Child Neurology: Past, present, and future

Part 1: History

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ABSTRACT

The founding period of child neurology occurred in 3 phases: 1) early individual contributory phase, 2) organized training phase, and 3) expansion phase. In the late 19th and early 20th centuries, individuals in pediatrics, neurology, and psychiatry established clinics and made important contributions to the literature on childhood epilepsy, cerebral palsy, and pediatric neurology. The latter half of the 20th century saw the organization of training programs in pediatric neurology, with fellowships supported by the NIH. This development was followed by a rapid expansion in the number of trainees certified in child neurology and their appointment to divisions of neurology in children's hospitals. In recent years, referrals of children with neurologic disorders have increased, and disorders previously managed by pediatricians are often seen in neurology clinics. The era of subspecialization is embraced by the practicing physician. The present day status of pediatric neurology and suggestions for the future development of the specialty are subjects for further discussion. ***Neurology*® 2009;73:e31–e33**

Child neurology was recognized as a board-certified specialty only 40 years ago, but the contributions to our understanding of neurologic disorders of childhood span more than 100 years. Various medical disciplines were involved in these early advances in child neurology. The history of the founding period of child neurology is long, and may be presented in 3 phases, beginning with an early individual contributory phase, followed by an organized training phase and an expansion phase.

EARLY INDIVIDUAL CONTRIBUTORY PHASE Long before pediatric neurology was established as a specialty, physicians of many different disciplines were contributing to the field. The biographies of most of these founders of pediatric neurology are included in books by Ashwal[1] and Aird.[2] Among the earliest contributors, Freud,[3] the psychiatrist, directed a clinic for children with cerebral palsy and published on the definition and nature of this controversial disorder in 1897. Bernard Sachs, a neuropsychiatrist, wrote a textbook of pediatric neurology in 1895, and also contributed to the classification of cerebral palsy in 1926. Ford,[4] a neurologist, is remembered for his classic book, *Diseases of the Nervous System in Infancy, Childhood and Adolescence* (1937), a monumental contribution that antedated the development of the specialty by 25 years. In pediatrics, several academicians and practitioners organized specialty clinics and wrote extensively on childhood epilepsy, cerebral palsy, and meningitis in the 1950s. The list of key founders of child neurology in the United States is long and includes Bronson Crothers, Randolph Byers, and William Lennox at Boston Children's Hospital; Douglas Buchanan at University of Chicago; Sidney Carter at New York Neurological Institute; Philip Dodge at Massachusetts General Hospital and Washington University, St Louis; and David Clark at Johns Hopkins. International founders include William G. Wyllie from London, England; Stobo Prichard from Toronto, Canada; and Yukio Fukuyama from Tokyo, Japan.

Even obstetricians contributed to the specialty, first in drawing attention to the role of abnormal parturition, difficult labor, and prematurity in asphyxia neonatorum as one of the causes of cerebral palsy in 1862[5] and, a century later, as members of the committee that launched the NIH perinatal project, which was in the planning stage in 1956. The perinatal project was, in part, a stimulus for the next phase of the founding of child neurology as a specialty. The director of the National Institutes of Neurological Disorders and Stroke,

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Disclosure: The authors report no disclosures.

Pearce Bailey, realized the need for pediatric neurologists to evaluate infants affected by perinatal complications, and appointed a pediatric neurologist to the NIH Clinical Center in 1955. A widening of interests among neurologists led to the founding of the American Academy of Neurology in 1948[6] and the development of sections in various neurology specialties, including child neurology in 1960.

ORGANIZED TRAINING PHASE Child neurology as a recognized specialty began to evolve in the 1960s, following the organization of a training grants program by the NIH. In 1957–1958, a limited number of university-based neurology departments in the United States accepted the first trainees into a 3-year fellowship, especially designed as preparation for a career in academic pediatric neurology. The fellowship and residency training, as outlined by an NIH ad hoc committee chaired by Doctors Dodge, Carter, and Clark (1958), usually consisted of successive years in clinical adult neurology, pediatric neurology, and basic sciences. The early fellowship positions were filled by pediatricians from academia, some having attained the rank of associate professor. They had demonstrated an expertise and research interest in childhood neurologic disorders and were strong in the developmental and metabolic aspects of child neurology, but lacked knowledge of neuroanatomy, pathology, and localization of neurologic lesions. They were encouraged to complete training in neurology and obtain board certification, realizing that without this qualification, a future in the field of pediatric neurology would be uncertain.

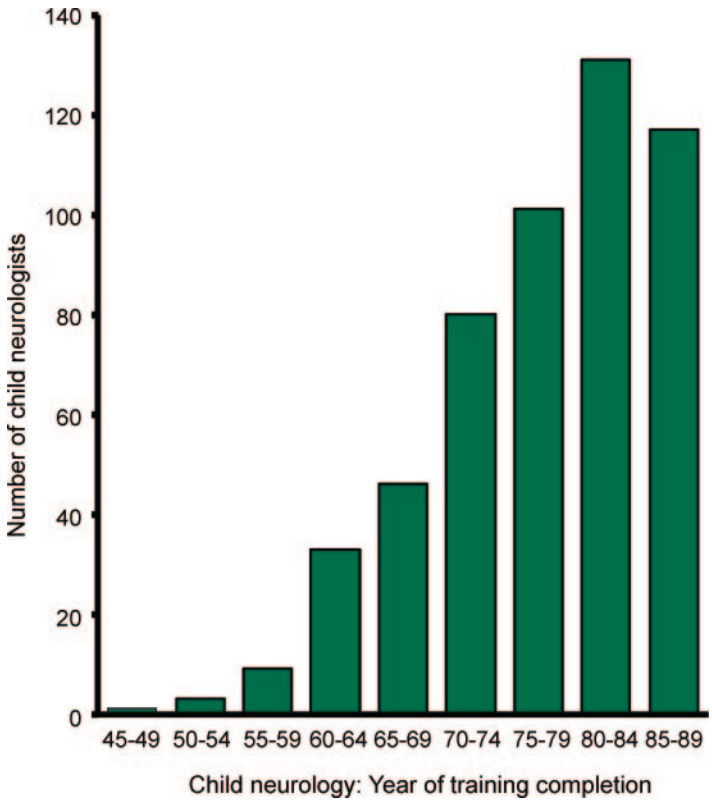
Child neurology was developed as a neurologic subspecialty. The faculty for these early training programs in pediatric neurology was drawn from university departments of neurology, and the training program directors were neurologists chosen for their rapport with children and their clinical and teaching skills. The collaboration of pediatrician and neurologist was mutually beneficial, and was particularly advantageous for the trainees, many renewing or proceeding to university appointments after graduation to establish their own training programs and pursue research interests.

EXPANSION PHASE The years 1960 through the early 1980s saw a rapid expansion of the number of training programs and pediatric neurologists who had completed training and were board eligible or board certified in neurology and child neurology. The Special Certificate in Child Neurology was first issued in 1967, admitting neurologists with an interest and recently qualified pediatric neurologists under a grandfather clause. Subsequently, specific training programs produced graduates eligible in neurology, with the additional certificate in child neurology. Some had initial residency in pediatrics, and others entered pediatric neurology having trained in internal medicine. Divisions of neurology established in children's hospitals with a relatively small staff of pediatric neurologists in the early 1960s have, in some cases, now expanded their staff near eightfold or 10-fold to accommodate a much larger clinical load of patients. The original emphasis on training for positions in academia and research has been modified to include trainees interested in the community practice of child neurology. The rapid expansion phase of pediatric neurology is eloquently demonstrated by data obtained as part of a research study regarding febrile seizure management.

SURVEY OF CHILD NEUROLOGISTS WHO COMPLETED TRAINING 1945–1990 In an attempt to determine a consensus among pediatric neurologists regarding management of febrile seizures, a questionnaire survey was mailed to all North American members of the Child Neurology Society (CNS) in 1990.[7] Founded in 1972, the CNS was a reliable source of physicians practicing the specialty. In addition to the focus of the survey, respondents were asked to provide information regarding their board certification, type of practice, university appointment, year training completed, and training institution. Of 909 pediatric neurologist CNS members, 869 received questionnaires, and 574 (66%) returned them completed. The average percentage of practice devoted to pediatric neurology was 87.6 (SD 23.3) and that involved with adult patients was 11.7 (SD 22.1). The majority of respondents were board certified or board eligible in child neurology (95%) and in pediatrics (85%); 48% were boarded in neurology and 26% in electroencephalography. The high percentage of respondents holding senior academic appointments at this time is noteworthy.

The figure shows the number of respondents who completed training in pediatric neurology in 5-year periods from 1945 to 1990.[7] Of a total of 78 training centers named by 547 respondents, 10 institutions accounted for the training of approximately half of all pediatric neurologists. The peak training period was 1980 to 1985 and 82% graduated between 1970 and 1989. Respondents holding university appointments numbered 497 (87%); 98 were professors (17.1%), 128 associate professors (22.6%), 193 assistant professors (33.7%), 46 instructors (8%), and 31 fellows (5.4%). Pediatric neurology practice was based in a university hospital for 296 (51.7%) respondents, a private office for 224 (39.1%), and a

Figure **Pediatric neurologists who completed training in 5-year periods from 1945 to 1990**



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hospital for 126 (22%); some practiced in more than one office setting. Of interest, despite the reported adverse effects on behavior and cognition, phenobarbital therapy was still favored by the majority of pediatric neurologists in 1990, particularly in the prevention of complex febrile seizures.

This study demonstrates the robust expansion of training programs and the numbers entering the specialty of pediatric neurology in the 3 decades from 1960 to 1990. This was indeed the "flowering period" of pediatric neurology in the United States,[2] stimulated and facilitated by the generous training program grants of the NIH. Neurology played a role by insisting on the training of pediatricians in basic neuroanatomy and clinical neurology before pursuing a career in pediatric neurology.

ACADEMIA RESISTANCE AND RESOLUTION

The process of specialization was not always smooth, and resistance to the development of the specialty often voiced by senior faculty in one or another department. In the early 1950s, when pediatricians were contributing to the field, they were supported by senior pediatric faculty but sometimes discouraged by neurologists. Neurologists had suffered similar power struggles in their efforts to escape from the cloak of internal medicine or psychiatry and to establish an independent department and patient service.[2] The NIH and the United States Public Health Service Training and Research Grants Committees did much to encourage the deans of medical schools to resolve these issues and, apart from an isolated institution, to permit the equal status of neurology and medicine.

Academic child neurology in the United States at the turn of the century was in a transition phase, the majority of programs having a division status within the departments of pediatrics, neurology, or both. A separate patient ward service is exceptional, but in hospitals with an epilepsy service and center, beds are assigned in a unit for overnight video electroencephalography. In Europe, many institutions have raised the status of pediatric neurology to that of a department. The present day status of pediatric neurology and suggestions for the future development of the specialty are subjects for further discussion.

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Neurology 2009;73;e31-e33
DOI 10.1212/WNL.0b013e3181b2a6df