In July 2006, neuroimaging was designated as a neurological subspecialty area of the United Council of Neurological Subspecialties (UCNS), based on the acceptance of the application put forward by the American Society of Neuroimaging (ASN). By the end of the summer of 2007, the UCNS will offer the first certification examination on neuroimaging for physicians who are certified in neurology by the American Board of Psychiatry and Neurology and who hold a valid license to practice medicine in the United States. For the first five years after the inception of this new certification, neurologists can apply for accreditation by various methods, which include formal fellowship training of at least one-year duration or a practice track (also called “grandfathering”), an option that is made available any time a new subspecialty is recognized. When a subspecialty has matured enough to merit a separate certification examination the many physicians who have developed it have a degree of knowledge similar or, generally, superior to the knowledge acquired during fellowship training. Once the five-year practice track period is over, the certification examination will be open only to graduates from approved neuroimaging fellowships. While this new certification may be welcome news to skilled neuroimaging specialists who desire a way to quantify their expertise, as well as residents with an interest in finding their niche, it may leave some practitioners already in the field wondering what it means for them. In this article, we’ll consider what changes, if any, are likely in the wake of this new certification.

Looking at the Numbers
Most neurologists use neuroimaging in their day-to-day clinical work. This is the conclusion of two surveys of American members of the American Academy of Neurology (AAN) carried out in 1996 and 2005.1,2 The response rate was 54 percent (353/650) for 1996 and 44 percent (390/886) for 2005. In the 2005 survey the characteristics of responders and non-responders were studied and were similar. Less than eight percent (1996) or seven percent (2005) of neurologists surveyed relied exclusively on someone else’s reading of CT and MRI for their clinical decision-making. Most relied on their own interpretation alone (36 percent in 1996 and 38 percent in 2005 for CT; 24 percent in 1996 and 33 percent in 2005 for MRI) or a combination of their own and someone else’s reading (58 percent in 1996 and 54 percent in 2005 for CT; 68 percent in 1996 and 60 percent in 2005 for MRI). The number of neurologists who relied solely on their own MRI reading for their clinical decision-making had increased in the nine-year span between the two surveys (p<0.05). In addition, a growing number of neurologists in the US perform official interpretation and obtain reimbursement for neuroimaging studies such as MRI, CT, ultrasound and endovascular procedures; the proof of this is apparent in the rising number of members in the ASN and Neuroimaging Section of the AAN.

From its inception, the field of neuroimaging has been developed and cultivated by physicians in the neurological sciences.3 It was Egas Moniz, MD, a neurologist, who performed the first...
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angiogram in 1927. Another neurologist, William Oldendorf, MD, developed the basis for computerized tomography in 1961 and the technique was applied to clinical diagnosis by an electrical engineer, Sir Godfrey Hounsfield, in 1973. After physicist Paul Lauterbur, PhD published the first MRI images and internist Raymond Damadian, MD applied it to the detection of tumors, it was neurologist Ferdinand Buonanno, MD, a neurologist at the Massachusetts General Hospital, who introduced this technique in the United States in 1983. Some of the most respected neuroimaging textbooks are the work of neurologists who are also leading groups that cultivate the cutting edge neuroimaging technologies, such as functional MR techniques or molecular imaging with PET.

Technical developments have largely been behind the drive to considerably advance the field of imaging of the nervous system in the last four decades. Over that period of time we have seen the advent of techniques that are common in clinical settings today, such as CT and MRI. These techniques have facilitated the imaging of all parts of the body, but the osseous structures that protect the brain and spinal cord kept them from being visualized by conventional radiology.

CT and MRI have helped increase patient comfort and improve early diagnosis, with better outcomes. The advantages of the new imaging techniques are so clear that comparison studies with older modalities have been considered unethical and have never been conducted. Those of us who have been practicing for a long time probably remember performing pneumoencephalography to diagnose and locate a brain tumor, and we know the risks and suffering this procedure inflicted on our patients, let alone its lack of precision for the diagnosis of many entities today easily diagnosed and treated thanks to CT, MRI and other imaging techniques.

Knowing What We See
Parallel to the technological development, there was tremendous development in the field of knowledge of imaging of the nervous system. This has permeated the training of neurologists, radiologists and nuclear medicine physicians. While not all training programs in any of the specialties emphasize imaging of the nervous system to the same extent, most specialists of any of these areas are knowledgeable enough to interpret brain or spine imaging studies.

However, it is undeniable that subspecialization is needed for the development of the field and, from a clinical perspective, for consultation in complex cases. This need was recognized first by radiologists, who determined that the radiology of the nervous system was complex enough to merit the new subspecialty of neuroradiology in the early 1990s. Thus, the American Board of Radiology has been issuing a certificate of Added Qualifications in Neuroradiology since 1992.

In a similar way, the major neurology organizations recognized that imaging of the nervous system is complex enough to require the subspecialty of neuroimaging. By 1992 they saw the importance of this issue and tried to obtain similar subspecialty recognition. As it happened, these organizations were able to negotiate only a cumbersome pathway consisting of a duplication of residency training in the two specialties of radiology and neurology. The striking difference in the length of training (seven years for a neurologist compared to five for a radiologist) and the fact that there was no Medicare financing for this excessively long program contributed to making this pathway almost a stillborn effort. More importantly, physicians in training who were interested in imaging of the nervous system found it unappealing that much of the time was spent in activities irrelevant to neuroimaging, such as working on abdominal scans or bone radiology. A few programs were created and died a quick death. The current combined program is neither part of the American Board of Medical Specialties (ABMS), who certifies physicians, nor of the Accreditation Council for Graduate Medical Education (ACGME) in charge of the accreditation of training programs.

This wrong approach was the product of a false premise: it was assumed that only physicians coming from radiology residency training programs could do imaging of the nervous system. The reality is that neuroimaging is an important part of the training of a “general” neurologist. The program requirements for residency training in neurology state: “Residents in neurology must have experience in neuroimaging that ensures a familiarity with and knowledge of all relevant diagnostic and interventional studies necessary to correlate findings with other clinical information for the care of patients. At a minimum this must include magnetic resonance imaging, computerized tomography and neurosonology. This may be accomplished as an integral part of supervised inpatient or outpatient care during required adult and pediatric neurology rotations, where neurology residents should review and interpret their own patients’ neuroimaging studies under supervision. Additional experience is desirable during rotations on neurosurgery or in subspecialty areas where neuroimaging is particularly relevant to patient care, such as cerebrovascular disease, neuro-oncology, neurointensive care, behavioral/cognitive neurology and epilepsy.”

Cooperating with Complementing Opinions
The ACGME requirements also recognize and encourage the important role of neuroradiology in the training of neurologists: “An organized elective rotation in neuroradiology should be available to those with interests that will require an in-depth understanding of neuroradiology. An elective rotation in neuroradiology may also provide additional opportunities to gain experience in supervised interpretation of neuroimages and to learn the basic concepts of neuroradiology.”
Neurologists have worked on neuroimaging in close collaboration with neurosurgeons, nuclear medicine physicians, psychiatrists, radiologists and other specialties interested in imaging of the nervous system as well. In the same way that organized radiology recognized in 1992 that neuroimaging was complex enough to merit a new subspecialty of neuroradiology, organized neurology has now recognized that clinicians may need a specialized education that emphasizes imaging of the nervous system by recognizing the subspecialty of neuroimaging.

It is important to note that neuroimaging is different from neuroradiology, and both subspecialties are complementary. The emphasis in neuroimaging is on the choice and application of the appropriate imaging techniques to the clinical problem presented by the patient and on the integration of the information provided by those techniques with physiological and other data so as to further the prompt and economical diagnosis and treatment of a given patient.

Clearly the Better Readers
The availability of the certification in neuroimaging does not imply that neurologists lacking this certification cannot evaluate neuroimaging studies. It is similar to what happened in radiology, where the existence of neuroradiologists did not imply that general radiologists cannot interpret studies of the nervous system. Indeed, most studies of the nervous system interpreted by radiologists in the US are interpreted by general radiologists. As regards hospital studies alone, in 2004 there were 5,759 hospitals in the US. The number of certified neuroradiologists is approximately 2,600.

Just as it is clear that general radiologists perform most neuroradiology procedures, it is likely that most of the neurologists reading neuroimaging studies need not have the subspecialty of Neuroimaging. However, those wanting to excel in this field will now find their way a little easier, as they finish the neurology training program and are able to enlist in neuroimaging fellowships.