Opinion & Special Articles: Neurology training

To pursue or not to pursue a fellowship

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The present-day burgeoning of new medical information, interventions, and procedures, as well as the emphasis on quality improvement, has fostered a greater need for specialization in medicine. More residents than ever before are pursuing a fellowship,¹ and neurology residents are no exception. Approximately 86% of neurology residents matriculate into a fellowship,² up nearly 10% from a decade ago.³ Although not all fellowships are accredited by the Accreditation Council for Graduate Medical Education, and applying for neurology fellowships is hardly a standardized process, the statistic suggests that residents value additional training (table). However, fellowships are not for everyone, and there remain compelling reasons for some residents to forgo fellowship in favor of a clinical position directly out of residency.

ADVANTAGES Many factors weigh in on an individual's decision to pursue fellowship directly after residency. During this unique period of time, general neurology preparation peaks in preparation for the board examination, and there is strong motivation to pursue further training, as evidenced by increasing rates of fellowship matriculation. Although limited data exist among neurology residents and fellows, a survey of postgraduate neurosurgical residents found that among the most important factors contributing to this decision is with an additional 1 or 2 years of training, fellows are able to attain greater academic prestige and gain valuable experience in a particular subspecialization of personal interest.⁴ Fellowship allows residents to focus on a high volume of patients with a relatively narrow spectrum of neurologic pathology.

The fellow's specific expertise, experience, and level of responsibility increase with additional specialty training. They are able to essentially function as an attending but with the benefit of having an experienced specialized physician as a safety net.

In addition, procedure-heavy fellowships, including electrophysiology and endovascular surgical neuroradiology, provide much-needed procedural skill instruction, permitting fellows to gain a comfort level and fulfill requirements for board certification

otherwise unattainable with residency alone. The majority of neurosurgical residents feel they have inadequate exposure to endovascular surgical neuroradiology,⁴ and it is not difficult to imagine that neurology residents have even less exposure, if any. Even for those residents pursuing inpatient general neurology or a neurohospitalist position, in which they would be required to manage a wide spectrum of neurologic illness from stroke to rapidly progressive dementia, a fellowship may strengthen areas in which their residency training was deficient. A common area of deficiency with neurology residency training lies in teaching the "business of neurology" and at least 70% of residents reported inadequate training in this area in the 2012 neurology resident survey.² Postgraduate education provides one avenue to gain familiarity with the practical aspects of medicine including optimizing reimbursement with effective coding and billing strategies.

Most neurology practice opportunities in both private and academic settings prefer fellowship-trained physicians.⁵ However, added experience is only a part of the competitive advantage attained through this additional training. During fellowship, fellows can explore their research interests and increase their publications to further strengthen their job applications. The benefit of mentorship in research productivity has been extensively studied in academic medicine. A case-controlled study comparing fellows paired with a mentor and fellows without a formal mentor-based fellowship program showed that the opportunity to cultivate a strong relationship with a distinguished mentor in a mutual area of interest was associated with a greater number of publications and academic success.⁶ This relationship is invaluable when later seeking an academic position, where such subspecialty circles are often small and personal recommendations are heavily weighed. Fellowship can also provide increased time for meetings and research presentations, fostering networking in an effort to facilitate the next career move.

Approximately half of all residents will leave their residency training institution to pursue fellowship,²

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Table Available fellowships for neurology graduates by accreditation status

ACGME-accredited	UCNS-accredited	Nonaccredited
Clinical neurophysiology	Behavioral neurology and neuropsychiatry	Advanced clinical neurology
Interventional neuroradiology	Clinical neuromuscular pathology	AIDS
Neurodevelopmental disabilities	Headache medicine	Basic research
Neuromuscular medicine	Neurocritical care	Cognitive disorders
Neuroradiology	Neuro-oncology	Epilepsy
Pain medicine	Neuroimaging	Geriatric neurology
Sleep medicine		Movement disorders
Vascular neurology		Multiple sclerosis
		Neural repair and rehabilitation
		Neuroepidemiology
		Neurogenetics
		Neurohospitalist
		Neuroimmunology
		Neuro-ophthalmology
		Neuro-otology
		Neuropharmacology
		Neuro-ophthalmology
		Neurovirology
		Rehabilitation
		Translational neuroscience

Abbreviations: ACGME = Accreditation Council for Graduate Medical Education; UCNS = United Council for Neurologic Subspecialties.

Adapted with permission from FitzGerald DB, Mitchell AL. Career choices: the fellowship search. *Neurology* 2008;70:E5-E8.

allowing them the advantage of networking at another facility while maintaining their connections and contacts from residency. It also provides the opportunity to gain new perspectives and exposure to different treatment approaches. However, those with established roots in their fellowship institution may be reluctant to leave a comforting training environment where the system is familiar and transition to an attending position is even easier.

If residents are undecided about their future specialty, fellowship can yield insight into a prospective specialty without necessarily committing to that field. Many fellowship programs also provide additional exposure to the academic setting, including the opportunity to take on a larger role in undergraduate and graduate neurology education,⁷ giving undecided fellows insight into their future should they choose to pursue work in an academic environment. For residents with US federal student loans, an extra year of fellowship is an extra year that undergraduate, graduate, and medical student loans can be deferred, albeit at the expense of an attending salary. Ultimately, fellowship provides extra time to make important decisions about the residents' future, including what type

of lifestyle they want to pursue and where they wish to settle.

DISADVANTAGES As the vast majority of residents favor specialty training, it is not surprising that there are few disadvantages to pursuing fellowship, although there are valid reasons to not extend training. Many residents, after completing residency at a busy academic center, are already well-trained, confident, and sufficiently experienced to function as general neurologists. In addition, some neurology programs offer focused elective time, particularly in EMG training, so residents can not only become proficient in performing and interpreting EMGs, but also meet requirements for board eligibility during residency without having to complete a separate year of fellowship. In these situations, a year of real-world experience may hold greater educational value than a year of fellowship training.

The ever-changing climate of reimbursement, which has negatively affected electrodiagnostic medicine, among other subspecialties, is another reason to be cautious of specialization.⁸ Those residents pursuing fellowship primarily for lucrative and billable procedures must

realize the landscape of neurology is undergoing a transition, and it may not be as financially advantageous to pursue specialty fields for their monetary benefit alone. This is exemplified by the recent negative interventional trials, which affected reimbursement, leading some to consider the indefinite suspension of all neurointerventional training programs.⁹ Those who practice general neurology, perhaps even after completing a fellowship, will always be in demand, as compared to those who subspecialize, particularly if that skill will no longer be reimbursed.

Often, older residents, or those who may have transitioned to neurology after initially pursuing a different field, may elect not to spend another year in training with a suboptimal salary in favor of settling down in an attending position.⁴

Nearly half of all neurology residents and fellows graduated from medical school outside of the United States.² Because some fellowship programs do not sponsor an H1 visa, the benefits of pursuing a private practice or attending position in a desirable location may be more attractive than a year of fellowship in a less than desirable location or field of interest.

Another disadvantage in the increased number of residents pursuing fellowship affects not the residents but rather the patients. The need for general neurologists continues to grow; however, greater fellowship training may lead to a relatively smaller proportion of general neurologists, and subsequently higher wait times for patients.¹⁰

DISCUSSION Fellowship after neurology residency is becoming increasingly popular. It offers a number of advantages, including additional specialty experience, a competitive resume, and academic prestige.⁴ However, some elect to forgo fellowship out of necessity and a desire to gain practical experience in a private practice or academic setting. With the increasing number of fellowship-trained neurologists, the need for well-trained general neurologists who see the vast spectrum of neurologic illness, from headaches to nonspecific gait disorders, should be emphasized. The increasing trend in pursuing fellowship training should be equally encouraged as it represents a genuine attempt, motivated by scientific interest and curiosity, toward the mastery of one of the

many pinnacles of subspecialty neurologic training. However, we must take care not to become that specialist who knows more and more about less and less, until finally knowing everything there is to know about nothing at all.

AUTHOR CONTRIBUTIONS

Zubair Ahmed: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval, acquisition of data. Shaheen E. Lakhan: drafting/revising the manuscript, study concept or design, accepts responsibility for conduct of research and final approval. Deborah Tepper: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval.

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