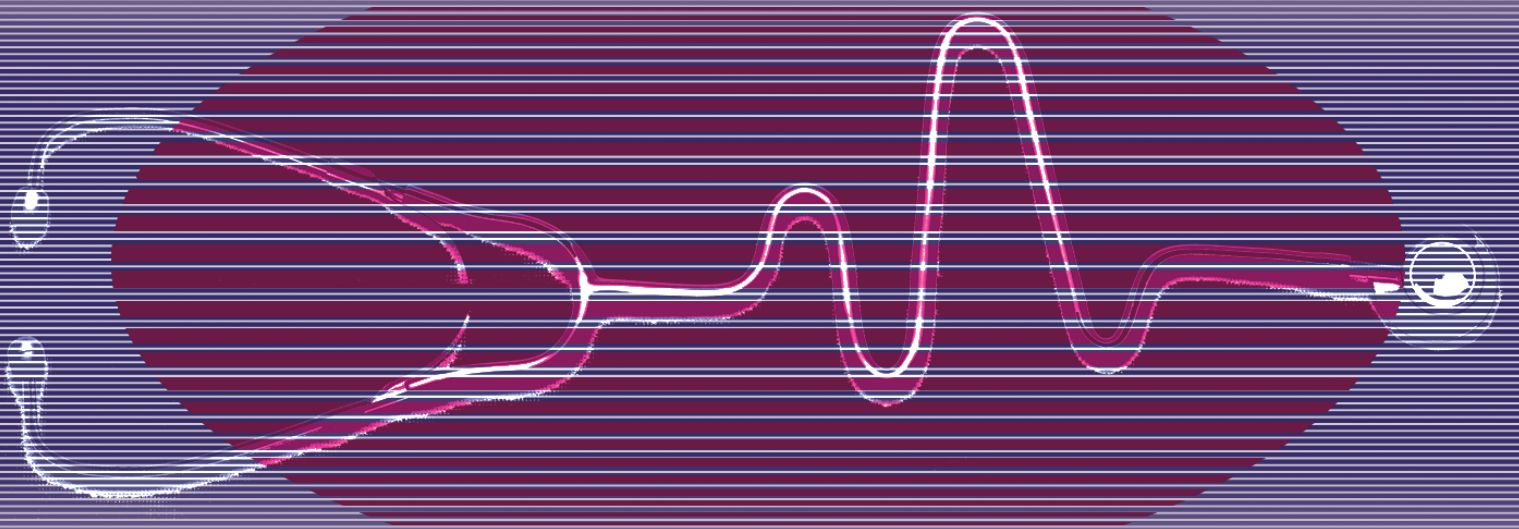# Recommendations for Clinical Skills Curricula for Undergraduate Medical Education
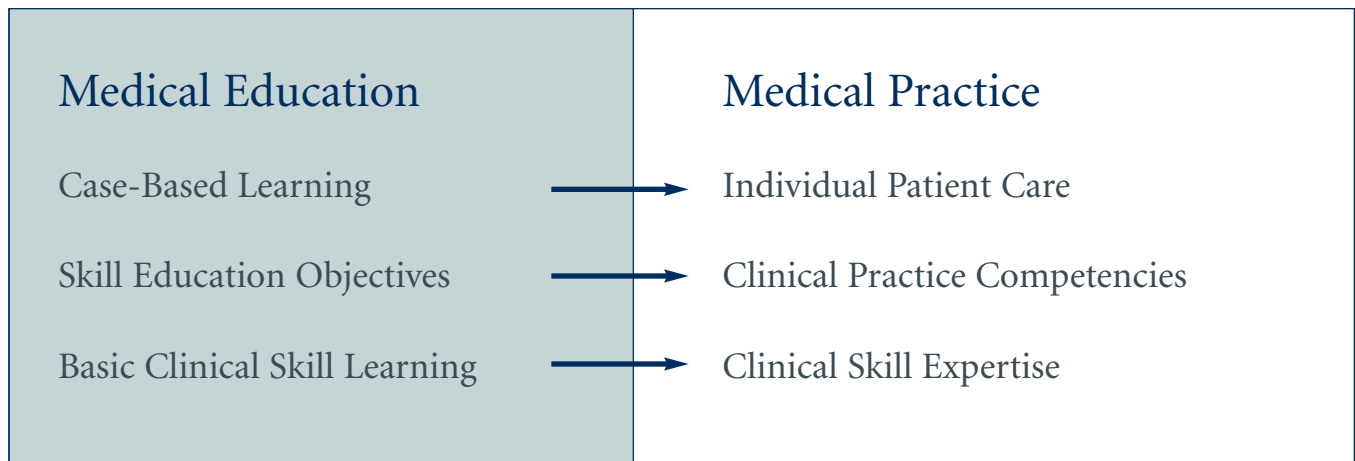
"Knowing is not enough; we must apply.
Willing is not enough; we must do." (Goethe)

The Association of American Medical Colleges

Recommendations for Clinical Skills Curricula for Undergraduate Medical Education

Task Force on the Clinical Skills Education of Medical Students

Achieving Excellence in Basic Clinical Method Through Clinical Skills Education: the Medical School Clinical Skills Curriculum

Medical Education	Medical Practice
Case-Based Learning →	Individual Patient Care
Skill Education Objectives →	Clinical Practice Competencies
Basic Clinical Skill Learning →	Clinical Skill Expertise

Several years ago, the Association of American Medical Colleges renewed its focus on improving the clinical education of medical students in the United States. In June, 2003 the Association convened a task force on clinical skills teaching that included representatives from the seven national clerkship organizations, the Alliance for Clinical Education and the American Academy on Physician and Patient. Each of these organizations has specific interest in improving the undergraduate medical curriculum. This task force has begun to develop a national consensus regarding the clinical skills education of medical students. The recommendations contained in this initial report represent the consensus of the organizations that set the standard for the clinical education of medical undergraduates. This report proposes the design and content of a model undergraduate clinical skills curriculum. The intent of this report is to inspire educators in their commitment to this fundamental element of physician competency.

AAMC

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Executive Summary

Skillful performance in the act of medical care is fundamental to the delivery of quality professional service to those who seek the care of physicians. Thus an essential purpose of medical education is to ensure that each student develops and continues to refine the basic clinical skills that are required to provide competent care throughout a lifetime of professional work.

In recent years, the opportunity for students' clinical skills development has come under threat. Adverse institutional, economic and regulatory influences upon the clinical environment have diminished the quality and content of students' education in clinical skills. Furthermore, since the Flexner report, basic skill education has remained an implicit process in the undergraduate medical curriculum; it is presumed to happen and intended to be robust. Yet it is not systematically taught nor comprehensively evaluated. As the paradigm for evaluating the quality of medical education now shifts from an emphasis upon educational process to one of learner performance outcome, much needs to be done to reestablish the clinical skill development process on behalf of medical students.

The AAMC Task Force on the Clinical Skill Education of Medical Students was established in June 2003, in order to foster a national consensus regarding the design and implementation of clinical skills curricula in the undergraduate medical experience. The Task force defines "clinical method" as a set of generic practice competencies required to provide medical care. Within each of these competencies there exist a wide variety of cognitive and psychomotor skills. A clinical skill is defined as any discrete and observable act of medical care. Clinical skills are *the* foundation of the clinical method competencies through which clinical practice is realized.

This report recommends that medical schools make explicit the clinical skills curriculum for medical students. Such a curriculum should provide the opportunity for the student to master the content of comprehensive clinical skills education. The task force makes six recommendations pertaining to the design and implementation of an explicit clinical skills curriculum. These are:

1. that medical schools adopt a set of common *principles* for guiding the clinical skills education process

2. that medical schools adopt an explicit set of *clinical skill education* objectives which define a comprehensive blueprint for the development of the competencies of basic clinical method

3. that medical schools identify a *specific set of skills* to be learned prior to graduation

4. that medical schools utilize a set of categories for organizing the selection of *clinical skill learning opportunities* in the undergraduate medical curriculum

5. that medical schools adopt an explicit, *developmental approach* to the design of the skills education curriculum, including expected levels of skill performance proficiency throughout the four-year curriculum

6. that clinical skills education curricula contain specific essential *programmatic elements*

Skill education principles are required so that teachers, learners and institutions have a common understanding of the process of professional skill education and their shared responsibility in it. The application of skill learning objectives, including the identification of skills to be mastered throughout the curriculum, will facilitate standardization of both the educational process and the assessment of skill competency outcomes. Comprehensive design of clinical skill learning opportunities ensures that students learn how clinical method applies throughout the continuum of contemporary care. Specific programmatic elements assure that the curricular process is comprehensive and effective in achieving its goals. These include opportunities throughout the curriculum for repetitive clinical skill practice and remediation if necessary. Program evaluation is recommended to assist educators in identifying areas of success and to enable continuing curricular improvement.

The task force recognizes that clinical skill mastery is developmental. To this end, clinical skills education best occurs as an integrated and longitudinal educational process. As the new clinician is exposed to an incrementally challenging skills curriculum, he or she has an opportunity to progressively master that set of skills that is important for postgraduate training and which is basic to clinical performance competency throughout their subsequent career.

"He who learns with a view to teaching, they give an opportunity to learn and to teach. And he who learns with a view to doing, they give him the opportunity to learn and to teach and to observe and to do"

—Sayings of the Fathers, the Talmud

"On the pedagogic side, modern medicine, like all scientific teaching, is characterized by activity. The student no longer merely watches, listens, memorizes: he does. His own activities in the laboratory and in the clinic are the main factors in his instruction and discipline. An education in medicine nowadays involves both learning and learning how; the student cannot effectively know, unless he knows how."

—Abraham Flexner, 1910

Introduction

In order to become a skilled physician, the student of medicine needs to develop the ability to apply an integrated understanding of contemporary biomedicine in a professional manner to the care of individual patients within their personal, cultural and social context. This is the fundamental act of all medical care. Enabling each medical student to develop the habit of clinical skill performance proficiency is therefore one of the traditional core objectives of undergraduate medical education. Indeed, the achievement of excellence in clinical care requires a deft mix of knowledge, professionalism *and* skill on the part of every physician.

Skill development must occupy a central position in medical education. John Dewey argued that "information severed from thoughtful action is dead, a mind crushing load" (1). Concern for the quality of medical students' clinical skill education has been a recurrent theme in American medical education (2,3). This concern has become especially evident over the past few decades, as reflected in a series of major reports from the Association of American Medical Colleges and others concerning undergraduate medical education in the United States (4-9). The contemporary literature about medical student education also describes deficiencies in clinical skill education and performance, highlighting a growing concern for the clinical education of students (10-28).

Clinical skills education requires an environment in which clinical teachers and students have adequate time to teach and learn from patient interactions across the spectrum of contemporary care circumstances. Physician educators have traditionally assumed that if a student spends enough time in the clinical environment, he or she will acquire the basic skills of generic clinical method. However, fundamental changes occurring in the current academic and clinical environment may be eroding the integrity and effectiveness of this essential learning opportunity (29, 30).

Together, the enormous and continuing growth in medical information and information technology give knowledge acquisition traditional primacy in the educational process of the beginning physician. Furthermore, as financial support for medical education diminishes, institutions give higher priority to the clinical and research productivity of faculty. Such policies drastically limit faculty time and attention to individual student clinical skill learning. It is much more efficient for example, for a faculty member to deliver a lecture to a large number of students than to work with them in a one-on-one clinical skill mentoring format. The implementation of new regulations that impose restrictions upon resident physician work hours may also contribute to lowering the priority that resident physicians give to medical student teaching.

Moreover, the traditional emphasis upon standardized written assessment in determining medical student professional development fosters a knowledge rather than a skill-based paradigm in undergraduate medical education. Not only does a multiple choice test, for example, seem more "objective", it is also a more efficient and less expensive way to evaluate student achievement than observing and assessing individual skill learning outcomes.

Physician specialization has also contributed to the weakening of basic clinical skill education. Specialized faculty, who comprise the sizable majority in medical schools today, often prefer to teach only within their immediate area of expertise. As a result, it can no longer be assumed that faculty in general can or will teach the core of basic clinical skills to students.

Increasing specialization in health care delivery in academic tertiary care hospitals has also greatly diminished the opportunity for students to engage in basic hands-on clinical skill learning. Patient care technicians perform basic pulmonary tests, insert urinary catheters and intravenous lines, draw venous and arterial blood, obtain electrocardiograms, measure hematocrits and blood sugars, observe body fluids under the microscope, position and move the body of bedridden patients, and assist in the performance of bedside diagnostic and therapeutic procedures. Until recently, these basic clinical skills were learned early and performed by medical students. Consequently, students have been gradually removed from opportunities to learn basic care skills and to communicate more intimately with

patients during these elementary care processes. The diminished opportunity to obtain a patient's consent, respond to momentary concerns, and learn more about the patient as a person during these one-on-one interactions serve to limit the student further from clinical performance learning and practice. Equally concerning, students may complete their undergraduate medical studies without sufficient understanding of how simple clinical tasks are done with real patients. Consequently, they are becoming less competent and confident to critically assess the data that results from these activities and to appreciate the nature of performance error. They are also less prepared to instruct others how to best perform these basic and frequently delegated clinical care tasks. They are also less able to contribute in simple but important ways to the care of patients when these services are not otherwise available, as is frequently the case outside of tertiary care institutions.

Increasing regulatory and payor influences constrain the conduct and governance of clinical teaching activities, resulting in the exclusion of students from active participation in the care of patients. Such influences have further undermined what has been traditionally a permissive educational milieu within which the medical student would otherwise participate in the examination of the patient or in maintaining the clinical record. These forces marginalize the role of the student physician in clinical care and therefore inhibit skill learning. Consequently, there is insufficient opportunity to develop the clinical competence and confidence that uniquely results from active skill learning.

Fortunately, the process of evaluating both medical practice and medical education is undergoing a paradigm shift. Measurement of performance outcome is gradually replacing process evaluation alone. Private and governmental insurers of health care increasingly use pay-for-performance to design care reimbursement schemes. Insurers are relying more on patient care outcomes than upon healthcare delivery process information.
In parallel fashion, learner performance outcomes are replacing learner knowledge acquisition and educational process as the essential elements of evaluation in medical education (3). The Accreditation Council on Graduate Medical Education (ACGME) now requires the evaluation of postgraduate clinical trainee performance and residency program quality in six outcome domains. (31). Further, graduating medical students in the US must now take a clinical skills evaluation component of the United States Medical Licensing Examination (USMLE), a process which is being reinstated after an almost 40-year absence from this national graduate physician certifying process (32). Clinical skill evaluation is already a part of the certification process of foreign medical graduates who wish to practice in the United States (33), as well as in the United Kingdom (34). Many schools in the US and worldwide increasingly emphasize clinical skills education in the form of standardized patient teaching and evaluation programs, simulation exercises and more recently, the development of clinical skills education facilities (9).

The Contemporary Medical Education Challenge

Because medical undergraduate clinical skill education has traditionally been an implicit process, few medical schools in the United States have an explicit and comprehensive plan that describes the clinical skill education activities expected of faculty and students (9). Since the Flexnerian era, which promoted the development of the teaching hospital, educators have implicitly expected students to learn the art and science of applied clinical care through exposure to practicing clinicians and from active participation in the care of patients in an educationally permissive clinical environment. Through this mechanism, students had the opportunity to learn through repeated skill practice. Unfortunately, as time with faculty and resident teachers diminishes and opportunities for skill learning and practice have become more limited, adequate time for students' basic skill learning has decreased proportionally.

The lack of curricular explicitness regarding what students should be learning to do as clinicians has therefore become a major educational barrier to the achievement of clinical skill development. Making the tasks of this aspect of clinical education more explicit in the undergraduate medical curriculum is therefore critical in enabling meaningful skills education within our clinical environment. This is the primary challenge confronting us in contemporary undergraduate medical education. It is hoped that the recommendations contained in this document will contribute to a renewed effort by encouraging a more enlightened dialogue among educators regarding the clinical skills education of medical students.

What is a Clinical Skill?

In the care of the patient, a practicing physician performs a purposely selected and integrated set of individually skillful acts that are pertinent to each patient encounter. These include, for example, engaging the patient in a professional relationship, taking a clinical history, performing a mental and physical examination, performing or initiating clinical tests or procedures, and undertaking diagnostic and therapeutic interventions. From an analytic perspective, these component acts of medical care reflect the generic **competencies** which comprise the practitioner's basic clinical method. Within each of these general competency categories, there exist a wide variety of more specific and individual clinical skills such as engaging the reticent patient, taking a sexual history, examining a specific body part, ordering a selected clinical test, or initiating care for an acutely ill patient with a defined clinical problem.

CLINICAL PRACTICE

▲

CLINICAL METHOD
COMPETENCIES

▲

CLINICAL SKILLS

Thus, a single clinical skill is any discrete act within an overall process of patient care. Clinical skills are the foundation elements of the clinical method competencies upon which clinical practice is founded. Although the complexion of a set of skills utilized may vary with the patient or the kind of clinical problem encountered, or with the specialty emphasis of the practicing physician, certain universal clinical practice competencies exist which together will be referred to in this document as **generic clinical method.**

Because skill *learning* requires the demonstration of skill proficiency, the performance of a clinical skill must be observable. For the purpose of medical education, the taskforce defines a **clinical skill** as any *discrete and observable act of clinical care.* Skill competency cannot be established through unobserved examination alone. Observation is necessary to evaluate performance. Moreover, learners need repeated and constructive feedback in order to continually refine and improve clinical skill performance. Thus, the evaluation of skill proficiency requires the direct involvement of a trained observer, such as a supervising physician or an experienced patient. Ultimately, the achievement of excellence in clinical practice results from continually improving one's clinical method competency. This in turn results from the repeated opportunity to perform and practice basic clinical skills.

Task Force Recommendations

Recommendation #1: Clinical Skill Education Principles

The task force recommends that medical schools adopt an explicit set of principles to guide the design and implementation of a comprehensive clinical skills curriculum.

Skill education principles are necessary in order that the teacher, learner and institution share a common understanding about the skill education process. Without this shared understanding, professional skills education may remain misunderstood, undirected and not fully accepted within the clinical environment. The task force recommends that skills education be guided by the following principles:
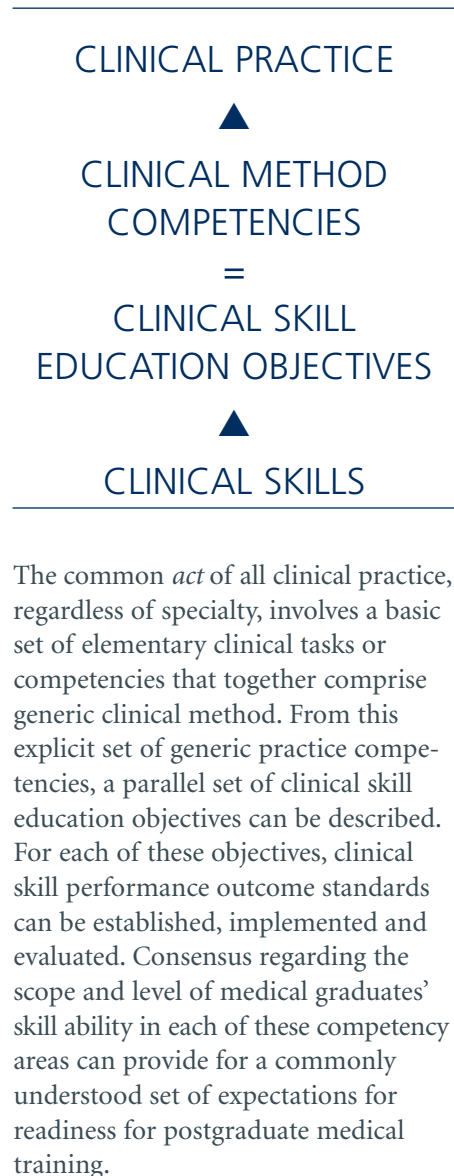
1. Skill learning is a professional *habit* that must be nurtured in each student throughout her or his general professional education. Developing competency in a set of specified skills is important. However, engendering the habit of skill learning should be the ultimate goal of a clinical skills curriculum;

2. Clinical skills education is fundamentally *developmental* in nature. The opportunity for a continuous and graduated set of skill learning opportunities should exist over the four-year undergraduate curriculum. For example, it is important to place the clerkship experience within the context of the overall undergraduate medical curriculum. Some clinical skills can be learned in anticipation of beginning clerkships. Others may need to be learned or further refined after the clerkship experience;

3. Teaching *and* assessment are *interdependent* in optimizing the effectiveness of a curricular process. The results of students' skill outcome assessments should guide the design and improvement of skills learning opportunities as much as they should validate and shape the effectiveness of clinical skills teaching;

4. *Faculty* have the *primary role* of ensuring the clinical skills education of students. They are also responsible for ensuring the quality of resident teaching of clinical skills to students. This task includes the elements of identifying and utilizing opportunities for skill learning;

5. Each *student* has the responsibility for achieving his or her individual clinical skill competency. The habit of skill learning is essentially a self-directed professional process. Most clinical skills cannot be learned best without a coach or mentor, but at a minimum, the student commits to ongoing practice and honesty in self assessment. Student and faculty together share the responsibility for identifying and utilizing skill learning opportunities;

6. Conceptualizing and evaluating clinical skill education content and outcomes must reflect a *patient-centered service philosophy*. Because clinical care is ultimately patient centered, and because the goal of clinical education is to develop skill in *direct patient care*, clinical education must subscribe to this same patient-centered care philosophy.

Recommendation #2: Generic Clinical Method: Skill Learning Objectives

The task force recommends that medical schools adopt an explicit set of clinical skill education objectives. These objectives should be a reflection of the generic practice competencies required to engage in the care of the individual patient. Together, these competencies define a comprehensive scope of basic clinical method.

CLINICAL PRACTICE
▲
CLINICAL METHOD COMPETENCIES
=
CLINICAL SKILL EDUCATION OBJECTIVES
▲
CLINICAL SKILLS

The common *act* of all clinical practice, regardless of specialty, involves a basic set of elementary clinical tasks or competencies that together comprise generic clinical method. From this explicit set of generic practice competencies, a parallel set of clinical skill education objectives can be described. For each of these objectives, clinical skill performance outcome standards can be established, implemented and evaluated. Consensus regarding the scope and level of medical graduates' skill ability in each of these competency areas can provide for a commonly understood set of expectations for readiness for postgraduate medical training.

The task force recommends that the following twelve clinical practice competencies be included in any definition of generic clinical method:

1. the ability to demonstrate *professional* behavior in the act of medical care (35,36). These include:

   a. respect
   b. responsibility and accountability
   c. excellence and scholarship
   d. honor and integrity
   e. altruism
   f. leadership and interdisciplinary collaboration
   g. caring and compassion

2. the ability to *engage and communicate* with a patient and to build a physician-patient relationship for the purposes of information gathering, guidance, education and support. This competency includes the ability to interact with patients and their families under a broad range of personal and clinical circumstances. It necessarily includes the ability to also build relationships with peers, teachers, healthcare professionals, and others who may be involved in the care of patients and in the education thereof;

3. the ability to *apply scientific knowledge and method* to clinical problem solving;

These first three objectives describe abilities that students have likely begun to develop in their personal and educational experiences prior to medical school. The purpose of the undergraduate medical curriculum is to advance and refine these foundational competencies as they apply to the clinical care of the individual patient. As well, these all-encompassing abilities serve to enable the development of performance proficiency in each of the following five component clinical competencies:

4. the ability to take a *clinical history*;

5. the ability to perform a *mental and physical examination*;

6. the ability to select, justify, and interpret *clinical* tests and imaging;

7. the ability to perform basic *clinical procedures*;

8. the ability to record, present, research, critique and manage *clinical information*;

These latter five objectives identify the traditional *analytic* components of basic clinical method. They represent the common tasks performed in any medical encounter and provide the clinical information base needed to undertake the activities specified in the following three objectives:

9. the ability to *diagnose* clinical problems including differential diagnosis, clinical reasoning and problem identification;

10. the ability to *intervene* in the natural history of disease through preventive, curative and palliative strategies, including the utilization of appropriate health care system resources;

11. the ability to *formulate a prognosis* about the future events of an individual's health and illness based upon an understanding of the patient, the general natural history of disease, and upon known intervention alternatives. Each of these is essential for planning for individual health care outcomes;

Objectives 9 through 11 represent the universal competencies required to perform the three main functions for which patients seek the care of physicians: deciding what, if any, clinical problems exist, what might be done to help prevent or care for a condition, and what will happen in the future with or without medical intervention. Through skillful incorporation of an integrated amalgamation of the first eight clinical skill competencies, these latter three represent the *synthetic* competencies of the physician's professional performance capability that most directly determine the nature and quality of clinical care.

Finally, objective 12 represents the most advanced category of clinical skill competency, that which involves the practical and daily application of clinical method to the actual clinical problems of individual patients:

12. the ability to provide clinical care *within the practical context* of the individual patient-physician relationship. This context includes taking into account the patient's age, gender, personal preferences and culture. It also includes adapting clinical care to practical encounter-time constraints, economic limitations, individual and family considerations, and to the availability of health care system resources. Ethical and legal perspectives also influence clinical action and need to be considered in clinical care management. This includes patient advocacy, health policy and public health concerns.

These twelve basic clinical competencies describe the elementary skill performance dimensions of patient care in general, and collectively define the scope of basic clinical method. They correspond directly to the competencies currently defined for postgraduate medical education. In this regard, they differ primarily in regard to specificity. Whereas the postgraduate competencies are described in more synthetic terms, the competencies for achievement in the undergraduate medical curriculum are described in terms which specifically emphasize the individual elements of basic patient care. The differences between these schemes reflect the developmental nature of clinical skill learning.

Recommendation #3: Specific Clinical Skills

The task force recommends that medical schools identify more explicitly the specific skills that should be learned during the undergraduate medical curriculum.

In an effort to initiate a consensus regarding what skills might best be learned in the undergraduate medical curriculum, the task force has created a menu of potential skills. The generic lists of skills in the appendices of this document have been compiled through a review of clerkship discipline medical education documents, selected medical school curricula, and other published literature. Medical schools are encouraged to adopt an explicit and

reasonably standard yet comprehensive approach to the skills which students should be able to perform before graduation. The taskforce recognizes the variability in educational intent and learning opportunity that characterizes institutions throughout the United States.

Communication Skills

It is important that communication skills be guided by the principles that govern professional skill development in general. Achieving effective professional communication skill is a *continuous* process developed over a lifetime of practice. Because individual communication skill learning requires awareness of one's personal communication style, the educational process in this respect must be *learner centered*. Because communication involves at least two interacting individuals, the learning experience must also be *relationship centered*, with appropriate attention to learning to observe, understand and facilitate relationship-building. Finally, because improving communication skill is a lifelong process that relies upon the substrate of personal experience for identifying areas for further skill development, opportunities for *reflective practice* need to occur continuously and *explicitly* in one's professional education, beginning and throughout the four years of undergraduate medical education. Without thoughtful, structured and continuous integration of communication skills teaching throughout the curriculum, students may receive mixed messages. For example, being taught to be open, reflective and patient-centered in preclinical communication skill courses may contrast with witnessing directive,

GME COMPETENCY	UME COMPETENCY
Professionalism	Professionalism
Medical Knowledge	Application of Scientific Knowledge
Communication Skill	Patient Engagement & Communication
Patient Care	History-taking Mental & Physical Examination Clinical Testing Clinical Procedures Information Management Diagnosis Skill Treatment, Prevention & Palliation Prognosis Skill
Practice-based Learning	All categories
Systems Based Practice	Care in Context Skills

doctor-centered communication during clinical clerkships. Preclinical and clinical educators must coordinate their efforts to continually address these issues in each school's curricular process.

In applying the list of communication skill competencies (Appendix A) to the medical curriculum, the term "competency" denotes the larger communication process within which several individual skills are embedded. For example, element one is "build the doctor-patient relationship". This competency consists of many skills and/or tasks such as greeting the patient; use of the patient's name; ensuring patient readiness and privacy; removing barriers to communication; ensuring comfort and putting the patient at ease; use of appropriate eye contact and body posture; appropriate use of touch; nonverbal gestures; language selection; eliciting or recognizing and addressing emotion; making facilitative comments with appropriate timing, et cetera.

As another example, element three is "gather information". The skills involved in this competency might include: use of open-ended beginning statement; use of non-focusing facilitating skills such as silence or neutral utterances; summarizing; allowing the patient the opportunity to add or clarify information; observing clues such as: nonverbal cues, physical characteristics, accoutrements, environment, self; utilizing transitions effectively from open-ended to closed questions; avoiding multipart questions; avoid leading questions; probing for undisclosed issues in sensitive areas (sex, illicit behavior, poor eating habits, use of substances, failure to live up to own standards, mistreatment of others,

noncompliance); providing reassurance; enlisting collaboration; and formally assessing mental status when appropriate.

For the undergraduate medical curriculum, the task force recommends two levels of communication skill competencies: core and advanced.

The core competencies should be introduced from the beginning of the curriculum. For these, students should achieve a minimum level of proficiency before beginning clinical clerkships. For example, they should be able to build the doctor-patient relationship, open the discussion, gather information and understand the patient's perspective. This includes the patient's view of illness causation and the affective dimensions which they experience. They should eventually be able to begin sharing information with patients, reach agreement on problems and plans, and manage closure. Additionally they should begin to develop an approach to diagnostic, therapeutic, preventive and prognostic reasoning, and to learn and practice basic oral and written case presentation skills.

Clerkship students should advance their skills in the core areas, especially gathering and sharing information and reaching agreement on clinical problems and plans. They should be encouraged to continuously refine their clinical reasoning skills and improve the accuracy, efficiency and clarity of oral and written case presentation skills. Advanced competencies should be practiced and acquired in the clerkship and during the 4th year of the curriculum. This latter year should provide continuing opportunities to develop and further refine communication competency. Communication skills teaching should include educational

opportunities for enhancing personal awareness, self-reflection and personal well-being. Patient-centered interviewing skills need continued reinforcement throughout the four years.

(see Appendix A)

**Mental And Physical Examination Skills
Basic Clinical Testing And Procedure Skills**

The task force has developed a large but not necessarily complete list of mental and physical examination skills, and basic testing and procedure skills that can be learned during medical school. This detailed list of discrete skills has been gathered from a review of selected medical school curricular sources and published literature (see Specific Clinical Skills references). These skills are organized largely by organ system. Where a specific skill has been identified and recommended in the published curriculum of a clerkship discipline, that source is identified for each skill.

Although it is implicitly assumed that all medical students will acquire proficiency in many of these skills, generally accepted standards regarding what skills should be learned and how well they can be performed during the undergraduate medical experience do not currently exist. Medical schools vary widely in the degree to which they do or do not specify what skills students are expected to learn. Similarly, no universally explicit expectations exist between undergraduate and postgraduate medical disciplines on this same issue. This area requires further attention within and among medical education organizations.

The mental and physical examination skills, and clinical test and basic procedural skills listed in the appendices of this document range from basic to very advanced. They are intended to serve only as a resource that schools may utilize in determining which skills their students should learn, and at what level, depending upon each school's mission and goals. For example, a school where graduates are encouraged to enter rural practice might emphasize more intense procedural skill proficiency compared to those whose students typically enter other clinical practice settings.

{see Appendix B}

Recommendation #4: Categories for Organizing Clinical Skill Learning Opportunities

The task force recommends that the selection of opportunities for clinical skill learning in undergraduate medical education be organized using four clinical education perspectives: generic, problem-based, discipline specific and continuum of care.

In medical education, clinical skill development begins at a generic level and progressively evolves from a "knows how" to a more discriminating "knows when" level of clinical practice ability.

1. **Generic clinical skills**

   At the generic skill learning level, the student begins to learn and practice how to perform basic clinical skills. At this level, there are three broad categories of skills:

1. *Communication skills.* This includes essential clinical interactions such as patient engagement and relationship building, general interviewing skills, clinical history-taking, counseling, teaching and reflection with patients, and the recognition of common barriers to successful doctor-patient relationships;

2. *Mental and physical examination skills.* This category includes skill in detailed observation of the anatomy and function of human biological organ-systems;

3. *Basic clinical testing and procedural skills.* These include a variety of hands-on skills required to obtain basic information about organ-system function or to perform elementary care processes.

As clinical method learning becomes more advanced, the student continues to learn and practice skills but with a greater emphasis upon direct care of the patient and the appropriateness and timing of clinical skill applicability. Two schemes are traditionally utilized to organize skill learning at this level. These include:

2. **Problem-based clinical skills**

   Case-based learning, as in the clerkship setting, creates the opportunity to teach and learn a more problem-focused method of skill performance competency. Such schemes classify skills according to patient complaint or by commonly encountered diagnoses, for example the skill of evaluating chest pain, fever, diabetes or the potential for suicide.

3. **Discipline-specific clinical skills**

   Many generic clinical skills can be learned and practiced during any clerkship. Other skills are discipline-specific and more likely to be learned in selected clerkships. For example aseptic technique might best be learned and repeatedly practiced in surgery while preventive health skills are learned in primary care clerkships. The major clinical disciplines have published recommended undergraduate medical curricula which describe specific skills for student learning based upon lists of commonly encountered clinical problems, selected tests and frequently performed procedures (see Clerkship Organization Published Curricula references).

The ultimate goal of medical education is to enable the clinician to skillfully apply clinical method at the highest level of performance competency in whichever specialty career is pursued. It is traditional to begin the formal clinical education of medical students by exposing them to the major care disciplines on the assumption that such exposure allows them to appreciate how clinical method is applied throughout the continuum of available care.

4. **Continuum of care skills**

   Since the Flexnerian era, comprehensive exposure to the continuum of clinical care has been implicitly assumed to occur as a result of student rotations through the traditional core clerkships in teaching hospitals. The increasing diversity of medical specialties coupled with the fact that most clinical care is now provided in the outpatient setting, has dramatically limited the

case mix of the teaching hospital and consequently the breadth of clinical exposure for the student there. This deinstitutionalization of patients once seen in the in-patient setting requires an alternative scheme if we are to guarantee that students have a representative exposure to the continuum of contemporary care. As in the past, such a scheme is best defined by the nature, stage and severity of illness and by the form of care provided to patients typically found in that setting.

In order to achieve the goal of exposing students to the continuum of healthcare delivery so as to enable them to experience clinical method learning broadly, **the task force recommends that students' clinical case exposure include patient care experiences in the following venues of care:**

a. outpatient emergency care
b. acute care (outpatient and inpatient)
c. critical care
d. chronic care (outpatient and institutional)
e. palliative and end of life care
f. wellness and preventive care
g. population-based care (community, public health)

Recommendation #5: A Developmental Perspective

The task force recommends that medical schools adopt an explicit developmental approach to the design of clinical skills education curricula including the designation of expected levels of skill performance proficiency throughout the four- year curriculum.

Professional skill learning is a developmental process that is continually shaped and refined throughout the physician's career as a function of sequentially more challenging clinical exposure and self-directed proactive professional development. Predoctoral clinical skills represent those that a medical student would be expected to perform proficiently, initially under direct supervision but with independent capability by the time of graduation.

In the curricula for undergraduate medical education there exist three general levels of clinical skill ability. They can be represented in either of two ways:

1. Basic		*Preclerkship*
2. Clerkship	vs	*Clerkship*
3. Advanced		*Post-clerkship (pregraduate)*

The task force recommends the adoption of an explicit preclerkship-clerkship-post-clerkship scheme in order to promote a continuous developmental paradigm for the clinical skills education of medical students. Linking levels of skill development within the existing structure of the curriculum helps to ensure that all of the faculty, courses and clerkships are integrated in a continuous clinical skill education effort.

In this scheme, the emphasis in the preclerkship curriculum is on preparing the student to acquire sufficient skill proficiency to participate in clerkship level clinical care activities. This scheme also implies that many clinical skills will not be fully mastered by the completion of the clerkship year and need further development during the final curricular year. Furthermore, in order to be prepared for post-graduate training responsibilities, students need repeated opportunities for advanced clinical skill practice.

Developmental Performance

Many educators have articulated explicit levels of educational development. Such alternative schemes help to conceptualize levels of skill learning and performance achievement (see Developmental Learning references).

Bloom's Taxonomy of Cognitive Skills (1956)	Dreyfus Levels of Skill Performance (1986)	Miller's Learning Pyramid (1990)	Pangaro's RIME Scheme (1999)
Knowledge	Novice	Knows	Reporter
Comprehension	Advanced beginner	Shows	Interpreter
Application	Competent	Shows How	Manager
Analysis	Proficient	Does	Educator
Synthesis	Expert		
Evaluation	Master		

In the 1950s, Bloom described a taxonomy of cognitive skills which includes six levels of ability, each encompassing the ones below it. Its purpose was to identify a sequential process of learning from the simple to the most complex in order to guide the establishment of a developmental curriculum. Bloom's scheme explicitly addresses the "cognitive" or mental processes that are involved in progressive learning. The inter-personal, emotional and professional aspects of development (collectively called the "affective domain" by Bloom and colleagues) are not included in this particular taxonomy.

Miller approached the matter of a developmental strategy in medical education more practically with a 4-level learning pyramid focused upon stages of clinical skill learning. This terminology specifies what a learner is expected to demonstrate as progress is made toward the apex of the pyramid ("does"). The pyramid is intended as a framework for assessment of learner performance, implying that certain assessment methods exist for each level of training. For example, for the clinical skill of taking an alcohol history, the first step would be that the student "knows" some interviewing strategies that would apply, such as the "CAGE" format, and can demonstrate mastery of the terminology and content ideas to be used in a written examination. Next, the student might be asked to demonstrate or "show" where such an interviewing technique might fit in a patient interview such as in a complete examination or with a patient who experiences frequent injury. "Showing how" the technique is used requires that the student perform the technique in an actual or simulated patient interview arranged to practice this

specific skill. Finally, the student is expected to perform ("does") this interviewing technique in an actual patient encounter in the clinic or hospital.

In a more recently utilized characterization of a developmental strategy for postgraduate medical education, Dreyfus, *et al* advance six levels of clinical skill performance. The terms in this developmental scheme are generic and do not elaborate upon what a successful student might actually be capable of doing. These terms are less behavioral and less concrete than those of Miller's pyramid or the RIME scheme (see below). On the other hand, the general nature of the Dreyfus terminology allows the faculty of a school to create its own vision of clinical skill performance gradation. This model also fits well with an undergraduate-postgraduate skill development continuum perspective.

Pangaro published an alternative four-level developmental scheme as an assessment strategy, the Reporter, Interpreter, Manager, Evaluator (RIME) framework. In contrast to Bloom's emphasis upon cognitive skills, the RIME model provides a synthetic vocabulary for clinical performance assessment in which skills, knowledge and professionalism are combined in each level of the student's progressive roles. It utilizes basic terms to visualize students' ongoing progress in developing clinical method as they work with patients.

To become a reliable *reporter* the student must skillfully and consistently gather and communicate clinical information with accuracy, organization and respect for patients and responsibly fulfill basic professional commitments required to participate effectively in

the clinical domain. The *interpreter* role requires a higher level of both skill and knowledge. The student must prioritize and analyze clinical information, for example, consistently offering a reasonable differential diagnosis. The transition to interpreter requires a greater level of confidence, and acceptance of personal responsibility for actively thinking through patients' problems. For a student, being a *manager* involves more knowledge, more skill and more maturity, including acceptance of responsibility for shared risk-benefit clinical decision-making, systems-based care of patients, and performing basic clinical procedures with consent and sensitivity to patient's preferences and needs. An individual who can assume the role of an *educator* can self-correct in mastering the first three levels. At this level, one is capable of getting to a deeper level of evidence in clinical problem-solving, and of enabling patients and other healthcare professionals to understand more complex problems.

In the RIME scheme, the novice student would be expected to become proficient at the "reporting" aspects of, for instance taking an alcohol history: gathering the correct information with respect for the patient's privacy and autonomy, communicating this to faculty, and documenting it in the appropriate written format. At the "interpreter" level, the student would be expected to arrive at correct conclusions about whether the patient did in fact have a problem with alcohol, and whether the term "alcoholism" (or some equivalent) should be applied. At the "manager/educator level" the student would be expected to suggest appropriate diagnostic and or therapeutic steps, and would be able to negotiate

with the patient on what would actually be done, and be able to monitor and self-correct his/her own interaction with the patient, seeking consultation or deeper study as appropriate.

The RIME terms can be used as a common and developmental strategy for advising students about the "next step" in their personal development of clinical method. In most schools, the basic skills of the *reporter* are introduced in the first year and practiced in the second year. Faculty can decide what level of proficiency is needed to earn entrance to work with patients in clerkships. Consistency in reporting should be a passing criterion by the end of third-year clerkships and as a requirement for eligibility for undertaking advanced responsibilities of a sub-intern. Consistency in sharing decision-making with patients (*manager*), or of self-improvement in clinical skills performance (*educator*) would be indications of higher achievement.

The task force does not advocate any one approach to structuring the developmental stages which underlie a clinical skills curriculum. For a given audience, one set of terms may have advantages, such as consistency with a school's theoretical framework across the four years of the curriculum. However, the task force does recommend that curricula contain explicit and increasing expectations of performance throughout the four years of medical study. Further, it is recommended that those who are responsible for the design of skills curricula and assessment should achieve terminology that can be widely acceptable to faculty across disciplines, and throughout the four years of medical school. By including

explicit developmental levels in the design of a skills curriculum, it becomes easier for student and teacher to identify and apply the element of progressive depth to professional skill development over time.

Recommendation #6: Essential Skills Curriculum Programmatic Elements

The task force recommends that in order to ensure satisfactory clinical skill ability on the part of every graduating medical student, a clinical skills education program should contain the following essential elements:

1. a set of explicit *clinical skill learning objectives* which define the scope of basic *clinical method*, that set of specific performance tasks which reflect the generic competencies of the act of medical care. It is this set of objectives which provide the overall template for the teaching and learning of clinical skills, and for the evaluation of clinical skill educational outcomes;

2. a set of *specific clinical skills* that students are expected to learn during the undergraduate medical experience;

3. designation of the role and expectations of clinical skill *teachers and mentors;*

4. designation of clinical skill *learning and practice opportunities* throughout the 4 year curriculum;

5. a clinical skills *assessment and feedback* process that exists throughout the 4 year curriculum to continuously measure and improve students' clinical skill development and establish minimal and desirable competency levels;

6. designation of specific opportunities for clinical skills *remediation and re-evaluation;*

7. an overall *developmental* skills education strategy;

8. implementation of a process of *program evaluation* to assure that the goal of clinical skill proficiency becomes measurable and is achieved for each potential graduate, and for the curriculum as a whole.

Synthesis: Implications for Clinical Skill Teaching

Compared to knowledge acquisition, clinical skill education involves unique teaching and learning behaviors that require observed performance and practice repetition. Certain aspects of skill performance can be learned and practiced in simulated circumstances such as with standardized patients, in computer and mechanical simulations, role playing scenarios and small group workshops. These strategies can also be used to supplement actual clinical learning experiences. Before graduation, the student must learn *to perform skillfully in the direct care of patients.* Ideally, the clinical experience should fully engage the medical student in this latter process, as illustrated in the following general clinical scenario:

During the care of a patient, the opportunity for the performance of a certain clinical skill arises. It might involve any of a number of communication, examination, clinical testing or basic procedural performance skills. At the outset of the clinical encounter, the patient's permission is required and obtained to involve the direct participation of the student. The teacher may already know or momentarily take the time to identify the student's current level of skill ability. The teacher may then demonstrate the skill by performing it in a way that addresses the student's learning needs. Alternatively, the student may be asked to demonstrate her or his ability by performing the necessary act of care with or without the assistance of the mentor. The teacher and student then

make certain that the necessary care has been accomplished and explained to the patient, and then assist in bringing the care activity with the patient to closure.

The teacher and student discuss the experience with particular emphasis upon evaluation of the quality of the act, concluding with feedback so that the student learns something from the teacher and the performance experience which advances the student's skill ability. From this interaction, the teacher also learns something about his or her own ability to influence this student's clinical skill development. Closure of the educational experience ideally includes an educational plan which anticipates the next step in skill learning on behalf of the student, and upon identifying pertinent resources for continued skill learning.

Analysis of this scenario identifies many of the core elements of effective clinical skills education. These include a skilled and willing *teacher* who is knowledgeable about the individual student and patient and able to judge the level of appropriateness for their participation in the clinical care activity. It also involves a *student* with appropriate readiness for skill learning, for which the student has been previously prepared. This opportunity also requires an appropriate service-oriented and patient-centered *opportunity* for clinical skill performance, as well as an informed and willing patient for whom privacy, comfort and safety are guaranteed. When accompanied by an attitude of shared professional responsibility toward the patient between student and teacher, the likelihood of patient cooperation is

enhanced. In order to complete the learning opportunity, educational content and process evaluation needs to follow including meaningful feedback between teacher and student. The educational value of this skill learning opportunity is maximized when it occurs within a continuous clinical skills education process that places the act within a student's overall learning experience.

Each of these elements relates to the individual clinical education scenario described above. At an institutional level where many students and clinical teachers are involved, a number of important skill education considerations are also raised:

1. The overall curriculum: are there explicit clinical education objectives for identifying the generic competencies to be mastered by all students? What are the specific skills to be learned for each competency? Have levels of skill development been defined within the curriculum? Do the clinical experiences required for clinical skills education exist throughout the curriculum? Is there adequate total case exposure opportunity for each student? What are the programmatic alternatives if skill learning is insufficiently attained and remediation required?

2. The clinical teachers: are they motivated and supported for clinical skill teaching? Are they appropriately prepared for teaching at the relevant student level? Are they teaching students at every opportunity and addressing the essential elements of the skills education scenario in their teaching style?

3. The students: are they learning the prescribed skills and are they able to demonstrate a defined level of competency? Do they have the opportunity to be self-directed in addressing their own level of skill development? Do they have repeated opportunities for skill practice and remediation? Have they been adequately prepared to participate in active clinical skill learning when the opportunity to do so arises? Do they respond to performance feedback in a way that reflects continued skill learning? Has the student demonstrated evidence that he or she accepts responsibility for their own improvement?

4. The patients: Within the clinical environment, is there a culture of learning such that patient expectation and acceptance of skills education on behalf of students is encouraged? Are the issues of informed consent and patient safety sufficiently addressed in the activities of the clinical education environment? Are there proactive mechanisms in place to address patient concerns and medical error?

5. The institution: is there sufficient time, space and administrative support allotted for skills education? Does clinical skill education on behalf of students have parity among the missions of the institution?

6. Educational outcomes: Does the information exist with which to evaluate whether the curriculum is achieving its overall clinical skills education outcome goals?

Conclusion

Clinical skills education in the undergraduate medical curriculum is fundamental to the development of basic clinical method and the lifelong achievement of excellence in clinical practice. There is much to consider in enhancing this basic element of clinical education on behalf of students and in making it explicit in the curriculum. Improving skills education ultimately involves more than attention to curriculum design alone. It requires expanded opportunity for students' participation in clinical care, and improved mentoring by both faculty and residents. It can be augmented with unique teaching methods such as clinical skills workshops, simulation training, and portrayed clinical scenarios by standardized patients. Improved clinical skills teaching and assessment facilities can also help to bring focused attention to skills education activities. Perhaps most importantly, coupling a more explicit clinical skills curricular process with the provision of appropriate administrative support and enhanced faculty development will lead to needed advances in this fundamental process of undergraduate medical education.

Postscript

"In what may be called the natural method of teaching, the student begins with the patient, continues with the patient, and ends his studies with the patient, using books and lectures as tools, as means to an end. The student starts, in fact, as a practitioner, as an observer of disordered machines, with the structure and orderly functions of which he is perfectly familiar. Teach him how to observe, give him plenty of facts to observe and the lessons will come out of the facts themselves. For the junior student in medicine and surgery it is a safe rule to have no teaching without a patient for a text, and the best teaching is that taught by the patient himself. The whole art of medicine is in observation, as the old motto goes, but to educate the eye to see, the ear to hear and the finger to feel takes time, and to make a beginning, to start a man on the right path, is all that we can do. We expect too much of the student and we try to teach him too much. Give him good methods and a proper point of view, and all other things will be added, as his experience grows."

Quoted in The Life of Sir William Osler, volume 1, pg 596-597, Harvey Cushing, 1925, Oxford at the Clarendon Press (reprinted by the Classics of Medicine Library, Leslie B Adams pub, Birmingham, AL, 1982)

Appendix A:
Communication Skills

Core competencies:

1. Build the doctor-patient relationship

2. Open the discussion

3. Gather information

4. Understand the patient's perspective including the patient's spirituality/religious beliefs/meaning and illness model (intercultural communication)

5. Share information; *e.g.*, communicate diagnostic, care plan and prognostic reasoning

6. Reach agreement on problems and plans, including:

   Shared, informed decision-making and informed consent;

   Appropriate discussion of psychological and behavioral issues;

   Discussion of medical error and error reporting

7. Recognize and probe, if necessary, for selected and common neuropsychiatric and psychosocial problems including:

   Altered levels of consciousness (*e.g.*, delirium),

   Impaired memory, concentration, use of language (*e.g.*, dementia),

   Psychotic symptoms (thought disorder, paranoia, hallucinations),

   Abnormal mood states,

   Violence risk,

   Suicide risk,

   Substance abuse,

   Eliciting social factors that contribute to or result from patient's medical conditions

8. Provide closure

9. Demonstrate respect, empathy, responsiveness and concern regardless of the patient's problems or personal characteristics

10. Maintain personal awareness/self-reflection/well-being including identifying his/her own responses to patients

11. Oral case presentation

12. Written case presentation

13. Managing time in the encounter

Advanced competencies:

a. Assessment

   1. Assessing patient's comprehension of information presented verbally or in writing

   2. Capacity to recognize and respond interpersonally to various common forms of psychological distress and psychopathology

      a. depression

      b. anxiety and panic

      c. somatization

      d. psychosis

      e. sequelae of trauma and violence

   3. Assessing risk of violence or suicide

   4. Assessing substance abuse

   5. Capacity to inquire about meaning and spirituality in patient's life

   10. Assessing health literacy

   11. Assessing decisional capacity

   12. Assessing functional impairment/disability

   13. Assessing pain in its biological, psychological and social dimensions

   14. Assessing genetic influences on disease

b. Counseling & Teaching

   1. Counseling for behavior change

   2. Obtaining informed consent

   3. Ability to teach in a patient-centered style

   4. Brief intervention for substance abuse

   5. Teaching colleagues and other healthcare professionals

   6. Eliciting and providing performance feedback

   7. Counseling regarding genetic risk of disease

c. Special Focus

   1. Attaining comfort in asking difficult questions

   2. Communicating bad news

   3. Communicating about medical errors

4. Engaging in end-of-life commu-
   nication, *e.g.*, discussion of
   advanced directives, end-of-life
   wishes, DNR discussion,
   managing the discussion about
   the transition from curative to
   palliative care

5. Communicating with or via an
   interpreter

6. Interviewing an adolescent
   patient

7. Obtaining a developmental
   history from a child's parent

8. Obtaining an appropriate devel-
   opmental history from a child

9. Eliciting and evaluating
   developmental factors in adults,
   e.g., early adverse or protective
   experiences, early family
   environment/social class/cultural
   identification, prior experience
   of family illness. Assessment of
   attainment of age-appropriate
   goals, *e.g.*, relationships, career

10. Interviewing an elderly patient

11. Interviewing culturally diverse
    patients and adjusting to
    language barriers

12. Communicating with family
    members

13. Conducting a family interview

14. Communicating and collaborating
    with other members of the
    healthcare team, including oral
    presentation skills

15. Identifying and responding to
    an impaired colleague

16. Successfully negotiating
    difficult interactions (*e.g.*,
    anger, seductiveness, cognitive
    impairment, mistrust, potential
    assaultiveness, transference,
    countertransference)

17. Discussion with patients about
    sexuality, sexual orientation,
    sexual functioning and
    reproductive choices

Appendix B:
Mental & Physical Examination Skills
Clinical Testing and Procedural Skills

Mental & Physical Examination Skills	**Testing & Procedure Skills**

General

Appearance (general descriptive alternatives)	(8)
Vital signs	
Height	(8)
Weight (various methods)	(8)
Body mass index	(5, 8, 9)
Pulse (rate, rhythm, volume)	(1, 5, 6)
Blood pressure (various sites, body positions)	(1, 5, 6, 8, 9)
Temperature (methods, sites, varying results)	(8)
Growth chart plotting (peds)	(8)
Head circumference	(7, 8)
Body touch & handling	(8)
Body immobilization technique (*e.g.*, neck, limbs)	(5, 7)
Odor (breath & body)	

General

Body handling & movement	
Body handling & positioning in OR	(5)

Cardiovascular

Palpate precordium (incl PMI)	(6, 8)
Identify S1 (tricuspid, mitral)	
Identify S2 (pulmonary, aortic)	
(Locations, intensities, splitting)	
S3, S4 gallops	(5, 6)
Murmurs	(5, 6)
Heaves, thrills, sternal lift	

Cardiovascular

Venipuncture/venous cannulation (needle, catheter)	(5)
Venus infusion technique	(5)
CVP interpretation	(5)
Arterial puncture	(5, 6)
Perform an electrocardiogram	
Electrocardiogram interpretation	(5, 6)

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills		Testing & Procedure Skills	
Clicks, snaps, rubs	(5, 6)	Chest x-ray interpretation	(5, 6, 8)
Arterial pulse exam (all locations incl. auscultation), bruits	(5, 6, 7, 8)	Pulse Doppler examination	(5)
Pulsus Paradoxu	(6)	Basic exercise testing	
Aorta examination (palp, auscult)	(5)	Basic cardiopulmonary resuscitation	(5, 6)
Abdominal bruit	(5, 6)	Cardiac defibrillation	(5)
Peripheral venous examination (incl. auscultation, location, valves)	(5)	Advanced cardiac life support	(5)
Capillary refill	(8)	Needle decompression of of tension pneumothorax	(5)
Jugular venous examination & interpretation	(5, 6)	Placement of cardiac monitor leads	
Hepato-jugular reflex maneuver	(6)	Subclavian puncture	(5)
Edema examination	(5, 6, 8)	Femoral puncture	(5)
Cyanosis	(6, 8)	Central venous catheter placement	(5)
Digital clubbing	(6, 8)	Simple echocardiographic technique & interpretation	(6)
Deep venous thrombosis	(5)	Basic cardiac stress test interpretation	(6)
		Basic cardiac nuclear interpretation	
		Pericardial puncture technique	
		Cardiac enzyme interpretation	(5, 6)
		Lipid test interpretation	(4, 6)
		Basic cardiac cath interpretation	(6)
Endocrine		**Endocrine**	
Thyroid examination	(5, 8)	Finger stick puncture technique	
Testicular examination	(5, 8)	Blood sugar measurement	(6)
Sexual characteristics (gender, developmental)	(8)	Glucometer techniques	
		Insulin injection	
		Insulin pump technique	
		Hypoglycemia Rx techniques	
		Diabetes test interpretation	(4, 5, 6)
		Thyroid test interpretation	(3, 4, 5, 6)

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills		Testing & Procedure Skills	
Gastrointestinal		**Gastrointestinal**	
Oro-pharyngeal examination (incl. dentition)	(5, 8)	Stool guaiac testing	(5, 6)
Abdominal examination (inspect, auscult, percuss, palp)	(5, 6, 8, 9)	Stool examination (wbc)	(5, 6)
Patterns of distention	(5)	Stool culture technique	(5, 6)
Patterns of tenderness (direct, rebound)	(5, 6)	Nasogastric intubation	(5)
Umbilical cord exam (newborn)	(8)	Enema	
Hernia examination	(5, 8)	Anoscopy	(5)
Hepatic, splenic & renal exam	(5, 6)	PEG tube re-placement	(5)
Rectal examination	(4, 5, 6)	Paracentesis technique	(5)
Ascites examination	(5, 6)	Liver function test interpretation	(5, 6)
Asterixis technique	(7)	Pancreatic test interpretation	(5, 6)
		Abdominal plain x-ray interpretation	(5, 6)
		Barium swallow result interpretation	(5, 6)
		Abdominal ultrasound result interpretation	(5, 6)
		Abdominal CT result interpretation	(5, 6)
		Abdominal MRI result interpretation	(5, 6)
		Endoscopy result interpretation	(5, 6)
		Interpret esophageal manometry	
Hematological		**Hematological**	
Lymph node examination	(5, 8)	Safe handling of blood specimens	(5, 8)
Spleen & liver examination	(5, 8)	Technique for obtaining and making peripheral blood-smear	
		Hematocrit (obtain & process)	
		Heel & finger stick	
		White blood cell count (obtain & process)	
		Interpret red cell morphology	(6, 8)
		Interpret white blood cell morphology	(6)
		Interpret platelet morphology & quantitative estimate	(6)

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills		Testing & Procedure Skills	
		Bleeding time	
		Prothrombin time (perform)	
		Blood culture techniques	(5, 6)
		Coagulopathy interpretation & mgmt	(5)
		Sedimentation rate, interpretation	(6, 8)
		Anemia evaluation & mgmt	(5, 6, 8)

Integumentary		**Integumentary**	
Demonstrate descriptive qualities (color, temp, texture, moisture)		KOH preparation	(8, 9)
Pigmentation patterns	(8, 9)	Skin anesthesia technique	(5, 8)
Lesion qualities (petechiae, urticaria, jaundice, vesicles, etc)	(8)	Skin biopsy & closure technique	(5)
Hair quality & distribution (incl head patterns)	(8)	PPD placement (intradermal technique) & interpretation	(6, 8)
Nail description		Fingernail puncture technique (finger, toe)	
Edema examination	(5, 8)	Nail removal technique	
Identify signs of infection	(5, 6, 8)	Applying/changing dressings	(5)
Identify signs of smoking	(6)	Apply steri-strips	
Identify signs of substance abuse	(5, 7)	Burn management	
Subcutaneous emphysema	(6)	Cryotherapy technique	
		Skin biopsy technique	(5, 9)
		Skin scraping for cells & organisms	(9)

Musculoskeletal		**Musculoskeletal**	
Shoulder examination	(8, 9)	Limb x-ray interpretation (incl epiphyses)	(5)
Upper extremity examination	(8, 9)	Back x-ray	(5, 6)
Hand & foot examination	(8, 9)	Bone mineral density interpretation	(4)
Neck examination	(6, 8, 9)	Limb/fracture, immobilization/splinting	(5)
Back examination (scoliosis, disc maneuvers)	(1, 5, 8, 9)	Simple joint dislocation reduction technique	
Hip examination (incl neonatal)	(1, 6, 8)	Joint aspiration technique	
Knee examination (incl maneuvers)	(8, 9)	Joint fluid examination	(6)

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

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Mental & Physical Examination Skills		Testing & Procedure Skills	
Ankle examination (incl. fracture rules)	(8, 9)	Simple casting technique	
Functional status exam	(5, 6, 9)	CT, MRI result interpretation	(5, 6)

Neurological—Comprehensive Examination

Neurological

Mental status examination   (7)
Level of alertness
Language function [fluency, comprehension,
repetition, and naming]
Memory [short-term and long-term]
Calculation
Visuospatial processing
Abstract reasoning

Skull film interpretation	(1, 5)
CT, MRI basic interpretation	(1, 5)

Lumbar puncture:

Interpretation	(5, 6, 7, 8)
Performance	(5, 7)
CS fluid (observe, analyze)	(5, 6 , 7, 8)

Cranial Nerves   (1,7,8,9)
Visual fields
Visual acuity
Ophthalmoscopic examination of fundi and retinae
[Color, Vasculature, AV crossings, Cup, Ocular venous
pulsations]

Nerve conduction velocity/EMG
(indications, basic interpretation)   (7)

EEG (indications, interpretation of results)   (7)

Pupillary examination   (1, 6, 7)
Extraocular movements
Facial sensation
Facial strength
Hearing
Palatal movement
Speech
Neck movements [head rotation, shoulder elevation]
Tongue movement

Motor Function   (1, 5, 7, 8, 9)
Gait/station [casual gait; toe, heel, and tandem
walking, Romberg]
Coordination [fine finger movements, rapid
alternating movements, finger-to-nose, heel-to-shin,
involuntary movements]
Pronator drift
Muscle tone, bulk, strength

Sensation   (1,6,7,9)
Light touch
Pain or temperature
Vibration
Proprioception

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills	Testing & Procedure Skills

Reflexes   (1, 7, 8, 9)
Deep tendon reflexes
Plantar responses
Primitive reflexes (neonatal)
Frontal release signs

Autonomic examination (*e.g.*, skin temp & moisture,
orthostasis, BP & pulse with valsalva)   (7)

Nuchal rigidity maneuvers   (8)

Development milestones (pediatrics)   (8)

Fontanel exam (neonate)   (8)

**Neurological—Altered level of consciousness and
coma examination**

                                                 (1, 5, 7)
Mental status [Level of arousal, Response to auditory
stimuli, Response to visual stimuli, Response to
noxious stimuli [applied centrally and to each limb
individually]

Selected cranial nerves [response to visual threat,
pupillary light reflex, oculocephalic reflex, vestibulo-
ocular reflex, corneal reflex, gag reflex],

Motor function [voluntary movements, reflex
withdrawal, spontaneous, involuntary movements, tone]

Reflexes (deep tendon reflexes,
plantar responses)   (1, 3, 5, 6, 7, 9)

Sensation (to noxious stimuli)   (5, 7, 9)

Respiratory pattern   (7)

Psychiatric

Mental status (general appearance, Attitude, behavior,
motor activity, Speech & language, thought content
And process, perception, cognition)   (3)

Recognize and respond appropriately to difficult
patient behaviors and affect   (3)

Anxiety assessment   (3, 4)

Violence risk assessment   (3, 4, 9)

Abuse, recognition & mgmt   (3, 4, 5, 9)

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills		Testing & Procedure Skills	
Eating disorder assessment	(3, 4, 8)		
Mood assessment including mania, depression	(3, 4, 6, 9)		
Suicidal risk assessment	(3, 4, 8, 9)		
Psychosis assessment	(3)		
Somatoform assessment	(3)		
Substance abuse assessment and drug withdrawal signs	(3, 5, 9)		
Reproductive		**Reproductive**	
Breast examination	(4, 6, 8)	Pap smear technique	(4, 6, 9)
Pelvic examination with speculum & rectal exam	(4, 5, 6, 9)	Needle aspiration	(5)
Adnexal examination	(4, 9)	Wet mount preparation & examination	
Vaginal inflammation, atrophia	(4, 9)	Urethral & cervical culture technique	
Scrotal, testicular & prostate exam	(5, 6, 8)	Pregnancy testing	
Fetal heart tone exam technique		Diaphragm fitting	
Secondary sexual characteristics	(8)	Normal vaginal delivery	
		Basic mammographic interpretation	(4, 5)
		Interpret pelvic CT	(5)
		Interpret pelvic ultrasound	(5)
Respiratory		**Respiratory**	
Respiratory rate, rhythm	(6, 8, 9)	Basic airway management (clearance, bagging)	(5, 8)
Mouth & throat exam (incl. teeth, tongue & salivary glands & ducts)	(6, 8)	Placement of oral airway	(5)
		Airway suctioning	
		Throat culture technique	(8, 9)
		Peak airflow measurement	(5, 6, 8)
Nasal flaring (pediatrics) (8)		Basic spirometry (vital capacity, FEV1 & interpretation)	(5, 6)
		Oral inhaler technique	(8, 9)
		Inhalation therapy technique	

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills		Testing & Procedure Skills	
Nasal speculum examination	(5)	Arterial blood gas performance & interpretation	(5, 6)
Sinus examination		Oximetry	(5, 6, 8)
Nasal exam (openings, turbinates, septum, mucosa)		02 desaturation testing	
Thyroid & cricothyroid cartilage		02 administration (methods and setup)	
landmarks	(5)	Mirror examination of retropharynx	(5)
Gag reflex	(8)	Cricothyroid membrane puncture technique	(5)
Thorax exam (shape, movement, diameters, ribs, diaphragm)	(5, 6, 8)	Laryngoscopy/endotracheal tube placement	(5)
Lung exam (percuss, fremitus, auscult & qualities of air sounds, lobar locations)	(6, 8, 9)	Fiberoptic examination of nasopharynx	
		Chest x-ray interpretation	(5, 6, 8)
Respiratory muscle movement exam	(6)	Intercostal injection technique	
Recognition of stridor	(8)	Pleural aspiration	(5)
Identify cough patterns	(8)	Pleural fluid examination	(6)
		Chest tube insertion	(5)
		Managing & interpreting chest drainage tubes	(5)
		Ventilator management	(5)
		Interpret V/Q scan	(5, 6)
		Interpret pulmonary angio result	(6)

Special Senses:		**Special Senses:**	
Hearing		Hearing	
Ear anatomy exam (incl otoscope)	(8, 9)	Ear wax removal	
Air insufflation for TM movement	(8, 9)	Ear syringing	
Acuity testing (manual, tuning fork)	(6)		

Eye		**Eye**	
External eye anatomy	(8)	Eye drop placement technique	
Cornea & anterior chamber		Corneal anesthesia	
Lens (clarity, artificial iol)		Tonometry	
Disc (color, edges, size & shape)	(1, 5, 6, 7)	Slit lamp examination technique	

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

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Mental & Physical Examination Skills		Testing & Procedure Skills	
Cup (size, centricity, cup/disc ratio)		Fluroscein corneal staining	
Color vision testing		Simple eye foreign body removal	
Upper lid retraction		technique	
Amblyopia screening			
Taste & Smell		**Taste & Smell**	
Examine modalities			
Renal/Urinary		**Renal/Urinary**	
Bladder exam (incl determination of distention)	(5, 6)	Clean-catch urine technique	
CVA location & tenderness test		Bladder catheterization (male & female)	(5)
Prostate examination	(5, 6)	Bladder catheter maintenance (incl. infection surveillance)	(5, 6)
		Emergent suprapubic cystostomy	
		Urinalysis (dipstick & microscopic)	(5, 6, 8)
		Urethral swab	
		Abdominal plain film (kidneys, bladder, stones), interpretation	(5, 6)
		Basic dialysis techniques	
		Renal function test interpretation	(5, 6, 8)
		PSA test use & interpretation	(5, 6, 9)
		Other Laboratory	
		Gram stain perform & interpretation	(5, 6)
		Sputum acid-fast examination	(6)
		Blood toxicology screening (incl. alcohol)	(3, 5, 6)
		Fluid/Electrolyte test interpretation	(5, 6, 8)
		HIV test interpretation	(3, 5, 6)
		KOH examination & interpretation	(6, 8)
		Specimen collection & preparation for laboratory analysis	

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills	Testing & Procedure Skills

Other General Diagnostic

Recognize emergent situations:

Allergic	(5, 8)
Cardiac/hemodynamic	(5, 6, 8)
Neuro (CNCD has list of 10)	(1, 7, 8)
Shock	(5, 8)
Infectious	(1, 5, 6, 8)
Assess hydration status	(5, 6, 8)
Assess nutrition status	(5, 6, 8)
Assess for substance abuse & alcoholism	(3, 4, 5, 6, 7)
Pain assessment	(9)
Illness severity assessment	

Other General Diagnostic

Fever/infection mgmt	(1, 5, 6, 8)
Shock evaluation & initial mgmt	(5)
Trauma evaluation & initial mgmt	(1, 5)
Preoperative risk assessment	(5)
Create a prioritized patient problem list	(5, 6, 8)
Differential diagnosis	(3, 4, 5, 6)
Death confirmation	

General Therapeutic

Aseptic/sterile technique	(5)
Gown & scrub for surgery	
Basic life support (CPR)	(5)
Blood component mgmt	(5)
Injection technique (intradermal, im, iv, subq)	(5, 9)
Establish drug dosing for common medications	(5, 6, 8)
Write prescriptions (incl controlled drug)	(5, 6, 8)
Needle & syringe technique	(5, 8, 9)
IV infusion systems (lines, fluids, connectors)	(5, 8)
Catheter management (vascular, dialysis)	(5)
Suturing technique	(5)
Surgical knot-tying	(5)

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Mental & Physical Examination Skills	Testing & Procedure Skills	
	Removing sutures and staples	(5)
	Incision & drainage technique	(5)
	Control of gross external hemorrhage	(5)
	Universal precautions (infectious disease)	(5, 6, 8)
	General wound care technique	(5)
	Wound debridement, simple	(5)
	Moving the injured patient	(5)
	Patient restraint technique	(3)
	Immunization technique & mgmt	(4, 5, 8, 9)
	Nutrition mgmt	(5, 9)
	General Administrative	
	Hospital admission orders	(5, 6, 8)
	Hospital progress notes	(5, 8)
	Hospital discharge	(5, 8)
	Hospital transfer	(3)
	Community health resources	(6, 8)
	Consultation management	(6)
	Obtain informed consent for procedures	(5, 6)
	Utilize patient education materials	(6, 8, 9)
	Utilize medical records	(6)
	Systems of medical practice problem mgmt	(6, 9)
	Be familiar with death certificate	

ANS=1   AAPP=2   ADMSEP=3   APGO=4   ASE=5   CDIM=6   CNCD=7   COMSEP=8   STFM=9

Clinical Skills Taskforce Organizations:

AAMC (Association of American Medical Colleges)
AAPP (American Academy on Physician & Patient)
ACE (Alliance for Clinical Education)
ADMSEP (Association of Directors of Medical Student Education in Psychiatry)
APGO (Association of Professors of Gynecology & Obstetrics)
ASE (Association for Surgical Education)
AANS (American Academy of Neurological Surgeons)
CDIM (Clerkship Directors in Internal Medicine)
CNCD (Consortium of Neurology Clerkship Directors)
AAN (American Academy of Neurology)
COMSEP (Council on Medical Student Education in Pediatrics)
STFM (Society of Teachers of Family Medicine)

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