Future Workforce Needs for Pediatric Nephrology: An Analysis of the Nephrology Workforce and Training Requirements by the Workforce Committee of the American Society of Pediatric Nephrology

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A national re-examination of the physician workforce in the United States has been the focus of professional and governmental bodies in recent years. There is general agreement that a surplus of specialists, a shortage of minority and general physicians, and a maldistribution of physicians may exist (1). On the other hand, relatively little discussion has centered on the appropriate number of pediatric subspecialists, either in total or in specific subspecialties. A decidedly different ratio of general physicians to subspecialists exists between pediatricians and internal medicine specialists; yet, sweeping recommendations for modifying the ratio of subspecialists to general physicians frequently fail to consider the differing health care needs of children and adults (2). Similarly, a call for reducing the number of international medical graduates (IMG) who receive their graduate medical education in the United States had wide support (3). The influence of this action on the workforce in pediatric specialties has not been clarified. Failure to evaluate the specific training needs for pediatric subspecialty disciplines carefully could result in inadequate or substandard care for children with serious and/or chronic disorders in the future.

Maintaining an appropriate number of skilled pediatric nephrologists to meet the clinical needs of children with renal disease and sustain the academic mission of pediatric nephrology has been, and continues to be, a long-term objective of the American Society of Pediatric Nephrology (ASPN) (4). The ASPN was founded in 1968 and worked with the American Board of Pediatrics to establish a Sub-Board of Pediatric Nephrology in 1970. Since the first examination in 1974, 496 pediatric nephrologists have received certification in this subspecialty. In 1995, the American Medical Association physician master file database documented 260 physicians who reported a primary specialty in pediatric nephrology, with an additional 123 who had a secondary specialty in pediatric nephrology (5). Pediatric nephrologists represent 6.4% (383 of 5950) of all nephrologists in the United States (5). In late 1996, there were 430 members of the American Society of Pediatric Nephrology.

The ASPN firmly believes that children with renal disease must have access to medical supervision by pediatric nephrologists to maximize clinical and psychosocial outcomes and quality of life. For this reason, the ASPN, in association with the other major nephrology societies—the American Society of Nephrology, the American Association of Transplant Physicians, the National Kidney Foundation, and the Renal Physicians Association—began an initiative to determine the number of pediatric nephrologists necessary to meet the clinical needs for children with kidney disease by year 2010. In collaboration with the Nephrology Workforce Committee, Abt Associates, Inc. (Bethesda, MD) constructed a survey tool to obtain information from the nephrology community. This survey document was reviewed and revised by the ASPN. Of the 450 completed and usable surveys, 81 were responses from pediatric nephrologists.

The data from the Nephrology Workforce survey show major differences in current practices and time allocation between pediatric and internal medicine nephrologists (6). Additionally, trends predicted for the incidence and prevalence of end-stage renal disease (ESRD) in children suggest that workforce requirements for pediatric nephrologists will differ from those in internal medicine nephrology. The conclusions drawn from the Workforce survey will serve as the basis for ongoing analysis and must be evaluated critically to assure that adequate numbers of pediatric nephrologists will be trained to meet the future clinical needs of children with renal disease.

Conclusions of the ASPN Workforce Committee About the Pediatric Nephrology Workforce Requirements in 2010

The Nephrology Workforce survey identifies two major differences between the clinical practice of pediatric nephrology and internal medicine nephrology practice: (1) Children and adolescents with ESRD require greater clinical time and supervision than do adults with ESRD, as a direct result of their greater disease acuity and changing maturational and developmental status; and (2) the vast majority of pediatric nephrologists are either full-time academic faculty or maintain signifi-
cant affiliations with academic medical centers. (Sixty-five percent of internal medicine nephrologists are practicing in nonacademic settings.) These two distinctions play major influences on the interpretation of the Workforce survey.

The epidemiology of ESRD also differs between children and adults. The population of children under the age of 19 is currently 72.3 million and is expected to rise to 78.1 million by 2010 (7). Most of this increase will occur among minority groups. The overall prevalence of children receiving ESRD therapy is 235 per 4 million children, with 15 per million children aged 0 to 4 years and 126 per million children aged 15 to 19 years (8). Among children undergoing dialysis, 3039 of 5244 (58%) are adolescents. Projection of prevalence figures to the year 2010 indicate a greater increase in adolescent patients than in younger patients. These data contrast with the overall prevalence of ESRD of 1045 per million for all ages and with 2782 per million between the ages of 65 and 70. In 1996, 5244 children under 19 years of age were undergoing dialysis. This number should rise to 5970 by 2010, assuming no increase in prevalence of renal disease, and to as high as 21,744, assuming a 9% annual increase in prevalence.

The Workforce survey predicts a rather modest need for future training requirements in pediatric nephrology, in contrast to the predicted demand for training increased number of internal medicine nephrologists (6). The ASPN urges caution in assuming that these differences justify reductions from the current numbers of fellowship trainees based on the following conclusions.

1. The analysis by the workforce survey that nine to 12 trainees in pediatric nephrology are needed annually may appreciably underestimate the actual need, because of the unique characteristics of the subspecialty and the patterns of clinical practice in children. Any retrenchment from current support for training positions may lead to significant workforce shortages in the future.
   A. The tight linkage between current pediatric nephrologists and academic medical center/medical school faculty status is not adequately considered in the Workforce recommendations.
   B. The Workforce survey focuses almost solely on the patient care manpower requirements in determining the need for fellowship training and does not recognize the increasing number of other tasks required by pediatric nephrologists as members of academic faculties.
2. The current number of pediatric nephrology trainees is not excessive, particularly if the number of IMG trainees is markedly reduced. Indeed, the number of US graduates entering the discipline of pediatric nephrology must increase to satisfy existing clinical care requirements for academic medical center-based pediatric nephrology practices.
3. The finding that the number of internal medicine nephrologists will be inadequate to care for a growing number of adults with ESRD may require additional pediatric nephrologists to care for older adolescents and younger adults with ESRD, as well as for non-ESRD pediatric patients, who otherwise might be receiving care from internal medicine nephrologists.
4. Access for children with renal disease to medical care by pediatric nephrologists should be a priority in an environment of managed health care. Because more than 50% of childhood ESRD patients are adolescents, failure of these children to access pediatric nephrology specialists will not only deprive them of unique resources available for adolescent patients but could also jeopardize the ability to meet the needs of younger children with ESRD.
5. Research is a central mission of the daily activity of a pediatric nephrologist. Time needed for adequate research, for obtaining extramural funding, and for conducting high-quality competitive research is not addressed by the Workforce survey.

**Rationale for these Conclusions**

The unique relationship between pediatric nephrology and academic medicine must be given greater consideration when estimating future workforce requirements. Because pediatric nephrologists spend nearly half of their professional time in nonclinical endeavors, the workload requirements of their academic environment must be carefully scrutinized. Clinical care for most pediatric nephrologists is inextricably linked to medical student, resident, and/or fellowship education. In addition to the added educational time, recently imposed stringent documentation requirements for teaching physicians have substantially increased the clinical time requirements of academic physicians (9). These "final rules" promulgated by the Department of Justice in collaboration with the Health Care Financing Administration occurred after the completion of the Workforce survey and are examples of how the relationship of pediatric nephrology to academia disproportionately affects workforce needs for pediatric nephrology. Furthermore, it is anticipated that the number of residents, and perhaps fellows, will decrease in the future. The loss of these physician providers will require greater involvement in hospitalized patient care by pediatric nephrologists.

The Workforce survey did not attempt to examine the research needs of the discipline of pediatric nephrology. Because an ongoing goal of an academic medical center is to advance knowledge through research, this role for academic pediatric nephrologists will persist and will clearly require more than 15% time effort of the pediatric nephrologists surveyed in the Workforce study. For those pediatric nephrologists wishing to focus on a research career, both the length of training and the time required to acquire and maintain research skills is considerable and appears to be increasing. The manpower requirements to meet these research goals are not directly addressed by the survey and are considerable if research in pediatric nephrology is to continue and flourish.

The association of the majority of pediatric nephrologists with academic medical centers is also likely to result in increased transitional opportunities for the more senior members of our Society. Thus, pediatric nephrologists at the associate or full professorial level are far more likely to have greater opportunities for administrative or nonclinical roles within
pediatric departments and medical schools than would nephrologists in internal medicine maintaining a community-based practice. For example, among the current 125 pediatric department chairs at medical schools, 15 chairs (12%) were practicing pediatric nephrologists. Thus, at a minimum, 5% of the pediatric nephrology workforce has essentially left the clinical and research academic nephrology pool for administrative positions. Senior academic pediatric nephrologists may well be likely to change career direction or to retire at an earlier age than adult clinical nephrologists because their activities later in their careers may be quite removed from clinical nephrology (10). This possible contraction of a clinical career was not accounted for in the survey. The possibility of “burnout” after dealing with the stresses of the morbidity and mortality of children with ESRD should also be considered, especially because many pediatric nephrologists practice in small departments with a heavy night call and weekend call schedule. All of these factors may lead to the need to train more than the projected number of fellows.

Other roles for full-time faculty members also should be considered. With the impact of market-driven health care reform, pediatric nephrologists may be required to allocate a segment of their time to practice in primary care settings. Because many academic medical centers are impressed with the need to provide an integrated model of health care, this partial shift in role may be necessary to meet the primary care responsibilities of a large integrated faculty practice plan and to derive the income of individual faculty members. The Workforce survey does not include time for sabbaticals or retraining to learn new research and/or clinical techniques. As technology related to the field of pediatric nephrology advances, these retooling sessions are essential. All of these activities tend to increase the number of pediatric nephrology positions required.

The impact of this increased length of training, the increase in time spent on research activities, and the potential need of subspecialty faculty to be involved in primary care, as well as the transition of senior pediatric nephrologists, will increase the need for trainees (10). In addition, not all trainees actually complete their fellowship training and enter the pediatric nephrology workforce. Indeed, the nine to 12 trainees required per year to maintain current or increased time demands (see Table D-4 of the Workforce survey), with the assumption of a 49-week per year, 57-hour workweek, may also be a low estimate because of these considerations (6).

The nature of ESRD in children must also be reviewed critically. Although both the incidence and prevalence of ESRD have been remarkably stable for many years, an increase in the prevalence may occur as children transplanted during early childhood undergo chronic rejection and return to dialysis in late childhood and adolescence. The current half-life of a functioning allograft in children is 7 to 12 years and 28% of all pediatric transplant recipients lose their allografts to chronic rejection (11). Half of the children transplanted between 1999 and 2003 potentially will be on dialysis in 2010. With 400 to 600 children being transplanted annually, potentially 1000 additional patients will require dialysis in pediatric facilities (8). Findings taken directly from the Workforce survey indicate that children with ESRD represent only 1.9% of all ESRD patients, but contact time for their care is 70% greater than that adult nephrologists spend with adult ESRD patients. Therefore, the dialysis workload for pediatric nephrologists has an “inflation factor” because of the increased contact time in dialysis patients. An increase in the dialysis workload of only 10% of current values will raise the training requirement by one to two positions per year.

For renal care in non-ESRD patients to have impact on pediatric workforce needs, the prevalence of these patients would have to increase. The survey concludes that work requirements for non-ESRD patients will not increase; however, the results of the survey suggest that this conclusion may not pertain. If shortages of internal medicine nephrologists restrict the access of older adolescents and young adults to nephrology care, pediatric nephrologists may be required to continue to provide care for this population and delay transfer until an older age. Furthermore, in areas where pediatric nephrologists are not easily accessible, some children with non-ESRD renal disease currently receive their medical care from internal medicine nephrologists. Such children may no longer have access to this resource. Their clinical care will add to the non-ESRD nephrology workload of pediatric nephrologists.

Additional non-ESRD workforce needs will also occur when pediatric nephrology expertise is required for support of bone marrow transplantation, other solid organ transplantation, and gene therapy (12). Although urinary or blood pressure screening programs might uncover a currently undetected group of patients, current data suggest that the number of these patients is minimal. Yet as we gain knowledge of the pathogenesis of chronic renal diseases that begin in childhood, early interventions and diagnostic studies are likely to require greater input from pediatric nephrologists in patients with minimal disease manifestations. The role of managed care organizations in altering the number of referrals of patients within non-ESRD is uncertain. Although referrals may decline, the requirement for telephone consultations after the detection of proteinuria or hematuria by a primary care provider is likely to increase the daily workload. The overall impact of the non-ESRD patients on changes in the pediatric nephrology workforce requirements must continue to be evaluated in light of these additional responsibilities.

Finally, the issue of IMG and their relationship to fellowship training is of notable importance. As the number of training slots in the United States is potentially reduced to 110% of the American graduating class of physicians (medical and osteopathic graduates) (3), the number of international medical graduates who can potentially receive training in pediatric nephrology will fall precipitously. Recommendations for reform of the workforce have included a restriction of J-1 visa grantees, a preference for US citizens educated in foreign countries to receive training in US training programs, and a 5-year requirement to return to country of origin (3). Among certified pediatric nephrologists, 55% are US citizens with US MD degrees; 93% live in and 7% live outside the United States. Hence, reductions in the number of IMG trainees clearly will have a major impact on the pediatric nephrology workforce (3).

Four hundred ninety-four pediatricians were certified by the Sub-Board of Pediatric Nephrology between 1974 and 1995.
After the initial certifying examinations, the biannual number of first-exam candidates has been between 31 and 55. Of current pediatric nephrology fellowship trainees being tracked by the American Board of Pediatrics, 44% are women and 63% are international medical graduates (IMG) (13). A career survey of first-time candidates taking the 1996 General Pediatrics examination found that 16 pediatricians, or 0.5% of all graduates of pediatric residency training programs, are entering pediatric nephrology fellowship training programs. Data from the American Board of Pediatrics indicates that of the current 16 first-year trainees, 63% are IMG; hence, only six US graduates entered fellowship training in pediatric nephrology in 1996 (13). Accordingly, we are currently training fewer fellows than the Workforce survey predicts that our country will need if the IMG fellowship pool disappears.

**Recommendations**

Based on the above discussion, the Ad Hoc Committee for Pediatric Nephrology Workforce expresses serious concern for the adequacy of the pediatric nephrology workforce if the entry into pediatric nephrology fellowship training programs falls below 18 to 20 fellows annually. In light of the falling number of US graduates now entering pediatric nephrology fellowship training, efforts to encourage pediatric residents to pursue careers in pediatric nephrology must be maintained to assure adequate numbers of pediatric nephrologists to care for children with renal disease.

For a number of years, the ASPN has monitored trends in pediatric nephrology fellowship training and job availability. Heretofore this process has been reactive. The Nephrology Workforce survey offers an important resource to approach future analyses in what is likely to be a volatile clinical and academic environment. The ASPN must monitor the pediatric nephrology workforce closely during this uncertain time and evaluate the number of retirees, changes in clinical practice, and increasing academic demands to advise its membership on the appropriate numbers of fellowship trainees to meet the multiple demands of the discipline.

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**References**