

# Musings from Mayo

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**W**hen I began my career in the Department of Neurology at Mayo in 1955, I was the 13th neurologist in the department. Although individual neurologists had special interests, every neurologist did essentially the same thing. Each neurologist saw outpatients in the clinic, took turns staffing one of the inpatient neurology services, taught residents in either setting, and may have had an interest in research but no formal time dedicated for that pursuit.

Now, among the 80 plus neurologists on the Mayo staff, it is unusual for any two to have the same kind of daily activities. Neurologists today see outpatients and teach residents, but only some attend a hospital service and only a few attend acute care services as their primary clinical responsibility. Although the number of procedures for clinical testing has greatly expanded, the big change has been the development of subspecialties in neurology. Mayo neurology currently has at least 15 more or less formalised subspecialties. This is not unique to Mayo, as it has occurred throughout the world.

The result has been the expansion of knowledge applied to the benefit of neurological patients, but it has also meant fragmentation of our speciality so that we communicate primarily with those in our subspecialty. A related development has been the expansion of neurological research. At present, nearly half of the Mayo neurological staff has a commitment to research funded from extramural sources, primarily the Na-

tional Institutes of Health (NIH), including dedicated time for research.

The research expansion in neurology at Mayo is an example of research expansion in the whole institution. It was not until 1958 that Mayo accepted the idea that extramural funds for research and education was a good thing. I was fortunate to be awarded one of the earliest grants to a clinician for research at Mayo when I received a grant from NIH with an annual budget of about \$5000 in 1959. Because we could not receive salary support from grants at that time, that award was sufficient for the research that was planned. Today, the Mayo research budget is in the hundreds of millions annually with about half provided by NIH or other extramural sources. The NIH has played a major role in the development of neurology in the United States.

Computed tomographic and magnetic resonance imaging of the nervous system have been the most dramatic additions to our diagnostic capability during my career. During the last half of my career, neuroimaging was available and has been increasingly precise, and I would not want to be without it. However, I do worry about the impact on the training of neurological clinicians. It was true prior to the availability of neuroimaging, and it is still true, that at least 85% of the information needed about a patient comes from a carefully obtained history and a small additional part from the neurological examination. It is tempting today to depend on neuroimaging at the expense of a careful history from the patient and a relevant neurological examination. Our faith in new technology so often exceeds its effectiveness.

When I was a budding neurologist, I was struck by the finding that then current textbooks of physiology devoted half or more of their pages to neurophysiology. That cir-



cumstance foretold the rapid expansion of knowledge about structure and function of the nervous system fostered by the expansion of the National Institutes of Health into the field of neurology. This occurred about the time I began my career in neurology. Neurologists have been so accustomed to 'managing' chronic neurological diseases, it is difficult to imagine that we are on the threshold of developing treatments that will control or perhaps even cure some of these conditions. I would not have imagined when I first became interested in stroke that we could treat acute ischemic stroke with fibrinolytic drugs and prevent disability with small risk to patients. I also would not have imagined that some neurological diseases that we euphemistically called 'degenerative' would be shown to be caused by an infectious piece of protein (prion) as a newly characterized mechanism of disease of the nervous system. It now seems possible that even genetically determined neurological disorders may be effectively treated or even prevented.

Training programmes in neurology throughout the world have been quite successful in producing new neurologists who have assimilated the expanding body of neurological knowledge from the laboratories. We have produced young neurologists with superior clinical and technical skills, and many have assumed that such training was sufficient to conduct research on patients with neurological disease. We seem to expect that academically orientated clinical neurologists outside the laboratories must master the principles and procedures of the scientific method on their own.

The need to judge medical care effectiveness is now an imperative. A randomized clinical trial is the preferred tool for judging efficacy of treatment but observational studies in well-defined populations or cohorts are necessary to assess effectiveness in clinical practice. In recent years, a few neurology training programmes have developed opportunities for training and mentoring in clinical research. If the budding academic neurologists of this era are going to contribute to patient orientated research, every clinical training programme in neurology must provide access to training in the methods of clinical research, including but not limited to epide-

miology, biostatistics, health services research and health economics.

I have been privileged to serve in leadership positions in both of the major neurological organizations in America. The American Academy of Neurology held its first annual meeting only a few years before I began my neurological training. The mission of the Academy has been, from the beginning, to serve all neurologists in the United States. I have seen it grow to become essentially an international organization with about 30% of its members being from countries other than the US and Canada. A third of those present at a recent annual meeting were from outside the US.

Our other major neurological organization, the American Neurological Association, is over 125 years old and its constituency is primarily academic neurologists. The ANA has also experienced remarkable changes during the time of my career in neurology. Neurologists are elected to membership based on their academic contributions. When I was elected, membership was limited to 250 members. Because of the growth of the speciality and the increase in the number of training programmes, the limit on the number of members was gradually increased and ultimately removed. This influx of young members contributed to restoring the life and prestige of this fine organization.

My generation of neurologists in America has probably had the best of times in many respects. We have been able to see the speciality develop into a bona fide clinical and investigative discipline with the help of NIH and without much interference from government or from insurers until recently. The young neurologists of today have little institutional memory for that earlier time of practice. There is no doubt that enormous opportunities lie ahead of them and their successors. I look at the future for neurology with envy. I wish I could start again.

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