Goals of Medical Student Education

The competent, effective and compassionate practice of medicine and the advancement of knowledge about disease, its prevention and treatment require that physicians in training be introduced to a lifelong educational process. Medical school provides a critical phase of this education. The goals of the University of Michigan Medical School include educating individuals who are imbued with achieving the highest ethical and performance standards required to provide exemplary patient care, and graduating physicians who will assume leadership roles in the areas of clinical medicine, research and teaching. These goals will be attained when students have demonstrated:

1. A commitment to achieving personal and professional excellence including the critical evaluation of the performance of peers and self;

2. A strong foundation in the biomedical sciences, clinical medicine, and in those aspects of the humanities, social and behavioral sciences that are relevant to medicine;

3. The expertise to access and critically evaluate the scientific literature and to assimilate new scientific information;

4. The ability to apply the scientific method and an appreciation of how knowledge of basic science and clinical medicine is integrated and applied;

5. The ability to identify and reduce the risk factors that contribute to the major causes of morbidity and mortality;

6. Skillfulness in obtaining and interpreting relevant information from patients, laboratory data and other sources to deliver optimal patient care;

7. The ability to organize and interpret clinical information and to make clinical decisions effectively and efficiently;

8. Excellence in procedural skills and patient management;

9. Interpersonal skills that facilitate effective and empathic relationships with patients and effective collaborations with other health care professionals;

10. The professional attributes of compassion, honesty and integrity; and social and professional responsibility in the context of a diverse and changing society.

Endorsed by the Executive Faculty, October 24, 1991.
Modified and approved by the Curriculum Policy Committee, August 30, 1996

The School and The City

History of the University of Michigan Medical School

The University of Michigan Medical School was the first medical school in the U.S. to own and operate its own hospital, the first major medical school to admit women and the first major medical school to base its instruction on science. The UM Medical School was also a pioneer in the introduction of the modern medical curriculum and the development of the clinical clerkships.

In the late nineteenth century the UM Medical School embarked on a mission to involve students as active participants—rather than passive observers—in their education, and to teach students how to acquire and interpret information.

These activities occurred during a period of pro-found change in medical education. The Medi-cal School had opened its doors in 1850 and charged the first class of medical students $5 a year for two years of education. The curriculum was all lecture, and the second year was a repeat of the first. None of the members in that first class were college graduates, and all were white males. To gain admission, they were required to know some Greek and enough Latin to read and write prescriptions.

In 1870 the UM Medical School accepted its first woman, Amanda Sanford. Ms. Sanford was admitted on somewhat of a technicality in that the UM regents passed a resolution that year allowing any Michigan resident to enroll at the University; the resolution did not mention, and therefore did not exclude, women and African Americans. In 1873 W. Henry Fitzbutler became the first African American medical student to graduate from the Medical School. Mr. Fitzbutler was the son of a slave.

In the late 1870s the UM Medical School increased its annual term from six months to nine, and in 1880 a three-year curriculum was adopted, laboratory instruction was introduced, and grades were assigned. In 1899 the UM Medical School successfully introduced the clinical clerkship, having succeeded where other medical schools had failed largely because the UM owned its own hospital (privately-owned hospitals would not allow medical students to touch their patients).

At the start of the twentieth century, the UM Medical School led efforts to revise and improve medical curricula, doubling the length of the program for the M.D. degree and integrating clinical rotations into every student's course of study. In the 1950s through the 1960s sweeping changes were made in the UM's medical curriculum, including early student contact with patients and an inter-departmental course in the neurosciences. The late 1960s was an era of

increased clinical train-ing in the first two (predominantly basic science) years of medical school. The UM, along with many medical schools across the country, adopted an interdepartmental Introduction to Clinical Medicine course that would remain a staple of the first two years for more than 20 years. In this same period, subinternships were introduced in the senior year; they remain part of the UM Medical School advanced clinical curriculum.

The UM Medical School continues its long tradition of excellence with a diverse and outstanding student body, world-renowned basic science and clinical faculty, a completely revised curriculum for the M.D. degree, and exceptional facilities for patient care, education and research.

Ann Arbor

Ann Arbor, home of the University of Michigan, combines the charm of a small town with the cultural and recreational opportunities of a big city. Individuals from all over the country and the world live and teach in Ann Arbor and add to the city's sophistication, excitement and diversity.

Located in southeastern Michigan, Ann Arbor is 40 miles west of metropolitan Detroit. The Huron River winds through Ann Arbor and many of the city's parks are on its banks. Because of its love-ly tree-lined streets and many parks, Ann Arbor is known as "Tree City."

Lower Michigan is a fabulous place for enjoying all four seasons. Spring in Ann Arbor is beautiful as trees come into bloom and flowers abound on and off-campus. Summer, occasionally hot but mostly quite temperate, is a great time to enjoy the parks and lakes in Ann Arbor and areas close by. The city's many trees provide spectacular color in the Fall, when the air is brisk and skies often sunny. Winter is variable, some years it is quite warm with little snow and other years it is cold, clear and a cross-country skier's paradise.

The University of Michigan is one of the few major academic medical centers that is not located in an urban setting. I chose UM over several other schools because I knew that Ann Arbor would be much more conducive to my academic and personal growth than the center of a big city.

Carey Lumeng, Medical Scientist Training Program, Class of 2000

Ann Arbor boasts a symphony orchestra, a civic theater, and many outstanding restaurants. Farmers from surrounding areas sell their produce on Wednesdays and Saturdays at the very popular Farmer's Market on Fourth Street. The Borders brothers opened their first book store in Ann Arbor 25 years ago.

The University's Central Campus is incorporated into the downtown State Street shopping/business area. In addition to the majestic and beautiful Angell Hall, Student Union, Hill Auditorium and other university buildings, there are libraries, galleries, shops, museums and theaters.

The University of Michigan has 51,000 students and 5,600 faculty on its three campuses. The UM Medical School ranks ninth among all medical schools in terms of NIH awards, while the UM's Medical School, College of Engineering, Law School, School of Business Administration, School of Dentistry, College of Pharmacy, School of Nursing, School of Public Health and School of Social Work all rank in the top ten nationally.

The Medical Center is within easy walking distance of downtown, and there are also free rides on the University buses which connect all parts of the campus. Most medical students live in apartment complexes that are within a short and delightful walk to the medical campus.

In the 1998-99 academic year, 671 medical students at the University of Michigan were actively working toward their M.D. degree.

ADMISSIONS

Admission Requirements

Each University of Michigan Medical School applicant must have completed:

- at least a four-year high school education, or equivalent, and
- at least three years (90 semester hours) of course work in an accredited college or university within the United States or Canada.

Applicants must be U.S. citizens or permanent residents of the United States. Permanent residents and others who did not attend U.S. or Canadian schools should complete at least one year, and preferably two, in residence at an accredited college in North America. All previous academic credits must be validated by the accredited college.

Students who have been previously enrolled in a medical school program leading to the M.D. degree must be in good standing at that institution in order to receive even initial consideration for admission to the University of Michigan Medical School as a first year student.

Subject Requirements

Following are the subject requirements for matriculation into medical school. Grades below "C" will not be accepted in any of the following required courses:

Chemistry:

8 semester hours (including laboratory work)
General inorganic and organic chemistry, with at least three hours of laboratory work, are required. Work in qualitative analysis, quantitative analysis, and physical chemistry is acceptable.

Biochemistry:

3 semester hours
A general biochemistry course is required. It should include the topics of pH and dissociation; structure and chemistry of amino acids, peptides, sugars, fats and nucleic acids; kinetics; thermodynamics; and subcellular structure and function. Students should also have been introduced to the topics of enzymology, carbohydrate metabolism, biological oxidation, and molecular biology. Laboratory work in biochemistry is not required.

Biology:

6 semester hours (including laboratory work)
This requirement may be satisfied by six semester hours in either general biology or zoology, or by courses of three semester hours each in zoology and botany, but not botany alone. Some exposure to genetics is recommended.

Physics:

6 semester hours (including laboratory work)

English Composition and Literature:

6 semester hours

Non-science subjects:

18 semester hours

At least 18 semester hours, including the six semester hours of English Composition and Literature noted above must be in subjects other than physical, chemical, biological sciences, or math.

The above list indicates minimum requirements but it should not be inferred that admission is probable for any applicant who meets them.

Since the many fields of medicine offer opportunities for those talented in both the humanities and the sciences, students should allow personal interests to dictate their choice of undergraduate major. In general, the study of a few subjects in depth is recommended. We also recommend courses in genetics and cell biology, as these topics contribute to preparation for the Medical School curriculum.

The Application Process

The Medical School participates in the American Medical College Application Service (AMCAS). Individuals interested in applying to the University of Michigan Medical School should obtain an application from their premedical counselor or from AMCAS. The AMCAS address is:

American Medical College Application Service
Association of American Medical Colleges
2501 M. Street, N.W., Lobby 26
Washington, D.C. 20037-1300
http://www.aamc.org/

Return the completed application directly to AMCAS *before November 15*. AMCAS will forward applications to our Medical School Admissions Office. Upon receipt of the completed application from AMCAS, the Admissions Office will forward further instructions to the applicant.

Applications may be filed on the basis of work completed, plus work in progress that will be completed before the start of medical school. Your official scores on the Medical College Admission Test will be reported to the medical schools you have designated.

It is the responsibility of the applicant to insure that the application is complete and that all required and requested information is forwarded to the Admissions Office. The Medical School notifies all applicants when their applications are received.

The Admissions Committee

After a preliminary screening of credentials, interviews with those applicants who are being seriously considered for admission are scheduled. This personal contact affords the interviewers an opportunity to explore the materials already in hand, and also permits the candidate to further support the application, and to ask questions about the Medical School.

The Admissions Committee, composed of Medical School faculty and students, strives to identify the best potential physicians from among the thousands of applications received each year. All students applying for admission are considered on the basis of individual qualifications. Attributes evaluated include:

- motivation,
- academic preparation,
- character, and
- personal fitness for the study of medicine.

The academic record and Medical College Admission Test (MCAT) furnish an estimate of academic preparedness. The less tangible qualities of motivation, character, and personal fitness are judged from activities, letters of recommendation, personal statement, and the interview.

All interviews are at the invitation of the Medical School. Where considerations of time and distance make an interview in Ann Arbor impractical, other arrangements may be made. No student is accepted without an interview. The Medical School reserves the right to close the file on any application without an interview and solely on the basis of credentials submitted.

The Admissions Committee welcomes all information that will assist in the selection of those applicants best suited to become physicians.

If Accepted

A student offered a position in the next entering class is required to accept or decline the offer within a specified period, by returning official forms to the Admissions Office. No enrollment deposit is required until May of the entering year. Accepted applicants are given financial aid information and forms in January, and a packet of housing, immunization, and other information in early May. Deferrals may be granted at the discretion of the Assistant Dean for Admissions. Individuals who have been given alternate status may be offered a spot in the class at any time there is a vacancy, until the first day of orientation in mid-August.

Matriculation into the Medical School occurs only after the student has satisfactorily completed all requirements for admission and has submitted an official copy of his/her final undergraduate transcript with degree posted.

Advanced Standing and Transfers

Because of the integration of clinical content with basic sciences in our curriculum, there is no provision for advanced placement. Students who have previously taken graduate level or medical school courses are not exempted from enrolling as full-time students in all required course work.

The University of Michigan Medical School does not accept any transfer students from other medical schools, regardless of their academic standing or personal situations.

Early Decision Program

The University of Michigan Medical School participates in the AMCAS Early Decision Program. Students interested in applying through this program will make one application only to the school that is their first choice. Students will be asked to sign a pledge that they will not apply to any other medical school before a decision has been reached on their Early Decision Application. Applicants to this program are expected to have excellent academic credentials.

Applicants considered for early decision are interviewed during August and September. The Admissions Committee decisions are made by October 1, after which applicants are notified of their status. Unsuccessful applicants are sent rejection letters or letters indicating that they will be considered later in the regular application process. These applicants should apply without delay to other medical schools in which they are interested.

Combined Degree Programs

MD/MPH

A number of students each year choose to pursue the Master of Public Health degree. The School of Public Health at Michigan is rated one of the best in the country. Programs of study include Biostatistics, Environmental and Industrial Health, Epidemiology, Health Behavior and Health Education, and Health Management and Policy.

Typically, medical students apply to the School of Public Health after they have arrived in Ann Arbor and begun medical studies. They usually take a leave of absence from medical school after the second year, enrolling for a year of public health courses. They return for the final two years of clinical work in medicine, and usually complete all requirements for the

Master of Public Health degree and the MD within five years.

Inquiries can be addressed to:
University of Michigan School of Public Health
Ann Arbor, MI 48109
or obtain more information at the web page address: http//www.sph/umich.edu/.

MD/MBA

The goal of the University of Michigan MD/MBA Combined Degree Program is to provide opportunities for students to explore and integrate complementary interests and career goals that combine medicine and business. The MD/MBA Program is a five-year integrated program. Students accepted into the Program will spend their first three years in Medical School, completing the M1, M2, and M3 course work. These students will then matriculate in the Business School to complete the full first year MBA course load as their fourth program year, and complete an MBA summer internship between the fourth and fifth program years. In the fifth year, students will spend one semester completing the MD requirements, and the other semester completing the MBA requirements.

Although most students will apply to the MBA program during the M3 year, prospective medical students may indicate to the Medical School's Admissions Office their intent to seek the MBA degree. Admission to the MD/MBA Program is highly competitive and is not automatic. Applicants are expected to have demonstrated outstanding academic achievement and professionalism in Medical School. Applicants must receive Medical School endorsement for admission to the MD/MBA Program through the Clinical Academic Review Board. This will include rigorous review of the applicant's overall medical school performance, personal statement, and any other relevant materials.

Students must also formally apply for the Business School's Decision II Deadline (January) by completing the standard MBA application (http://www.bus.umich.edu/apply) and fulfilling all listed requirements, including the GMAT exam, essays, letters of recommendation, and transcripts. Students are encouraged to set up an interview through the Business School Admissions Office. Business School officers have been advised that Medical School students will be applying for the Decision II deadline and they will give these applicants full consideration.

For additional program information, contact Kathleen Atkins, atkinsk@umich.edu

MD/JD and Other Combined Degrees

At this time, there are no other formal combined degree programs. However, the medical school provides flexibility for students who wish to combine their education with additional courses or a degree program in many fields.

MEDICAL SCIENTIST TRAINING PROGRAM

The Medical Scientist Training Program (MSTP) is a joint effort of the University of Michigan graduate and medical schools to provide a superb and balanced training in science and medicine. The MSTP, which is open to citizens or permanent residents of the United States, attracts excellent students who are committed to a career in biomedical research.

The MSTP curriculum generally requires seven full calendar years, but many fellows take eight. Typically, MSTP fellows begin with the two-year *Pre-Clinical Phase* in the curriculum for the M.D. degree, additional graduate course modules in biological chemistry or other areas, and laboratory rotations in the summers. All fellows must pass the USMLE Step 1 (medical licensure) exam before becoming full-time graduate students. In the *Graduate Phase*, they complete the requirements for Ph.D. candidacy including preliminary examinations, thesis research, and a written dissertation. After defense of the dissertation, fellows return to the M.D. curriculum to take the *Clinical Phase* of their education, including all required clerkships, a subinternship, electives and the USMLE Step 2 examination. In recognition of the interdependency of the degrees, the M.D. and Ph.D. degrees are conferred by the University only after completion of both.

Many doctoral programs are available to students, including Anatomy and Cell Biology, Biological Chemistry, Cellular and Molecular Biology, Human Genetics, Microbiology and Immunology, Neuroscience, Pharmacology and Physiology. Other closely related programs available include Biomedical Engineering, Biophysics, Medicinal Chemistry and Pathology. Entering MSTP fellows are not required to choose a doctoral field until midway through the second year.

MSTP fellows receive full tuition support, health insurance and an annual stipend. Seven to nine students are admitted to the program each year. For more information, please contact:
Medical Scientist Training Program
7310 Medical Science Building I
University of Michigan
Ann Arbor, Michigan 48109-0624
(734) 764-6176
http://www.umich.edu/medschool/MSTP

Pre-Matriculation Program

The UM Medical School invites selected incoming first-year students to participate in a six-week summer pre-matriculation program designed to help them enhance their academic and study skills, to introduce them to the Medical School course work and the Medical School faculty, and to acquaint them with academic and personal support services.

There are introductory courses in Molecular and Cellular Biology (MCB) and Anatomy (including Embryology), cooperative learning seminars for refining learning skills, and a comprehensive program of study skills including time management, note taking, memorization and self-motivation. Small-group discussions introduce students to personal development issues such as communication styles, self-awareness and sensitivity to others, and leadership skills.