>-12 to 36</td>
</tr>
<tr>
<td>Conducting utilization review or chart audit</td>
<td>22</td>
<td>30</td>
<td>24</td>
<td>12</td>
<td>11 to 70</td>
<td>-12 to 44</td>
</tr>
<tr>
<td>Reviewing quality benchmarks (eg, HEDIS, immunization goals)</td>
<td>32</td>
<td>43</td>
<td>46</td>
<td>14</td>
<td>24 to 76</td>
<td>1 to 37</td>
</tr>
<tr>
<td>Visiting a patient at home</td>
<td>90</td>
<td>83</td>
<td>92</td>
<td>2</td>
<td>65 to 100</td>
<td>-19 to 44</td>
</tr>
<tr>
<td>Using formal practice guidelines in caring for a patient</td>
<td>88</td>
<td>86</td>
<td>93</td>
<td>5</td>
<td>88 to 97</td>
<td>-6 to 27</td>
</tr>
</tbody>
</table>
conducting a utilization review or chart audit, reviewing quality benchmarks and clinical guidelines for a specific health condition, and interviewing office staff about how they manage patient care.

Discussion

The challenge of teaching systems-based care is to offer a comprehensive clinical experience beyond the traditional academic medical center teaching hospital where only about one in 1,000 patients end up seeking medical care. Teaching systems-based care requires medical students to understand the major elements of the health system and how physicians and other caregivers mobilize and coordinate care for patients and populations. Through the UME-21 project, the eight partner schools incorporated some important new elements of systems-based care into the third and fourth years. These components included exposing medical students to care provided in skilled nursing facilities, the patient’s home, and public health agencies and in teaching students skills in quality improvement, utilization management, and systems-based chronic disease care.

The schools had variable success providing a comprehensive set of clinical experiences in systems-based care outside the traditional teaching hospital. This may reflect, to some degree, the challenge of developing necessary partnerships with health plans, health systems, public health agencies, and other organizations external to the traditional medical school and teaching hospital. It appeared that medical schools operating within a comparatively well-developed, integrated, and comprehensive academic health system were in a better position to enhance clinical experiences in systems-based care. Yet, with a committed dean and senior medical education faculty, several medical schools were able to form effective partnerships beyond their existing academic health system (eg, with a public health department and managed care organization) to enhance student experiences in systems-based care.

The national attention brought by the IOM, ACGME, and others to health system performance and the leadership role of the physician may be expected to maintain a focus on teaching systems-based care to medical students and residents. The experiences of the UME-21 partner schools may be helpful to medical school deans, curriculum committees, and faculty as they seek to incorporate this important content area into undergraduate and graduate medical education.
6. Systematic Review Findings related to Question 2: Effective/appropriate strategies to establish the health assistant role as a recognised delegated clinical role and promote their inclusion in models of care. During the search related to this question, a substantial amount of literature was deemed as potentially relevant to the question. Structured interviews. Operating department assistants and nurses. Participants' perspective on teaching, learning, and safe practice as well as working relationships. Implementation of the national vocational qualification has brought an improvement in the relationship between the two major non-medical staff groups in the two units involved in the study. Jelley et al. Through teaching systems-based care, medical students can learn how physicians effectively deliver and coordinate care within the health system. While medical students can be introduced to the organization, financing, and delivery of the health care system through lectures, the principles and practice of systems-based care must be reinforced through structured learning experiences during the clinical (ie, third and fourth) years. Discussion: The experiences of the UME-21 schools in teaching about systems-based care, as discussed in this paper, may be useful to those involved in medical school curricula planning. Publication types. Comparative Study. Systems-Based Teaching & Practice. Start here: the only reason you would want to teach anything to a fellow is if it represented a key part of their future independent practice. We'll argue today that Hematology practice is systems-based in nature and can only be improved by better understanding and advancing how systems work. So, 15 years after the debut - - here's a recap of the least understood and valued competency. Residents are expected to: 1) Work effectively in various health care delivery settings and systems relevant to their clinical specialty; [Pediatrics Adds: Residents are expected to know how types of medical practice and, Systems-Based Practice ASH PDW 2012. Practicing value-based care: What do doctors need? Perspectives from the Deloitte 2016 Survey of US Physicians. A report by the Deloitte Center for Health Solutions. FFS, the most common payment system in the United States today, rewards physicians and hospitals for furnishing a high volume and intensity of services. Many experts agree that FFS works against population health goals of using health care resources effectively and efficiently to improve the lifetime health and well-being of a specific population. 10 Facing rising and unsustainable costs and subpar quality, employers, private health insurers, and government purchasers of health care are pushing for value-based payment models. Care pattern reports provide physicians with feedback on their clinical practices.