

Child neurology: a separate and necessary discipline

Donna M Ferriero and Stephen Ashwal

Although child neurology is generally considered to be a new discipline, its origins can be traced back as far as the 1600s (Ashwal S [Ed.]; 1990] *The Founders of Child Neurology*. San Francisco: Norman Publishing). As the specialties of pediatrics and neurology developed as distinct entities in the 1700s and 1800s, the subspecialty of child neurology emerged. Board certification was formalized in 1969, with designation of child neurology as a distinct subspecialty of the American Board of Psychiatry and Neurology, and issuance of the certificate 'Neurology with Special Competence in Child Neurology'.

Recently, there has been an explosion in knowledge about neurological diseases affecting newborns and children. Identification of genes associated with neurometabolic disorders has allowed earlier recognition and treatment, and has consequently reduced morbidity and mortality. Epilepsy syndromes that particularly affect infants and children have received increased attention, including the identification of genes linked to these conditions, and growing interest in therapies such as the ketogenic diet, as well as surgery for medically intractable epilepsies.

Recent developments in neuroimaging, especially fetal MRI, have contributed to the rapid expansion of knowledge in the field of child neurology. Characterization of MRI findings has enabled the prenatal diagnosis of genetic disorders, and *in utero* recognition of lethal or debilitating diseases has brought the child neurologist into the obstetrical arena, with a new array of consultative services being required. Child neurologists are now involved with perinatologists and geneticists counseling parents about fetal outcomes. Likewise, child neurologists are actively involved in the care of children in neonatal intensive care units, as one of the leading causes of morbidity in the newborn is stroke or hypoxic ischemic brain injury, which can frequently result in cerebral palsy and developmental delay. Child neurologists also play an important role in the pediatric intensive

The number of specialists being trained in the child neurology field remains inadequate to serve the needs of children with neurological disabilities

DM Ferriero is Professor of Neurology and Pediatrics and Chief of Child Neurology at the University of California, San Francisco, CA, USA, and an Advisory Board member of Nature Clinical Practice Neurology. S Ashwal is Professor and Chief of the Division of Child Neurology in the Department of Pediatrics at the Loma Linda University School of Medicine, Loma Linda, CA, USA.

Competing interests

The authors declared they have no competing interests.

www.nature.com/clinicalpractice
doi:10.1038/ncpneuro0343

care unit in the evaluation and long-term care of older children with traumatic brain injury. In addition, child neurologists have vital roles in the diagnosis of children with brain tumors and CNS infections, and frequently become the principal care provider for managing the long-term cognitive and motor problems that result from these conditions.

Advances in the recognition and treatment of neurocognitive disorders such as autism, Tourette's syndrome, developmental language disorders and attention deficit disorder has challenged the traditional training of the child neurologist, requiring more exposure to cognitive and behavioral neurology. Although training programs have adapted to the growth of knowledge in these areas, the number of specialists being trained in the child neurology field remains inadequate to serve the needs of children with neurological disabilities. At present, there are around 1,500 board-certified child neurologists, reflecting a ratio of just 1.28 child neurologists to every 100,000 children with neurological disorders. Despite the increasing demand on the time of child neurologists, however, a recent survey of practicing child neurologists (Polsky D *et al.* [2005] *Neurology* 64: 942–948) showed high levels of career satisfaction. In addition, those surveyed found that referrals were appropriate and that the needs of the children could not be met by either general pediatricians or adult neurologists.

Maintaining an adequate workforce of child neurologists is an important issue. The subspecialty is not well known to most medical students, and according to a study by Werner and Polsky (Werner RM and Polsky D [2004] *Pediatr Neurol* 30: 35–38), early exposure of students to this discipline is critical. The Child Neurology Society and the Child Neurology Foundation have responded by instituting a Summer Medical Student Scholarship Program for first and second year students. Efforts like these will result in a much-needed expanded workforce.