

Bridging the gap



## How to train your future leader in medical science

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**ABSTRACT:** In the arc of every scientific life, there comes a moment when the focus naturally shifts. The attention that once centered on one's own findings, papers, and recognitions begins to expand — sometimes imperceptibly — toward people. The students, colleagues, and early-career scientists whose curiosity, ambition, and questions commence to mirror those of our younger selves. In that moment, leadership becomes less about how we navigate the system and more about how we prepare others to move through it with clarity, confidence, and direction. The next generation of scientists will shape what we will live to see — and what we will never witness. Some of them will eventually lead our institutions, our disciplines, and in many cases, ourselves. Training them is no longer a personal gesture; it is a generational imperative.

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The myth of the lone genius — brilliant, competitive, untouchable — has persisted for far too long. It breeds isolation and fuels a culture where collaboration is transactional, and leadership is synonymous with authority. But the true leaders in medical science do not emerge from silos. They are shaped in ecosystems of trust, dialogue, and contradiction. They thrive in environments that reward intellectual generosity over dominance, and curiosity over control.

Leadership, in this context, is not a pinnacle, but a process. It is the ability to see further, connect deeper, and act responsibly under uncertainty. It does not require being the most knowledgeable in the room. It demands the humility to listen and the courage to decide. These are not traits that appear by accident. They are cultivated — slowly, deliberately, and through exposure to real human complexity.

Every generation of researchers inherits a different set of scientific and clinical challenges. What remains constant is the need to understand the structure of thinking itself. The ability to read a dataset without being misled by it. To identify gaps, ask unorthodox questions, and resist the pressure to conform to familiar pathways. Training future leaders means emphasizing analytical sharpness without rushing them into technical proficiency. We must teach them to distrust simplicity, to embrace uncertainty, and to work across disciplines — not as tourists, but as bilingual thinkers. Too often, young scientists are rewarded for compliance and punished for delay. But delay is where real reflection lives. It is in that pause before the conclusion, before the grant submission, before the publication, that science breathes. Leaders must learn how to inhabit that space — how to think with patience and act with urgency, without collapsing one into the other.

Mentorship cannot be an administrative checkbox or a loose affiliation. It is an ongoing intellectual and emotional contract. At its best, it creates room for disagreement, experimentation, and even temporary failure. It builds a sense of belonging that allows people to take intellectual risks. To train future leaders, we must create these spaces — where ideas can be challenged without ego, and people can be challenged without fear. There is also a temporal awareness required of mentors: knowing when to guide, when to protect, and when to step aside. The most delicate part of leadership is letting go. If we are truly preparing people to lead, we must allow them to make decisions we would not have made, to follow directions we would not have chosen. Leadership cannot be inherited. It must be earned through an agency. And mentors, too, must remain open to transformation. There is no static version of mentorship. The relationship evolves. With time, many of our mentees will become collaborators, peers, and — eventually — our own sources of inspiration and accountability.

Science, especially when driven by ambition, has a tendency to overlook its own ethical scaffolding. But leadership without ethical rigor is little more than influence. It may produce short-term results, but it cannot build sustainable legacies. The future leader must be deeply grounded in the fundamental responsibilities of medical science: to protect data integrity, to honor the trust of patients and communities, and to resist shortcuts — especially when they appear convenient. Ethics must not be taught as doctrine, but embodied as behavior. Young scientists do not memorize integrity; they witness it. They absorb it in how we respond to a reviewer's harsh comment, how we acknowledge others' work, how we handle ambiguity, and how we accept fault. If we want to cultivate ethically grounded leaders, we must model the type of silence that holds tension, the type of speech that respects complexity, and the type of courage that resists applause.

The next generation of leaders will need more than intellect. They will need stamina, empathy, and a sense of internal equilibrium that can survive disappointment, contradiction, and change. The scientific environment can be unkind to emotional complexity. Yet, it is precisely this complexity that makes leadership sustainable. We must train people to understand themselves — not in the abstract, therapeutic sense, but in terms of how they react under pressure, how they navigate conflict, and how they learn from dissonance. Emotional intelligence is not an accessory to leadership. It is the mechanism that allows leaders to connect ideas to people and people to each other. This also means preparing future leaders to deal with solitude, ambiguity, and failure — without withdrawing or losing direction. Leadership is often a lonely space, not because one is alone, but because one is accountable. That distinction matters, and it must be learned.

Talent does not flourish in isolation. Institutional structures must create real opportunities for early-career scientists to explore, publish, present, fail, and reorient. Protected time, fair funding, exposure to diverse environments, and access to collaborative networks are not luxuries — they are prerequisites. And these structures must reflect the values we want to see replicated in the leaders we are trying to train. Equity must also be structural. We must ensure that leadership is not shaped by proximity to power but by alignment with purpose. That means supporting those who come from underrepresented regions, institutions, and backgrounds — not as a gesture of inclusion, but as an investment in the depth and relevance of science.

There is a beautiful and inevitable inversion in good mentorship. Eventually, those we trained begin to see further than we do. They think differently. They challenge us. And in doing so, they extend the relevance of our work beyond our own time. That is the moment when we must choose to be led. It requires a distinct kind of humility to recognize when it is time to ask for guidance from someone you once taught. But this is the true cycle of scientific leadership: to prepare people not for obedience, but for autonomy; not for replication, but for disruption. The future will not be built by those who followed us, but by those who transformed what we gave them.

Our legacy is not the number of publications we leave behind, nor the positions we once held. It is the people. Those who sat across from us in lab meetings, sent late-night drafts full of questions, and walked with us through both scientific breakthroughs and intellectual silence. If we train them with honesty, conviction, and generosity, they will carry something of our spirit forward. They will improve it, challenge it, and reinvent it. And one day, when they lead, we will know that our work was never just about discovery. It was always about them.

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