Report on American Allopathic Medical School Curricula

Organization of Student Representatives- The Association of American Medical Colleges
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INTRODUCTION

The purpose of this report is to present the similarities and vast differences in curricula among medical schools in the United States. The report was cumulated by the Organization of Student Representatives (OSR) of the Association of American Medical Colleges (AAMC) from the University of Iowa Carver College of Medicine. The spirit of the *Report on American Allopathic Medical School Curricula* was founded upon Iowa's revamping of its basic science curriculum in attempt to meet the challenges of current medicine and prepare students for the future in a dynamic medical landscape. This report is being published at a time when new medical schools are being founded and many existing medical schools are reassessing their curriculum. In this regard, this report was produced with the hope of serving as a valuable resource for these institutions. The information was collected by e-mail and phone contact of the OSR representatives from American allopathic medical schools.

The *Report on American Allopathic Medical School Curricula* will address and analyze the following key aspects of medical school education drawn out by the responses of OSR representatives throughout the country:

1. Basic Science Curriculum Structure
2. USMLE Step I preparation
3. Technology
4. Examinations
5. Grading and Student Evaluation
6. Anatomy Lab
7. Clinical Years

The intent of this report is to present this information to aid medical school curriculum committees and OSR representatives when comparing their program to trends in American medical school education.

I. Basic Science Curriculum Structure

Medical schools in the United States divide the traditional basic sciences during the first two years but with variation in the timing, presentation, and integration of material. The traditional classes include: Anatomy, Biochemistry, Cell biology, Evidence Based Medicine, Genetics, Histology, Immunology, Introduction to Clinical Medicine, Microbiology, Neuroscience, Pathology, Pharmacology, and Physiology. Some schools do not directly participate in a systems based approach which causes material from one system (e.g. renal, pulmonary) to be taught at various times throughout the first two years of medical school (presented in anatomy, biochemistry, genetics, and physiology). Some OSR representatives stated that it was "frustrating" when they did not receive a well-rounded view of each system, but the repetition did help them gain retention. Conversely, some programs follow an integrated curriculum in which they separate their subjects within the following themes: "Food and Fuel," "Structure and Function," "Homeostasis and Regulation," and "Fundamentals of Patient Care." This approach eliminated any overlap in material. These themes are found within six blocks of a given year: Foundations, Musculoskeletal, Cardiovascular and Respiratory, Renal and Gastrointestinal, Urogenital and Reproductive, Cognition and Control, along with a final synthesis block to tie concepts together. Each block starts off with a real life patient case that relates to the content. The pros of this approach include: increased time do to less repetition of material; integrated material to prepare for national boards; and the synthesis block allows students to teach the material to a group of assigned peers followed by a final exam. The cons of this approach include: anatomy lab is spread out over the year; overload on some courses compared to other courses (e.g.

Musculoskeletal and the Cognition and Control blocks were exceptionally more difficult because of the breadth and depth of material as compared to the Foundations or Urogenital and Reproductive block). Schools that use the system and organ based approach must take heed that Microbiology, Biochemistry and Embryology usually are not covered in depth (per student feedback) because they do not integrate as well with that type of curriculum. A unique approach to the basic science curriculum has been adopted by a couple of schools in which the preclinical years are completed within one year and a half followed by the "third year" of required clerkships and taking USLME Step I during the third year when the student has already completed many of his or her clerkships. Another approach to this unique structure includes taking the National Board of Medical Examiner's Comprehensive Basic Sciences exams before beginning clinical rotations. Students then complete their rotations and schedule, on their own, their USMLE Step I. These students typically take their exam before March of their third year (third March of medical school).

A Problem Based Learning (PBL) approach has been adopted by many of the responding schools. On average, this offers students 3-5 hours per week in PBL, 12-15 hrs per week in lecture, and 3-5 hrs per week in small group sessions throughout the basic science curriculum. PBL was expressed as a positive experience for the most part, but, according to student feedback, should be limited to only 2-3 hours per week due to the demands on students' time. The PBL sessions helped students integrate their classroom information to solve patient centered cases. These sessions could also be used as a time to teach the basics of how to obtain the chief complaint, patient history, physical exam, and assessment.

The structure of the class day is crucial when attempting to maximize the amount of "potential working hours, which is usually much more for a typical medical student than the average student." This is an important consideration. Some schools follow a 9-5 routine while other programs only have set class times from 8-12 a.m. followed by time for lab or small groups. This approach provides the student with more time for independent study. One particular school only takes one class at a time. This program only has 2 hours of lecture per day followed by 2 hours of small group.

Medical school is not only about the core science requirements but about the development of the individual as a competent, compassionate, and well-informed physician upon graduation. Many programs offer electives which include community initiatives, humanities (e. g. art, literature, and music as related to medicine), mentorship program in which a group of ten students are led by a physician to discuss various aspects of medical school and medicine in an informal setting, and classes of enjoyment such as law, business, and public health. These electives can be incorporated during the regular academic calendar or during the summer.

Simulated patients are the keystone for many schools and their incorporation into the curriculum received praise from many of the respondents of this survey. Students learn a specific aspect of an office visit and then practice it on a standardized (actor) patient in a clinical suite under the supervision of a physician. These encounters are video recorded to allow the student the ability to view and critique him or herself. Real patients can also be incorporated within a class conference in which the patient describes a particular diagnosis taught earlier that week to the students. This experience helps reinforce the lecture material with a real patient during a question and answer session.

Many times, it is difficult for faculty to communicate items that may be emphasized from lecture that will be covered on the exam or overall communication between the class and the faculty is

poor. Some schools have developed a liaison committee in which a few students are chosen by their classmates to meet with the course director to discuss any student concerns and information about the upcoming exam that can be presented to the class in a report style format. These schools report improved communication between faculty and students.

Tutors have been incorporated within a few medical schools. These tutors are third and fourth year medical students who have already completed a course with a high grade. Tutors are provided for interested students and are not required, except as mandated by some schools for students in remediation. This fosters an atmosphere for discussion, questions, and study. Some schools will pay these medical school students from the Department of Student Life budget.

Research is a central aspect of many medical schools' curricula. For example, some schools offer a research block of an 8-12 week paid period to conduct research prior to their first year of medical school and the summer after their first academic year. At least one school also offers protected time during subsequent semesters to complete projects following the initial research period. Many students present their projects at national meetings, funded fully or in-part by their institution. The research is usually limited to one of the following areas: Biomedical informatics, medical education, medical ethics, basic science, clinical research, global health, community health, and healthcare management/public health.

2) USMLE Step I Preparation

One of the most important examinations for any medical student is the USMLE Step I examination sponsored by the Federation of State Medical Boards of the United States and the National Board of Medical Examiners. Respondents have noted that NBME subject exams substituted as the final examination in a course has been very helpful in engaging students to begin thinking in the mind frame of board style examination questions. In comparison to schools that do not use the NBME examinations, students tend to feel less prepared for major comprehensive exams prior to studying for the USMLE Step I.

Programs have been developed in which students are paired with their friends or assigned group members to meet weekly to discuss chapters from the *First Aid USMLE STEP I* review book. This usually begins six months before the examination date. Some schools offer a mock Step I examination to gauge a students' areas of strength and weakness in the basic sciences.

3) Technology

There are a number of software programs that can be purchased by the medical school to record audio and screen capture the lecturer's presentation. There are numerous advantages to this technology. Students can use this to supplement their in-class learning when they begin independent study to review the lecture to clarify or solidify certain points. It also reduces the stress of taking comprehensive notes in class because if a student misses a particular point or concept in lecture, they can listen to it again.

Many schools are requiring students to have a personal laptop either issued by the school or purchased personally. Some professors use Smart boards loaded with different software during lecture, small groups, and review sessions. Histology can also be augmented with virtual microscopy or digital imaging. Anatomy lab also incorporates large TV monitors to center students' attention on a particular view of interest or structure while teaching dissection or during review.

4) Exams

Many schools have moved to computer-based examinations. The advantages to this approach includes preparation for the computer based USMLE exams, the ability to present high quality photographs of histological or anatomical images to test students' identification skills, and immediate notification of the student's raw score. This improves the quality and clarity of a histological image compared to a printed copy of a slide with poor pixel quality. Another advantage to computer-based examination is flexibility in administering exams. One school provides the student with total autonomy to take an examination within a video-recorded computer lab anytime from Friday at 5 pm until 11:59 pm on Sunday. This creates flexibility in a student's schedule especially if he or she is unable to attend a predetermined examination time during the semester.

5) Grading

There is a vast array of grading policies throughout medical schools. Some schools follow a pass/fail system for the basic science curriculum while others follow an honors/near honors/pass/fail system. Respondents have noted frustration regarding these differences among various medical schools because of their possible impact during residency interviews. Some medical schools have also moved away from traditional examinations, with students evaluations based on an e-portfolio in which they post artifacts online to be graded by faculty. One alternative to the traditional A, B, C grades would be to have Honors, Near Honors, Pass, and Fail during the first year, followed by Pass/Fail during the second year to decrease competition and focus more on preparing for USMLE Step I.

6) Anatomy Lab

Anatomy lab can be approached from a number of angles. Some schools begin first year with a six week block dedicated solely to anatomy, others spend the entire first semester of the first year studying anatomy in conjunction with other basic science classes and then learn the neuroanatomy during the second semester. Another approach includes a year-long anatomy lab which reduces the time commitment during the first semester.

An interesting approach includes dividing students into rotating dissector/teacher groups and learner groups. For example, if six students are assigned to a cadaver, two students will perform the dissection on Monday and Tuesday and then one of these dissector/teachers will teach two students the dissection on Wednesday and the other dissector/teacher will teach the remaining two students on Thursday. Students rotate into the dissector/teacher group every third week. This limits the amount of time physically in the lab, while still providing instruction into each dissection. The only disadvantage noted is that dissector/teachers master the material from their particular dissection better than when they are instructed by a peer.

A typical anatomy course that only covers one semester will include three 50-minute lectures and three 3-hour labs per week with one 20-30-minute mini lecture at the beginning of one of the lab sessions. Anatomy classes may also have M4 teaching assistants who have been through the course and use this experience as a teaching elective recognized by the medical school to teach first year students.

7) Clinical Years

Simulation centers are expensive but very useful for medical students. Students who have access to a simulation center benefit from learning basic procedures, practicing nerve blocks, administering medications to a patient, and dealing with a "real life" situation (e.g. acute myocardial infarction) in which they are video taped for feedback and personal review.

SUMMARY

This report addressed seven key areas of medical school education that vary by program. It is clear that medical schools across the country are making continuous improvements to meet students' needs in a quickly evolving profession. We, as students, can encourage and influence these changes made in each of our respective schools. We would like to thank the Organization of Student Representatives of the Association of American Medical Colleges for providing us with information.

The traditional system does not use an organ systems based approach but does use lecture and small groups with minimal PBL to cover the necessary information for the basic science curriculum.

The disadvantage of a traditional curriculum is the lack of integration (best example is the second half of the *First Aid USMLE STEP I* review book which integrates all subjects based on organ systems). Some of the respondents noted that a traditional non-systems-based curriculum tested the ability to memorize and regurgitate facts rather than master basic science and its application to medicine.