Medical schools haven’t changed since the Flexner report of 1910." In the past ten years, I have heard a variety of individuals say this, including leaders of academic medicine and legislators, and have read it in the press on many occasions. Fortunately, that statement, whether spoken, written, or implied, is incorrect. It reflects a lack of information about just how fundamentally U.S. and Canadian medical schools have reformed what they teach and how they teach it, especially in the last decade, and how this process of change is continuing. I am aware of what the schools are doing because my work brings me into almost daily contact with the many medical school faculty and administrators who are working diligently to find the best ways to prepare physicians to practice medicine in the 21st century. But I am fortunate; until recently, most people did not have an easy way to learn what medical schools have done and are doing to revise their educational programs. That is no longer the case, thanks to the collection of reports you now hold in your hands, which together create a panoramic “snapshot” of medical students’ education at the beginning of the 21st century.

It is true that medical schools have long needed to make changes in the ways they educate their students. There have been numerous reports about medical education and recommendations for change over the past 20 years: the GPEP Report and the ACME–TRI Report from the Association of American Medical Colleges (AAMC), reports from the Josiah Macy, Jr. Foundation such as The New Biology and Medical Education and Adapting Clinical Medical Education to the Needs of Today and Tomorrow, the American Medical Association’s Future Directions for Medical Education, and publications issued by the Hastings Center, by a group of medical educators in Canada, and by the General Medical Council of Great Britain represent only a few of these. Many of the reforms now taking place have built on the recommendations published in these and other reports.

In 1996, the AAMC launched the Medical School Objectives Project (MSOP) to assist medical schools in their efforts to revise their educational programs to improve the quality of medical students’ education and to produce physicians who can meet the changing needs of society and of the health care environment. The Project has published four reports to date, and AAMC staff are working with medical schools on implementing changes based on criteria and guidelines in these reports.

How This Supplement Came to Be

The strong response to the MSOP reports made even clearer to me and my colleagues that many changes have been made, in the past decade especially, or are under way in medical students’ education. In most cases, these changes have occurred without a major influx of money or additional resources and are dependent on the commitment and hard work of a dedicated group of faculty and administrators, responsive to societal needs. I and others felt that persons inside and outside academic medicine would benefit from knowing about these many changes, which amount to a quiet revolution in curricular reform. Hence, the idea for this collection of reports was born.

Jordan J. Cohen, MD, president of the Association, Michael E. Whitcomb, MD, senior vice president, Division of Medical Education at the Association, and the editors of Academic Medicine have supported this idea from the beginning, and the editors, both at the Association and at the journal’s publishing house in Philadelphia, have been of inestimable help in every aspect of making the idea a reality. Once the editors determined that we could produce a supplement in excess of 400 pages, and Dr. Cohen agreed to support the costs of the publication, the work began.

First, a letter was sent from Dr. Cohen to all U.S. and Canadian medical school deans and the associate deans for academic affairs asking them to answer a set of questions about their schools’ educational programs. I used the question format rather than a more open-ended one because I wanted to have the same types of information about all medical schools. I took this approach partly because we had to limit the length of each school’s published responses in this supplement. In addition, I thought it would be more useful
to compare and contrast the schools if their responses were presented in a similar manner. That is why all the schools’ responses are presented within sets of identical (in most cases) categories—e.g., “Learning Outcomes”—that reflect the topics covered by the questions sent to the schools.

The time we had to accomplish our task was short, but the response of the schools was gratifying and even a bit overwhelming. This supplement presents my compilations of the answers to my questions by representatives of 130 of the 141 accredited allopathic medical schools in the United States and Canada. This kind of information about every medical school’s educational program has never been collected in a single place before. I call these “snapshots” because, like camera snapshots, they reveal considerable information about each school at a particular point in time, but there is more that could be said in each case. I have often said that when you have seen one medical school, you have seen one medical school, and I believe the 131 snapshots in this supplement support my contention. Even so, the entries taken together form a three-dimensional mega-snapshot of the tremendous breadth, richness, and diversity of North America’s medical school programs.

How the Schools’ Responses Are Organized

As you read through these pages, you will find that the schools took different approaches to responding to the questions. I tried to include most of what the schools sent, but it was necessary to edit in every case in order to fit the schools’ responses to the bulleted format and the main categories that organize each report’s information. Some of the schools chose to focus exclusively on their curricular reform activities and did not include information for all the categories.

Short explanations of what these categories mean and highlights from the reports are summarized below. I also developed a glossary of terms used throughout the reports, which can be found at the end of this supplement.

Curriculum Management and Governance Structure

Each school was asked to provide an overview of the governance of its curriculum and how it is managed. Many of the schools have centralized the governance of the curriculum in an executive committee that has oversight responsibility for all aspects of the curriculum. Components of the curriculum, and sometimes the various years of the curriculum, have their own committees, which report to the central governing committee. Usually, the associate dean for academic affairs (or curriculum, or education—the titles vary considerably) has ultimate responsibility for the management and implementation of the medical students’ educational program.

The role of the dean and his or her involvement in support of the educational program is highlighted throughout the schools’ responses. In every case where curricular reform has been successful and is sustained, the dean has played a key role in supporting the reform, and has typically given authority to an associate dean to assure that the goals of the curriculum are met.

Office of Education

One of the changes that I have become aware of in the past decade is an increase in the numbers of offices or departments at medical schools whose mission is to support the educational program. The responses from the schools supported my observation: 111 of the schools that responded have an office, with funds, devoted to support of the educational program. Some of the offices of education have been in place since the 1970s, but their responsibilities have changed and increased. Since 1990, 65 new offices or positions for a person with responsibility for the educational program have been added.

Budget to Support Educational Programs

An important strategy that the 1993 ACME—TRI Report proposed was that “a medical school must have a specific budget for its program for medical students’ education.” With resources for medical schools diminishing and the growing demand on the faculty to devote more time to generating clinical revenue and research dollars, I wanted to find out how many schools had a clear source of funding or a line item in the budget to support the educational program, and what the sources of funding were. While there are more schools that have defined budgets for their educational programs now than was the case in the early 1990s, there is still a long way to go before all schools can say that their educational missions are supported by their own budgets. (The AAMC has initiated a “mission-based budgeting” program to assist schools to align their educational, research, and patient care missions with their budgets and sources of revenue.)

Valuing Teaching

A major barrier to change identified in the ACME—TRI Report was a lack of incentive for faculty to teach. An essay at the conclusion of that report suggests that the faculty are committed, dedicated people who want to teach, but who
perceive that the academic medicine culture does not give students’ education a high priority. If you read the mission statement of almost any medical school represented in this supplement, the mission is to educate physicians for the safe and ethical practice of medicine. Yet the people charged to provide the education are often overlooked in promotion and tenure. I deliberately chose the words “valuing teaching” because that is what is necessary if the role of the faculty member is to change in medical schools. The responses from the schools indicate that there are many awards given for excellence in teaching and resources devoted to faculty development efforts to promote teaching. This change is positive. Even so, there is room for the academic societies and faculty members themselves to place a higher value on the activities of teaching. These activities include serving on admission and curriculum committees; writing articles for publication in journals such as *Academic Medicine* and *Medical Education* that would receive as much attention from the promotion and tenure committees as would articles written for scientific publications; presenting papers at conferences that are devoted to medical education rather than to the faculty members’ disciplines; and having such a presentation “count” on the faculty member’s curriculum vitae.

At least two of the schools whose reports are in this supplement have developed academies to support excellence in teaching (the University of Illinois at Chicago College of Medicine and the University of California, San Francisco, School of Medicine), which may serve as models for other schools. Some schools have developed tenure tracks for clinician-educators, to allow faculty to receive promotion and tenure for their work in education.

### Curriculum Renewal Process

This category of each school’s report, and the categories that follow it, illustrate the significant changes that the school has made in its educational program. Perhaps even more important, the schools’ combined information in this category demonstrates that medical schools’ curricula are constantly undergoing change and revision. Medical schools seldom say, “We have finished our curricular reform,” but instead have developed processes for continued curricular renewal.

### Learning Outcomes

A survey conducted in 1996, at the start of the preparation for the MSOP reports, revealed that fewer than 18% of U.S. and Canadian medical schools had sets of outcomes for their medical school graduates that had been developed and agreed upon by the faculty. In this supplement, the responses of the schools presented in the Learning Outcomes category suggest that many more schools have developed sets of objectives or outcomes for their graduates since 1996. Space limitations prevented publication of all the objectives that were included with the schools’ responses, but in every case where the authors included the objectives, there is a note to the reader that a copy of the objectives is available from the authors.

The learning outcomes range from explicit objectives for each course to broad outcomes for graduation. Often the schools indicate that they have used the attributes and objectives presented in the first MSOP report as a blueprint for developing the outcomes for their graduates. Though not every school had objectives available to include with its report, in most cases, the authors indicate that work is under way to develop learning outcomes for the educational program.

### Changes in Pedagogy

Perhaps the area in which the greatest changes are taking place is pedagogy; the reports in this supplement show that medical schools are using a wide variety of approaches to educate physicians. The methods used, the sites where the education occurs, and the technology used have all, to greater or lesser degrees, changed in the past decade. There has been a shift from faculty-centered to student-centered learning, with an increase in small groups, discussions, tutorials, and students’ use of the library to discover information for themselves, rather than obtaining it through lectures only. There is an increased emphasis on students’ developing good communication skills and dealing with difficult ethical issues during medical school. There also is more use of standardized patients, and students have contact much earlier with real patients—often in the first week of their first year of medical school. Some schools have developed longitudinal components of the curriculum that allow a student to follow a panel of patients, or a family, from the time the student enters medical school until he or she graduates. Students are exposed to more activities in the community, and the emphasis is on understanding patients in the context of their environments, not just as isolated individuals who present with illnesses.

### Application of Computer Technology

If there is a single area that represents the greatest change in the way physicians are preparing to enter practice in the 21st century, it is in the application of computer technology to almost every aspect of their education. Forty-five of the 130 responding schools require students to have their own computers upon admission to medical school. For those schools that do not require students to own computers, there
are computer facilities available 24 hours a day for the students.

Course syllabi, textbooks, class notes, histology slides, patient cases, even examinations are delivered via the computer. Several schools report that significant amounts of the communication between faculty and students use electronic mail. Many faculty have developed software used in their courses. Computers are used to teach evidence-based medicine, and to search the literature; the importance of the library has increased with the use of the computer. The Internet is used in self-directed learning and research activities. There are few areas of medical students’ education that have not been affected by the applications of computer technology.

Changes in Assessment

The schools’ reports in this supplement indicate numerous changes in the ways students’ learning and performance are assessed. The assessment methods used are more closely aligned with the principles being taught than was true in years past. Actual people (standardized patients) are used to teach and assess physical examination skills and history taking. Standardized patients play a critical role in assessing noncognitive skills such as communication with the patient. Some schools use peer assessment as a means of determining students’ attributes and abilities. A total of 107 of the responding schools reported using objective structured clinical examinations (OSCEs) as a means of assessing students’ clinical skills. Often standardized patients are part of that assessment process. As noted earlier, the computer is used for the delivery of many examinations.

The role of faculty observation in assessment and in comprehensive examinations was noted by many schools, though it was acknowledged that, due to competing demands on the faculty, such observation could be intermittent.

Clinical Experiences

Overall, clinical experiences now occur earlier in students’ medical education than was true even a few years ago. The authors of several of this supplement’s reports indicate that students see patients as early as the first week of the first year of medical school. In others, students are assigned to a patient or a family in their first year and follow these patients through their four years of medical school as part of a longitudinal experience. While teaching hospitals are critical to the clinical education of students, much of the clinical education now occurs outside the hospital wards and takes place in clinics and physicians’ offices. The role of the community physician as a preceptor for students’ experiences has increased and changed in the past decade.

As part of their clinical education, students are exposed to managed care settings, nursing homes, and hospices; even prisons have become a site for medical education.

Students have begun their own community clinical activities in some schools. Homeless shelters and free clinics are sites of some important clinical education and reinforce the human side of medicine. Because there is increasing demand from society for physicians to have better communication skills, students are being exposed to more opportunities to learn such skills, to deliver “bad news” in the best way, and to attend to the whole person in their clinical experiences. These experiences often are facilitated by standardized patients trained to serve as both patient and teacher for the students.

More than in the past, students’ clinical experiences expose them to aspects of health care that reflect the needs of society and the issues these students will encounter when they are physicians. These issues include those of domestic violence, medical ethics, death and dying, communicating effectively with people from different cultures, making decisions about patients who have no money to pay for urgent medical care, working in teams, getting practical experience in managed care, and treating the homeless.

Meeting the Needs of the New Century

In the above paragraphs I have given only highlights of some of the profound changes that have occurred and are occurring in medical students’ education today, as described in more detail in the accompanying reports. These reports clearly show that the medical education process is robust and constantly remaking itself to meet the changing needs of our society and the health care environment. The medical schools of North America have groups of incredibly dedicated faculty and community physicians willing to make the reforms that are needed to successfully educate students for practice in the twenty-first century. Perhaps we will revisit the schools in five years to see how much more they have changed.

My thanks to all of the authors represented on these pages, who met a very short timeline and responded with enthusiasm and even more information than I could include in this supplement. I am grateful to Jordan Cohen and Michael Whitcomb for their support for this project, even when at least one of them doubted it could be done. I thank Addeane Caelleigh and Lisa Dittrich of the Academic Medicine edi-
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REFERENCES