Describing the Journey and Lessons Learned Implementing a Competency-Based, Time-Variable Undergraduate Medical Education Curriculum

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Abstract

Oregon Health & Science University School of Medicine launched a completely new undergraduate medical education curriculum in 2014. This initiative dramatically transformed the MD degree program, changing the instructional content taught, the pedagogical methods used by the faculty, and the methods of assessment, and it added new elements such as academic coaching and programmatic entrustment to the program. One of the most exciting and impactful aspects to date of this curricular transformation has been the deliberate implementation of a competency-based framework that incorporates frequent assessment, tracking of student progression using an electronic portfolio, and academic coaching to optimize learning and customize curricular elements for each student. The next major step in this process—the implementation of time-variable progression—is currently ongoing as a planning group at the school works through the conceptual, logistical, legal, and regulatory issues related to implementing such a system. When implementation is complete, MD students will graduate only once they have earned entrustment for all 13 Core Entrustable Professional Activities for Entering Residency. This article describes the school’s progress to date in its curricular transformation and articulates lessons learned thus far in driving substantive and dramatic institutional changes that profoundly impact students, faculty, and administrators in one academic health center.

Introduction

OHSU did not start this journey in a vacuum. Indeed, most medical schools in the United States have considered, begun, or completed significant curricular changes. The reasons for these changes are myriad: the explosion of medical knowledge; the emergence of new disciplines and new educational methods; the focus on patient safety and quality improvement; decreased public funding for institutions of higher education; the entry of digital natives into the health professions; and the profound economic pressures borne by health care delivery systems and payers. In response, thought leaders across the country have called for fundamental changes in medical education to meet the evolving needs of society.1–3

Context and Local Environment

After a 2012 site visit by the Liaison Committee on Medical Education (LCME), our dean charged a team with transforming the UME program. Shortly thereafter, one of us (G.C.M.) was recruited into a new position as the senior associate dean for education, and both of us have served on the school’s Curriculum Transformation Steering Committee (CTSC). The CTSC spent six months exploring different models of medical education before coalescing on a set of guiding principles to direct the development of a transformed curriculum. These principles included the importance of being learner centered; the need to foster critical thinking, inquiry, and lifelong learning; the provision for opportunities to individualize learning; the integration of the basic, clinical, and health systems sciences; the promotion of active learning; and a commitment to competency-based education. Importantly, the goal of the new curriculum was to effectively prepare graduates for residency training and professional practice to best serve and meet the needs of society in the 21st century.

As these guiding principles were being socialized to a wide array of stakeholders, we became aware of the American Medical Association’s Accelerating Change in Medical Education initiative. We submitted an application and were awarded a $1 million grant that brought in external resources and linked us to a cadre of medical education innovators across the country. Most important, it validated our existing ideas. One year later, further momentum was achieved when we were selected by the Association of American Medical Colleges as 1 of 10 schools to participate in the Core Entrustable Professional Activities for Entering Residency (Core EPAs) pilot.

Although the CTSC would continue to meet for another year, one of us (T.N.B.), who had been recently appointed as the new associate dean for UME, turned
her attention toward implementation and convened a foundational phase development team that comprised scientists, clinicians, and educators. New course goals were created and then mapped to the six domains of competency championed by the Accreditation Council for Graduate Medical Education (ACGME). Meeting weekly for 10 months, the team also worked on organizing content into a series of seven integrated course blocks connected by longitudinal threads, created objectives at the level of individual sessions, and articulated the general framework of the foundational phase of the new curriculum.

As the foundational phase development team was finishing its work and prior to the launch of the new curriculum, a foundations operations team was selected. These individuals had responsibility for leading the new blocks and threads, identifying faculty for content delivery, and creating assessment instruments aligned with the framework set forth by the development team. A similar process was used for creating the new clinical experience phase of the curriculum (i.e., a development team focused on concepts followed by a different group that was responsible for implementation).

The new curriculum called YourMD, depicted in Figure 1, was successfully launched in August 2014. The first phase focuses on foundational basic, clinical, and health systems sciences and typically lasts 18 months. The second phase consists of core and elective clinical rotations; dedicated time for completion of a scholarly project; and intersessions, which are new, two-week courses that integrate basic, clinical, and health systems science content related to four important topics facing society. Flexibility is paramount, and students can explore electives at any time during either phase of the curriculum.

Every student is assigned a coach for the entire program. Together, the student and coach create an individualized learning plan, a key element of our future vision of time-variable progression. This learning plan effectively customizes each student’s experience in the curriculum, allowing her to set and meet her goals, and optimizes self-assessment skills and academic performance. The students and coaches have full access to our OHSU electronic platform called the Research in Evaluation Data for Educational Improvement portfolio that allows visualization and tracking of each student’s academic progress, including all the data associated with assessment.

Once the new curriculum is fully implemented, students will be required to demonstrate that they have achieved a documented level of competence (i.e., a specified milestone), across 43 distinct competencies. This is analogous to demonstrating their ability to perform...
at level 1 milestones as described by the ACGME. In addition, students will be required to earn digital badges, depicted in Figure 2, signifying that the school has made a summative determination of entrustment for all 13 Core EPAs described by Englander and colleagues.

The first cohort to enter YourMD in the fall of 2014 is set to graduate in 2018, as the model is not yet time variable. While the new courses in each phase, competency links, and other program requirements, such as passing national licensure examinations, were in place throughout their medical education, the full framework for graduating only once all competencies and EPA badges have been earned was not. Indeed, their overall progress, both in terms of time to and ease of achieving the intended outcomes, has helped us better understand this process and make ongoing innovative curricular changes in real time. Because of this, we have not held the students in this cohort to our eventual milestone and EPA thresholds to graduate. We anticipate full implementation of the milestone and EPA badges as graduation requirements in two to three more years once we have additional student performance and competency data to support these high-stakes decisions.

What Helped Foster Change?

LCME site visit results, national events, and initiatives

First, the LCME shared its accreditation findings in 2012, creating a sense of urgency given the numerous elements that were noncompliant or needed monitoring. The results “softened the ground” and sent a very strong message that there was much room for improvement. Second, the American Medical Association award and selection to participate in the Association of American Medical Colleges’ Core EPA pilot validated our ideas, granted us permission to innovate, secured external resources, and provided an opportunity to network with innovators across the country. Additionally, the rollout of the ACGME’s Next Accreditation System helped because it embraced milestones and competencies as cornerstones of how learners must be tracked over time. Because competency-based systems rely on workplace-based assessment, the ACGME’s emphasis on the clinical learning environment highlighted for us the importance of aligning our efforts

Figure 2 Digital badges, corresponding to the 13 Core Entrustable Professional Activities for Entering Residency, that students must earn after summative decisions are made by the Entrustment Group at Oregon Health & Science University School of Medicine.
with the needs of our own health care delivery system.

Supportive stakeholders
Change could not have occurred without the support and buy-in from institutional leaders (e.g., our provost and dean). Indeed, our dean had directly fostered the curriculum change process by charging the CTSC, pushing for rapid deployment of the changes envisioned, recruiting change agents, securing internal resources, and fostering a culture that embraced the guiding principle that the school existed to serve society.

Another set of key stakeholders was a group of junior faculty who were “waiting in the wings,” eager for opportunities to participate in curricular transformation. Whereas faculty who had held leadership roles in the previous curriculum were sometimes hostile to the ideas being brought forth, many junior faculty members supported the changes. A final group of stakeholders were prospective students who were enthusiastic about completing the new curriculum.

Available resources
We were fortunate to have both internal and external sources of funding. The internal funds were secured by positioning the curriculum transformation as a capital project. Similar to a building project, the new curriculum was framed as a strategic investment that required funding separate from the operational budget needed to run the previous curriculum.

Other available resources included individuals at OHSU with specific education skill sets, such as curricular mapping and instructional design, and vocal faculty champions. Finally, we were fortunate to have new learning spaces that opened just as the new curriculum launched, including a new collaborative life science education building with flexible learning spaces, state-of-the-art technology, and brand new simulation suites.

Effective change management
We deliberately chose the Kotter model, an eight-step process for successful organizational change, to help drive our initiative.6 For example, a burning platform was regularly used by the dean. Similarly, small victories were celebrated so that momentum could be maintained. Throughout the journey, stakeholder engagement was used to socialize ideas and obtain buy-in. One example involved faculty and student teams that worked together on specific issues (e.g., technology in the classroom). Other examples included a schoolwide kickoff retreat, surveys to elicit broad input into planning, communication with alumni, road trips to communities across the state, and discussions with faculty and health system leaders. A deliberate campaign using multiple communication modalities was used to reinforce important messages and garner support.

Key opinion leaders external to OHSU were invited to showcase their schools’ transformations. Similarly, we visited other medical schools and participated in national forums related to curricular change. Perhaps our most effective change methods were also our riskiest ones: deliberately embracing the uncertainty associated with launching the curricular changes without having all the details articulated, and maintaining a rapid pace of change. The combination of an unwavering commitment to change and the speed of deployment made effective resistance difficult to muster.

What Hindered Change?
In contrast to the forces that helped foster change, several formidable factors hindered our progress. Regulatory barriers included the LCME’s Element 6.8, mandating that “a medical education program include at least 130 weeks of instruction.”7 Thus, any accredited medical school interested in instituting time-variable curricula is constrained by this minimum time-to-degree. Similarly, the National Resident Matching Program has an “all-in policy” that requires that residency programs registering for the Match must attempt to fill all positions through the Match.8 Both policies are barriers to time-variable and off-cycle graduation.

Another factor was resistance from a cadre of well-respected faculty members who opposed many of the proposed changes. Some concerns raised by these individuals were deeply felt and brought forth with good intentions. Other concerns, we believe, were based on a fear of losing power, control, and resources at both the individual and department levels. Particularly troublesome were key opinion leaders of entrenched departments, who were powerful individuals who fought to preserve the status quo. This issue has been aptly described as the challenge of “curricular ossification.”9 Some scientist–faculty members were shocked by the loss of “time on stage,” the perception that their subject matter had lost importance, and the sense that their expertise was less valued. Some individuals openly critiqued the changes by stating that we were bound to produce subpar physicians because our new curriculum was “science light.”

Graduate medical education (GME) program directors also raised concerns. They did not want OHSU to change to a “pass/no pass” grading system for clerkships. Skeptical about the use of untested competency-based assessments, they voiced concerns that they would increasingly have to rely on students’ United States Medical Licensing Examination Step 1 scores as a proxy for competence and excellence when ranking applicants.

In contrast, students mostly supported the changes envisioned, with the exception of members of the Class of 2017, who occasionally expressed a sense of being neglected because our attention was focused on implementing the new curriculum, of which they were not part. Interestingly, students in the new curriculum have a different concern—they want to be heard and have their feedback taken seriously to affect change and make further improvements. As such, multiple new feedback systems are now in place, such as town halls, surveys, and meetings with student leaders, to gather this input.

Finance officers at OHSU also raised some objections because of the costs associated with implementing and operating a competency-based system. Faculty development, computer systems, new facilities, and “buying protected time” for a larger number of educational leaders requires significant and sustained use of resources that would otherwise be spent on other initiatives. Lastly, nearly everyone was concerned about change fatigue and the faculty time and effort needed to implement the new curriculum in a successful manner.

Our Progress to Date
Despite these barriers, the factors supporting change outweighed the factors favoring the status quo. Resistance
has waned since the new curriculum was launched, and much progress has occurred, primarily in implementing a competency-based model while continuing to work toward a time-variable framework.

Most important, we conceptualized and were able to articulate an end product for the UME curriculum—residency-ready learners who will better serve society. The guiding principles were approved without controversy. Forty-three new competencies organized under six domains were approved, and now all courses have linked competencies according to which students are taught and assessed. Behavioral descriptors (i.e., milestones) for each competency are being used to assess whether a student has performed at the level expected of a day 1 resident. OHSU has also adopted the 13 Core EPAs as the eventual pathway for graduation. Assessments are housed in a central place, the dean’s office, allowing standardization.

In the foundational phase of the curriculum, we have built in real-time remediation options for students who initially do not meet the passing threshold for a block. If a student passes her customized remediation assessment, which is individualized to her areas of deficiency, she passes the course and continues with her cohort. Final grades for this phase are now pass/no pass.

We are still working to solidify our approach to competency assessment for clinical clerkships. As such, clerkship students currently are graded using both a traditional method including a final, global-tiered grade (i.e., A, B, C, D, F) and also a pass/not-yet-passed, competency-based assessment for each linked competency. This competency-based assessment relies on observations of behaviors associated with one of three milestone levels. Each clerkship has a minimum of four competencies that the clerkship director chose because they can be taught and assessed during that rotation. The program has also designated a required number of level 3 milestone judgments needed for each competency over the student’s entire education.

Students in the YourMD program are able to view their performance within a single clerkship as well as their progression to date in accumulating a specified number of level 3 milestone judgments across each of our 43 required competencies. An example dashboard showing a student’s progress in 1 competency domain (i.e., patient care and procedural skills) is shown in Supplemental Digital Appendix 1 available at http://links.lww.com/ACADMED/A515.

Further, summative entrustment decisions will now be made by the recently formed Entrustment Group (EG) using a model that is comparable to the clinical competency committees in GME. The EG reviews data obtained from multiple assessment tools, including data from ad hoc entrustment judgments regarding a single EPA in authentic clinical settings. A depiction of the different data sources that the EG considers is shown in Figure 3.

Other successes have been the creation of the Research in Evaluation Data for Educational Improvement electronic portfolio that houses assessment data for each student and the training of academic coaches who have protected time to meet individually with students. The digital badges in Figure 2 will soon be used to display whether and when a summative entrustment decision has occurred for each of the 13 Core EPAs. Lastly, to optimize learning in GME, we are working on an educational handoff to the students’ residency program directors, which will be crucial to better assist these program directors as they receive our graduates into their training programs.

Next Steps: Time Variability

Still in the early implementation phase, OHSU has seen less progress in establishing a time-variable curriculum. This is partly a result of curricular design. Our threads and integrated organ system approach for blocks in the foundational phase of the curriculum have integrated

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**Figure 3** Examples of the different data sources used by the Entrustment Group at Oregon Health & Science University (OHSU) School of Medicine to make summative decisions about students for each of the 13 Core Entrustable Professional Activities (EPAs) for Entering Residency. Abbreviation: AAMC indicates Association of American Medical Colleges.
content from many fields. An unforeseen complication of that design is that an entire domain of competence, such as medical knowledge, is difficult to unpack into discreet components to allow acceleration or deceleration through the curriculum. Thus, the decision to deliberately integrate many disciplines into a single course has made acceleration through this early phase difficult unless one can bypass the entire foundational phase of the curriculum. In the coming years, our plans for time variability will focus more on individualizing workplace learning in authentic clinical settings.

In another step toward time variability, we have engaged more than 60 faculty, staff, and learners in the planning and design of a new Program to Accelerate Competency-based Education (PACE). Anticipated to launch with approximately 16 students in the entering class of 2019, PACE will allow highly accomplished students selected into the program to start an OHSU residency program in a variety of disciplines outside of the Match. Because OHSU’s academic calendar is based on quarters, students can earn their MD degree and graduate following any of the spring, summer, fall, or winter terms. Therefore, we envision that PACE will allow off-cycle entry into OHSU residency programs immediately following graduation at the completion of any of the four academic terms. The group working through the conceptual, logistical, legal, and regulatory issues involved with PACE is in the process of addressing approximately 80 questions that have been identified regarding the implementation of such a program. A schematic showing when each decision related to PACE is anticipated to occur is depicted in Figure 4. Importantly, the PACE program will require an exemption from the National Resident Matching Program to comply with their “all-in policy.” Finally, once the time-variable aspects of YourMD are fully implemented, some students may take more, or less, time to meet graduation requirements regardless of whether they are in PACE or not.

We acknowledge that there are financial issues associated with a time-variable program, but we consider these to be an opportunity and not an insurmountable challenge. Specifically, we have made a commitment to reduce indebtedness whenever possible. As such, any of our students who graduate early will be charged less tuition compared with their peers who take the traditional four years (or longer) to earn their degree because tuition and fees are charged each term a student is enrolled.

**Lessons Learned**

We began this journey of curriculum transformation for the OHSU School of Medicine MD program because we believe that a competency-based, time-variable framework strongly supports the goal of creating better-prepared residents and physicians. Along the way, we have identified several lessons that may be helpful to others who are considering the implementation of such a curriculum:

- **Start with the end in mind.** This fostered a sense of pragmatism and allowed us to take an innovation approach to change.
- **Paraphrasing the words of Voltaire, “Do not let the perfect be the enemy of the good.”** Components were implemented as soon as they were developed, which helped us overcome resistance and sustain forward momentum.
- **Maintain an unwavering commitment to the stated principles.** This served as a constant reminder of why we had embarked on this journey.
- **Know when to compromise.** This allowed us to recognize the value of receiving input from stakeholders, encouraged continued engagement, and demonstrated our receptivity to a wide range of ideas.
- **Perseverance and grit are essential.** Anyone embarking on such a journey should expect good days and bad days because changes of this magnitude do not come easily.
- **Tolerate risk.** This allowed implementation to occur rapidly and diminished the likelihood of getting bogged down in details that would hinder progress.

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**Figure 4** Anticipated structure and timeline for the new Program to Accelerate Competency-based Education (PACE) at Oregon Health & Science University (OHSU) School of Medicine. PACE allows selected students to progress through the undergraduate medical education curriculum at their own pace, graduate, and enter an OHSU graduate medical education (GME) program following competency attainment as well as earning entrustment in all 13 Core Entrustable Professional Activities for Entering Residency.
• Expect resistance. This helped to keep focus and minimize distractions. Understanding Rogers’s diffusion of innovation helped us weather many storms during implementation.

• Choose leaders wisely. The importance of identifying and selecting people who will transform the vision into reality cannot be overstated; managing those who persistently oppose the innovation takes time and deliberate effort.

• Effective communication through a variety of channels is critical to success. Meeting frequently with the school’s communication staff allowed sharing of ideas, dissemination of information, and mechanisms for soliciting ongoing feedback.

• Encourage innovation in a protected and unfettered environment. Engaging teams separate from their operational duties helps reduce the chance that day-to-day issues will overwhelm creative problem solving.

• Know how things get done at your institution. In-depth knowledge of governance structures, policies, and procedures was critical to success; careful attention to how change occurs within the institution is just as, if not more, important as focusing on what needs to change.

Finally, our greatest lesson is that, despite the efforts involved in change management, we were able to achieve a major curricular transformation. While the journey is ongoing and we continue to innovate, especially with respect to realizing a true time-variable curriculum, we have confidence that this initiative will result in a better experience for students, facilitate their progression through the continuum of medical education, and ultimately produce better physicians for society.

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