

# Medical Education in the United States

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# Routes to becoming a physician in the US circa 1900

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- **Apprenticeship**
  - Oldest training method
  - Training was variable
  - Little formal lecturing
  - “Ran his/her master’s errands, washed the bottles, mixed the drugs, and spread the plasters”



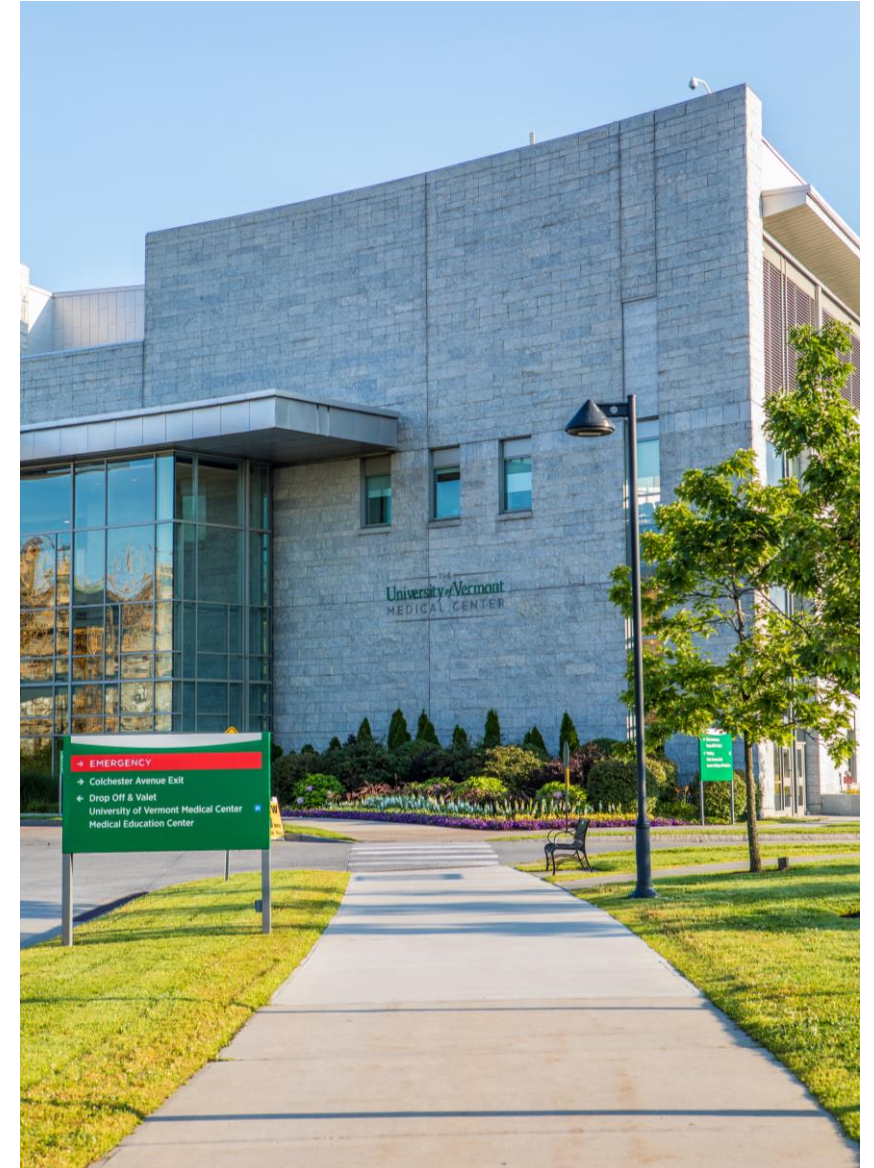
# Routes to becoming a physician in the US circa 1900

- **Proprietary or for-profit school system**
  - Run by practicing physicians
  - Loosely affiliated with larger institutions
  - Students paid tuition and received a series of lectures
  - Sometimes affiliated with a larger institution
  - No admission criteria beyond ability to pay the fees

# Routes to becoming a physician in the US circa 1900

- **University System**

- Least common route
- Originally lecture based
  - University of Pennsylvania – 1765
  - King's College (Columbia) – 1767
  - Harvard – 1782
- Curriculum usually consisted of 16 weeks of lectures repeated during the next term



# 1900s

- The decade before the Flexner report was an active period for medical education
- 70 MD granting schools merged or closed and 50 new schools were founded
- By 1910 there were 133 medical schools
  - 25,000 enrolled students
- Based on the varied education, there was a concern for the quality of the graduating physicians

# Entrance Requirements

- Highly variable
  - 74% required four-year high school education
  - 20% required two or more years of college
  - 5% required physics, inorganic chemistry, biology
- Schools requiring college were typically associated with universities

# Beginning of Calls for Reform

- **Association of American Medical Colleges (AAMC)**
  - Requirement for membership in AAMC (1890)
    - An examination in English as an entrance requirement
    - A graded curriculum of three terms of at least six months each
    - Laboratory teaching in chemistry, histology, and pathology
    - Written and oral examinations as a requirement for credit in individual courses

# Beginning of Calls for Reform

- **American Medical Association's (AMA) Council on Medical Education**
  - National survey in 1906
  - Used Johns Hopkins, Harvard and others as a standard
  - Found that many medical schools were deeply unsatisfactory





# A Third Party

- Carnegie Foundation for the Advancement of Teaching
  - Henry Pritchett
  - Hired Abraham Flexner to study medical education in North America





# Abraham Flexner

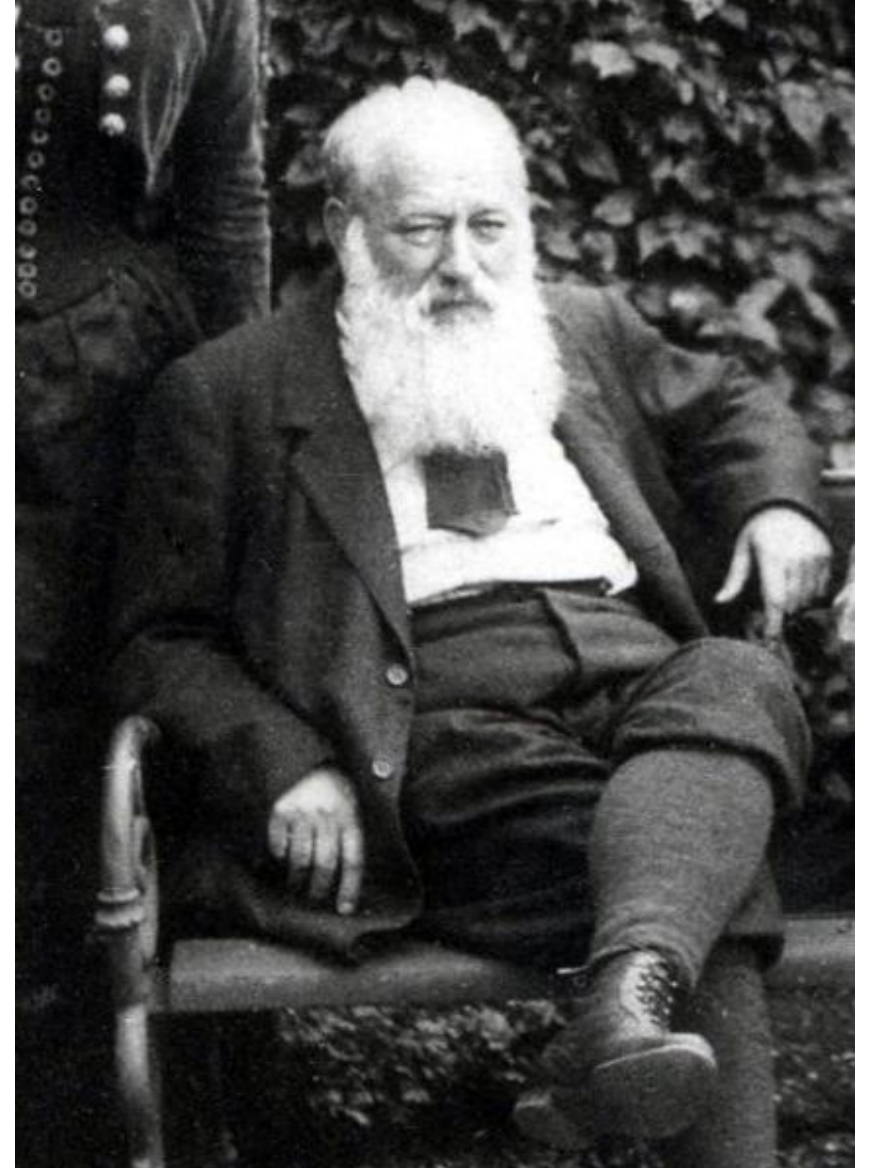
- Born 1866 in Louisville, Kentucky
- Father – hat merchant
- Mother – seamstress
- Sixth of nine children
- Family valued education, but lost all finances during the financial panic of 1873

# Flexner in Europe

- His exploration of European education focused on university medical education
- This paralleled a then common practice of young American physicians traveling abroad to complete their studies
- Based on his teaching experience and what he learned in Europe, he wrote *The American College; A Criticism*

# Flexner's Preparation

- Immersed himself in the literature of medical education
  - Theodor Billroth's *Medical Education in the German Universities*
  - Looked to the German system as a model
  - Laboratory investigation as a prelude for clinical training and investigation





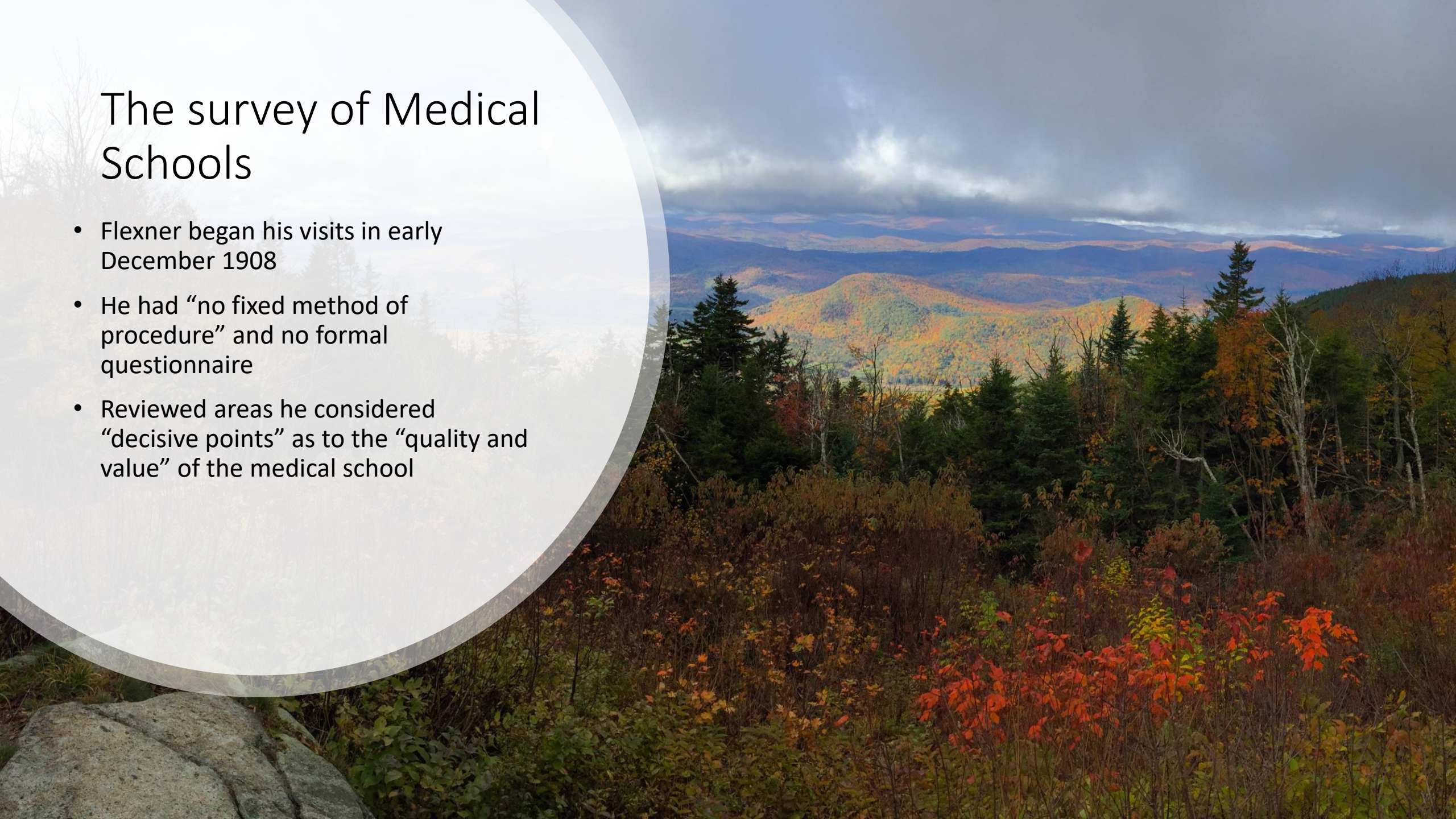
# Flexner's Preparation

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- Sought the advice of AMA Committee members and the Carnegie Foundation
- Dr. William Welch
  - Founding dean at Johns Hopkins
  - German model of education was in place at Hopkins

# The survey of Medical Schools

- Flexner began his visits in early December 1908
- He had “no fixed method of procedure” and no formal questionnaire
- Reviewed areas he considered “decisive points” as to the “quality and value” of the medical school



# The Decisive Points

- Entrance requirements
- Size and training of the faculty
- Funding from endowment and fees and how they were utilized
- Quality and adequacy of the laboratories
- Relationship between the medical school and hospitals
- Flexner visited 155 schools in the US and Canada

# The Flexner Report

- 364 pages, consisting of two sections
  - Part I - Articulated a conceptual model of modern medical education
  - Part II – A brief description of each medical school with his findings regarding the decisive points

**MEDICAL EDUCATION  
IN THE  
UNITED STATES AND CANADA**

**A REPORT TO  
THE CARNEGIE FOUNDATION  
FOR THE ADVANCEMENT OF TEACHING**

**BY  
ABRAHAM FLEXNER**

**WITH AN INTRODUCTION BY  
HENRY S. PRITCHETT  
PRESIDENT OF THE FOUNDATION**

**BULLETIN NUMBER FOUR (1910)**  
*(Reproduced in 1960)*  
*(Reproduced in 1972)*



# Part I – Expectations for Medical Schools

- Applicants who study biology, chemistry, and physics at the college level before entry
- Curriculum where a medical student can “acquire the methods, standards, and habits of science”
- Access to hospitals and dispensaries where the student participates in the care of patients, under supervision
- Salaried faculty in both the basic and clinical sciences who devote their time to teaching and research

## Part II – Brief Descriptions

- Focused on his findings regarding the decisive points
- Flexner was very candid and frank
- Awarded praise where he felt it was deserved
- The AMA Council on Medical Education felt this was a valuable component of the report

# Johns Hopkins

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# Johns Hopkins

- Entrance: “The bachelor’s degree, representing attainments in chemistry, physics, biology, German, and French”
- Teaching staff: “All the laboratory teaching is conducted by instructors who give their entire time to teaching and research”
- Laboratory: “These facilities are in every respect unexcelled”
- Clinical facilities: “The hospital and dispensary provide practically ideal opportunities”



# University of Vermont

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# University of Vermont

- Entrance requirement
  - “Less than a four-year high school education”
- Teaching staff:
  - “33, of whom 18 are professors. Thirteen teachers are non-resident, among them the professors of medicine, obstetrics, pediatrics, physiology, and pathology. Some of the non-resident teachers go to Burlington weekly; others give a concentrated course covering several weeks. The entire teaching staff never meets. There is one full-time teacher, - in the department of anatomy.”

# University of Vermont

- Laboratory facilities:
  - “The school has an attractive new laboratory building adequate to routine teaching of anatomy, pathology, histology, bacteriology, physiology, and chemistry. No research is in progress. There is no library, no museum, few teaching accessories, and no animals on the premises”

# University of Vermont

- Clinical facilities:
  - “Two hospitals with 200 ward beds are in a limited way available, but the material is predominantly surgical: medical and obstetrical cases are relatively few. Infectious diseases are in the main didactically taught. There is little bedside work, patients being examined by assigned students in a small room and subsequently demonstrated in the amphitheater.”



# Flexner on New England

- To many doctors, many poorly trained
- Close all the schools except Harvard and Yale
- “The clinical departments of Dartmouth, Bowdoin, and UVM would certainly be lopped off; there is no good reason why these institutions should be concerned with medicine at all.”

# University of Vermont Medical Center



# The Flexner Report

- Schools were assigned to one of three groups
  - Those that compared favorably to Hopkins
  - Those considered substandard but which could be salvaged with financial assistance
  - Those of such poor quality that closure was indicated
- The report was public and released at a time when the public was demanding more accountability in medical care

# Change Following the Flexner Report

- The Flexner Report was embraced as the definition of the academic model for American medical education
  - The AAMC, AMA Council on Medical Education, and the public supported the model
- State medical boards began to require “recognized or reputable medical schools”

# Change Following the Flexner Report

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- By 1927 there were only 71 US medical schools
- Proprietary medical schools and the apprentice system disappeared within two decades
- The German model became the dominant curricular model
- Medical educators became fulltime faculty of the university



# Medicine Advances

- As the art and science of medicine advanced, so did the duration of training
  - Specialty specific training was required
  - Residency training was relatively unregulated
  - ACGME founded in 1981
    - Originally focused on GME training quality and quantity but not “outcomes”

# Admission Requirements for Medical School

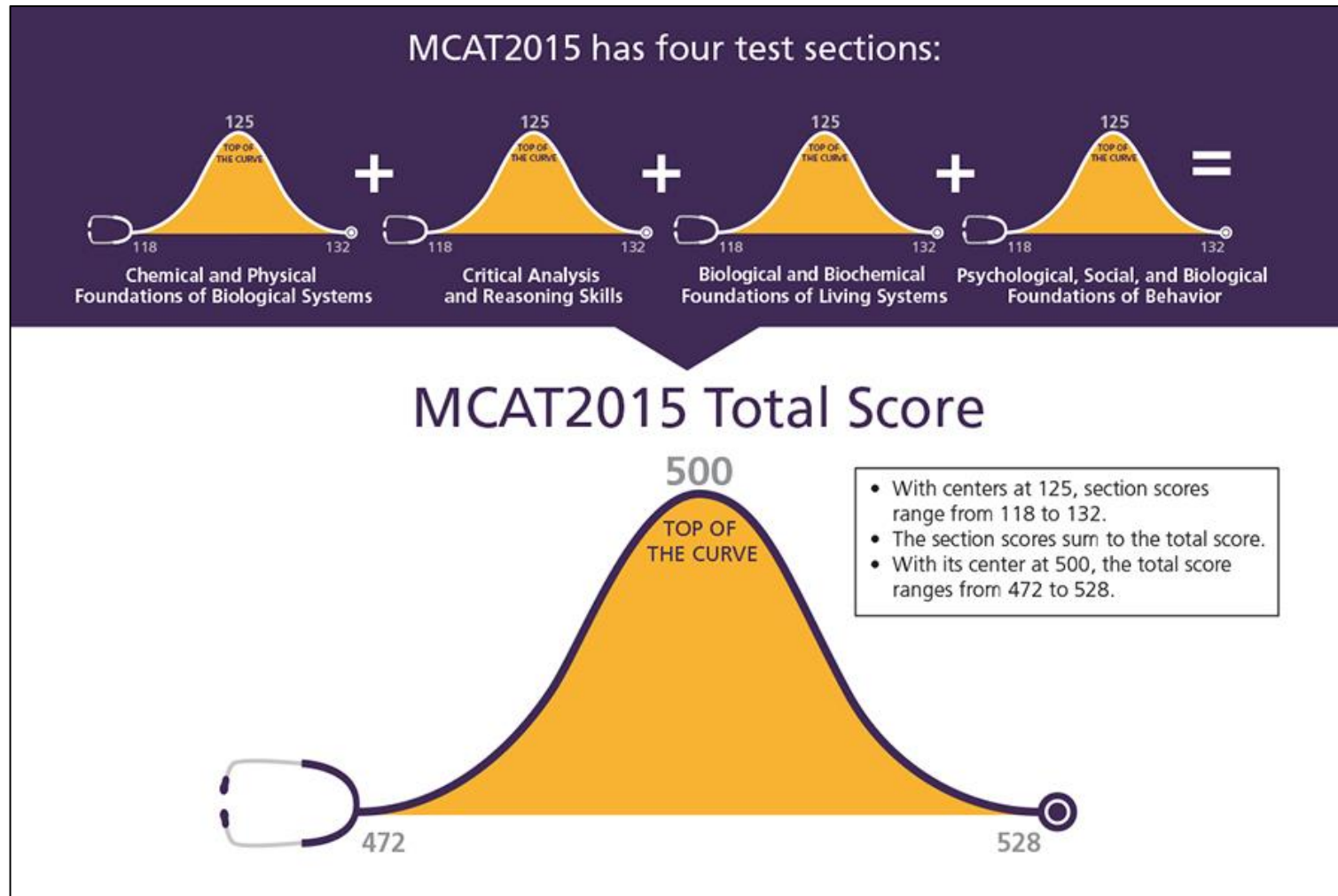
- One year Biology
- One year Physics
- One year English
- Two years Chemistry (through organic chemistry)
- Applicants should look for opportunities to demonstrate a range of competencies

# Medical College Admission Test (MCAT)

- Developed and administered by the AAMC
- Assesses problem solving, critical thinking, and knowledge of natural, behavioral, and social science concepts and principles prerequisite to the study of medicine
- Four test sections
  - Biological and Biochemical Foundations of Living Systems
  - Chemical and Physical Foundations of Biological System
  - Psychological, Social, and Biological Foundations of Behavior
  - Critical Analysis and Reasoning Skills



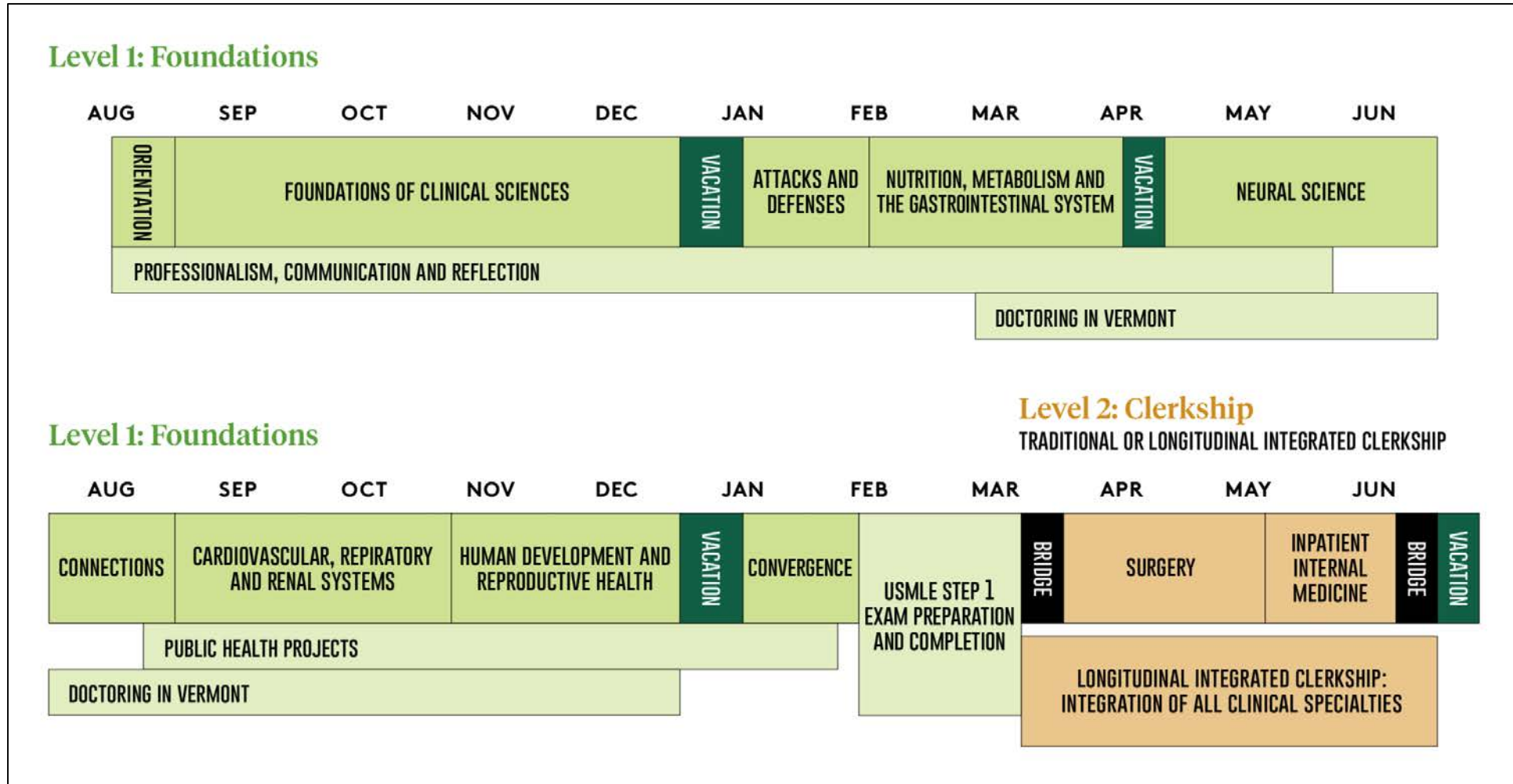
# Medical College Admission Test (MCAT)



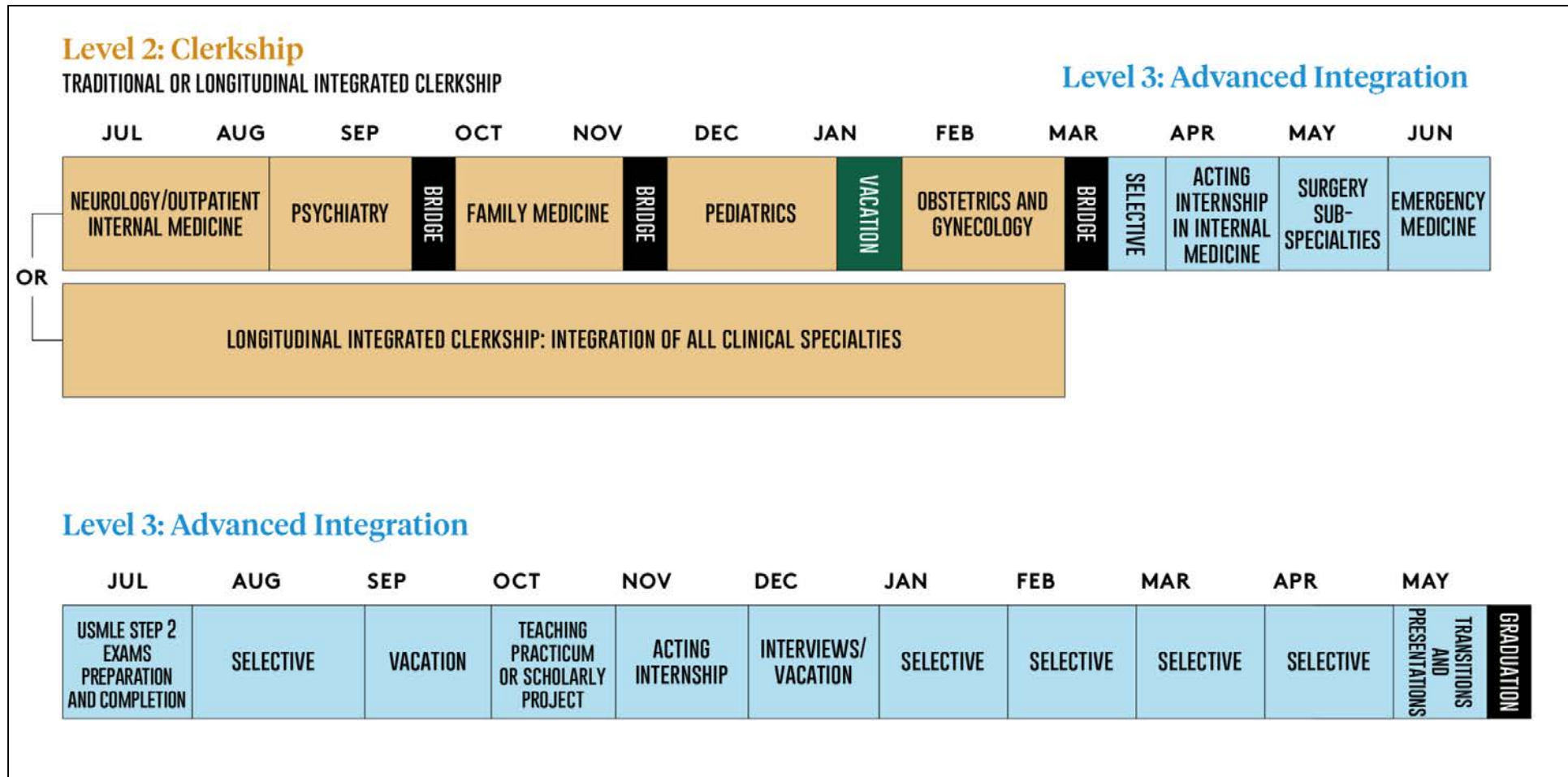
# Accreditation

- LCME (Liaison Committee on Medical Education)
  - LCME accreditation is a voluntary, peer-reviewed process of quality assurance that determines whether the medical education program meets established standards
  - Jointly sponsored by the Association of American Medical Colleges (AAMC) and the American Medical Association (AMA)
  - Most state boards of licensure require that U.S. medical schools granting the MD degree be accredited by the LCME as a condition for licensure

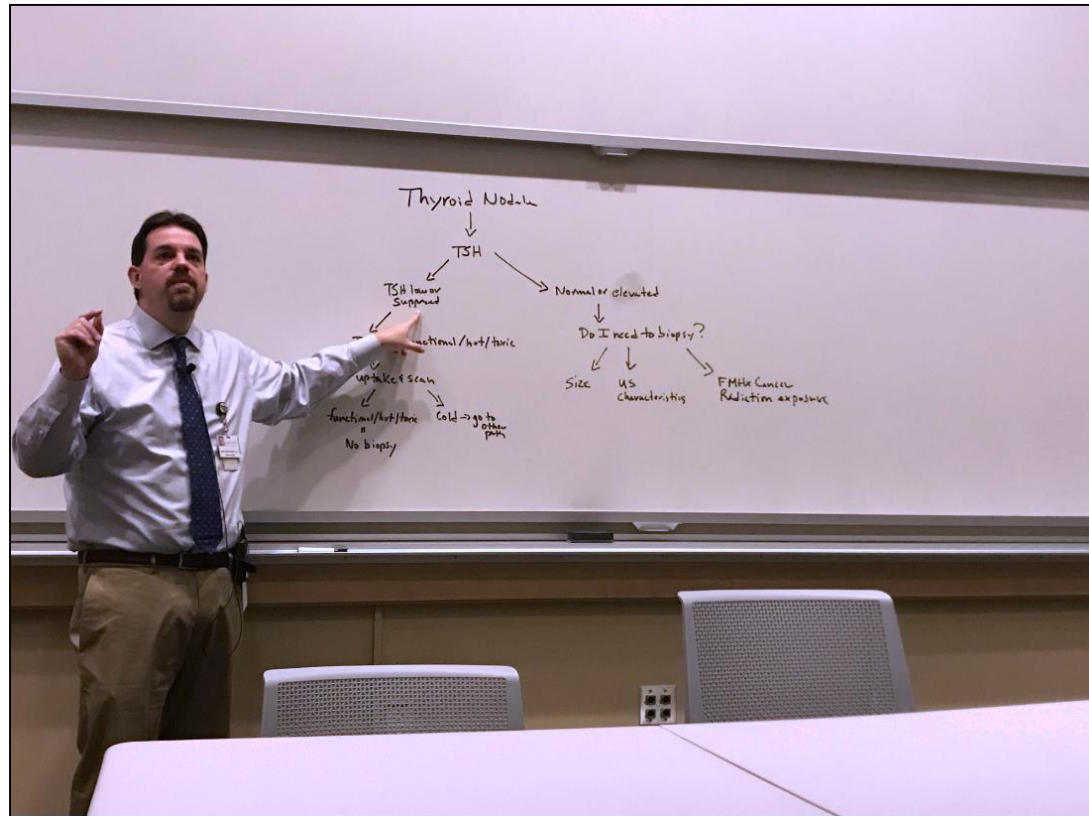
# Larner College of Medicine Integrated Curriculum



# Larner College of Medicine Integrated Curriculum



# Didactic vs Active Learning



# United States Medical Licensing Examination

- Three-step examination for medical licensure in the United States and is sponsored by the Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME)
- Assesses a physician's ability to apply knowledge, concepts, and principles, and to demonstrate fundamental patient-centered skills, that constitute the basis of safe and effective patient care
- Step 1 – Basic Science
- Step 2 – Clinical Science (CK and CS)
- Step 3 – Application of Medical Knowledge

# Residency Training in the United States

- Accreditation Council for Graduate Medical Education (ACGME)
  - **Accredits** Sponsoring Institutions and residency and fellowship programs
  - Confers **recognition** on additional program formats or components
  - Dedicates resources to **initiatives** addressing areas of importance in graduate medical education
  - Committed to improving the patient care delivered by resident and fellow physicians today, and in their future independent practice
    - Fostering clinical learning environments characterized by excellence in care, safety, and professionalism

# Accreditation Council for Graduate Medical Education (ACGME)

- Common Program Requirements
  - Basic set of standards (requirements) in training and preparing resident and fellow physicians
- Milestones
  - Describe performance levels residents and fellows are expected to demonstrate for skills, knowledge, and behaviors in the six clinical competency domains
- Clinical Competency Committees
- CLEAR Visits
- Review Committees





# Common Program Requirements

## II.B. Faculty

II.B.1. At each participating site, there must be a sufficient number of faculty with documented qualifications to instruct and supervise all residents at that location. (Core)

The faculty must:

II.B.1.a) devote sufficient time to the educational program to fulfill their supervisory and teaching responsibilities; and to demonstrate a strong interest in the education of residents; and, (Core)

II.B.1.b) administer and maintain an educational environment conducive to educating residents in each of the ACGME competency areas. (Core)

# Milestones 2.0

Medical Knowledge 2: Clinical reasoning (AP/CP)				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates a basic framework for clinical reasoning</p> <p>Identifies appropriate resources to inform clinical reasoning</p>	<p>Demonstrates clinical reasoning to determine relevant information</p> <p>Selects relevant resources based on scenario to inform decisions</p>	<p>Synthesizes information to inform clinical reasoning, with assistance</p> <p>Seeks and integrates evidence-based information to inform diagnostic decision making in complex cases, with assistance</p>	<p>Independently synthesizes information to inform clinical reasoning in complex cases</p> <p>Independently seeks out, analyzes and applies relevant original research to diagnostic decision making in complex clinical cases</p>	<p>Demonstrates intuitive approach to clinical reasoning for complex cases</p>
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# ACGME Review Committee

- Evaluates program Data to ensure quality of program and continued accreditation
  - Self reported program information
  - ACGME resident and faculty surveys
  - Procedure logs
  - 10 year self-study



# Summary of Medical Education in US

- Undergraduate Prerequisites and MCAT admission examination
  - 3 to 4 years
- Medical school curriculum
  - 4 years (typical)
  - LCME oversight
- Residency education
  - 3+ years, depending on specialty
  - ACGME oversight
- Residency training typically followed by subspecialty fellowship training
  - 1 to 2 years, typically
  - ACME oversight

# Thank You

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