Reflection: The Early Career Surgeon-Scientist’s Pathway to Independence

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Abstract

The surgeon-scientist offers a unique perspective as one who can arguably best comprehend clinical needs, identify areas ripe for research, and translate discoveries from bench to bedside. However, the long transition from postdoc to independent investigator can prove to be quite challenging. Surveys have long been described as having results-oriented personalities, and so the long road to independence can be fraught with frustration at times. It requires humility in seeking scientific direction and mentorship, institutional support, and ultimately extramural funding. This reflection piece examines some hallmark steps along the pathway to independence for one otolaryngology–head and neck surgeon-scientist in her early academic career.

Keywords

reflection piece, early career, surgeon-scientist

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The life of a surgeon-scientist will never be a life for the faint-hearted. But with curiosity, imagination and persistence, a clinical surgeon can be a productive scientist.

—Joseph E. Murray

Our patients trust us to manage their airways, dissect their carotid arteries, remove their skull base tumors, and reanimate their paralyzed faces. We have completed years of formal education, including undergraduate, medical school, residency, fellowship, and graduate school. We consider ourselves to be fully independent surgeons. However, as early career surgeon-scientists, we find ourselves only at the very beginning of the long, winding research career “pathway to independence.”

For readers who may not be as familiar with the National Institutes of Health alphabet terminology, there is an actual Pathway to Independence Award (K99/R00). There are also Early Independence Awards and a multitude of Mentored Research Awards (K Series). The existence of these awards demonstrates that the early career academic surgeon is rarely ready to be an independent scientist. At an early career stage, surgeon-scientists must develop a new set of skills that sets them apart from nonsurgeon investigators and noninvestigator surgeons.

The surgeon-scientist must develop versatility. According to Joseph E. Murray, 1990 Nobel laureate and plastic/ transplant surgeon, the surgeon and bench scientist roles differ conceptually in several ways. The scientist “knows that he does not know,” whereas the surgeon is expected to know. The scientist can wait for all of the information to become available, whereas the surgeon must be able to act on available information. The scientist works with group data, whereas the surgeon works with the individual. The surgeon-scientist therefore works to be facile in both roles.

The surgeon-scientist must also develop discipline. As Evers wrote, “development of a surgeon-scientist requires enormous discipline, commitment, and dedication because there are so many distractions along the way.” As a resident, I could not imagine what I would do with 50% protected research time. Now it is barely enough time to execute experiments, let alone analyze data and publish results. Science takes time; science takes funding; and funding takes time.

Science takes time. While everything in surgery has immediate practical bearing on a matter of importance, even a week’s worth of scientific experiments rarely results in immediate answers. Science takes time, patience, and discipline. Establishing important relationships with mentors and collaborators also takes time.

Science takes funding, and funding takes time. The current research environment for academic surgeons demands that extramural funding be obtained. Research shows that surgeons are less likely to apply for career development awards and that those who do are less likely to be successful than their nonsurgical peers. Awards to practicing surgeons have historically represented between 1% and 2% of the National Institutes of Health grants, and there has been...
unprecedented volatility in federal support for research in the last 20 years. Therefore, when pursuing extramural funding, a surgeon-scientist must have a combination of confidence, perseverance, and a mind-set not dissuaded by rejection. These characteristics are typically not inherent to most surgeons, who are less tolerant of uncertainty; who stereotypically demonstrate “type A personality” characteristics of competitiveness, time urgency/impatience with unproductive time, and extreme dedication to achievement; and who are also accustomed to success. Surgery entails around 95% success, and science entails around 95% failure. Hence, surgeon-scientists must have not only the discipline and patience to propose, revise, and resubmit their ideas for funding but also the tolerance to withstand the unpredictable nature of grant funding.

Writing takes time. Distractions of patient care and work in general take their greatest toll on my writing. Proximity to the hospital makes it nearly impossible to retreat to quiet isolation to devote time to uninterrupted writing. Revered authors are known for their isolated writing retreats, such as Henry David Thoreau’s woodland hut at Walden Pond, Mark Twain’s summer gazebo, and George Bernard Shaw’s garden hut that rotated so that he could constantly work in sunlight. I can write modular clinical notes amidst a whirl of clinical noise, pagers, and other interruptions. Writing a 40-page grant proposal, however, is a different challenge. I have been advised that extended blocks of research time, completely protected from meetings/emails/calls, are critical to successful writing.

Patient care takes time. In addition to the time demands of developing research and securing funding, the surgeon-scientist faces the competing time demands of patient care and education. Early career surgeons are working to establish their surgical practices. Inevitably, patient care consumes research time. In emergencies, patient care takes priority over even the most important experiment or stiffest deadline. However, research time is not expendable time that can readily absorb nonemergent patient issues; this is paramount yet difficult for clinical colleagues to understand. Academic surgeons are also expected to educate and mentor, and this also has an insidious way of distracting from research. To succeed as an early career surgeon-scientist, it is critical to have departmental leaders who uphold the vital role of research in academic medicine, understand its demands, and stringently protect research time from clinical demands.

The time demands of research and patient care—running in parallel to the fast pace of research advances—means that staying state-of-the-art requires much more than a part-time interest. While all surgeons deal with a schedule of patients and with the occasional unscheduled patient issue, the surgeon-scientist additionally deals with an amorphous block of research time. As an early career surgeon-scientist, I am learning to stay disciplined and intentional about my schedule. Protecting blocks of research and compressing a clinical schedule to make it efficient have been helpful. Like my predecessors, I have found that the most productive protected time often occurs away from the hospital “on weekends and from 8 PM to midnight on weekdays.”

In addition to having tremendous support from my departmental chair, solid mentorship has been the key element of direction along my pathway to independence. Mentors have demystified and expedited the grant-writing process by sharing full copies of their grant proposals, including letters of support, biosketches, budgets, and research plans. A senior mentor showed me how I could improve my research efficiency, by simply having me write down what I do hour by hour. Senior mentors have also given me perspective regarding funding frustration, divulging the details of their former funding rejections and successes.

Let me conclude by saying what a personal honor and immense privilege it is to be given the opportunity to travel this humbling path of becoming a surgeon-scientist. My patients and their concerns generate meaningful research questions; it is edifying to potentially answer these questions. I wish to thank those who have supported me along the surgeon-scientist pathway. The intellectual challenge and freedom, day-to-day variety, and rich collaboration with other clinicians and researchers is incredibly rewarding and stimulating.

Author Contributions

Stephanie Shintani Smith, conception of the work, drafting the work, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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References