Supporting Research Career Development of Physician-Scientists

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My perspectives on how to support the research career development of physician-scientists are based on my experiences as division chief. In the last 7 years, we have grown the clinical and educational enterprise of the division and have recruited 8 physician-scientists who are succeeding on all measures, including getting promoted. While ongoing challenges exist, I am optimistic about the future of infectious diseases–trained physician-scientists and their myriad of contributions to the infectious diseases academic enterprise.

A physician scientist is recruited. The clock starts ticking. The milestones come in rapid succession: get grants, publish articles, be promoted, and achieve tenure. The task is daunting. Run, run…keep running. Sprint, sprint…keep sprinting. Yes, we know it is a long road—a marathon, actually—but keep sprinting.

Sprinting a marathon: this is essentially what we are asking of young physician-scientists. So, it is easy to understand why choosing and supporting research careers for physician-scientists is a daunting prospect. Yet, I remain optimistic and positive about the special role that physician-scientists play in academic medicine. The physician-scientist contributes to basic, translational, and clinical research projects; provides research opportunities and serves as a role model for trainees, and contributes to the academic reputation of an organization. Indeed, I consider it our obligation to support this role so that we can preserve the essential and unique contributions made by physician-scientists at the interface of clinical medicine and innovative scientific research.

Given the tremendous institutional resources used to recruit physician-scientists, it behooves us to think deeply and proactively about what institutions and divisions can do to best support early career faculty as they develop their research programs. Indeed, the commitment is enormous. Institutional resources have been garnered. The faculty member has persevered and has often given up a more lucrative financial future to pursue their passion of an investigative career. So, the urgent questions involve how we can ensure that this early career faculty member is successful and that the physician-scientist community is varied, diverse, and resilient.

In my experience, it takes the following 4 things: (1) resources and money to support the research; (2) protected time, especially in the early years, with no pretense that one can do it all; (3) balance between work and personal life, because happy people are more resilient and do better research; and (4) a group of committed mentors who are available to support and guide the junior faculty member. The journey is daunting, but armed with these resources our best and brightest young scientists will succeed. And those of us in infectious diseases leadership roles should consider it our obligation to provide this tool kit for success to deserving candidates.

RESOURCES

We all know that money makes money. The rich get richer. Expecting to retain and recruit the best and brightest physician-scientists with paltry start-up resources (or no start-up resources, which often happens, particularly in elite institutions) is equivalent to ensuring failure or, at best, suboptimal success. With the continued decline in funding from the National Institutes of Health and other sources, an institutional financial commitment to the physician-scientist is essential. And while it is not easy to compare start-ups resources from different institutions, it is absolutely clear that substantial unrestricted startup funds are crucial to future success for junior physician-scientists. This is even truer for physician-scientists with wet-bench research programs, but it also applies to those doing dry-bench research. Concerns about women getting start-up packages lower than those for men have been noted [1], although from these limited data one cannot make broad generalizations. However, I would encourage all junior colleagues to be proactive and ensure they get the resources they need. A reasonable approach is to consider what it takes to get your research program off the ground: salary support for 3 years, support for 1–2 staff for 2–3 years, and laboratory supplies for...
2–3 years. Also, consider factors such as equipment that you need access to, equipment you must buy, and special costs for animal experiments.

If a junior faculty member is unable to freely move to another institution and has difficulty garnering unrestricted resources at their home institution, a temporizing measure could be to push for more visibility and shared resources. This can occur via access to core support (eg, statisticians, clinical research coordinators, laboratory technicians, and core technologies), coinvestigator or co–principal investigator status on grants, receipt of internal grants, delivery of invited talks, and assumption of leadership responsibilities on projects. These internal efforts would hopefully create enough forward motion to successfully compete for foundation and National Institutes of Health grants. Division chiefs have a vital role during this interim period. They can ensure a culture of junior-senior faculty partnerships, ensure coinvestigator status for the junior colleague, advocate for appropriate authorship credit, support junior faculty in their candidacy for internal grants, and ensure that the junior colleague is not relegated to an eternal support staff designation. Thus, as the division chief provides support to the junior faculty, they must also be cognizant of helping finding ways to push the junior person forward.

It takes money, time, and support to transform innovative ideas into reality. We should fully acknowledge this, and as leaders in our institutions, we should be willing to break the cycle. Do not hire internal recruits if you cannot garner resources for them. Encourage them to find other offers and advocate hard at home to find funds for them. If our best trainees go to other programs because they get better offers there, then support and applaud that accomplishment. And use that data with institutional leadership to retain the next superb candidate. This is a culture change that needs to happen, including at top-tier programs.

It is also essential for junior physician-scientists to become savvy regarding the financial statistics of their own program. It is your small business: understand the financial statistics of staff salaries and supplies, have a sense of the monthly burn rate, be aware of financial cliffs, and know when to advocate for a potential reinfusion of funds. As an example, if you are just about to have a major breakthrough in research but are running short of funds, is that the time to lay off everyone? I would suggest downsizing (you need to demonstrate that you know the realities of running your business) but to use that opportunity to proactively have a conversation with the leadership and discuss 6-, 12-, 18-, and 24-month plans regarding scientific research, staff, and funding. No one has unlimited resources, and simply expecting more money from the institutional leadership is not the answer. But coming forward with data about accomplishments, efforts, and fiscal accountability and asking for a partnership to move forward with an infusion of support is a credible and business-savvy option.

**PROTECTED TIME**

Many of us aspire to being a consummate clinician and a stellar scientist. I am not saying that this is unattainable, but I am convinced that this is not possible in any meaningful way during the early years of establishing a research program. Junior physician-scientists should be focusing on research, being creative, thinking, and imagining. Once they have received grants, they will be more able to actively and fully engage in clinical work and other academic activities. I advocate very strongly for substantial protected time until at least 1 or 2 substantial grants are obtained. Protected time most commonly refers to protection from clinical duties, but it also means protection from activities such as administrative responsibilities and participation on search committees. To be honest, the protection most often needed is from the divisional leadership itself. It is very easy to reach out to junior colleagues when X, Y, or Z is needed, and the junior colleague, in an effort to be a great citizen, will likely say yes. I have a firm contract with myself that I will not ask the junior physician-scientists in our division to take on additional responsibilities until I have approached every other person in the program, including myself! Protecting the faculty member gives our investment in them the greatest chance of success.

**BALANCE**

Be a great scientist and work hard. That is what most junior faculty hear—from external sources but also often from the voices within. I agree: work hard and push the scientific envelope. But it is also essential to have balance. Leaders should specifically encourage faculty to aim for this balance and especially encourage junior colleagues to put time aside to focus on self, family, friends, and community. A meaningful life can energize, rejuvenate, and nurture the soul, and a happy and healthy soul will be more creative and productive. There are indications that happy people are more efficient and productive [2–4].

There is a concerning increase in the frequency of burnout among physicians. Junior physician-scientists have some unique considerations in this regard. They are often paid less than counterparts in purely clinical roles, and those with young families and children are especially vulnerable to financial pressures. Add the additional dimension of pressure of tenure as a so-called up-or-out decision, and it is a perfect recipe for stress and burnout.

There has been a national conversation and focus on physician wellness, and we should actively prioritize physician wellness among our colleagues. As an example, the Stanford University School of Medicine has taken a national leadership role in this arena by recently hiring a chief wellness officer [5]. The multifaceted wellness program at the school of medicine offers interest groups to encourage social ties and training and classes in mindfulness and self-care, and it is working with the hospital leaders to improve the efficiency of practice. Additionally, the Stanford University Department of Medicine has further
invested in physician wellness by creating the Making SPACE program as a way to teach self-awareness, resilience, and mindfulness to junior faculty, both clinicians and scientists. It will be interesting to track the outcomes of such endeavors, and I encourage leaders to support physician wellness as a crucial component of long-term research success.

MENTORSHIP

As with many things in life, it takes a village. That sentiment is especially true as it relates to mentoring junior physician-scientists. We hire the best and brightest minds to do cutting-edge research. Research expertise they have, but they are often inexperienced with the administrative aspects of running a research program (eg, budgeting and hiring, firing, and managing personnel) and navigating the complicated political dimensions of research. With the increasing emphasis on team-based research and the complicated dynamics this can create, mentors can play a critical role in guiding junior faculty to success in this area. I strongly advocate for all junior faculty to have at least 1 if not many mentors for the various issues that they will encounter, including establishing effective collaborations, adopting strategies for funding success, getting feedback on grant applications, and publishing in high-impact journals.

The role of the division leadership in providing some of this mentorship, via regular quarterly meetings, is an obvious starting point. But just as important is support from other senior faculty with content expertise and overlapping research interests; one would also hope that the faculty member can count on ongoing support from previous research mentors. A community of colleagues that provides feedback on grant applications and research presentations is ideal and allows all to participate in the faculty's growth and successes. Administrative support that gives guidance on laboratory personnel management and in addressing issues with trainees in their laboratories is also very important. As the junior faculty member grows and advances professional, they can then become a part of the village and pay it forward by supporting the next group of junior colleagues. Perpetuating a cycle of ongoing support ensures enduring benefits for the greater community.

One special consideration is a junior faculty member being mentored by a senior colleague with very similar interests. The positives are easy to consider (the senior colleague can provide scientific expertise and the junior colleague can contribute to grant applications and manuscript submissions). However, the risk is the inability to ascribe independence (in concepts, results, and publications) to the junior person. When the junior colleague is being considered for promotion, the ability to demonstrate an independent program or niche of the junior colleague is especially crucial. Another aspect of mentoring is the importance of networking. It is crucial for junior faculty to develop a presence outside of their institution and to make personal and scientific connections. This can occur by presenting at meetings, helping chair sessions at meetings, hosting/meeting invited seminar speakers, and making themselves available for invited talks in their area of expertise. Hopefully, their chief will push them forward in these roles, but if not, junior faculty must advocate to get this exposure.

Physician-scientists should also consider the benefits of peer-to-peer mentoring. This is especially crucial for those who may find themselves in a less-than-ideal professional situation. If the mentorship or resources they had hoped for are not forthcoming, then the input, advice, and support from their colleagues (even from a different department and a different institution) are even more valuable and can help fill some of the gaps. If junior faculty are lucky to be in a situation where they are getting most of what they need, then should pay this opportunity forward to a colleague who could benefit from their insights and support.

A topic that deserves special mention is the concept of diversity as community strength. Just as a diverse community of microbiota is strong and resilient, an infectious diseases workforce of physician-scientists will be optimal when it has strong and diverse representation both scientifically and socially (ie, gender, sexual orientation, race, ethnic cultures, and social distance traveled). Both scientific and social diversity have been shown to enhance creativity and innovation and lead to better problem-solving abilities and productivity [6]. These issues are not specific to the infectious diseases field and are not specific to physician-scientists, but as we plan for the future, we should prioritize that infectious diseases be poised to be leaders in this arena. Given the intersection of infectious diseases with underserved populations (think HIV medicine and global health), we are well suited to lead this issue, moving forward.

Most physician-scientists aspire to be a so-called triple threat by running a nationally recognized research program, being a fantastic teacher, and having clinical expertise. Above, I outlined some thoughts on how division leaders can contribute to these aspirational goals in terms of ensuring research success. But how does one maintain clinical skills while having protected time for research? This is a tough question, and while the task is not easy, I think it can be done. My perspective is that, during the first few years of a physician-scientist's independent position, the clinical work should be minimal: research time marches on, grant applications do not wait, and the tenure clock does not stop ticking. This is especially important while the junior colleague is building up their research program and trainees, when the focus must largely be on research. Division administration can support physician-scientists during this time by paying for continuing medical education and board-review courses, by partnering clinic responsibilities with a colleague (eg, a physician-scientist could have clinic every other week, with their clinician colleagues managing clinical issues in the interim), and by sharing attending-physician responsibilities (eg, a physician-scientist could comanage busy clinical services with an active clinician) so that more frequent but less intense engagement with...
clinical activities can occur. What are the positive impacts of this integration on the career of a busy clinician? How does this relationship benefit them? Ideally one would link clinicians and physician-scientists with symbiotic skills. For example, the clinician is the patient-facing lead of a clinical research program led by the physician-scientist; the clinician benefits by participating in clinical research, getting academic credit for publications, and, ideally, receiving some salary support from grants based on the collaboration. Another approach would involve the physician-scientist engaging clinical colleagues in writing book chapters, writing review articles, and presenting findings at regional conferences. In most institutions, clinicians need to demonstrate regional or national expertise as a criterion for promotion; thus, the academic output from the clinician-scientist partnership could be the perfect way to garner the necessary exposure. With targeted partnerships, the academic productivity and exposure of the clinician increases, and the physician-scientist benefits from integration in the clinical realm. The time involved in clinical care can certainly increase once the faculty member has an established research program. While a physician-scientist may not have the clinical efficiency of a full-time clinician, they can maintain their clinical acumen, be great doctors, and participate effectively in clinical care, while bringing their unique investigative skills to clinical conversations.

Physician-scientists are ideally suited to the educational mission, and I encourage teaching. Because teaching can be focused in one's area of expertise, it is a great way to showcase scientific excellence and an effective way to get integrated into the academic mission of a new institution and recruit graduate students or MD/PhD students to one's research laboratory. However, I would caution junior faculty to not overextend themselves in this commitment; it should be complementary to research and still allow the research efforts to be of highest priority.

There is not one set formula for success, and what works at one institution may need to be modified somewhat for a different environment. But the basic recipe is the same: hire diverse, stellar junior faculty; provide resources to allow them to do innovative research; ensure that they have protected time to think creatively about science; create a culture that prioritizes balance, self-fulfillment, and happiness; and provide a community of mentors to guide them on the path to academic success. I do not think it is a set recipe for success, but I do believe the ingredients listed above are essential. Take all of the above, mix well, and bake.

We, as leaders in the infectious diseases community, owe it to our young colleagues to be genuine and meaningful in our support. Let us walk the walk and help these young colleagues take infectious diseases research into the future.

Notes

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