A Curriculum in Systems-based Care: Experiential Learning Changes in Student Knowledge and Attitudes

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**Background:** To provide efficient, quality patient care, physicians must have a fundamental understanding of how the health care delivery system functions and how to appropriately use the various components of this system. As part of the Undergraduate Medical Education for the 21st Century (UME-21) initiative, the University of Miami in partnership with AvMed Health Plans, a nonprofit managed care organization (MCO) developed a longitudinal educational program that prepares all students for medical practice in emerging systems of care. **Methods:** The program, which spans the 4-year undergraduate curriculum, incorporates didactic sessions and practical experiences to teach about the clinical, managerial, financial, and ethical aspects of systems-based care. During the third year of medical school, students visit the administrative offices of AvMed Health Plans for a day-long series of presentation-discussions and experiential tours through the various administrative departments. There, they experience first-hand all facets of a systems-based approach to care using evidence-based practice guidelines, utilization review, quality measurement and improvement, and chronic disease management. **Results:** An attitudinal survey, constructed to evaluate general attitudes toward managing care and MCOs, was administered to students at the beginning of their first, second, and third year and immediately before and after their visit to AvMed during their third year. Using factor analysis, there were no significant differences in students’ attitudes at the beginning of the first, second, or third year nor immediately before the seminar day at the MCO. However, the day-long seminar at AvMed did have a favorable effect on attitudes toward systems of care and MCOs in general. In addition, students performed well on post-evaluation knowledge assessments addressing fundamental concepts of systems of care and the function of an MCO in managing the care of its members. The visit to the MCOs (AvMed) offices and the day-long curriculum was replicated at another medical school, with similar effects on students’ attitudes. **Conclusions:** Medical students have neutral-to-negative opinions of systems of care and MCOs. Early educational experiences such as classroom lectures and panels that address managing care issues have minimal effect on these opinions. However, bringing medical students to an MCO’s administrative offices, seeing first-hand how systems of care operate, and having an open dialogue with physician administrators does effect a positive change in medical student opinions of a system in which care is managed. In addition, medical students can gain new knowledge about effective systems-based practice.

Managed care, even while its definition is evolving, remains an essential component of today’s health care delivery system. Managed care systems first directed their attention to controlling escalating costs through contractual price discounts and then evidence-based utilization controls. As managed care systems evolved, they placed more emphasis on prevention, wellness, and the identification and management of individuals with “high impact” diseases. Managed care has pioneered the development of systems for measuring the type of care patients receive, the patterns of care that physicians provide, the quality of care delivered, the quality of service provided, patient satisfaction, and the cost of providing specific clinical services. Managed care has also introduced chronic disease management programs that improve the quality of care at lower overall costs. And, most remarkably, despite its many detractors, managed care has introduced these improvements in our systems of care while making that care more accessible and affordable than the traditional fee-for-service or prospective payment models.

Nonetheless, attitudes toward managed systems of care continue to be negative or, at best, neutral, among the public, physicians, and medical students. Yet,
as managed care has matured, its goals and efforts are more difficult to dismiss, since it has introduced important improvements in our care delivery systems.\textsuperscript{14,15}

The principles and practice of systems-based care must be understood and embraced by physicians if they are to optimize the care provided for individuals and populations of patients.\textsuperscript{16} The National Academy of Science Institute of Medicine, in its landmark report, \textit{Crossing the Quality Chasm: A New Health System for the 21st Century,} made a strong call for a change in the education and training of physicians and other health care workers to meet the “Six Aims for Improvement” and the “Ten Rules for Redesign of the Health Care System” that it felt were necessary to address the problems with quality, access, and outcomes in the present system.\textsuperscript{17} Significant similarity exists among the physician competencies that the Accreditation Council on Graduate Medical Education and other experts feel are needed to practice effectively in the health system, including evidence-based care, population-based medicine, interpersonal and communication skills, systems-based practice, and quality improvement.\textsuperscript{18-21}

With the support of Health Resources and Service Administration (HRSA)’s Undergraduate Medical Education for the 21st Century (UME-21) project, the University of Miami, in partnership with AvMed Health Plans, a nonprofit managed care organization (MCO), has developed a longitudinal educational program spanning the 4-year undergraduate curriculum that has an objective of preparing students to practice effectively in health care systems. This paper discusses the partnership between the University of Miami and AvMed Health Plans and describes the format, curriculum, objectives, and outcome measures of our managing care teaching module. We will describe the results of an attitudinal survey completed by our medical students several times during the 4-year curriculum illustrating the unique effect that this day-long exercise has on their attitudes toward and knowledge about MCOs systems of care.

Program Design

To develop the UME-21 curricular innovations, the University of Miami partnered with five external entities: the Miami-Dade County Health Department, the Miami-Dade County Area Health Education Center (AHEC), two community health centers (the Jefferson Reaves Community Health Clinic and the Camillus Health Concern), and AvMed Health Plans.

\textit{First-year Curriculum}

Students participate in a series of lectures on the history and evolution of the health care delivery system in the United States and are introduced to the basics of health care economics. The philosophy and basic concepts underlying managed care are introduced. Three panels are also presented: Managed Care, the Patient’s Perspective; Managed Care, the Physician’s Perspective; and Managed Care, the HMO’s Perspective. The first-year curriculum also includes sessions and exercises in teamwork and leadership, and students are introduced to public health during an epidemiology course.

\textit{Second-year Curriculum}

Students are introduced to clinical guidelines and evidence-based decision making for individual and populations of patients. After introductory lectures on quality measurement and improvement, students perform a quality assessment of their community preceptor’s practice site in the spring of the second year. This exercise focuses on the assessment of quality of access to care, quality of the care environment, and quality of medical documentation. An assessment instrument that uses quality indicators from NCQA and HEDIS has been developed for this exercise. Students also rotate through the Public Health Department.

\textit{Third-year Curriculum}

The UME-21 curriculum is designed so that the fundamental concepts addressed in the first 2 years can be applied and strengthened during the third-year clinical rotations. The content of the UME-21 curriculum is particularly prominent in the 12-week primary care block clerkships (family medicine: 5 weeks, geriatrics: 1 week, and generalist primary care: 6 weeks). This block is coordinated by an interdisciplinary team of faculty from departments of family medicine, general internal medicine, and general pediatrics. It is during this segment of the clinical curriculum that one fourth (35-40) of the third-year medical students travel each quarter to the AvMed administrative headquarters for a 1-day educational experience. During the fourth year, students again rotate through the health department.

\textit{Managing Care: Visit to MCO}

This day-long visit to AvMed Health Plans is comprised of a series of didactic lectures, dialogue with AvMed medical directors and University of Miami faculty preceptors, and experiential tours of AvMed’s major departments (Table 1). The learning objectives of the module include teaching students how MCOs (1) are organized and work, (2) coordinate and facilitate care, (3) are regulated and reviewed for quality, (4) measure and improve physician care, and 5) identify opportunities to improve member health through programs such as disease management.

The didactic sessions begin with an introduction of a systems approach to health care, defining general concepts and terminology, comparing and contrasting the MCO to the traditional, unmanaged medical system of the 1960s and 1970s, and delineating the spec-
trum of managing care models. During these 3 hours of interactive lecture-discussions, the tools of systems-based practice are described, including the use of risk stratification, chronic disease registries, physician profiling, practice guidelines, disease management programs, and quality improvement strategies.

After an informal luncheon-discussion, students take tours of AvMed’s four major departments, “rounding” at (1) Preauthorization, (2) Disease Management, (3) Member Services, and (4) Physician Services and interacting with staff. They witness first-hand the daily functioning of the MCO, such as following a claim through the network, observing a nurse managing a disease protocol with a patient over the phone, and tracking a member’s telephone complaint and health-related question. Throughout the day, dialogue and debriefing sessions are held with AvMed’s various medical directors, giving students a forum to ask critical questions about the MCO’s services and programs as well as systems of care in general. The objectives of these sessions are shown in Table 1.

Table 1

Visiting a Managed Care Organization (MCO):
Systems-based Care Curriculum
Content and Schedule

Learning Objectives
Students will learn:
• What is managed health care and what is a health plan?
• How does managed care and health plans differ from the traditional system?
• What are the real and potential benefits of managed care?
• What does this mean for physicians: what are the new skills required for effective practice in the 21st century health system?

Students will learn how health plans:
• Are organized and work
• Coordinate and facilitate care
• Are regulated and reviewed for quality
• Measure and improve physician care
• Identify opportunities to improve member health

Morning didactics
1. Introduction
2. Managed Care: What and Why?
3. Variations in Clinical Practice
4. How Health Plans Work
5. Improving Member Care and Health
6. Dialogue and lunch

Afternoon rounds
30-minute tours through four major departments:
1. Preauthorization
2. Disease Management
3. Member Services
4. Physician Services

Debriefing and dialogue

Evaluation

An attitudinal survey has been administered to students at the beginning of their first year, second year, third year, and immediately before and after their visit to AvMed during their third year (Table 2). Survey items were constructed to evaluate general attitudes toward managing care in addition to specific views towards MCOs. Factor analysis was used to group the survey items into six factors (Table 3). Additional questions measured students’ knowledge about how managed care functions.

Results

Attitudes Toward Managing Care in Years 1-3

There were no significant differences in students’ attitudes when tested at the beginning of the first year, second year, third year, or immediately before the AvMed visit (Figure 1). Of the 14 items surveyed, students were consistently neutral on eight of the items and negative toward six of the items.

Evaluation of AvMed Health Plans Site Visit

Since its inception in 1999, the visit to AvMed’s offices has been evaluated favorably by the more than 600 medical students and approximately 25 university primary care faculty participants. Overall, most have felt the experience was positive and valuable. Course evaluations rate the didactic sessions above average to excellent in the areas of organization, well-defined learning objectives, use of audio-visual materials, and involvement of the audience by the presenters. Rounding at each of the major departments was rated extremely useful and informative, and many appreciated the opportunity for open dialogue with AvMed medical directors. Some students have felt the experience has helped to allay their fears of MCOs and of systems of care overall.

Attitudes Toward Managing Care After AvMed Health Plans Site Visit

The day-long seminar at AvMed had a favorable effect on attitudes toward systems of care and MCOs in general. As shown in Table 4, students’ attitudes significantly improved for the following eight items surveyed: Q1 “I am comfortable working in a managed care system,” Q2 “MCOs have potential to improve quality,” Q3 “MCOs provide better care than traditional systems,” Q4 “Patient satisfaction is easier to achieve in managed care,” Q5 “MCOs are unreliable.” Q6 “MCO’s make it difficult to know patients,” and Q8 “MCOs interfere with care.” On a measure of the percentage of the medical students that abandoned their negative attitudes toward managed care and MCOs, at least 20% of the students changed their response from negative to positive for the following five survey items: Q2 “MCOs have the potential to improve quality”
(20%), Q3 “MCOs provide better care than traditional systems” (25%), Q4 “Patient satisfaction is easier to achieve in managed care” (29%), and Q8 “MCOs interfere with care” (28%).

Knowledge Assessment After AvMed Health Plans Site Visit

As shown in Table 4, students’ self-reported knowledge about how managed care functions (Q13) increased significantly, and 41% of students changed their response from negative to positive. The final written examination at the end of the primary care clerkship has contained a variable number of questions from the didactic sessions. These questions address fundamental concepts of systems of care and the function of a MCO in managing the care of its members. As expected, medical students performed well on knowledge assessments of material that they knew will be included on written examinations.

| Table 2 |

AvMed Health Plans Pre-Post Site Visit Attitude Survey Form

UME-21 Survey on Attitudes About Managed Care

The following survey should take you just a few minutes to complete. In order to anonymously analyze your responses to this survey and other future evaluations, please provide the last four digits of your social security number:

This survey is anonymous, and your responses will never be associated with your identity.

Please circle the number that is closest to how you feel about each item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel comfortable with the idea of working as a physician in the managed health care system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Health maintenance organizations (HMOs) have the potential to improve the quality of patient care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Managed care organizations provide better care than the traditional health care delivery system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Patient satisfaction is easier to achieve in a managed health care system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. With exploding medical costs, HMOs are inevitable.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. HMOs make it more difficult for doctors to know their patients compared to the traditional health care delivery system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Managed health care is a serious threat to my future income as a physician.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. HMOs interfere with the delivery of effective health care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. A physician must know how to use information technology to function effectively in the managed health care system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Physicians’ responsibilities for the health of populations are as important as their responsibilities for the health of their individual patients.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Medical care is improved as a result of the team approach implicit in a managed health care system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Cost containment is more feasible in a managed health care system compared to other types of care delivery systems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I have a good understanding of how the managed health care system functions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Managed care has reduced professionalism in medicine.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Transportability of Site Visit to AvMed Health Plans

The University of Florida (UF), in Gainesville, Fla, also has a formal relationship with AvMed Health Plans. In an effort to provide more education in managing care and based on the early success of this exercise in Miami, the UF requested that the AvMed program presented at UM also be presented at UF. This was done, and the didactic components of the UF program are nearly identical to those at UM. The UF program includes an abbreviated rounding experience through some of the administrative departments at AvMed.

The UF students completed the attitudes survey before and immediately after the program. Using the same attitude survey (Table 2), the UF students’ attitudes toward systems that manage care and changes before and after the MCO site visit are similar to those of students at UM.

Discussion

We have shown that medical students have neutral-to-negative opinions of a system in which health care is managed and also of the companies responsible for managing that care. Early educational experiences such as classroom lectures and panels that address the reasons for and concepts of managed care have minimal effect on these opinions. Core clinical clerkships also have no significant effect on the medical students’ adverse opinions of a system in which care is managed. However, bringing medical students to an MCO’s administrative offices and having physician administrators from the MCO present information and discuss the principles, goals, and actual functions of the MCO, does effect a positive change in medical student opinions of a system in which care is managed. We have not evaluated whether the positive change in the students’ attitudes toward MCOs and a system in which health care is managed is sustained or is only a short-lived phenomenon.

We have also demonstrated that medical students can gain new knowledge about health care delivery systems through this 1-day curriculum. Students evaluate the quality of this educational program highly. They report value in the opportunity to discuss issues of how an insurance company manages the care of its members in partnership with physicians in its health system. While we have shown that this simple program can be effectively replicated at another medical school, it must be noted that the success of this program is dependent on a positive partnership between the medical school and the MCO. This beneficial relationship is founded on commitments from individuals within both organizations who will champion the program through any unplanned, yet inevitable, difficulties.

The partnership with AvMed, the managed care partner, was founded on a strong commitment from the company’s highest leadership and from the regional medical director, who has a professional interest in primary care education and the evolving health care delivery system. Prior to the UME-21 project, the University of Miami and AvMed had entered into an agreement that included contracts for clinical services by the medical school’s faculty and hospitals and health insurance for the university’s employees.

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Table 3
Factors Derived From Attitudes Survey

<table>
<thead>
<tr>
<th>Factor</th>
<th>Survey Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Comfort with managed care</td>
<td>1. I feel comfortable with the idea of working as a physician in the managed health care system.</td>
</tr>
<tr>
<td>2. Understanding of managed care</td>
<td>13. I have a good understanding of how the managed health care system functions.</td>
</tr>
<tr>
<td>3. Constraints seen in managed care</td>
<td>6. HMOs make it more difficult for doctors to know their patients compared to the traditional health care delivery system.</td>
</tr>
<tr>
<td>4. Improvement in medical care inherent in managed care</td>
<td>7. Managed health care is a serious threat to my future income as a physician.</td>
</tr>
<tr>
<td>5. Managed care implied by cost containment needs</td>
<td>8. HMOs interfere with the delivery of effective health care.</td>
</tr>
<tr>
<td>6. New physician skills implied by managed care</td>
<td>14. Managed care has reduced professionalism in medicine.</td>
</tr>
<tr>
<td>7. Health maintenance organizations (HMOs) have the potential to improve the quality of patient care.</td>
<td></td>
</tr>
<tr>
<td>8. Managed care organizations provide better care than the traditional health care delivery system.</td>
<td></td>
</tr>
<tr>
<td>9. Patient satisfaction is easier to achieve in a managed health care system.</td>
<td></td>
</tr>
<tr>
<td>10. Medical care is improved as a result of the team approach implicit in a managed health care system.</td>
<td></td>
</tr>
<tr>
<td>11. Cost containment is more feasible in a managed health care system compared to other types of care delivery systems.</td>
<td></td>
</tr>
<tr>
<td>12. Physicians’ responsibilities for the health of populations are as important as their responsibilities for the health of their individual patients.</td>
<td></td>
</tr>
</tbody>
</table>
Table 4

Results of Annual and Pre and Post AvMed Health Plans Site Visit Attitude Survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Year 1-2-3*</th>
<th>Pre</th>
<th>Post</th>
<th>Pre-Post Sig**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel comfortable with the idea of working as a physician in the managed health care system.</td>
<td>2.9</td>
<td>2.7</td>
<td>2.9</td>
<td>P&lt;.01, improved 20%</td>
</tr>
<tr>
<td>2. Health maintenance organizations (HMOs) have the potential to improve the quality of patient care.</td>
<td>3.3</td>
<td>3.2</td>
<td>3.6</td>
<td>P&lt;.01, improved 20%</td>
</tr>
<tr>
<td>3. Managed care organizations provide better care than the traditional health care delivery system.</td>
<td>2.4</td>
<td>2.2</td>
<td>2.6</td>
<td>P&lt;.01, improved 25%</td>
</tr>
<tr>
<td>4. Patient satisfaction is easier to achieve in a managed health care system.</td>
<td>2.2</td>
<td>2.0</td>
<td>2.5</td>
<td>P&lt;.01, improved 29%</td>
</tr>
<tr>
<td>5. With exploding medical costs, HMOs are inevitable.</td>
<td>3.4</td>
<td>3.0</td>
<td>3.3</td>
<td>P&lt;.01</td>
</tr>
<tr>
<td>6. HMOs make it more difficult for doctors to know their patients compared to the traditional health care delivery system.</td>
<td>4.0</td>
<td>3.8</td>
<td>3.5</td>
<td>P&lt;.01</td>
</tr>
<tr>
<td>7. Managed health care is a serious threat to my future income as a physician.</td>
<td>3.9</td>
<td>3.4</td>
<td>3.4</td>
<td>NS</td>
</tr>
<tr>
<td>8. HMOs interfere with the delivery of effective health care.</td>
<td>3.5</td>
<td>3.6</td>
<td>3.2</td>
<td>P&lt;.01, improved 28%</td>
</tr>
<tr>
<td>9. A physician must know how to use information technology to function effectively in the managed health care system.</td>
<td>4.1</td>
<td>4.0</td>
<td>4.1</td>
<td>NS</td>
</tr>
<tr>
<td>10. Physicians’ responsibilities for the health of populations are as important as their responsibilities for the health of their individual patients.</td>
<td>3.6</td>
<td>3.7</td>
<td>3.6</td>
<td>NS</td>
</tr>
<tr>
<td>11. Medical care is improved as a result of the team approach implicit in a managed health care system.</td>
<td>2.9</td>
<td>2.9</td>
<td>3.1</td>
<td>NS</td>
</tr>
<tr>
<td>12. Cost containment is more feasible in a managed health care system compared to other types of care delivery systems.</td>
<td>3.5</td>
<td>3.2</td>
<td>3.3</td>
<td>NS</td>
</tr>
<tr>
<td>13. I have a good understanding of how the managed health care system functions.</td>
<td>3.2</td>
<td>3.0</td>
<td>3.8</td>
<td>P&lt;.01, improved 41%</td>
</tr>
<tr>
<td>14. Managed care has reduced professionalism in medicine.</td>
<td>3.0</td>
<td>3.0</td>
<td>2.9</td>
<td>NS</td>
</tr>
</tbody>
</table>

n = 658 students.

* Responses from annual surveys are averaged.

** Significance of difference between pre and post surveys using Student’s t test; “improved 20%” indicates that 20% more respondents had a positive response on the post survey compared to the pre survey

NS—not significant

Over the 3 years of the project, this relationship between the medical school and the managed care company underwent significant change, leading to a termination of the clinical contracts. This financial parting of the ways between the two organizations posed a serious threat to the UME-21 partnership. However, the strong commitment to the goals of the UME-21 project by the medical director and the positive working relationships among the medical school faculty and the MCO’s leadership has kept the partnership intact and the collegial teaching efforts in place. The program and the partnership continue, even after the UME-21 project has ended, a testimony to the perceived value of the experience for the participants and the strong commitment by the MCO and the medical school to the UME-21 goals. The simple, 1-day educational program described in this paper can improve attitudes and knowledge that medical students have toward a system of care that will likely be present, in one form or another, throughout their professional careers.
Figure 1

Mean Scores for Six Factors Surveyed at the Beginning of Years 1, 2, and 3 of Medical School and Immediately Before the AvMed Visit

Each line represents results of one survey administered at the beginning of the first, second, and third years or immediately before the AvMed visit. Mean score is Likert scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree

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