

Educating for translation



If translational medicine is to fulfill its promise, educational programs must evolve to prepare a workforce not only capable of discovery, but capable of moving discovery toward the patients who need it.

Over the past two decades, governments and institutions have invested massively in translational medicine initiatives aimed at accelerating the journey from scientific discovery to clinical practice¹. But can the educators of our biomedical PhD programs and medical schools say the same? Have they adapted their curricula to equip future scientists and clinicians with the knowledge, skills and professional fortitude needed to traverse the translational continuum?

Our experience with the Eureka Institute for Translational Medicine suggests not. Over the past 14 years, we have educated more than 1,000 scientists, physicians and researchers from around the world on these very issues – not only helping them develop the knowledge and competencies to lead translation, but also the mindset and philosophy as well. What we find, time and again, is not a lack of understanding of their own science. On the contrary, participants are already deeply knowledgeable and technically skilled. The challenge is what comes after discovery – how to move an idea beyond the laboratory and academia and through the complex terrain of clinical testing, regulation, funding and implementation. The cost of this gap is ultimately borne by patients when scientifically sound discoveries fail to translate into interventions that improve care or outcomes².

If we truly wish to fulfill the promise of translational medicine, our educational programs must do better. We must not only teach the process of translation, but also nurture the identity of the translational scientist. Here, we provide a conceptual framework based on the Eureka experience for graduate research education programs to guide this necessary curricular modernization.

A conceptual framework for teaching translation

First, teaching translation requires more than adding a short course or guest lecture on translational medicine. Teaching translation requires re-examining what scientific training

assumes about the purpose of translation. Three elements are consistently transformative for scientists and clinicians.

Systems knowledge. Understanding the translational continuum and ecosystem, from problem recognition to successful implementation, helps participants see research as part of a larger pathway, not an isolated endeavor³.

Stakeholder perspectives. Participants learn how differently clinicians, regulators, payers, funders and patients assess risk, need, feasibility and value. This realization alone reshapes how they interpret their own work.

Professional identity formation. Scientific training rarely engages with the question of professional identity. Who am I becoming as a scientist, and what responsibilities accompany this role? In many programs, the implicit message is that a scientist is primarily a producer of knowledge, judged by the volume of publications, the impact factor of journals, and the competitiveness of grants.

Eureka programs challenge this traditionally narrow view. Participants are encouraged to “think, act and feel” like problem-solvers acting on behalf of patients⁴. They begin to see themselves not only as discoverers, but also as individuals with a responsibility to improve lives. This shift is not prescriptive. It is clarifying. A biomedical PhD is not meant to certify technical proficiency alone. It is meant to prepare leaders who can shape the direction of their field, steward knowledge responsibly and influence systems beyond the bench or computer. Yet many curricula and academic medical institutions, with their emphasis on first-author publications, may unintentionally signal that publication and grant funding is the end of one’s scientific responsibility and crucial for individual career advancement. Translation to broader societal impact becomes someone else’s job.

What if publication were reframed not as a finish line, but as a milestone? What if

doctoral education encouraged students to consider where their findings might lead and what knowledge and skills would be needed to move them forward? This reframing does not expand time-to-degree. It expands purpose and professional identity.

Taken together, these elements help participants place their work within a broader landscape of scientific and societal need. Many describe the experience as the first time they have been asked to consider where their science fits, what it demands of them, and how it might create value beyond publication. Reflections shared publicly by participants often note how the experience broadened their understanding of the responsibilities and long-term purpose associated with moving discoveries toward impact. One participant remarked that they “realized there is a much larger landscape for my work than the institutions in which I trained,” while others described gaining a clearer sense of the challenges and opportunities embedded within translational work.

If you are a current or former student of a PhD science or medical program, ask yourself whether this lack of orientation rings true to your experience. We suspect it does. Perhaps you have learned some of this informally from mentors who themselves lacked structured training and instead learned through trial and error, collecting ‘battle stories’ along the way. But the school of hard knocks is not a sustainable strategy for meeting the medical needs of today or tomorrow. We need science, and scientists, to work better than that. Indeed, the opportunities of the digital transformation and the wondrous biotechnological advances that artificial intelligence enables will need to be directed towards solutions that positively impact patients and populations.

A coherent approach to translational education

If Eureka programs consistently feel distinctive, it is because they were built intentionally to address four elements essential for

translation – elements that traditional training rarely weaves together.

Systems knowledge told by stakeholders who live the work. Participants hear directly from people who operate within different points of the translational pathway, including clinicians, scientists, regulators, entrepreneurs, funders and patients. These perspectives reveal how decisions are made, why progress stalls and how value is assessed. Participants often describe this as the first time they have seen the full landscape in which their science sits.

Professional competencies required for translational work. Technical expertise is only part of translational success. Scientists must learn to collaborate across disciplinary boundaries, communicate complex ideas to non-experts, negotiate differences in priorities, resolve conflict and work effectively in teams. And all this while maintaining a health work–life balance. These competencies are not ancillary – they are operational necessities⁵. By surfacing them explicitly, Eureka programs legitimize them as core components of scientific training – skills that distinguish future leaders from mere technicians.

A realistic picture of the sacrifices and demands of translation. Advancing meaningful discoveries requires navigating competing incentives. Publishing and securing grants support academic advancement, but translation also requires protecting intellectual property, engaging regulators, working with payers, engaging patients and building evidence for implementation. Eureka presents this work honestly, as meaningful but demanding. That honesty prompts participants to reevaluate their expectations and align their choices with what truly matters to them.

A supportive, enduring network. Eureka participants leave with a community that shares their mindset and values. This network becomes a resource for advice, perspective and collaboration – something to draw on when difficult decisions, strategic forks or translational obstacles arise. The power of this network lies not in size but in shared purpose.

Together, these four components create a structure that feels both new and overdue. They show that translational competence

is not a single skill but a combination of understanding, capability, moral orientation and support.

Eureka programs layer the personal, professional and systems issues across the curriculum of the translational continuum – from problem identification to real-world solution. We use a variety of educational experiences to implement this framework. For example, on the personal level, we explore a case-based scenario of a scientist's experience from identifying a potential biomarker through the development of a potential new standard of treatment. The associated personal and professional trade-offs associated with the case bring depth to translational content and lay explicit the reality that recognition and reward incentives can conflict.

What future-ready scientific training could look like

A future-ready model of scientific training integrates the elements described above into the experience of every doctoral and post-doctoral researcher. Students could map the translational potential of their work, not to commercialize it prematurely but to see its possible trajectory. They could engage with the perspectives of stakeholders who will later influence the fate of their discoveries, not for expertise but for literacy. They could participate in guided reflection that helps them articulate who they are becoming as scientists and why their work matters. And they could learn within teams where everyone, not only senior faculty, shares a sense of translational purpose. Such training does not diminish scientific rigor, it elevates it by connecting rigor to relevance.

If translational medicine is to fulfill its promise, educational programs must evolve. We call on graduate schools, medical schools and research institutions to integrate translational systems knowledge into core curricula, to support identity formation so scientists see themselves as advocates for solving medical problems, to reexamine graduation requirements to ensure they promote readiness for impact, to extend translational literacy to all research personnel, and to cultivate networks and communities that sustain the translational journey. These shifts are not radical. They are necessary corrections to an imbalance in how we prepare scientists for the world in which their work must live. The opportunity now

lies with our educational systems to prepare a workforce not only capable of discovery, but capable of moving discovery toward the patients who need it.

Addressing this challenge will require more than adding new content to existing curricula. It calls for a shift in the ethos of science and medicine educational programs. A translational mindset must be cultivated – one that blends personal purpose with professional competence. Students should learn to think, act and feel like problem solvers for patients' unmet needs, guided by a sense of responsibility to improve lives at scale.

When systems knowledge and professional identity converge, scientists begin to act not only as discoverers and publishers but as advocates for real people facing medical problems. They begin to think impact first, before impact factor. Achieving this requires institutional recognition systems that value and reward the critical role scientists play in bridging discovery to care.

The future need not be bleak. We already have the infrastructure for translation. Programs like the Eureka Institute's International Certificate Course, and its regional counterparts in Singapore, Europe, Canada and the United States, show that scientists and their institutions are increasingly seeking translational competency. The appetite is present. What remains is for our educational programs to meet it, preparing scientists who are not only capable of discovery but capable of moving discovery toward the people who need it.

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