Career Paths in Neuroepidemiology

The AAN Neuroepidemiology Section has drafted the following prospectus on career opportunities in Neuroepidemiology as a helpful guide for those looking to pursue a career in the field. The following is intended to provide an understanding of what's useful for practitioners vs. academicians in trying to decide on a career path within neuroepidemiology.

What is Neuroepidemiology?

Neuroepidemiology is a branch of epidemiology involving the study of the frequency, occurrence, distribution and determinants of diseases affecting the central nervous system in human populations. The term was first introduced by Drs. Len Kurland, Milton Alter, and John Kurtzke in 1967. Traditionally, neuroepidemiology has been perceived as an observational science of the frequency and etiology of neurologic disorders. An equally important part of neuroepidemiology is its experimental component, which seeks to examine the efficacy and effectiveness of medications and other interventions in neurologic disorders (adapted from Wikipedia). More recently, prediction research, including diagnostic and prognostic research, has become part of neuroepidemiology.

What Factors are Important in Considering a Career in Neuroepidemiology?

Following are some questions provided to help you reflect on your own experience and training.

Do I have the appropriate training?

To practice neuroepidemiology at the highest level (to be Principal Investigator on NIH grants), you will need either a PhD, or an MPH or MSPH specializing in Epidemiology. Individuals with MD and Master's degrees can develop their own research programs, but a PhD in Public Health (specializing in Epidemiology) will give you the highest credentials and knowledge base to pursue a career in neuroepidemiology.

Do I have the quantitative skills necessary?

Most Schools of Public Health programs in Epidemiology require applicants to have a solid background in mathematics. College-level math courses are essential; calculus is helpful. Advanced statistical methods are part of the PhD curriculum and are used in everyday neuroepidemiology.

Do I have the necessary mentorship?

At the Master's level, strong mentorship is helpful but at the PhD level it is essential. Finding a program that has faculty members who currently conduct the type o research you are interested in is highly recommended. A strong mentor can make all the difference in your future career. Specific programs in neuroepidemiology are few so make sure you earn your degree at a university that has active researchers in the areas you are interested in.

Can I afford it?

With the cost of a medical education increasing yearly, it is an important consideration for many. Programs such as the NIH Loan Repayment Program allow people to pursue a less remunerative academic career by repaying a substantial portion of student debt. Keep in mind that accredited Schools of Public Health exist in both public and private schools. For a list of accredited Schools of Public Health, see: http://www.asph.org/.

What Type of Educational Background is Needed to Begin a Career in Neuroepidemiology?

- PhD in Public Health, specializing in Epidemiology from an accredited School of Public Health or from a School of Medicine – Department of Preventive Medicine or equivalent
- MD with a Master in Public Health or Master in Science in Public Health (there exist both accredited and non-accredited programs)
- MD with appropriate mentorship (mentor has a PhD in Epidemiology)
- Neurology residents:

Do I need another degree?

Yes, you will probably need at least an MPH or an MSPH in epidemiology and may see the need to obtain a PhD in Public Health (specializing in epidemiology).

What are the Paths to Becoming a Neuroepidemiologist?

Neurologists planning an academic career:

- It is important to identify an area of interest and find a mentor as early as possible. This will allow you to begin gaining experience to help you decide if you like the field, to make sure it is in keeping with your abilities, and to begin to establish a publication record.
- Pursue a PhD in Public Health specializing in Epidemiology; take a course (or courses) in Neuroepidemiology and conduct a dissertation in this area, and publish papers in peer-reviewed journals
- Physician can pursue a Master of Public Health or Master of Science in Public Health and connect with a researcher in the field
- Pursue a PhD in a related field of study and find a mentor who is an established researcher
- Non-research practitioners (WHO/CDC) – State Health Departments, CDC, NIH, WHO – professionals who work in a government setting
- Other: Specialists who focus on a neurologic disorder

Resources to Start Pursuing a Career in Neuroepidemiology

- American Schools of Public Health – look at faculty interests at accredited Schools of Public Health http://www.asph.org
- Feigin V, Brainin M, Breteler MMB, et al. Teaching of neuroepidemiology in Europe: time for action. European Journal of Neurology 2004;11:795-799: EFNS_guildeine_2004_Teaching_of_neuroepidemiology_in_Europe[1].pdf
- Harvard School of Public Health Neuroepidemiology Research Group: (Boston, Massachusetts) http://www.hsph.harvard.edu/research/neuroepi/index.html
- Kaiser Permanente Division of Research Neuroepidemiology Studies: (Oakland, CA) http://www.dor.kaiser.org/external/DORExternal/neuroepi/index.aspx?id=2670
- Department of Epidemiology, University of Washington (Seattle, WA), Aging/Neuroepidemiology: http://depts.washington.edu/epidem/research/Aging_Neuroepidemiology.shtml
- University of Illinois College of Medicine at Chicago: Neuroepidemiology Fellowship http://chicago.medicine.uic.edu/departments___programs/departments/neurology/education_and_training/neuroepidemiology_fellowship/
- Neuroepidemiology Training Program at Columbia University (New York, NY): http://www.mailman.hs.columbia.edu/academic-departments/epidemiology/training-programs/neuro-epidemiology
- Neuroepidemiology track at the University of South Florida (contact Dr. Amy R. Borenstein or Dr. James A. Mortimer, Dept of Epidemiology and Biostatistics, College of Public Health, University of South Florida, Tampa, FL (aborenst@health.usf.edu; jmortime@health.usf.edu).

Another common route for physicians into epidemiology (and for neurologists into neuroepidemiology) are the Clinical Research Training Programs (CRTP) that award an MS in clinical research and the PhD in Clinical Investigation programs that are now part of the CTSAs at over 40 US medical schools. For example, at Einstein, many CRTP students do coursework and mentored research in neurology. Sometimes the CRTP program is done with a clinical fellowship in a subspecialty area (e.g., a clinical neurologist might do clinical subspecialty training in epilepsy over 2-3 years).

The following grants support up to 5 years of training and research for early-career MDs and PhDs:

- NIH K23: http://grants.nih.gov/grants/guide/pa-files/PA-05-143.html
- K12 grants: http://grants.nih.gov/grants/guide/pa-files/PAR-02-076.html

K Kiosk / NIH Career Development Awards:
http://grants.nih.gov/training/careerdevelopmentawards.htm

Other T32 grants:
Harvard School of Public Health Department of Biostatistics:
http://www.hsph.harvard.edu/biostats/research/training_grants/neurostatistics/program.html

Neuroepidemiologist Profiles

Below are some example of people in the field and the path they took.

Typical paths within the United States:

Clinton B. Wright, MD
Dr. Wright is a vascular neurologist with a Master in Science (M.S.) in Epidemiology. He trained in neurology and in his last year of residency identified an area of interest within epidemiology. He also identified a mentor who was Principal Investigator (PI) of a large population-based study and began working in his area of interest. As part of a T32 Neuroepidemiology fellowship program, Dr. Wright pursued the M.S. and clinical training. On graduation from fellowship, he applied for and received a mentored award (K-12) that supported his initial two years after completing fellowship and provided protected research time as he was starting out.

Amy R. Borenstein, PhD, FAAN
Dr. Borenstein is a Research Scientist member who is also an AAN Fellow (FAAN). She began with a Bachelor's degree in Biology and then continued to earn a Master in Public Health in Epidemiology and a PhD in Public Health in Epidemiology. Her dissertation was a case-control study of Alzheimer's disease. She began publishing in this area and has now been working for over 20 years on her research program in Alzheimer's disease and other neurologic diseases.

An example of a career path outside the United States:

Mirjam I. Geerlings, PhD
Dr. Geerlings is an Associate Professor of Neuroepidemiology in the Netherlands. She began with a MSc in Clinical Neuropsychology and obtained a PhD in Epidemiology after finishing her PhD thesis on psychosocial risk factors for Alzheimer's disease. She also finished a postgraduate training program in epidemiology.

Neuroepidemiology Links And Resources:

- AAN Neuroepidemiology Section http://www.aan.com/go/about/sections/neuroepidemiology
- World Federation of Neurology: http://www.wfneurology.org/
- *Neuro-epidemiology* journal: http://content.karger.com/ProdukteDB/produkte.asp?Aktion=JournalHome&ProduktNr=224263
- National Institute of Neurological Disorders and Stroke: http://www.ninds.nih.gov/
- National Institute on Aging: http://www.nia.nih.gov
- Books:
    - Nelson LM, Tanner CM, Van Den Eeden SK, McGuire VM.(Eds). Neuroepidemiology: From Principles to Practice. New York: Oxford University Press, 2004. ISBN 0-19-513379-X.
    - Feigin VL, Bennett DA (Eds). Handbook of Clinical Neuroepidemiology. Nova Science Publishers, 2006. ISBN-13: 978-1600215117.
    - Gorelick PB, Alter M (Eds). Handbook of Neuroepidemiology (Neurological Disease and Therapy). Informa HealthCare/Marcel Dekker, 1994. ISBN-13: 978-0824792428.
    - Batchelor T, Cudkowicz ME (Eds). Principles of Neuroepidemiology. Butterworth-Heinemann, 2001. ISBN-13: 978-0750670425.