

An Overview of the Medical Education Process

It is widely understood that it takes an extended period of time for an individual to become a physician. However, the process of becoming a physician (the medical education process) is one that is less well understood. The purpose of this section is to give an overview of the process of becoming a physician and to simultaneously provide an understanding of what is meant by “*curriculum renewal*”. Before describing the process, it is helpful to understand that there are two main groups of physicians: *primary care* physicians and *specialists*. Primary care physicians are those physicians who address the most common health concerns of the general public: family medicine, obstetrics, pediatrics, and general internal medicine. Specialists concentrate on particular types of illnesses and health problems such as orthopedics, cardiology, urology, anesthesiology, etc. Obstetrics and Gynecology (OB/GYN), despite being a specialty, is frequently included with the primary care disciplines, as many women consider their OB/GYN to be their primary medical provider.

Medical Education Process

The medical education process involves two major threads: 1. education in the sciences where the individual learns about the complexities of the human body and its systems; and 2. clinical instruction in which the individual learns about the physician-patient interaction, physical examinations, causes of disease (etiology), diagnoses, and treatment plans. Figure 1 provides an outline of the medical education process beginning with the *bachelor’s* (B.S. or B.A.) degree, moving next to *medical school* (also known as the undergraduate medical education period), then to *residency training* (also known as graduate medical education or *GME*), and finally to practice where the individual is affirmed as someone who can practice medicine without supervision. Note from Figure 1 that some specialists complete additional subspecialty training, which is known as a “Fellowship”, before entering practice.

To conceptualize medical education, it is helpful to think of an ever-expanding apprenticeship of becoming a physician. During the bachelor’s degree period, students learn the basic principles of the sciences (biology, physiology, psychology, chemistry, etc.) and the clinical component generally involves ‘*shadowing*’ mentor physicians. Shadowing simply involves observing the physician in their practice.

The physician’s education officially begins in medical school. In the U.S., the Liaison Committee on Medical Education (LCME), sponsored by the Association of American Medical Colleges (AAMC) and the American Medical Association (AMA), is the committee which accredits all M.D.-granting medical schools. In order to meet accreditation standards, schools must meet a variety of requirements ranging from inter-professional experiences, to science instruction standards, to exposure and practice of clinical skills, to required space for delivering a curriculum. Admittance to medical school is extremely competitive and is dependent upon a strong written application (including bachelor’s degree grade point average, Medical College Admission Test score) as well as an exceptional in-person interview with a medical admissions panel. Once admitted to medical school, students continue their study in the sciences and clinical practice. Wyoming does not have its own medical school but instead has an agreement with the University of Washington School of Medicine (UWSOM), which U.S. News and World Report ranks as the #1 primary care medical school in the U.S. Twenty seats per year are reserved for Wyoming residents. The states of Alaska, Montana and Idaho have similar agreements with the UWSOM. Collectively, these states comprise the WWAMI program.

Traditionally, the first two years of medical school have been devoted to an intense period of advanced science training in discipline-specific courses (Human Anatomy, Biochemistry, Micro-Biology,

Immunology, etc). Clinical skills learned in the first two years of medical school are basic physical examination skills and the patient interview (family history, medical history, social history, etc.). These clinical skills are generally taught in a course entitled “An Introduction to Clinical Medicine” and students have an opportunity to practice these skills with patients in the *preceptor* setting. Whereas the shadowing experience in the bachelor’s degree time period was merely observational, the preceptor experience goes beyond observation to student participation in patient care in a highly supervised environment in which the student interviews patients and conducts the basic physical exam. The *clerkship* years (years 3 and 4) are when the bulk of the clinical instruction takes place. Students rotate through required clinical rotations in primary care medicine and have the opportunity to do elective rotations in specialty areas. While the preceptorship involves a highly supervised setting for the patient interview and physical exam, the clerkship experience requires students to draw from their knowledge of science (obtained during the first two years of medical school) and begin diagnosing patients and developing treatment plans. Diagnoses and treatment plans are then reviewed by an experienced physician who serves as the clerkship faculty member. Science instruction during the clerkship phase primarily involves reviewing medical literature as students learn to evaluate differing diagnoses (referred to as the differential diagnosis) and treatment plans.

After successfully completing the fourth year of medical school, the student is awarded the MD degree. Unlike many disciplines, however, obtaining the MD degree does not imply a certification to practice medicine. Physicians must complete an accredited *residency* program to become licensed to practice medicine. The residency portion of medical education is known as graduate medical education (commonly referred to as GME). Residency training is the final stage of the physician apprenticeship. During this period of time, physicians finish clinical training with a progressive increase in patient care responsibilities. The timeframe that one spends in residency depends upon their area of medicine (e.g., family medicine takes less time to complete than orthopedic medicine).

Why Curriculum Renewal?

It is important to note the **UWSOM curriculum renewal is specifically targeted at the four-year medical school experience** (outlined in dark blue in Figure 1). The current curriculum model for medical school has been the standard for medical education in the U.S. since 1910 and its basic structure is as presented in Figure 2a. The current model is often attributed to Abraham Flexner who published this framework as part of a study sponsored by the Carnegie Foundation. In a nutshell, the current model (i.e., the Flexner model) presents medical students with intensive science training in their first two years (with little or no connection made between science and practice of medicine) and then intensive clinical training in the last two years (the clerkship years). Other than the basic history and physical exam, students have very little understanding of clinical medicine when they begin their clerkship years under the Flexner model.

There is no doubt that the landscape of medicine has changed more during the last decade than at any other point in modern history. Rapid advances in medical technology, the advent of the electronic health record (EHR), skyrocketing costs for medical care, a new emphasis on holistic patient treatment (i.e., treatment involving a team approach of first responders, physicians, nurses, pharmacists, social workers, etc.), and advances in learning theory have caused a nationwide response to revamping the delivery of medical education in the U.S. A 2010 Carnegie report entitled “Educating Physicians: A Call for Reform of Medical School and Residency” offered two main suggestions for the reform of medical school curricula: 1. Integrate the teaching of science and the practice of medicine; and 2. Move from lecture based content delivery to active learning motivated from clinical cases. Put simply, the integration of science and the practice of medicine means that when science is being taught, the clinical relevance would simultaneously be discussed.

Figure 2b illustrates the UWSOM model for this modern approach to an integrated medical curriculum. There are three notable differences between the integrated model outlined in Figure 2b and the Flexner model outlined in Figure 2a:

1. The instruction of foundational science is integrated with clinical relevance. To illustrate, in the Flexner model a student would learn about lung function as a separate topic in anatomy, biochemistry, pathology, and pharmacology from a purely scientific perspective (i.e. no clinical relevance discussed and all instruction is done by PhD scientists) and at different times during the first two years. In an integrated model, all of these aspects of lung function are discussed at the same time to increase the understanding of how the human lung functions and responds to disease as well as treatment. The instruction will be done with the PhD scientist and the MD clinician working together.

2. The Foundations phase is shorter (18 months) in the integrated model than it is in the Flexner model (24 months) but the clinical/patient care phase is longer (27 months) in the integrated model than in the Flexner model (24 months). By integrating science and clinical relevance, less relevant science can be omitted and duplication of science content is largely avoided, thereby reducing the amount of time needed to provide foundational science instruction. Greater clinical exposure in medical school (3 additional months in the integrated model) is highly correlated with successful physician performance [Carr, Celenza, Puddey, and Lake (BMC Medical Education, 2014)].

3. As noted in comparing Figures 2a and 2b, the integrated model is based upon active learning vs. the lecture delivery utilized under the Flexner model. This move from lecture delivery to active learning is based on sound principles from learning theory, which rely on the premise that one learns best by doing.

Upon adopting these three fundamental changes during the Foundations period, students will not only retain their science knowledge more efficiently but they will also have more advanced clinical skills when they begin their clerkship training, thus resulting in a more enriched experience and greater clinical performance when they enter residency training.

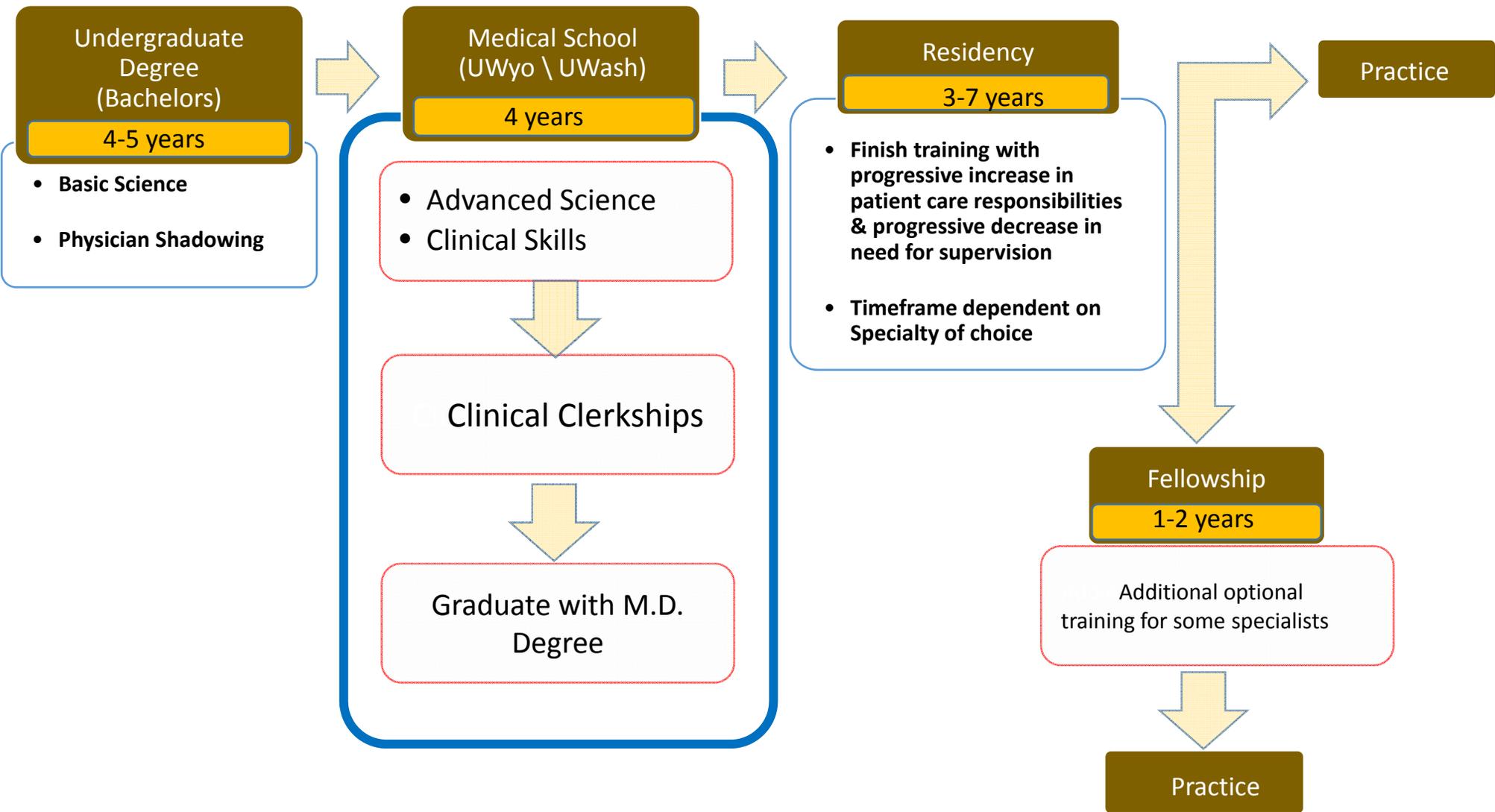


Figure 1

Figure 2a

Current/Flexner

Medical School
(UWyo \ UWash)

4 years

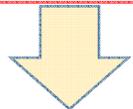
Years 1 & 2 – Foundations Phase (24 months)

- Advanced Sciences courses taught independent of each other. For Example:
 - Histology
 - Anatomy
 - Biochemistry
 - Behavioral science
- Minimal clinical integration with science
- Predominately lecture-based instruction
- Basic clinical skills taught and practiced
- Precepting with local physicians
- First year spent in Laramie; Second year spent in Seattle



Years 3 & 4 (24 months)

- Clinical Clerkships
- Locations throughout 5 state WWAMI region



Graduate with M.D.
Degree

Figure 2b

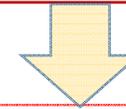
Proposed

Medical School
(UWyo \ UWash)

4 years

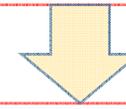
Foundations Phase (18 months)

- Advanced Sciences integrated with relevant clinical applications
- Theme-based v. discipline based
- Active/case-based learning (minimal formal lecture)
- Basic clinical skills taught and practiced
- Precepting with local physicians
- Location: Laramie



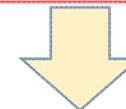
Transitions Phase (3 months)

- Board exam prep
- Research
- Location: Seattle



Patient Care Phase (27 months)

- Clinical Clerkships – Required Seattle rotation
- Sub-Internships
- Locations throughout 5 state WWAMI region



Graduate with M.D. Degree