



Changing Medical Education: Examining The Genomic Health Revolution



Francis Collins, M.D., Ph.D., director of the National Institutes of Health (NIH), indicated there is a genetic test that is fairly useful in predicting some degree of one's individual susceptibility—family history. It is free, and we do not use it very effectively. Rarely is the family history non-contributory unless the patient was adopted and has no information about any of his/her blood relatives.

There is a tool called the surgeon general's family history available on the Web for patients to enter information about

their family members and their medical experiences, which gets placed into software that can be printed out as a pedigree. When responding to a question as to how the medical school of the future will be in a genomic era characterized as a genomic health revolution, Dr. Collins remarked that he wished he could predict. He indicated he knew from personal experience as a professor at the University of Michigan just how difficult it is to change just one hour of the curriculum because there were many entrenched views about what the curriculum should look like.

He further stated it was easier to sequence the human genome than to change an hour of medical school training, and that it's still a challenge to do that. In addition, he explained that some medical schools have taken this on in a pretty thoughtful and creative way. They have tried to build medical school education around a holistic view of how biology works from the genome all the way up to the whole organism and the environment instead of having things pigeonholed by discipline. Genetics is really straightforward stuff, he said, not like learning neuroanatomy. If you learn a few principles in genetics, you can figure out the rest, Dr. Collins remarked.

However, he also stated that genetics is quite digital, but still not part of the armamentarium of many practicing physicians. He also commended the National Coalition for Health Professional Education in Genetics (NCHPEG), which is an organization founded initially by the American Medical Association, the American Nurses Association, and the NIH that now is in the process of providing case-based information for busy practitioners who feel they have something to learn.

To view some of the NCHPEG's materials, please visit www.nchpeg.org. Because things will be changing much in genomics, Dr. Collins concluded that there will be a constant need for refreshing.

(Collins F. Three scientific breakthroughs changing medicine. medscape.com. February 15, 2012.)

Training in Genomics for Cardiologists Considered a Priority



Challenges associated with genomics in the clinic in general, and with next generation sequencing (NSG) technologies in particular, are significant and cardiologists need to be prepared if they wish to employ this genomic opportunity. Twenty-four years separated the development of DNA sequencing technology and the publication of the draft human genome.

Four years later, commercially available next generation sequencing was available and now, six years later, NGS is already used in clinical practice. The next generation of clinical cardiologists must be trained in genomics and understand the potentials and pitfalls of genomic medicine along with a coordinated investment in technology and informatics. Up until recently, two million bases of sequence per day were used to sequence the first human genome. However, this output is very low compared with the size of the human genome (one strand of the human genome contains 3,000,000,000 base pairs).

Next generation sequencing technologies massively increase output (up to 50 billion bases per day) at a reduced cost per base. An increase in the availability of genetic testing for clinical diagnostics and personalized medicine requires genetic literacy among cardiologists, together with increased support from clinical geneticists and genetic counselors. Specialty training will have to ensure that trainees are able to interpret genetic information in the context of both rare and common diseases. This will require an investment in training and the development of teaching experts.

(Ware JS, Roberts AM, Cook SA. Next generation sequencing for clinical diagnostics and personalized medicine-implications for the next generation cardiologist. Heart. 98(4):276-281. 2012.)

Family Medicine Rural Training Track Residencies

A Rural Training Track Technical Assistance Program that is federally funded by the Office of Rural Health Policy has led to as many as 76 percent of graduating residents practicing in rural locations. A study of the WWAMI Rural Health Research Center at the University of Washington acquired data from 14 of 24 family medicine rural training track programs (RTT), which represented 10 sponsoring institutions reporting on the outcomes of 85 physicians who completed these residencies.

These RTT graduates were 54.1 percent men and 45.9 percent women compared to 44.3 percent men and 55.7 percent women from family medicine programs nationally. The mean age of RTT graduates was 34.7 compared to 30.8 for all family medicine graduates in 2010-11. Seven of the 85 graduates, or 8.2 percent, were osteopathic physicians, and about half of the graduates were international medical graduates. About one third of the RTT graduates practiced in Federally Qualified Health Centers (FQHCs), Rural Health Clinics (RHCs), or Critical Access Hospitals (CAHs). Between 47.6 and 72.5 percent of the RTT family medicine residents practiced in rural locations compared to 22 percent of other family medicine residents.

(Patterson DG, Longenecker R, Schmitz D, Xierli IM, Phillips RL, Skillman SM, Doescher MP. Rural residency training for family medicine physicians: graduate early-career outcomes. Policy Brief, WWAMI Rural Health Research Center; January 2012.)

Methods of Assessing Medical Student Professional Behavior

As a result of a Liaison Committee on Medical Education (LCME) survey of 131 medical schools, the methods employed to assess the professional behavior of medical students were determined. The most frequently employed methods were observations by clinical faculty members in clerkships, observation during small group sessions in the preclinical years, and observations by residents.

Other frequently used methods included observations during laboratory sessions (e.g., gross anatomy) and the use of objective structured clinical examinations (OSCE) with one or more professionalism stations. Also significant were comments from other health professionals, comments from administrative staff members, and comments from patients.

(Assessment of professional behavior: methods used in U.S. medical schools. AAMC Curriculum Reports: www.aamc.org/curriculumreports. LCME Annual Questionnaire Part II; 2011.)

Objective Structured Systems–Interaction Examination (OSSIE)

The Southern Illinois University (SIU) School of Medicine Internal Medicine Residency Program has developed an Objective Structured Systems-Interaction Examination (OSSIE). SIU indicates that scenarios and their affiliated materials may be used by others working at institutions using standardized performance-and systems-based examinations.

Educational Objectives and Scenarios

■ *Cost awareness and risk/benefit analysis:* Residents are expected to incorporate considerations of cost awareness and risk/benefit analysis in patient and/or population-based care as appropriate.

■ *Advocate for quality care/optimal patient care systems:* Residents are expected to incorporate considerations of cost awareness and risk/benefit analysis in patient and/or population-based care as appropriate.

■ *Coordinate patient care within health care delivery setting:* Residents are expected to advocate for quality patient care and optimal patient-care systems.

■ *Knowledge of practice and delivery systems:* Residents are expected to work effectively in various health care delivery settings and systems and coordinate patient care with the health care system.

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■ *Communication, professionalism, and advocate for quality care:* Residents are expected to participate in identifying systems errors and implementing potential systems solutions.

Different from objective structured clinical examinations (OSCEs) that are set in a simulated clinic office, OSSIE cases are situated in simulated hospital rooms, physician offices, nurses' stations, conference rooms, and resident lounges using desks, other office furniture instead of exam tables, and charts that accurately simulate hospital records.

(Thompson Hingle S, Ferguson J, Kovach R, McCann-Stone N, Robinson S, Rosher R, et al. Scenarios and standardized professionals from the objective structured system-interaction examinations (OSSIEs) of an internal medicine residency program. MedEdPORTAL; 2012. www.mededportal.org/publication/9087.)

Future Physicians and Behavioral and Social Science

A recent publication of the Association of American Medical Colleges indicated that over 50 percent of premature morbidity and mortality is due to behavioral and social determinants of health. This includes such determinants as smoking, diet, and exercise as well as socioeconomic status.

The AAMC also reminds that health disparities and medical errors also interact negatively with health care quality and equity compounded by the growing shortage of primary care providers and access to care across geographic and socioeconomic variables. It concluded that these issues can be improved through education in behavioral and social sciences. In addition to traditional medical knowledge, physicians need to understand why patients chose to make the choices they do, such as choosing to smoke, and how to facilitate change in their behavior.

Having such knowledge also creates an appreciation of social issues such as peer pressure, the health care system, referral resources, and other factors. In the educational environment, behavioral and social sciences are essential tools since they can guide professional development, inform education, and support a humane training environment.

To use such information in clinical situations, trainees need to be able to understand and manage emotions, stress, and competing demands. At the same time, they must remain empathetically connected with the patients they serve. Professional identity development together with the tools for learning and practice are governed by behavioral and social science principles. These could be greatly enhanced by behavioral and social sciences-informed teachers and mentors.

(Behavioral and social science foundations for future physicians: report of the behavioral and social science expert panel. Association of American Medical Colleges; November 2011.)

Airplane Notes: Cheating on Dermatology and Radiology Board Examinations

CNN reported that dermatology and radiology residents have been recalling examination questions immediately after they completed their certifying examinations. It has been confirmed that they write down as many questions as they can remember on the airplane as they return home from their examination. The American Board of Medical Specialties

condemned this practice and indicated it could result in permanent barring from certification as well as prosecution for copyright violation.

The American Board of Dermatology acknowledged it had heard of such practice and has tightened security by minimizing the number of previously used questions. About 20 percent of questions

each year are recycled on the dermatology board and 50 percent on the written exam in radiology. The American Board of Family Medicine indicated it reuses a very small number of questions from old exams, while the American Board of Orthopedics reuses about 20 percent.

(Zamost S, Griffin D, Ansari A. Doctor cheating warnings expand to dermatology. CNN; February 3, 2012.)

Perceptions on Decisions by Osteopathic Medical Graduates to Take the USMLE

While no data exists on the number of ACGME-accredited residency programs that require osteopathic medical students to take the USMLE, the majority of the 978 students who responded to a poll taken at 19 osteopathic medical schools believed they should. Forty percent of these respondents were in the top quintiles of their class. The primary reason given by 507 or 46 percent of the 2,333 D.O. students who took at least one step of the USMLE was to keep their options open. Also important

among the reasons for D.O. students to take the USMLE was to enhance their chances of getting into an allopathic residency.

The study noted that osteopathic medical students tended to score lower on USMLE Step 1 and Step 2 Clinical Knowledge than Liaison Committee on Medical Education medical students. However, they scored higher than graduates of foreign medical schools. ACGME program directors considered scores on USMLE Step 1 the second-most important

factor out of 14 in their decision making. A similar study of osteopathic residency program directors was recommended by the study authors concerning the importance of COMLEX-USA Levels 1 and 2-CE in resident selection.

(Hasty R, Snyder S, Suci GF, Moskow J. Graduating osteopathic medical students' perceptions and recommendations on the decision to take the United States Medical Licensing Examination. Journal of the American Osteopathic Association. 112 (1)83-89; 2012.)



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