The Clinical Education of Medical Students

Report on Millennium Conferences I & II

Carl J. Shapiro Institute for Education and Research
Harvard Medical School and Beth Israel Deaconess Medical Center

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Introduction

Several years ago, the faculty and staff of the Carl J. Shapiro Institute for Education and Research at Harvard Medical School and Beth Israel Deaconess Medical Center decided that the beginning of the new millennium would be an ideal time to host a working conference on the clinical education of medical students. The confluence of a number of circumstances led to this conclusion: recognition of the educational challenges that exist at the interface between a medical school and an academic medical center; a sense of the financial and time pressures felt by clinical faculty as they discharge their patient care and teaching responsibilities; the publication of Kenneth Ludmerer's landmark book, *Time to Heal*, that chronicles so well the development of the daunting challenges faced by academic medical centers; and an interest in expanding the Shapiro Institute's activities in medical education beyond the local academic community.

At the same time, the Association of American Medical Colleges (AAMC) had launched its Project on the Clinical Education of Medical Students. The project was designed to conduct a comprehensive review of the clinical education of medical students and to effect changes in the design and conduct of the clinical curriculum to improve the quality of medical students' education. Phase I of the project was intended to define the organization, structure, and content of the clinical curriculum, and to identify both issues of concern and the educational innovations that might address those concerns. Phase II of the project was envisioned as a set of activities that would promote a national dialogue on the need for change in the clinical education of medical students and assist individual schools in planning and implementing reform efforts.

Given both organizations' interest in the topic, it made sense to co-host a national conference on the clinical education of medical students in the new millennium. We decided that a working conference involving small teams of medical educators and education leaders from a representative group of medical schools would generate ideas for innovations in clinical education that each school's team could use in designing educational reforms that might be implemented at their institution, and that could be disseminated widely to stimulate reform in other institutions.

We felt that the first Millennium Conference (April 28 to May 1, 2001) was highly successful in achieving the goals we had set. As a result, we decided to co-host a second conference, involving teams from another group of schools. Millennium Conference II (April 26 to 28, 2002) was designed to allow the participating schools to reap the benefit of the discussions that occurred at Millennium Conference I by focusing the attention of the participants on the issues and opportunities considered most important by the participants at that conference.

In this report, we attempt to capture much of the rich discussion and many of the thoughtful ideas that characterized both Millennium Conferences. We present a single summary, because there was significant overlap in the discussions that occurred at the two conferences. It is difficult to convey in a written report the sense of urgency, as well as the excitement and enthusiasm that characterized the discussions of educational reform and innovation. In issuing this report, we hope that the ideas contained within will stimulate discussions at medical schools across the country about the clinical education of their medical students, and lead to meaningful reforms of their educational programs.

In this way, the Millennium Conferences will have an impact on many more schools than the relatively small number that were able to participate in the two conferences.

In closing, we wish to express our sincere gratitude to several individuals at the AAMC whose contributions, support, and participation in the conferences were truly invaluable –Dr. Jordan Cohen, President of the AAMC; Dr. Donald Nutter, Petersdorf Scholar in Residence (2000-2001) and Co-Chair of the LCME; and Ms. Brownell Anderson, Senior Associate Vice President for Medical Education. We also are indebted to a number of individuals associated with the Shapiro Institute – Drs. Charles Hatem, Richard Schwartzstein, and Mitchell Rabkin; Jane Neill, Deputy Director of the Shapiro Institute until 2001 and now Deputy Director of the Academy at Harvard Medical School; Christine Coughlin, Associate Director of the Shapiro Institute; Carol Murree, Operations Coordinator at the Shapiro Institute; Michele Cohn, Academic Coordinator at the Shapiro Institute until 2001 and now Academic Program Manager of the Academy of Harvard Medical School; and Deanne Nakamoto, who assisted with preparation of this report.

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Conference Format

The first Millennium Conference on the Clinical Education of Medical Students (Millennium Conference I) was held from April 28 to May 1, 2001 at the Center for Executive Education at Babson College, Wellesley, Massachusetts. Requests for applications to participate in the conference were sent to the deans of all North American medical schools in the fall of 2000. Forty-eight schools submitted applications. Eleven schools were selected to attend based in part on the scope and potential impact of a school's proposed plans for reform of the clinical education of its students, and on a demonstrated commitment to educational reform. In addition, a conscious effort was made to have diversity in the types and locations of the participating schools. The following schools participated in Millennium Conference I:

- Baylor College of Medicine
- Duke University School of Medicine
- University of California, Los Angeles School of Medicine
- University of California, San Francisco School of Medicine
- Harvard Medical School
- University of Iowa College of Medicine
- MCP Hahnemann University School of Medicine (now the Drexel University School of Medicine)
- Mayo Medical School
- Mount Sinai School of Medicine of New York University
- University of Rochester School of Medicine and Dentistry
- Uniformed Services University of Health Sciences F. Edward Hebert School of Medicine

Each of the participating schools sent to the conference a team composed of four of the institution's education leaders. The teams generally included the associate or vice dean for medical education, a clinical clerkship director, a residency program director, and an education administrator representing one of the school's major affiliated teaching hospitals.

To set the stage for the work of the conference participants, Dr. Jordan Cohen presented a keynote address entitled "A Second Revolution in the Education of Physicians: Why Now?" Dr. Donald Nutter followed by presenting a talk that summarized the findings of Phase I of the AAMC's Project on the Clinical Education of Medical Students. The conference participants were then informed of the three main questions that they would be asked to address during the course of the conference:

1. What should be taught in the clinical curriculum? (What to teach?)
2. How should the clinical curriculum be taught? (How to teach?)
3. Who should teach the clinical curriculum? (Who teaches?)

To address those questions, the participants were divided into working groups composed of team members from different schools. All of the groups addressed each of the questions, one at each of three separate working group sessions. A brief plenary session was held before each of the three sessions to orient the participants to the major issues of concern related to the question to be addressed during the session and to clarify the objectives of the session. At the completion of each working group session, the teams presented the major points that arose during their discussions to the entire group of conference participants. At this conference, these presentations were followed by comments from a group of experienced educators who had been invited to attend the conference.

Following the three working group sessions, Dr. Charles Hatem presented a plenary talk that focused on the barriers to educational reform. The

school teams then met individually to discuss how the issues identified in the three prior working group sessions might be addressed at their school, and to develop a plan for effecting reforms that were deemed desirable. The conference concluded with a presentation of each school's preliminary plans for reform.

Millennium Conference II was held from April 26 to 28, 2002, again at the Center for Executive Education at Babson College in Wellesley, Massachusetts. Eight schools were selected to send teams to the conference, using a selection process similar to that used in selecting schools for the first conference. The following schools participated in Millennium Conference II:

- Dartmouth Medical School
- Indiana University School of Medicine
- Medical College of Georgia School of Medicine
- University of Michigan Medical School
- University of Nebraska College of Medicine
- New York University School of Medicine
- Northwestern University Feinberg School of Medicine
- State University of New York Upstate Medical University College of Medicine

In addition, each school that had participated in Millennium Conference I sent a team representative to Millennium Conference II. Each of those representatives presented a report summarizing the progress that had been made in implementing the plans that had been developed at the end of Millennium Conference I for reform of the clinical education of their students. The representatives also served as resource faculty for the Millennium Conference II working groups.

At Millennium Conference II, team members were again divided into small groups, each composed of faculty from different schools, to discuss the key questions: What to teach? How to teach? Who should teach? However, by taking advantage of the discussions that occurred during Millennium Conference I, it was possible to focus those discussions on a more specific set of issues. Again, at the completion of the three working group sessions, each school's team met to discuss reform proposals for their school. The conference concluded with a presentation of the plans developed by each of the teams.

Working Group Sessions

As noted above, the participants at the two conferences were divided into working groups, and each working group was charged to address issues related to the three main questions that served as the organizing framework for the conferences. We summarize below the major points that arose in response to those questions during the working group discussions at both conferences. Each of the three sessions is described separately. Before summarizing the major discussion points that arose in each session, we outline the issues of concern presented in the brief plenary sessions that were held before the working group discussions. We also present the specific charges that were made to the working groups before they began their discussions.

Session I - What to Teach?

The clinical curriculum has two purposes. First, it must provide opportunities for students to acquire the knowledge, skills, and attitudes they will need to provide supervised patient care as a resident physician in the early months of their residency training. Second, it must provide opportunities for students to acquire the knowledge, skills, and attitudes needed for a strong foundation in clinical medicine, which they can build on during residency training as they strive to become competent clinicians in the specialty of their choice.

Given this, the working groups were charged to consider the following issues:

1. What content should be included in the clinical curriculum, with a particular focus on interdisciplinary clinical topics that generally fall outside the domains of individual specialties (sometimes called "orphan topics") and on advances in basic science knowledge relevant to clinical medicine?

2. What level of mastery of fundamental clinical skills should students be expected to achieve during their clinical education, to include communication skills and other skills important for establishing a productive doctor-patient relationship?

Four common themes emerged from the working group sessions.

1. Development and use of a competency-based curriculum

It is critical that each medical school establish a set of graduation competencies that it wishes its students to achieve, and then design the curriculum in a manner that will best allow the students to acquire these competencies. Because competencies are now being established for graduate medical education, the acquisition of competencies should be considered throughout the continuum of medical education, with a clear indication of the developmentally appropriate time for each competency to be achieved during that continuum.

2. Performance assessment

To ensure that students achieve the objectives of the clinical curriculum, competency-based assessments must be conducted at regular intervals. Although assessment is a component of each clinical clerkship, the acquisition of competencies, as viewed in an integrated, cross-disciplinary fashion, should be assessed at regular intervals independent of specific clerkship assessments, e.g., at the end of each year of the four-year curriculum. Formative feedback should be provided based on these performance assessments, and individual learning plans should be developed that take into account any deficiencies in performance, and student-specific educational and career goals.

3. Integration of "orphan topics"

Although there was concern about the appropriateness of the term "orphan topics," there was general agreement about the importance of incorporating into the medical school curriculum a relatively large number of interdisciplinary topics of contemporary importance. These topics typically fall outside the purview of any single clinical clerkship, but rather have threads that should be woven throughout the curriculum. Some topics, such as medical ethics, are clinically relevant to each of the clinical clerkships. Others, such as bioinformatics, do not need to be integrated into all of the clerkships, although the topic does need to be covered at some point during the clinical curriculum. A number of models for incorporating these topics into curricular design were discussed, taking into account both horizontal and vertical integration throughout the four years of the curriculum. Examples of such models include: a) scheduling courses throughout the curriculum that include appropriate coverage of these topics; b) scheduling of "inter-sessions" (e.g., blocks of time interspersed at intervals throughout the clinical curriculum) during which one or more of these topics are discussed.

4. Integration of basic science and clinical medicine

Given the continued advances in understanding of the basic sciences that are fundamental to clinical medicine, it is important that the curriculum be designed to integrate basic science and clinical medicine throughout the four years. Students develop a better appreciation of the importance of basic science when they can see the clinical applications of basic science knowledge, and they become better clinicians by understanding the scientific underpinnings of clinical medicine. In

addition, given the importance of lifelong learning and the need for physicians to understand future advances in basic science throughout their careers, it is essential that medical students develop a value system that recognizes the important link between basic science and clinical medicine, and that they acquire a skill set that facilitates future understanding of the interface of basic science and clinical medicine. Examples of models for integrating basic science and clinical medicine include development of intersessions during the clinical years, at which time students return to basic science topics, or development of required or elective courses during the fourth year that link basic science and clinical medicine.

Session II – How to Teach?

The design and conduct of the clinical curriculum has changed very little during the past half century despite major changes in the clinical environments in which medicine is practiced and taught, and in society's expectations of medicine. Now, as in the past, students rotating through required clinical clerkships (generally year-three of the curriculum) are simply assigned to a clinical team, and their learning is largely determined by the scope of the team's patient care activities. Although many medical schools have learning objectives for those clerkships, the teaching faculty are generally unaware of the objectives, and do not teach or assess students' performances based on those objectives. It is also clear that there is insufficient attention paid to the formative assessment of students' skills during the required clerkship experiences. Furthermore, since at most medical schools the fourth year of the curriculum is devoted largely to elective experiences, monitoring of students' progress to ensure they are achieving the level of clinical skills expected at the time of graduation is not adequate.

Given this, the working groups were charged to consider the following issues:

1. How should the required clerkship be designed? Is the current set of specialty-specific clerkships still valid? How should ambulatory sites be used in the required clerkships? What is the optimal time in the course of the four year curriculum to begin the required clerkships, and how should elective experiences relate to the sequencing of the required clerkships?

2. How should the elective curriculum be designed? Should electives be chosen based on a student's interests and career plans, or should they be chosen to address deficiencies in a student's performance during the required clerkships? Should electives be designed to foster the students' professional development, to allow integration of core content throughout the four-year curriculum, or both?

3. How should the clinical curriculum be designed to provide better integration of core content across the entire curriculum, to include both advances in scientific knowledge relevant to clinical medicine and contemporary issues important to medicine, such as end-of-life care, population health, cultural competence, etc?

4. How should non-traditional educational methodologies, such as computer-based programs, standardized patients, simulation experiences, and others, be incorporated into the clinical curriculum?

5. How should the curriculum be structured to focus on the development of the student as a future physician? How should the roles of clinical faculty be defined to ensure appropriate faculty supervision and role modeling for students? How should the curriculum be structured to encourage students to develop personal standards of excellence and a commitment to lifelong learning?

Seven common themes emerged from the working group sessions.

1. **Centralization of curricular oversight**

There was general agreement on the need for centralized design and oversight of the clinical curriculum, thus allowing better coordination of the educational program across different clerkships. At present, responsibility for the development and implementation of clinical clerkships often resides at the level of clinical departments, rather than with the central administration of the medical school. As a result, interdepartmental barriers often inhibit educational innovation and the ability to incorporate into the curriculum topics that are multidisciplinary and cross departmental lines.

2. Design of the clinical experience: curricular integration

The design of the clinical experience proved to be one of the most fruitful topics of discussion. Most participants felt that significant innovation and reform was needed. There was a general consensus surrounding the need for better integration between the first two years (typically considered preclinical years) and the last two years (typically considered clinical years) of medical school. Clinical exposure should begin during the preclinical curriculum, with the recognition that the particular type of exposure and assigned responsibilities should be consistent with a student's experience and level of training. At a number of schools students begin the required clinical clerkships in the spring of year-two of the curriculum. One benefit to this approach, noted by a school whose students begin clinical rotations in April, is that first-year residents are relatively experienced at that point, and hence better able to supervise novice students than is the case in July when both the students and the first-year residents are new.

At the same time, the thread of basic science should be woven more clearly throughout the clinical curriculum. As one model, the distinction between preclinical and clinical years could be removed, and the four years of medical school could be considered as a continuum, during which students are simultaneously dealing with basic science and clinical medicine. Using this approach, there would be a progressive decrease in the relative proportion of basic science and a progressive increase in the amount of clinical medicine as the student proceeds through the four years of medical school. Another approach would be to intersperse discrete periods of basic science exposure throughout the clinical years, serving as basic science "intersessions" that enrich clinical exposure. A third model would involve a more aggressive integration of basic science coverage within each clinical clerkship, through commitment of faculty and course directors to focus on the basic science aspects of clinical issues encountered by the student.

Integration of "orphan topics" throughout the curriculum was also felt to be an important goal of curricular reform. Development of a matrix that shows when and how the orphan topics are incorporated into the clinical clerkships is one way to assure appropriate coverage of these interdisciplinary topics. A model of "immersion and retreat," the latter allowing time for reflection and synthesis of knowledge and experiences, was felt to be a valuable one. The medical student experience should be made more distinct from the graduate medical education model that generally does not allow for periods of retreat, reflection, and consolidation.

3. Refocusing the clinical experience

At present, the inpatient model for many disciplines is the "team" model, in which the team of attending physician, house staff, and students provides the central focus for clinical care and educational activities. The student "fits" into the team, as does the group of patients who are cared for by members of the team. Alternative models make the patient the focus, emphasizing the importance of the clinical encounter as part of the longitudinal care of the patient, or make the student the focus, recognizing that the primary goal of medical school is the education of the student and the development of his/her skills as a clinician. The "patient-centered" focus requires more integration of inpatient and outpatient care, as well as more integration across disciplines – the student follows the patient through all aspects of the patient's care and across all disciplines providing care for the

patient. Implementing such a model would require interdisciplinary teams of clinicians who are responsible for supervision and education of students.

The "student-centered model" designs educational experiences that are appropriate for a student's level of development. These experiences may need to be customized, depending upon the student's previous clinical experience and areas of deficient clinical exposure. Close mentorship and supervision would become a fundamental component of this model, ensuring the student's growth as a skillful and knowledgeable clinician.

4. Optimizing the use of the fourth year

The objectives of the fourth year of medical school need to be better defined. Innovative approaches need to be developed that link the experiences of the fourth year to its defined goals, as well as to the overall goals of the four years of medical education. Fourth-year courses should have objectives and thoughtfully produced curricula, rather than being simply "tag-along" inpatient team experiences. Innovative advanced experiences need to be created that: (a) build on the scientific and clinical foundations begun in the earlier years of medical school; (b) integrate interdisciplinary topics, especially orphan topics; and (c) provide guided elective experiences of particular value for the individual student based on his/her future goals and career plans. Appropriate faculty guidance that allows each student to develop a curricular plan is particularly important for optimizing the experience, and oversight is necessary so that students do not take multiple, and essentially repetitive, "audition electives" in the same discipline.

5. Transition experiences

Innovative courses or experiences should be developed for critical junctures within a student's education. These include the transition from preclinical to clinical years, and the transition from medical school to house staff training (graduate medical education). The transition from preclinical to clinical years would introduce the student to the clinical environment, to the culture of the inpatient setting, and to those skills of particular value when entering the hospital environment. The transition from medical school to postgraduate training might include topics ranging from management of common emergencies to development of teaching skills.

6. Use of multiple venues for clinical education

Whereas the inpatient services have been the traditional focus of clinical education, increasing emphasis is now being placed upon ambulatory education. Opportunities are also available for educational experiences in such settings as chronic care, urgent care, and emergency facilities. Utilizing these different venues, a curriculum could be designed that is centered around four basic types of patients – the emergently ill patient (e.g., in the emergency room), the acutely ill patient (in the inpatient setting), the chronically ill patient (in the outpatient setting, especially in specialty practices), and the healthy patient (in the primary care setting). Such an organizational approach would contribute to breaking down traditional departmental barriers that limit integration of content across disciplines.

7. Use of computer-based technology

Although computer-based educational tools clearly have a role in medical education at the beginning of the 21st century, they cannot and should not replace clinical experiences with patients. Rather, educational technology should be used to fill gaps and enhance the clinical experiences of a student. In this way, educational technology can be customized to meet particular needs based on a student's clinical experiences. In addition, computer-based education using virtual patients can allow the longitudinal tracking of a patient's course and the natural history of disease that may not be available to a student in the real-life clinical setting.

Session III – Who Teaches?

The roles and responsibilities of the clinical faculty of medical schools have changed dramatically

in the past few decades, primarily because of the increased involvement of full time faculty in the provision of clinical services. In response to financial pressures now being experienced by academic medical centers, the clinical faculty is increasingly expected to meet certain clinical care productivity goals. As a result, many members of the clinical faculty find it difficult to devote time and effort to the teaching of medical students.

Given this, the working groups were charged to consider the following issues:

1. Should there be a core group of faculty responsible for the teaching of medical students, and if so, how should this group be selected and supported by the medical school?

2. What roles should specialists and generalists, ambulatory-based and hospital-based faculty, and residents play in the teaching of medical students?

3. What mechanisms should be used for evaluating and improving the quality of teaching?

4. What mechanisms should be employed for rewarding faculty, both academically and financially, for teaching medical students?

Eight common themes emerged from the working group sessions.

1. Composition of teaching faculty

There was general agreement that all clinical faculty members interested in teaching should be given the opportunity to do so, recognizing that each faculty member's teaching interests and abilities will differ. Some may be best matched to attending duties, others to problem-based learning or small-group tutoring, and others to precepting in practice sites. In general, many felt that all faculty should teach in some venue, whether in the classroom, the clinical environment, or the laboratory.

Teachers of medical students should include both generalists and specialists. Whether or not a generalist or a specialist is the appropriate teacher should be determined by the educational objectives of the learning experience. Because students develop their career goals and plans during medical school, it is important for students to have a balanced exposure to generalists and specialists. Although general principles of care are often learned on more general services, it was acknowledged that these principles also can be learned on specialized services, as long as learning objectives are clearly defined and guide the design of the educational experience.

2. House staff as teachers

For a number of reasons, residents must continue to teach students, but perhaps not to the present extent. Having so recently been students themselves, residents have realistic expectations of medical students and excellent insight about students' needs. They are also the main professional colleagues of the students — the ones to whom they can relate best, and the ones to whom they feel comfortable asking questions. Residents are important teachers of students in part because they are there when the action happens, and they are the "how-to-do" experts.

However, residents today are busier, more stressed by clinical demands, and less able to perform well clinically when they also have heavy teaching responsibilities. The service responsibilities of residents may need to be adjusted to allow them to teach. Faculty development for residents is very important. These efforts should focus both on teaching skills and on clarifying the roles of the house staff in the school's curriculum. A number of schools have initiated "resident as teacher" programs designed to develop teaching skills specific to the role residents assume vis-à-vis students. Another model is to offer senior residents the opportunity to focus on medical education during elective months. For example, the Department of Medicine at Beth Israel Deaconess Medical Center offers a three-month "Medical Education Area of

Concentration" for senior residents. Residents should also be rewarded somehow for their teaching, e.g., through resident teaching awards.

A number of ideas emerged for improving the role of residents as teachers:

- Strengthen the role of chief and senior residents in particular as primary teachers of students
- Teach residents how to capture the real-time "teachable moment," since residents have the most consistent real-time working relationship with students in the course of patient care
- Better define the goals and responsibilities of residents as teachers
- Develop a structure as part of the housestaff curriculum for ongoing development and improvement of housestaff as teachers

3. Attributes and expectations of teaching faculty

Students learn from faculty through role modeling, through guided reflection on their clinical experiences, through synthesis of the information they gather, and through the interactions they have with members of the entire healthcare team. Therefore, it is important to define the attributes that make faculty most effective in each of those facets of their work with students.

First and foremost, clinical teachers must be knowledgeable, skilled clinicians who themselves are curious and inquisitive life-long learners. They must be excellent communicators and role models of professionalism. The medical profession itself is characterized as embodying specialized knowledge, curiosity and inquisitiveness, the courage to challenge existing paradigms, altruism (putting the patient first), and commitment to life-long learning. These are qualities that teachers should embody.

Additionally, all faculty involved in teaching students must be committed to developing the skills necessary to be excellent teachers, including the ability to assess the range of learners' needs and to take the level of each learner into perspective. Faculty also must develop a practice of providing timely, constructive, and effective feedback to learners. On inpatient services, teachers must take students to the bedside. All teachers must be willing to make the time to design educational activities, and all teachers must be provided adequate time to prepare for teaching and to carry out their teaching responsibilities.

4. A "core faculty"

A core faculty of dedicated clinician-educators should be developed and sustained. It was argued that since there are elite researchers, there also should be elite teachers as well. One reason that teaching is not appropriately valued at present is that it is not seen as an activity requiring special skills.

Members of a core faculty should be those whose primary contribution to the academic mission is based on teaching, as opposed to either research or patient care. Their contributions to the missions of their institutions need not be limited to education, but their primary academic role should be in the domains of teaching and education.

Members of the core faculty should have a strong commitment to supporting the learning objectives of the educational program; participate in meaningful ways in curriculum planning, educational scholarship, and monitoring of the general learning and teaching experience; mentoring of students; and assessment of students' performance.

To establish a core faculty of teachers, medical schools should establish a special career path for medical educators. In doing so, schools should establish standards for medical education training and provide for interested faculty, career development opportunities that would include mentoring relationships and support for scholarship. Oversight of the core faculty should be centralized to whatever extent possible.

In establishing a core faculty, it is imperative that other faculty who teach not be alienated. There are many other individuals who do essential teaching, but who would not be considered core faculty:

- Full-time and volunteer faculty who teach in the course of providing patient care
- Residents
- Fourth-year medical students who might serve as teaching assistants

5. Assessing and refining the quality of teaching

There was a strong consensus that quality teaching is not adequately recognized. An organized effort to measure continuously faculty effort and contributions to education (more than teaching alone) is a crucial element in facilitating the equitable reward of faculty, and in demonstrating that the school attaches importance to educational activities. In this context, standards should be developed for assessing the quality of teaching. Recommendations for evaluating the quality of teaching include:

- Use of standardized forms for the objective reporting of student evaluations of teaching, already in use in most schools, though not necessarily in all courses
- Increased use of peer review (e.g., by course and clerkship directors, chairs, deans, etc.)
- A centralized faculty teaching evaluation board

Regarding the use of standardized forms for objective evaluation of teaching, there must be mechanisms in place to ensure that faculty receive feedback on their teaching that is objective and constructive, and programs must be in place to help faculty improve their teaching skills.

6. Scholarship in medical education

Department chairs and promotions committees also must become familiar with the scholarship of medical education and with the standards that define excellence in both teaching and educational scholarship. This understanding will enable them to evaluate faculty members' academic productivity relating to educational scholarship, as well as teaching portfolios and other contributions, such as development of enduring educational materials, local, regional and national presentations, and consulting on educational reform at other medical schools.

More funding, both external and internal, is needed for the support of scholarship in medical education. Many schools provide education seed grants to support small research projects or educational initiatives. Information about these and other external funding opportunities should be posted and shared widely with faculty. Funding to support research in medical education is not plentiful. A national program for funding medical education research is needed.

Faculty should be encouraged to publish the results of their work. The results of research studies and descriptive pieces about curricular innovations, faculty development programs, organizational changes, and assessment tools should be submitted for publication in peer-reviewed journals. They should also present their work at local, regional, and national meetings. Schools might form educational research groups that allow faculty to share ideas, experiences, and expertise.

7. Faculty development

All faculty who teach should participate in faculty development programs. Time away from clinical activity is required to develop teaching skills. The pace of patient care should not be allowed to limit faculty participation in faculty development programs.

Those aspiring to be members of the core faculty should be encouraged to participate in a formal program, such as a medical education fellowship or faculty development program, which has a curriculum designed to enhance their contributions

to educational scholarship. Seminars should be developed and made available to all faculty, and faculty should be given time to attend these seminars, just as there is an expectation that faculty in academic medical centers will attend grand rounds. Some medical schools compensate departments for the time that members of their faculty spend attending seminars, or they provide stipends to faculty who are enrolled in medical education fellowships.

8. Rewarding quality teaching

Standards for excellence in teaching must be developed, codified, and incorporated into the process of evaluating faculty for promotion. Department chairs and promotion committees must become familiar with the standards of excellence for teaching, medical education research, curricular innovation and development of curricular materials, and other important contributions made by faculty whose academic focus is teaching and medical education. There must be institutional support for peer review of teaching that is rigorous and objective, and systems for peer review must be established.

Mission-based budgeting is one mechanism being used by many medical schools to ensure that funds are earmarked for the teaching mission and channeled to support those faculty who are the primary teachers of both medical students and house staff. Some schools are establishing core faculty structures to support faculty who have a serious interest in medical education, the requisite skills for becoming an outstanding teacher, and the willingness to make a significant commitment of time and effort to teaching and to other education-related activities. Allocation of teaching funds for salary support of these individuals allows them to assume dedicated teaching roles. Core faculty members also are required to participate in formal professional development programs that both develop the skills necessary for excellent teaching (e.g., teaching on rounds and at the bedside, teaching in ambulatory settings, giving effective feedback) and also provide valuable credentials.

A number of schools, such as Baylor, Mayo, UCSF, and Harvard, are establishing "academy" organizations to support excellence in teaching and curricular innovation, to serve as advocacy organizations for teachers and medical education, and to engage in raising funds to support medical education. Some medical schools and organizations within medical schools, such as the Shapiro Institute and the academies mentioned above, provide seed grants to faculty to initiate innovative medical education projects.

Promotion policies must be changed to reward the contributions that faculty members whose academic focus is on medical education make to the academic mission. Endowments to support the educational mission of medical schools should be a serious focus of the fundraising goals of medical schools. Currently, endowed chairs are almost exclusively awarded to faculty whose focus is research. Endowed chairs to recognize senior faculty teachers should be established as well.

Summary

As noted in the introduction, it is difficult to convey in a written document the excitement and enthusiasm that characterized the discussions of the issues that the conference participants were charged to consider during the working group sessions. The brief summaries presented above make it clear that the participants believed that medical schools must implement a number of changes if they wish to improve the clinical education of their students. The summaries do not reflect the sense of urgency that characterized the participants' recommendations for change.

Certainly, all of the major themes summarized in the previous section are important, and all deserve the attention of medical school deans and faculties. For that reason, no effort was made to prioritize the nineteen themes that emerged during the three working group sessions. Nonetheless, it seemed clear that certain of the themes generated more discussion during the course of the two conferences. Indeed, some generated discussion in more than one of the three focused, working group sessions. The purpose of noting those is not to suggest that they are more important than the others, but to highlight the fact that real innovation is needed to address some of the concerns that exist about the quality of the clinical education of medical students.

For example, the need to integrate, within the clinical curriculum, core content related to advances in biomedical science and to contemporary issues in medicine is extremely important, and it is clear that schools will need to use innovative approaches to accomplish this. Some schools have started to implement approaches for accomplishing this, but it is clear that more models need to be developed before it will be possible to judge how the required content can best be integrated into students' clinical experiences.

The need to redesign the clerkship experiences to accommodate the integration of core content generated a great deal of discussion about the continued validity of the traditional clinical clerkship experience. A general consensus developed during the course of those discussions that simply assigning students to teams composed of residents and an attending physician was not an adequate strategy for achieving well-defined educational objectives. There was a strong sense that innovative clinical rotations that were truly patient-centered would be more effective learning experiences for students, and would accommodate more readily the integration of core content. To date, only a few schools have implemented experiences of this kind. A great deal of innovation will be required before it will be possible to make judgments about effective models.

And finally, there was a strong sense among the conference participants that given the realities of modern academic medical centers, schools must re-think how they define the roles and responsibilities of faculty, and how they support and reward those who are most committed to the institutions' medical education mission. The conference participants were attracted to the concept that designation of a core faculty composed of highly skilled teachers and educators would be an effective means for improving the clinical education of students. Once again, a great deal of innovation is required before it will be possible to identify models that are most effective.

In closing, it is important to emphasize once again the tone and spirit that dominated the discussions in both the working group and general sessions. The conference participants, all of whom were involved on a daily basis in the clinical education of medical students, felt strongly that reforms are needed in the design and conduct of the clinical education of medical students. In addition, they felt that for reforms to be effective, they needed to be highly innovative and far- reaching. Though there are undoubtedly challenges that will need to be overcome in implementing reforms, the conference participants embraced the concept that substantive reform of the clinical education of medical students presents a genuine opportunity to improve the ways that physicians are been trained for medical practice in the 21st century.