CHILD NEUROLOGY *Workforce Study*

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A Profile of Child Neurology: Reports from Practitioners and Trainees

Background note: For more than a decade, reports have indicated that the supply of child neurologists is inadequate to provide care for the growing number of children with acquired and genetic neurological conditions. Other reports reveal that fewer new physicians are choosing child neurology as a specialty, which will exacerbate present shortages as practicing physicians retire. To gain an understanding of how the shortages affect the practice of child neurology, the attitudes of child neurologists, and ability of the field to attract new members, the Child Neurology Society awarded a grant to Dr. Polsky and colleagues at the University of Pennsylvania. This is an Executive summary of their findings.

Child neurology faces present and predicted workforce shortages as demand for services increases

The field of child neurology has rapidly expanded since board certification was established in 1969. The Child Neurology Society (CNS) has grown from about 200 members in 1972 to more than 1400 today. But this growth in the profession has been overshadowed by the even more rapid expansion of basic and clinical knowledge in the neurosciences and in treatment strategies for children with neurological disorders.

- In 1998, a Workforce Task Force of the American Academy of Neurology reported a total of 1,080 active child neurologists, which translated into 819 full-time equivalent patient care child neurologists. Using the demographic supply model of the Bureau of Health Professions, the Task Force found that staffing was 20% below the demand for child neurology services, a shortage projected to remain unchanged through 2020.
- The Task Force surmised that pediatricians and adult neurologists are meeting the demand for services, but the extent to which these specialties can and do substitute for child neurologists is unknown. The effects of the workforce shortage on the practice of child neurologists, particularly on referral patterns and waiting times for an appointment, are also unknown.
- A declining number of physicians are entering the field of child neurology. According to data from the American Medical Association, the percentage of filled residency positions in child neurology decreased from 70% to 55% in the last decade. Although adult neurology and pediatric subspecialty programs also saw a downward trend, the proportion of filled residency slots in these fields remains high at 79% and 73% respectively.

Surveys describe demographic and practice characteristics of child neurologists

In conjunction with the Child Neurology Society, Polsky and colleagues conducted a series of surveys to obtain information on practicing child neurologists and child neurology trainees.

- The investigators attempted to reach all child neurologists providing patient care in the United States. In March 2002 a questionnaire was sent to all active CNS members (n=1051) and to non-member physicians listing child neurology as a primary or secondary specialty on the American Medical Association (AMA) Masterfile (n=433). The response rate was 65%, with higher rates of response from CNS members (72%) than from non-members located through the AMA Masterfile (48%). The final sample included 815 respondents who were eligible for the study.
- To put their results in context, the investigators compared the responses of child neurologists with those of other specialists in the Community Tracking Study (CTS), which asked similar questions of a representative sample of patient care physicians in the United States. The CTS was conducted in two waves of interviews from 1996-1999.
- To learn more about the pipeline that provides future child neurologists, the investigators surveyed trainees in child neurology programs. In August 2002, 65 programs were identified, and 62 program directors responded. Twelve of those programs were inactive, with no current residents. Polsky and colleagues surveyed the 152 trainees in the remaining 53 programs. Responses were received from 80 residents in 38 programs.
- To discern potential factors in attracting students to child neurology, the investigators identified and compared the 50 top-ranked U.S. medical schools with the most, and fewest, graduates choosing child neurology over the last 18 years. These schools were contacted by phone in the summer of 2002 and asked about the structure of the division of child neurology, as well as about components of the curriculum. Nine schools with at least 6 child neurology graduates were contacted as were 13 schools with zero or one graduate in child neurology. Eight of nine of the high-supplying schools responded and eight of the 13 low-supplying schools responded.

Child neurologists work similar hours, earn less than other pediatric subspecialists

The survey of practitioners reached physicians in a variety of work settings. About 35% of respondents are faculty based in a university setting, 26% are faculty in a non-university setting (usually solo or neurology group practice) and 39% are not faculty, primarily in private practice.

- The majority of child neurologists in the survey are male (70%) and white (81%). Their mean age is 51. Most (86%) are board certified in child neurology and 69% are certified in both child neurology and pediatrics. When compared to respondents in the Community Tracking Study, child neurologists are similar in demographics to other pediatric subspecialists, but have a higher proportion of men and white physicians than pediatricians.
- The demographic composition of the field seems to be changing. Respondents with less than 15 years experience are more likely to be female, Asian, or international medical graduates (IMGs) than their more experienced colleagues. These older colleagues are more likely to hold certification in both child neurology and pediatrics, and they work slightly longer hours than more recent graduates.

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- Respondents work an average of nearly 55 hours per week. Overall, respondents spend 69% of their time in patient care, 12% in research, and 20% in other medically-related activities. Not surprisingly, university-based faculty report spending a significantly lower percentage of their time on patient care (56%) than non-university based faculty (73%) or non-faculty (84%). Thus, in a typical week, the child neurologist spends 37 hours in patient care, 6 in research, and 11 hours in other activities. Child neurologists spend similar hours per week on patient care as pediatricians and other subspecialists, but less than adult neurologists.
- Most respondents report earning between $100,000 and $175,000 per year, with an average annual income of $149,787. University faculty report significantly lower income than their colleagues in other settings. Compared to reports from the Community Tracking Study, child neurologists earn about $18,000 less than other pediatric subspecialists, and about $22,000 less than adult neurologists.
- The practice of child neurology is not heavily oriented toward procedures, although performance or interpretation of EEGs is common. More than 70% of respondents perform or interpret EEGs for reimbursement; those that do interpret an average of 47 per month. Only 16% perform EMGs/NCSs, although those who do perform an average of 18 per month. More than 60% perform lumbar punctures, although they perform an average of just two a month.

Waiting times for patient appointments are considered excessive

The survey explored several perceived indices of workforce adequacy, such as waiting times and perceived need for more child neurologists.

- Respondents report that new patients waited an average of 49 days for an appointment, with an average wait of 41 days for a return visit. Most respondents (65%) believe that these waiting times for an appointment are excessive. The waits are significantly longer in the university setting than other settings for both a new and return visit.
- The vast majority of respondents (81%) agree that more child neurologists will be needed in the next 3 to 5 years. Less than 20% report facing competition from other child neurologists. These perceptions were mirrored, to an even greater extent, by child neurology trainees in a separate survey.

Child neurologists remain satisfied with their careers, but report increasing referrals from primary care physicians

The respondents were asked about personal career satisfaction, the appropriateness of referrals, and changes in the number and complexity of patients in the last two years.

- Almost all respondents felt that child neurology is a satisfying career, despite an almost equal amount believing that earnings are low compared to similarly trained peers. Child neurologists report lower levels of dissatisfaction (5%) than pediatricians (13%), other pediatric subspecialists (11%), and adult neurologists (18.5%) in the Community Tracking Study.
- Nearly 60% believe that the complexity or severity of patients at the time of referral is appropriate, although 23% believe it is less than it should be. This potential problem in referral patterns is three times higher than that reported by other pediatric subspecialists (7%) or adult neurologists (7%).

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- Most respondents do not believe that most conditions seen by child neurologists can be taken care of by pediatricians (71%) or adult neurologists (93%). However, 35% agree that pediatricians could take care of many of the patients they refer to child neurologists.
- Considering trends over the past two years, 41% believe that the complexity of patients, problems has increased and 63% perceive that the number of patients referred by primary care physicians has increased. The percentage reporting a recent increase in referrals is greater than that reported by other pediatric subspecialists (46%) or neurologists (39%).

Trainees emphasize importance of early exposure, mentors in choosing specialty

The survey of current child neurology residents and residency programs, as well as a sample of medical schools, provided insights into attributes that attracted current residents to the field, as well as what the future of the child neurology workforce holds.

- Child neurology residents were 33 years old on average, when they started residency. Overall, 55% were graduates of U.S. medical schools, and 23% had a PhD.
- Most respondents (52%) were exposed to child neurology for the first time in their third or fourth year of medical school, with 41% indicating that they chose the specialty at that time. U.S. graduates identified having a mentor as one of the most influential exposures in their career choice.
- The majority of child neurology residents graduated from medical school with some educational debt (58%), a lower proportion than among medical students overall (80%). Those with debt had an average of almost $95,000 in debt, with U.S. medical graduates carrying an average debt of close to $105,000.
- The career expectations of residents differed somewhat from the reported activities of current practitioners. Residents predicted that they would spend less time on patient care and more time on research than practicing neurologists report. However, residents' prediction about their income in five years was similar to practitioners' actual income.
- When asked about actions that could improve the attractiveness of the field, residents responded that medical students should get more exposure to child neurology, both in preclinical work and in electives, and that some exposure should be required.
- Medical schools producing the highest number of child neurologists had stronger neuroscience curricula in the first and second year, stronger academic reputations, and larger Divisions of Child Neurology than schools producing the fewest.

Supply of child neurologists per child likely to drop if present trends continue

Polsky and colleagues used these practitioner and trainee data to calculate the geographic distribution of child neurologists, and to project the supply of child neurologists in the next 20 years taking population and aging trends into account.

- Estimates of the number of child neurologists delivering patient care in this study are remarkably similar to those of the Workforce Task Force. The investigators estimate 817 full-time equivalent child neurologists, which translates into 1.14 child neurologists per 100,000 children.

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- The supply of child neurologists, as the supply of pediatricians and all physicians, varies geographically. The supply is highest in the Northeast (1.46 per 100,000 children), and lowest in the West (.71 per 100,000 children).
- If the number of trainees in child neurology does not increase, the number of patient care child neurologists per 100,000 children will drop from 1.14 to 1.06 in the next 20 years. However, if all residency slots were filled, the ratio would rise to 1.83 by 2022.

POLICY IMPLICATIONS

These findings are consistent with previous reports of a workforce shortage in child neurology, and provide a glimpse of how this shortage affects the practice and attitudes of child neurologists. They also suggest actions needed to attract high quality students and trainees to the field.

- With referrals reported to be increasing and waiting times for a new appointment averaging seven weeks, the current ratio of child neurologists to children may not be meeting demand. At the same time, our respondents did not believe that the demand could be met by pediatricians or adult neurologists. An increase in the number of patient care child neurologists could reduce patient waiting times.
- The number of trainees in child neurology will have to increase just to maintain a constant ratio of child neurologists to children over the next two decades. However, if all available residency slots were filled, this ratio would improve considerably. Attracting medical students to train in child neurology should be a top priority.
- In the short term, the use of the existing child neurology workforce should be optimized. Our findings suggest that some child neurologists believe that they are seeing many patients who could be cared for by pediatricians. Such inefficiencies will exacerbate workforce shortages, diluting the capacity of child neurologists to meet the demand for their specialized services. Research should be conducted on the factors that influence pediatricians' referral patterns, and on strategies to improve the appropriateness of referrals to child neurologists.
- Responses from child neurology trainees about their choice of specialty underscore the importance of mentorship and child neurology electives in the third and fourth year of medical school. Providing medical students with a clerkship or elective in child neurology should be stressed. But this should not minimize the importance of a strong neuroscience curriculum in the first or second year; medical schools with a proven track record of producing child neurologists tend to have a strong neuroscience curriculum that exposes students early to the field of child neurology, and maintains their interest through their course of study.
- To the extent that economic factors influence career choices, the relatively long training period for child neurology (usually five years) and relatively low future earnings may create disincentives to enter the field, especially for students with educational debt. Highlighting the high career satisfaction of practicing neurologists, and providing assistance with debt for child neurology trainees, may make the field of child neurology more attractive to medical students.