Medical School Hotline

Genetics in the John A. Burns School of Medicine Curriculum: a nationally recognized need and an opportunity for curricular Integration

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The New Genetics of The Common Disorder

Genetic diseases are not rare. Their impact lies far beyond cystic fibrosis, sickle cell and thallasemia. Hypertension, alcoholism, depression, diabetes, and cancer are now recognized to be, to some extent, genetic diseases. Although we do not yet know all the details, it is clear that genetic background can define predisposition to a number of significant etiologies. Medical genetics is one of the most rapidly advancing areas of medical practice. The knowledge of medical genetics that is necessary for medical practice is likely to be very different in 5 or 10 years than it is now. Every physician who practices in the 21st century will require a basic knowledge of the principles of human genetics and their application to a wide variety of clinical problems.

The Human Genome Project is predicted to be complete by the 50th anniversary of Watson and Crick's Double Helix paper in *Nature*. Thousands of researchers working to apply the derived results will yield rapid advances in genetic medicine. There has been an explosion in the number and membership of professional organizations related to human genetics. New health care professions and career paths have rapidly evolved.

Because of the shear number of common gene-related diseases, and the advent of managed care, there is a general recognition that the General Practitioner will necessarily fill some of the roles of genetic councilor and diagnostician as DNA chips, family genetic history-taking tools, and genotype-specific interventions become common practice.

Recognition of a Need for a Curriculum of The New Genetics

A recent issue of the Association of American Medical Colleges (AAMC) Newsletter[1] quotes "Students must understand that if they want to be a good internist, say, they have to understand genetics. They don't expect to be a good physician without learning about the kidney-well, they can't ignore genetics any more than they can ignore the kidney." The American Medical Association (AMA) has undertaken a significant effort to develop CME courses in genetics. The latest AAMC exit poll reports 44% of new graduates were unsatisfied with the amount of genetics they received in their curriculum. A 1997 study found that almost a third of physicians surveyed could not distinguish an inconclusive result from a negative one in a genetic test for colon cancer. Partly in recognition of these findings, genetics items have recently been added to the US Medical Licensing Examination (USMLE) Content Outline and Genetics sub scores are reported for Part I of the USMLE Board Examination. The AAMC is concerned enough about this issue that it hosted a series of Focus Sessions relating to the development of genetic curricula at its most recent national meeting.

The New Genetics in the JABSOM Curriculum: Building on National Recommendations

"The New Genetics" provides an opportunity to deliver an integrated curriculum, including basic science, clinical science, public health and epidemiology, ethics and cultural issues. This "GPEC" (Genetics, Public Health, Ethics and Cultural) curriculum would go beyond the GEE (Genetics, Epidemiology, and Ethics) curriculum recently rolled out by the University of Vermont with great interest and fanfare. With the recognition of Public Health as unfolding from epidemiology, and the cultural complexity of our Hawaii, there are unique opportunities to develop a "whole" (not "complete") PBL curriculum with the new genetics as a longitudinal binding theme. An attractive attribute of this plan is a mechanism by which faculty of the School of Public Health can become involved in MD Program curriculum design and delivery.

The American Society of Human Genetics has developed a Medical School Core Curriculum[2] to provide guidance to deans and curriculum committees regarding knowledge, skills, and attitudes related to medical genetics that are likely to be needed by all current medical students during their careers as physicians. Their generalized recommendations follow:

Medical genetics is both a basic biomedical science and a clinical specialty; it is insufficient to teach it as either alone. Teaching in medical genetics must span the entire undergraduate medical school curriculum and must continue into the postgraduate years as well.

Medical genetics must be explicitly included in the curriculum. Although some aspects of medical genetics overlap with and may be taught by other disciplines, students are unlikely to learn what they need unless specific learning objectives in medical genetics are established for them. This is especially true of issues that lie at the heart of medical genetics, such as the importance of disease prediction and prevention, the appropriate application of novel scientific discoveries to clinical care, and the nondirective approach to counseling.

A person or committee should be given specific responsibility for the curriculum in medical genetics at each medical school. This responsibility should extend throughout the entire undergraduate curriculum and should include involvement in all courses that contain (or that should contain) material related to medical genetics.

Medical genetics can be taught effectively by a variety of different methods and in various formats. **Problem-based learning is particularly well-suited to medical genetics**, which involves the integration of skills and knowledge from many different fields [emphasis added].

The Association of Professors of Human or Medical Genetics report entitled "Clinical Objectives in Medical Genetics for Undergraduate Medical Students"[3] defines the knowledge, skills and attitudes in genetics that all medical students should achieve during the clinical phase of their education. These objectives complement those of the ASHG Medical School Core Curriculum in Genetics, which covers both basic science and clinical aspects of medical student education. The reader will find many behavioral, populational, cultural, and clinical issues listed in the objectives enumerated by this organization.

The desired outcome of an integrated genetic curriculum at JABSOM is to prepare the student to:

1) practice modern medicine which includes recognizing the role of genetic factors in health and disease. This requires knowledge of the structure, function, and transmission of genes and understanding of interactions both among genes and between genes and the environment.

2) synthesize factual material related to genetic diseases and congenital anomalies and to use this information to formulate an appropriate plan for diagnostic evaluation and patient management. Students will learn to communicate information regarding genetic conditions, clearly, nondirectively, and without personal bias, to people from greatly differing educational, socioeconomic, ethnic, and cultural backgrounds.

3) be sympathetic, nonjudgmental, and nondirective counselors who recognize their own limitations, seek consultation whenever necessary, and become lifelong, self-motivated learners.

References

1. Not Your Father s Genetics Curriculum. http://www.aamc.org/newsroom/reporter/oct99/genetics.htm. AAMC Reporter:9, 1999.
2. Report from the ASHG Information and Education Committee: Medical School Core Curriculum in Genetics. http://www.faseb.org/genetics/ashg/policy/rep-01.htm *Am. J. Hum. Genet. 56:535—537, 1995.*
3. Clinical Objectives in Medical Genetics for Undergraduate Medical Students. http://www.faseb.org/genetics/aphmg/aphmg12.htm *Am J Hum Genet 1995;56:535-537.*