Child Neurology: Restructuring for Survival in the Future

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It has been helpful to have the benefit of the commentaries that have preceded this discussion, as they have helped crystallize my thoughts concerning the directions of our specialty. As others have commented recently in the Journal of Child Neurology, the past has been and is often a prologue to the future. The seminal observations of nonneurologists such as Little and Freud at the end of the last century and the turn of this century serve to remind us that contributions to our specialty have never been and never will be the exclusive province of neurologists. This caveat notwithstanding, it is safe to assume that the major advances in the knowledge, understanding, and therapy of disease of the nervous system in the modern era have derived primarily from those schooled in the neurosciences, whether they wear the mantle of adult neurology, child neurology, or neurobiology. The explosion of knowledge in neurosciences mandates that trainees in the future have a defined core of knowledge regarding the function and structure of the nervous system. Only then will they be able to understand and treat the large spectrum of acute and chronic disease that involves the central and peripheral nervous system.

Our specialty, like only a few others, is uniquely an American-derived phenomenon. Following considerable dialogue between the American Board of Pediatrics and the American Board of Psychiatry and Neurology, 36 certificates with competency in child neurology without examination were granted in 1968 under the aegis of the American Board of Psychiatry and Neurology. Another 83 certificates were issued in 1969, 13 by examination, and 70 certified on record without examination. Since then, a total of 1191 individuals have sat for the examination given by the American Board of Psychiatry and Neurology in neurology with special competence in child neurology. Of this number, 778 have been certified to date. Due to the establishment of an identified board in child neurology and the energy and vision of Dr Kenneth Swaiman at the University of Minnesota, the Child Neurology Society was founded. This society has grown to a membership of over 1000 individuals. It is probably safe to conclude that the society is the primary organ for child neurologists in this country and throughout the world. Shortly after the development of the Child Neurology Society, the organized academic arm of child neurology, the Professors of Child Neurology, was created. Both of these groups serve, in concert, as the political and academic voice of our field in the medical establishment nationally and locally. There are now two new American journals exclusively devoted to child neurology topics. Virtually all the major journals in the clinical neurosciences have child neurologists sitting on their editorial boards. Specifically, because of their identification as child neurologists or developmental neurobiologists, select members of our specialty serve on the most prestigious national scientific committees involving the neurologic community. In addition, child neurologists are part of the political process of the American Academy of Neurology, the American Neurologic Association, the Association of University Neurologic Professors, and multiple other scientific advocacy groups of neurologic interest throughout the country.

The Asian and European communities of child neurology have followed the American example.
They, too, have formed child neurology societies and have identified specialty journals. Despite the high degree of sophistication of care in Asia and Europe, the United States and Canada remain singular in the standardization of programs leading to credentialization and identification of child neurologists.

These accomplishments are truly outstanding when one considers that we have existed as an organized discipline only since 1969. Our rapid maturity has resulted in credentialing of our specialty by the American Board of Medical Specialties, the formation of the Child Neurology Society (a society that encompasses the needs of virtually all child neurologists in the country), the development of the Professors of Child Neurology (the academic arm of our discipline), the creation of several journals devoted to our specialty, and our acceptance in the highest political and academic arenas of organized medicine.

The above accomplishments notwithstanding, for child neurology the decade of the brain is fraught with as much trepidation as optimism. Consequently, this may be the time for a far-reaching examination of where the field has been and where it is going. Areas of concern are multiple: (1) Are the current training programs forged in the 1970s relevant for the practice of the 1990s and into the next millennium? For those who will be practicing child neurology, are training programs preparing them to care for children with all types of diseases of the nervous system? (2) Are the numbers of child neurologists expanding, contracting, or remaining stable? What is the need for the future? (3) Is the umbrella under which child neurologists practice becoming too constricted and will requests for neurologic services increasingly be responded to by others than those formally trained in our specialty? (4) Will the practice of child neurology increasingly be limited to a primary focus on seizures, headaches, learning disabilities, and attention deficit disorders, and will children with the more arcane diseases of the nervous system look outside the specialty for expert opinions? (5) Will advances in the neurosciences emanate from departments within neurology, child neurology, and more broadly defined departments of neurosciences, or will others assume the mantle of leadership in such areas as neurogenetics, developmental neurobiology, and metabolic disease? (6) Are invitations to consult in clinical arenas such as the intensive care nursery and the intensive care units decreasing because of lack of perceived expertise? Who better than the neurologist should be equipped to follow and evaluate neurologic problems arising in these units? (7) Will individuals other than neurologists increasingly be responsible for the care of cerebral palsy, neoplasms, degenerative diseases, and chronic diseases of the nervous system? In my view, these problem areas currently exist and, if not corrected, threaten the life blood of child neurology as we now know it.

The above questions may be rhetorical in that clear-cut answers will not be immediately forthcoming. Nonetheless, the issues do raise legitimate concerns and deserve exploration. As pointed out repeatedly by others, current training programs may not be germane in preparing child neurologists for the future. Training programs, despite their length, leave little room for exposure to research methodology. Research exposure is necessary in order to test the trainees' aptitude or heighten their desire for investigative neuroscience. Paradoxically, as the neurology boards seek to redress the length of training by shortening the time of exposure to general pediatrics, the boards in pediatrics have increased the training requirement for subspecialty certification. Currently, in order to receive subspecialty training in pediatrics, 3 years of subspecialty training preceded by 3 years of general pediatric training is required. One year of specialty training requires a research experience. Neurology, on the other hand, has opted to decrease the time of exposure to general pediatrics and has provided as one of its alternative tracks, a research year in neuroscience. Whether either approach will be sufficient to stimulate and promote the interests of those destined for academic careers will not be determined for several years.

The dearth of child neurology applicants, as reflected by a training pool consisting of 30 to 40 trainees a year, suggests that there is a need to enhance the attractiveness of our discipline and to rethink how one trains and develops the neurologist for the future. It has been suggested that 15% to 30% of all disease seen in a pediatric inpatient environment involves the nervous system. Others have suggested that over 8 million children in this country have chronic handicapping neurologic conditions (Society for Developmental Pediatrics, personal communication).

Despite the large array of problems, clinical child neurologists find themselves increasingly confined to narrow clinical areas. Further, general pediatric programs are deemphasizing the need to have trainees spend defined periods of time in neurology. More and more, the neurologic experience for the pediatrician in training is provided either by devel-
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opmental pediatricians or general pediatricians with virtually no, or limited, training in clinical or basic neurosciences. Understandably, all those who care for children with neurologic disease cannot be neurologic specialists. However, it is not too much to expect that the preparation of physicians to care for neurologic problems should derive from those who are expert in the field. Most child neurology departments in this country are relatively small, consisting of 1 to 3 individuals responsible for large patient burdens, usually consisting of epilepsy, learning disabilities, and headaches. The perception is growing that the neurologists have limited contributions to make in neonatal units, metabolic units, and intensive care units. If these trends are allowed to continue, not only will our specialty be threatened in the academic centers, but the fallout will be far-reaching for the practicing community of child neurologists.

In my view, what is needed is a complete restructuring of child neurology departments. Rather than small groups of individuals providing a limited range of services to a large number of patients within academic health centers, the base of the department of neurology should be broadened. Because neurologic disease is so universal, divisions of neuroscience should be created within academic environments much akin to what has been done at the Kennedy Institute in Baltimore. Neurologic complications of bone marrow transplantation, cancer of the nervous system, extracorporeal membrane oxygenation, transplantation surgery, and acquired immunodeficiency syndrome (AIDS) will demand training of physicians equally skilled in general pediatric medicine and in the neurologic complications of these modalities. Training environments must provide not only general competency in pediatric medicine but also expertise in recently identified entities confined primarily to the nervous system, such as mitochondrial and peroxisomal disorders, AIDS, and neurologic disorders, to name but a few. In addition, patients with more traditional neurologic diseases, such as static encephalopathies, neuromuscular disease, epilepsy, cognitive disorders, and delayed development, should be collected in one facility and cared for by individuals who share a broad common base of knowledge. Neurologic physicians of the future must be given the opportunity and resources to train in environments that prepare them to be the experts of tomorrow. It is counterproductive for both developmental pediatrics and child neurology to compete with one another. The trend to develop several units within a pediatric environment competing for similar patients with neurologic diseases is healthy neither for pediatrics, the field of developmental disabilities, nor for child neurology. What could be more stimulating than to be trained in an environment in which all these areas are combined under one roof?

Using the above model, individuals interested in pediatric clinical neurosciences would enter a broad-based department. Following 1 to 2 years of postgraduate training in pediatrics, the first year of training in the clinical neurosciences would be general and include exposure to both adult and child neurology. An additional year of training would then be devoted to increasing familiarity with the basic neurosciences, i.e., neuropathology, neurochemistry, neurophysiology, and neurogenetics. On completion of this initial exposure, an individual would be given the option of spending time in a whole host of neurologically derived areas, i.e., molecular biology, neurogenetics, chronic developmental disease, metabolic disease, seizures, etc. Once the trainee has sufficient background, he or she would be encouraged to focus his or her interests in one or more areas. An approach such as this would provide an individual with expertise in clinical neurosciences. Incorporating under one umbrella the cognitive neurosciences (i.e., neuropsychology, language disorders, speech and hearing, etc) along with general neurology would intensify the academic environment of the training center. What better breeding place could exist to initiate inquiry into specific problems that affect the developing and the young nervous system?

When considering neurosciences as a career path, a prospective trainee would not be faced with the problem of applying to departments with competing interests, nor would training be limited to divisions or departments with a narrow focus. Pediatric neuroscience departments, rather than consisting of one to three individuals, might consist of 10 to 20 individuals with multiple areas of interest and expertise. They would have the ability to interact on multiple levels. Units such as this would be well positioned to apply and extend the promise of new research technology such as molecular biology, genetic research, biochemical research, gene therapy, treatment of neoplastic diseases, and newer pharmacologic approaches to movement disorders and seizures. The ferment of activity generated by the increase of patient care and research under one roof should, in a measurable way, enhance the prospect of attracting young physicians into our specialty.

Increasingly, the academic community of child
neurology has argued for a change in training programs incorporating some of the suggestions discussed above. Recently, a committee of the Professors of Child Neurology has proposed that subspecialty training in developmental pediatrics be offered only in centers that contain academic departments of neurology, child neurology, and developmental pediatrics. A similar argument could be made for the child neurology programs of the future. Rather than recognizing a training program in all 126 medical schools in the United States, training programs might be credentialed only if they are capable of providing clinical and research experience in a broad range of neurosciences.

Developmental pediatric programs and child neurology programs presently consist of one or two trainees a year relating to small numbers of attending physicians. Contraction of training programs into major academic centers and broadening the umbrella under which these programs function would provide a larger residency peer group as well as promote a more stimulating and intellectually demanding experience. As the pool of applicants increases and the demand for services and academically trained individuals proliferates, training programs could then expand to meet the need. Centralization of training programs in a few academic centers, although possibly threatening to established programs, would provide a product that would be highly sophisticated and address many of the problems presently threatening our discipline.

Currently, there is a proposal before the American Board of Pediatrics and the American Board of Psychiatry and Neurology to establish a combined training program in developmental pediatrics. Although most assuredly the proposal will not take the form envisioned by this author, one scenario, much as discussed above, would have young trainees entering neurologic programs after a defined period of general pediatrics. Specialty training would begin with a core program in general neurology followed by a period of focus in child neurology, developmental pediatrics, and research. Alternatively, there might be an exchange of residents from one program to another in an effort to broaden the experience of the trainee. In this manner, a trainee might elect to obtain clinical experience in one center and research experience in another. Programs could pool their resources to provide a more eclectic experience. Training by design would consist of 6 years, conforming with the American Board of Pediatrics standards for subspecialty certification, as well as providing individuals who are truly experts in their field. At the conclusion of such a training program, the individual would be certified in pediatrics, child neurology, and developmental pediatrics.

The neurologic physicians of the future must be given the opportunities and resources to train in environments that truly prepare them to be the specialists of tomorrow. The future of child neurology demands inclusiveness rather than exclusivity, a message pertinent for both our neurologic and pediatric colleagues.

Understandably these comments are apt to be provocative, but if they serve to initiate a dialogue, they will, I suspect, have served the purpose of the Editor in initiating commentaries in this journal.