

Global minimum essential requirements in medical education

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SUMMARY *The process of globalization increasingly evident in medical education makes the task of defining the global essential competencies required by the 'global physicians' an urgent matter. This issue was taken up by the newly established Institute for International Medical Education (IIME). The IIME Core Committee developed the concept of 'global minimum essential requirements' (GMER) and defined a set of global minimum learning outcomes, which students of the medical schools must demonstrate at graduation. The 'Essentials' are grouped under seven broad educational domains with set of 60 learning objectives. Besides these 'global competencies', medical schools should add national and local requirements. The focus on student competences as outcomes of medical education should have deep implications for curricular content as well as the educational processes of medical schools.*

Introduction

The Board of Trustees of the China Medical Board of New York, Inc. approved a grant to establish the Institute for International Medical Education (IIME) on 9 June 1999. The Institute's task is to provide the leadership in defining the 'global minimum essential requirements' ('essentials') of undergraduate medical programs. These 'essentials' were to consist of the medical knowledge, clinical skills, professional attitudes, behavior and ethics that all physicians must have regardless of where they are trained.

The task of defining the 'global minimum essential requirements' was given to the Core Committee, which comprised international medical education experts from different parts of the world. The IIME Steering Committee, consisting of eight senior education and health policy experts with broad national and international experience, advises the leadership of the Institute and helps guide the Core Committee. Further advice is provided by the IIME Advisory Committee composed of Presidents or senior representatives of 14 major international organizations active in medical education. The Committee provides a forum for information exchange, advice and helps to ensure that other efforts are complementary and not contradictory to the IIME process.

It was understood from the beginning that defining such competencies or outcomes of the medical education process would have significant implications for medical school curricula. Medical school graduates should demonstrate professional competencies which will ensure that high quality care could be provided with empathy and respect for patients' well-being.

Graduates should be able to integrate management of illness and injury with health promotion and disease prevention and be able to work in multi-professional teams. In addition, they should be able to teach, advise and counsel patients, families and the public about health, illness, risk factors and healthy lifestyles. They should be able to adapt to changing a pattern of diseases, conditions and requirements of medical practice, medical information technology, scientific advances, and changing organization of health care delivery while upholding the highest standards of professional values and ethics.

The IIME Project Consists of Three Phases:

The first phase (Phase I) '**Defining Essentials**', began with the establishment of the Institute for International Medical Education. Its task was to develop a set of 'global minimum essential requirements' ('GMER') drawn in part from standards that currently exist. These standards were to include the sciences basic to medicine, clinical experiences, knowledge, skills, professional values, behavior and ethical values. These 'essentials' were to represent only the core of a medical curriculum since each country, region and medical school also has unique requirements that their individual curricula must address. Hence, each school's educational program will be different but all will possess the same core.

In the second phase(Phase II), the '**Experimental Implementation**' of the 'GMER' will be used to evaluate the graduates of the leading medical schools in China. The schools will use the evaluation methods that are consistent with their experience, and have to cover all seven domains and 60 learning outcomes, to identify the strengths and deficiencies eventually found in the schools participating in this experiment. Efforts then will be made to improve all areas of weakness before a second evaluation is made. If a school meets all of the 'Essentials', it will be certified accordingly.

In the third (Phase III), or '**Dissemination Phase**', the lessons learned and the process used will be modified and offered to the global medical education

community for its use. Hopefully the 'essentials' will serve as a tool for improving the quality of medical education and a foundation for an international assessment of medical education programs.

Background

Globalization forces are becoming increasingly evident in medical education. This is quite natural as medicine is a global profession and medical knowledge and research have traditionally crossed national boundaries. Physicians have also studied medicine and provided services in various countries of the world. Furthermore, human creativity demands that globalization includes activities in the intellectual and cultural domains. Various multilateral agreements and conventions are opening the doors to global mobility and encouraging the development of common educational standards, mutual recognition of qualifications, and certification processes by which professionals are allowed to practice their vocation.

Presently, there are about six millions physicians worldwide, serving over six billion inhabitants. They receive their education and training in over 1800 medical schools throughout the world. Although, at first glance, global medical curricula appear similar, their content varies greatly. While there have been a number of near-successful efforts to evaluate the process leading to the MD or its equivalent degree, few of these have focused on the outcomes of their educational effort. However, there has never been an attempt to define the core or minimal competencies that all physicians should possess at the completion of their medical school training and before they enter their specialty or postgraduate training. Finally, in some countries, there has been a proliferation of new medical schools without proper assurance of educational quality.

At the same time, health services and medical practice are undergoing profound changes forced by economic difficulties in financing healthcare systems. The increasing cost of health interventions and related cost-containment policies could threaten physician's humanism and values. As a result, there is a need to preserve the goals of social benefit and equity in the face of these increasing economic pressure and constraints.

Rapid advances are occurring in biomedical sciences, information technology and biotechnology. These advances present new ethical, social and legal challenges for the profession of medicine and call for preservation of a balance between science

and the art of medicine. An important task of medical education is to prepare future doctors to be able to adapt to the conditions of medical practice in a rapidly changing health care environment. The challenge before the medical education community is to use globalization as an instrument of opportunity to improve the quality of medical education and medical practice.

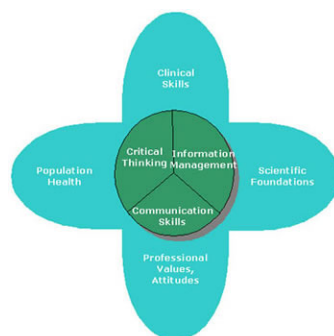
In defining the essential competencies that all physicians must have, an increasing emphasis needs to be placed on professionalism, social sciences, health economics and the management of information and the health care system. This must be done in the context of social and cultural characteristics of the different regions of the world. The exact methods and format for teaching may vary from school to school but the competencies required must be the same. Thus, the concept of 'essentials' does not imply a global uniformity of medical curricula and educational processes. Furthermore, the global essential requirements are not a threat to the fundamental principle that medical education has to identify and address the specific needs in social and cultural context where the physician is educated and will practice. Finally in pursuing the 'global minimum essential requirements', medical schools will adopt their own particular curriculum design, but in doing so, they must ensure that their graduates possess the core competencies envisioned in the minimum essentials. They must in short 'think globally and act locally.'

The Core Committee grouped the 'essentials' under following seven, broad educational outcome-competence domains shown in Figure 1:

Professional Values, Attitudes, Behavior and Ethics

Professionalism and ethical behavior are essential to the practice of medicine. Professionalism includes not only medical knowledge and skills but also the commitment to a set of shared values, the autonomy to set and enforce these values, and responsibilities to uphold them. The medical graduate must demonstrate:

Figure 1. Domains of global essential requirements



- recognition of the essential elements of the medical profession, including moral and ethical principles and legal responsibilities underlying the profession;
- professional values which include excellence, altruism, responsibility, compassion, empathy, accountability, honesty and integrity, and a commitment to scientific methods,
- an understanding that each physician has an obligation to promote, protect, and enhance these elements for the benefit of patients, the profession and society at large;
- recognition that good medical practice depends on mutual understanding and relationship between the doctor, the patient and the family with respect for patient's welfare, cultural diversity, beliefs and autonomy;
- an ability to apply the principles of moral reasoning and decision-making to conflicts within and between ethical, legal and professional issues including those raised by economic constraints, commercialization of health care, and scientific advances;
- self-regulation and a recognition of the need for continuous self-improvement with an awareness of personal limitations including limitations of one's medical knowledge;
- respect for colleagues and other health care professionals and the ability to foster a positive collaborative relationship with them;
- recognition of the moral obligation to provide end-of-life care, including palliation of symptoms;
- recognition of ethical and medical issues in patient documentation, plagiarism, confidentiality and ownership of intellectual property;
- ability to effectively plan and efficiently manage one's own time and activities to cope with uncertainty, and the ability to adapt to change;
- personal responsibility for the care of individual patients.

Scientific Foundation of Medicine

The graduate must possess the knowledge required for the solid scientific foundation of medicine and be able to apply this knowledge to solve medical problems. The graduate must understand the principles underlying medical decisions and actions, and be able to adapt to change with time and the context of his/her practice. In order to achieve these outcomes, the graduate must demonstrate a knowledge and understanding of:

- the normal structure and function of the body as a complex of adaptive biological system;
- abnormalities in body structure and function which occur in diseases;
- the normal and abnormal human behavior;
- important determinants and risk factors of health and illnesses and of interaction between man and his physical and social environment;
- the molecular, cellular, biochemical and physiological mechanisms that maintain the body's homeostasis;
- the human life cycle and effects of growth, development and aging upon the individual, family and community;
- the etiology and natural history of acute illnesses and chronic diseases;
- epidemiology, health economics and health management;
- the principles of drug action and its use, and efficacy of various therapies;
- relevant biochemical, pharmacological, surgical, psychological, social and other interventions in acute and chronic illness, in rehabilitation, and end-of-life care.

Communication skills

The physician should create an environment in which mutual learning occurs with

and among patients, their relatives, members of the healthcare team and colleagues, and the public through effective communication. To increase the likelihood of more appropriate medical decision making and patient satisfaction, the graduates must be able to:

- listen attentively to elicit and synthesize relevant information about all problems and understanding of their content;
- apply communication skills to facilitate understanding with patients and their families and to enable them to undertake decisions as equal partners;
- communicate effectively with colleagues, faculty, the community, other sectors and the media;
- interact with other professionals involved in patient care through effective teamwork;
- demonstrate basic skills and positive attitudes towards teaching others;
- demonstrate sensitivity to cultural and personal factors that improve interactions with patients and the community;
- communicate effectively both orally and in writing;
- create and maintain good medical records;
- synthesize and present information appropriate to the needs of the audience, and discuss achievable and acceptable plans of action that address issues of priority to the individual and community.

Clinical Skills The graduates must diagnose and manage the care of patients in an effective and efficient way. In order to do so, he/she must be able to:

- take an appropriate history including social issues such as occupational health;
- perform a physical and mental status examination;

- apply basic diagnostic and technical procedures, to analyze and interpret findings, and to define the nature of a problem;
- perform appropriate diagnostic and therapeutic strategies with the focus on life-saving procedures and applying principles of best evidence medicine;
- exercise clinical judgment to establish diagnoses and therapies;
- recognize immediate life-threatening conditions;
- manage common medical emergencies;
- manage patients in an effective, efficient and ethical manner including health promotion and disease prevention;
- evaluate health problems and advise patients taking into account physical, psychological, social and cultural factors;
- understand the appropriate utilization of human resources, diagnostic interventions, therapeutic modalities and health care facilities.

Population Health and Health Systems

Medical graduates should understand their role in protecting and promoting the health of a whole population and be able to take appropriate action. They should understand the principles of health systems organization and their economic and legislative foundations. They should also have a basic understanding of the efficient and effective management of the health care system. The graduates should be able to demonstrate:

- knowledge of important life-style, genetic, demographic, environmental, social, economic, psychological, and cultural determinants of health and illness of a population as a whole;
- knowledge of their role and ability to take appropriate action in disease, injury and accident prevention and protecting, maintaining and promoting the health of individuals, families and community;

- knowledge of international health status, of global trends in morbidity and mortality of chronic diseases of social significance, the impact of migration, trade, and environmental factors on health and the role of international health organizations;
- acceptance of the roles and responsibilities of other health and health related personnel in providing health care to individuals, populations and communities;
- an understanding of the need for collective responsibility for health promoting interventions which requires partnerships with the population served, and a multidisciplinary approach including the health care professions as well as intersectoral collaboration;
- an understanding of the basics of health systems including policies, organization, financing, cost-containment measures of rising health care costs, and principles of effective management of health care delivery;
- an understanding of the mechanisms that determine equity in access to health care, effectiveness, and quality of care;
- use of national, regional and local surveillance data as well as demography and epidemiology in health decisions;
- a willingness to accept leadership when needed and as appropriate in health issues.

Management of Information

The practice of medicine and management of a health system depends on the effective flow of knowledge and information. Advances in computing and communication technology have resulted in powerful tools for education and for information analysis and management. Therefore, graduates have to understand the capabilities and limitations of information technology and the management of knowledge, and be able to use it for medical problem solving and decision-making. The graduate should be able to:

- search, collect, organize and interpret health and biomedical information from

different databases and sources;

- retrieve patient-specific information from a clinical data system;
- use information and communication technology to assist in diagnostic, therapeutic and preventive measures, and for surveillance and monitoring health status;
- understand the application and limitations of information technology;
- maintain records of his/her practice for analysis and improvement.

Critical thinking and research The ability to critically evaluate existing knowledge, technology and information is necessary for solving problems, since physicians must continually acquire new scientific information and new skills if they are to remain competent. Good medical practice requires the ability to think scientifically and use scientific methods. The medical graduate should therefore be able to:

- demonstrate a critical approach, constructive skepticism, creativity and a research-oriented attitude in professional activities;
- understand the power and limitations of the scientific thinking based on information obtained from different sources in establishing the causation, treatment and prevention of disease;
- use personal judgments for analytical and critical problem solving and seek out information rather than to wait for it to be given;
- identify, formulate and solve patients' problems using scientific thinking and based on obtained and correlated information from different sources;
- understand the roles of complexity, uncertainty and probability in decisions in medical practice;
- formulate hypotheses, collect and critically evaluate data, for the solution of problems.

To retain and advance competencies acquired in medical school, graduates must be aware of their own limitations, the need for regularly repeated self-assessment, acceptance of peer evaluation and continuous undertaking of self-directed study. These personal development activities permit the continued acquisition and use of new knowledge and technologies throughout their professional careers.

The 'Essentials' alone are not likely to change graduates' competencies unless they are linked to evaluation of students' competencies. Therefore, assessment tools for the evaluation of educational outcomes are essential for the implementation of this document. This will ensure that graduates, wherever they are trained in the world, have similar core competencies at the start of further graduate medical education (specialty training) or when they begin to practice medicine under the appropriate, nationally determined supervision. Such tools are under development by the specially established IIME Task Force for Assessment.

The presented 'Global Minimum Essential Requirements' are considered an instrument for improvement of the quality of the medical education and indirectly of the medical practice. It is hoped that the IIME project will have significant influence on medical school curricula and educational processes, paving the road to the competence-oriented medical education.

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Minimum Essential Requirements and Standards in Medical Education

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SUMMARY *Increasing globalization of medicine and worldwide migration of physicians call for urgent definition of a set of global standards and requirements to guide medical education curricula. This article reviews the definition of standards in general, and proposes a definition of standards and global minimum essential requirements for use in medical education. They may serve as a tool for the improvement of quality and international comparisons of basic medical programs. Reviewing the use of medical standards worldwide, the China Medical Board established the Institute for International Medical Education (IIME). The IIME project is aimed at defining 'global minimum essential requirements' comprising sciences basic to medicine, clinical knowledge and skills, professional values, behavior and ethics of universal value. They represent only a portion of requirements since the curriculum of each country and medical school has to address its unique health and social needs. Finally, existing impediments and hesitation in use of international standards in medical education are presented.*

Introduction

On the dawn of a new millennium, the world is facing increasing globalization in different areas of our lives. We are observing an increasing migration of physicians from one country to another, and the rise of the 'global professional' qualified to provide services in any country of the world. This inevitably is giving way to an introduction of internationally accepted definitions, educational standards and requirements and professional values and behavior. However, the content of medical curricula, which is the foundation of undergraduate courses conducted in about 1600 medical schools worldwide vary from one school to another. Their content is mostly defined in terms of general objectives based on the consensus of academic teachers regarding requirements at the time of the final examinations. This results in a very different level of medical knowledge, skills and behavior acquired by graduates of medical schools from different countries with implications for the quality of health care delivered for over six billion inhabitants worldwide.

Consequently, we cannot neglect an urgent need for defining 'global essential

requirements and standards' that would specify the 'core' knowledge, skills, competencies, attitudes and behavior of the universal value to the practice of medicine. They should be incorporated in every medical curriculum as global requirements that would equip graduates, regardless of where they are educated, with similar universal competencies, thus securing proper quality of health care.

Globalization and International Standards

The global trend is to formulate international standards aimed at improving the quality of life for increasing numbers of people. There are already international standards for financial transactions and telecommunications, enabling people to communicate and transact business with each other. International standards are emerging in such areas as environmental protection, and food safety. Standards for data collection are enabling organizations such as the United Nations and the Organization for Economic Cooperation and Development (OECD) to develop common statistical measures and to make comparisons. There are also standards for human rights, bringing the pressure of world opinion on states that violate generally accepted standards of behavior.

Globalization is helping to produce a new vision of cooperation for common goals and specific advantages without precluding the local culture, language and various requirements responsive to local realities. Thus, the development of common international standards is progressing rapidly, especially in view of such international agreements as the North American Free Trade Agreement (NAFTA, 1993), and the World Trade Organization General Agreement on Trade in Services (GATS, 1994). These agreements are opening doors to global mobility and encouraging the development of common educational standards, mutual recognition, and the liberalization of processes by which, professionals are allowed to practice. Although higher education is not mentioned explicitly in NAFTA, it is nevertheless affected by Annex 1210.5, which calls for member countries to encourage to develop mutually acceptable standards for licensing professional service providers, and to provide recommendations on mutual recognition.

Standards: what does it mean?

Standards are developed because without them the life would be unpredictable, chaotic and often dangerous. Strict standards are used in construction of buildings, bridges, highways, and tunnels. Stringent security and maintenance standards are

essential in aviation, and pilots are expected to have passed appropriate tests. Proper governmental agencies are expected to develop standards to protect the quality of drinking water and food. Consumers expect pharmaceutical products to be safe and effective because they are checked against standards. When people see doctors, they expect professional conduct and assume that he or she has met the licensing standards for practicing medicine.

However, the term 'standard' means different things to the different people, and often is used interchangeably with 'objectives', 'outcomes' and 'goals'. Sometimes the word is used as a synonym for doing better in some nonspecific way such as "we should improve our standards", or "the standards are too low".

The dictionary definition of '*standard*' refers to "something set up and established by authority, custom or general consent as a model, example or rule for the measure of quantity, weight, extent, value, or quality". 'Standard' is also defined as a "criterion, gauge, yardstick, and touchstone" by which judgments or decisions may be made. Thus, the word 'standard' refers simultaneously to both 'model and example' and 'criterion or yardstick' for determining how well one's performance approximates the designed model. Thus, a standard is both a *goal* (what should be done) and a *measure of progress* toward that goal (how well it was done). Therefore to be meaningful, a standard should offer a realistic prospect of evaluation to measure whether anyone actually meets it. Without that, it has no practical value.

A standard may be *mandatory* (required by law), *voluntary* (established by professional organizations and available for use), or *de facto* (generally accepted by custom or convention way of dress, manners or behavior). It can be measured and enforced in a wide variety of ways.

Setting International Standards or Essential Requirements for Medical Education

The function of any standard is a transmission of information from those who have the knowledge to those who need and can use that knowledge. In the educational system, standards tell students what is expected of them to succeed in the school and professional life, and the assessment provides information about how well expectations have been met. Assessment also tells whether graduates truly possess the necessary knowledge and skills to start work or study further.

The first international standard in the field of education was developed in mathematics, where experts had to agree what should be taught and learned in their subject. This helped promote the development of standards in other areas of science. However, medical education is an area that lags behind others in this regard, in spite of the fact that most technical aspects of medicine, many aptitudes of physicians, and the essence of doctor-patient relationship are crossing national boundaries.

In view of very different meanings of 'standard', the following working definition of medical education standards might be proposed:

Standards in medical education are set up, by consent of experts or by decision of educational authority, as "model designs or formulations" related to different aspects of medical education, and presented in such way to make possible assessment of graduates performance in compliance with generally accepted professional requirements.

Three types of interrelated educational standards might be envisaged. First, the *content standards or curriculum standards* describe skills, knowledge, attitudes and values that teachers are supposed to 'teach' and students are expected to learn. Second, the *assessment or performance standards* define degrees of attainment of content standards and level of competencies in compliance with the professional requirements. Finally, the *process or opportunity-to-learn standards* define the availability of staff and other resources necessary for medical school students to meet the content and performance standards. In other words, the content standards define what is to be taught and learned, and performance standards describe how well it has been learned. The content standards, without performance standards, are meaningless. Similarly, opportunity-to-learn standards cannot stand on their own because without content and performance standards, it is not possible to assess whether the resources are effectively deployed.

The *content standards* of medical education can be defined as '*essential (core) requirements*' that undergraduate medical curriculum should provide to equip physicians with the knowledge, skills and attitudes necessary to start graduate medical education or specialty training or in some countries, practice medicine under specified supervision. From an international perspective, one can speak about the '*global minimum essential requirements*' or, briefly '*global minimum essentials*', which may be defined as follows:

The global minimum essential requirements specify the knowledge, skills and attitudes related to sciences basic to medicine, clinical practice and ethical values, which medical curriculum should contain to ensure that graduates are prepared to begin further graduate medical education or to start practice medicine under supervision.

The '*global minimum essential requirements*' may appear similar to a three-tiered cake composed of international, national, and medical school layers. The concept of the 'global minimum essential' does not imply uniformity of medical curriculum. Besides universal competencies required by physicians throughout a world, there are competencies specific to given settings and cultures where the physician will practice. Thus, setting global standards and requirements should not be considered a threat to the fundamental principle that medical education has to address the specific needs in a given social and cultural context. The standards and essential requirements should serve as guidance - not as directives - and there should be enough leeway in their implementation to permit continual revision and improvement.

Some of the present-day art and science of medicine is essential for the medical practice, and as such will certainly endure fast progress in science and technology, being of universal value and application. Such essential elements should be incorporated into every medical curriculum. These international standards should be used as a starting point when building up national or medical school standards specific to local needs. Whether standards are international or national, teachers should adapt and modify them to take advantage of current events. The faculty of each medical school, working with the school's dean, is responsible for determining the learning objectives and specifying the curriculum for the school's educational program including the methods of assessment of students to demonstrate the acquired professional competencies. The provision for special study modules may create diversity between medical schools and between individual graduates. The medical schools should follow the motto '*think globally and act locally.*'

However, standards alone are not likely to change anyone's behavior and expectations. Whether developed at the international or national level, standards must be linked to student tests; for the standards to matter to teachers and students, the tests must be based on the standards. If the two are linked, both teachers and students will know what the test is likely to cover, and both will know that what is taught counts. When a nation announces standards but continues to use old tests, then of course the new standards will be ignored. If the standards

form the basis for the nation's testing program, they will not be ignored.

If national standards meet global standards, then all schools of medicine which are accredited by the national organization would be accepted as meeting the global standards of the future global accrediting system.

Medical standards in use: the world's overview

In the United States, the National Board of Medical Examiners (NBME) was established in 1915. With the central office located in Philadelphia, the NBME guarantees equal standards for medical doctors graduating from all 125 medical schools, and assures portability of qualifications within the United States. That examination is a prerequisite for licensure in the fifty states and recently also for foreign medical graduates. Graduates from medical schools outside of the United States, Canada and Puerto Rico, are recognized by the Educational Commission for Foreign Medical Graduates (ECFMG), and its certificate allows foreign graduates to work as members of the U.S. medical profession. Since 1993, the Federation of State Medical Boards and the National Board of Medical Examiners have established a new single, three-step examination for medical licensure. It is designed to assess a physician's ability to apply knowledge, concepts, and principles that are important in health and diseases which constitute the basis of patient care.

In Mexico, the National Committee on Accreditation has recently begun the process of accreditation in a few medical schools with support of U.S. Liaison Committee on Medical Education.

In Europe, medical education has been challenged by political changes brought about by the Maastricht Agreement (1993) and the establishment of the European Union (UE) free labor market agreements. This resulted in the increased migration of doctors between the member states. However, the first agreement on mobility of medical doctors was established in 1965 between five Nordic countries. In June 1975, the European Economic Community, now the European Union, issued a Directive on the free movement of medical doctors and the initial recognition of their diplomas and certificates. This Directive has opened up a free movement of medical doctors primarily between nine States. In 1992, EFTA countries were also included and presently free movement is taking place among 18 Member States. This political decision was based on the assumption of comparability of standards of medical education in the member countries. Therefore, the specified

requirements were very formal and requested only a minimum of 6 years' duration or 5500 hours of basic and clinical sciences and training during undergraduate curriculum at the medical school. Established in 1975, the Advisory Committee on Medical Training (ACMT) has been entrusted with a task of ensuring high standards of medical education in the member states. It has produced a number of reports and recommendations. Without any administrative power, but using indirect influence they have contributed to diminishing the traditional differences between Northern and Southern Europe and to improving the quality of medical education.

In view of the forthcoming challenge of integration of new members from Central and Eastern Europe into the European Union requirements, interest in the introduction of mutual requirements and standards in medical education with attempts for the accreditation of medical programs may grow.

In Great Britain, the report of the Education Committee of the General Medical Council issued in December 1993 made an attempt to reduce curriculum overload by revising the standards of undergraduate medical education, and indicated how most effectively to revise the medical curriculum framework. The report recommended that medical schools should move away from the traditional, all-embracing curriculum and strive towards a more modern twofold approach. Undergraduate students must adhere to a rigorously defined 'core curriculum' which defines the requirements needed to equip them with the essential skills that must be met before assuming the responsibilities of a pre-registration doctor. Students are given the opportunity to pursue 'special study modules' in areas of particular interest to them. The core and special study modules are strictly assessed.

In Australia, the Accreditation Committee of the Australian Medical Council (AMC) established in 1985, has been entrusted with developing criteria for accreditation and all matters related to assessment and accreditation of the medical schools. Since 1991, Australian Health Ministry requires that all medical practitioners in Australia receive unconditional registration in any state or territory of the Commonwealth, if graduated from an Australian or New Zealand medical school, or to hold certificate of the Australian Medical Council. Prior to the establishment of the Accreditation Committee, medical education recommendations of the General Medical Council of the UK were used.

In Latin America, since the 1960s, the 'Alliance for Progress' fostered collaboration

between South and North American medical institutions with impact on the improvement of medical education. A new immigration law introduced in the United States in 1977 created major obstacles to the influx of medical students from Latin America. Today, the quality of medical education in Latin American countries varies from excellent to poor. The Pan American Federation of Association of Medical Schools (PAFAMS), established in 1962, and the National Associations of Medical Schools have made attempts to develop accreditation standards for Latin American states. With the advent of MERCOSUL (cooperation among Brazil, Paraguay, Uruguay, and Argentina), physicians are being trained more according to the standards developed at least for South America.

In Asia, the situation differs from country to country. In China, there is recognition of the necessity to modernize medical education; however, only several medical universities have adopted innovations in the form of pilot projects and most medical schools continue a 'teacher-centered' curriculum. Very recently, an effort has been made to modernize the medical education process and the national accreditation system for medical schools programs has been introduced. In Malaysia, there are attempts to develop an accreditation system of medical schools based on the experiences of the United States Liaison Committee on Medical Education.

The World Federation for Medical Education (WFME), from its inception, has been involved in the improvement of medical education. Recently, it has begun the effort of developing globally accepted international standards to be used for the assessment of medical schools. A meeting of a group of international experts in medical education took place in Copenhagen in October 1999, and the report of this Working Group on defined 'International Standards in Basic Medical Education' is to be published soon. The World Federation plans to organize a series of conferences and workshops devoted to the implementation of these standards as a tool for international assessment and accreditation of medical schools.

The Institute for International Medical Education (IIME), established in 1999 by the China Medical Board of New York, has undertaken the task of providing leadership in defining 'global minimum essential requirements' of undergraduate medical programs. The project consists of three phases. Phase I started immediately with the creation of the Institute. Information on various aspects of medical education has been collected, and a Core Committee has been established consisting of experienced experts in international medical education, to begin the process of defining 'global minimum essential requirements' that every medical school should

provide. These 'essentials' include the sciences basic to medicine, clinical knowledge and skills, and professional values, behavior and ethics of universal significance. They represent only a portion of the educational content of the medical curriculum since each country, region and medical school will have unique needs and requirements that the curriculum must also address. How these are taught or conveyed may differ with each medical school. Once a consensus is reached, these 'essentials' will be tested in several selected medical schools (Phase II). With successful employment and lessons learned, the process used in the first two phases will be modified (Phase III) and offered to the global academic community for further testing as a tool for improving the quality of medical education and of health care. It may provide an acceptable basis to be used for the process of international evaluation and accreditation of medical programs.

The IIME Core Committee is further guided by a Steering Committee consisting of eight senior education and health policy experts with broad national and international experience. In addition, further oversight is provided through an Advisory Committee composed of 14 presidents or senior representatives from major international educational organizations interested and active in medical education. The Advisory Committee will provide an important forum for information exchange, advice and assistance to avoid duplication of similar efforts by different institutions. Thus, setting the 'global minimum essential requirements' should not be considered a threat to the fundamental principle that medical education has to address the specific needs in a given social and cultural context where the physician is educated and will practice.

All of the above mentioned events and activities indicate a growing awareness of the process of globalization of medical education. Also in the circle of world medical experts, there is a rapidly growing understanding of the urgent need for the development of 'global minimum essential requirements and standards' in medical education that may be tested and available worldwide.

Hesitations and impediments

Much anxiety surrounds the misconception that 'international standard' in medical education equals **uniformity or a common curriculum**. **It is quite clear that no one in the academic world would accept any compulsory compliance with rigid rules.** The basic issue is to identify what is global and what is local, clearly stating the difference between **globalization and uniformity**.

Some global issues can be immediately identified as common ground. Obviously, the scientific basis of disease processes, the human genome, the molecular basis of disease, population (public) health, principles for practice of medicine, professional behavior and ethics or the development of habits using knowledge to produce more knowledge are truly global. The exchange of medical information is already global through the Internet, which makes all information available to the entire world. Other global issues have to be formulated after screening out curricula of medical schools around the world to evaluate the outcomes by the quality of medical care delivered.

Many educators negatively associate standards with standardized multiple-choice tests. However, standardized tests are only one of many other means of measuring progress toward external standards such as practical examination of performance or practical demonstrations of competencies, which have been acquired during studies.

The most controversial issue regarding standards is how they are going to be developed and enforced and by whom; will such standards be mandatory, voluntary, or *de facto*? There is fairly general agreement that content and performance standards should be voluntary and not mandatory, and that they should be created by professional associations of teachers and scholars, free of political interference.

However, the greatest impediments are the disparate resources available in different part of the world, and the different cultural context in which medicine is to be practiced. Therefore, it is important to try to indicate what should be considered global and what local, where the commonality lies, and what is already global in medical education. It is clear that process of globalization of medical education will be incremental, long and arduous. It is also clear that as the different stakeholders in medical education have varying expectations, the development of international essential requirements and standards is a matter of the negotiations necessary to reach consensus. This also will require time.

Thus, we can no longer ignore the urgent need for the development of international essential requirements and standards in education. If we do not proceed with a constructive approach guided by the knowledge and experience of medical education experts from around the world, administrative approaches may begin to dominate with possible inconsistencies and inadequacies in meeting educational

and changing societal needs. The very promising news is that many top medical educators are ready to contribute to this dialogue, believing that the outcomes could be most rewarding.

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The Assessment of Global Minimum Essential Requirements in Medical Education

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Based on the Work of the IIME Task Force for Assessment

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Summary

Using an international network of experts in medical education, the Institute for International Medical Education (IIME) developed the "Global Minimum Essential Requirements" ("GMER") as a set of competency-based outcomes for graduating students. To establish a set of tools to evaluate these competencies, the IIME then convened a Task Force of international experts on assessment that reviewed the "GMER". After screening seventy-five (75) potential assessment tools, they identified three (3) that could be used most effectively. Of the sixty (60) competencies envisaged in the "GMER", thirty-six (36) can be assessed using a 150-item multiple-choice question (MCQ) examination, 15 by using a 15-station Objective Structured Clinical Examination (OSCE) exam, and 17 by using a 15-item faculty observation form. In cooperation with eight (8) leading medical schools in China, the MCQ, OSCE, and Faculty Observation Form were developed to be used in an assessment programme that is scheduled to be given to all 7-year students in October 2003.

"Practice Points"

This educational experiment indicates that it is possible to obtain agreement among international experts in medical education on a set of global medical competences and the means to assess them in medical graduates. The results of this pilot assessment can be used as part of a process to ensure the quality of medical schools worldwide.

Introduction

Physicians are members of a profession that is globally identifiable. However, such a profession is not sustainable without a set of core competencies that define a physician, regardless of the site of training or practice. In 1999, the China Medical Board of New York established the "**Institute for International Medical Education**" ("**IIME**") to define the minimum essential competencies that all graduates worldwide must possess if they wish to be called a physician. These minimum educational requirements were intended to form a core of outcome standards for pre-specialty medical education internationally.

This initiative has taken the form of three Phases that include following:

- **Phase I:** Definition of the global minimum essential requirements ("GMER") and methods to evaluate them
- **Phase II:** Assessment of a sample of China's leading medical schools using the "essentials" from Phase I as a reference for the evaluation
- **Phase III:** Sharing the results of Phases I and II with the global community of medical educators.

Phase I of the IIME Project has been completed, and the "GMER" have been defined by an international committee of expert medical educators. This "Core Committee" chose to define the minimum essentials in the form of competencies which were looked upon as outcomes of medical education. These competencies fall into seven domains:

- 1) professional values, attitudes, behavior and ethics
- 2) scientific foundation of medicine
- 3) clinical skills
- 4) communication skills
- 5) population health and health systems
- 6) management of information
- 7) critical thinking and research

The selection of these seven domains as priority areas was based on the conviction

of committee members that they are of the crucial importance for practicing medicine in the 21st Century. Consensus was also reached on a set of global attributes to meet society's expectations in the practice of medicine. The document represents only the core requirements, since each country, region and medical school also have unique requirements that their curricula must address. Hence, each school's educational program might be different but at the core, they should all be the same (Core Committee 2002).

The "Global Minimum Essential Requirements" ("GMER") provide a set of learning outcomes for graduates of medical schools. However, the "Essentials" alone are not likely to change graduates' competencies unless they are linked to the process of evaluation. Hence, of equal, if not greater importance to defining the "GMER" was determining whether students possess these competencies at the time they complete their general medical education. In short, how can these outcomes of medical education be assessed? This paper will report on the assessment methods that will be used in the IIME Project.

The Assessment Task Force

The assessment of competencies envisioned in this project poses new challenges for medical education. Educators have commonly evaluated some competencies of medical students (e.g., history taking and clinical skills) but have rarely attempted to evaluate the entire spectrum of expected outcomes of the medical education experience, and never across multiple schools simultaneously.

To do this, the IIME assembled a Task Force made up of experts in medical education evaluation (See Annex 1) and entrusted them with the task of recommending the tools that should be used in the evaluation of the "GMER" in a developing country in multiple schools simultaneously. The Task Force on Assessment thus established a set of general principles of assessment for the purposes of this project and a matrix of recommended assessment tools for each component of the "GMER". The information and recommendations included in this document are a consensus of the opinion and ideas of the members of the Task Force.

General Principles of Assessment

Prior to assigning specific assessment tools to domains of competence, the Task

Force deliberated on a set of general principles of assessment. These principles included the concepts that assessment should ideally support the desired outcomes of medical education, that assessments should be developed in cooperation with the target schools, and that assessments are best made within the context of what outcomes will be expected. Such guiding principles guarantee that the tools developed will be both relevant and not counterproductive to the overall educational effort.

In addition to these general principles, the IIME project is focused on measuring the best possible outcomes of education at the medical school level, rather than the individual student level. For this reason, the Task Force agreed that assessment at the exit point (medical school graduation) is preferred, understanding that some assessments will be made over a period of time and submitted upon exiting from medical school. This principle ensures that graduates are departing with these competencies, rather than measuring some intermediate competency. For example, while knowledge of basic principles of pathophysiology may be necessary to understand and manage diabetic nephropathy, it is the latter condition that constitutes the measurement outcome of interest for this project.

An assumption of this work is that the assessment of curriculum can be achieved by sampling the medical student "outcomes" from an individual medical school. In that way, while medical students are the medical education "outcome" of interest for this project, each student constitutes a sample of the effect of the educational experience including the curriculum. The implications of this principle is that not all students would necessarily need to be evaluated on every domain, thereby providing an opportunity, though not the necessity, for cost-savings. In addition, the Task Force concluded that the measurement of different outcome competencies could be made by assessing different students and the results amalgamated for a snapshot of an entire school's educational success.

Because there are some domains for which there is no one, single, best assessment tool, it is likely that the triangulation of assessment methods may be necessary. For example, the assessment of communication skills might be evaluated through the use of multiple choice questions, a standardized patient/OSCE experience, and through the use of faculty observations of student behavior in clinical care situations. Although it should be clear from use of the term "outcome assessment," and from the overall intent of the IIME project, that the outcomes themselves are expected to be criterion-rather than

norm-referenced. There is a core foundation of knowledge, skills, and behaviors expected of physicians internationally, and the standard for these elements should not be influenced by the average competency of graduating students, but rather, by expectations of the educators.

Grouping of Requirements by Assessment Tool

Having determined the purpose and philosophy of this evaluation project, the Task Force identified the measurement methods that would be congruent with the expected competencies. The choice of measurement methods and construction of measurement instruments is a crucial step in the evaluation process because it provides the link between student performance and expected outcomes. If the assessment methods are inappropriate, or if there is imbalance between theoretical knowledge assessment and clinical assessment, unfortunate learning consequences for students and curriculum may occur. Equally importantly, if the assessments are of low quality, wrong decisions could be made which might be detrimental to the future of the students or to the welfare of the community.

From the beginning of the evaluation process, it was abundantly clear that the sixty "GMER" learning objectives could be evaluated using many different assessment tools. The specific purpose of the Task Force was to propose a limited number of tools that are both economically feasible and educationally adequate for the task of assessing the "GMER". The assessments which will be used may not be the best or the only methods of assessing each competency, but it is hoped that they provide a credible framework on which a program of assessment could be developed.

In a brainstorming session, the Task Force imagined over seventy (70) different tools that could be used for this project. This list was narrowed to three based on: 1) the established reliability and validity of the tool; 2) the practicality for implementing the assessment at multiple sites; and 3) the cost. While the tools not chosen were felt to be both feasible and adequate for the task of assessing the "GMER", the three chosen best met the criteria established for Phase II of the project. However, it was understood and accepted that the three tools could be replaced by others as the technology and science of assessment evolves and develops.

The three assessment tools for this project are: 1) a Multiple-Choice written examination (MCQ), 2) an Objective Structured Clinical Examination (OSCE) using

patient and bench simulations with post-interaction exercises, and 3) Observer (faculty, peer, nurse, or patient) ratings of performance and Logbook of students' learning experiences. Of the sixty (60) "GMER", 36 can be assessed by MCQ, 17 by OSCE, 14 by observer ratings, and 4 by logbooks. Included in this enumeration are seven items that are to be assessed by both MCQ and OSCE, one by MCQ and observer rating, one by MCQ and Logbook, and two by OSCE and Logbook. The sixty (60) "GMER" are listed in Tables 1-4, categorized by the assessment tool identified as most appropriate. Figure 1 provides a depiction of the percentage of each "GMER" domain assessed by each tool.

Phase II of the IIME Project

Eight leading medical schools in China have sent delegates to three workshops in preparation for Phase II of the project, i.e. the assessment of competencies. Each school has a representative who is charged with leading the implementation of Phase II scheduled for October 2003, and each of these leaders is working in their home institution to develop the assessment team necessary to complete this evaluation. This project is the largest simultaneous, identical outcome assessment of multiple schools project ever attempted. It opens a new era of educational accountability for medical schools, and helps to ensure that the quality of physicians worldwide meets a global standard for excellence.

Discussion

It was understood from the beginning that defining and assessing outcomes in medical education would have significant implications for medical school curricula. Although the project will evaluate students, the IIME will aggregate student results to provide individual schools with data about its relative strengths and weaknesses. This report can then be reviewed by medical educators to alter the learning experiences they provide. Prior to a repeat evaluation, schools would be expected to improve areas of weakness, and share areas of strength with other schools. If a school meets all of the essential requirements, they will be certified as having done so by the IIME. This is intended to be an iterative process of continuous improvement based upon the experiences gained through the evaluation itself.

The IIME activity is a developing, living process, guided by the input and ideas of worldwide medical education experts. The "GMER" are intended as a starting point

which future generations of physicians can (and should) adapt and improve as the practice of medicine, the science upon which it is based and educational theory and technology improves. For example, the current "GMER" domain "*Management of Information*," is a competency that few would have identified prior to the information revolution of the late 20th Century. Similarly, the process of assessment underway in China is not the gold standard for all time. Instead, as assessment technology changes and as existing tools become more feasible, this process of evaluation may be altered. In recent years, the development of new assessment methods such as the Objective Structured Clinical Examination (OSCE), the portfolio approach, standardized patient examinations, and computer case simulations have permitted us to assess the competences envisaged in the "GMER". While assessment tools may change over time, what will not change is the insistence that only the best available and feasible tools be used to evaluate the "GMER" outcomes.

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The above references were selected from a very extensive literature list on assessment in education as particularly useful and relevant for understanding the scope of IIME project and planning its evaluation program.

Annex 2

**Table 1. GMER Items assessed by multiple-choice examination (n = 36)
Professional Values, Attitudes, Behaviors and Ethics (n = 6/11) ***

- Recognition of the essential elements of the medical profession, including moral and ethical principles and legal responsibilities underlying the profession
- An understanding that each physician has an obligation to promote, protect, and enhance these elements for benefit of patients, the profession and society at large
- Recognition that good medical practice depends on a mutual understanding and relationship between the doctor, the patient and the family with respect for patient's welfare, cultural diversity, beliefs and autonomy

- An ability to apply the principles of moral reasoning and decision-making to conflicts within and between ethical, legal and professional issues including those raised by economic constraints, commercialization of health care, and scientific advances
- Recognition of the moral obligation to provide end of life care, including palliation of symptoms
- Recognition of ethical and medical issues in patient's documentation, plagiarism, confidentiality and ownership of intellectual property

Scientific Foundation of Medicine (n = 10/10)

- The normal structure and function of the body as a complex of adaptive biological system
- Abnormalities in body structure and function which occur in diseases
- The normal and abnormal human behavior
- Important determinants and risk factors of health and illnesses and of interaction between man and his physical and social environment
- Molecular, cellular, biochemical and physiological mechanisms that maintain the body's homeostasis
- The human life cycle and effects of growth, development and aging upon the individual, family and community
- The etiology and natural history of acute illnesses and chronic diseases
- Epidemiology, health economics and health management
- The principles of drug action and its use, and efficacy of various therapies
- Relevant biochemical, pharmacological, surgical, psychological, social and other interventions in acute and chronic illness, in rehabilitation, and end-of-life care.

Communication Skills (n = 2/9)

- Apply communication skills to facilitate understanding with patients and their families and to enable them to undertake decisions as equal partners
- Communicate effectively both orally and in writing

Clinical Skills (n = 7/10)

- Apply basic diagnostic and technical procedures, to analyze and interpret findings, and to define the nature of a problem
- Exercise clinical judgment to establish diagnoses and therapies
- Recognize immediate life threatening conditions
- Manage the common medical emergencies
- Manage of patients including health promotion and disease prevention in an effective, efficient and ethical manner the care of patients including health promotion and disease prevention
- Evaluate health problems and advise patients taking into account of physical, psychological, social and cultural factors
- Understand appropriate utilization of human resources, diagnostic interventions, therapeutic modalities and health care facilities

Population Health and Health Systems (n = 7/9)

- Knowledge of important life-style, genetic, demographic, environmental, social, economic, psychological, and cultural determinants of health and illness of a population as a whole
- Knowledge of their role and ability to take appropriate action in disease, injury and accident prevention and protecting, maintaining and promoting the health of individuals, families and community
- Knowledge of international health status, of global trends in morbidity and mortality of chronic diseases of social significance, the impact of migration, trade, and environmental factors on health and the role of international health organizations
- Understanding the need for collective responsibility for health promoting interventions which requires partnership with the population served, and a multidisciplinary approach including the health care professions as well as intersectoral collaboration
- An understanding of the basics of health systems including policies, organization, financing, cost-containment measures of rising health care costs, and principles of effective management of health care delivery
- An understanding of the mechanisms that determine equity in access to health care, effectiveness, and quality of care

- The use of national, regional and local surveillance data as well as demography and epidemiology in health decisions

Critical Thinking and Research (n = 4/6)

- Understand the power and limitations of the scientific method including accuracy and validity of scientific information in establishing the causation, treatment and prevention of disease including
- Identify, formulate and solve patients' problems using scientific thinking and based on obtained and correlated information from different sources
- Understand the role of complexity, uncertainty and probability in decisions in medical practice
- Formulate hypotheses, collect and critically evaluate data for the solution of problems.

* n = number to be assessed out of total competencies in each domain, e.g.; 14/17 would mean 14 assessed by this method out of a total 17 competencies in this domain.

Table 2: GMER items assessed by OSCE (n = 17)

Communication Skills (n = 5/9)

- Listen attentively to elicit and synthesize relevant information about all problems and understanding of their content
- Apply communication skills to facilitate understanding with patients and their families and to enable them to undertake decisions as equal partners
- Demonstrate sensitivity to cultural and personal factors that improve interactions with patients and the community
- Communicate effectively both orally and in writing
- Synthesize and present information appropriate to the needs of the audience, and discuss achievable and acceptable plans of action that address issues of priority to the individual and community.

Clinical Skills (n = 7/10)

- Take an appropriate history including social issues such as occupational health
- Perform a complete physical and mental status examination
- Perform appropriate diagnostic and therapeutic strategy with focus on life saving procedures applying principles of best evidence medicine
- Recognize immediate life threatening conditions
- Manage the common medical emergencies
- Manage of patients including health promotion and disease prevention in an effective, efficient and ethical manner the care of patients including health promotion and disease prevention
- Evaluate health problems and advise patients taking into account of physical, psychological, social and cultural factors

Management of Information (n = 4/5)

- Search, collect, organize and interpret health and biomedical information from different databases and sources
- Retrieve patient-specific information from a clinical data system
- Use information and communication technology to assist in diagnostic, therapeutic and preventive measures, and for surveillance and monitoring health status
- Understand application and limitations of information technology

Critical Thinking and Research (n = 1/6)

- Formulate hypotheses, collect and critically evaluate data for the solution of problems.

Table 3: GMER items assessed by observer ratings (n=14)

Professional Values, Attitudes, Behaviors and Ethics (n = 5/11)

- Professional values which include excellence, altruism, responsibility, compassion, empathy, accountability, honesty and integrity, and a commitment to scientific methods
- Self-regulation and a recognition of the need for continuous self-improvement with an awareness of personal limitations including limitations of one's medical knowledge
- Respect for colleagues and other health care professionals and the ability to foster a positive collaborative relationship with them
- Ability to effectively plan and efficiently manage one's own time and activities to cope with uncertainty, and the ability to adapt to change
- Personal responsibility for the care of individual patient.

Communication Skills (n = 4/9)

- Communicate with colleagues, faculty, the community, other sectors and the media
- Interact with other professionals involved in patient care through effective teamwork
- Demonstrate basic skills and positive attitudes towards teaching others
- Create and maintain good medical records

Population Health and Health Systems (n = 3/9)

- Knowledge of their role and ability to take appropriate action in disease, injury and accident prevention and protecting, maintaining and promoting the health of individuals, families and community
- An acceptance of the roles and responsibilities of other health and health related personnel in providing health care to individuals, populations and communities
- Willingness to accept leadership when needed and as appropriate in health issues.

Critical Thinking and Research (n = 2/6)

- Demonstrate a critical approach, constructive skepticism, resourcefulness, and a research-oriented attitude in professional activities
- Use personal judgments for analytical and critical problem solving and seek out information rather than to wait to be given

Table 4: GMER items assessed by logbook (n=4)

Clinical Skills (n = 2/10)

- Apply basic diagnostic and technical procedures, to analyze and interpret findings, and to define the nature of a problem
- Perform appropriate diagnostic and therapeutic strategy with focus on life saving procedures applying principles of best evidence medicine

Management of Information (n = 2/5)

- Use information and communication technology to assist in diagnostic, therapeutic and preventive measures, and for surveillance and monitoring health status
- Maintain records of own practice for analysis and improvement

Figure 1: Percentage of Each GMER Domain Assessed by Test Type*

(*Totals more than 100% per domain as some GMER items are assessed by multiple testing types)

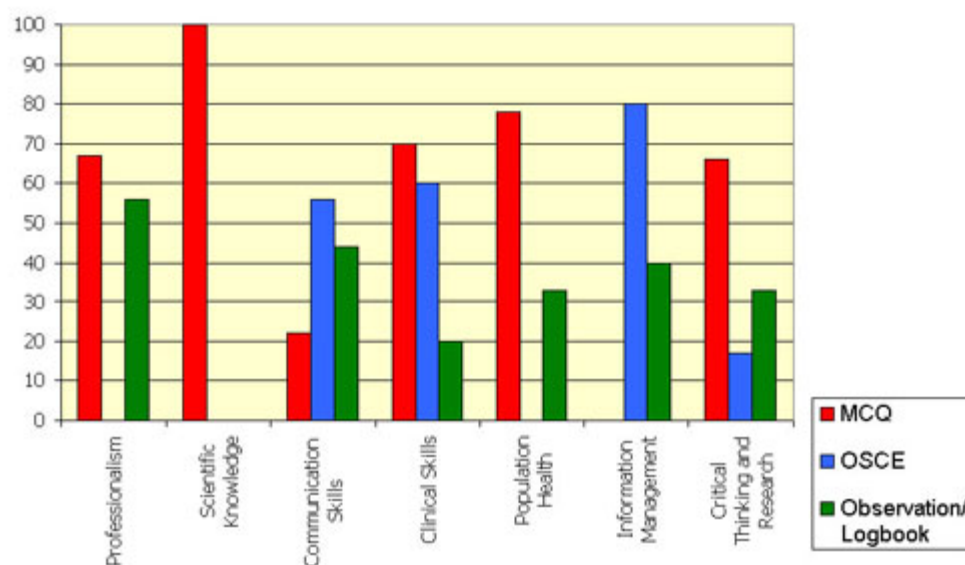
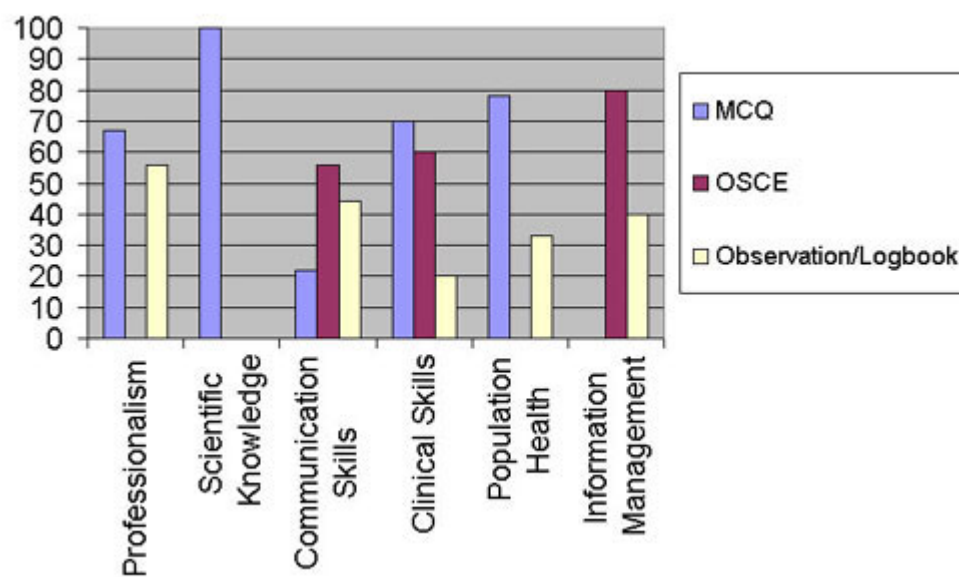


Figure 2: Percentage of Each GMER Domain Assessed by Test Type*

(*Totals more than 100% per domain as some GMER items are assessed by multiple testing types)



Global minimum essential requirements: a road towards competence-oriented medical education

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SUMMARY

With the growing globalization of medicine and the emerging concept of a 'global profession of physicians', the issue of the essential competences that all physicians must possess becomes sharply focused. If defined, these competences would help indicate what teachers are supposed to teach, what students are expected to learn and what educational experiences all physicians must have. The 'minimum essential competences' that all graduates must have if they wish to be called physicians were identified by the Institute for International Medical Education (IIME), sponsored by the China Medical Board of New York, through working groups of educational and health policy experts and representatives of major international medical education organizations. In the first phase of the project, seven domains have been identified that define the knowledge, skills, professional behavior and ethics that all physicians must have, regardless of where they received their general medical training. Appropriate tools to assess each of the domains have been identified. In the second phase of the project the 'global minimum essential requirements' (GMER) will be implemented experimentally in a number of Chinese medical schools. The aim of the third phase will be to share the outcomes of this educational experiment, aimed at improving the quality of medical education, with the global education community.

Introduction

Physicians are now members of a global community. Created by interlocking economies, a global language, the informatics revolution and rapid travel, globalization has penetrated all aspects of human existence including science, public health, the environment, law, security and religion. Medicine will not be left untouched by those forces and will at a minimum be required to address the question 'What kind of physician does this global village require?'

This development is quite natural, as medicine has always considered itself to be a global profession and medical knowledge, research and education have traditionally crossed national boundaries. Furthermore, many aptitudes of physicians are

universal, such as the doctor-patient relationship. This relationship, with its implied obligations by the physician and the patient, does not vary by time or place and it is a universal part of any good medical education program (Schwarz, 2001).

During the past decade, various multilateral trade agreements and commercial conventions have pointed to the time when a freer flow of physicians across international boundaries will occur. This development has pushed medical leaders in various countries to look at their educational programs, qualifications standards and certification processes through new, 'global' glasses. Often, new multinational agreements have emerged from this analysis. For example, Mercado Común del CONO SUR (MERCOSUR) -- the southern Common Market, an agreement between Brazil, Paraguay, Uruguay and Argentina -- addresses the need for physicians for a single continent. Furthermore, the Treaty of Rome declared that all professional services, including that of doctors, would be freely exchangeable.

International standards are emerging as the way to secure compatibility of different areas of people's lives across international boundaries. International standards already exist for financial transactions and telecommunications, enabling people to communicate and transact business with each other internationally. They are also emerging in such areas as environmental protection, food safety and the pharmaceutical industry. Medical education will not escape this movement, in large part because when Western people see doctors in countries other than their own, they expect the same professional conduct and assume the same level of expertise as they would find in their physicians 'at home'. It follows that medical education institutions in the foreign countries will also be expected to produce graduates that meet these minimum expectations.

Over the past few years, several national and international groups have proposed recommendations to improve the quality of international medical education and adapt it to the rapidly changing global situation. However, most of these efforts have not received proper international or national recognition. One such important initiative was a meeting organized jointly by the World Health Organization (WHO) and the Educational Commission for Foreign Medical Graduates (ECFMG) in 1994 in Geneva. This meeting brought together 28 experts from 20 countries to discuss the topic: 'Toward a Global Consensus on Quality Medical Education: Serving the Needs of Populations and Individuals'. The focus of this conference was undergraduate medical education, which laid the foundation for future professional life. Undergraduate medical education is the first step and in many ways the most

important part of the three-part medical education continuum. At the conference, there was agreement that since many competences required by physicians across the world were identical, the goal of producing global medical education standards would be fully justified. It was agreed that besides general core competences such as a knowledge of the sciences basic to medicine and clinical skills there are other competences specific to medicine such as the ability to communicate effectively, teamwork, critical reasoning, ethics, self-assessment and self-directed learning.

The concluding remarks were made by the lead author of this paper, M. Roy Schwarz, MD, who at that time served as Senior Executive Vice-President of the American Medical Association. Reviewing the changes in global economics, telecommunication and informatics, international travel and various trade agreements among the nations and regions, a vision was presented of medicine and medical education in the next century. Indicating the growing global cooperation in medical research, public health and medical education, and stressing views expressed during the past days' discussions, he predicted the emergence of the 'global physician' who should possess universal core competences required for medical practice throughout the world. He has also considered, as an unavoidable future development, a process of international certification of physicians based on these universal core competences and an international accreditation of medical schools. Since a global profession cannot be a reality without a set of core competences that define what a physician is, regardless of where he/she is trained, he suggested that a process be put in place, including the formation of an international expert group to develop global recommendations on the core competences, core curriculum, and evaluation methods. Despite the lack of an immediate response to this plea, the changes that have occurred since this conference increase the desirability of defining the meaning of being a physician in a global community (World Health Organization/Education Commission for Foreign Medical Graduates, 1995).

In the meantime, the WHO, which for a long time was active in all efforts aimed at improving the quality of medical education, has shifted its interest and support to other health areas. More recently, a very active role on the international education scene was undertaken by the Association for Medical Education in Europe (AMEE) in the form of a global forum for research. This forum has led to many innovative initiatives in medical education. In addition, in late 1999, the World Federation of Medical Education (WFME) started to develop a set of standards to be used for the global accreditation of medical schools (World Federation for Medical Education

Task Force, 2000). This set of international standards addressed the *process* of medical education and focused on the structure and function of medical schools, including educational procedures, duration of programs, facilities, number of staff available for instruction, and other resources necessary to provide educational experiences for students. Such process standards have been used for years by the US Liaison Committee on Medical Education for the accreditation of the medical schools in the United States and Canada and have also been adopted for use in a small number of other countries.

Although the proper admissions policies, a relevant curriculum, competent teachers and essential educational facilities are necessary for a quality education, these elements alone do not guarantee that graduates will have acquired the competences necessary for high-quality medical practice. In short, a medical school could meet accreditation requirements without educating graduates who are necessarily competent in all the desirable areas. In part, this is because the minimal competences that every student should have at the end of medical school training have not been defined nor have the proper methods been developed to assess whether these competences have been acquired by the graduates.

With the growing globalization of medicine and the emerging concept of a 'global profession of physicians', the issue of the essential competences that all physicians must possess becomes very sharply focused. If defined, these competences would help indicate what teachers are supposed to teach, what students are expected to learn and what educational experiences all physicians must have. In addition, mechanisms to assure that all graduates of medical schools possess these competences at graduation must be developed (Schwarz, 1998; Hamilton, 2000).

In 1999, the China Medical Board of New York created the Institute for International Medical Education (IIME), which was entrusted with the responsibility of defining the 'minimum essential competences' that all graduates must have if they wish to be called physicians (Wojtczak & Schwarz, 2000, 2001). With these competences in hand, graduates will be prepared to enter specialty training. The IIME project consists of three phases, as follows:

Phase I: Definition of minimum essentials:

- Develop the 'global minimum essential requirements' (GMER) that define the knowledge, skills, professional behavior and ethics that all physicians must have regardless of where they received their general medical training.
- Identify and develop the methods necessary to assess graduates' competences and to evaluate whether a school is providing the educational experiences that allow for the acquisition of these competences.

Phase II: Experimental implementation:

- Use the competence assessment methods to evaluate the educational outcomes of a small number of leading Chinese medical schools.
- Initiate programs to remedy envisaged weaknesses in the educational process and repeat the evaluation to determine whether the weaknesses have been eliminated.

Phase III: Globalization:

- Share the outcomes of this educational experiment, aimed at improving the quality of medical education with the global education community.
- Facilitate the development of a global medical education network.

Phase I: Definition of minimum essentials

The first phase of the project, which is devoted to defining the 'Minimum Essentials', began in 1999 with the establishment of the IIME and the appointment of three committees. The first committee or *Steering Committee* was given the role of advising the leadership of the Institute on the implementation of the project. This 'brains trust' consists of eight senior educational and health policy experts with broad national and international experience. The second committee was given the task of defining and formulating the 'Global Minimum Essential Requirements' (GMER). This committee was called the *Core Committee* and it consisted of 17 experts in medical education selected from around the globe. The GMER were to include the knowledge, skills, professional attitudes and behavior that each graduate should possess at the time of graduation from medical school regardless of where he/she is trained. They also were to represent the 'essential (core) requirements' necessary for a physician to start graduate medical education (specialty training) or in some countries to practice medicine under specified supervision.

The third committee, or *Advisory Committee*, consists of representatives from every

major organization in the world with an interest in medical education. This committee is composed of Presidents or Senior Representatives of 14 major international organizations with a long history of devotion to medical education. Included in this group are the Accreditation Council for Graduate Medical Education, the American Association of Medical Colleges, the Association for Medical Education in Europe, the American Medical Association, the Education Commission for Foreign Medical Graduates, the National Board of Medical Examiners, the Pan-American Federation of the Association of Medical Schools, The Network: Community Partnerships for Health through Innovative Education, Service and Research, the World Federation for Medical Education, the World Health Organization, and other national medical education associations. The Advisory Committee provides the forum for exchange of information and advice based on the perspective of these organizations. To date, the advice and counsel received has been invaluable.

Membership of the committees can be found on the IIME website:
<http://www.iime.org/committee/index.htm>

Global minimum essential requirements

The IIME Core Committee has defined the minimum essential core competences and grouped them under seven broad educational domains. These domains were identified through a review process involving literature searches, obtaining input from unpublished sources and from educational experts, and by a pooling of the experience and expertise of the committee members. Every existing major published listing of standards, outcomes and processes of medical education was incorporated into reference materials for the committee.

The seven domains that emerged from these deliberations included the following:

- (1) Professional Values, Attitudes, Behavior and Ethics
- (2) Scientific Foundation of Medicine
- (3) Clinical Skills
- (4) Communication Skills
- (5) Population Health and Health Systems
- (6) Management of Information
- (7) Critical Thinking and Research

These domains are considered to be truly 'essential', i.e. every physician must have them if he/she wishes to be called a physician. As such, they are considered to be of crucial importance for practicing medicine in the 21st century. The meaning of each domain may be found in the 60 learning objectives that define what each domain is intended to cover.

The importance of the two domains called *Scientific Foundation of Medicine* and *Clinical Skills* is well understood and universally accepted since they have always created the foundation for effective medical care. The remaining five domains, while acknowledged as being important, have not been 'codified' or defined to the degree included in the IIME effort.

There is no doubt that the domain entitled *Professional Values, Attitudes, Behavior and Ethics*, which reflects the essence of medical and public opinion, is essential to the practice of medicine. Many of the daily complaints against physicians and medical services relate to this area. Physicians must be prepared to meet the consequences of the rapid advances in biomedical sciences, information technology, changes in organization and management of healthcare and increasing economic constraints without losing the traditional values that have guided medicine for thousands of years. In addition, the advances bring their own unique and new ethical, social and legal challenges that physicians must respond to.

No one doubts the importance of *Communication Skills* as an essential tool for all physicians. This follows since effective communication is necessary to create an environment in which mutual learning occurs among patients, their relatives, members of the healthcare team, colleagues and the public. Communication is essential if the physician is to understand the context of the patients' beliefs and cultural values. In addition, the physician must be able to teach, advise and counsel patients, families and the public about health, illness, risk factors and healthy lifestyles.

The selection of *Population Health and Health Systems* as one of the essential domains reflects the growing conviction that it is no longer sufficient to focus on the understanding of diseases, how a given disease affects an individual and the diagnosis and management of that disease. Given the global epidemics facing medicine including HIV/AIDS, tobacco and violence, there is a need for knowledge and skills in the health of populations. Physicians must work in teams with other

health professionals to promote, maintain and improve the health of a given population.

Such efforts often must be conducted in the context of the existing healthcare system. Hence, physicians must also know the principles upon which health systems are built, their structure, and their economic and legislative foundations. Anything short of this will result in a physician who cannot care for the health of a given population.

The domain '*Management of Information*' is justified by the fact that the practice of medicine and the management of a health system, now and even more in the future, depend on the effective flow of knowledge and information. Therefore, physicians need to know how to use modern communication and information technology to access and manage medical information. They also have to understand the capabilities and limitations of information technology, and be able to use it for medical problem solving and decision making.

Finally, '*Critical Thinking and Research*', as a priority domain, reflects the need for critical evaluation of existing knowledge, technology and information. This is essential if a physician is to be able to solve health problems. In caring for individual patients, physicians must apply the principles of evidence-based medicine in making decisions about the utilization of limited medical resources. Graduates have to learn how to critically evaluate various data and information and understand the role of research in quality medical practice. This is especially true since the medicine of today will not be the medicine of tomorrow.

Advances in genetics, immunology, neuroscience and proteomics are transforming the face of medical practice. Educators face the challenge of how to prepare trainees of today for tomorrow's medicine. It is clear that the continued acquisition of new knowledge, technologies and skills will be required. Hence, graduates have to be committed to lifelong learning and they have to know how to go about such learning in this new information age. In addition, they have to be aware of their own limitations, be ready for regular self-assessment and peer evaluation and be willing to undertake continuous self-directed study.

It is worthwhile to say that in many recent publications dealing with various aspects of medical education, one can find many similarities in the learning objectives. This indicates a broad consensus among the global medical academic community about

what constitutes the most important competences required for high-quality medical practice today and tomorrow.

The concept of 'Global Minimum Essential Requirements' implies a set of global minimum learning outcomes for graduates of medical schools. However, it is essential to understand that local, national and even regional needs must also be taken into account. This may translate into a need to understand cultures, socioeconomic conditions and patient-physician relationships at a non-global level. A particular school must be responsive to these needs even if the needs are not global in nature. Hence, a curriculum to provide the 'global minimum essentials' would be incomplete without the addition of the unique educational experiences necessary to address the local, national or regional health needs. The concept of 'GMER' does not imply a global uniformity of medical curricula and educational processes. Medical schools should adopt their own particular curriculum design, but in so doing they should first assure that their graduates will possess the core competences stated in the GMER document and, second, the competences necessary to meet the unique healthcare needs of the area they serve.

The acceptance of the 'Essentials' and the incorporation of them into curricula are not in and of themselves likely to change graduates' competences unless they are linked to an evaluation process. The assessment of the learning outcomes expressed in 'GMER' should ensure that educators will focus on these outcomes when they are planning educational programs and that students will try to acquire them before the time of evaluation. Therefore, before starting the implementation of the project, a special *Task Force for Assessment* was established consisting of experts in assessment technology. The overall goal of this Task Force was to develop a set of methods to be used in the assessment of each of the stated learning objectives. At the present time, the universally accepted measurement instruments for all of the objectives set forth in the GMER do not exist, particularly those related to professional attitudes and values. However, the time has come to begin the quest to develop instruments, methods and processes that will be used to assess these competences. Clearly, a research agenda will emerge from further experience in this area.

To further support the implementation of the GMER, the Institute has created a 'Glossary of Medical Education Terms' giving the definition of the terms used in IIME documents, and an online 'Worldwide Database of Medical Schools', which will be reproduced in this and the following five issues of *Medical Teacher*. They are also

available on the Institute's website.

Phase II: Experimental implementation

The second phase of the project (Phase II) -- the Experimental Phase -- will begin in 2002. In this Phase, the 'GMER' will be used to evaluate graduates' competences of several leading medical schools in China. It may be necessary to allow a school to use evaluation methods that are consistent with its particular curriculum. However, these instruments must cover all domains and learning outcomes. Although the project foresees, primarily, the evaluation of students, it may be necessary in the beginning to use an aggregation of data from many students for the evaluation process.

Once the initial evaluation is completed, efforts then will be made to improve all areas of weakness that are found. It is hoped that then a second evaluation will then be made to see whether the weaknesses have been corrected. If a school meets all of the essentials, they will be recognized in a formal manner.

It is clear that not all aspects of each competence can be fully evaluated the first time this is tried. There will be a continuous process of improvement of the evaluation process based on the experiences gained through the evaluation.

Phase III: Globalization

Once the process has been refilled, the third phase of the program, the Dissemination Phase, will begin. The evaluation instruments, the process employed, the problems and areas in need of further development will be shared with the world community. This, together with the other efforts currently under way, should provide an added stimulus for a global network.

Operational conclusions

In the course of this effort, certain principles and implications have become clear. Some of these are as follows:

- The GMER prepare physicians for the professional roles required at the present time and set in place attitudes, skills and knowledge that serve as a basis for lifelong learning. Graduates of medical schools are not to be thought of as technicians trained by a 'cook book' but are highly educated professionals capable of practicing the art and science of medicine now and in the future.
- The IIME-initiated GMER project is an experiment. It has never been done before either in its global goals or in its focus on outcome competences. Learning will occur as the project proceeds and thinking will mature and understanding will broaden. It cannot be expected to 'get it right' in all respects the first time, and adjustments and improvements will undoubtedly have to be made.
- The GMER are not American, ECFMG, AAMC or China Medical Board 'requirements'. They are 'owned' by all who have helped in their development. It is hoped that eventually they will be adopted by the global medical education community as their standards. If they are viewed as 'requirements from the USA or from the developed world', they are doomed.
- The competences contained in the GMER define what a physician is. They do not define what a specialist is. Hence, they are the '*Core*' that makes for a single profession of medicine.
- This project has attempted to cooperate with all the major medical education organizations of the world. The purpose of this effort included recognizing the important and legitimate role that these organizations have played in medical education in the past and profiting from their expertise and long experience in this field. It is clear that for an effort of this nature to succeed, 'we' must all be in it together
- It is not the intent of this effort 'to have foreigners evaluate our medical schools'. First, participation in the experiment is voluntary. Furthermore, the GMER were developed by representatives from the global medical enterprise. As such, they represent a consensus of the global-oriented Core Committee. This was and is a global community effort and not one emanating from a single country, organization or program.
- Some programs do not and may never meet these requirements. This does not mean that their products are not playing important roles in healthcare in their local setting. It does mean that these professionals are not 'physicians' in the sense defined in this project. As such, it would be useful to refer to the products by a name other than physician.

Presently, many educational leaders agree that the time is right for an effort such as

this. If it is not done with a constructive approach guided by the knowledge and experience of worldwide experts in medical education, other less palatable approaches to standards development may begin to emerge. The challenge before the medical education community is to use globalization as an instrument of opportunity to improve the quality of medical education and its outcomes. In so doing the quality of medical practice will be significantly improved around the globe (Harden *et al.*, 1999).

It was understood from the beginning of the project that a focus on competences or outcomes of the medical education process would have significant implications for medical school curricula. At present, the results of implementation are difficult to predict. However, the situation can be compared to the early 1900s when Abraham Flexner defined the proper foundation of 20th-century medical education for North America and Canada. The long-term outcome of the Flexner effort was a remarkable improvement in the quality of medical education and patient care across the North American continent. It is possible that the IIME-GMER effort could have the same effect in China and around the globe.

Note: Lists of the members of the Committees referred to in this paper can be found on the IIME website: www.iime.org/committee/index.htm

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Evaluation of Learning Outcomes

Assessment Methods and Measurement Instruments

Working Review

August 2001

Introduction

Evaluation permits the critical question to be asked and answered: have the goals and objectives of new curriculum have been met? It assesses individual achievement to satisfy external requirements, and provides information that can be used to improve curriculum, and to document accomplishments or failures. Evaluation can provide feedback and motivation for continued improvement for learners, faculty, and innovative curriculum developers. To ensure that important questions are answered and relevant needs met, it is necessary to be methodical in designing a process of evaluation.

In the last decade, we have observed the rapid evolution of assessment methods used in medical education from the traditional ones towards more sophisticated evaluation strategies. Single methods were replaced by multiple methods, and paper-and-pencil tests were replaced by computerized tests. The normative pass/fail decisions moved to assessment standards, and the assessment of knowledge has been replaced by the assessment of competence. Efforts have been also made to standardize subjective judgments, to develop a set of performance standards, to generate assessment evidence from multiple sources, and to replace the search for knowledge with the search for "reflection in action" in a working environment. Assessment tools such as the objective structured clinical examination (OSCE), the portfolio approach, and hi-tech simulations are examples of the new measurement tools. The introduction of these new assessment methods and results obtained has had a system-wide effect on medical education and the medical profession in general. The commonly used slogan that "assessment drives learning", although certainly true, presents a rather limiting concept. It was therefore suggested that it should be replaced by an alternative motto: "assessment expands professional horizons" (M. Friedman, 2000). This stresses an important role of assessment in developing multiple dimensions of the medical profession.

Recent developments of so-called "quantified tests", standardized patient examinations, computer case simulations, and the present focus on the quality of the assessment evidence and the use of relevant research information to validate the preferred assessment approaches have been impressive, initiating the birth of **Best Evidence-Based Assessment (BEBA)**. However, the problem is that such performance-based assessments consume resources and require a high level of technology. They are not readily applied in developing countries or even in most developed ones, due to their expense and logistical problems.

Therefore, we cannot forget the value and of the importance of all assessment methods, which recognize the primacy of evaluations by teachers and supervisors in the real health care environment. This so-called "descriptive evaluation" which uses words to describe and summarize a student's level of competence is in contrast to quantitative assessment techniques whose summary of achievements yields a score, typically a number. This is an area where the summative faculty judgments are necessary, but certainly not sufficient to pronounce a student as competent, and should be supplemented by the quantified assessment methods of professional performance.

"Objective" vs. "Traditional" Methods of Evaluation

Most educators would accept that prolonged periods of observation of students working with patients on a regular basis would have more validity than most assessment tests of clinical competence. The problem is that we strive to achieve reliability and precision in these observations as a requirement for a valid assessment. It is optimal to represent an evaluation of a spectrum of skills, including the cognitive ability to know what information is worth remembering, personal skill to manage one's time successfully, and a commitment to self-directed learning.

On the other hand, there are barriers to accepting the validity of descriptive evaluations of competence which are broadly used in the world. Deficiencies in conventional or traditional clinical examination have been clearly identified in an assessment of students' clinical skills in addition to the traditional multiple-choice questionnaire exams which measure only one aspect of competence, specifically knowledge. First and foremost is a belief that words are subjective and that numbers are objective. Use of the term objective for an assessment tool that yields a number or percentage, or score above or below a mean, gives it a status in the

scientific community that is often denied to observations by teachers. A teacher wishes to be accurate in conveying impressions of a student or does not want to harm a student's career. Even if the teacher's observations are correct, he or she is aware that the number of student observations may not necessarily provide sufficient reliability, and therefore may be uncomfortable giving a grade. One solution is to increase the number of cases presented to students.

Nevertheless, a **ward- or practice-based assessment** is the most desirable environment in which to assess the student, and it provides the opportunity to make multiple observations over a period of time in a variety of clinical situations. Medical teachers frequently fail to take advantage of this opportunity by rarely observing students as they perform patient histories and examinations. The small number of observations is likely to make such assessments unreliable and thus unfair for decision-making purposes. Not only does this undermine the quality of such in-training assessments, but reduces the chances that students will get specific feedback (formative assessment) and appropriate remedial teaching. Such assessments could be made over an extended period of time or combined with a more objective procedure such as an [OSCE](#), to achieve a higher degree of reliability.

In some countries and in particular in the United States, the tendency has been to move away from examinations at the bedside and towards patient management problems. Recent developments in performance assessment achieve a high level of authenticity and reliability. Computerization of multiple-choice examinations, especially those with sequential and adaptive testing as implemented by the National Board of Medical Examiners is an impressive feat.

What Should Be Evaluated and When?

The evaluation that attempts to determine different aspects of educational structure, process and outcomes may have several forms. The **formative individual evaluation** provides feedback to an individual learner identifying areas and provides suggestions for improvement, whereas the **formative program evaluation** provides information and suggestions for improving a curriculum and program's performance.

On the other hand, **summative individual evaluation** measures whether specific performance objectives were accomplished, certifying competency or its lack in performance in a particular area, and **summative program evaluation** measures the success of a curriculum in achieving learner and process objectives.

Formative evaluations generally require the least rigor and summative individual and program evaluation for internal use need an intermediate level of rigor. Summative individual and program evaluation for external use, e.g., certification of competence or publication of evaluation results requires the most rigors.

When a high degree of methodological rigor is required, the measurement instrument must be appropriate in terms of validity and reliability. Establishing **validity** is the first priority in developing any form of assessment. In simple terms, this means ensuring that it measures what it is supposed to measure. The test must contain a representative sample of what the student is expected to have achieved. This aspect of validity, known as content validity, is the one of most concern to the medical teacher. On the other hand, **reliability** expresses the consistency and precision of the test measurements. There are a variety of factors, which contribute to reliability. In a clinical examination, there are three variables - the students, the examiners and the patients. In a reliable assessment procedure, variability due to the patient and the examiner should be removed. In the clinical examination, wherever possible, a subjective approach to marking should be replaced by a more objective one. Unreliability in clinical examinations result from the fact that different students usually examine different patients, where one may help some students while obstructing others.

Also important is the **practicality** of the assessment procedures. Factors such as the number of staff available, their status and specialties, availability of patients and space, and cost have to be taken into account. The ideal examination should take into account the number of students to be assessed, as an assessment procedure appropriate for twenty students may not be practical for hundreds. Unfortunately, the resources available to conduct evaluations are always restricted. However, if medical schools want to achieve minimally acceptable standards of validity and reliability, they have to be prepared to expend more time and resources in this area. This applies particularly to the assessment of clinical skills, where much longer or more frequent observations of student performance than is usually undertaken are required.

The first step in planning the evaluation is to identify the likely users of the evaluation. Different stakeholders who have responsibility for, or who may be affected by the curriculum will also be interested in evaluation results. In addition, students are interested in the evaluation of their own performance. Evaluation

results may also be of interest to educators from other institutions.

The next step in designing an evaluation strategy for a curriculum is to identify whether the evaluation is used to measure the performance of individuals, the performance of the entire program, or both. The evaluation of an individual usually involves determining whether the person has achieved the objectives of a curriculum. On the other hand, program evaluation usually assesses the aggregate achievements of all individuals, clinical or other outcomes, actual processes of a curriculum implementation and perceptions of learners and faculty. Another use of an evaluation might be for formative purposes (to improve performance), summative purposes (to judge performance), or for both.

The long-term goal underlying revision of the curriculum is to produce better physicians with qualities such as extensive and appropriate knowledge, humanism, compassion, career achievement, the ability and desire to learn throughout life, and receptiveness to patients' care and clinical research. In that situation, the proper time of evaluation is graduation or later.

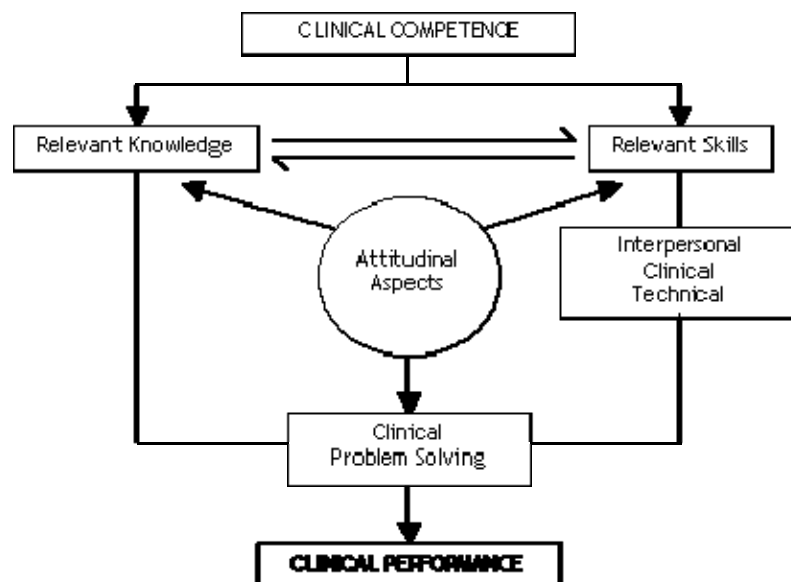
Whatever the purpose and whenever performed, such assessments will have a powerful effect on what students learn and how they go about their studies, and the assessment of clinical competence is one of the most important tasks. Therefore, the assessment should be regularly incorporated within the coursework to provide ongoing feedback to students and teachers which usually is undertaken at the end of a clinical course to certify a level of achievement.

Assessment of Medical Competence

Although the evaluation of professional competence is considered one of the most important final goals of medical education and the most important tasks of teachers, until very recently, we have used the term **clinical competence** rather loosely without a general agreement. Presently, **competence** is defined in terms of what the student or doctor should be able to do at an expected level of achievement, such as at graduation or when commencing an internship. Thus, competence is the synthesis of all attributes necessary to do the task for which one is being trained, and clinical competence may be regarded as the mastery of relevant knowledge and acquisition of a range of relevant skills, which would include interpersonal, clinical and technical components. Competence itself, of course, is only of value as a prerequisite for performance in a real clinical setting.

There is a tendency to separate the term clinical competence from the term **clinical performance**. Performance is defined as what a student or doctor actually does under specific conditions; for instance, during a test, or while being watched, or in real clinical practice. What more, "performing" is ongoing and continuous, and indicates activity rather than the finished product. To know that a student is competent, we need to observe the student performing *in vivo*, not an isolated performance under *in vitro* test conditions. In many ways, it is easier to assess competence than performance. This matter is of less concern in the undergraduate arena, where assessment of competence is particularly appropriate, as students are not expected to practice in an unsupervised situation.

Fig.1 Components of clinical competence (Newble, 1992)



Unfortunately, competence does not always correlate highly with performance in practice. Both competence and performance are influenced by professional attitudes; however, assessing this component poses great difficulties.

The prevailing approach is analytic in nature, and is used by educators to break up competence into separate parts called skills, knowledge and attitudes. The components of clinical competence include abilities such as obtaining a detailed and relevant patient history, carrying out a physical examination, identifying patient problems, choosing appropriate diagnostic methods, performing differential diagnosis, interpreting obtained results, and undertaking an appropriate case management approach including patient education. In this way, the assessment of competence requires a whole series of performances reflecting the interaction of

patients and competent physicians, and what varies from patient to patient. This helps avoid situations where more attention is paid to the detection of abnormal physical findings during examinations rather than student observations of history-taking from patients and their interactions.

What should be assessed is not simply whether the student is able to do a specific task when observed by a teacher, but how he or she is assessed by a patient. It is why the clinical examination is broadly regarded as of key importance in the assessment of a student's competence to practice medicine and the cornerstone of qualifying examinations. This requires observation of student performances in real practice settings.

In the clinical examination, there are three variables: the student, the examiner and the patient. The aim should be to standardize the examiner and the patient so that the student's performance can be seen as a measure of his or her clinical competence. The assessment of clinical competence is usually undertaken in one of two settings, such as a ward- or practice setting, or an examination setting. The ward- or practice-based assessment is the most desirable environment to assess a student. It provides the opportunity to make multiple observations in a variety of clinical situations, such as how students perform patient histories and examinations. It may also provide the opportunity for students to get specific feedback (formative assessment) and appropriate remedial teaching. In some parts of the world, competencies are certified by passing so-called **examinations based assessment**, consisting largely of multiple-choice written tests. In other parts of the world, the **traditional clinical examination**, consisting of long and short cases based on patients, is seen as a critical component of final examinations. The former approach suffers from a low level of validity, and the latter from a very low level of reliability.

To further improve the quality of assessment procedures, we should be more precise in defining what we aim to assess and should ensure that we introduce methods of assessment which are both valid and reliable. As no single method is adequate to appropriately measure all aspects of clinical knowledge, skills and problem solving techniques, the multi-format assessment conducted in examination settings is essential.

Selection of Evaluation Tools

The first step in making choices of measurement instruments is to determine the

purpose and desired content of evaluation, as it is important to choose the measurement methods that are congruent with the evaluation questions. The choice of measurement methods and construction of measurement instruments is a crucial step in the evaluation process because it determines the data that will be collected. If the assessment methods are inappropriate, or if there is imbalance between theoretical knowledge assessment and clinical assessment, unfortunate learning consequences for students and curriculum may occur. Equally importantly, if the assessments are of low quality, improper decisions could be made which might be detrimental to the future of a student or to the welfare of the community.

Most evaluations will require the construction of specific measurement instruments such as tests, rating forms, interview schedules, or questionnaires. The methodological rigor with which the instruments are constructed and administered affects the reliability, validity, and cost of the evaluation. It is also necessary to choose measurement methods that are feasible in terms of technical possibilities and of available resources.

Planners and users of evaluations should be aware of various rating biases, which can affect both an instrument's reliability and validity. A more careful specification of content, a proper number of activities performed and observed, and use of structured and standardized approaches such as checklists and rating forms for marking, improve the quality of clinical assessment.

With the emergence of complex performance assessment methods in general, there is a need to re-examine the existing methods to determine standards of performance, which separate the competent from the non-competent candidate. Setting standards for performance assessment is a relatively new area of study and consequently, there are various standard setting approaches currently available for both written and performance tests.

In designing assessment tests, it is necessary to incorporate performance criteria designed to provide evidence that students have successfully completed the task, to demonstrate acquired competencies by responding correctly to the task criteria, and to achieve maximum scoring points. In reality, however, candidates may demonstrate a variety of performance profiles that range from non-competent, to minimally competent, to fully competent. Consequently, the cut-off point on the scoring scale, which separates the non-competent from the competent, has traditionally been set to respond correctly to 70% of the items, does not provide

robust and valid evidence for pass/fail decisions.

To evaluate individuals or educational programs, methods of measurement commonly used are rating forms, questionnaires, essays, written or computer-interactive tests, oral examinations, individual or group interviews/discussions, direct observation, and performance audits. Among the so-called objective methods, the most popular is the [OSCE](#). As students progress from novices to experts, they integrate their learning experiences, and as multiple aspects of their profession are introduced into their training, the complexity of the required tasks increases. Consequently, assessment of students' performances will require the proper selection of measurement methods and instruments. Because all measurement instruments are subject to threats to their reliability and validity, the ideal evaluation strategy will employ multiple approaches that include several different measurement methods and several different raters. When all results are similar, the findings are robust, and one can be reasonably comfortable about their validity.

Learning Objectives

The IIME Core Committee has developed the concept of "Global Minimum Essential Requirements" (GMER) and defined a set of global minimum learning outcomes, which students of the medical schools must demonstrate at the point of graduation. The "Essentials" are grouped under seven broad educational domains with set of sixty learning objectives in total. The following are the 60 learning objectives grouped by domain.

I. Professional Values, Attitudes, Behavior and Ethics

A. Recognition of the essential elements of the medical profession, including moral and ethical principles and legal responsibilities underlying the profession.

B. Professional values which include excellence, altruism, responsibility, compassion, empathy, accountability, honesty and integrity, and a commitment to scientific methods.

C. An understanding that each physician has an obligation to promote, protect, and enhance these elements for benefit of patients, the profession and society at large.

D. Recognition that good medical practice depends on a mutual understanding and relationship between the doctor, the patient and the family with respect for patient's welfare, cultural diversity, beliefs and autonomy.

E. An ability to apply the principles of moral reasoning and decision-making to conflicts within and between ethical, legal and professional issues including those raised by economic constraints, commercialization of health care, and scientific advances.

F. Self-regulation and a recognition of the need for continuous self-improvement with an awareness of personal limitations including limitations of one's medical knowledge.

G. Respect for colleagues and other health care professionals and the ability to foster a positive collaborative relationship with them.

H. Recognition of the moral obligation to provide end of life care, including palliation of symptoms.

I. Recognition of ethical and medical issues in patient documentation, plagiarism, confidentiality and ownership of intellectual property.

J. Ability to effectively plan and efficiently manage one's own time and activities to cope with uncertainty, and the ability to adapt to change.

K. Personal responsibility for the care of individual patients.

II. Scientific Foundation of Medicine

A. The normal structure and function of the body as a complex of adaptive biological system.

B. Abnormalities in body structure and function which occur in diseases.

C. The normal and abnormal human behavior.

D. Important determinants and risk factors of health and illnesses and of interaction between man and his physical and social environment.

E. Molecular, cellular, biochemical and physiological mechanisms that maintain the body's homeostasis.

F. The human life cycle and effects of growth, development and aging upon the individual, family and community.

G. The etiology and natural history of acute illnesses and chronic diseases.

H. Epidemiology, health economics and health management.

I. The principles of drug action and its use, and efficacy of various therapies.

J. Relevant biochemical, pharmacological, surgical, psychological, social and other interventions in acute and chronic illness, in rehabilitation, and end-of-life care.

III. Communication Skills

- A. Listen attentively to elicit and synthesize relevant information about all problems and understanding of their content.
- B. Apply communication skills to facilitate understanding with patients and their families and to enable them to undertake decisions as equal partners.
- C. Communicate effectively with colleagues, faculty, the community, other sectors and the media.
- D. Interact with other professionals involved in patient care through effective teamwork.
- E. Demonstrate basic skills and positive attitudes towards teaching others.
- F. Demonstrate sensitivity to cultural and personal factors that improve interactions with patients and the community.
- G. Communicate effectively both orally and in writing.
- H. Create and maintain good medical records.
- I. Synthesize and present information appropriate to the needs of the audience, and discuss achievable and acceptable plans of action that address issues of priority to the individual and community.

IV. Clinical Skills

- A. Take an appropriate history including social issues such as occupational health.
- B. Perform a physical and mental status examination.
- C. Apply basic diagnostic and technical procedures, to analyze and interpret findings, and to define the nature of a problem.
- D. Perform appropriate diagnostic and therapeutic strategies with the focus on life-saving procedures and applying principles of best evidence medicine.
- E. Exercise clinical judgment to establish diagnoses and therapies.

F. Recognize immediate life threatening conditions.

G. Manage the common medical emergencies.

H. Manage patients in an effective, efficient and ethical manner including health promotion and disease prevention.

I. Evaluate health problems and advise patients taking into account physical, psychological, social and cultural factors.

J. Understand the appropriate utilization of human resources, diagnostic interventions, therapeutic modalities and health care facilities.

V. Population Health and Health Systems

A. Knowledge of important life - style, genetic, demographic, environmental, social, economic, psychological, and cultural determinants of health and illness of a population as a whole.

B. Knowledge of their role and ability to take appropriate action in disease, injury and accident prevention and protecting, maintaining and promoting the health of individuals, families and community.

C. Knowledge of international health status, of global trends in morbidity and mortality of chronic diseases of social significance, the impact of migration, trade, and environmental factors on health and the role of international health organizations.

D. Acceptance of the roles and responsibilities of other health and health related personnel in providing health care to individuals, populations and communities.

E. Understanding of the need for collective responsibility for health promoting interventions which requires partnerships with the population served, and a multidisciplinary approach including the health care professions as well as intersectoral collaboration.

F. Understanding of the basics of health systems including policies, organization, financing, cost-containment measures of rising health care costs, and principles of

effective management of health care delivery.

G. Understanding of the mechanisms that determine equity in access to health care, effectiveness, and quality of care.

H. Use of national, regional and local surveillance data as well as demography and epidemiology in health decisions.

I. Willingness to accept leadership when needed and as appropriate in health issues.

VI. Management of Information

A. Search, collect, organize and interpret health and biomedical information from different databases and sources.

B. Retrieve patient-specific information from a clinical data system.

C. Use information and communication technology to assist in diagnostic, therapeutic and preventive measures, and for surveillance and monitoring health status.

D. Understand the application and limitations of information technology.

E. Maintain records of his/her practice for analysis and improvement.

VII. Critical Thinking and Research

A. Demonstrate a critical approach, constructive skepticism, creativity and a research-oriented attitude in professional activities.

B. Understand the power and limitations of the scientific thinking based on information obtained from different sources, in establishing the causation, treatment and prevention of disease.

C. Use personal judgments for analytical and critical problem solving and seek out information rather than to wait for it to be given.

D. Identify, formulate and solve patients' problems using scientific thinking and based on obtained and correlated information from different sources.

E. Understand the roles of complexity, uncertainty and probability in decisions in medical practice.

F. Formulate hypotheses, collect and critically evaluate data, for the solution of problems.