

AND THIS, TOO, SHALL CHANGE

The Medical College Admission Test, and More

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The Old Testament (First Kings 10:1-13) describes a visit by the Queen of Sheba* to King Solomon's court. The Queen wanted to see if Solomon deserved his reputation for great wisdom, and asked him many questions and posed many riddles. It came to pass that he answered all of them correctly, but the Bible doesn't tell us what the questions were. Chaim Nachman Bialik, the greatest Hebrew poet of modern times (he died in 1934), imagined the meeting between Solomon and Sheba, and wrote a number of tales based on folk legends and his own creativity.

In one of his more memorable stories, Sheba challenges Solomon to produce a statement that could be uttered in all times and all places and—regardless of the circumstances—would always be appropriate. After considerable deliberation and reflection he responds:

“And this, too, shall pass away.”

I prefer a less depressing but equally universal answer: “And this, too, shall change.”

THE MEDICAL COLLEGE ADMISSION TEST

There are innumerable applications of Bialik's modified tale to our daily lives, but we confine ourselves in this column to the world of health care where change is inevitable, and is never more surprising than when it occurs after a long period of stasis. The Medical College Admissions Test (MCAT) has not undergone substantial modification for more than 20 years (since 1991). The Association of American Medical Colleges (AAMC) has announced major alterations of the MCAT for 2015,¹ a date which should not be viewed

as far-off, since the 2015 version of the MCAT will be administered to the class of 2016 that is entering college this fall.

In explaining the need for change, Darrell G. Kirch, MD, AAMC president and CEO, said: “being a good doctor is about more than scientific knowledge. It also requires an understanding of people. By balancing the MCAT exam's focus on the natural sciences with a new section on the psychological, social, and biological foundations of behavior, the new exam will better prepare students to build strong knowledge of the socio-cultural and behavioral determinants of health.”

The revised exam builds on the framework described in the 2009 report from the Scientific Foundations for Future Physicians Committee.² This committee was a partnership formed by the AAMC with the Howard Hughes Medical Institute, and was comprised of scientists, physicians, and science educators from small colleges, large universities, and medical schools. They were tasked to address the AAMC's concerns about an unavoidable reality: the amount of scientific knowledge grows inexorably, while the time available for teaching and learning remains finite. (The committee addressed both premedical and medical education, but I will discuss here only their conclusions about premedical education.)

In brief, the committee concluded that it is crucial for premedical students to acquire not only a basic fund of scientific information, but eight crucial scientific competencies that will enable them not only to succeed in medical school, but to continue to acquire knowledge and evaluate new developments throughout their professional lives.

* On the basis of various scriptural allusions, the Queen of Sheba is presumed to have been a black African, and her domain is thought to have included the area of modern Ethiopia. Indeed, Haile Selassie, Emperor of Ethiopia from 1930-1974, was believed by his people to be - like all prior Ethiopian hereditary monarchs - a descendant of a union between Solomon and Sheba. In that dynastic tradition, Selassie bore the honorific “Lion of Judah.”

The competencies are:

- Apply quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world;
- Demonstrate understanding of the process of scientific inquiry, and explain how scientific knowledge is discovered and validated;
- Demonstrate knowledge of basic physical principles and their applications to the understanding of living systems;
- Demonstrate knowledge of basic principles of chemistry and some of their applications to the understanding of living systems;
- Demonstrate knowledge of how bio-molecules contribute to the structure and function of cells;
- Apply understanding of principles of how molecular and cell assemblies, organs, and organisms develop structure and carry out function;
- Explain how organisms sense and control their internal environment and how they respond to external change;
- Demonstrate an understanding of how the organizing principle of evolution by natural selection explains the diversity of life on earth.

To assess these competencies, the new test's two traditional sections on the natural sciences will not only test concepts taught in introductory college courses in biology, general and organic chemistry, biochemistry, and physics, but will also test skills in scientific inquiry and reasoning that demonstrate readiness for medical school. A section entitled "Critical Analysis and Reasoning Skills" will ask students to "analyze, evaluate, and apply information provided in passages from a wide range of social sciences and humanities disciplines, including ethics and philosophy, cross-cultural studies, and population health."

The changes to the exam also recognize the profound influence of patients' behavior on their health, and the growing body of evidence that integrating social and behavioral sciences into medical education curricula and clinical practice can improve the health of all patients.³ Thus, in addition to the traditional sections on the natural sciences, a new section—"Psychological, Social, and Biological Foundations of Behavior"—tests an understanding of the ways in which those areas influence a variety of phenomena including

"people's perceptions and reactions to the world; behavior and behavior change; what people think about themselves and others; cultural and social differences that influence well-being; and the relationships among socio-economic factors, access to resources, and well-being."

In another major change, the exam will no longer include a writing section. Feedback from admissions officers and other data revealed that this section offered little additional information about applicants' preparation for medical school, particularly in light of the insights offered by undergraduate grades and the other sections of the exam. With all the revisions to the test, the length of the exam will increase to about six and a half hours.

The AAMC is well aware that these changes in the MCAT have profound implications for college curricula, and they pointedly advise that premedical education should not be limited to preparing for a narrow professional discipline, but should instead be devoted to a broad, "intellectually expansive" liberal arts education. The AAMC also hopes that by focusing on scientific competencies rather than courses, they are providing undergraduate institutions with more freedom to develop novel courses to achieve the desired competencies without increasing the total number of instructional hours in the sciences.

These new initiatives from the AAMC are being received with particular enthusiasm at small liberal arts colleges like Franklin & Marshall here in Lancaster, where fostering the development of exactly those critical reasoning and analytical skills has always been part of their essential pedagogical mission, and low student-faculty ratios and small class sizes have always been a special advantage in that regard. Further, at small research colleges like F&M (not all liberal arts colleges are research colleges) faculty research is a key component of the academic mission and is required for tenure. Unlike major research universities, however, there are no graduate students, and faculty members do their research side-by-side with undergraduates, thus giving students unique opportunities to strengthen their reasoning and analytical skills. As a further bonus, college departments in the humanities and social sciences are being invigorated by the enhanced role they will play in the education of science majors.

The pathway through a broad college curriculum to acceptance into medical school is becoming

increasingly complex, and undergraduates need skilled assistance and dedicated mentoring to help them find the path that best suits their talents and needs.**

IN THIS ISSUE

On the same theme, Thomas E Beeman, PhD, FACHE, President and CEO of Lancaster General Health, discusses the inevitability of change in the health care system and how LGH must and will adapt.

Dr. Shanthi Sivendran and a group of authors associated with the LGH Oncology program discuss the dramatic changes in cancer chemotherapy that can be achieved by identifying molecular targets that are specific to malignant cells. Drugs that exploit a cancer's unique metabolic pathways or genetic mutations enable targeted chemotherapy to avoid the dose-limited toxicity of conventional shotgun chemotherapy.

Dr. Edgar Fearnow, Section Chief of Computed Tomography at LGH, describes the changes in screening for lung cancer that will shortly be introduced here as a result of new developments in low dose computed tomography. This discussion is particularly relevant in light of the articles in our last issue about the hazards of radiation exposure that results from radiologic studies, particularly CT imaging.^{4,5}

Retired (and venerated) ophthalmologists Paul Ripple and John Bowman discuss the changes in their specialty over the centuries, and how it has developed in Lancaster County. This is the first in what we hope will be a series of articles about medicine in Lancaster County which is being coordinated by Dr. Nikitas J. Zervanos, formerly the Director of our Family Practice Residency and now President of the Edward Hand Medical Heritage Foundation, whose mission is "to preserve and make accessible the rich heritage of the healing arts, with special attention to Lancaster."

Dr. Ray Foley, President of our Medical Staff, and Lisa Riffanacht, Executive Director of Project Access Lancaster County, provide an update on PALCOs remarkably successful efforts to provide health care to those who cannot afford it. Christopher O'Connor, our regular columnist on medico-legal matters, provides an informative and important discussion of the question: when a medical device fails, who pays for its replacement?

And finally, Dr. Alan Peterson provides an usually diverse potpourri of interesting updates on dental x-rays, testosterone, cervical cancer, and bone density.

Certainly, there is something here for everyone.

NOTES

** Full disclosure: as Chairman of the Board of Trustees at Franklin & Marshall College in Lancaster, I have an especially keen interest in premedical education. At F&M a special taskforce, led by Dr. Robert Aber, an F&M alumnus who is Chairman of the Dept. of Medicine at Penn State-Hershey Medical School, recently completed a study of Pre-Healing Arts advising, which is currently performed part-time by a member of the science faculty. The committee supported the conversion of that responsibility to a full-time position at F&M.

REFERENCES

1. www.aamc.org/newsroom/newsreleases/273712/120216.html
2. www.aamc.org/download/271072/data/scientificfoundationsforfuturephysicians.pdf
3. www.aamc.org/download/271020/data/behavioralandsocialsciencefoundationsforfuturephysicians.pdf
4. Montagnese, AD. The evolving role of radiation-dose considerations in diagnostic imaging. *J Lanc Gen Hosp.* 2012; 1:13-16
5. Wu, D. Radiation exposure in trauma patients. *J Lanc Gen Hosp.* 2012; 1:8-12