Sustaining the Pediatric Endocrinology Workforce: Recommendations from the Pediatric Endocrine Society Workforce Task Force

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The pediatric endocrinology workforce, once projected to be in surplus, is now struggling to sustain an adequate, let alone optimal capacity. Although establishing an appropriate growth trajectory for this workforce is vital, healthcare deliberations often overlook the unique needs of pediatricians, subspecialists, and the population that they serve. A 2014 analysis predicted that the deficit of ~100 pediatric endocrinology providers would end by 2016, and thereafter an excess would develop.[1] Instead, a presumed 6% annual increase in pediatric endocrinology fellowship training positions was replaced by stagnation in trainee slots, and total fellows in pediatric endocrinology (n = 254) in 2012 declined to 243 by 2018. Decreasing application numbers have led to a current applicant to position ratio of 0.7, so that 41 out of 108 positions offered in the 2020 National Resident Matching Program went unfilled via the match (Figure). Diminished interest in the subspecialty can be attributed to factors discussed below that contribute to a highly unfavorable "return on investment" ranking for pediatric endocrinology among pediatric subspecialty careers.[2] Predictions for workforce needs are obscured by failure to account for growing clinical demand, aging of the workforce, and variations in percentage time devoted to clinical practice. Moreover, pediatric endocrinologists are experiencing a growing population of pediatric patients with type 1 diabetes and type 2 diabetes, virtually all of whom seek specialty care, and an expanding spectrum of other endocrine disorders. Projections also fail to consider that pediatric endocrinologists commonly treat patients beyond 18 years of age particularly those with diabetes and other chronic conditions.

These synchronous trends—weakening fellowship recruitment in the face of increasing patient numbers—have created a shortage of trained pediatric endocrinologists that, lacking corrective actions, will only worsen in the future. Pediatric endocrinology already has longer appointment

wait times, larger increases in referral volume,[3] and more limited accessibility for primary care physicians than other subspecialties.[4] In addition, challenges in expanding the racial and ethnic diversity and correcting geographic mal-distribution of the pediatric endocrinology workforce need to be addressed. This analysis, conducted by a Pediatric Endocrine Society Task Force, will justify the need for an expanded workforce to sustain pediatric endocrinology as a specialty, identify barriers and threats to this trajectory, and propose policy, legislative, and medical education initiatives to address these concerns.

What Evidence Raises Concern about the Future Pediatric Endocrinology Workforce?

Although the number of pediatric endocrinologists with active certification increased from 1016 in 2011 to 1386 in 2018, important factors overestimate the clinical care volume that can be accommodated by this workforce. In 2018, 21% of active certificate holders were >60 years old. Many pediatric endocrinologists in academic practice are involved in research, education, and other valuable activities that limit the time available for clinical practice. In addition, as being female (includes 69% of certified pediatric endocrinologists) and being >20 years from training are key factors increasing the likelihood of part-time work, the proportion of the pediatric endocrinology workforce that is part-time will increase beyond the current 14% reported.[3] Geographic distribution of pediatric endocrinologists is uneven with 10 states in the US having fewer than 1 per 100 000 children (American Board of Pediatrics) and ranging from 0.2 per 100 000 children in New Mexico to 5.0 per 100 000 children in Massachusetts. This also reflects that among the slowly declining number of graduating trainees in Pediatric Endocrinology, many are pursuing academic medicine careers rather than clinical practice (https://www.abp.org/content/comparison-abp-data-nrmp-match-data). In summary, current

workforce numbers overestimate the current clinical work capacity and underestimate the true numbers of pediatric endocrinologists required to meet clinical care needs.

Regarding demand, a prior workforce analysis assumed that the number of patients cared for by pediatric endocrinologists would remain relatively stable.[1] Current reality shows that the spectrum of conditions with increasing prevalence among youth and referrals to pediatric endocrinology continues to expand (discussed below). Many of these patients remain in "pediatric" care well beyond high school, and wait times for specialty care appointments, which also often require long-distance travel, are as long as 6 months in many regions of the country.[4] Accordingly, more than 80% of pediatric endocrinology division chiefs report a need to hire additional clinical faculty in the next 3 years.

Why Does the Pediatric Endocrinology Workforce Need to Grow in Number and Diversity?

Growth in number and diversity of pediatric endocrinologists is needed to match increased patient volume and diagnostic and ethnic diversity of the patient population. Between 2001 and 2009, prevalence of type 1 and type 2 diabetes among youth <20 years of age increased by 21.1% and 30.5% respectively,[5] and currently, the US has an estimated 210 000 youth with diabetes. The obesity epidemic (18.5% of children and adolescents ages 2-19 years; Centers for Disease Control and Prevention data) is accompanied by a rising prevalence of type 2 diabetes and increases in dyslipidemia, hypertension, and related disorders. In addition to "traditional" endocrine disorders, pediatric endocrinologists now care for an increasing number of children with endocrine consequences of childhood cancer and organ transplantation, cystic fibrosis related diabetes, impaired bone health associated with genetic bone diseases, chronic inflammatory disorders, neuromuscular diseases or eating disorders, and transgender youth. Few

primary care practices have resources to provide standard-of-care attention to these diagnoses, which require frequent monitoring, input from allied health specialists (eg, dieticians, nurse specialists, certified educators), and prolonged patient visits with limited reimbursement. Further, deficiencies in existing structures for transition of care and discomfort among adult providers regarding assuming care often require pediatric endocrinologists to continue providing care for adolescents with chronic endocrine conditions for several years post-high school.

Increasing ethnic, racial, socioeconomic, and psychosocial diversity of patients presents an additional challenge for the pediatric endocrinology workforce. The proportion of male pediatric endocrinologists taking the certifying examination has decreased from 50.0% in 1991 to 20.3% in 2017 (https://www.abp.org/content/pediatric-subspecialists-ever-certified). In 2019, 66.2% of "ever-certified" pediatric endocrinologists were female, and the numbers are further skewed in those ≤50 years (76.6% female) vs those >50 (51.4% female). This shift toward female providers among recently certified pediatric endocrinologists has not been accompanied by diversity in race and ethnicity. Metabolic syndrome and type 2 diabetes disproportionately impact minority and underserved groups, and the dramatic emergence of transgender care has added yet another dimension of diversity to the population served by pediatric endocrinologists. Although the racial and ethnic distribution has improved among our trainees, with underrepresented minorities comprising 23% of pediatric endocrine trainees in 2018 vs 12% in 2006, only 5.5% of 236 fellows in 2018 were black[6] vs 13.5% in the last US census. Recognizing that the effectiveness of chronic medical care is enhanced when delivered by providers and teams who resemble the patients for whom they care, the needs for a more diverse and larger pediatric endocrinology workforce are apparent.

What Factors and Perceptions Threaten the Pediatric Endocrinology Workforce Pipeline?

The American Academy of Pediatrics concluded that the number of pediatric subspecialists, including in endocrinology, is insufficient.[7] Factors contributing to the pipeline shortage include lack of early exposure to the subspecialty, financial concerns, insufficient mentorship, and potentially negative trainee perceptions regarding the quality of life of pediatric endocrinologists.[8] Medical student career choice is a trajectory influenced by personal characteristics, intellectual interests, curriculum, and clinical experiences.[9,10] Because pediatric subspecialties are not required medical school rotations, exposure of learners during a critical period of career planning is random.[11] Most first and second year pediatric residents experience endocrinology on inpatient services managing patients with diabetes, creating the impression that the specialty is 1-dimensional and rife with psychosocial challenges. By the time third year residents have an outpatient pediatric endocrine rotation, they have typically already committed to a different career path. Thus, insufficient exposure to the extensive variety and complexity of pediatric endocrinology during critical career choice periods presumably contributes to the declining number of applicants for fellowship training in pediatric endocrinology.

Financial compensation and quality of life considerations provide additional barriers. Medical student debt, now averaging $232 000, dissuades trainees from undertaking additional years of training and postponing compensation as independent practicing attending physicians. Concerns that the current 3-year training period may negatively influence recruitment to pediatric endocrinology have prompted consideration of shortening the training period required for board certification to 2 years. Barriers to shortening fellowship training include achieving consensus among the majority of pediatric endocrinologists and approval by the American Board of Pediatrics. Concerns have been raised that a 2-year fellowship may be inadequate for a specialty focused increasingly on longitudinal care and would complicate funding and training for those

pursuing a career in clinical or basic science research. The relatively low average salary of pediatric endocrinologists further discourages those for whom debt-repayment potential is a key consideration.[12] Quality of life, including a distinct separation between personal and professional time are top priorities for today's medical trainees[13] and perceived to be unpredictable for pediatric endocrinologists. Ever-increasing emphasis on nonclinical, nonacademic, administrative, and revenue-enhancing activities can have an amplified morale-draining effect when an elastic workload without time-commitment boundaries is accompanied by lower compensation. Given the profound impact of experiences with mentors in driving career choices,[13] exposure to faculty struggling with multiple stressors may further reduce attraction to the specialty.

A recent survey of Pediatric Endocrine Society members corroborated these factors as detrimental to attraction to the subspecialty. A large majority (84%) named financial constraints as the major deterrent and suggested that increased compensation (80%) and improvements in loan repayment or forgiveness options (41%) would enhance interest in pediatric endocrinology. Formative experiences during residency (57%) or medical school (45%) and faculty role models (45%) were key factors in choosing the subspecialty, highlighting the importance of early exposure to pediatric endocrinology and its faculty in creating interest in the field.[12]

How Can the Pediatric Endocrinology Workforce Grow in Number and Diversity?

The Pediatric Endocrine workforce must not only grow in number but also recruit more providers of color, more men, and more sexual and gender minorities. The specialty must also address the inequitable geographic distribution to provide more specialty care in locations distant from urban centers. In part, these objectives could be pursued by innovative provider training; eg, training and certifying primary care physicians to provide some endocrine care or training

and certifying physician assistants and nurse practitioners as remote-site endocrine practice providers collaborating with centrally located board-certified pediatric endocrinologists. However, only the most routine endocrine disorders are amenable to such extension of the workforce, with management of nuanced, complex, and acutely ill children with endocrine disorders still requiring the depth of knowledge in pathophysiology obtained through residency and fellowship training.

Rapid implementation of telemedicine during the coronavirus disease 2019 pandemic has facilitated subspecialty care especially for remote populations. Although this landscape continues to evolve in terms of reimbursement, regulation, and evaluation of care quality, telemedicine will not reduce the need for additional pediatric endocrinologists. Incentive programs such as loan forgiveness for pediatric subspecialists committed to working in underserved regions would help reduce the conspicuous scarcity of pediatric endocrinologists in many parts of the country. If funded, the Pediatric Subspecialty Loan Repayment Program, reauthorized in 2020, would be an important step toward making subspecialty training more attractive.

What Efforts Are Needed to Increase the Numbers and Diversity of the Pediatric Endocrinology Workforce?

Efforts to increase the pediatric endocrine workforce should be focused on increasing positive exposure to pediatric endocrinology and diabetes during medical school and first year of residency and lessening barriers (eg, financial burden, duration of training, perceived lifestyle detractors). Meaningful change in each will require initiatives at the training, institutional, health care system, and policy levels. At each training level, promoting interest in pediatric endocrinology requires current subspecialists to display a collective passion for the field that counterbalances stresses of productivity targets and diminishing reimbursements.

To address this challenge, the Pediatric Endocrine Society workforce taskforce recommends the following:

Teaching institutions should include pediatric subspecialty exposure in core rotations for medical students and during the first pediatric residency year. This exposure should emphasize outpatient activities to capture better the multidimensional scope and continuity-of-care aspect of the subspecialty. Pediatric endocrinology divisions should create and sustain rotations for medical students distinguished by exposure to interesting, challenging patients and enthusiastic endocrinology mentors—both fellows and faculty—to positively influence career path selection. Key organizations (eg, Council of Pediatric Specialties, Association of Pediatric Program Directors) should urge early residency exposure to nonprocedural subspecialties, including pediatric endocrinology, during the critical career planning period.

Professional societies should prioritize initiatives that connect medical students with the subspecialty and effective mentors (eg, annual meeting attendance and interactive case-based learning and career discussions). Recognizing enthusiastic fellows as influential role models for students and residents, society programs should target enhancement of fellows' networking and professional fulfillment. In an era in which burnout threatens the current pediatric endocrinology workforce, society support to facilitate members' professional and scholarly accomplishment could also help to attract future trainees.

Medical student loan forgiveness measures for applicants committed to working in underserved regions must expand beyond current options and target subspecialties with lower future financial rewards. Policies that lessen financial barriers to pediatric endocrinology would not only improve recruitment but would also reduce the effect of debt on risk of burnout.[14] Specifically,

funding of the Loan Repayment Program for Pediatric Subspecialties, recently passed by Congress, is paramount.

The widening gap between time and money investment and anticipated financial reward and professional fulfillment highlights the need to modify pediatric endocrinology training and clinical care processes to be not only effective and sustainable, but also aligned with professional and personal compensation and lifestyle goals. This includes a thorough re-evaluation of training duration, and a willingness to modify the current format if deemed appropriate. Further, shared care models that recognize and appropriately reward the essential expertise of the endocrinologist need to be implemented to enable changes in compensation necessary to sustain non-procedural pediatric subspecialties in general.[15]

Effectiveness of chronic medical care is facilitated when delivered by providers who resemble the patients they serve. Hence, these efforts need to be accompanied by an ever-increasing commitment to equity, diversity, and inclusion as core values of the subspecialty community and prisms through which the implementation and evaluation of each initiative is viewed.

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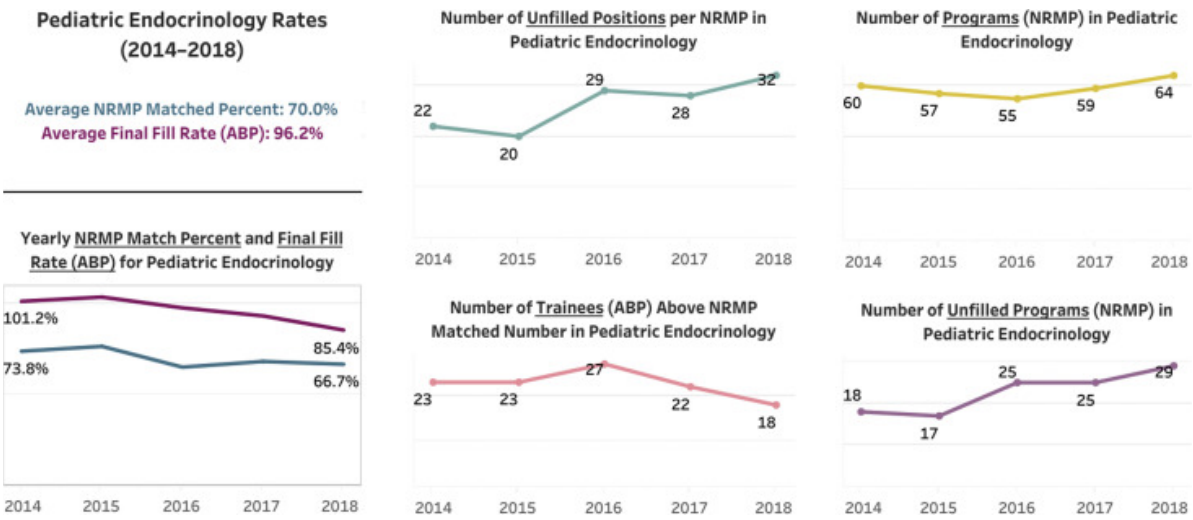

Figure. Pediatric endocrinology fellowship match and program fill rates from 2014 to 2018.

Source: National Resident Matching Program (NRMP) data and American Board of Pediatrics (ABP) data; https://www.abp.org/content/comparison-abp-data-nrmp-match-data.