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CAREERS IN NEUROLOGY IN A GLOBALIZING WORLD

Neurology as a career will grow in opportunities and attractiveness with increasing demand, globalization, and accelerated progress in the understanding of the brain and its diseases. Career selection does not end with neurologic training. An increasingly interconnected world offers choices for changing roles within a career or even having careers within careers, such as neurologists in developed countries participating in education and research in less developed countries. The future cannot be predicted, but trends can be spotted.

Trends. Divergent demographics. Soon, those aged 65 years and older will equal the number of children 5 years and younger. Henceforth, the number of older individuals will continue to increase while the number of children will continue to decrease (figure).

An aging population means increasing demands for neurologists specializing in stroke, dementia, and movement disorders. Headaches, epilepsy, and neuromuscular disorders will likely continue as major challenges. The unsatisfied demand for pediatric neurologists will probably remain, and although there will be fewer children, pediatric neurologists will have more to offer.

Diagnostics. A new functional brain anatomy is emerging, emphasizing dynamic networks and functional asymmetries, e.g., the right insula being dominant for sympathetic function and the left for parasympathetic function. Right handers are 5 times more likely to die of sudden death after a TIA or minor stroke than ambidextrous or left-handed individuals.¹ Right handers have a greater asymmetry of autonomic control, so that damage to one insula results in a greater imbalance between sympathetic and parasympathetic function and proneness to fatal arrhythmias than in left handers or ambidextrous persons, where autonomic control is more distributed.²

From broad categories to specific mechanisms. In the aging brain, it is very difficult to make a precise diagnosis

of the subtypes of dementia. However, it is now possible to image mechanisms leading to dementia, e.g., amyloid plaques, tau protein deposition, and inflammation by PET. MRI can identify cerebrovascular disease with growing precision. Thus, maybe in the future, rather than treating broad categories such as “dementia,” we will be targeting specific mechanisms causing cognitive impairment.

Devices. Recent reports demonstrate the effectiveness of thrombectomy for acute stroke.³ This joins the use of balloons and coils in the treatment of aneurysms and arteriovenous malformations.

Stimulation has become a growth area as seen in transcranial stimulation for rehabilitation and deep brain stimulation in Parkinson disease, epilepsy, and even depression and experimentally in Alzheimer disease. Peripheral stimulation is used for pain treatment and vagal stimulation for epilepsy control.

One consequence of the increased use of devices has been further subspecialization within neurology. At the same time, the subspecialties are becoming integrated in multidisciplinary teams that include close collaboration with neurosurgeons, neurointerventionists, and other specialists and nurses, neuropsychologists, physiotherapists, and other health professionals.

Opportunities. In your own country. The clear preference is to train in a well-recognized large center; however, smaller centers have their own advantages. The dilemma of being a small fish in a big pond or a big fish in a small pond is ubiquitous. The important thing is to keep swimming!

Leave home! If medical school is completed in one center, it would be desirable to obtain further training at another center. This allows for a broader experience, new friendships, and learning about different ways to practice neurology.

For those who aspire to train abroad, prepare for what you aspire to do. If you want to work in a particular area, talk to people at your center and, even better, to those with whom you will work, and develop a plan of what specific skills are required.

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Figure Young children and older people as a percentage of global population: 1950-2050

From United Nations. Word Population Prospects: The 2010 Revision, by Department of Economic and Social Affairs, ©2010 United Nations. Reprinted with the permission of the United Nations.

Candidates with a plan are much more likely to be accepted in a program abroad and return to a desirable job.

Globally. The internet has transformed access to knowledge and has enabled telemedicine, patient blogs, and cyberconsultations.⁴ Although not all information is of equal value, exemplified by the profligate proliferation of online journals of dubious quality, the internet also provides access to reliable Web sites and established journals, some of open access.

Digital technology facilitates information interpretation. The program ZUIS displays simultaneously text, images, and videos. The information can be viewed at different levels of detail, zooming in specific areas that provide more specific information.⁵

Technology also allows for the discovery of unsuspected relationships. Text mining 20 million articles in the MEDLINE database revealed an unsuspected indirect link between E-cadherin (an adhesion molecule) and Parkinson disease.⁶

Social media have their own role, and making connections with trainees in other countries could be both pleasant and useful.

Most universities now offer free massive open online courses in subjects relevant to neurology, such as statistics and clinical epidemiology, essential in understanding and practicing neurology.

Internationally. Travel is highly desirable and increasingly feasible. Most large organizations offer travel scholarships to their congresses or meetings. The American Academy of Neurology offers a Bruce Schoenberg competition requiring a completion of a

project and scholarships to attend the annual meeting of American Academy of Neurology.

The World Federation of Neurology provides travel grants to its World Neurology Congresses and also opportunities for individuals to spend time at other centers. Moreover, under my Presidency of the World Federation of Neurology, we introduced a small grants program whereby individuals can design a project and obtain modest funding for low-cost, high-impact projects (<http://www.wfneurology.org>). It is worthwhile exploring individually what specific meetings offer travel scholarships and what some organizations such as the European Academy of Neurology may offer for trainees.

Principles. *Do what you love doing.* Regardless of current perceived opportunities, choose something you love to do.

People excel at what they like doing and there will always be a call for outstanding physicians in a broad range of fields. It is said that “People who love their jobs do not work a single day in their lives.”

If you are unsure, “Do not get off the highway until you know where you are going.” You can only gain by getting further education and training, which is seldom wasted. By acquiring further qualifications, you enhance your opportunities and broaden the range of choices.

Take the long-term view. The more generic skills you acquire now, the better you will be equipped to deal with the ever-changing world. The one aspect of medicine likely to change the least is the clinical approach. You need to identify some good role models who are able to practice not only the science but the art of medicine (the part left out of textbooks). Identify one or more role models who you feel you would want to be looked after should you have an illness and learn the ways of bringing medicine to bear on an individual’s problems in a caring, compassionate, and effective manner.

The more you sow the more you will reap. While debt is becoming an increasing burden for medical graduates, training time is still relatively cheap compared to what it will be worth in the future. Hence, an investment in additional training, electives or education at another center, and getting involved in larger causes may pay handsome dividends in the future.

Conclusion. Never has there been a greater demand for or greater opportunities in neurology. Increasingly neurology is moving from short encounters to long-term relationships, given the chronic nature of most neurologic disorders. Some of the most grateful patients are those you can do the least for medically but the most compassionately. William Osler stated that “Medicine is ... a calling in which your heart

will be exercised equally with your head.” Nowhere is this more true than in neurology.⁷

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