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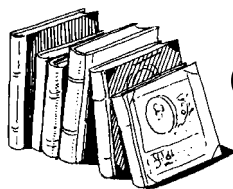
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Commentaries

Specialty Care

ALL DOCTORS BELIEVE THEMSELVES, LIKE THE children in Lake Wobegone, to be above average. Certainly specialists consider themselves even more so, at least with respect to non-specialists, but we don't often have data to prove it. A recent article in *Neurology*, in support of this assertion (*Neurology* 2011;77:851) made me recall some comments I heard regarding neurologists and Parkinson's specialists.

At a large primary care meeting that a colleague, another movement disorders specialist, lectured at, the panel of speakers was asked, "When should someone with PD be referred to a neurologist?" A prominent family care doctor on the panel answered, "Never." I suspect that the response emanated from experience that the specialists concentrated on the motor aspects of PD and failed to view the patient as a whole human being, addressing the manifold concerns that accompany disabling diseases in general and the non-motor problems of PD in particular. A few years later, a different prominent primary care professor, a colleague at Brown, told me that neurology training for medical students was generally a waste of time so that it didn't matter that Brown didn't require it for graduation. "How much useful information would a student learn in an MS clinic or a PD clinic?"

The article that triggered this commentary simply examined a gigantic cohort of patients in the Medicare data base for the whole United States and surveyed out-patient claims to determine how many people diagnosed with PD had seen a neurologist, and whether there were differences in outcome between those who did and those who didn't. Women and minorities were less likely to see a neurologist. PD patients who had seen a neurologist lived longer, had fewer hip fractures and were less likely to end up in nursing homes. There were no overall benefits seen in those who were not referred to a neurologist.

I would like to extrapolate that PD patients who saw PD-specialists (ie like myself) do even better but that would

be speculative. This is not to say that every patient needs referral to a specialist. Many patients are a lot better off *not* seeing one.

All doctors see their role as guardians of their patients' health and well being. Some do this by limiting testing as much as possible, with the notion that excessive testing leads to excessive costs, excessive worry, and sometimes unintended consequences. Some, on the other hand, believe that it is crucial not to miss anything, and testing provides a written, objective report stating that something was looked for and not found. Just as PCP's have different thresholds for ordering tests, they have different thresholds for referrals to specialists.

Specialists are just like PCP's with regards to referrals and testing. Some count on their expertise and clinical judgment and simply reassure their patient, "This headache is really bothersome, but another MRI isn't going to make it better," and others may say, "Well, I'm pretty sure there's nothing abnormal, and it's probably migraine, but let's get another MRI just to be sure." A friend complained of chest pain after she took her alendronate. Esophageal irritation is a well known side effect, which is why patients are instructed to not bend over or swallow anything for 30 minutes after taking it. So the gastroenterologist opined that the symptom was likely due to the alendronate, but, since the patient was 60 years old and her father had an MI, it would be a good idea to get an echocardiogram and a stress test, despite the absence of any other cardiac symptoms or ECG changes. And, of course, the echocardiogram had a minor anomaly, which led to a cardiology consultation, which, luckily, stopped the ball from rolling further downhill when he said her heart was fine.

Some specialists feel, with justification, that "the buck stops here." It's their job to provide the highest degree of certainty that something is either not wrong, or at least not diagnosable with current technology, or to define, as well as possible, what is wrong. A patient I

evaluated for a movement disorder was then seen at an even more specialized center, which focused only on one particular type of movement disorder. I had ordered the usual "mundane" tests, MRI, a few routine blood tests and a genetic test for the most common disorder that might explain the problem, despite the absence of a family history. When that came up negative, as is often the case, I explained that I was not going to be able to diagnose the problem, that it was likely one of a group of very similar diseases, thought to be hereditary, none of which had any treatment. The patient desired further evaluation. At the quaternary referral center, there are, apparently, no barriers to testing, other than those imposed by the insurers. Eighteen thousand dollars of testing later, no identifiable cause for the disorder had been found, but, as the super-specialist noted, even, had a cause been found, there would have been no treatment for any of them anyway.

I like to think I'm on the conservative end of test ordering, but I'm certain there are colleagues who think I order too many, and others who think I order too few. I try to find guidance from my patients. Do they want to pursue expensive testing to find a cause that will have no treatment or are they content to know they have a type of disorder, say a spinocerebellar ataxia, rather than knowing they have spinocerebellar ataxia type 23? I don't think there's a "right" answer to the problem of how much to test. Each case is different. The only thing I do know is that the functionary at the other end of the telephone in an insurance company office probably is less capable of making these decisions than I am.

— JOSEPH H. FRIEDMAN, MD

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e-mail: joseph_friedman@brown.edu

A Special Vision To See Beyond Tomorrow

A SUNDAY SCHOOL STUDENT, AFTER SOME HESITATION, ASKS: “IS THERE a difference between a revelation and a prophecy?” His teacher pauses and then responds: “Yes, there is a notable difference. A revelation is an act of disclosing, of making something presently apparent that had not previously been apparent. A prophecy, on the other hand, is a foretelling of events that have not as yet happened; it is a disclosure of future happenings.

The student remains confused but does not immediately pursue his thoughts further, allowing his mind to dwell more on next Thursday’s basketball game. Yet, the doubts persist as he recalls a vagrant thought from a prior Sunday School session when he learned that revelations, meaningful revelations, required a divine intervention, while the other kinds of revelation, those in the secular realm, were but speculative gossip.

Days later, his doubts about the nature of prophecy and revelation return and he now speculates: “If I lose my house key, search for it and eventually find it by overturning yesterday’s newspaper which had been hiding it, was this an inspired revelation or merely an accidental disclosure? And is revelation, then, nothing more than an uncovering—accidental rather than inspired—of a reality waiting to be realized?”

So, this student concludes, a revelation is a disclosure which can be accidental, fortuitous – or, alternatively, guided by divine instruction. And given the many multiple-choice tests at his school, the student now prays for more divine guidance during examination time.

Days later, just prior to the SuperBowl, this student offers a prediction on its outcome based on a mixture of hope and an appraisal of each team’s past performance. And he then asks himself: “Am I making a prediction or, alternatively, a prophecy?” And so, through in a different arena, the wonderments about the dimensions of revelation and prophecy return.

The SuperBowl goes badly and this student’s thoughts persist in reviewing not only the many lost opportunities during the game, those dropped forward passes for example; but further, uninvited reflections on prophecy, revelation; and whether, perhaps, one is merely a disguised form of the other.

The furtive seeds of skepticism, of demands for rational explanation, lurk as this student strives for clarity. His active mind gathers a cluster of vaguely similar words regarding the future, words such as speculation, informed conjecture, wild guess, even prophecy; and then wonders about the meaning—and weight—of each.

The word, prophecy, intrigues him. It brings forth visions of mystery, astrology and wizards wearing conical hats. The dictionary—a book that he uses rarely—tells him that the word, prophet, is based upon an ancient Greek compound word, meaning one who speaks in behalf of another, a spokesman in other words who transmits predictions and judgments derived, generally, from some higher source. By this rigorous definition, then, a prophet is a transmitting vehicle, a passive message-carrier; and thus the gift of prophecy is not primarily within him but merely passes through him.

He recalls his aunt, a physician in general practice, who regularly predicts her patients’ futures: those who may some day be burdened with heart disease, those who may develop diabetes, those whose current occupation may lead to occupational diseases in the foreseeable future. And this student remembers that she employs certain predictive tests, that give her estimates an air of reliability. These predictive elements all seem quite pragmatic, down-to-earth, to this striving adolescent; and certainly free of any messages from higher sources. And he remembers stories, told by his aunt, of the great 19th Century physician, William Osler, who would stop strangers on the Baltimore streets to tell them, in the most courteous of terms, that they have—or will shortly have—certain terrible diseases but which are not as yet evident to the casual eye. And so the student wonders: “Was Osler a prophet or merely a well-informed physician who visually inspected the passing strangers for signs of physical ailments? And further, can prophecy be little more than a happy exploitation of premonitory signs (discerned by only a few avid seekers) and a bit of random good luck?”

And so, thinks this lad, the need for prophecy, may shrink as revelations become more exactly sensitive. And since all consequences seem to have their own causes, might not the day arrive when the tomorrows will be revealed beforehand by uncovering all of the secret causes hidden in the todays? This adolescent logic seems to work with weather predictions. Maybe, some day, this credulous youngster concludes, the results of future SuperBowls will also be foregone conclusions.

— STANLEY M. ARONSON, MD

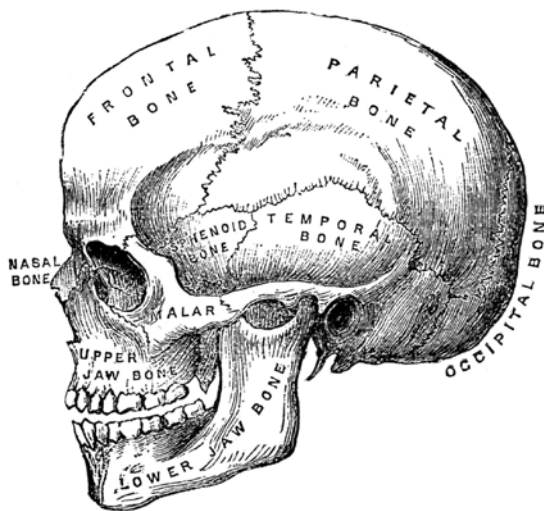
Stanley M. Aronson, MD is dean of medicine emeritus, Brown University.

Disclosure of Financial Interests

The author and his spouse/significant other have no financial interests to disclose.

CORRESPONDENCE

e-mail: SMAMD@cox.net



Medical Education: Introduction

Edward J. Wing, MD

WE AT THE WARREN ALPERT MEDICAL SCHOOL ARE GRATEFUL FOR the opportunity to report on the latest developments in our educational programs. Dr. Phil Gruppuso and his colleagues have done a truly outstanding job over the past seven years taking the school through curriculum redesign, expansion of the class, the introduction of a standard route of admission, and construction of the first home for the Medical School in the Jewelry District. In October we will be undergoing a review by our accrediting agency, the **Liaison Committee on Medical Education (LCME)**. I am confident that the changes that have been made and the progress of the school will result in a positive review.

In this issue we first highlight Alpert's class of 2012—their residency selections and a comparison with past classes. You can quickly get a sense of the outstanding quality of our students from the data. The following article presents the Doctoring Program. This program which places first and second year students in physicians' offices plays an essential role in teaching

physical diagnosis, history taking, and the physician-patient relationship. We greatly appreciate our clinical faculty in this endeavor. I know what it takes to teach in this setting and what a financial cost it is.

The next piece describes the innovative curriculum changes which have been made and are planned for the future. The final article describes how we assess the clinical competence of our fourth year students. The new building allows us to use a state of the art clinical skills suite to test students through OSCE exams.

We hope you find the articles informative and we welcome any comments, suggestions or interest in participating in our educational programs.

Edward J. Wing, MD, is the Dean of Medicine and Biological Sciences at the Warren Alpert Medical School of Brown University.

The Warren Alpert Medical School of Brown University Class of 2012

Philip A. Gruppuso, MD, Eileen Palenchar, and Janice Viticone

ON MAY 27, 2012, 78 MEN AND WOMEN received the Doctor of Medicine degree from the Warren Alpert Medical School of Brown University. These new physicians represent the 38th class graduated from our institution since 1975. Of the over 2,800 physician graduates of **Alpert Medical School (AMS)** to date, approximately ten percent are currently licensed to practice in Rhode Island. This represents a substantial contribution of the medical school to health care in our state. By introducing the graduates of the MD Class of 2012 to the physician community in our state, we aim to apprise Rhode Island's physician community of the medical school's ongoing contribution to health care in Rhode Island.

A PORTRAIT OF THE CLASS OF 2012

Of the 78 graduates in this year's class, 44 are women and 34 are men. Five of our most recent graduates are residents of Rhode Island. The Rhode Island stu-

dents in this year's graduating class came from five different communities in the state: North Providence, Barrington, West Warwick, Providence and Block Island. The remaining students came from across the US.

This was an experientially diverse class at the time of matriculation. The breakdown of the graduating class by admissions route is 64% **PLME (the 8-year Program in Liberal Medical Education)**, 26% standard pre-med and 6% students from post-baccalaureate programs (two from Bryn Mawr, one from Goucher, and two from Columbia). The remaining three students came to AMS via the Early Identification Program, Brown-Dartmouth and MD-PhD routes. The most common undergraduate major among the graduates was biology (47%; inclusive of sub-disciplines such as biochemistry, neuroscience, and community health). Taken together, science majors (including math, engineering, chemistry and psychology) accounted for 61% of all majors. Of the remaining students,

27% of majors were in the humanities and 12% in the social sciences.

The students in the Class of 2012 continued to pursue their diverse interests during medical school. This the third graduating class to complete AMS' Scholarly Concentrations Program, an elective program that was established six years ago. It provides students with the opportunity to undertake mentored scholarly work in a variety of cross-disciplinary areas. Twenty-one students participated in and completed the program. Their areas of focus were Advocacy and Activism (two students), Aging (two), Contemplative Studies (one), Disaster Medicine and Response (one), Global Health (six), Medical Education (three), Physician as Communicator (three), and Women's Reproductive Health (three). Of the students who completed the Scholarly Concentrations Program, 15 were from the PLME program, five were from the standard admission route and one attended a post-baccalaureate program.

RESIDENCY AND CAREER CHOICES

The specialty choices made by this year's graduates (Table 1) showed a proportion choosing primary care disciplines that was about the same as the past four years, approximately half of the graduates. Internal medicine continued to be the primary career choice among all disciplines. The proportion of students entering family medicine was 9%, about the same percentage as last year. There were no significant differences in career choice when comparing students who

came to AMS via the PLME and premed admission routes.

As has been the case in recent years, our students' residency placements (Table 2) again showed many students matching at highly regarded programs within their chosen specialties. This was reflected in the number of students matching at programs affiliated with Harvard Medical School (11) and the University of Pennsylvania (three), as well as students who moved on to programs at Johns Hopkins, Columbia, Yale and Stanford. Students' residency

placements again showed considerable geographic diversity (Table 3). Twelve of our graduates, 15% of the graduating class, have stayed on in AMS-affiliated programs. As has been the trend in recent years, many of our students entered programs in Massachusetts (17), California (12) and New York (eight). Of the 78 graduates, six are delaying entry into residency to undertake additional research or other scholarship.

One other aspect of this graduating class, its relatively small size, deserves comment. Over recent years, the number

Table 1. Specialty Choices for Warren Alpert Medical School Classes of 2005 – 2012

	2012		2011		2010		2009		2008		2007		2006		2005	
Specialty Choice	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Primary Care, Total	35	45%	25	55%	47	48%	39	46%	35	50%	47	50%	34	38%	32	44%
Internal Medicine, Total	17	22%	24	24%	17	18%	18	21%	13	19%	19	20%	17	19%	16	21%
Categorical	1	1%	21	21%	14	14%	11	13%	13	19%	16	17%	0	0%	16	21%
Primary Care	17	22%	3	3%	3	3%	7	8%	0	0%	3	3%	0	0%	5	7%
Pediatrics	4	5%	12	12%	13	13%	9	11%	9	13%	13	14%	9	10%	4	13%
Family Medicine	7	9%	8	8%	5	5%	4	5%	6	9%	8	9%	5	6%	7	8%
Medicine/Pediatrics	1	1%	4	4%	4	4%	2	2%	3	4%	4	4%	1	1%	2	2%
Obstetrics & Gynecology	5	6%	7	7%	8	8%	6	7%	4	6%	3	3%	2	2%	3	1%
Surgery	0	0%	8	7%	7	8%	7	8%	5	7%	6	6%	9	10%	3	4%
Surgical Subspecialties, Total	12	15%	12	12%	7	7%	10	12%	8	11%	8	9%	10	11%	6	8%
Ophthalmology	3	4%	3	3%	0	0%	3	4%	2	3%	0	0%	2	2%	3	2%
Orthopedics	2	3%	4	4%	1	1%	3	4%	2	3%	3	3%	4	4%	2	1%
Neurosurgery	3	4%	1	0%	2	2%	1	1%	1	1%	0	0%	1	1%	0	0%
Urology	2	3%	1	1%	0	0%	2	2%	2	3%	2	2%	1	1%	1	2%
Plastic Surgery	0	0%	2	2%	1	1%	0	0%	1	1%	1	1%	0	0%	1	2%
Vascular Surg	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Otorhinolaryngology	2	3%	0	0%	3	3%	1	1%	0	0%	2	2%	2	2%	0	0%
Dermatology	3	4%	1	1%	3	3%	2	2%	1	1%	4	4%	5	6%	5	7%
Emergency Medicine	4	5%	9	9%	8	8%	6	7%	5	7%	3	3%	7	8%	3	4%
Psychiatry	3	4%	4	4%	6	6%	5	6%	3	4%	8	9%	5	6%	4	5%
Neurology	2	3%	2	2%	2	2%	3	4%	1	1%	1	1%	1	1%	1	1%
Transitional & Preliminary Medicine	4	5%	1	1%	4	4%	1	1%	1	1%	7	8%	0	0%	1	1%
Institutional Specialties, Total	9	12%	4	4%	11	11%	7	8%	9	13%	7	8%	9	10%	9	12%
Anesthesiology	4	5%	1	1%	3	3%	1	1%	1	1%	3	3%	2	2%	1	1%
Pathology	0	0%	0	0%	2	2%	0	0%	3	4%	0	0%	1	1%	0	0%
Rehabilitation Medicine	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Radiology & Rad Oncology	5	6%	3	3%	6	6%	6	7%	5	7%	4	4%	6	7%	9	3%
Delaying Residency	6	8%	2	2%	1	1%	5	6%	1	1%	2	2%	9	10%	9	12%
Not Entering Medicine	0	0%	2	2%	1	1%	0	0%	1	1%	0	0%	0	0%	0	0%
Totals	78	100%	100	100%	97	100%	85	100%	70	100%	93	100%	89	100%	73	100%

Table 2. Warren Alpert Medical School MD Class of 2012 Match List (cont.)

Name	Hospital	Affiliation	Specialty
Yasir Ahmed	Mt. Auburn Hospital	Harvard Medical School	Medicine-Prelim
	Milton S Hershey Medical Center	Pennsylvania State University	Ophthalmology
Shyamal Asher	University of Chicago Medical Center	Pritzker School of Medicine	Anesthesiology
James Azzi	New York Eye and Ear Infirmary	New York Medical College	Otolaryngology
Grace Bhak	Pennsylvania Hospital	University of Pennsylvania Health System	Obstetrics/Gynecology
Deborah Brooks	University of Maryland Medical Center	University of Maryland Sheppard Pratt Health System	Psychiatry
Benjamin Brown	University of Chicago Medical Center	Pritzker School of Medicine	Obstetrics/Gynecology
Karen Browning	Women & Infants Hospital	Alpert Medical School	Obstetrics/Gynecology
Christine Chen	CA Pacific Medical Center	Sutter Health System	Medicine-Prelim
	Beth Israel Deaconess Medical Center	Harvard Medical School	Radiology
Edward Cheung	UCLA Medical Center	David Geffen School of Medicine	Orthopaedic Surgery
David Cohen	Rhode Island Hospital	Alpert Medical School	Medicine
Naida Cole	Cambridge Health Alliance	Harvard Medical School	Transitional
	Massachusetts General Hospital	Harvard Medical School	Anesthesiology
Ana Creo	Mayo School of Graduate Medical Education	Mayo School of Graduate Medical Education	Pediatrics
Nedim Durakovic	Barnes-Jewish Hospital-MO	Washington University School of Medicine	Otolaryngology
Geolani Dy	University of Washington	University of Washington School of Medicine	Surgery-Prelim
	University of Washington	University of Washington School of Medicine	Urology
Jonathan-James Eno	Stanford University	Stanford University School of Medicine	Orthopaedic Surgery
Jessica-Renee Gamboa	David Grant USAF Medical Center	Travis AFB, CA	Family Medicine
Riabianca Garcia	California Hospital Medical Center	Keck School of Medicine of USC	Family Medicine
Sarah Garcia	UC San Francisco-Fresno	University of California San Francisco	Emergency Medicine
Lauren Goddard	Memorial Hospital	Alpert Medical School	Family Medicine
Shilpa Gowda	University of Southern California	University of Southern California School of Medicine	Surgery-Prelim
Ryan Graddy	Johns Hopkins/Bayview	Johns Hopkins Health System	Medicine-Primary
Joseph Grossman	Beth Israel Deaconess Medical Center	Harvard Medical School	Medicine
Sunil Hebbar	UCLA Medical Center-Santa Monica	David Geffen School of Medicine	Family Medicine
Richard Hinds	Rhode Island Hospital	Alpert Medical School	Surgery-Prelim
Sarah Housman	Beth Israel Deaconess Medical Center	Harvard Medical School	Medicine
Angela Hua	Mt. Sinai Hospital	Mount Sinai School of Medicine	Emergency Medicine
Natasha Hunter	Beth Israel Deaconess Medical Center	Harvard Medical School	Medicine
Miyako Igari	University Southern California	Keck School of Medicine of USC	Medicine
Sunny Intwala	Northwestern/McGaw/NM H/VA	Northwestern Feinberg School of Medicine	Medicine
Salman Khan	NYU Medical Center/Bellevue Hospital	NYU School of Medicine	Medicine
Jennifer Kim	Brigham & Womens Hospital	Harvard Medical School	Medicine-Prelim
	Brigham & Womens Hospital	Harvard Medical School	Neurology

Table 2. Warren Alpert Medical School MD Class of 2012 Match List (cont.)

Name	Hospital	Affiliation	Specialty
Thomas Kim	Boston University	Boston University School of Medicine	Medicine-Prelim
Ann Kuo	UC San Diego Medical Center	UC San Diego School of Medicine	Medicine
Lawrence Kwon	Griffin Hospital	Yale School of Medicine	Medicine-Prelim
Sarah Lee	Oregon Health & Science University	Oregon Health & Science University	Medicine
Sarah Leeper	University of North Carolina Hospitals	UNC-Chapel Hill School of Medicine	Emergency Medicine
Jay Levin	Rhode Island Hospital	Alpert Medical School	Medicine-Prelim
	Rhode Island Hospital	Alpert Medical School	Neurology
Jonathan D. Lin	Rhode Island Hospital	Alpert Medical School	Medicine-Prelim
	Jackson Memorial Hospital	University of Miami Miller School of Medicine	Anesthesiology
Jonathan T. Lin	Mt. Sinai Hospital	Mount Sinai School of Medicine	Medicine
Jerome Liu	Butler Hospital	Alpert Medical School	Psychiatry
Jonathan Liu	Hospital of the University of Pennsylvania	Perelman School of Medicine at the University of Pennsylvania	Medicine
Alina Markova	Massachusetts General Hospital	Harvard Medical School	Medicine-Prelim
	Boston University Medical Center	Boston University School of Medicine	Dermatology
Julie McFarland	Maine Medical Center	MMC-Tufts School of Medicine	Obstetrics/Gynecology
Aleksey Novikov	New York Presbyterian Hospital	Weill Cornell Medical Center	Medicine
Linda Paniagua	University of Texas Medical School	University of Texas-Houston	Emergency Medicine
Chintan Patel	Lahey Clinic Medical Center	Tufts University School of Medicine	Surgery-Prelim
	Lahey Clinic Medical Center	Tufts University School of Medicine	Urology
Nilay Patel	Massachusetts General Hospital	Harvard Medical School	Medicine
Lily Pike	Einstein/Beth Israel Medical Center	Alpert Einstein College of Medicine	Family Medicine
Francesco Pucci	Rhode Island Hospital	Alpert Medical School	Neurological Surgery
Elizabeth Rodriguez	Stamford Hospital/Columbia	Columbia University College of Physicians and Surgeons	Obstetrics/Gynecology
Jason Rothschild	Tufts Medical Center	Tufts University School of Medicine	Transitional
	UC Irvine Medical Center	UC Irvine School of Medicine	Radiology
Dan Schwarz	Brigham & Womens Hospital	Harvard Medical School	Med/Peds
Vivek Shenoy	Tufts Medical Center	Tufts University School of Medicine	Pediatrics
Tracey Simon	Brigham & Womens Hospital	Harvard Medical School	Medicine
Wei Song	University of Utah Affiliated Hospitals	University of Utah School of Medicine	Triple Board
Tristan Stani	Oregon Health & Science University	Oregon Health & Science University	Neurological Surgery
Komal Talati	Wilson Memorial Regional-UHS-NY	United Health Services Hospitals	Transitional
	Beth Israel Deaconess Medical Center	Harvard Medical School	Radiology
Kaitlin Thein	UC San Francisco	UC San Francisco School of Medicine	Pediatrics
Katherine Thompson	Boston University Medical Center	Boston University School of Medicine	Medicine
Amy Tsai	Cambridge Health Alliance	Harvard Medical School	Transitional
	Boston University Medical Center	Boston University School of Medicine	Radiology
Michelle Tsang Mui Chung	Rhode Island Hospital	Alpert Medical School	Medicine-Prelim
	Rhode Island Hospital	Alpert Medical School	Radiology

Table 2. Warren Alpert Medical School MD Class of 2012 Match List (cont.)

Name	Hospital	Affiliation	Specialty
Victoria Tseng	Harbor UCLA Medical Center	David Geffen School of Medicine	Medicine-Prelim
	LA/EyeSTAR Jules Stein Eye Institute	David Geffen School of Medicine	Ophthalmology
Kumar Vasudevan	Emory University School of Medicine	Emory University School of Medicine	Neurological Surgery
Annie Wang	Rhode Island Hospital	Alpert Medical School	Medicine-Prelim
	Rhode Island Hospital	Alpert Medical School	Dermatology
Hannah Watson	Boston University Medical Center	Boston University School of Medicine	Family Medicine
Lawren Wellisch	University of Chicago Medical Center	Pritzker School of Medicine	Pediatrics
Amanda Westlake	NY Presbyterian Hospital	Columbia University Medical Center	Medicine
April Wilhelm	Allina Family Residency Program	Allina Hospitals and Clinics	Family Medicine
Zerlina Wong	Hospital of the University of Pennsylvania	University of Pennsylvania	Anesthesiology
Wesley Wu	Harbor UCLA Medical Center	David Geffen School of Medicine	Transitional
	Baylor College of Medicine-Houston	Baylor College of Medicine	Dermatology
Ali Zarrabi	Mt. Sinai Hospital-NY	Mount Sinai School of Medicine	Medicine
Jason Zhang	Roger Williams Medical Center	Boston University School of Medicine	Medicine-Prelim
	University of Texas Medical Branch Hospitals	University of Texas-Galveston	Ophthalmology

Table 3. Geographic destination for all MD Class of 2012 graduates moving on to PGY-1 positions.

State	Number	%
California	12	16.6
Connecticut	2	2.7
Florida	1	1.3
Georgia	1	1.3
Illinois	4	5.5
Maine	1	1.3
Massachusetts	17	23.6
Maryland	2	2.7
Minnesota	2	2.7
Missouri	1	1.3
New York	8	11.1
North Carolina	1	1.3
Oregon	2	2.7
Pennsylvania	4	5.5
Rhode Island	9	12.5
Texas	3	4.1
Utah	1	1.3
Washington	1	1.3
Total	72	

of matriculants to AMS has increased markedly from 73 in 2005 (the MD Class of 2009) to 120 students who began medical school this August as members of the MD Class of 2016. However, slightly more than a third of the original matriculants in the Class of 2012 chose to extend their medical education by at least one year. Ten undertook secondary degrees (MPH, MEd, PhD). The majority took advantage of the medical school's policy to allow time away for "fellowship," which is most often used to pursue research or international work. We feel that this indication of our students' commitment to their professional and career development bodes well for the contribution they will make to their future patients' care and to the healthcare system.

Philip A. Gruppuso, MD, is Associate Dean for Medical Education and Professor of Pediatrics

Janice Viticone is Medical Residency Program Coordinator

Eileen Palenchar is Records and Registration Systems Manager

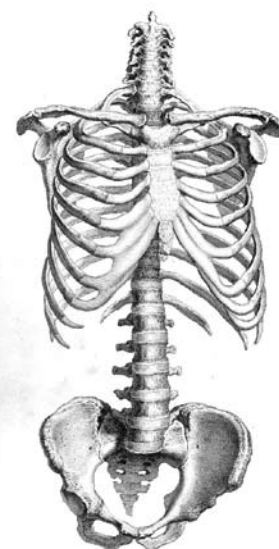
All are with The Warren Alpert Medical School of Brown University

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CORRESPONDENCE

Philip A. Gruppuso, MD
Brown University
Box G-M143
Providence, RI 02912
phone: (401) 863-1618
fax: (401) 863-3801



Warren Alpert Medical School's Doctoring Program: A Comprehensive, Integrated Clinical Curriculum

Julie Scott Taylor, MD, MSc, Michelle Daniel, MD, Paul F. George, MD, Sarita Warriar, MD, Kimberly Dodd, MD, and Richard H. Dollase, EdD

THE DOCTORING PROGRAM AT ALPERT Medical School (AMS) teaches students the knowledge, attitudes, skills, and behaviors necessary to develop into competent, ethical, and humane 21st-century physicians. Over the past eight years, the Doctoring course has grown from a one-year, two-semester introduction to clinical skills into a four-year, seven-course systematically integrated program designed for a medical school class of 120 students per year. In this paper, we describe the current Doctoring program in the preclinical years (Years 1 and 2), as well as the ongoing clinical curriculum redesign process that has led to a series of new Doctoring courses in the clinical years (Years 3 and 4). The overarching goal of the program remains to provide all graduating medical students with the fundamental clinical skills they need to succeed as physicians, regardless of clinical specialty.

DOCTORING IN THE PRECLINICAL YEARS (DOCTORING I - IV)

Doctoring in Years 1 and 2 is a two-year, four-course required program that combines instruction and assessment in medical interviewing, physical examination, oral presentation, and professional development. Year 1 of the course runs from mid-August to late-May. Students are in class on Tuesday afternoons for three hours and work with a clinical mentor on Thursdays for four hours. Year 2 of the course runs from late-August until late-February. Students are in class on Thursday afternoons for three hours and work with a clinical mentor on Tuesdays or Wednesdays for four hours. Course leaders hail from the clinical specialties of General Internal Medicine, Geriatrics, and Emergency Medicine.

The courses use an educational paradigm that models interdisciplinary teaching and collaboration, and promotes patient-centered care, reflection, teamwork, and teacher-learner partnerships. Thirty-three physician (MD) faculty co-teach in the classroom setting. Their specialties include family medicine, pediatrics, internal medi-

cine, emergency medicine, and surgery. Thirty-three social and behavioral science (SBS) faculty co-teach in the classroom setting. They have a variety of different training and careers including nursing, social work, psychology, education, medical administration, and public health.

At the medical school, students work in groups of eight with an MD and SBS faculty pair and standardized patients to learn fundamental clinical skills including medi-

cal interviewing, physical examination, oral case presentations, written documentation, and professionalism (Tables 1 and 2). They write reflections (field notes)¹ as well as case write ups. Each course includes both formative and summative **objective structured clinical exams (OSCEs)** that take place in the medical school's new Clinical Skills Suite using Learning Space technology.²

In addition to the classroom co-teachers at AMS, the two-year course uses more

Table 1. Doctoring I and II (Year 1), 2012-13.

Fall semester: 33 small group faculty teaching hours, 6 at an assisted living facility
Spring semester: 40 small group faculty teaching hours, 9 at an assisted living facility
Feedback and evaluation (written work and 4 OSCEs*): 30 hours

Medical Interviewing Skills (15 hours)

The medical interview: chief complaint (CC), history of present illness (HPI), past medical history (PMHx), and family history (FHx)

Assessment of pain

Social, sexual, and nutrition history

Review of systems

Responding to emotions

Listening to the patient's story

Motivational Interviewing Skills (8 hours)

Smoking cessation counseling

Alcohol and drug abuse counseling

Nutrition and physical activity counseling for overweight adults

Physical Diagnosis Skills (21 hours)

Vital signs

Head, eyes, ears, nose, and throat (HEENT)/neck exam

Neurological exam

Musculoskeletal exam

Introduction to the cardiopulmonary and abdominal exams

Oral Case Presentation Skills (3 hours)

Written Documentation Skills (write ups from ALF* sites)

Professionalism / Ethics (6 hours)

Learning in the clinical setting

Professional boundaries

Dual relationships

Healthcare systems

Careers in medicine

Cultural Competence (3 hours)

Social determinants of health

Explanatory models of illness

Cultural humility and cultural competence

Cross-cultural communication

ALF** Curriculum (15 hours)

Geriatrics including life history interview and functional assessment

Advanced directives

Longitudinal care of patients

* Objective structured clinical examinations

** Assisted living facility

than 250 community faculty each year as mentors in the outpatient, inpatient, and emergency room settings. The continuity experience in a mentor's clinical practice enables students to form relationships with real patients, to practice the clinical skills they are learning in class, and to see the clinical presentations of common diseases. Students work with a different mentor in each year of the course so they can gain initial experience with individual clinicians, specialties, patient populations, and clinical settings. In Year 1, there are fifteen mentor sessions; in Year 2, there are fourteen.

Unique to Year 1 of the Doctoring course is a now well-established **Assisted Living Facility (ALF)** experience. The goal of the ALF curriculum is for students to develop proficiency and confidence in performing clinical examinations on older adults in the context of a longitudinal care relationship. Every small group is assigned to a single ALF site; at the site, each medical student is matched with an individual ALF resident. Small groups visit their ALF sites five times during the year. During those half-day sessions, students practice their medical interviewing and physical diagnosis skills under the close supervision of their MD and SBS faculty.

THE CLINICAL CURRICULUM REDESIGN PROCESS

In 2008, the Associate Dean of Medical Education and AMS's Curriculum Committee, a 27-person committee of administrators, course leaders, and medical students that meets monthly, embarked on a redesign of the clinical curriculum. A major component of the clinical curriculum redesign was the plan to extend the Doctoring program from Years 1 and 2 into Years 3 and 4. In 2009, a Doctoring curriculum development working group made the fundamental decision to work around the current specialty-specific clerkships rather than trying to integrate new Doctoring curriculum into those existing clinical courses.

The working group started the expansion process by conceiving of a three-week transition course for students to complete before beginning specialty-specific clerkships, similar to other medical schools nationally.³⁻⁵ In 2010, a core group of medical educators from the working group designed a **Clinical Skills Clerkship (CSC)** as an extension and continuation of the Doctoring course from Years 1 and 2. The team deliberately incor-

Table 2. Doctoring III and IV (Year 2), 2012-13.

Fall semester: 31 small group faculty hours
Spring semester: 15 small group faculty hours
Feedback and evaluation (written work and 5 OSCEs*): 45 hours

Medical Interviewing Skills (11 hours)

- Screening for depression
- Screening for interpersonal violence
- Caring for gay, lesbian, bisexual, and transgender (GLBT) patients
- The pediatric interview
- Delivering bad news
- End of life conversations
- Family meetings

Physical Diagnosis Skills (21 hours)

- Cardiopulmonary exam
- Abdominal exam
- Head, eyes, ears, nose, and throat (HEENT)/neck exam
- Neurological exam
- Musculoskeletal exam
- The complete physical exam
- GU/GYN exam training (2 hours per student)
- The pediatric examination with an emphasis on normal growth and development

Oral Presentation Skills (9 hours)

Written Documentation Skills (10 hours, 6 case write ups)

Professionalism / Ethics (6 hours)

- Truth-telling
- Informed consent
- Medical errors

Cultural Competence (1 hour)

Working with interpreters

** Objective structured clinical examinations

porated and expanded every component of the previously existing two-day orientation to clinical clerkships.

To make room for the new CSC in the Year 2 curriculum, while preserving students' time to prepare for the USMLE Step 1 exam and vacation, the second year of the basic science curriculum was deliberately shortened by three weeks. Over two years, each second-year basic science course in the pre-clerkship curriculum was reduced proportionately, primarily by eliminating redundant content.

THE CLINICAL SKILLS CLERKSHIP (DOCTORING V)

In 2012, the Office of Medical Education launched a new three-week, innovative, non-specialty-specific, classroom-based CSC. The CSC is technically a second-year course but is only available for students going immediately on to clinical clerkships. Therefore a student who takes time off from medical school between Years 2 and 3 would not take the CSC until he or she

returned to medical school for clinical clerkships. A password-protected e-syllabus with the schedule, syllabus, readings, resources, videos, and discussion questions was designed as a resource for students during their clinical years of medical school.

The overarching goal of the new CSC is to fully prepare medical students for their seven specialty-specific clerkships in Community Health, Family Medicine, Obstetrics and Gynecology, Pediatrics, Internal Medicine, Surgery, and Psychiatry. The first course ran in April and May of 2012 with three course leaders including two physicians and one nurse: the Director of Clinical Curriculum (which includes Doctoring I-IV), the Director of the Year 2 Curriculum (which includes the basic science curriculum), and the Director of the Clinical Skills Suite, respectively. The inaugural CSC included close to 90 hours of new curriculum taught by more than 120 faculty members from a wide variety of medical specialties and a broad range of health care disciplines. The CSC is comprised of

Table 3. Doctoring V: The inaugural Clinical Skills Clerkship (Year 3), 2012.

1. Virtual Family Curriculum

Content: The matriarch of the 3-person, 3-generation virtual family is Barbara Garcia, a 69-year-old woman whom students first meet in the outpatient setting (Family Medicine) and follow through the Emergency Room to a hospital admission (Internal Medicine), an operation (Surgery), and discharge from the hospital to a rehabilitation unit where she gets depressed (Psychiatry). Her daughter, Samantha Garcia, has a baby named Joseph (Obstetrics and Gynecology) who gets sick (Pediatrics) and requires a hospital admission and a specialty consultation.

Clinical Skills: Oral presentations, written documentation including history and physicals ("H+Ps"), admission orders, daily progress notes, discharge paperwork; interpretation of diagnostic tests, electrocardiograms (EKGs), and chest x-rays (CXRs); management of intravenous fluids (IVF) and blood sugars; dosing medications.

2. Clinical Skills Training

Content: Basic suturing; searching for clinical evidence: formulating clinical questions and accessing practice guidelines; lumbar punctures; IVs; subcutaneous and intramuscular injections; venipuncture and phlebotomy; arterial blood gases; nasogastric tube insertions; male and female catheterizations; operating room scrub technique including gloves, gowns, and sterile fields; wound care including stapling and vacuums; ABCs for trauma.

Clinical Skills: Familiarity with the above procedures (indications, equipment and supplies, consent, and documentation); medical student roles during codes, Advanced Cardiac Life Support (ACLS) certification.

3. Professional Development

Content: Working in clinical environments; scholarship in the clinical years; inter-professional team training exercises (in conjunction with students from local pharmacy and nursing schools); student health and Occupational Safety and Health Administration (OSHA) certifications; user names and passwords and training for various electronic health records (EHRs).

Skills: Clear understanding of attendance, medical student work hour, and evaluation policies. Strategies and resources for choosing a medical specialty, answering clinical questions (including app sharing), navigating social media, and self-care.

4. A six-station Objective Structured Clinical Examination (OSCE)

- Observe a videotaped clinical encounter of a senior medical student evaluating one of the members of the virtual Garcia family
- Documentation: Write an admission H+P and hospital admitting orders
- Interpretation: CXR and EKG
- Procedures:
 - Perform an evidenced-based medicine literature search using a PICO strategy (patient or population; intervention; comparison; and outcome)¹²
 - Place 3 simple interrupted stitches and remove them

three main content areas—a virtual family curriculum, interactive clinical skills training, and professional development—each implemented under the primary direction of a different course leader (Table 3).

The Virtual Family Curriculum introduces students to different medical specialties and clinical skills via a multi-generational virtual family that travels through the health care system and encounters each specialty in the course of their health care. Teaching materials prepared for this curriculum include 1) videotaped encounters between a senior medical

student and members of the virtual family as portrayed by standardized patients, 2) small group facilitation guides, and 3) oral presentations performed by senior medical students. Each of the six sessions takes four hours and has three components: a one-hour content-heavy skills lecture, a 30-minute introduction by clerkship directors to the medical specialty of the day, and two and a half-hours of skills practice taught by senior medical students in small groups of eight or nine students per group. For example, on the Pediatrics Day, the lecture is on **intravenous fluids**

(IVF) and the skills include writing IVF orders, pediatric medication dosing, and obtaining a specialty consultation.

The Clinical Skills Training introduces students to common clinical procedures and protocols. These five days of curriculum are primarily organized as stations and co-taught in small groups by medical, nursing, and pharmacy faculty as well as senior students.

The Professionalism Curriculum focuses on practical strategies for maximizing students' experience as learners and health care team members in a series of new clinical learning environments. Teaching formats include interactive panels, workshops, team exercises, and multiple individual peer mentoring sessions.

Much of the CSC curriculum is taught or co-taught by a core team of 12 senior medical students participating in a new four-week medical education elective led by a senior medical student as part of his or her Medical Education Scholarly Concentration work. The Scholarly Concentration Program at AMS is an elective program at our institution through which medical students may "pursue a course of study beyond the scope of their conventional curriculum and to translate personal interests and activities into scholarship."⁶ The team of senior medical students has a myriad of teaching responsibilities in the CSC ranging from facilitating small group sessions to supervising procedure stations to giving lectures and demonstrations to individual peer counseling to grading OSCE stations, all under the guidance of course leaders.⁷ In addition to the senior medical students as teachers, all of the Doctoring III-IV small group faculty (who teach in the clinical courses the students have just finished) and all the clerkship directors and coordinators (who are responsible for the courses the students will be taking next) taught in the course.

THE LONGITUDINAL AMBULATORY CLERKSHIP (DOCTORING VI)

Students are required to complete a **longitudinal ambulatory clerkship (LAC)** in their last two years of medical school. The LAC must be of six months duration and consists of one-half day per week of seeing patients at a single outpatient site. When the Doctoring working group considered in depth what was actually "longitudinal" about the experience—patient care, clini-

cal site, or the attending physician—it is the ongoing physician mentorship that is most valuable to students, quite similar to the mentoring component of the Doctoring course in Years 1 and 2. As such, in 2013, this very successful existing course will be renamed an “Advanced Clinical Mentorship,” goals and objectives will be refined, and additional assignments, such as quality improvement projects, may be incorporated.

THE INTERNSHIP PREPARATION ELECTIVE (DOCTORING VII)

The new Doctoring program will be complete in the spring of 2013 with a one-week Internship Preparation course that will be piloted as an elective for graduating seniors during the week after Match Day. This classroom-based course will be a collaboration between the Office of Medical Education (clinical skills) and the Office of Student Affairs (professional and personal development) designed to prepare AMS students for the professional and personal challenges of internship, considering the needs common to all nascent physicians, again regardless of specialty choice.⁸⁻¹¹ Specific objectives for this final Doctoring course are as follows:

1. To provide a broad review of key clinical information and skills
2. To introduce new clinical skills that will be essential for internship
3. To practice increasingly effective, efficient clinical skills
4. To refine teaching and learning skills, of self and others
5. To build robust resources for professional and personal development and self-care

THE FOURTH-YEAR OSCE

The Doctoring program culminates with a ten-station summative OSCE that is designed to prepare students for the USMLE Step 2 Clinical Skills Examination. At AMS, students take the fourth-year OSCE immediately following the completion of their third-year specialty-specific clerkships. Successful completion of the exam is a graduation requirement and results are reported on students' residency applications.

Grading options for the components of Doctoring as well as the fourth-year OSCE are Pass/Fail, with the exception

of Doctoring IV and the Longitudinal Ambulatory Clerkship. These two courses offer the possibility of Honors. In all cases, students must pass one course before they can proceed to the next one in the series.

CONCLUSION

In summary, Brown's Doctoring program is now in the final stages of becoming a robust, seven-course experience to provide all AMS graduates with strong clinical and professional skills. Next steps in program development involve further refinement and integration of the curriculum both across the individual Doctoring courses and between Doctoring courses and other curriculum, expansion of our technologic capacity for education within the Clinical Skills Suite including feedback and evaluation, and adjusting to the increased class size that has now reached its target of 120 students per class with the MD Class of 2016.

REFERENCES

1. Wald HS, Borkan JM, Taylor JS, Anthony D, Reis SP. Fostering and evaluating reflective capacity in medical education: Developing the REFLECT rubric for assessing reflective writing. *Acad Med.* 2012;87(1):41–50.
2. George P, Taylor JS, Holden PL, Dollase R. The new Clinical Skills Suite at Alpert Medical School: Integrating technology, medical education, and patient care. *MHRI.* 2011;94(8):234–8.
3. Poncellet A, O'Brien B. Preparing medical students for clerkships: a descriptive analysis of transition courses. *Acad Med.* 2008 May;83(5):444–51.
4. Teunissen PW, Westerman M. Opportunity or threat: the ambiguity of the consequences of transitions in medical education. *Med Educ.* 2011 Jan;45(1):51–9.
5. Windish DM, Paulman PM, Goroll AH, Bass EB. Do clerkship directors think medical students are prepared for the clerkship years? *Acad Med.* 2004 Jan;79(1):56–61.
6. Green EP, Borkan JM, Pross SH, Adler SR, Nothnagle M, Parsonnet J, Gruppuso PA. Encouraging scholarship: Medical school programs to promote student inquiry beyond the traditional medical curriculum. *Acad Med.* 2010 Mar;85(3):409–18.
7. Frei E, Stamm M, Buddeberg-Fischer B. Mentoring programs for medical students—a review of the PubMed literature 2000–2008. *BMC Med Educ.* 2010;10:32.
8. Prince KJ, Boshuizen HP, van der Vleuten CP, Scherpier AJ. Students' opinions about their preparation for clinical practice. *Med Educ.* 2005 Jul;39(7):704–12.
9. Lyss-Lerman P, Teherani A, Aagaard E, Loeser H, Cooke M, Harper GM. What training is needed in the fourth year of medical school? Views of residency program directors. *Acad Med.* 2009 Jul;84(7):823–9.
10. Teo AR, Harleman E, O'sullivan PS, Maa J. The key role of a transition course in preparing medical students for internship. *Acad Med.* 2011 Jul;86(7):860–5.
11. Walling A, Merando A. The fourth year of medical

education: a literature review. *Acad Med.* 2010 Nov;85(11):1698–704.

12. Schardt C, Adams MB, Owens T, Keitz S, Fontelo P. Utilization of the PICO framework to improve searching pubmed for clinical questions. *BMC Med Inform Decis Mak.* 2007;7:16.

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Disclosure of Financial Interests

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Julie Scott Taylor, MD, MSc, is an Associate Professor of Family Medicine and Director of Clinical Curriculum at the Warren Alpert Medical School of Brown University.

Michelle Daniel, MD, is an Assistant Professor (Clinical) of Emergency Medicine and Course Leader for Doctoring III and IV at the Warren Alpert Medical School of Brown University.

Paul F. George, MD, is an Assistant Professor of Family Medicine and Associate Director of Preclinical Curriculum at the Warren Alpert Medical School of Brown University.

Sarita Warriar, MD, is an Assistant Professor of Medicine (Clinical) and Course Leader for Doctoring I and II at the Warren Alpert Medical School of Brown University.

Kimberly Dodd, MD, is an Assistant Professor of Family Medicine and Assistant Course Leader for Doctoring I and II at the Warren Alpert Medical School of Brown University.

Richard H. Dollase, EdD, is the Director of the Office of Medical Education at the Warren Alpert Medical School of Brown University.

CORRESPONDENCE

Julie Scott Taylor, MD, MSc
Office of Medical Education
The Warren Alpert Medical School
of Brown University
Box G-M 304
70 Ship Street
Providence, RI 02903
Julie_Taylor@brown.edu
phone: (401) 863-3340
fax: (401) 863-7574

Curriculum Innovation at the Warren Alpert Medical School of Brown University

Luba Dumenco, MD, Paul George, MD, Julie Scott Taylor, MD, MSc, and Richard Dollase, EdD

OVER THE LAST SIX YEARS, THE WARREN Alpert Medical School of Brown University (AMS) has developed an integrated, patient-centered curriculum. Students are now engaged in a dynamic interdisciplinary learning process that provides a foundation of basic science and clinical knowledge, as well as clinical skills and clinical experiences that promote and enhance their professional development. The Medical School's strong central oversight helps to provide a high-quality curriculum. Ongoing quality improvement efforts are focused on enhancing all aspects of the teaching and learning environment. These curriculum initiatives are informed by and responsive to faculty and students' needs and aspirations. In addition to their preclinical and clinical training, students have a broad range of options to pursue interdisciplinary scholarship and traditional research. They have the opportunity to work toward becoming physician-scientists, patient and community advocates, and/or academic leaders.

In providing an overview of the Medical School curriculum, we focus on seven major educational innovations that we developed or refined over the last six years: the Nine Abilities; the Integrated Preclinical Curriculum; the Academic Support Program; Inter-Professional Team Learning; the Scholarly Concentration Program; the Clinical Skills Clerkship; and the Individual Education Plan.

THE NINE ABILITIES

In 1996, AMS designed *MD2000*, a competency-based curriculum, which was named after the year of its initial implementation in academic year 2000-01.^{1,2} As the first medical school in the nation to establish a competency-based curriculum, we pioneered the development of competency standards and assessment protocols to evaluate students' progress. Working groups of faculty, students and administrators, under the leadership of the Medical Curriculum Committee, developed the nine competency standards.

In 2011, the Medical Curriculum Committee appointed a new working group to revise the standards to reflect national trends and recent developments in medical education. In the process, we retitled our competency-based curriculum *The Nine Abilities*. A major goal of the revision was to clarify the domains of our curriculum that focus on patient-centered care, advocacy, and professional development. The Nine Abilities are as follows:

- I. Effective Communication
- II. Basic Clinical Skills
- III. Using Basic Science in the Practice of Medicine
- IV. Diagnosis, Prevention and Treatment
- V. Lifelong Learning
- VI. Professionalism
- VII. Community Health Promotion and Advocacy
- VIII. Moral Reasoning and Clinical Ethics
- IX. Clinical Decision Making

Our competency-based objectives inform our major educational planning initiatives and our student and program evaluation systems. The Nine Abilities are seamlessly integrated into each of the required preclinical courses and core clerkships. All student evaluation forms that faculty complete, in either the preclinical courses or the core clerkships are based on the Nine Abilities framework.

Assessing the Nine Abilities

The Nine Abilities are substantively assessed in our required preclinical courses and core clerkships. Students who demonstrate successful fulfillment of the competencies by satisfying course and clerkship requirements receive a grade of Satisfactory or Honors in each preclinical course and core clerkship. Students who do not pass a medical school course must remediate the course before competency credit is realized.

A variety of traditional methods of evaluation and performance assessment

measures are employed in assessing students' competence, including multiple choice examinations and performance-based assessments such as **Objective Structured Clinical Examinations (OSCEs)**. A fuller description of the Nine Abilities appears in Table 1.

PRECLINICAL INTERDISCIPLINARY CURRICULUM

Our interdisciplinary preclinical curriculum is composed of Integrated Medical Sciences, a two-year basic science course, and Doctoring, a two-year clinical skills course. The latter course is designed to teach the knowledge, skills, and attitudes of a competent, ethical, and humane physician.

Year I

Integrated Medical Sciences I (IMS-I)

IMS-I provides students with foundations of cell biology, cell physiology, biochemistry, nutrition sciences, immunology and genetics, all of which are integrated with gross and microscopic anatomy. IMS-I also includes general pathology in which students are introduced to concepts underlying the mechanisms of disease. This foundation forms the basis for the subsequent systems-based blocks of IMS II through IV.

Integrated Medical Sciences II (IMS-II)

Brain Sciences, the first interdisciplinary IMS-II course integrates head and neck anatomy with neurobiology, brain and behavior, neuropathophysiology, neuropathology, and neuropharmacology. In the second IMS-II course, microbiology is integrated with infectious diseases and relevant pharmacology. Endocrine Sciences is the final IMS-II course. It incorporates endocrine physiology with endocrine pathophysiology, pathology and pharmacology.

Doctoring I & II

In Year I, Doctoring focuses on basic communication skills including

Table 1. Nine Abilities

*The Nine Abilities constitute a competency-based curriculum that defines the knowledge, skills and personal and professional values we expect of all of our graduates. Students are evaluated in the Nine Abilities by multiple methods of assessment: Written exams; in labs and small-group discussions; on performance-based methods of assessment such as **Objective Structured Clinical Examinations (OSCEs)** in Doctoring, a preclinical clinical skills course, and in a number of core clerkships. A description of these abilities and a table depicting where in the curriculum the abilities are addressed and assessed follow:*

Ability I: Effective Communication.

The competent graduate demonstrates effective verbal, nonverbal and written communication skills in a wide range of activities, including patient care, consultation and teaching. The graduate has the communication skills to establish rapport with and the ability to counsel patients and their families.

Ability II: Basic Clinical Skills

The competent graduate develops the skills to obtain a comprehensive history, conduct a thorough physical examination, perform basic clinical tests and interpret data in a spectrum of patient care settings.

Ability III: Using Basic Science in the Practice of Medicine

The competent graduate logically applies basic scientific principles and concepts in evaluating, identifying, treating and preventing illness.

Ability IV: Diagnosis, Prevention and Treatment

The competent graduate is able to diagnose, manage and prevent a spectrum of health problems. This competency involves formulating an assessment and care plan for individuals and extending it to families and communities.

Ability V: Lifelong Learning

The competent graduate understands the need to continually expand and enhance one's knowledge and abilities to best serve patients. The graduate is intellectually inquisitive and competent. The graduate seeks out and evaluates information from the full spectrum of resources continually updating one's knowledge of best practice guidelines.

Ability VI: Professionalism

The competent graduate displays a deep and ongoing commitment to the care of patients while ably attending to professional and personal responsibilities

Ability VII: Community Health Promotion and Advocacy

The competent graduate practices medicine in a broader context by understanding the many factors that influence health, disease and disability. The graduate advocates for the patient's well-being and works with community partners to identify and address environmental, social and behavioral factors and health system policies which alter the opportunities to be healthy.

Ability VIII: Moral Reasoning and Clinical Ethics

The competent graduate recognizes the ethical dimensions of medicine and health policy. The graduate formulates, defends and effectively carries out a course of action that takes into account the ethical complexity of the health care setting. The graduate respects patients' values and beliefs, and is able to reconcile them with alternative options while maintaining ethical integrity.

Ability IX: Clinical Decision Making

The competent graduate demonstrates an understanding of and reflects on the complex processes involved in the evaluation and treatment of a patient. The graduate can incorporate the previous eight competencies into a holistic approach to medical care.

the patient-centered medical interview, behavior change counseling and oral and written case presentations. Students participate in lectures and small group sessions led by multi-disciplinary faculty teams. Students practice their skills a half-day a week in an outpatient setting working under the guidance of a community-based physician-mentor and in several visits to a resident of an Assisted-living Facility. Through writing exercises called "field notes," students reflect on their community mentoring experiences and assess their strengths and weaknesses in developing their clinical skills and professional competence.

Year II

Integrated Medical Sciences III & IV

Students continue with a systems-based approach in Year II: The seven course sections are cardiovascular, renal, human reproduction, pulmonary, supporting structures (comprised of orthopedics, dermatology and rheumatology), hematology, and gastroenterology. Epidemiology is incorporated into year II courses, along with a journal club component in several problem-based learning small-group sessions that helps prepare students to interpret the medical literature. In addition, students have self-directed learning time in the second-year schedule to accommodate participation in the Scholarly Concentrations Program.

Doctoring III & IV

In Year 2, Doctoring builds upon the skills covered in Year I with an emphasis on mastery of the physical examination, the oral presentation, the application of physician-patient communication skills and critical thinking/clinical problem solving. Students continue to work with their community-based physician-mentor a half-day per week throughout the year.

ACADEMIC SUPPORT PROGRAM

The Office of Medical Education (OME) provides preclinical students with a very effective and robust peer-tutoring program and ample learning resources. The OME also has formal mechanisms

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October 23, Tuesday

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University of California, San Diego & Salk Institute
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Metcalf Auditorium, Brown campus
(book signing will immediately follow lecture)
Lecture 5 pm | Reception 6 pm

November 1, Thursday

Paul W. Glimcher
Center for Neuroeconomics, NYU
Title: *Decisions, Decisions, Decisions: Understanding the Neural Circuits for Human Choice*
Metcalf Auditorium, Brown campus
Lecture 5 pm | Reception 6 pm

October 30, Tuesday

Steven Pinker
Dept of Psychology, Harvard University
Lecture Title: *The Better Angels of Our Nature*
Salomon Auditorium, Brown campus
(book signing will immediately follow lecture)
Lecture 5 pm | Reception 6 pm

November 5, Monday

John P. Donoghue
Brown Institute for Brain Science, Brown University
Title: *Neurobionics: Restoring and Replacing Lost Brain Functions With Technology*
Location: TBD
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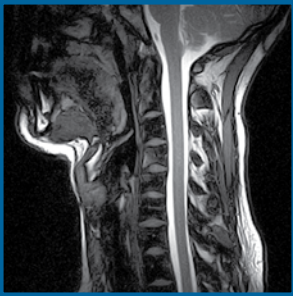


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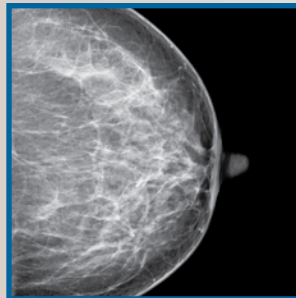
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Table 2. Inter-professional Workshops (Medical Students, URI Nursing and Pharmacology Students)

Fall Workshop	Didactic Content	Standardized Patient Case: Pneumonia
Goals: Acquire knowledge of each other's role & professional training	Asthma paper case COPD paper case	Patient interview Physical examination Diagnosis Drug Therapy Patient Counseling
Practice working together as a health care team		
Spring Workshop	Didactic Content	Standardized Patient Case: Lacerations
Goals: Gain understanding of how a team works together effectively	Team Building Exercise: Seeing the Big Picture	Patient interview Physical examination Suturing Wound dressing Patient counseling
Practice working together as a health care team		

in place for student feedback and direct curriculum input.

PEER TUTORING

Tutorial assistance is provided principally by our peer tutoring program. Each academic year, second-year tutors offer first-year students assistance with studying for examinations and developing their clinical skills. In addition, second-year students are tutored in content areas by third- and fourth-year students. The four preclinical peer tutoring programs at the Medical School are the Doctoring Teaching Academy, Content Tutoring Program Teaching Assistant Program, and the USMLE Step I Tutoring Program.

1. Doctoring Teaching Academy

Each year 25-35 second-year medical students who demonstrated both excellent clinical skills and exemplary professional attitudes and behavior during the first year of Doctoring are selected by Doctoring course faculty to serve as peer mentors to first-year students in Doctoring I. The duties of the peer-mentors include: (1) working with first-year students individually or in pairs to help develop their history-taking and physical examination skills; (2) serving as peer-advisors to first-year students, especially in regard to their professional development as medical students.

2. Content Tutors

Each year, twenty-five to thirty second-year students who received Honors in their course work offered tutoring for first-year students. The tutors are selected by the OME based upon their outstanding academic performance in particular courses and their interpersonal skills. The tutors meet regularly with first-year students who requested tutoring services, providing one-on-one or small-group instruction tailored to the individual needs of students. The tutoring program is coordinated by two or three second-year Medical Education Scholarly Concentrators (the scholarly concentration program is described below). Workshops are held for content tutors to provide them with appropriate tutoring and teaching strategies.

3. Teaching Assistants

Second-year medical student who are chosen from the group of Content Tutors are selected to serve as Teaching Assistants for several first-year courses (Histology, **Scientific Foundations of Medicine (SFM)**, General Pathology and Brain Sciences). Before each first-year exam, the Teaching Assistants hold an afternoon or evening optional session to review important basic science concepts and principles, provide mnemonics and tips for addressing content,

and answer questions from the first-year students.

4. USMLE Step 1 Tutoring Program

In addition to serving as Content Tutors for second-year students, a number of third- and fourth-year students also serve as Step 1 tutors who help prepare second-year students for the board examination. A number of the Step 1 tutors in their roles as Teacher Assistants hold optional content review sessions open to the whole class. They also provide tutoring sessions for individual students and help students develop board study plans and monitor their progress.

CURRICULUM DEVELOPMENT

First- and second-year medical students play an active role in ongoing curriculum improvement initiatives. In addition to individual feedback to the Directors of the Preclinical Curriculum, students participate in formal focus groups and in summer curriculum development work.

1. Focus Groups

Course evaluations are reviewed after each preclinical course is completed, and focus groups of first- or second-year students are held to determine the strengths and weaknesses of the course or block. Students are selected randomly to participate in one or two focus groups during the year. In addition, a small num-

Table 3. Scholarly Concentrations Program

Concentration Areas:

- Advocacy and Activism
- Aging
- Caring for Underserved Populations
- Contemplative Studies
- Disaster Medicine & Response
- Global Health
- Health Policy
- Informatics
- Integrative Medicine
- Medical Education
- Medical Humanities & Ethics
- Medical Technology & Innovation
- Physician as Communicator
- Women's Reproductive Health, Freedom & Rights

ber of medical education concentrators also participate in each focus group, in order for them to learn how to lead focus group discussions. Student recommendations are discussed with Course Leaders, and, whenever possible and appropriate, changes are incorporated into the course curriculum the following academic year.

The focus group initiative is, in reality, a needs-assessment that enables us to plan for the continual quality improvement of our curriculum, which is in large part carried out by students who serve as curriculum developers working with the Directors of the Preclinical Curriculum.

Table 4. Fourth-Year Individual Educational Plan (IEP)

Student proposes a the fourth-year academic schedule with a faculty advisor who must sign off on the IEP.

IEP Components

- Completion of graduation requirements
- Preparation for residency and for the student's chosen discipline
- Scholarship

Example 1: Primary Care Specialty

Goal: Preparing for a Family Medicine Residency

Students choose clinical experience in specialties such as:

Neurology, Emergency medicine, Orthopedics, Community health
Dermatology, Obstetrical or Surgical sub-specialties

Graduation Requirements:

Four-week Sub-internship in Family Medicine, Internal Medicine
or Pediatrics
Two-week Longitudinal Ambulatory Clerkship (1/2-day per week over
6 months)
Six-week Community Health Elective Clerkship

Recommended Electives:

Four-week Emergency Medicine elective
Four-week Orthopedics (in the community) or Dermatology elective
Neurology elective
Independent study (to complete either Scholarly concentration
research or community health research)

Example 2: Surgical Specialty

Goal: Preparing for a General Surgery Residency

Students select course work in:

Anatomy, Pathology, Neurology, ICU, Surgical sub-specialties (such
as Orthopedic surgery, Urology, Neurosurgery)

Graduation Requirements:

Four-week Subinternship in Surgery
Two-week Longitudinal Ambulatory Clerkship (1/2-day per week over
6 months)
Six-week Community Health Elective Clerkship

Recommended Electives:

Four-week surgical sub-specialty elective (Orthopedic surgery, Urology
or Neurosurgery)
Four-week Neurology Elective
Four-week Emergency Medicine Elective
Four-week Independent Study Research Project to complete scholarly
concentration research or basic science article for publication

2. Medical Education Curriculum Developers

Based on the needs-assessments, during ten weeks each summer, selected students undertake curriculum-development initiatives. Curriculum projects during the summer of 2012 included revising anatomy dissectors, developing new lecture materials in SFM, and Brain Sciences, helping to re-structure Doctoring sessions and preparing a handbook to help first-year students utilize their iPads in lectures and small groups. Fourth-year students also served as curriculum developers creating Problem-Based Learning cases and fourth-year OSCE stations.

INTER-PROFESSIONAL TEAM LEARNING

During Year II, two inter-professional workshops bring together AMS medical students and nursing and pharmacy students from the University of Rhode Island and Rhode Island College to learn about their respective roles as future health-care professionals, and to work together as a health-care team in examining standardized patients and developing a plan of care. The goal of these workshops is to promote greater team work and collaboration among health-care professionals in order to improve patient care locally and nationally. Feedback from students at each institution involved has been overwhelmingly positive. See Table 2 for more details on the inter-professional workshop experiences.

SCHOLARLY CONCENTRATION PROGRAM

In addition to the integrated pre-clinical courses, the medical school also offers an elective **Scholarly Concentrations (SC)** Program that runs throughout the four years of medical school. During the summer between the first and second year of medical school, students have ten weeks to undertake a Scholarly Concentration project, perform basic science research, undertake curriculum development projects, or engage in clinical experiences in this country or abroad.

The Scholarly Concentration Program promotes interdisciplinary scholarship and research and has five major components:

- Cross-disciplinary inquiry
- Independent project work
- Faculty-student mentorship
- In-depth summer research experience
- Submission of a scholarly product in Year IV

Approximately one-third of our students participate in a formal Scholarly Concentration Program each year. Students actively undertake self-directed learning projects that often lead to publication of one or more journal articles. A number of the Scholarly Concentrators also engage in collaborative research, curriculum development or patient advocacy projects. Almost 90% of our students who completed the 2012 AAMC Graduate Questionnaire Survey report engaging in a research project with faculty by the time of graduation. Over 79% of these students report they also engaged in a community-based research project. See Table 3 for list of current Scholarly Concentrations.

CLINICAL SKILLS CLERKSHIP

For the first time this year, in mid-April 2012, students completed a second-year **Clinical Skills Clerkship (CSC)**, a three-week transitional clerkship. The goal of this clerkship is to prepare rising third-year students for the core clinical clerkships that begin in early May. One hundred twenty faculty members from a wide variety of medical specialties provided more than 90 hours of instruction. There are three major components to this innovative course:

Virtual Family Curriculum

The Virtual Family Curriculum is designed to build clinical competence by providing students with a holistic understanding of the longitudinal aspects of health care and family dynamics as well as a set of advanced clinical skills essential in the clinical setting.

Utilizing a three-person, three-generation virtual family, students follow Barbara Garcia, a 69-year-old woman, from the outpatient setting (Family Medicine) to the Emergency Room to a hospital admission (Internal Medicine), and then to the operating room (Surgery). After discharge from the hospital she enters a rehabilitation unit where she gets depressed (Psychiatry). Her daughter, Samantha Garcia, has a baby named Joseph (Obstetrics and Gynecology)

Table 5. National Examination Results (Academic Year 2010-2011)

USMLE Step 1 (2010)		
Year	Brown Mean	National Mean
2010	226	222
USMLE Step 2 CK (2010-2011)		
Year	Brown Mean	National Mean
2010-2011	237	233
USMLE Step 2 CS (2010-2011)		
Year	Percent Passing	National Percent Passing
2010-2011	99	98
NBME Subject Examination (SHELF Exams)		
2010-2011	MEDICINE SHELF EXAM	Total Test Mean
	AMS Students	77.9
	National Average	77.1
2010-2011	OBSTETRICS AND GYNECOLOGY SHELF EXAM	Total Test Mean
	AMS Students	75.6
	National Average	74.7
2010-2011	PEDIATRICS SHELF EXAM	Total Test Mean
	AMS Students	75.9
	National Average	77.4
2010-2011	PSYCHIATRY SHELF EXAM	Total Test Mean
	AMS Students	83.3
	National Average	79.9
2010-2011	SURGERY SHELF EXAM	Total Test Mean
	AMS Students	76.6
	National Average	74.7
Brown Students' performance on AMS 4th year OSCE and USMLE Step 2 CS		
Year	AMS 4th Year OSCE Passing Percentage	USMLE Step 2 CS Passing Percentage
2010	99%	96%

who gets sick (Pediatrics) and requires hospital admission and a specialty consultation.

Clinical Skills Training

Advanced clinical skills addressed in the course include:

- Effective oral presentations, written documentation (history and physicals, admission orders, daily progress notes, discharge paperwork).
- Interpretation of diagnostic tests, including **electrocardiograms (EKGs)**, and **chest x-rays (CXR)**s; management of intravenous (IV) fluids and blood sugars; dosing medications.
- Searching for evidence: formulating clinical questions and accessing practice guidelines.

- Lumbar punctures; IVs; subcutaneous/intramuscular injections; venipuncture/ phlebotomy; arterial blood gases; nasogastric tube insertions; male/female catheterization.
- Basic suturing; operating room procedures in scrubbing in including gloving and and gowning/sterile fields; stapling/ wound care vacuums; ABCs for trauma; **advanced cardiac life support (ACLS)** certification; and medical student roles during codes.

Professional Development

A final component of the course addresses clerkship expectations related to students working effectively in the clinical environment (*e.g.* attendance, work hour

and evaluation policies). An inter-professional workshop (in conjunction with students from University of Rhode Island and Rhode Island College pharmacy and nursing schools) is held to further effective health care team training and interaction. Students also acquire **Occupational Safety and Health Administration (OSHA)** certifications; they become familiar with various **electronic health records (EHRs)**; and participate in workshops focusing on scholarship in the clinical years.

Clinical Skills Clerkship Teaching Fellows Program

In the new Clinical Skills Clerkship, 12 fourth-year students serve as small-group leaders. The Teaching Fellows have a number of teaching responsibilities that include facilitating small group sessions, supervising procedure stations, giving mini-lectures and demonstrations, providing peer counseling, and grading the Objective Clinical Skills Exams (OSCEs under the supervision of the course leaders). To prepare for their teaching roles, Teaching Fellows spend a week before the clerkship begins developing the teaching materials and preparing for the course under the guidance of the clerkship faculty.

CLINICAL CURRICULUM

In the third year, students take six core required clinical clerkships. They vary in length: the Family Medicine, Ob/Gyn, Pediatrics, and Psychiatry Clerkships are all six-week rotations. The Surgery Clerkship is an eight-week rotation and the Internal Medicine Clerkship is a 12-week rotation. At the end of the third year in June, students take the Fourth-Year OSCE, a summative performance evaluation that both assesses student mastery of the Nine Abilities and helps prepare students to successfully complete the USMLE Step 2 Clinical Skills examination.

In the fourth year, students are required to take a six-week Community Health clerkship, a four-week subinternship, and a Longitudinal Ambulatory Clerkship. The latter involves working for one half-day per week with an attending physician for 6 months, often in the specialty in which the student is applying to residency programs. In total, students must complete 80 weeks of course work in the clinical years—56 weeks of required courses and 24 weeks of electives. There

are over 150 clinical electives at the Medical School that students may select from in the fourth year. Students may also take electives at other medical schools.

INDIVIDUAL EDUCATIONAL PLAN

With the help and guidance of faculty career advisors and administrators, fourth-year students develop an **Individual Education Plan (IEP)** that is designed to prepare them for their residency of choice. Students have a variety of advanced electives and independent study options from which to tailor a fourth-year curriculum based on their career goals and aspirations. In developing the IEP, students need to justify their fourth-year curriculum. A faculty advisor provides oversight and advises students on their course selections. See Table 4 for examples.

CURRICULUM EFFECTIVENESS

The four-year curriculum is designed to provide our students with an excellent foundation that promotes and enhances student acquisition and utilization of medical knowledge and clinical skills. The medical school experience also provides opportunities for students to undertake self-directed learning and self-reflection, and to continue to utilize these resources for developing their professional identity and career pathways. Students are exposed to a range of medical specialties and physician roles as physician-scientist, patient advocate and medical educator. Assignments in hospitals and outpatient settings and Assisted Living Facilities enable our students to experience diverse practice environments that help them in selecting a specialty.

The redesign of the curriculum that began to be implemented in 2006, is an ongoing and dynamic process that is responsive to perceived student and faculty needs as well as to changing national trends and federal and state policy initiatives in medical education. Evidence of success of our general professional education is indicated by our students' successful performance on USMLE Steps 1 and 2 and Clerkship Shelf Examinations, and by their demonstration of clinical and professional competence on the summative fourth-year OSCE. (See Table 5 for national examination results for academic year 2010-2011.) Data from the recent 2012 residency match, in which our students placed in 17 different clinical specialties across the nation, strongly sug-

gests that our curriculum initiatives enable our students to build upon their general education foundation in diverse ways. In the AAMC 2012 Graduate Questionnaire, students report that they are highly satisfied with their educational experience and preparation for residency. In 2012, 96.1% of our students (as compared with 93.3% for all US medical schools) "agreed or strongly agreed" that they "have the fundamental understanding of common conditions and their management encountered in the major clinical disciplines" and 94.3% of our students (88.2% for all schools) "agreed or strongly agreed" that "overall, I am satisfied with the quality of my medical education;" 48.1% of our students (42.2% for all schools) "strongly agreed" with the statement.

REFERENCES

1. Smith SR, Dollase, R, Boss J. Students' performance in a competency-based curriculum. *Acad Med*. 2003 January; 78: 97-107.
2. Smith, SR, Dollase R. Outcome-based education: Part 2: Planning, implementing and evaluating a competency-based curriculum. *Med Teach*. 1999; 15-22.
3. Rougas, S, Rusley, J, Young, B, Romain, C, Lambrese, J, Dollase, R. Development of a student-based teaching academy. *MHRI*. 2008; 252-4.

Luba Dumenco, MD, is Director of the Preclinical Curriculum at the Warren Alpert Medical School of Brown University.

Paul George, MD, is Director of the Second-Year Preclinical Curriculum at the Warren Alpert Medical School of Brown University.

Julie Scott Taylor, MD, MSc, is Director of the Clinical Curriculum at the Warren Alpert Medical School of Brown University.

Richard Dollase, EdD, is the Director of Medical Education at the Warren Alpert Medical School of Brown University.

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CORRESPONDENCE

Richard Dollase, EdD
The Warren Alpert Medical School of
Brown University
222 Richmond Street
Providence, RI 02912
phone: 401-863-9609
fax: 401-729-2923

Assessing Clinical Competence of Graduating Medical Students at the Warren Alpert Medical School of Brown University

Paul George, MD, Julie Scott Taylor, MD, MSc, and Richard Dollase, EdD

AN OBJECTIVE STRUCTURED CLINICAL Examination (OSCE) is a performance assessment that enables medical educators to evaluate the clinical skills and professionalism of future physicians. At the **Warren Alpert Medical School of Brown University (AMS)**, there are multiple OSCEs in the first two years of the Doctoring course, in the Clinical Skills Clerkship and in three specialty-specific clerkships: Internal Medicine, Obstetrics and Gynecology and Pediatrics. In this paper, we focus on the fourth-year OSCE, a summative clinical examination which is administered at the start of our students' final year of medical school.

Harden and colleagues first described an OSCE in 1975 as students rotating "round a series of stations... At one station they are asked to carry out a procedure, such as take a history, undertake one aspect of physical examination, or interpret laboratory investigations... Students may be observed and scored at some stations by examiners using a check list."¹

OSCEs are now commonplace in undergraduate medical education. Approximately 80% of US allopathic medical schools currently require students to pass a summative fourth-year OSCE prior to graduating from medical school.² In addition to medical students, other types of health professional students, including pharmacy and nursing, are now evaluated using OSCEs.^{3,4}

An OSCE is best used to evaluate a learner's competence in clinical skills such as taking a patient history, performing a physical examination and professionalism.⁵ There is evidence that OSCEs also effectively evaluate a student's ability to use information technology in patient encounters, to understand patient interactions within a large health care system and to advocate for patients within the health care system.⁶

An OSCE can be used as a teaching tool, specifically to give students feedback on their patient care skills.^{7,8} OSCEs have also been shown to predict future real life

performance of students. In one study, over 90% of individuals who passed a medical school-based OSCE also passed subsequent licensing examinations.⁹ Fewer than 70% of those who did not pass the same school-based OSCE passed a subsequent licensing exam.

Perhaps most importantly, OSCEs can predict residency performance.¹⁰ A major driving force behind requiring the passing of the fourth-year OSCE as a graduation requirement is to ensure that AMS students are ready to enter residency with proficiency in data gathering including taking a history and performing a physical examination, patient counseling and clinical decision making. The secondary force behind the OSCE as a graduation requirement is that students need to pass a national board examination, USMLE Step 2 Clinical Skills (CS) as part of a three-step, four test sequence in order to become fully licensed in the United States.

To create a summative OSCE for a medical school, medical education experts such as clerkship directors usually write cases, often based in part on real life patient care experiences.¹¹ OSCEs typically use

standardized patients (actors hired to portray real patients) in place of actual patients. At AMS, over the years, several clerkship directors have contributed to writing cases. The Office of Medical Education staff train approximately 40 **standardized patients (SPs)** per year to participate in the fourth-year OSCE. This training encompasses both portraying a specific case and giving written feedback to students.

AMS students take the fourth-year OSCE in June immediately following the completion of third-year clerkships. Students are graded on their performance on individual stations. The overall OSCE is graded on a pass/fail basis. Students receive their grade and detailed written feedback within two weeks of taking the examination. Students who do not pass the fourth-year OSCE are required to remediate. Successful performance on the exam is a graduation requirement. Results of the fourth-year OSCE are reported in the Medical Student Performance Evaluation (or Dean's letter), the summative narrative every allopathic medical school in the US sends out as part of a medical student's application to residency programs.

Table 1: Sample Fourth-Year OSCE Blueprint.

OSCE Case	Specialty	Ability Assessed*
Pregnancy	Obstetrics and Gynecology	I, II, III, IV, VI, IX
Depression	Psychiatry	I, II, III, IV, VI, IX
Domestic Violence	Family Medicine	I, IV, VI, VII, VIII
Chronic Liver Disease	Surgery	I, II, III, IV, VI, IX
Joint Pain	Orthopedics	I, II, III, IV, VI, IX
Fever	Pediatrics	I, III, IV, VI, IX
Hypertension	Internal Medicine	I, II, III, IV, VI, IX
Vision Changes	Neurology	I, II, III, IV, VI, IX

*** The Nine Abilities**

- I. Effective Communication
- II. Basic Clinical Skills
- III. Using Basic Science in the Practice of Medicine
- IV. Diagnosis, Prevention and Treatment
- V. Lifelong Learning
- VI. Professionalism
- VII. Community Health Promotion and Advocacy
- VIII. Moral Reasoning and Clinical Ethics
- IX. Clinical Decision Making

Table 2: Student Performance on AMS's Fourth-Year OSCE in June, 2012 (n=100).

OSCE Component	Mean Score (Range)
History	83% (67%-93%)
Physical Examination	84% (61%-97%)
Counseling	87% (72%-100%)
Inter-station Exercises*	87% (64%-98%)
Overall Performance	85% (69%-96%)

*Examples of inter-station exercises: Write a progress note, develop a differential diagnosis, describe an appropriate therapeutic treatment regimen for a patient, interpret an EKG, interpret a chest x-ray, write a brief essay dealing with an ethical issue, or answer a clinical question in real time using available information technology.

In order to ensure that our graduates are both proficient in crucial skills necessary for residency and are optimally prepared to pass USMLE Step 2 CS, key personnel in the Office of Medical Education systematically studied student performance on the fourth-year OSCE at AMS, the national board examination, USMLE Step 2 CS, and our graduates' first year of residency training.

METHODS

We conducted our study at the Warren Alpert Medical School of Brown University in Providence, Rhode Island. We required all medical students who plan to graduate in 2013 to take the fourth-year OSCE. The four-hour exam has ten stations, each of which lasts 22 minutes and includes two parts:

- A direct patient encounter in which students are asked to take a history, perform a physical examination or counsel a patient. This portion of each station typically lasts 15 minutes.
- An inter-station exercise. This portion of each station typically lasts seven minutes.

The patients whom students encounter deliberately represent the breadth of clinical experiences addressed in third-year clerkships at AMS. Every fourth-year OSCE contains one case each from following specialty areas: Family Medicine, Internal Medicine, Neurology, Obstetrics and Gynecology, Orthopedics, Pediatrics, Psychiatry and Surgery. An example OSCE blueprint is shown in Table 1. This exam blueprint is determined by medical and education staff in AMS's Office of Medical Education prior to the exam.

The exam evaluation criteria are directly linked to AMS's Nine Abilities, or

competencies, in which all Brown students are assessed during their entire four year education. All of the Nine Abilities are assessed during the fourth-year OSCE (Table 1). For the first time in the school's history, using the new evaluation management software system in the AMS clinical suites,¹² we were able to mine student performance data from the fourth-year OSCE that was administered in June of 2012. We also compared passing data from the fourth-year OSCE during its administrations from 2009 through 2011 with passing data from USMLE Step 2 CS over this same time interval.

Finally, to triangulate our results further, for the AMS Class of 2010, we surveyed all residency program directors through a single conventional mailing at programs to which our graduates matched to assess the perception of our graduates' competencies in relation to the Nine Abilities after they finish their intern year. Residency directors are asked to evaluate each of our graduates' competencies. The survey data helped us to evaluate to what degree the prior assessment of our graduates' residency competency matched the perception of residency program directors.

RESULTS

In June 2012, 100 medical students completed the fourth-year OSCE at AMS over 13 examination sessions. The overall pass rate on the first attempt was 96%. The average score on the fourth-year OSCE was 85% with a standard deviation of 6%. Results for individual components of the fourth-year OSCE are given in Table 2. One student failed the entire OSCE and was required to remediate. Three students failed one or two individual stations on the

Table 3: Receiving Residency Program Directors' Assessment of AMS Class of 2010 (Class size = 94, Response rate = 66%).

Skill (Ability assessed on survey)	Unsatisfactory (%)	Below Average (%)	Average (%)	Above Average (%)	Superior (%)
Communication (Ability I)	0	3.1	17.1	40.8	39.0
Clinical Skills (Ability II)	0	1.8	24.1	55.0	19.1
Basic Science Knowledge (Ability III)	0	0	28.0	52.5	19.6
Diagnosis, Management and Prevention (Ability IV)	0	1.6	14.3	52.5	31.5
Lifelong Learning (Ability V)	0	3.1	12.2	36.7	47.9
Personal Growth (Ability VI)	0	4.5	13.7	35.4	46.3
Social and Community Health Skills (Ability VII)	0	1.7	18.0	37.7	42.7
Ethics and Professionalism (Ability VIII)	0	2.8	7.2	33.4	56.6
Problem Solving (Ability IX)	0	3.2	12.5	48.4	35.9
Fund of Knowledge	0	1.6	19.0	39.7	39.7

fourth-year OSCE and were required to remediate only the failed stations.

We then compared the percentages of students passing the fourth-year OSCE with the percentages of students passing the USMLE Step 2 CS examination. Over a three-year period from 2009 to 2011, the passing rate for the AMS students on the fourth-year OSCE has averaged 98% with a range of 96% to 98% while the passing rate for AMS students on USMLE Step 2 CS has averaged 96% with a range of 94% to 97%.

Finally, for the AMS Class of 2010, we examined residency program directors' perception of our fourth-year students' competence in their first year of internship. Sixty-six percent of programs directors responded to our survey (N=62). Nearly all of our students are rated as competent to outstanding residents by residency program directors (Table 3).

CONCLUSIONS

Based on our data, AMS students perform well on the summative fourth-year OSCE. These senior students also perform well on the individual components of the OSCE in regards to history taking, physical examination and communication skills. In addition, the passing rates on the fourth-year OSCE very closely parallel those of USMLE Step 2 CS. Triangulating these results with our residency program director survey indicates that our fourth-year OSCE is a valid method of assessment for our students.

The implications of our study for AMS are significant. First, as medical educators, it is our goal to train medical students in preparation for residency, where they often will be the first physician contact for patients in the medical system. Therefore, ensuring competency in crucial skills such as history taking, physical examination and counseling is vital and is a focus of both our preclinical and clinical curriculum. Additionally, students need to be able to write progress notes, develop differential diagnoses, and propose reasonable, cost effective therapeutic plans for patients. The results on our inter-station exercises indicate that the vast majority of senior students are able to do just that demonstrating the effectiveness of our curriculum.

We should not understate the importance of correlating fourth-year OSCE performance with that on USMLE Step 2

CS. The stakes of USMLE Step 2 CS are high. The cost of the examination is now over \$1,000, and it is only offered at five sites in the United States (the closest location to Providence is Philadelphia). It is not unusual for examination slots on USMLE Step 2 CS to be filled six months or more in advance. In addition to the obvious logistical and financial implications, failing the USMLE Step 2 CS has the potential to delay the start of residency. We believe the fourth-year OSCE is a predictor of success on USMLE Step 2 CS, allowing students to predict readiness for this licensing examination.

Our study has several limitations. It was conducted at only one medical school and parts of our data were for only one academic year, limiting our study's generalizability to other institutions. However, the new information management systems in the Clinical Skills Suite will allow us to determine the reliability of our examination going forward, providing further validity evidence for the AMS fourth-year OSCE and enhancing its generalizability. The exam itself lacked complete predictive validity as those students who failed the fourth-year OSCE were not necessarily the same as those who failed USMLE Step 2 CS. In addition, we could not do a thorough statistical analysis linking individual performances of students on the fourth-year OSCE and USMLE Step 2 CS because the National Board of Medical Examiners, the organization that develops and administers the USMLE examinations, reports only whether a student passed or failed USMLE Step 2 CS and does not give numerical data on performance.

In conclusion, our results demonstrate an association between AMS student performance on the fourth-year OSCE and on USMLE CS Step 2. In addition, our results indicate that AMS students are acquiring skills and competencies that make them well prepared for residency, as indicated by our fourth-year OSCE data, results on USMLE Step 2 CS and residency directors' assessments. In the future, we will continue to refine the currently effective summative exam to assess the preparedness of our graduating students for subsequent training and their future roles as licensed physicians.

REFERENCES:

1. Harden RM, Stevenson M, Downie WW, Wilson GM. Assessment of clinical competence using objective structured examination. *Br Med J*. 1975 February 22; 1: 447-51.

2. Barzansky B, Etzel S. Medical schools in the United States, 2009-2010. *JAMA*. 2010; 304:1254.
3. Salinitri FD, O'Connell MB, Garwood CL, Lehr VT, Abdallah K. An objective structured clinical examination to assess problem-based learning. *Am J Pharm Educ*. 2012; 76: 1-10.
4. McWilliam PL, Botwinski CA. Identifying strengths and weaknesses in the utilization of Objective Structured Clinical Examination (OSCE) in a nursing program. *Nurs Educ Perspect*. 2012; 33: 35-9.
5. Hochberg MS, Kalet A, Zabar S, Kachur E, Gillespie C, Berman RS. Can professionalism be taught? Encouraging evidence. *Am J Surg*. 2010; 199: 86-93.
6. www.acgme.org. Accessed July 30, 2012.
7. White CB, Ross PT, Gruppen LD. Remediating students' failed OSCE performances at one school: The effects of self-assessment, reflection, and feedback. *Acad Med*. 2009; 84:651-4.
8. Brazeau C, Boyd L, Crosson J. Changing an existing OSCE to a teaching tool: the making of a teaching OSCE. *Acad Med*. 2002; 77 (9): 932.
9. Mavis BE, Henry RC. Between a rock and a hard place: finding a place for the OSCE in medical education. *Med Educ*. 2002; 36:408-9.
10. Wallenstein J, Heron S, Santen S, Shayne P, Ander D. A core competency-based objective structured clinical examination (OSCE) can predict future resident performance. *Acad Emerg Med*. 2010; 17: S67-71.
11. Casey PM, Goepfert AR, Espey EL, Hammoud MM, Kaczmarczyk JM. To the point: reviews in medical education – the Objective Structured Clinical Examination. *Am J Obstet Gynecol*. 2009; 200: 25-34.
12. George P, Taylor JS, Holden PL, Dollase R. The new clinical skills suite at the Warren Alpert Medical School: integrating technology, medical education and patient care. *MHRI*. 2011; 94: 234-5; 238.

Paul George, MD, is an Assistant Professor of Family Medicine and Associate Director of Preclinical Curriculum at the Warren Alpert Medical School of Brown University.

Julie Scott Taylor, MD, MSc, is an Associate Professor of Family Medicine and Director of Clinical Curriculum at the Warren Alpert Medical School of Brown University.

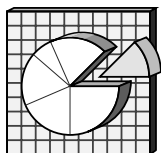
Richard Dollase, EdD, is the Director of Medical Education at the Warren Alpert Medical School of Brown University.

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CORRESPONDENCE

Paul George, MD
The Warren Alpert Medical School
of Brown University
222 Richmond Street
Providence, RI 02912
phone: (401) 863-9609
fax: (401) 729-2923



Neighborhood Health Differentials In Warwick, RI: An Analysis of Risk Factors

Robert Vanderslice, PhD and John P. Fulton, PhD

THE ABILITY TO DEFINE AND MEASURE THE HEALTH OF RHODE ISLAND'S residents is essential to achieving a common goal of a healthy and prosperous Rhode Island. The **Rhode Island Department of Health (HEALTH)** routinely reports on trends in disease and other health status measures. These data inform policies and decisions, help target interventions for neighborhoods with the greatest disparities in health and disease indicators, and address citizens' health concerns about environmental impacts. This report describes HEALTH's on-going efforts to address the concerns of residents who live adjacent to Rhode Island's only major commercial airport, T.F. Green, located in the geographical heart of Warwick, Rhode Island, and the challenges to providing a simple answer to questions about its health impacts.

METHODS

Evaluation of Citizen Concerns of Increased Cancer Rate

Initial analysis. In 2004, staff of the Rhode Island Cancer Registry studied the geographical patterns of cancer incidence in the City of Warwick. Average annual, age-adjusted cancer incidence rates for 1987-2001 were computed by cancer type, census tract, and gender, focusing on lung cancer and other cancers known to be associated with environmental risk factors. Rates were constructed from counts of newly diagnosed cancers reported to the Cancer Registry for Warwick residents (numerators), and parallel population estimates constructed from the US Censuses of Population in 1990 and 2000 (denominators). Relative to cancer incidence rates for all Rhode Island residents, 1987-2001, cancer incidence rates for lung cancer in Warwick census tracts immediately south and east of T.F. Greene Airport were found to be elevated (Figure 1). Some of the elevations were statistically significant. Cancer incidence rates for residents of census tracts immediately north and west of the airport (including residents of census tracts in south Cranston) were not elevated. A report of these findings proposed chance variation in risk factors, tobacco use, exposure to indoor and outdoor air pollutants

and/or a combination of these factors as the most likely factors associated with this elevation in lung cancer rates.¹

Further time-trend analysis. An analysis of the changes in cancer rates over time was conducted to shed light on the likelihood of environmental causes for the observed cancer increase compared to tobacco use. Recent national trends show a decline in male smoking rates at the same time that air traffic at T.F. Green has increased. Extending the cancer incidence data set to include incident cases from 2001 to 2004 allowed a comparison to be conducted between tracts with significant increases in rates and those where none were observed. For men in census tracts with high cancer rates, rates were stable over time, but declined in the rest of Warwick. These time trend data were equivocal with respect to identifying likely sources for the geographical distribution of cancer cases, but supported the need for further study.

Surveillance of Other Health Risks and Outcomes. In contrast to lung cancer, acute changes in asthma or other respiratory diseases can occur with daily changes in air quality. Data on these health measures are available from two sources, the **Rhode Island Behavioral Risk Factor Surveillance System (RI-BRFSS)**—part

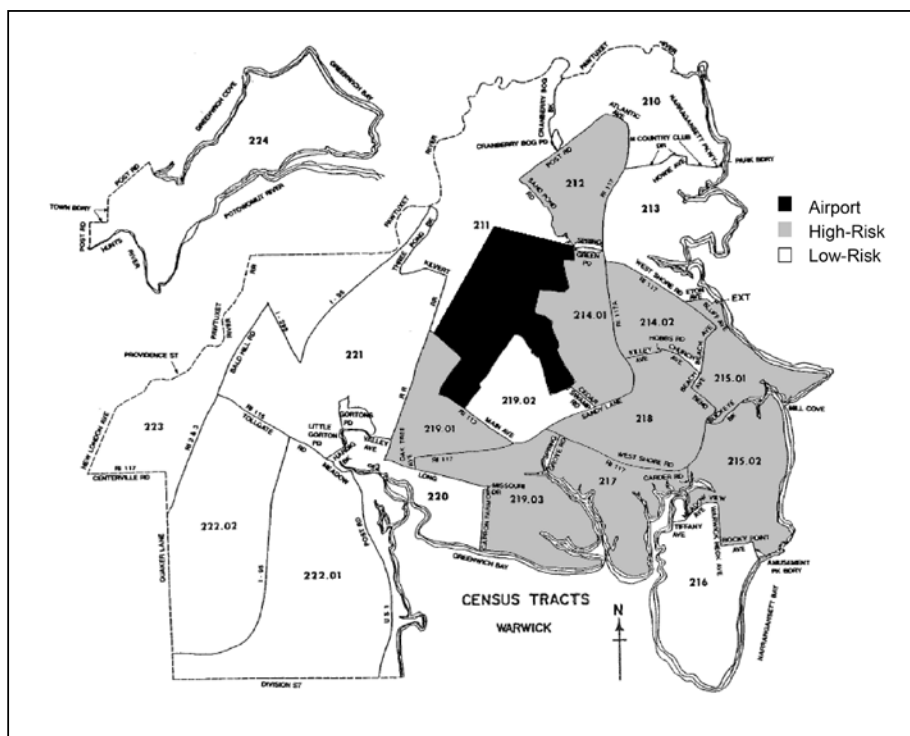


Figure 1. City of Warwick, Rhode Island census tracts with elevated lung cancer incidence rates, covering the period 1987-2000. Source: Fulton, J: Preliminary Cancer Incidence Rates, Warwick, Rhode Island (Memorandum), February 2, 2004.

of a national, ongoing telephone survey organized and supported by the Centers for Disease Control and Prevention—and discharge data from Rhode Island's 15 hospitals, reported annually to HEALTH.

Since 1984, the RI-BRFSS has monitored the prevalence of health risks that contribute to the leading causes of disease and death among adults 18 years and older. In some years, data are available for rates of asthma (self-reported prevalence), smoking, exposure to environmental tobacco smoke, and the postal (zip) code. In Warwick, six of nine census tracts with significantly elevated lung cancer rates are located in one zip code—“high-risk zip code”—while two other Warwick zip codes subsume census tracts with lower lung cancer incidence rates, in the main—“low-risk zip codes.” The high-risk zip code covers an area generally south and east of T.F. Greene, while the low-risk zip codes cover areas generally north and west of T.F. Greene. Normally, the numbers of RI-BRFSS respondents would be too small to allow geographical comparisons between these high-risk and low-risk areas. However, these areas were over-sampled in the 2008 RI-BRFSS survey, yielding 741 Warwick residents, sufficient to make the desired comparisons.

Hospital discharge data were also used to elucidate differences between the high-risk and low-risk areas of Warwick, so designated on the basis of lung cancer incidence rates. Using ICD-9 codes, discharge diagnoses of “asthma” or “other respiratory diseases” were identified for calendar years 2006 and 2007. Age-adjusted prevalence rates for asthma and other respiratory diseases were constructed using counts of population from the 2000 census. As with RI-BRFSS data, the geographic specificity of hospital discharge data was limited to zip code, with areas designated as either high-risk or low-risk, as described above.

RESULTS

Compared to respondents residing in low-risk areas, those residing in the high-risk area were significantly more likely ($P < 0.05$) to have incomes less than \$35,000 (23.5 percent vs. 15.6 percent), to be current smokers (22.3 percent vs. 12.5 percent), to report mold growth in their homes (18.4 percent vs. 17.9 percent) and to report current exposure to second hand tobacco smoke either at home or at work. (Refer to Table 1.) Compared to respondents residing in low-risk areas, those residing in high-risk areas were more likely to report being diagnosed with asthma by a medical provider (12.4 percent vs. 7.5 percent). The latter differential was corroborated by hospital discharge rates for asthma (152 discharges per 100,000 people per year for patients residing in high-risk areas vs. 104 discharges per 100,000 people per year for patients residing in low risk areas), and hospital discharge rates for other respiratory diseases (447 vs. 369 discharges per 100,000 people per year, respectively).

Table 1. Characteristics, risk factors and hospitalization rates for asthma and other respiratory diseases and conditions among residents of Warwick, Rhode Island by geographic area* compared to statewide data

	Warwick High-Risk Zip Code	Warwick Low-Risk Zip Codes	State of RI
BRFSS (2008)	(%)	(%)	(%)
Income < \$35,000.00	23.5	15.6	28.2
Ages 18-30	20.7	15.4	23.3
Current smoker	22.3	12.5	18.1
Exposure to 2nd hand smoke at home	15.5	12.1	14.2
Exposure to 2nd hand smoke at work	18.6	15.5	15.6
Current asthma diagnosis	12.4	7.5	9.8
Mold in home	18.4	17.9	12.6
Hospital discharge rates (2007-2008)	(Per 100,000)	(Per 100,000)	(Per 100,000)
Asthma	152	104	138
Other respiratory diseases	447	369	430

*Note: areas at high-risk or low-risk of lung cancer
 Sources: RI_BRFSS, calendar year 2008, including over-sample of Warwick, Rhode Island, Rhode Island Department of Health; RI Hospital Discharge Data Set, Rhode Island Department of Health.

In addition, hospital discharge data for myocardial infarction and ischemic heart disease revealed significantly higher morbidity in Warwick than in Rhode Island as a whole (627 discharges for myocardial infarction per 100,000 people per year for residents of Warwick vs. 313 discharges per 100,000 people per year for residents of the state as a whole, and 295 discharges for ischemic heart disease per 100,000 people per year for residents of Warwick vs. 250 discharges per 100,000 people per year for residents of the state as a whole. Additionally, significant differences in rates of discharge for myocardial infarction were observed between high-risk and low-risk areas of Warwick (731 vs. 560 discharges per 100,000 people per year).

DISCUSSION

The results of these analyses can be used to support the original (2004) hypothesis that the most likely explanation for the geographical distribution of lung cancer cases was a combination of chance variation in risk factors, tobacco use, and/or exposure to indoor and outdoor air pollutants. The relatively small number of cases used in this evaluation means that chance variation cannot be discounted. The clear and significant difference between high and low risk groups with respect to rates of smoking and exposure to second hand tobacco smoke support tobacco smoke exposure as a likely factor for the differences in the incidence of lung cancer and myocardial infarction and the prevalence of asthma and other respiratory diseases. As well, the higher prevalence of mold in residences located in high-risk areas suggests that indoor air quality unrelated to smoking may also be related to observed morbidity differentials between high-risk and low-risk areas. Finally, outdoor air pollutants, either associated with airport traffic or independent of it, cannot be discounted, nor can the synergistic effects of environmental lung carcinogens and tobacco smoke for the development of lung cancer.

As with many studies, the present analysis raises important questions not anticipated at the start. Why is the rate of heart disease in the City of Warwick so high, compared to the rest of

Rhode Island? We know that environmental exposures to elevated levels of particulate matter during smog events are associated with increased cardiovascular morbidity and mortality. We also know that elevated levels of black carbon and ultra-fine particulates in the air are associated with airplane activity. Therefore, airport traffic *might* be related to the differentials observed in cardiovascular morbidity and mortality, but additional study, designed specifically to test this hypothesis, would be necessary to confirm or deny the connection.

REFERENCES

1. Fulton, JP, and Chiaverini, LC. *A Geographical Analysis of Cancer Incidence in Warwick*, Rhode Island Department of Health, 2004.

Robert Vanderslice, PhD, is the Team Lead for Healthy Homes and Environment, Division of Community Family Health and Equity, Rhode Island Department of Health

John P. Fulton, PhD, is Administrator, the Rhode Island Cancer Registry, Rhode Island Department of Health, and Clinical Associate Professor of Community Health, The Warren Alpert Medical School of Brown University,

Disclosure of Financial Interests

The authors and/or their spouses/significant others have no financial interests to disclose.

CORRESPONDENCE

Robert Vanderslice, PhD
Rhode Island Department of Health
3 Capitol Hill, Room 206
Providence, RI 02908
phone: (401) 222-7766
e-mail: robert.vanderslice@health.ri.gov

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Information for Contributors

Medicine & Health/Rhode Island is peer-reviewed, and listed in the *Index Medicus*. We welcome submissions in the following categories:

CONTRIBUTIONS

Contributions report on an issue of interest to clinicians in Rhode Island: new research, treatment options, collaborative interventions, review of controversies. Maximum length: 2500 words. Maximum number of references: 15. Tables, charts and figures should be submitted as separate electronic files (jpeg, tif, or pdf). Each submission should also be accompanied by a short (100-150 words) abstract.

CREATIVE CLINICIAN

Clinicians are invited to describe cases that defy textbook analysis. Maximum length: 1200 words. Maximum number of references: 6. Photographs, charts and figures may accompany the case.

POINT OF VIEW

Readers share their perspective on any issue facing clinicians (e.g., ethics, health care policy, relationships with patients). Maximum length: 1200 words.

ADVANCES IN PHARMACOLOGY

Authors discuss new treatments. Maximum length: 1200 words.

ADVANCES IN LABORATORY MEDICINE

Authors discuss a new laboratory technique. Maximum length: 1200 words.

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Authors submit an interesting Image, with a 300-400 word explanation.

For the above articles: Please submit an electronic version (Microsoft Word or Text) with the author's name, mailing address, phone, fax, e-mail address, and clinical and/or academic positions to the managing editor, John Teehan, e-mail: jtteehan@rimed.org. For additional information, phone: (631) 903-3389. Faxes may be sent to (401) 826-1926.

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Images In Medicine

Subungual Glomus Tumor

Alan H Daniels, MD, and Arnold-Peter C Weiss, MD

A 43-YEAR OLD MALE PRESENTED TO OUR HAND surgery office complaining of 8 years of small finger pain and sensitivity. He had previously seen three physicians without an accurate diagnosis. We made the diagnosis of subungual glomus tumor based on his history and physical examination, which revealed exquisite tenderness of the fingertip and a bluish hue under his fingernail (Figure 1). The tumor was removed in the operating room (Figure 2) leading to immediate and complete relief of his symptoms. He has had no recurrence of symptoms at 1-year follow-up.

Glomus tumors are benign vascular tumors that are found most commonly in the fingertip, frequently subungual, and often present with classic triad of symptoms: (1) hypersensitivity to cold, (2) paroxysmal pain, and (3) pinpoint pain in the finger. Patients often go undiagnosed or misdiagnosed because the tumors are small, usually not palpable, and have varying presentations. A combination of history, physical examination, and magnetic resonance imaging (MRI) with gadolinium is used to support the diagnosis. Surgical excision is usually curative and provides complete pain relief. An awareness of the diagnosis is critical to prevent an unnecessary delay in treatment.

Alan H Daniels, MD, is Chief Orthopaedic Surgery Resident at the Warren Alpert Medical School of Brown University.

Arnold-Peter C. Weiss, MD, is R. Scot Sellers Scholar of Hand Surgery, Professor of Orthopaedics, at the Warren Alpert Medical School of Brown University.

Disclosure of Financial Interests

The authors and/or their spouses/significant others have no financial interests to disclose.

CORRESPONDENCE

Alan H Daniels, MD
593 Eddy Street
Providence, RI 02903
phone: (401) 444-4030
fax: (401) 444-6182
e-mail: alan_daniels@brown.edu

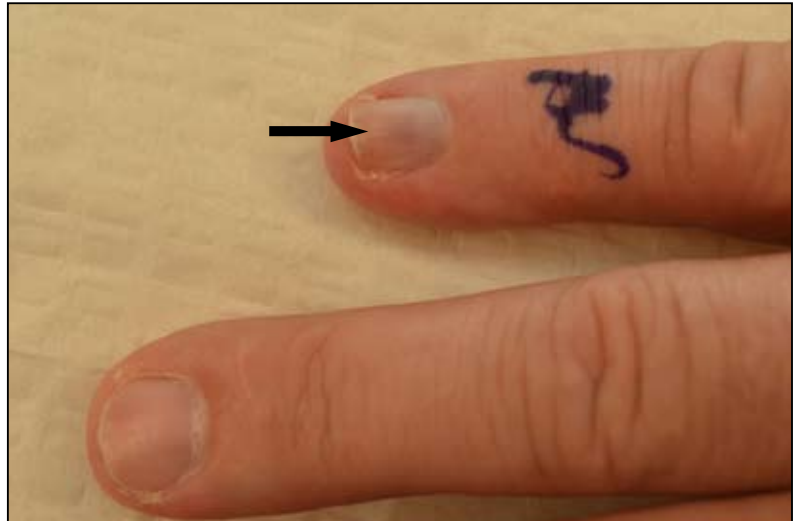


Figure 1: Small finger subungual bluish hue (arrow), indicating location of glomus tumor.

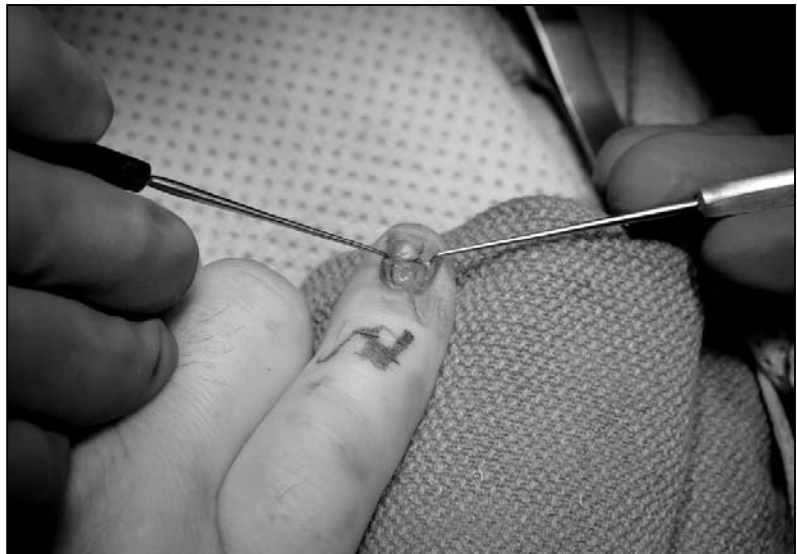
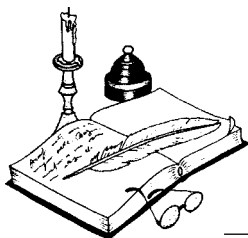


Figure 2: Intraoperative photograph showing well encapsulated subungual glomus tumor.



Physician's Lexicon

The Epi- Words of Medicine

THE STANDARD MEDICAL DICTIONARY CONTAINS almost eight pages of medically-relevant words each beginning with the prefix, *epi-* (or its phonemic equivalents, *ep-* and *eph-*.) It is of Greek origin conveying meanings such as 'upon', 'subsequent to' or 'following.'

A host of anatomic terms, employing *epi-* as a prefix, need no etymologic explanation (epicardium, epicondyle, epidermis, epididymis, epigastrium, epiphysis, etc.) But other terms, using the *epi-* prefix, have wandered somewhat from their Greek origins.

The word, epilepsy, is derived from the Greek, *epi-* and *lambanien*, the latter meaning to seize or take hold of, leading, in time, to the Latin, *epilepsia*, which faithfully translates to the English, seizure. The Greek prefix, *lepto-*, however, means thin or delicate, as in words such as leptomeninges.

An episode—currently meaning an incident or a specified interval of time—originates from the Greek, *episodion*, a noun meaning 'coming in', or 'beside'. It stems earlier from the Greek, *eisodos*, meaning 'an entrance' or 'an arrival'; and still earlier from the Greek, *hodos*, meaning 'a pathway'. A medical episode, hence, conveys a narrower meaning: a happening, often quite brief, of pathological significance (e.g., an episode of fainting).

An epidemic (a Greek noun, *epidemia*) means, literally, 'that which is among', or 'upon the people' and, inferentially, a communicable disease.

The epiglottis, the cartilagenous triangle at the base of the tongue, is a word of Greek origin compounding the prefix, *epi-*, and the root *glossa*, meaning tongue. *Glossa* has also given rise to terms such as glossary thus using the metaphoric

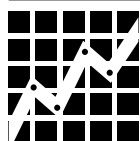
meaning of the word, tongue, to signify a language (as in English, "He speaks in many tongues.") Related words include hypoglossal, pangloss, polyglot, glosstomy and glottis.

The hormone, epinephrine, translates as 'upon the kidney', and the Latin equivalent would be 'adrenal.'

Epistaxis, a bleeding, inferentially, from the nose, comes from the Greek root, *stasis*, meaning 'a standing' or 'a falling'. A similar word, epistasis, in genetics means the dominance of one gene over another (ie, one gene standing over another.).

And amongst the many '*ep-*' words there is EPCOT, a Disney theme park in Orlando, Florida, and a center of great revelation. It represents an acronym for Experimental Prototype of Tomorrow.

— STANLEY M. ARONSON, MD



RHODE ISLAND DEPARTMENT OF HEALTH
MICHAEL FINE, MD
DIRECTOR OF HEALTH

Rhode Island Monthly Vital Statistics Report Provisional Occurrence Data from the Division of Vital Records

VITAL STATISTICS

EDITED BY COLLEEN FONTANA, STATE REGISTRAR

Underlying Cause of Death	Reporting Period			
	October 2011	12 Months Ending with October 2011		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	212	2,466	234.1	3,692.0
Malignant Neoplasms	162	2,233	212.0	5,535.0
Cerebrovascular Diseases	29	436	41.4	684.5
Injuries (Accidents/Suicide/Homicide)	58	682	64.8	9,692.5
COPD	27	528	50.1	525.0

Vital Events	Reporting Period		
	April 2012	12 Months Ending with April 2012	
	Number	Number	Rates
Live Births	1,046	13,779	13.1*
Deaths	793	11,202	10.6*
Infant Deaths	(5)	(91)	6.6#
Neonatal Deaths	(4)	(70)	5.1#
Marriages	366	6,927	6.6*
Divorces	238	3,858	3.7*
Induced Terminations	290	4,659	338.1#
Spontaneous Fetal Deaths	37	735	53.3#
Under 20 weeks gestation	(31)	(622)	55.5#
20+ weeks gestation	(6)	(113)	8.2#

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.

(b) Rates per 100,000 estimated population of 1,052,567. (www.census.gov)

(c) Years of Potential Life Lost (YPLL).

Note: Totals represent vital events that occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

* Rates per 1,000 estimated population

Rates per 1,000 live births

NINETY YEARS AGO, OCTOBER, 1922

Read before the quarterly meeting of the RI Medical Society at Woonsocket on September 7th, 1922, John J. Baxter, MD, shares reminiscences of surgery for the last 36 years of his professional career and notes that all should be thankful for the marvelous advances made in both surgery and internal medicine in that time. He focuses a significant portion of the discussion to the antiseptic revolution and the changes in the operating room. He also discusses the founding of Woonsocket Hospital and its surgical team trained in the latest techniques.

Superintendent of Health, Charles V. Chapin, MD, looks at the problems of the health officer in the state of Rhode Island. The most serious problems are the fundamental ones of the cause of disease and its prevention. Few medical men, and few health officers, have had sufficient scientific training in establishing a basis for promoting preventative medicine. Even though much has been learned about infectious disease, there is also much that is still not known. While many causative germs for disease have been discovered, comprehensive knowledge of germs of scarlet fever, measles, smallpox, and influenza remain illusive. While containment is possible despite lack of knowledge regarding the causative germ, discovery would be of great benefit. Exact knowledge of the manner of spread of contagious disease is often of as much practical value as the knowledge of the germ which causes it. Thus far, the greatest triumph of medicine has been the control of insect-born diseases.

An editorial looks at vitamins, diet and nutrition with "The study of vitamins has helped make clearer why a variety of foods is so essential to well being, and how danger may follow when diet becomes restricted from either necessity or caprice."

FIFTY YEARS AGO, OCTOBER, 1962

Orland F. Smith, MD, and Thomas J. Holland, Jr. discuss the cost of doing business. "Up to now, no one has ever tried to determine or discuss such cost as given locality from the point of view of either the doctor or the economist. The subject of the doctor and the money he is paid for his services has always been surrounded by a great deal of mystery. As medical care gets ever closer to being classified as a commodity through the medium

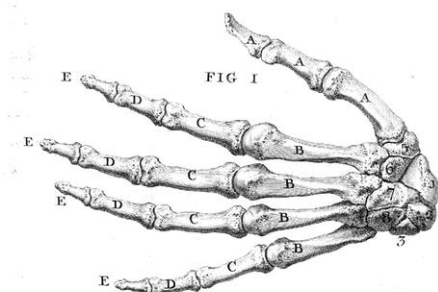
of the fee schedule, it seems logical that we combine the efforts of the economist and the doctor in an effort to shed a little more light on the subject."

Edward H. Smith, MD, and Edward V. Famiglietti, MD, present a case report on "Hernia of the Linea Semilunaris (Spigelian hernia)." A 65 year-old woman is entered with a three-year history of constipation requiring the frequent use of laxatives. Several days before admission, she noted obstipation and abdominal distension with cramps, and she also experienced an episode of "bilious" vomiting. There was also a past history of intestinal trouble and "intestinal obstruction due to constricting bands." Physical examination revealed a "well-developed, obese, hypertensive, white female in mild discomfort." The abdomen was markedly distended and tympanitic with hyperactive peristaltic sounds. A moderately tender left lower quadrant "prominence" was noted. A 180-degree clockwise volvulus of the sigmoid was found incarcerated in a left Spigelian hernia. On the day of discharge, an incarceration of the cecum in a right Spigelian hernia necessitated readmission. Both herniae were treated successfully by surgical intervention.

TWENTY-FIVE YEARS AGO, OCTOBER, 1987

Julie G. Beitz, MD, and Alan B. Weitberg, MD, present the first part of a report on cancer control in Rhode Island and the value of screening with the statement that more intense cancer screening and education will reduce cancer mortality and morbidity. They also note that "the rationale for screening for breast, colorectal, or cervical cancer is detection and treatment of the disease at an early stage prior to the development of metastases, in order to reduce mortality. This is particularly true for lung cancer. Thus, cancer control efforts related to lung cancer have focused instead on prevention of the disease, that is, on reduction of smoking incidence." The authors further note that the National Cancer Institute has set a goal of 50 percent reduction in the age-adjusted cancer mortality rate by the year 2000.

Yusef Barcohana, MD, examines precautions for obstetrical teams in regard to Acquired Immune Deficiency Syndrome. He discusses the history of the disease, its transmission, and its manifestation. He lists eight major precautions that should be taken including masks, gloves, gowns, and eye coverings—especially for cesarean section surgery, disposable items, care when using sharp instruments, disposable needles and syringes, disposable anesthesia equipment (mask, breathing circuit, laryngoscopes, and self-contained disposable CO₂ single use absorbers), placing reusable items in a biohazard container for repeated cleaning and sterilizing, thoroughly washing hands and gloves with antiseptic agents, and addressing mouth-to-mouth resuscitation with mouth pieces and resuscitation bags placed strategically in all areas of the hospital.



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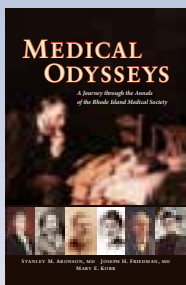
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RIMS is commemorating its bicentennial with a series of events and observances that will leave a lasting legacy.



MEDICAL ODYSSEYS

RIMS published this anthology of essays by Dr. Stanley Aronson, Dr. Joseph Friedman, and editor Mary Korr.

HAY LIBRARY EXHIBIT

Items from RIMS' collection, dating from the 16th century to the present, were on display for the first time in decades.



PORTRAIT RESTORATION

The 1795 portrait of RIMS' first president, Amos Throop, was restored to optimal condition for public display.



ANNUAL MEDICAL STUDENT AWARDS

RIMS' first annual Amos Throop Prize and Herbert Rakatansky Prize were presented to deserving medical students on May 25, 2012.



BICENTENNIAL GALA

A festive black tie evening of dinner, dancing, and entertainment was held at Rosecliff Mansion in Newport in April.



COMMEMORATIVE VIDEO

"Celebrating 200 Years of the Rhode Island Medical Society," produced for the bicentennial, premiered at the Gala.

LOBSTER BAKE

NORCAL will host this July 20 event for RIMS members on the grounds of the Naval War College Museum in Newport.



PHOTO: NAVAL WAR COLLEGE



NEUROBIOLOGY SYMPOSIUM

RIMS will sponsor a lecture series this autumn in cooperation with the Brown Institute for Brain Science and the Norman Prince Neurosciences Institute.



NEW RIMS HISTORY

A new account of RIMS' history is under the pen of Executive Director Newell Warde, PhD.



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