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Outcomes-Oriented Medical Training: A Critical Curricular Design Consideration in Developing 21st Century Health Care Professionals

Darrin D'Agostino, DO, MPH, MBA

Frank J. Papa, DO, PhD

From Community Health
(Dr D'Agostino) and
Curricular Design and Faculty
Development (Dr Papa)
at the University of North
Texas Health Science Center
Texas College of Osteopathic
Medicine in Fort Worth.

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Address correspondence to
Darrin D'Agostino, DO,
MPH, MBA,
University of North Texas
Health Science Center,
1000 Montgomery St,
Fort Worth, TX
76107-2625.

E-mail:
darrin.dagostino@unthsc.edu

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The core competencies of medical schools and residencies have initiated a change in curricular design but have been limited in their execution of systems-based practice. The introduction of milestones and entrustable professional activities has emerged to enhance the current educational paradigm. Linking public health systemic approaches with evidence-based practices focused on population-level health care will affect patients more than current non-systems-based approaches. Curricular redesign, including population health-based strategies, public health competency, health care policy, and education linking the “determinants of health” to patient care, will better prepare future physicians to practice in the emerging paradigm of health care of the future. Thus, the University of North Texas Health Science Center Texas College of Osteopathic Medicine has launched a 3-phase model that addresses the specific foundational needs required to instantiate fundamental systems-based concepts in faculty, undergraduate medical curricula, and clinical practice.

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A distinction exists between goal-oriented initiatives and outcomes-oriented initiatives. Goal-oriented initiatives represent the continuous pursuit of an overarching achievement and are often generated by health care professionals. In contrast, outcomes-oriented initiatives focus on the patient experience and represent narrowly focused objectives.

Medicine is in the early stages of articulating how outcomes-oriented initiatives can be used to concretely and reliably improve the health of individuals, communities, and populations.¹ In 2000, the Health and Medicine Division (HMD) of the National Academies of Sciences, Engineering, and Medicine (previously the Institute of Medicine) launched its *Quality Chasm* series.² This initiative continually identifies the “gaps between what is known to be good health care versus current practice norms”² so that today’s health care

professionals can improve areas of suboptimal health care outcomes.³

In the 2015 report *Improving Diagnosis in Health Care (Quality Chasm)*,⁴ the HMD emphasized that the frequency and severity of diagnostic errors represents an urgent health care system concern. More specifically, the HMD reported that diagnostic error will (1) occur at least once in the lifetime of every US resident, (2) affect 5% of all adults seeking outpatient care each year, (3) be associated with 10% of all deaths, (4) cause 6% to 17% of all adverse events in hospitals, and (5) lead to the majority of paid medical malpractice claims.⁴ Some researchers have suggested that diagnostic errors may be the third leading cause of death in the United States after cardiovascular disease and cancer, with estimates ranging from 250,000 to 400,000 premature and unnecessary deaths occurring annually.^{5,6}

A search for causes of diagnostic errors led the HMD to conclude that medical training programs and licensing boards are “not adequately preparing individuals to become skilled diagnosticians.”^{4(p7)} Thus, they recommended that diagnostic instruction and assessment at all levels of medical training (ie, undergraduate, residency, and continuing medical education) use evidence-based approaches from the learning sciences.^{4(p29)}

Presently, an apprenticeship model of clinical education exists in which education is linked to the varied beliefs and experiences of students’ health care mentors. This model is far removed from and inferior to a learning sciences-based approach, which uses learning theory to create declarative and task-specific experiences to help fortify learning and create consistent health care behaviors.⁷ Because students often observe patient encounters with clinical preceptors and in multiple settings where there is little, if any, monitoring of patient outcomes, concrete health care behaviors are inconsistently learned and can be potentially harmful.

Such concerns were core drivers in the formulation of competency initiatives by the Accreditation Council for Graduate Medical Education, the American Osteopathic

Association, and the National Board of Osteopathic Medical Examiners. These organizations all agree on a core set of 6 competencies (ie, patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice) as separate yet inter-related domains to be mastered by medical students and residents before graduation.⁸⁻¹⁰ In 2001, medical specialty colleges and residency programs developed specialty-specific outcomes or milestones in each of these broadly defined competency domains to be completed by 2008.^{11,12} These highly granular outcome markers define the specific knowledge, skills, and attitudes of greatest relevance and interest to each specialty college and their respective residency training programs.

The Association of American Medical Colleges and the American Association of Colleges of Osteopathic Medicine have also endorsed the philosophy of competencies- and outcomes-oriented approaches to instruction and assessment in undergraduate medical training and accordingly recommended the adoption of entrustable professional activities.^{13,14} If students can complete these activities before graduation, residency training programs would be able to more efficiently and effectively develop specialty and competency domain-specific milestones that graduates would have to meet before entering clinical practice. Undergraduate medical training programs have focused on 4 domains (ie, patient care, medical knowledge, interpersonal and communication skills, and professionalism) because practice- and systems-based competencies are difficult to concretely define, train, and assess.¹⁵ However, the latter 2 domains will likely play the primary role in defining 21st century health care.

If graduates are to lead in the implementation of future models of health care, undergraduate medical training programs must (1) integrate instruction and assessment in service to practice- and systems-based competencies within the curriculum and (2) create a clinical learning environment in which faculty can model practice- and systems-based competencies.

In the present article, we summarize a 3-phase model designed by the University of North Texas Health Science Center Texas College of Osteopathic Medicine (UNTHSC/TCOM). This model will prepare medical educators and students to develop an outcomes-oriented approach to practice- and systems-based competencies. We also discuss systems-based health care in the United States and abroad.

Developing Systems-Oriented Competencies in Undergraduate Medical Education

Best practices is often used interchangeably with *evidence-based practice* (EBP). However, critical distinctions exist between these 2 terms that are not always fully appreciated by practicing clinicians and medical educators. Evidence-based practice describes clinical activities that produce an optimal outcome in a specific area of patient care and provide evidence of the replicability of the specific outcome. Examples include a particular medication, regimen, or surgical intervention that has been objectively documented to decrease the frequency and severity of chest pain caused by cardiovascular diseases or the morbidity and mortality associated with coronary vascular disease. Cost-based EBP could include a particular regimen used to manage cardiovascular disease that is equivalent to other regimens in terms of morbidity and mortality while substantially reducing the cost of care. Best practices are often clinical activities representing medications, regimens, techniques, methods, or processes that are generally accepted on the basis of observations, experiences, and habits of experienced professionals, but they nonetheless lack the validation of a formalized, data-based evaluation process.¹⁶

UNTHSC/TCOM's 3-Phase Model

Curricular deliberations involving many practice- and systems-based competencies have been initiated at UNTHSC/TCOM. A 3-phase, logic-model-based

strategy was designed to address the specific foundational needs required to instantiate fundamental systems-based concepts in the school's faculty, undergraduate medical curriculum, and, ideally, clinical practice.

Phase 1

In January 2016, phase 1 was introduced. This phase involves a 2-semester course for approximately 40 faculty who are members of UNTHSC/TCOM's Academy of Medical Educators (AME). The AME, launched in 2010, provides faculty with training in learning sciences-derived models of mind, competence, outcomes, and education that should enable them to create a 21st century approach to medical education. The first semester of this faculty development program has largely consisted of population-oriented health care training (eg, recognizing and understanding barriers to health care), fundamentals of health promotion, and outcomes-oriented disease management techniques. The training also aimed to help faculty understand that wellness is not simply the absence of disease. The second semester course of phase 1 will take place in spring 2017 and will reinforce class content distributed throughout the year. One critical component of this phase 1 faculty development program involved the establishment of a working definition of population health using Frieden's Health Impact Pyramid.¹⁷

Phase 2

The second phase began in May 2016. The goal was to develop systems-based course content, generate learning sciences-based instruction and assessment methods, and train faculty on appropriate course objectives for the undergraduate medical curriculum. A unique element of this coursework is that a team of representatives from most areas of the osteopathic medical school's curriculum, as well as key faculty from UNTHSC's schools of public health and pharmacy and the physician assistant program, wrote objectives for the undergraduate medical curriculum. These key players serve 2 purposes: (1) to integrate the content and instructional and assessment objectives of

their respective fields of expertise and (2) to lay a foundation of interprofessional education that can be used in all of the health care training programs.

Phase 3

The institution is several years away from launching phase 3, which will aid in the development of systems-based practices in UNTHSC/TCOM's various clinics. Phase 3 will involve the application of the procedural knowledge developed in previous phases. In this phase, students will work in environments that will reinforce learned behaviors and skills. These skills and behaviors will influence the preceptors and mentors to look at and think about health care delivery in a different way. The next natural iteration of this phase will be to develop continuing education and programming to enhance the current physician pool as well as expand the learning opportunities for the medical students. Although the institution is anxious to implement the last of the 3-phase strategy, we recognize that systems-based practices in the United States are developing slowly, to our knowledge.

Systems-Based Health Care in the United States and Abroad

When coordinated systems-based care does not exist, varied and disjoint health care is delivered. Most of the guiding principles are based on the foundations of health rather than disease, which include the determinants of health. By not addressing the determinants of health, health care professionals expose patients to the development of disease. With approximately 174 schools or programs of public health,¹⁸ the United States arguably has the greatest opportunity to create a systems-based health care model that focuses on patient safety, quality health outcomes, and population health.

The United States' public health systems provide the tools and expertise that are geared to offer guidance on the delivery of health care to communities and populations. Medical schools, medical practices, and public health resources can partner together and organize

around the systems-based health care principles that are most likely to improve community- and population-specific health care outcomes. Examples include a greater appreciation of the core elements comprising the determinants of health, reduction of the burden of chronic diseases and conditions, greater attention to emotional and mental disorders, the impact of socioeconomic and environmental factors on health, the role of genetic predispositions in disease and health, and aberrant health behaviors.

Although systems-based, outcomes-oriented health care interventions are still in the formative stage in the United States, they have been successfully launched in many other countries. Japan, Switzerland, and Italy have been rated as the top 3 countries, with 11 high-impact outcomes categories (eg, infant mortality, disease-specific mortality, mental health).¹⁹ Systems-based metrics go beyond focusing on individuals and are rather used to demonstrate improved health, decreased mortality, improved quality of life, decreased adverse events, and decreased costs of care across a community, specific patient populations, and, subsequently, an entire society.

Conclusion

Current and future generations of medical educators must be trained in both EBP and evidence-based medical education. Such training will enable future physicians to develop skills in EBP and the enduring changes in behaviors that lead to improved patient care outcomes. Through a 3-phase model, UNTHSC/TCOM has introduced its faculty to systems-based health care concepts and has engaged in efforts to introduce systems-based health care concepts in the undergraduate medical curriculum. The institution recognizes the need for coordination across various professional schools and interprofessional training programs and provides an institutional commitment to the creation of clinics serving as a learning environment wherein faculty model systems-based health care and nurture students in this core competency.

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