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AAMC/HHMI Committee Defines Scientific Competencies for Future Physicians

A new report, issued today by an expert committee convened by the AAMC (Association of American Medical Colleges) and the Howard Hughes Medical Institute (HHMI), for the first time defines scientific competencies for future medical school graduates and for undergraduate students who want to pursue a career in medicine.

“Scientific Foundations for Future Physicians” recommends that medical and premedical education evolve from a static listing of courses to a dynamic set of competencies. The [22 committee members](#) believe that this fundamental change will encourage the development of innovative and interdisciplinary science curricula, maintain scientific rigor, and allow premed students at the undergraduate level the flexibility to pursue a strong liberal arts education. The new report is the subject of an editorial in the June 5, 2009, issue of *Science* magazine.

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“Future doctors must be equipped to provide the best and most scientifically sound care for their patients,” said AAMC Executive Vice President Carol Aschenbrener, M.D. “The AAMC hopes this report will be the beginning of a broad dialogue within the undergraduate and medical education communities

to reinvigorate the scientific preparation of physicians.”

“This report is timely and important. Science has always been the foundation of modern medicine, but today, science is moving forward with increasing speed at new and ever-expanding interfaces,” says Peter J. Bruns, Ph.D., HHMI’s vice president for grants and special programs. “The report will help premedical and medical educators design the curricula needed to arm aspiring and developing physicians with the scientific knowledge they will need today and the intellectual attitudes that will sustain them in the future.”

While the scientific knowledge important for medicine has changed dramatically over the decades, the approach to science education in premedical and medical curricula has essentially stayed the same. To address this concern, the AAMC and HHMI formed a committee in 2007 of researchers, physicians, and science educators from small colleges, large universities, and medical schools across the country and representing a wide range of scientific and medical disciplines. The committee was co-chaired by Robert J. Alpern, M.D., dean of Yale University School of Medicine, and Sharon Long, Ph.D., professor of biological sciences at Stanford University and former dean of the School of Humanities and Sciences.

The report offers 11 overarching principles to help guide educators in their discussions to define competencies, recommends eight competencies focused on the natural sciences that all medical students should demonstrate before receiving their M.D. degrees, and identifies eight broad scientific competencies that individuals should master prior to entering medical school. The committee defined a competency as the knowledge, skill, or attitude that enables an individual to learn and perform in medical practice. For example, instead of requiring specific mathematics courses, medical students will be expected to show competence in applying “quantitative knowledge and reasoning—including integration of data, modeling, computation, and analysis—and informatics tools to diagnostic and therapeutic clinical decision making.” The report supplements the competencies with specific learning objectives and examples.

By focusing on competencies rather than on specific courses taken or disciplines studied, committee members seek to encourage innovation in the design of premedical and medical curricula. The committee does not suggest that the number of requirements be increased; instead, it proposes substituting more relevant requirements for less relevant ones. The committee also recommends that the scientific competencies undergo periodic review and updating in order to ensure that they reflect ongoing advances in scientific knowledge.

The report's findings will be considered, along with other initiatives, in the AAMC's comprehensive review of the MCAT, which is currently underway. Expected to be completed by 2012, the review will assess the test's current content and recommend changes that are likely to increase its usefulness to the medical school admissions process. In addition, a separate report on the behavioral and social science competencies for future physicians is expected in late 2010.

For a copy of the AAMC/HHMI report, "Scientific Foundations for Future Physicians," as well as the executive summary and a list of committee members, go to: www.hhmi.org/grants/sffp.html

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The Association of American Medical Colleges is a not-for-profit association representing all 130 accredited U.S. and 17 accredited Canadian medical schools; nearly 400 major teaching hospitals and health systems, including 68 Department of Veterans Affairs medical centers; and nearly 90 academic and scientific societies. Through these institutions and organizations, the AAMC represents 125,000 faculty members, 75,000 medical students, and 106,000 resident physicians. Additional information about the AAMC and U.S. medical schools and teaching hospitals is available at www.aamc.org/newsroom.

The Howard Hughes Medical Institute is one of the world's largest philanthropies, with laboratories across the United States and grants programs throughout the world. The Institute is a nonprofit medical research organization that employs hundreds of leading biomedical scientists working at the forefront of their fields. In addition, through its grants program and other activities, HHMI is helping to enhance science education at all levels and maintain the vigor of biomedical science worldwide. Its headquarters are located in Chevy Chase, Maryland, just outside Washington, D.C. More information about HHMI can be found at www.hhmi.org.