First-year students work together in small groups during their Foundations of Medical Science and Practice course. (photo by Kata Sasvari)

David Mullins, PhD, teaching the first-year course, Infection, Inflammation, and Immunity, in the redesigned Chilcott Lab classroom. (photo by Lars Blackmore)
GEISEL LAUNCHES A NEW CURRICULUM

by Susan Green

DARTMOUTH COLLEGE'S OUTSTANDING LIBERAL ARTS CURRICULUM teaches students to be critical thinkers and equips them with an array of skills for lifelong learning in lieu of becoming adept at memorizing and reiterating facts. Yet medical school curriculums have long focused on the latter—memorizing facts during preclinical years rather than creating an environment conducive for problem solving and critical thinking before sending doctors-in-training off to clinical rotations.

Nationally, medical education is shifting from teacher-centered to learner-centered—a shift that Geisel began several years ago. Providing an educational experience that differs from most medical schools, Geisel students consistently score very well on the U.S. Medical Licensing Exam Step 1 and are recognized as being exceptionally well prepared for residency. Additionally, the sense of community at Geisel is unique—the small class size and collegial atmosphere allows faculty and students to get to know each other individually, beyond classroom pedagogy, which helps facilitate what can be a very stressful experience.

Out of this climate of national change and Geisel’s unparalleled culture emerged a new approach to medical education at Dartmouth. Taking a cue from the liberal arts, Geisel developed an innovative curriculum that launched this fall for matriculating medical students—an organ-based integrated curriculum designed to help them assimilate facts and data into concepts and ideas along with new programming to help medical students with professional development.

“We've taken a very good curriculum and maintained its effectiveness while making it more flexible within the national climate of medical education. We also wanted to create more opportunities for electives and sub-internships for students during the summer and spring of their third- to fourth-year transition before they apply for residency,” says Adam Weinstein, MD, chair of Geisel's Medical Education Committee (MEC), which oversees curricular changes. “The residency application timeline is now earlier, making the process tight for our students who want to explore a career that isn't part of a core clerkship.”

The new preclinical 18-month program allows for earlier clinical exposure. That’s a significant change to the academic timeline. “It is a misconception to think this is reducing what students are learning—it’s about eliminating redundancies and making learning more efficient,” says Virginia Lyons, PhD, associate dean for preclinical education and associate professor of medical education. In large part, the content remains the same, what’s changed is the manner and sequence in which the material is delivered. This does not negate the necessity of having to memorize facts, rather it puts the facts into context—strengthening medical students' problem solving and critical thinking skills early on, which improves their ability to learn.

“Courses now go in a sequence, with complementary systems being taught at the same time—for example, cardiology and respiratory, creating purposeful crossover between courses that clinically go hand in hand,” says David Mullins, PhD, associate dean for basic science integration and associate professor of medical education and of microbiology and immunology.

To illustrate his point, Mullins relays an anecdote: “A few students told me when I introduced Staphylococcus aureus in class, and then they learned in the anatomy course about a patient with a cavernous sinus thrombosis triggered by a staph infection, they thought, ‘You and Dr. Lyons set that...”
up nicely!’ The integration wasn’t intentional, but they learned about something at a basic science level and then saw how it applied clinically—learning about those microbes was relevant. Students do need to memorize primary data, but we are now intentionally teaching them to think about applying that data in a clinical setting, which happens best when we integrate teaching across courses.”

**INTEGRATION**

Mullins is responsible for promoting and assessing integration of basic, clinical, and social sciences over all four years of the curriculum. Integration is about demonstrating the relevance of basic science and social factors in medicine by connecting them to clinical problems. The new curriculum will incorporate basic sciences into the clinical years in a more intentional way, thereby reinforcing the science behind diseases students are studying. The reverse is also true—the preclinical phase includes clinical correlates and health issues—something many faculty were already doing in their courses. For example, earlier this year during the widely reported measles outbreak, Mullins spent class time on the issue because it was an important public health topic.

“You can use whatever is in the day’s news to make a topic relevant to students,” he says, offering another anecdote. “When I introduced leptospirosis, students were asking me why they had to learn it. I explained that someone from Hanover rescued a few stranded dogs after the hurricane in Puerto Rico, brought them home, then took them to an outdoor restaurant where the dogs peed on the patio, which resulted in three cases of leptospirosis in Hanover—the dogs urine contained Leptospira.

“That instantly morphed into a class session—students said they now realize the need to know about that because they don’t know what the world will be like in a few years or where they’ll be.” Patients & Populations, an existing healthcare delivery course, is one of the courses that has been restructured to include urgent real-time health topics. Both Lyons and Mullins believe this style of teaching brings a sense of relevance to what is being taught, making it dynamic and memorable.

The preclinical program also introduces a variety of longitudinal topics that will be integrated across all four years—ranging from clinical subjects such as radiology and nutrition, to societal issues such as race, health equity, and substance use. Many of these topics were discussed previously, though in the new curriculum they will be more seamlessly integrated and coordinated with science content.

But not everything has changed. Successful and specific elements of the curriculum have been retained. “During curricular reform, many medical schools eliminated the open summer, but it is something we value that we intentionally preserved,” says Lyons, “This gives students an opportunity to do whatever they want to engage in a structured process through assignments, conversations, and other exercises to help them think deliberately about their career development—they learn through reflection, exploratory activities, and working toward individual goals.”
do—pursue research, spend time with family, travel, or gain clinical experience locally or abroad.”

The same is true for service learning, which is not a formal part of the curriculum, but most students participate in extracurricular activities or service learning during the preclinical phase. Weinstein says the MEC kept that in mind while creating a curriculum that encourages rather than inhibits student participation. “Students go out into the community to assist with care to underserved populations in free clinics—some are student-led with faculty supervision—where they provide a service to the community while learning and practicing their skills.”

Beyond synchronizing course content, the dominate forms of pedagogy in the new program emphasize collaboration, teamwork, and problem-solving. “Our teaching is interactive in both small and large groups, and the newly designed Chilcott classroom (formerly Chilcott lab) encourages group discussions of problems and cases—students work together to help each other learn,” says Lyons who is responsible for the anatomy and embryology content in the medical curriculum. “The preclinical curriculum is a pass-fail system, which fosters a climate of collaboration among students—medicine is practiced by teams working together and medical school is the best place to introduce that,” she says. This lack of competition for grades also leads to peer teaching, which, faculty say, is extraordinarily powerful.

Also new this academic year, as part of Geisel’s work with the Kern National Network on Caring and Character in Medical Education, is a longitudinal coaching program. This program connects all incoming medical students with a faculty coach for the duration of their studies at Geisel. “The idea is to have them engage in a structured process through assignments, conversations, and other exercises to help them think deliberately about their career development—they learn through reflection, exploratory activities, and working toward individual goals,” says Kimberly Gifford, MD, coaching program director and an assistant professor of pediatrics. “These are things that Geisel students have not previously been asked to do.”

Enculturation into medicine is another aspect of the coaching program. “There are different social expectations in practicing medicine, and sometimes when you get it wrong, you don’t know why,” Gifford explains. “Our goal is to help students, especially those who have less experience with medical culture, understand that culture in order to function better within it.”

Enabling students to build close rapport, maintain consistent academic and professional support, reflect on their experiences, and engage in small group and individual coaching sessions contributes to the development of their professional identity.

To evaluate whether or not these changes are successful, an assessment plan has been built into the curriculum as part of the teaching process. Faculty provide continuous feedback to students leaving no mystery as to where they are doing well, need improvement, or have failed, via a detailed weekly report. Fluid assessment allows problems to be identified before it’s too late for them to adjust study methods or to seek help.

CAPSTONE

Two new courses are in place to mark transitions: a self-directed integration course that ends the preclinical curriculum and a fourth-year capstone course to pragmatically prepare medical students for residency.

As the co-director for the pediatrics clerkship and the On Doctoring course—Geisel’s introduction to clinical skills—Weinstein, who also participates in foundational science courses, is leading the case-based integration course.

“I’m excited to be able to bridge how science applies to clinical cases. My vision is one that integrates all of the different scientific fields together with evidence-based medicine, pathophysiology, clinical reasoning, learning technologies, health equity, medical ethics, communication skills, and social sciences that are essential to medical education—things trainees are going to experience, learn, and manage in the clinical phase of their education,” he says.

“Cases will be chosen together with pre-clinical course directors and clinical clerkship directors to make sure we include those core, vital, common, and essential situations that they’ll be participating in during their third- and fourth-year clinical rotations while reinforcing and integrating the foundational sciences.

“We are hoping this will be fun and engaging.”

Kata Sasvari

Kimberly Gifford, MD, introduces students to the new coaching program.