

# Science of Health Care Delivery: An Innovation in Undergraduate Medical Education to Meet Society's Needs

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## Abstract

The purpose of this special article is to describe a new, 4-year Science of Health Care Delivery curriculum at Mayo Clinic School of Medicine, including curricular content and structure, methods for instruction, partnership with Arizona State University, and implementation challenges. This curriculum is intended to ensure that graduating medical students enter residency prepared to train and eventually practice within person-centered, community- and population-oriented, science-driven, collaborative care teams delivering high-value care. A Science of Health Care Delivery curriculum in undergraduate medical education is necessary to successfully prepare physicians so as to ensure the best clinical outcomes and patient experience of care, at the lowest cost.

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The Institute for Healthcare Improvement's "triple aim" is to ensure optimal health outcomes with the best experience of care at the lowest cost.<sup>1</sup> Despite tremendous changes in the US health care system, research advances are slow to enter clinical practice, many patients lack access to care, clinical outcomes are frequently suboptimal, care is fragmented, and the current system is financially unsustainable. In addition, the many incentives built into current care delivery systems often do not align with patients' best interests. Therefore, these systems must be redesigned at every level, and leaders must provide a compelling vision and enable the diverse health care workforce to implement solutions for the patients they serve. Teams must integrate and coordinate care, share knowledge, collaborate across teams and within communities, and rapidly adopt new care models.

Since the Flexner report<sup>2</sup> was published, US undergraduate medical students routinely have been educated in the basic (eg, anatomy, histology, physiology) and clinical (eg, history taking, physical examination, differential diagnosis) sciences. Although many schools have added content over the years (such as evidence-based medicine [EBM], population health, and cross-cultural communication), these curricular additions often have been made in a piecemeal fashion and have not matched the pace of change in health care. To help ensure that medical education meets the needs of society in the 21st century, students must learn the third science of health care delivery,<sup>3</sup> also referred to as health systems science (HSS),<sup>4</sup> as they learn the basic and clinical sciences.<sup>5</sup>

In 2013, Mayo Clinic School of Medicine (MCSM), in partnership with Arizona State University (ASU) and with support from the



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Kern Family Foundation and the American Medical Association's Accelerating Change in Medical Education initiative, began work on a new model for undergraduate medical education that includes a required, 4-year, integrated Science of Health Care Delivery (SHCD) curriculum.<sup>6</sup> The intent of this curriculum is to ensure that graduating medical students enter residency prepared to train and eventually practice within person-centered, community- and population-oriented, science-driven, collaborative care teams delivering high-value care. The purpose of the current article is to describe the curriculum, the experience with it and outcomes to date, as well as challenges for successful completion and sustainability of its implementation.

### CURRICULUM OVERVIEW

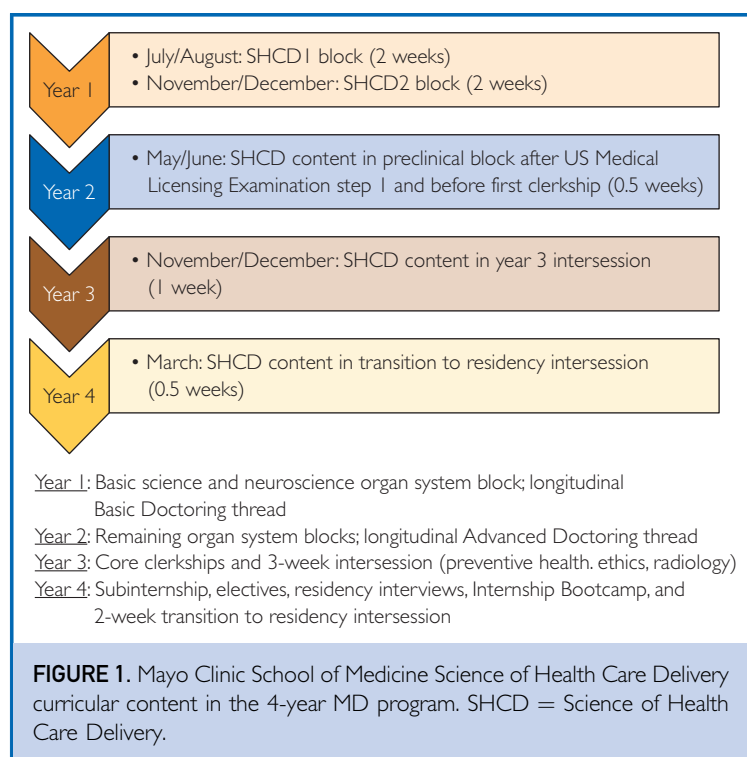
The SHCD curriculum is required for all MD students who matriculated in or after July 2015. Starting in 2017, this included full cohorts of students, on both of Mayo Clinic's 4-year campuses (Rochester, Minnesota, and Scottsdale, Arizona). The year 3 and year 4 portions of the curriculum have been designed but not yet fully implemented, as the first

cohort of students entered year 3 in July 2017. The curriculum is structured within 6 domains of knowledge: person-centered care; population-centered care; team-based care; high-value care; health care policy, economics, and technology; and leadership.<sup>6</sup> Leaders for SHCD were directed by their curricular deans to opportunities for enhancing time in the 4-year curricular schedule to ensure that the new curriculum did not negatively affect the time spent on basic and clinical science content.

Instruction during the first 2 years is primarily a blend of online and face-to-face activities, with 74 online modules providing knowledge and assessing understanding of key concepts before activities are undertaken in the classroom or simulation center. Interactive classroom experiences include informal simulation, case-based discussions and reflections, dialogue with subject matter experts, and panel and student presentations. Longitudinal curricular experiences (known as "threads"), with substantial preclinical and planned clinical activities (shared decision making [SDM], health coaching, and high-value, cost-conscious [HVCC]) care, help ensure that what is learned in the first 2 years will be successfully practiced and applied during the clinical years.

Figure 1 indicates the SHCD content in the 4-year curriculum. Roughly half of the curricular content is delivered in two 2-week blocks. Approximately 20 hours of content is delivered after step 1 of the US Medical Licensing Examination, as part of students' preclinical multispecialty block. Two weeks of instruction are planned for midway through year 3 and 1 week during March of year 4. All graduating students earn a Certificate in the Science of Health Care Delivery, and students who opt to complete additional credits can earn a Master of Science degree in the Science of Health Care Delivery from ASU as part of their 4-year undergraduate medical education program.

Once the SHCD curricular framework was created and consensus learning outcomes were written for each domain (Table), a curriculum team was selected to be responsible for curriculum development, implementation, student assessment, and ongoing improvements. Because this national school (with campuses



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