

II. EDUCATIONAL PROGRAM FOR THE M.D. DEGREE

A. Educational Objectives

ED-1. The faculty of an institution that offers a medical education program must define the objectives of its program. The objectives must serve as guides for establishing curriculum content and provide the basis for evaluating the effectiveness of the program.

Objectives for the medical education program as a whole serve as statements of what students are expected to learn or accomplish during the course of the program.

It is expected that the objectives of the medical education program will be formally adopted by the curriculum governance process and the faculty (as a whole or through its recognized representatives). Among those who should also exhibit familiarity with these objectives are the dean and the academic leadership of clinical affiliates who share in the responsibility for delivering the program.

ED-1-A. The objectives of a medical education program must be stated in outcome-based terms that allow assessment of student progress in developing the competencies that the profession and the public expect of a physician.

The objectives of the medical education program are statements of the items of knowledge, skills, behaviors, and attitudes that medical students are expected to exhibit as evidence of their achievement.

The educational objectives, along with their associated outcome measures, should reflect whether and how well graduates are developing these competencies as a basis for the next stage of their training.

There are several widely recognized definitions of the knowledge, skills, behaviors, and attitudinal attributes appropriate for a physician, including those described in the AAMC's Medical School Objectives Project, the general competencies of physicians resulting from the collaborative efforts of the Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS), and the physician roles summarized in the CanMEDS 2005 report of the Royal College of Physicians and Surgeons of Canada.

ED-2. An institution that offers a medical education program must have in place a system with central oversight to ensure that the faculty define the types of patients and clinical conditions that medical students must encounter, the appropriate clinical setting for the educational experiences, and the expected level of medical student responsibility. The faculty must monitor medical student experiences and modify them as necessary to ensure that the objectives of the medical education program are met.

The institution that offers a medical education program is required to establish a system to specify the types of patients or clinical conditions that medical students must encounter and to monitor and verify the medical students' experiences with patients so as to remedy any identified gaps. The system must ensure that all medical students have the required experiences. For example, if a medical student does not encounter patients with a particular clinical condition

(e.g., because it is seasonal), the medical student should be able to remedy the gap by a simulated experience (e.g., a standardized patient experience, an online or paper case) or in another clerkship (or, in Canada, clerkship rotation)..

When clerkships/clerkship rotations in a given discipline are provided at multiple instructional sites, compliance with this standard (ED-2) may be linked to compliance with standard ED-8, which requires that the medical education program demonstrate comparability of educational experiences across instructional sites.

ED-3. The objectives of a medical education program must be made known to all medical students and to the faculty, residents, and others with direct responsibilities for medical student education and assessment.

B. Structure

1. General Design

ED-4. A medical education program must include at least 130 weeks of instruction.

ED-5. The curriculum of a medical education program must provide a general professional education and prepare medical students for entry into graduate medical education.

ED-5-A. A medical education program must include instructional opportunities for active learning and independent study to foster the skills necessary for lifelong learning.

It is expected that the methods of instruction and assessment used in courses and clerkships (or, in Canada, clerkship rotations) will provide medical students with opportunities to develop lifelong learning skills. These skills include self-assessment on learning needs; the independent identification, analysis, and synthesis of relevant information; and the appraisal of the credibility of information sources. Medical students should receive explicit experiences in using these skills, and they should be assessed and receive feedback on their performance.

ED-6. The curriculum of a medical education program must incorporate the fundamental principles of medicine and its underlying scientific concepts; allow medical students to acquire skills of critical judgment based on evidence and experience; and develop medical students' ability to use principles and skills wisely in solving problems of health and disease.

ED-7. The curriculum of a medical education program must include current concepts in the basic and clinical sciences, including therapy and technology, changes in the understanding of disease, and the effects of social needs and demands on care.

ED-8. The curriculum of a medical education program must include comparable educational experiences and equivalent methods of assessment across all instructional sites within a given discipline.

Compliance with this standard requires that the educational experiences at all instructional sites be designed to achieve the same educational objectives. Course or clerkship (or, in Canada, clerkship rotation) length must be identical, unless a compelling reason exists for varying the length of the experience. The instruments and criteria used for medical student assessment, as well as the policies for the determination of grades, should be the same at all instructional sites. The faculty who teach at all instructional sites should be sufficiently knowledgeable in the subject

matter to provide effective instruction and have a clear understanding of the objectives of the educational experience and the assessment methods used to determine achievement of those objectives. Opportunities to enhance teaching and assessment skills should be available for faculty at all instructional sites.

Although the types and frequency of problems or clinical conditions seen at each instructional site may vary, each course or clerkship/rotation must identify any core experiences needed to achieve its objectives and ensure that students receive sufficient exposure to such experiences. Similarly, although the proportion of time spent in inpatient and ambulatory settings may vary according to local circumstances, in such cases the course or clerkship/rotation director must ensure that limitations in learning environments do not impede the accomplishment of objectives.

To facilitate the comparability of educational experiences and the equivalency of assessment methods, the course or clerkship/rotation director should orient all participants, both faculty and students, to the educational objectives and grading system used. This orientation can be accomplished through regularly scheduled meetings between the director of the course or clerkship/rotation and the directors at the various instructional sites that are used.

The course and clerkship/rotation leadership should review medical students' evaluations of their experiences at all instructional sites to identify any persistent variations in educational experiences or assessment methods.

ED-9. A medical education program must notify the LCME and the CACMS, when applicable, of its plans for any major modification of its curriculum.

The notification should include the explicitly-defined goals of the change, the plans for implementation, and the methods that will be used to evaluate the results. Planning for curriculum change should consider the incremental resources that will be required, including physical facilities and space, faculty and resident effort, library facilities and operations, information management needs, and computer hardware.

In view of the increasing pace of discovery of new knowledge and technology in medicine, the LCME and the CACMS encourage experimentation that will increase the efficiency and effectiveness of medical education.

2. Content

ED-10. The curriculum of a medical education program must include behavioral and socioeconomic subjects in addition to basic science and clinical disciplines.

Lists of subjects widely recognized as important components of the general professional education of a physician are included in the medical education database that is completed in preparation for full accreditation surveys and in the LCME Part II Annual Medical School Questionnaire. Depth of coverage of the individual topics will depend on the medical education program's educational goals and objectives.

ED-11. The curriculum of a medical education program must include content from the biomedical sciences that supports students' mastery of the contemporary scientific knowledge, concepts, and methods fundamental to acquiring and applying science to the health of individuals and populations and to the contemporary practice of medicine.

It is expected that the curriculum will be guided by clinically-relevant biomedical content from, among others, the disciplines that have been traditionally titled anatomy, biochemistry, genetics, immunology, microbiology, pathology, pharmacology, physiology, and public health sciences.

ED-12. The curriculum of a medical education program should include laboratory or other practical opportunities for the direct application of the scientific method, accurate observation of biomedical phenomena, and critical analysis of data.

Opportunities in the curriculum could include hands-on or simulated (e.g., computer-based) exercises in which medical students either collect or use data to test and/or verify hypotheses or to address questions about biomedical principles and/or phenomena. The medical education program should be able to identify the location in the curriculum where such exercises occur, the specific intent of the exercises, and how the exercises contribute to the objectives of the course and the ability to collect, analyze, and interpret data.

ED-13. The curriculum of a medical education program must cover all organ systems, and include the important aspects of preventive, acute, chronic, continuing, rehabilitative, and end-of-life care.

ED-14. The curriculum of a medical education program must include clinical experience in primary care.

ED-15. The curriculum of a medical education program must prepare students to enter any field of graduate medical education and include content and clinical experiences related to each phase of the human life cycle that will prepare students to recognize wellness, determinants of health, and opportunities for health promotion; recognize and interpret symptoms and signs of disease; develop differential diagnoses and treatment plans; and assist patients in addressing health-related issues involving all organ systems.

It is expected that the curriculum will be guided by the contemporary content from and the clinical experiences associated with, among others, the disciplines and related subspecialties that have traditionally been titled family medicine, internal medicine, obstetrics and gynecology, pediatrics, preventive medicine, psychiatry, and surgery.

ED-16. The clinical experiences provided to medical students by a medical education program must utilize both outpatient and inpatient settings.

ED-17. Educational opportunities must be available in a medical education program in multidisciplinary content areas (e.g., emergency medicine, geriatrics) and in the disciplines that support general medical practice (e.g., diagnostic imaging, clinical pathology).

ED-17-A. The curriculum of a medical education program must introduce medical students to the basic scientific and ethical principles of clinical and translational research, including the ways in which such research is conducted, evaluated, explained to patients, and applied to patient care.

The faculty of the medical education program should develop explicit learning objectives (knowledge, skills, behaviors, and attitudes) to meet the requirements of this standard. One example of relevant objectives is contained in Report IV of the AAMC's Medical School Objectives Project (Contemporary Issues in Medicine: Basic Science and Clinical Research).

There are several ways in which the medical education program can meet the requirements of this standard. They range from separate required coursework in the subject to the establishment of appropriate learning objectives and instructional activities within existing patient-focused courses or clerkships (or, in Canada, clerkship rotations) (e.g., discussing the application of new knowledge from clinical research in bedside teaching activities, offering mentored projects, or conducting journal club sessions in which medical students explore the development or application of clinical and translational research).

ED-18. The curriculum of a medical education program must include elective opportunities to supplement required courses and clerkships (or, in Canada, clerkship rotations).

Although electives permit medical students to gain exposure to and deepen their understanding of medical specialties reflecting their career interests, they should also provide opportunities for medical students to pursue individual academic interests.

ED-19. The curriculum of a medical education program must include specific instruction in communication skills as they relate to physician responsibilities, including communication with patients and their families, colleagues, and other health professionals.

ED-20. The curriculum of a medical education program must prepare medical students for their role in addressing the medical consequences of common societal problems (e.g., provide instruction in the diagnosis, prevention, appropriate reporting, and treatment of violence and abuse).

ED-21. The faculty and medical students of a medical education program must demonstrate an understanding of the manner in which people of diverse cultures and belief systems perceive health and illness and respond to various symptoms, diseases, and treatments.

Instruction in the medical education program should stress the need for medical students to be concerned with the total medical needs of their patients and the effects that social and cultural circumstances have on patients' health. To demonstrate compliance with this standard, the medical education program should be able to document objectives relating to the development of skills in cultural competence, indicate the location in the curriculum where medical students are exposed to such material, and demonstrate the extent to which the objectives are being achieved.

ED-22. Medical students in a medical education program must learn to recognize and appropriately address gender and cultural biases in themselves, in others, and in the process of health care delivery.

The objectives for instruction in the medical education program should include medical student understanding of demographic influences on health care quality and effectiveness (e.g., racial and ethnic disparities in the diagnosis and treatment of diseases). The objectives should also address the need for self-awareness among medical students regarding any personal biases in their approach to health care delivery.

ED-23. A medical education program must include instruction in medical ethics and human values and require its medical students to exhibit scrupulous ethical principles in caring for patients and in relating to patients' families and to others involved in patient care.

The medical education program should ensure that medical students receive instruction in appropriate medical ethics, human values, and communication skills before engaging in patient care activities. As students take on increasingly more active roles in patient care during their

progression through the curriculum, adherence to ethical principles should be observed, assessed, and reinforced through formal instructional efforts.

In medical student-patient interactions, there should be a means for identifying possible breaches of ethics in patient care, either through faculty or resident observation of the encounter, patient reporting, or some other appropriate method.

The phrase "scrupulous ethical principles" implies characteristics that include honesty, integrity, maintenance of confidentiality, and respect for patients, patients' families, other students, and other health professionals. The program's educational objectives may identify additional dimensions of ethical behavior to be exhibited in patient care settings.

C. Teaching and Evaluation

ED-24. At an institution offering a medical education program, residents who supervise or teach medical students and graduate students and postdoctoral fellows in the biomedical sciences who serve as teachers or teaching assistants must be familiar with the educational objectives of the course or clerkship (or, in Canada, clerkship rotation) and be prepared for their roles in teaching and assessment.

The minimum expectations for achieving compliance with this standard are that: (a) residents and other instructors who do not hold faculty ranks (e.g., graduate students and postdoctoral fellows) receive a copy of the course or clerkship/rotation objectives and clear guidance from the course or clerkship/rotation director about their roles in teaching and assessing medical students and (b) the institution and/or its relevant departments provide resources (e.g., workshops, resource materials) to enhance the teaching and assessment skills of residents and other non-faculty instructors. There should be central monitoring of the level of residents' and other instructors' participation in activities to enhance their teaching and assessment skills.

There should be formal evaluation of the teaching and assessment skills of residents and other non-faculty instructors, with opportunities provided for remediation if their performance is inadequate. Evaluation methods could include direct observation by faculty, feedback from medical students through course and clerkship/rotation evaluations or focus groups, or any other suitable method.

ED-25. Supervision of medical student learning experiences at an institution that offers a medical education program must be provided throughout required clerkships (or, in Canada, clerkship rotations) by members of the institution's faculty.

ED-26. A medical education program must have a system in place for the assessment of medical student achievement throughout the program that employs a variety of measures of knowledge, skills, behaviors, and attitudes.

Assessments of medical student performance should measure the retention of factual knowledge; the development of the skills, behaviors, and attitudes needed in subsequent medical training and practice; and the ability to use data appropriately for solving problems commonly encountered in medical practice. The system of assessment, including the format and frequency of examinations, should support the goals, objectives, processes, and expected outcomes of the curriculum.

ED-27. A medical education program must include ongoing assessment activities that ensure that medical students have acquired and can demonstrate on direct observation the core clinical skills, behaviors, and attitudes that have been specified in the program's educational objectives.

ED-28. A medical education program must include ongoing assessment of medical students' problem solving, clinical reasoning, decision making, and communication skills.

ED-29. The faculty of each discipline should set standards of achievement in that discipline and contribute to the setting of such standards in interdisciplinary and interprofessional learning experiences, as appropriate.

ED-30. The directors of all courses and clerkships (or, in Canada, clerkship rotations) in a medical education program must design and implement a system of fair and timely formative and summative assessment of medical student achievement in each course and clerkship/clerkship rotation.

Faculty of the medical education program directly responsible for the assessment of medical student performance should understand the uses and limitations of various test formats, the purposes and benefits of criterion-referenced vs. norm-referenced grading, reliability and validity issues, formative vs. summative assessment, and other factors associated with effective educational assessment.

In addition, the chief academic officer, curriculum leaders, and faculty of the medical education program should understand, or have access to individuals who are knowledgeable about, methods for measuring medical student performance. The medical education program should provide opportunities for faculty members to develop their skills in such methods.

An important element of the medical education program's system of assessment should be to ensure the timeliness with which medical students are informed about their final performance in courses and clerkships/clerkship rotations. In general, final grades should be available within four to six weeks of the end of a course or clerkship/clerkship rotation.

ED-31. Each medical student in a medical education program should be assessed and provided with formal feedback early enough during each required course or clerkship (or, in Canada, clerkship rotation) to allow sufficient time for remediation.

Although a course or clerkship/clerkship rotation that is short in duration (e.g., less than four weeks) may not have sufficient time to provide a structured formative assessment, it should provide alternate means (e.g., self-testing, teacher consultation) that will allow medical students to measure their progress in learning.

ED-32. A narrative description of medical student performance in a medical education program, including non-cognitive achievement, should be included as a component of the assessment in each required course and clerkship (or, in Canada, clerkship rotation) whenever teacher-student interaction permits this form of assessment.

D. Curriculum Management

1. Roles and Responsibilities

ED-33. There must be integrated institutional responsibility in a medical education program for the overall design, management, and evaluation of a coherent and coordinated curriculum.

The phrase "integrated institutional responsibility" implies that an institutional body (commonly a curriculum committee) will oversee the medical education program as a whole. An effective central curriculum authority will exhibit the following characteristics:

- Faculty, medical student, and administrative participation.
- Expertise in curricular design, pedagogy, and evaluation methods.
- Empowerment, through bylaws or decanal mandate, to work in the best interests of the institution without regard for parochial or political influences or departmental pressures.

The phrase "coherent and coordinated curriculum" implies that the medical education program as a whole will be designed to achieve its overall educational objectives. Evidence of coherence and coordination includes the following characteristics:

- Logical sequencing of the various segments of the curriculum.
- Content that is coordinated and integrated within and across the academic periods of study (i.e., horizontal and vertical integration).
- Methods of pedagogy and medical student assessment that are appropriate for the achievement of the program's educational objectives.

Curriculum management signifies leading, directing, coordinating, controlling, planning, evaluating, and reporting. Evidence of effective curriculum management includes the following characteristics:

- Evaluation of program effectiveness by outcomes analysis, using national norms of accomplishment as a frame of reference.
- Monitoring of content and workload in each discipline, including the identification of omissions and unplanned redundancies.
- Review of the stated objectives of each individual course and clerkship (or, in Canada, clerkship rotation), as well as the methods of pedagogy and medical student assessment, to ensure congruence with programmatic educational objectives.

Minutes of the curriculum committee meetings and reports to the faculty governance and deans should document that such activities take place and should report on the committee's findings and recommendations.

ED-34. The faculty of a medical education program must be responsible for the detailed design and implementation of the components of the curriculum.

Faculty members' responsibilities for the medical education program include, at a minimum, the development of specific course or clerkship (or, in Canada, clerkship rotation) objectives, selection of pedagogical and assessment methods appropriate for the achievement of those

objectives, ongoing review and updating of content, and evaluation of course, clerkship/clerkship rotation, and teacher quality.

ED-35. The objectives, content, and pedagogy of each segment of a medical education program's curriculum, as well as of the curriculum as a whole, must be designed by and subject to periodic review and revision by the program's faculty.

ED-36. The chief academic officer of a medical education program must have sufficient resources and authority to fulfill his or her responsibility for the management and evaluation of the curriculum.

The dean often serves as the chief academic officer, with ultimate individual responsibility for the design and management of the medical education program as a whole. He or she may, however, delegate operational responsibility for curriculum oversight to a vice dean or associate dean.

Examples of the kinds of resources needed by the chief academic officer to ensure effective delivery of the medical education program include:

- *Adequate numbers of teachers who have the time and training necessary to achieve the medical education program's objectives.*
- *Appropriate teaching space for the methods of pedagogy employed in the medical education program.*
- *Appropriate educational infrastructure (e.g., computers, audiovisual aids, laboratories).*
- *Adequate educational support services (e.g., examination grading, classroom scheduling, faculty training in methods of teaching and assessment).*
- *Adequate support and services for the efforts of the curriculum management body and for any interdisciplinary teaching efforts that are not supported at a departmental level.*

The chief academic officer must have explicit authority to ensure the implementation and management of the medical education program and to facilitate change when modifications to the curriculum are determined to be necessary.

ED-37. A faculty committee of a medical education program must be responsible for monitoring the curriculum, including the content taught in each discipline, so that the program's educational objectives will be achieved.

The committee, working in conjunction with the chief academic officer, should ensure that each academic period of the curriculum maintains common standards for content. Such standards should address the depth and breadth of knowledge required for a general professional education, the currency and relevance of content, and the extent of redundancy needed to reinforce learning of complex topics. The final year should complement and supplement the curriculum so that each medical student will acquire appropriate competence in general medical care regardless of subsequent career specialty.

ED-38. The committee responsible for the curriculum at a medical education program, along with the program's administration and leadership, must develop and implement policies regarding the amount of time medical students spend in required activities, including the total number of hours medical students are required to spend in clinical and educational activities during clinical clerkships (or, in Canada, clerkship rotations).

Attention should be paid to the time commitment required of medical students, especially during the clinical years. Medical students' hours should be set after taking into account the effects of fatigue and sleep deprivation on learning, clinical activities, and health and safety.

ED-39. The chief academic officer of a medical education program must be responsible for the conduct and quality of the educational program and for ensuring the adequacy of faculty at all instructional sites.

ED-40. The principal academic officers at each instructional site of a medical education program must be administratively responsible to the program's chief academic officer.

ED-41. The faculty in each discipline at all instructional sites of a medical education program must be functionally integrated by appropriate administrative mechanisms.

The medical education program should be able to demonstrate the means by which faculty at each instructional site participate in and are held accountable for medical student education that is consistent with the objectives and performance expectations established by the course or clerkship (or, in Canada, clerkship rotation) leadership. Mechanisms to achieve functional integration may include regular meetings or electronic communication, periodic visits to all instructional sites by the course or clerkship rotation leadership, and sharing of student assessment data, course or clerkship/rotation evaluation data, and other types of feedback regarding faculty performance of their educational responsibilities.

ED-42. A medical education program must have a single standard for the promotion and graduation of medical students across all instructional sites.

ED-43. A medical education program must assume ultimate responsibility for the selection and assignment of all medical students to all instructional sites or educational tracks. There must be a process whereby a medical student with an appropriate rationale can request an alternative assignment when circumstances allow for it.

A medical education program having multiple instructional sites or distinct educational tracks is responsible for determining the specific instructional site or track for each medical student. That responsibility should not preclude medical students from obtaining alternative assignments if appropriate reasons are given (e.g., demonstrable economic or personal hardship) and if the educational activities and resources involved allow for such reassignment. It is understood, however, that movement among campuses may not be possible (e.g., because the instructional sites may offer different curricular tracks).

ED-44. In a medical education program, medical students assigned to each instructional site should have the same rights and receive the same support services.

ED-45. *Currently, there is no standard ED-45.*

E. Evaluation of Program Effectiveness

ED-46. A medical education program must collect and use a variety of outcome data, including national norms of accomplishment, to demonstrate the extent to which its educational objectives are being met.

The medical education program should collect outcome data on medical student performance, both during program enrollment and after program completion, appropriate to document the achievement of the program's educational objectives. The kinds of outcome data that could serve this purpose include performance on national licensure examinations, performance in courses and clerkships (or, in Canada, clerkship rotations) and other internal measures related to educational program objectives, academic progress and program completion rates, acceptance into residency programs, and assessments by graduates and residency directors of graduates' preparation in areas related to medical education program objectives, including the professional behavior of its graduates.

ED-47. In evaluating program quality, a medical education program must consider medical student evaluations of their courses, clerkships (or, in Canada, clerkship rotations), and teachers, as well as a variety of other measures.

It is expected that the medical education program will have a formal process to collect and use information from medical students on the quality of courses and clerkships/clerkship rotations. The process could include such measures as questionnaires (written or online), other structured data collection tools, focus groups, peer review, and external evaluation.