

The Merits and Challenges of Three-Year Medical School Curricula: Time for an Evidence-Based Discussion

John R. Raymond Sr, MD, Joseph E. Kerschner, MD, William J. Hueston, MD, and Cheryl A. Maurana, PhD

Abstract

The debate about three-year medical school curricula has resurfaced recently, driven by rising education debt burden and a predicted physician shortage. In this Perspective, the authors call for an evidence-based discussion of the merits and challenges of three-year curricula. They examine published

evidence that suggests that three-year curricula are viable, including studies on three-year curricula in (1) U.S. medical schools in the 1970s and 1980s, (2) two Canadian medical schools with more than four decades of experience with such curricula, and (3) accelerated family medicine and internal medicine

programs. They also briefly describe the new three-year programs that are being implemented at eight U.S. medical schools, including their own. Finally, they offer suggestions regarding how to enhance the discussion between the proponents of and those with concerns about three-year curricula.

The recent resurgence of interest in three-year medical school curricula has been driven by a projected shortage of 46,000 to 90,000 physicians by 2025^{1,2} and by mounting medical student debt. Three-year programs have been the subject of spirited debate in the peer-reviewed medical literature,³⁻⁷ the mainstream press,⁸⁻¹⁰ and online publications.¹¹

In addition to citing the growing education debt burden and projected physician shortages as primary reasons to support three-year medical school curricula, proponents note that some residency program directors¹² and some medical education leaders have questioned the value of the fourth year of medical school as currently structured. Indeed, in 1990 Robert Petersdorf,¹³ then president of the Association of American Medical Colleges, commented that “the present fourth year ... turns

out to be nothing more than a chance to travel about the country or to engage in audition clerkships.” More recently, a blue-ribbon commission of the American Osteopathic Association and the American Association of Colleges of Osteopathic Medicine recommended creation of “a new education model that is based on achievement of competencies without a prescribed number of months of study.”¹⁴

Others argue that the fourth year allows for student maturation, rounds out and enriches core medical education experiences with research and specialty electives, and provides ample time for choosing residency programs. Individuals concerned about three-year curricula cite potential problems such as student burnout, faculty fatigue, the increasing complexity of medicine, quality issues, and diminished competitiveness for residencies.¹⁵⁻¹⁸

We believe it is time for key stakeholders to engage in a well-informed discussion about the merits of accelerated medical school curricula. This discussion should be evidence based, address risks, and acknowledge that there may be multiple pathways to competence in medical practice. In our view, the published literature strongly supports the feasibility of three-year medical school curricula. In this Perspective, we focus on the advantages of three-year curricula, but we accept that both sides of the debate have merit. Participants in an evidence-based discussion should recognize that students

have different learning styles, financial situations, and readiness and capacity to accelerate their education.

For brevity, we refer to three- and four-year models, but it is critical to note that the actual differences in contact hours between these types of curricula are measured in weeks or months because of the elimination of summers off and the shortening of vacations and intercessions in typical three-year curricula. The Liaison Committee on Medical Education requires accredited U.S. and Canadian MD-granting programs to include a minimum of 130 weeks of curriculum but does not mandate a time frame over which the curriculum must be delivered.¹⁹ For the purposes of this Perspective, therefore, “three-year programs” refers to programs that have been compressed, modified, or integrated with residency training to achieve a three-year medical school graduation goal. A contemporary discussion of completion of medical school in less than four years could include the newer concept of competency-based (rather than time-based) education, but that is beyond the scope of this article.

Three-Year Medical Curricula in the Literature

The three-year medical school curriculum is not a new idea.^{17,20,21} In contrast to the speculative discussions of the concept in the 1970s, the current debate is guided by a body of published evidence. The broad array of published

Please see the end of this article for information about the authors.

Correspondence should be addressed to Cheryl A. Maurana, Medical College of Wisconsin, 8701 Watertown Plank Rd., Milwaukee, WI 53226; telephone: (414) 955-8075; e-mail: cmaurana@mcw.edu.

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially.

Acad Med. 2015;90:1318–1323.

First published online August 11, 2015
doi: 10.1097/ACM.0000000000000862

works—from U.S. medical schools that had three-year programs in the 1970s and 1980s, from two Canadian medical schools with more than four decades of experience with such programs, and from family medicine and internal medicine 3 + 3 programs, which allow medical students to accelerate their medical education by combining their fourth year of medical school with their first year of residency—suggests that students in three-year programs perform as well as their four-year counterparts at all stages of their careers.

U.S. medical school experiences in the 1970s–1980s

The traditional Flexnerian model of medical education has remained largely unchanged for more than a century, with students sequentially mastering two years of preclinical classes followed by two years of clinical clerkships.²² When Abraham Flexner recommended this model, medical school was the extent of most physicians' training—there was little availability of residency training programs. Today, however, becoming a physician is not a three- or four-year proposition but, rather, a 7- to 10-year journey with medical school comprising the first step.

In the United States, the four-year model was modified out of necessity during World War II, when physicians were trained in less than three years.^{23,24} The four-year model also was challenged in the 1970s when three-year curricula were created in response to a perceived physician shortage and were fueled by the availability of federal capitation funding through the Comprehensive Health Manpower Training Act of 1971 (Public Law 92-157). In 1973, nearly 25% of U.S. medical schools offered three-year programs,^{7,25} with enrollment in these programs peaking at about 2,600 students in 1973–1974.²⁴

These three-year programs waned rapidly, however, and eventually disappeared. Their demise was due to the discontinuation of capitation funding, declining concern about physician shortages, and broad-based faculty dissatisfaction with the pace and intensity of such programs.^{15,18,24} Students, however, generally were satisfied with their experiences.²⁵ It is noteworthy that, despite faculty concerns, most studies showed no significant differences in the

academic or clinical performances of the graduates of three-year and four-year programs.^{26–30}

More contemporary evidence suggests that students can master the medical school curriculum in three years. Several U.S. medical schools have successfully delivered a three-year core curriculum in four years, with the extra year devoted to research or other enrichment activities. At Duke University School of Medicine, for example, students focus on the basic sciences in the first year, complete their core clerkships in the second year, and devote the third and fourth years to electives and research.³¹ At the Perelman School of Medicine at the University of Pennsylvania, the fourth year includes 36 weeks of flexible time and scholarly training.³² Harvard Medical School's New Integrated Curriculum carves out nearly a year for advanced experiences in clinical medicine and basic science, a scholarly capstone project, electives, and a subinternship.³³ These programs reinforce the idea that the traditional core components of medical school can be delivered effectively in three years in the right setting to highly motivated and capable students.

Canadian medical school experiences

In Canada, the Michael G. DeGroote School of Medicine at McMaster University (McMaster) and the Cumming School of Medicine at the University of Calgary (Calgary) have experience with three-year curricula that spans more than four decades. The McMaster and Calgary three-year programs deliver their competency-based curricula focused on clinical experience and learning in context in 130 weeks and 131 weeks, respectively.

A comparison of medical school graduates of Calgary and the University of Alberta (which has a four-year curriculum) showed Calgary graduates' satisfaction levels to be comparable to or higher than those of Alberta graduates regarding their training, practice patterns, specialty choices, and maintenance of competence in clinical practice.³⁴ Additionally, Calgary graduates have been rated as superior or equivalent to graduates of four-year Canadian medical schools in various domains of competency, using data from the College of Physicians and Surgeons of Alberta's Physician Achievement Review program.^{35,36}

Neufeld and colleagues³⁷ reviewed the McMaster experience through 1989. They found that McMaster graduates were comparable to four-year graduates of U.S. and Canadian medical schools in terms of performance on standardized national examinations, preparation for and performance during residency, ability to obtain preferred first-year residencies, and percentage pursuing primary care. Interestingly, they also found that McMaster graduates were more likely to pursue academic careers compared with graduates of four-year medical schools. A survey of faculty attitudes at McMaster regarding the three-year curriculum demonstrated satisfaction.³⁸

Accelerated family medicine and internal medicine program experiences

In the 1980s and 1990s, approximately 25 U.S. medical schools offered accelerated family medicine programs that allowed students to begin residency training while finishing their fourth year of medical school. These 3 + 3 programs eventually were terminated because of unresolved graduate medical education (GME) accreditation issues. Studies^{39–43} showed performance of students in these programs to be comparable to that of students in traditional four-year curricula in terms of standardized tests, initial resident characteristics, performance outcomes, practice choices, patient visit profiles, resident demographics, and graduate surveys. Interestingly, family medicine 3 + 3 graduates were more likely than traditional graduates to be chosen as chief residents in many family medicine programs.^{40,42,43}

Several medical schools piloted accelerated internal medicine programs that incorporated the fourth year of medical school into internal medicine residency training. A study of such a curriculum at New York Medical College and St. Vincent's Catholic Medical Centers of New York compared six classes of residents who had completed internal medicine training from 1995 to 2000. Graduates of the accelerated program were comparable to graduates of the traditional program in terms of performance on in-service examinations and the Intern Clinical Evaluation Exercise, monthly attending evaluations, and board examination pass rates.⁴⁴ Similar results were obtained in a study of the University of Kentucky's accelerated internal medicine program.⁴⁵

Thus, accelerated family medicine and internal medicine programs have been shown to reduce training time without degradation of performance. Although not directly comparable, students in six-year baccalaureate–MD programs have been found to perform as well as traditional students on board examinations.⁴⁶

More recently, several institutions—University of California, San Francisco; University of Colorado Denver; University of Minnesota; and University of Utah—have begun to participate in the Education in Pediatrics Across the Continuum project. This pilot program is designed to combine undergraduate medical education and GME in pediatrics, through the use of competency-based progression and entrustable professional activities.⁴⁷

Emerging Three-Year Medical School Programs in the United States

A rich variety of three-year medical school curriculum models is emerging

in the United States (Figure 1). These models possess varying criteria for admission and advancement, and some require students' commitment to certain primary care residencies. All of them focus to some degree on competency-based assessment and advancement of students. We are aware of at least seven U.S. medical schools, in addition to our own, with three-year programs that have matriculated students recently or that are in the process of completing consultations and approvals with their respective institutional accrediting bodies:

- Lake Erie College of Osteopathic Medicine (LECOM) in 2007 initiated the Primary Care Scholars Pathway (PCSP), a three-year curriculum for students committing to family medicine. The PCSP admits 12 students annually.^{48,49} In 2011, LECOM began the Accelerated Physician Assistant Pathway (APAP), a customized three-year medical school track for practicing physician assistants. The APAP admits 12

students per year and accommodates applicants with a declared interest in primary care as well as those who are undecided about their residency plans.⁵⁰

- Columbia University College of Physicians and Surgeons in 2013 began a three-year Fast-Track MD program, which admits up to four students holding life science PhDs each year.⁵¹ This program has some similarities to a previous two-year medical school track for PhD scientists at the University of Miami in the 1970s and 1980s. A study of the Miami program's graduates 20 years later found that it was successful in producing physician–scientists.⁵²
- Mercer University School of Medicine in 2010 initiated the Accelerated Track in Family Medicine on its Savannah campus. Two students committing to family medicine are admitted to the three-year program annually, following an application process that occurs midway through the first year of medical school.⁵³

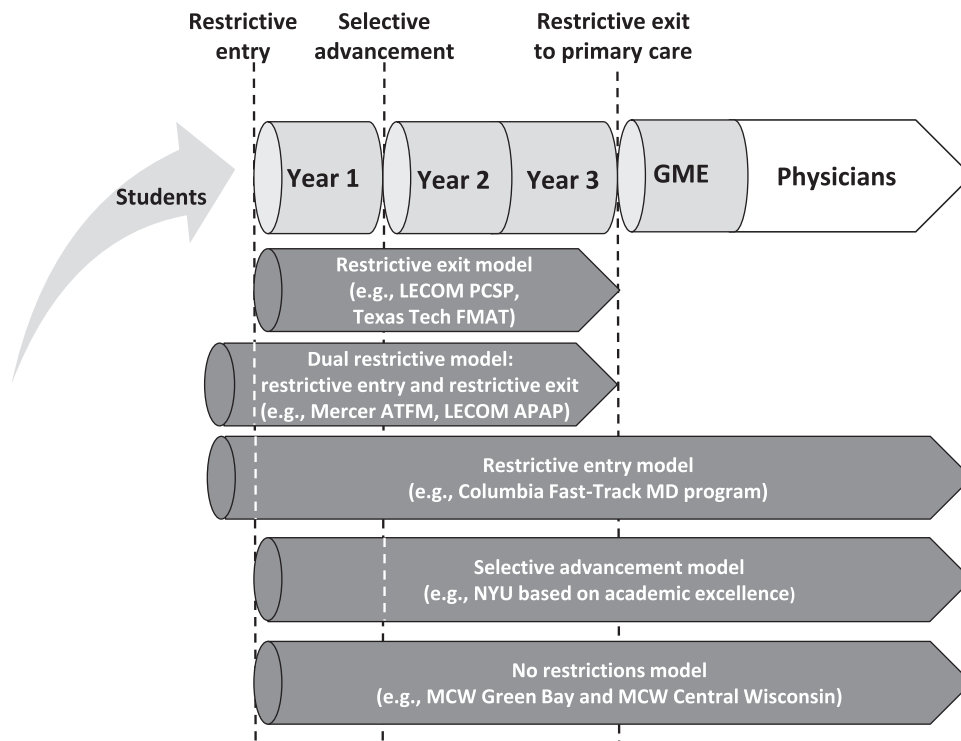


Figure 1 New three-year medical school curricula: five models. This figure highlights the variety of models for new three-year medical school tracks. One model has restrictive exit criteria, such as entering primary care residencies. A second model uses restrictive entry criteria (e.g., being a physician assistant, having a PhD in the life sciences, making a commitment to primary care, or being a state resident). A third model includes both entry and exit criteria. A fourth model employs selective advancement into a three-year track based on scholastic achievement in the first year of medical school. A fifth model has no entry or exit restrictions but may give preference to certain students (e.g., state residents, students from underserved communities). Abbreviations: GME indicates graduate medical education; LECOM, Lake Erie College of Osteopathic Medicine; PCSP, Primary Care Scholars Pathway; Texas Tech FMAT, Texas Tech University Health Sciences Center Family Medicine Accelerated Track; Mercer ATFM, Mercer University School of Medicine Accelerated Track in Family Medicine; APAP, Accelerated Physician Assistant Pathway; Columbia Fast-Track MD, Columbia University College of Physicians and Surgeons program for scientists with life science PhDs; NYU, New York University School of Medicine; MCW, Medical College of Wisconsin.

- Texas Tech University Health Sciences Center began its Family Medicine Accelerated Track (FMAT) in 2011. In the first two years, 24 students committing to family medicine matriculated in the program. Each student in the FMAT receives a first-year scholarship.⁵⁴
- The New York University (NYU) School of Medicine began a three-year track in 2013. Up to 10% of the matriculated class can choose a three-year option, but the transition into the track occurs after the first year. Students are chosen on the basis of their scholastic performance and desire to accelerate their education. In the first year the track was offered, 16 students pursued it. Although there are no restrictions on residency programs for three-year students, NYU makes a special effort to match students in the accelerated track with local residency programs that will allocate slots for them.^{55,56}
- The University of California Davis School of Medicine, in partnership with Kaiser Permanente Northern California, matriculated six students into a three-year Accelerated Competency-Based Education in Primary Care (ACE-PC) program in 2014. The ACE-PC program is funded by a grant from the American Medical Association.⁵⁷
- The Louisiana State University School of Medicine is planning a three-year program in partnership with the University of Louisiana–Lafayette.⁵⁸ Forty students per year will matriculate in the program beginning in 2015 or 2016. Students must be from Louisiana to be considered for this program.
- Our institution, the Medical College of Wisconsin, matriculated 26 students in 2015 to a three-year program at our new Green Bay regional campus, and plans for 20 to 25 more per class to a three-year program at our Central Wisconsin campus in 2016. Preference will be given to students from Wisconsin and underserved communities; otherwise, both entrance and residency opportunities will be nonrestrictive.

Some may ask whether circumstances have changed sufficiently to enable successful implementation of three-year medical education programs in the United States. We note that the programs

described above are small in scale and involve a limited number or niche group of students rather than the entire student body. Thus, these new programs should be studied carefully.

Potential Advantages of Three-Year Medical School Curricula

The potential advantages of three-year curricula, such as the new programs described above, include reduced education debt burden and more rapid entry into clinical practice, transitional pathways into medical school for those with appropriate experiences, and redirection of the fourth year of medical school to create opportunities for enriching medical education.

Reduced education debt burden and more rapid entry into clinical practice

It has been discussed widely that three-year programs could reduce lifetime student debt burden and provide an opportunity for an additional year of productive clinical practice. For the 2012–2013 academic year, the mean education debt for graduating medical students in the United States was over \$170,000.⁵⁹ A three-year program could thus reduce a student's debt burden by tens of thousands of dollars.

Some have questioned the value of the fourth year of medical school,⁶⁰ the structure of which has remained fairly similar across time and institutions and typically offers clinical and research electives, subinternships, research experiences, job interviews, and “recuperation” time. Many students forgo electives to “audition” for residencies during their fourth year. Certainly, these rotations have value, but do all students need the fourth year of medical school? It is possible that students and faculty do not assign sufficient value to opportunities available during the fourth year to make them essential for success. For some students, though, the fourth-year reprieve and interregnum between the first and second years are unnecessary. A three-year program would allow such students to enter clinical practice more rapidly.

Transitional pathways for nonphysician health care providers and scientists

Three-year curricula also could provide transitional pathways for nonphysician

health care providers to become physicians, as evidenced by the APAP at LECOM. If the APAP is successful, one could envision similar programs for advanced practice nurses, pharmacists, optometrists, and providers in other patient care disciplines. We acknowledge, however, that creating such pathways could slightly exacerbate shortages of other types of health care providers.

Similarly, three-year programs could provide pathways into medicine for scientists whose training and experiences overlap with the basic science component of the medical school curriculum. For example, as described above, Columbia's Fast-Track MD program allows individuals with PhDs in life science disciplines to complete medical school in three years.⁵¹

Creation of opportunities to enrich medical school education

Three-year medical school curricula are not simply accelerated pathways to primary care residency and practice. They also could provide opportunities for students to use the fourth year to obtain training relevant to their chosen careers, perhaps through master's degree programs. For example, a master of public health degree would provide opportunities for students who want to work at the interface of primary care and public health. Similarly, a master of science in clinical research degree could be useful for students who want to perform patient-oriented research. Other relevant master's degree programs include business administration, epidemiology, health care administration, and public policy.

A three-year track also could allow students pursuing lengthy specialty residencies to accelerate entry into their chosen specialty field.

Enhancing the Discussion

To enhance an evidence-based discussion, institutions introducing new three-year medical school curricula should collect and assess data. They should monitor and measure quality of student performance, content delivered, and processes in real time; gauge outcomes throughout the careers of their matriculants and graduates; and report the results of their work in a rigorous manner. We recognize

that longitudinal tracking of the careers of graduates poses significant challenges once they successfully complete licensing examinations. The Commonwealth of Pennsylvania, however, has developed a tracking system for graduates of its allopathic and osteopathic medical schools⁶¹; perhaps other states can emulate its approach.

Researchers should compare outcome measures—historical or simultaneous—of graduates of three-year programs with those of graduates of traditional four-year programs at the same institutions and across multiple institutions. We acknowledge that comparing student performance outcomes from various medical schools is challenging, as was highlighted recently by Albanese.⁶² Nevertheless, carefully constructed comparative studies of graduates of three- and four-year programs would be valuable. By using a combination of collection and evaluation of internal data and examination of external data sets, one could make a data-based case for or against the adoption of three-year curricula.

There are several key considerations that should be addressed to ensure success. Institutions with three-year curricula should choose their matriculants wisely and seek student input to optimize these programs. They should provide robust support systems for students and deal constructively with burnout. They should develop strong faculty support and faculty development programs to address faculty fatigue and to aid new community-based educators. They should create transition or deceleration pathways for students who are not able to complete the accelerated curriculum within three years. Finally, they should cultivate relationships with residency programs or create their own destination residency programs for students in their three-year curricula.

To enhance the discussion, those with concerns about three-year curricula should be respectful in expressing their skepticism and criticism. They should encourage measurement of outcomes, support productive dialogue with a broad range of stakeholders, and strive to avoid undermining the confidence and attitudes of students and stigmatizing graduates of three-year programs.

In Sum

Now is the time for an evidence-based discussion about the merits—and the challenges—of three-year medical school curricula. We believe the recent resurgence of interest in three-year curricula is warranted in light of the projected physician shortage and the need to alleviate the growing education debt burden that encumbers our medical school graduates. The debate about the merits of three-year curricula can be informed by evidence in the extant literature.

As described above, new three-year programs have begun in the United States and are taking a variety of approaches to selection, entry, advancement, and exit into GME. Clearly, as a three-year curriculum is not for all medical students, careful selection of matriculants is critical. Indeed, it may take a special type of student to successfully complete a three-year curriculum. It is possible that a higher level of focus and stamina could be required to deal with the grueling pace of mastering a medical curriculum in three years. Evaluation of three-year programs' operations and effectiveness—and publication of the results—will be essential.

Physicians' tendency to be lifelong learners should mitigate concerns about any perceived or real differences between graduates of three-year and four-year programs. Stetten²⁰ made this point eloquently 40 years ago (in what was an otherwise skeptical article on three-year medical school curricula) when he wrote, "The number of years which intervene between baccalaureate and doctoral degree is ... not important provided the product—the physician—is a continuing scholar in medicine." Both those with concerns and proponents should embrace an evidence-based discussion about three-year medical school curricula.

Acknowledgments: The authors wish to acknowledge the contributions of Sara Wilkins, executive communications and project manager, Jean Moreland, academic outreach program manager, Angie Nemanic, strategic outreach program associate, and Alicia Witten, academic outreach program manager, at the Medical College of Wisconsin in the preparation of the manuscript. All authors are founding members of the Medical College of Wisconsin Incitation Writing Team.

Funding/Support: Funding for this Perspective was provided by the Medical College of Wisconsin's Advancing a Healthier Wisconsin Endowment.

Other disclosures: None reported.

Ethical approval: Reported as not applicable.

J.R. Raymond Sr is professor of medicine, president, and chief executive officer, Medical College of Wisconsin, Milwaukee, Wisconsin.

J.E. Kerschner is professor of otolaryngology and communication sciences, dean of the medical school, and executive vice president, Medical College of Wisconsin, Milwaukee, Wisconsin.

W.J. Hueston is professor of family and community medicine and senior associate dean for academic affairs, Medical College of Wisconsin, Milwaukee, Wisconsin.

C.A. Maurana is professor of population health, vice president for academic outreach, and director, Advancing a Healthier Wisconsin Endowment, Medical College of Wisconsin, Milwaukee, Wisconsin.

References

- 1 Association of American Medical Colleges. Physician supply and demand through 2025: Key findings. <https://www.aamc.org/download/426260/data/physiciansupplyanddemandthrough2025keyfindings.pdf>. Accessed May 5, 2015.
- 2 Grover A, Niecko-Najjum LM. Building a health care workforce for the future: More physicians, professional reforms, and technological advances. *Health Aff (Millwood)*. 2013;32:1922–1927.
- 3 Abramson SB, Jacob D, Rosenfeld M, et al. A 3-year M.D.—accelerating careers, diminishing debt. *N Engl J Med*. 2013;369:1085–1087.
- 4 Emanuel EJ, Fuchs VR. Shortening medical training by 30%. *JAMA*. 2012;307:1143–1144.
- 5 Flegel KM, Hebert PC, MacDonald N. Is it time for another medical curriculum revolution? *CMAJ*. 2008;178:11, 13.
- 6 Goldfarb S, Morrison G. The 3-year medical school—change or shortchange? *N Engl J Med*. 2013;369:1087–1089.
- 7 Whitcomb ME. Who will study medicine in the future? *Acad Med*. 2006;81:205–206.
- 8 Chen PW. Should medical school last just three years? [blog post]. *NY Times*. October 24, 2013. http://well.blogs.nytimes.com/2013/10/24/should-medical-school-last-just-3-years/?_r=0. Accessed May 5, 2015.
- 9 Boodman SG. Medical school done faster. *Washington Post*. January 13, 2014. http://www.washingtonpost.com/national/health-science/medical-school-done-faster/2014/01/13/4b6d9e54-5c40-11e3-be07-006c776266ed_story.html. Accessed May 5, 2015.
- 10 Jaschik S. Will medical schools join 3-year degree trend? *USA Today*. March 25, 2010. http://usatoday30.usatoday.com/news/education/2010-03-25-medical-school-early_N.htm. Accessed May 5, 2015.
- 11 Hartman B. The 3 year medical school: Is shorter good enough? *The Gupta Guide*. *MedPage Today*. September 16, 2013. <http://www.medpagetoday.com/PublicHealthPolicy/MedicalEducation/41651>. Accessed May 6, 2015.
- 12 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;84:823–829.
- 13 Petersdorf RG. If I were dean. *J Am Board Fam Pract.* 1990;3(suppl):39S–48S.
 - 14 Shannon SC, Buser BR, Hahn MB, et al. A new pathway for medical education. *Health Aff (Millwood).* 2013;32:1899–1905.
 - 15 Beran RL, Kriner RE. A Study of Three-Year Curricula in U.S. Medical Schools. Washington, DC: Association of American Medical Colleges; August 1978.
 - 16 Crowley AE. Medical education in the United States in 1973–1974. Introduction. *JAMA.* 1975;231(suppl):1–2.
 - 17 Sparks RD, Haven GT, Klintberg I, Rigby PG. The three-year curriculum: Advantages and disadvantages. In: Purcell EF, ed. *Recent Trends in Medical Education.* New York, NY: Josiah Macy Jr. Foundation; 1976:94–110.
 - 18 Trzebiatowski GL, Peterson S. A study of faculty attitudes toward Ohio State's three-year medical program. *J Med Educ.* 1979;54:205–209.
 - 19 Liaison Committee on Medical Education. Functions and Structure of a Medical School: Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree. June 2013. <http://www.lcme.org/publications/functions.pdf>. Accessed May 5, 2015.
 - 20 Stetten D Jr. Projected changes in medical school curriculum. *Science.* 1971;174:1303–1306.
 - 21 Swanson AG. The three-year medical school curriculum. *J Med Educ.* 1972;47:67.
 - 22 Flexner A. Medical education, 1909–1924. *JAMA.* 1924;82:833–838.
 - 23 Harvard Medical School, Center for the History of Medicine. Harvard Medical School in World War II, 1944. 2009. <http://repository.countway.harvard.edu/xmlui/handle/10473/1784>. Accessed May 7, 2015.
 - 24 Berman BU. Three-year programs in medical and dental schools: An appraisal. *Public Health Rep.* 1979;94:85–87.
 - 25 Page RC, Boulger JG. An assessment of the three-year medical curriculum. *J Med Educ.* 1976;51:125–126.
 - 26 Beran RL. The rise and fall of three-year medical school programs. *J Med Educ.* 1979;54:248–249.
 - 27 Dinham SM, Barbee RA. Assessment of three-year versus four-year medical school graduates. *Eval Health Prof.* July 1978;1:25–34.
 - 28 Garrard J, Weber RG. Comparison of three- and four-year medical school graduates. *J Med Educ.* 1974;49:547–553.
 - 29 Hallock JA, Christensen JA, Denker MW, Hochberg CJ, Trudeau WL, Williams JW. A comparison of the clinical performance of students in three- and four-year curricula. *J Med Educ.* 1977;52:658–663.
 - 30 Hecker K, Violato C. How much do differences in medical schools influence student performance? A longitudinal study employing hierarchical linear modeling. *Teach Learn Med.* 2008;20:104–113.
 - 31 O'Connor Grochowski C, Halperin EC, Buckley EG. A curricular model for the training of physician scientists: The evolution of the Duke University School of Medicine curriculum. *Acad Med.* 2007;82:375–382.
 - 32 Perelman School of Medicine University of Pennsylvania. Office of Admissions and Financial Aid. 2015. <http://www.med.upenn.edu/admiss/curriculum4a.html>. Accessed May 6, 2015.
 - 33 Dienstag JL. Evolution of the New Pathway curriculum at Harvard Medical School: The new integrated curriculum. *Perspect Biol Med.* 2011;54:36–54.
 - 34 Lewkonja R, Baumber J, Gupta D, Walji A. A comparative study of medical curriculum outcomes: Opinions of graduates of a traditional curriculum and an innovative curriculum. In: Scherpier A, van der Vleuten CPM, Rethans JJ, van der Steegeds AFW, eds. *Advances in Medical Education.* Dordrecht, the Netherlands: Kluwer Academic Publishers; 1997:554–556.
 - 35 Lockyer J, Violato C, Wright B, Fidler H, Chan R. Long-term outcomes for surgeons from 3- and 4-year medical school curricula. *Can J Surg.* 2012;55:S163–S170.
 - 36 Lockyer JM, Violato C, Wright BJ, Fidler HM. An analysis of long-term outcomes of the impact of curriculum: A comparison of the three- and four-year medical school curricula. *Acad Med.* 2009;84:1342–1347.
 - 37 Neufeld VR, Woodward CA, MacLeod SM. The McMaster M.D. program: A case study of renewal in medical education. *Acad Med.* 1989;64:423–432.
 - 38 McAuley RG, Woodward CW. Faculty perceptions of the McMaster M.D. program. *J Med Educ.* 1984;59:842–843.
 - 39 Bratton RL, David AK. The University of Kentucky's accelerated family practice residency program. *Fam Med.* 1993;25:107–110.
 - 40 Delzell JE Jr, McCall J, Midtling JE, Rodney WM. The University of Tennessee's accelerated family medicine residency program 1992–2002: An 11-year report. *Fam Med.* 2005;37:178–183.
 - 41 Galazka SS, Zweig S, Young P. A progress report on accelerated residency programs in family practice. *Acad Med.* 1996;71:1253–1255.
 - 42 Petranj SM, Crespo R. The accelerated residency program: The Marshall University family practice 9-year experience. *Fam Med.* 2002;34:669–672.
 - 43 Ringdahl E, Kruse RL, Lindbloom EJ, Zweig SC. The University of Missouri integrated residency: Evaluating a 4-year curriculum. *Fam Med.* 2009;41:476–480.
 - 44 Chang LL, Grayson MS, Patrick PA, Sivak SL. Incorporating the fourth year of medical school into an internal medicine residency: Effect of an accelerated program on performance outcomes and career choice. *Teach Learn Med.* 2004;16:361–364.
 - 45 Thompson JS, Haist SA, DeSimone PA, Engelberg J, Rich EC. The accelerated internal medicine program at the University of Kentucky. *Ann Intern Med.* 1992;116(12 pt 2):1084–1087.
 - 46 Loftus LS, Willoughby TL, Connolly A. Evaluation of student performance in combined baccalaureate–MD degree programs. *Teach Learn Med.* 1997;9:248–253.
 - 47 Powell DE, Carraccio C, Aschenbrener CA. Pediatrics redesign project: A pilot implementing competency-based education across the continuum. *Acad Med.* 2011;86:e13.
 - 48 Bell HS, Ferretti SM, Ortoski RA. A three-year accelerated medical school curriculum designed to encourage and facilitate primary care careers. *Acad Med.* 2007;82:895–899.
 - 49 Raymond RM, Madden MM, Ferretti SM, Ferretti JM, Ortoski RA. Preliminary outcomes of the Lake Erie College of Osteopathic Medicine's 3-year primary care scholar pathway in osteopathic predoctoral education. *J Am Osteopath Assoc.* 2014;114:238–241.
 - 50 Kauffman M, Ferretti SM. The accelerated physician assistant pathway: A three-year medical school curriculum for physician assistants to obtain DO degrees. *Acad Med.* 2014;89:1645–1648.
 - 51 Columbia University Department of Medicine. College of Physicians and Surgeons 3-year PhD-to-MD program. http://www.columbiamedicine.org/education/3Y_PhD-MD.shtml. Accessed May 6, 2015.
 - 52 Koniaris LG, Cheung MC, Garrison G, Awad WM Jr, Zimmers TA. Perspective: PhD scientists completing medical school in two years: Looking at the Miami PhD-to-MD program alumni twenty years later. *Acad Med.* 2010;85:687–691.
 - 53 Thompson T. Senior associate dean of academic affairs, Mercer University School of Medicine. Personal communication with C. Maurana, April 29, 2014.
 - 54 Berk SL. Viewpoint: Encouraging student interest in family medicine: Texas Tech's family medicine accelerated track. *AAMC Reporter.* November 2011. <https://www.aamc.org/newsroom/reporter/november2011/266836/viewpoint.html>. Accessed May 6, 2015.
 - 55 Grady D. The drawn-out medical degree. *NY Times.* August 1, 2014. http://www.nytimes.com/2014/08/03/education/edlife/the-drawn-out-medical-degree.html?_r=0. Accessed June 17, 2015.
 - 56 NYU Langone Medical Center. NYU School of Medicine debuts three-year md program [press release]. December 26, 2012. <http://nyulangone.org/press-releases/nyu-school-medicine-debuts-three-year-md-program>. Accessed June 17, 2015.
 - 57 UC Davis Health System. AMA awards \$1 million to UC Davis–Kaiser Permanente partnership for innovative primary care training. June 14, 2013. <http://www.ucdmc.ucdavis.edu/publish/news/newsroom/7929>. Accessed May 6, 2015.
 - 58 McClugage S. Professor and head, Department of Cell Biology and Anatomy, School of Medicine, LSU Health New Orleans. Personal communication with C. Maurana, April 30, 2014.
 - 59 Association of American Medical Colleges. Table E4: Educational indebtedness of U.S. medical school graduates—student responses. In: *AAMC Data Book: Medical Schools and Teaching Hospitals by the Numbers (2014).* Washington, DC: Association of American Medical Colleges; 2014.
 - 60 Wolf SJ, Lockspeiser TM, Gong J, Guiton G. Students' perspectives on the fourth year of medical school: A mixed-methods analysis. *Acad Med.* 2014;89:602–607.
 - 61 Rabinowitz HK, Veloski JJ, Aber RC, et al. A statewide system to track medical students' careers: The Pennsylvania model. *Acad Med.* 1999;74(1 suppl):S112–S118.
 - 62 Albanese MA. Commentary: Measurement and interpretation challenges in comparing student performance outcomes from different medical schools. *Acad Med.* 2011;86:1073–1075.