

# Reframing Medical Education

---

**Herbert L. Fred, MD, MACP**  
**Jed D. Gonzalo, MD, MSc**

**H**ealthcare delivery in America today is fragmented, costly, and often regarded as impersonal and unsatisfactory.<sup>1-5</sup> In response, our medical schools are making far-reaching modifications in their curricula, aligning them with other health-providing systems to ameliorate these problems. The goal is to produce physicians who have the knowledge, attitudes, and skills to practice flexibly as members of interprofessional teams and to contribute effectively to the improvement of healthcare delivery.<sup>6</sup> This editorial focuses on these curricular modifications and the forces that drive them.

## A New “Pillar” of Medical Education

Since the Flexner report more than 100 years ago, most of our medical schools have educated students in the basic sciences first and then in the clinical sciences.<sup>7,8</sup> In the late 1990s, however, this format began to change. Spurred, in part, by the Institute of Medicine reports on medical errors and the need for better healthcare delivery, medical educators started paying more attention to systems-related competencies.<sup>9</sup> As a result, they developed a Systems-Based Practice competency domain and integrated it into the evaluations of graduate medical education. This action broadened the skills expected of students, residents, and faculties.<sup>10</sup> During the early 2000s, interprofessional education and collaboration, together with social determinants of health, increased in prominence and prompted many medical schools to modify their curricula in these areas.

Until 2012, these new competency areas remained limited in focus and scope within medical school curricula. They also lacked a formal curricular framework, leading medical schools to focus on different aspects of systems-based content. In 2013, Catherine Lucey, in a seminal challenge, called for a reexamination of medical education and for incorporating “systems sciences” into the medical curriculum.<sup>6</sup> After several other national calls for change, many schools altered the traditional framework by creating new courses and early clinical roles for students to learn about the healthcare delivery system in a more structured way.<sup>11-13</sup> The move established a third pillar of medical education: Health Systems Science (HSS), defined as the “principles, methods, and practice of improving quality, outcomes, and costs of healthcare delivery for patients and populations within systems of medical care.”<sup>13,14</sup> This pillar involved decades of work and provides the comprehensive educational framework for competencies in interprofessional collaboration, population health, clinical informatics, high-value care, and systems thinking.<sup>15</sup>

Physicians who will be working in these complex systems will need knowledge and abilities related to healthcare financing, population health, quality improvement, socio-ecological health, informatics, teamwork, leadership, and other requisites of optimal healthcare delivery.<sup>16,17</sup> These HSS competencies are highly interdisciplinary and distinct from traditional basic and clinical sciences. They require innovative and integrated pedagogic strategies coupled with a more informed view of our traditional educational framework. And they will help students understand and navigate the growing complexity of the healthcare system that they will soon enter as physicians. This transformation reframes the traditional 2-pillar relationship to an interdependent 3-pillar framework of basic, clinical, and health systems science.<sup>13</sup>

## Transformational Curricular Innovations

The aforementioned competencies are designed to transform the skills and the minds of future physicians. This new mindset becomes part of a physician’s identity—one

**From:** Dr. Fred is an Associate Editor of the Texas Heart Institute Journal. Dr. Gonzalo is from the Division of General Internal Medicine, Departments of Medicine and Public Health Sciences, Penn State College of Medicine, Hershey, Pennsylvania 17033

**E-mail:** hlf1929@yahoo.com

Reprints will not be available from the authors.

© 2018 by the Texas Heart® Institute, Houston

that encompasses the social determinants of individual and population health, views clinical informatics as advancing patient care, and sees health systems improvement as a crucial component of the clinician's role. It is a systems "citizenship" that expands the physician's professional role to include the obligation (not just the aspiration) to enter a synergistic relationship with the system and to consider one's role as a leader in HSS competencies and changes therein.<sup>18,19</sup> For these reasons, many believe that HSS must be integrated into the fabric of medical education as an equal partner with the other 2 traditional pillars.

### An Urgent Need

Physicians trained in HSS have been needed for years as part of the health system improvement process.<sup>20,21</sup> To satisfy this need, more and more medical schools are fulfilling their professional responsibility to lead this change.<sup>22</sup> Accordingly, students will learn HSS not only in classrooms, but even more by working with senior physicians who know and actively practice these competencies. This robust clinical learning environment will affect all educational activities for students.

### It's Not Easy

This educational transformation is both difficult and demanding.<sup>23</sup> Many medical schools are struggling to allocate requisite resources, find space in an already overly packed curriculum, and find educators trained in HSS.<sup>24</sup> Student engagement in these curricular areas will vary somewhat, because current board examinations and selection of residency applicants focus on traditional clinical knowledge and skills.<sup>25</sup> In addition, students currently entering clinical learning environments are not encountering the required breadth of role modeling of HSS principles necessary for their knowledge and ultimate skills.

### A Call to Action for All Physicians

Like it or not, HSS is here to stay. The transformation, however, cannot achieve the desired goals without physician educators who have a systems mindset and who can serve as effective role models. We see no satisfactory alternative.

### Coda

*Omnia mutantur, nos et mutamur in illis.*

(All things change, and we change with them.)

## References

1. Institute of Medicine (US). Committee on Quality of Health Care in America. Crossing the quality chasm: a new health system for the 21st century. Washington (DC): National Academy Press; 2001.
2. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 2008;27(3):759-69.
3. Berwick DM, Hackbarth AD. Eliminating waste in US health care. *JAMA* 2012;307(14):1513-6.
4. Fred HL. Cutting the cost of health care: the physician's role. *Tex Heart Inst J* 2016;43(1):4-6.
5. Fred HL. Dishonesty in medicine revisited. *Tex Heart Inst J* 2008;35(1):6-15.
6. Lucey CR. Medical education: part of the problem and part of the solution. *JAMA Intern Med* 2013;173(17):1639-43.
7. Flexner A. Medical education in the United States and Canada. From the Carnegie Foundation for the Advancement of Teaching, Bulletin Number Four, 1910. *Bull World Health Organ* 2002;80(7):594-602.
8. Cooke M, Irby DM, Sullivan W, Ludmerer KM. American medical education 100 years after the Flexner report. *N Engl J Med* 2006;355(13):1339-44.
9. Kohn LT, Corrigan J, Donaldson MS. To err is human: building a safer health system. Washington (DC): National Academy Press; 2000.
10. Guralnick S, Ludwig S, Englander R. Domain of competence: systems-based practice. *Acad Pediatr* 2014;14(2 Suppl):S70-9.
11. Gonzalo JD, Dekhtyar M, Hawkins RE, Wolpaw DR. How can medical students add value? Identifying roles, barriers, and strategies to advance the value of undergraduate medical education to patient care and the health system. *Acad Med* 2017;92(9):1294-301.
12. Gonzalo JD, Thompson BM, Haidet P, Mann K, Wolpaw DR. A constructive reframing of student roles and systems learning in medical education using a communities of practice lens. *Acad Med* 2017;92(12):1687-94.
13. Gonzalo JD, Haidet P, Papp KK, Wolpaw DR, Moser E, Wittenstein RD, Wolpaw T. Educating for the 21st-century health care system: an interdependent framework of basic, clinical, and systems sciences. *Acad Med* 2017;92(1):35-9.
14. Skochelak SE, Hawkins RE; AMA Education Consortium. Health systems science. 1st ed. Philadelphia: Elsevier; 2017.
15. Gonzalo JD, Dekhtyar M, Starr SR, Borkan J, Brunett P, Fancher T, et al. Health systems science curricula in undergraduate medical education: identifying and defining a potential curricular framework. *Acad Med* 2017;92(1):123-31.
16. Gonzalo JD, Ahluwalia A, Hamilton M, Wolf H, Wolpaw DR, Thompson BM. Aligning education with health care transformation: identifying a shared mental model of "new" faculty competencies for academic faculty. *Acad Med* 2018;93(2):256-64.
17. Lucas B. Getting the improvement habit. *BMJ Qual Saf* 2016;25(6):400-3.
18. Hafferty FW, Levinson D. Moving beyond nostalgia and motives: towards a complexity science view of medical professionalism. *Perspect Biol Med* 2008;51(4):599-615.
19. Brennan TA. Physicians' professional responsibility to improve the quality of care. *Acad Med* 2002;77(10):973-80.
20. Crosson FJ, Leu J, Roemer BM, Ross MN. Gaps in residency training should be addressed to better prepare doctors for a twenty-first-century delivery system. *Health Aff (Millwood)* 2011;30(11):2142-8.
21. Combes JR, Arespachaga E. Lifelong learning physician competency development. American Hospital Association Physician Leadership Forum. Available at: <http://www.aha-physicianforum.org/files/pdf/physician-competency-development.pdf> [2012 Jun; cited 2018 May 1].
22. Gonzalo JD, Haidet P, Wolpaw DR. Authentic clinical experiences and depth in systems: toward a 21st century curriculum. *Med Educ* 2014;48(2):104-5.
23. Gonzalo JD, Baxley E, Borkan J, Dekhtyar M, Hawkins R, Lawson L, et al. Priority areas and potential solutions for successful integration and sustainment of health systems sci-

- ence in undergraduate medical education. *Acad Med* 2017;92(1):63-9.
24. Gonzalo JD, Caverzagie KJ, Hawkins RE, Lawson L, Wolpaw DR, Chang A. Concerns and responses for integrating health systems science into medical education. *Acad Med* 2018;93(6):843-9.
  25. Gonzalo JD, Haidet P, Blatt B, Wolpaw DR. Exploring challenges in implementing a health systems science curriculum: a qualitative analysis of student perceptions. *Med Educ* 2016;50(5):523-31.