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Study identifies key barriers to innovation among medical trainees

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Fresh ideas in medicine drive the creation of new therapies and tools that improve patient care, but medical trainees face significant barriers to innovation, according to a new survey conducted by researchers at

Massachusetts General Hospital (MGH). The results of the survey, published in *Nature Biotechnology*, reveal that most medical students, residents and fellows do not see themselves as innovators, but eliminating certain barriers and teaching the fundamentals of innovation could allow more trainees to bring novel ideas to the bedside, says MGH emergency radiologist Marc Succi, MD, the senior author of the paper.

Succi is executive director of the Medically Engineered Solutions in Healthcare (MESH) Incubator, an in-house innovation and entrepreneurship center at Mass General Brigham (MGB) and Harvard Medical School—the first of its kind integrated within a hospital system. "Ever since we started MESH in 2016, my goal has been to democratize innovation," says Succi, who believes that anyone who works in the MGB system and who has an idea for how to improve patient care, develop new research techniques, and create more efficient hospitals processes should be able to explore and develop it.

Previously, in 2018, Succi led a survey of his colleagues in the MGH radiology department and found that while some had creative ideas for solving clinical problems, most lacked a basic understanding of the innovation process, such as how to design a prototype or protect intellectual property. These findings helped Succi and colleagues develop and publish an innovation rotation for residents, fellows and hospital staff in all specialties that was originally based at MGH, named MESH Core. This rotation, the first of its kind, has since expanded across MGB through a new innovator-development platform that Succi leads in his role with Mass General Brigham Innovation, known as the MGB Innovation MESH Network. MESH Core has graduated over 300 clinicians and researchers, and currently has more than 1,300 active program enrollees across the MGB system.

The new paper in *Nature Biotechnology* expands Succi's effort to understand where roadblocks in the innovation process exist. Medical

trainees who are readers of *2 Minute Medicine* (a medical media and news website) were invited to take a survey that asked about their involvement in innovation, what barriers they perceived in pursuing innovation, and what tools they needed to develop their ideas.

The survey received responses from 51 medical trainees. Several key findings emerged from their answers, says Succi. First, relatively few trainees—just 31%—consider themselves innovators; the remaining respondents said they are either not innovators or weren't sure. Importantly, the trainees identified key impediments to innovation. Asked to rank which barriers are "most important," the survey participants cited limited time and energy (43%), lack of physical resources (35%), and lack of expertise (31%). What might help them be more innovative? Dedicated time for developing ideas (61%), financial support from grants and start-up funding (49%), and partnership with mentors (47%).

"We'll use these findings to help further improve the development of innovators," says Succi, who says that removing obstacles to innovation increases the proportion of investigators who embrace the pursuit of new ideas in medicine. "That's why we put the Incubator in the hospital."

Succi also argues that medical schools should not only implement innovation tracks, but also make them mandatory. "Medical schools are phenomenal at teaching the fundamentals of disease processes and pathophysiology," he says. "But what's missing is: When you have an idea, how do you translate that from your head to concept to paper to patient?" Succi is encouraged, though, by the number of U.S. medical schools that are holding "hackathons" and integrating innovation programs in their curricula.

Making it easier for clinicians and researchers to innovate is already paying off: Succi notes that ideas nurtured and grown through MESH

have led to the creation of several products already used in patient care, at least 10 early-stage companies, and a half dozen medical devices on the development path for application for approval by the Food and Drug Administration.

Succi is an instructor in Radiology at Harvard Medical School.

More information: Okechi Boms et al, Integrating innovation as a core objective in medical training, *Nature Biotechnology* (2022). DOI: 10.1038/s41587-022-01253-x

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