

# Pediatric Dermatology: Past, Present, and Future

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**Abstract:** Up to 30% percent of pediatric primary care visits include a skin-related problem, and referrals are hampered by appointment wait times among the longest of any pediatric subspecialty. Despite the clear demand for pediatric dermatologists, there has been a long-standing shortage of providers, leaving dermatology as one of the most underserved pediatric subspecialties. Another consequence of the workforce shortage is the limited opportunity for pediatric dermatology training for residents and postgraduate general pediatricians and dermatologists. This review includes the evolution of the subspecialty from conception through the present, along with obstacles to workforce expansion and potential solutions to improve access to care for children with skin diseases.

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Between 10% and 30% of pediatric primary care visits include a skin-related problem (1–4). This obvious clinical need was the catalyst for establishing the subspecialty of pediatric dermatology, beginning with the first international symposium held in Mexico City and the founding of the International Society of Pediatric Dermatology in October 1972 (5). The Society for Pediatric Dermatology (SPD) was founded 18 months later (1). The next decade witnessed the launch of the journal *Pediatric Dermatology* in 1982 and the creation of an American Academy of Pediatrics (AAP)-sponsored Section on Dermatology in 1986. Initial interest in the subspecialty was high. Those who chose to focus their practice on

treating children with skin disease generally completed residency training and earned certification in pediatrics and dermatology (1). Since that time, the field has evolved. The enormous breadth and depth of clinical information discovered over the past four decades has filled several texts and inspired countless publications and conferences. Initial informal fellowship training experiences evolved into formal 1- to 2-year programs sponsored by the American Board of Dermatology (ABD). In 2000, the Accreditation Council of Graduate Medical Education (ACGME) recognized this unique body of knowledge as a subspecialty of the ABD (6). Subspecialty certification examinations have been held every other year since

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2004, followed by the implementation of a recertification program. Along with these changes, the demand for pediatric dermatology services has continued to grow far beyond the available workforce. This article will review the genesis of the field and the most important challenges to the future of the subspecialty.

### Defining the Subspecialty

Surveys conducted in primary care offices in the mid-1980s estimated that 10% to 30% of pediatric clinic visits included dermatologic concerns. The most common conditions were skin infections, followed by atopic dermatitis, seborrheic dermatitis, contact dermatitis, acne, and infestations (2–4). Along with this observation, pediatric training programs were noted to devote “very little time to organized teaching of dermatology” and “house officers’ experience with skin problems was likely to be on a hit-or-miss basis” (2).

At this time, when less than two-thirds of pediatric residencies in the United States offered electives in pediatric dermatology and far fewer had pediatric dermatologists to supervise the electives (7,8), several studies were conducted to compare the ability of pediatricians and dermatologists to evaluate skin problems. One comparative study assessed residents from seven training programs in the United States by asking them to identify color transparencies of dermatologic findings in children. Pediatrics residents had a mean score of 53%, compared with a mean of 86% for dermatology residents. A similar study focusing on the 20 most common pediatric dermatoses found that dermatologists made the correct diagnosis in 96% of cases, whereas pediatricians at the same institution averaged only 49% correct (9).

Related surveys in other North American countries yielded similar conclusions. Data collected from the National Institute of Pediatrics in Mexico City between 1995 and 1999 compared diagnoses made by pediatric and dermatology residents for more than 200 skin findings and found that pediatric residents misdiagnosed more than 75% of cases. This inadequacy was attributed to a lack of dermatology exposure during training in Mexico, where an average of 0.8% of the medical student curriculum was allocated to dermatology, and similar to training in the United States, where a rotation in dermatology was optional for pediatric residents, despite a much greater prevalence of skin complaints in Mexico (10).

After the founding of *Pediatric Dermatology*, the dearth of related research and publications began to

improve. Before 1983 only 15% of dermatologic journal articles focused on pediatrics and only 4% of pediatric articles focused on skin disease. The great majority of these pediatric dermatology articles were case reports, most often featuring unusual diagnoses. There were few prospective studies (11).

In 1986 the first systematic evaluation of the U.S. pediatric dermatology workforce was published (8). Fifty-seven subspecialists were identified, practicing mainly in large teaching hospitals. More than half of the individuals younger than 40 years of age. Half were board certified in pediatrics and dermatology, but few of these specialized physicians cared exclusively for children. Only 20% of practices followed a patient population that included at least 75% children, whereas more than half of the patients were adults in more than 60% of practices. At that time, a majority of hospital administrators stated that they would like to hire a pediatric dermatologist, although fewer than half had available positions, and not all of those positions were funded. The article concluded that employment opportunities were limited for pediatric dermatologists (8).

Despite that discouraging conclusion, significant progress was made in the 1990s, most notably in the number of peer-reviewed journal articles, textbooks, and meetings documenting advances in pediatric dermatology. In 2000 the subspecialty was recognized as comprising a unique body of knowledge and was formally certified by the Committee on Certification, Subcertification and Recertification of the ACGME.

### The Early Years

Expanding clinical and academic activity launched professional organizations in the United States and abroad, beginning with the International Society of Pediatric Dermatology,<sup>1</sup> founded during the first international symposium in 1973. Drs. Alvin Jacobs, Samuel Weinberg, Nancy Esterly, Sidney Hurwitz, William Weston, and Coleman Jacobson established the SPD (<http://www.pedsderm.net>) in the United States in 1975. Seven years later the European Society

<sup>1</sup>The first international symposium was held in October 1973 in Mexico City, Mexico, and was hosted by Ramon Ruiz-Madonado. The 14 participants founded the International Society of Pediatric Dermatology: Dagoberto Pierini of Argentina, E.J. Moynahan of Great Britain, Eva Torok of Hungary, Martin Beare of Ireland, Ferdinando Gianotti of Italy, Kazuya Yamamoto of Japan, Armando Franco and Ramon Ruiz-Maldonado of Mexico, and Sidney Hurwitz, Alvin Jacobs, Coleman Jacobson, Guinter Kahn, Andrew Margileth, and Lawrence Solomon of the United States (1).

International Society of Pediatric Dermatology  
 Society for Pediatric Dermatology (United States)  
 European Society for Pediatric Dermatology  
 British Society for Pediatric Dermatology  
 AAP Section on Dermatology  
 French Society of Pediatric Dermatology  
 Latin American Pediatric Dermatology Society  
 Dutch Belgian Pediatric Dermatology Society  
 Israeli Pediatric Dermatology Society  
 Italian Society of Pediatric Dermatology  
 Spanish Society of Pediatric Dermatology  
 Thailand Pediatric Dermatology Society

**Figure 1.** International organizations for pediatric dermatology.

- International Society of Pediatric Dermatology
  - 350 members
  - 5 continents
- Society of Latin American Pediatric Dermatology
  - 200 members
- Society for Pediatric Dermatology
  - 1,000 members
  - 45 states
  - 37 countries

**Figure 2.** International workforce for pediatric dermatology.

was founded. Today, many countries throughout the world have their own national societies (Figs. 1 and 2).

### Growing Demand

In the 15 years before 2001, the number of physicians in the United States who identified themselves as pediatric dermatologists nearly tripled, to 151, but contrary to the 1986 prediction (8), this supply was insufficient to meet the demand for clinical care and teaching. In 2002 a survey of dermatology residency programs in the United States found that only 48% employed a pediatric dermatologist and 25% were recruiting, although 75% of chairpersons thought it was important to have a pediatric dermatologist faculty member and 70% felt that there was a shortage of pediatric dermatologists (12). Interest in establishing a career in pediatric dermatology did not reflect the increasing demand. By 2002, 40 pediatricians had completed dermatology residency training in the previous 5 years, but only 26 were practicing primarily pediatric dermatology. During that year, 10 programs offered pediatric dermatology fellowship positions. There was no formal match program and only six positions were filled (12).

A shortage of qualified faculty and institutional organization has complicated adequate dermatology training for pediatricians. The ABD governs certification in dermatology and pediatric dermatology, whereas the much larger American Board of Pediatrics (ABP) certifies pediatricians and nonsurgical pediatric subspecialists. Pediatric residency training programs that offer a rotation in dermatology have long done so as a noncore elective. Statistics have not been collected on the number of pediatric residents electing a dermatology rotation. The quality of and access to these rotations is variable because many lack pediatric dermatology faculty and a few do not even have access to general dermatology faculty. For many pediatricians, the only exposure to dermatology may be during medical school. A 2008 survey found that 93% of U.S. medical schools offered dermatology electives for their students, often during the fourth year (13). The required number of hours for teaching in dermatology was 10 or fewer in half of the 65 dermatology residency programs included in the survey. For 8% of programs, there was no requirement. An outcome of this training gap was documented in a 2002–2006 U.S. study that ranked pediatric dermatology third behind only psychiatry and allergy/immunology as subspecialties providing long-term care to children who primary care providers could more appropriately serve (14).

A June 2004 survey including all Canadian dermatology residents ranked pediatric dermatology among the top three areas in which training had been inadequate to support their practice. There was a large discrepancy between the perceived importance of pediatric dermatology, which was ranked among the highest of several educational components of the curriculum, and overall satisfaction with training. The study also indicated that “early intervention during residency may help foster their involvement in academic career paths” (15).

During this time the ABD recognized the need for formal certification in pediatric dermatology. The process used to create certification examinations was also evolving to address the need for recertification. Pediatric dermatology was included among the three subspecialty and two general committees established to formulate questions for certification and recertification examinations.

The first certifying examination in pediatric dermatology was administered in Deerfield, Illinois, on October 4, 2004. Eligibility criteria to sit for this examination included ABD certification in general dermatology plus board certification in pediatrics and dermatology, completion of a pediatric dermatology

fellowship, or “grandfather” experience. “Grandfather” eligibility required documentation of at least 5 years of clinical practice that included at least 50% children. Ninety of the 94 registered candidates passed the 2004 examination. The majority were double-boarded in pediatrics and dermatology. Biennial examinations were subsequently held every other October, with fewer candidates and a similar very high pass rate (Table 1). During the same interval, ABD diplomates with time-limited certification began the process of recertification. This required passing a two-part examination, including one general dermatology module and a second among four available modules of the candidate’s choice. Between 2004 and 2011, fewer than 6% of ABD diplomates chose the pediatric dermatology module for recertification, making it the least popular option among the pool of ABD diplomates taking the recertification examination (Fig. 3), reflecting the decreased interest in pediatric dermatology among general dermatologists and exacerbating the existing workforce shortage.

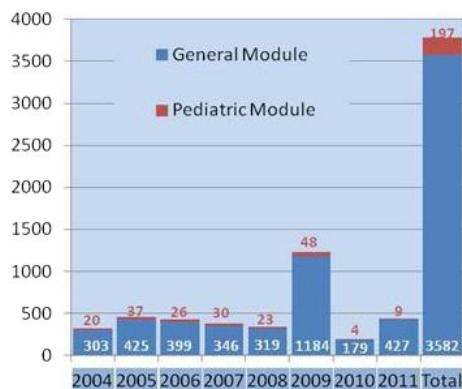
**TABLE 1.** *Subspecialty Certification of Practicing Pediatric Dermatologists in the United States*

Year	Number (%) completing a fellowship)	Number (%) passing the exam
2004	24 (25)	90 (96)
2006	3 (10)	41 (93)
2008	18 (58)	31 (91)
2010*	24 (63)	34 (92)
2012	43 (97)†	37 (86)
Total	112	233‡

\*Last year for grandfather eligibility.

†Two candidates who did not complete a fellowship were repeat test takers following prior failure to pass.

‡Approximately 60% qualified by meeting grandfather criteria.

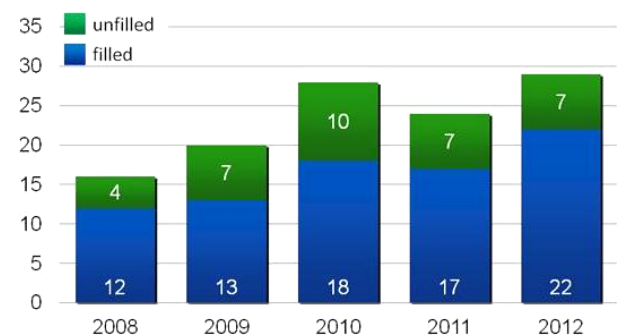


**Figure 3.** Module chosen among American Board of Dermatology diplomates taking the recertification examination.

International training standards for pediatric dermatology have also been evolving, as documented in a 2002 survey (16). In Argentina and Mexico, subspecialization follows a pediatric or dermatology residency. In the United Kingdom, pediatric residents subsequently complete a portion of their dermatology residency without an additional fellowship training requirement. In Italy, Belgium, Spain, and Germany, pediatric dermatology has not been a formally recognized subspecialty, but is practiced by physicians who complete either residency. Dermatology residents from Singapore and Australia have travelled elsewhere for further pediatric dermatology training. Peru has not formally recognized the subspecialty (16).

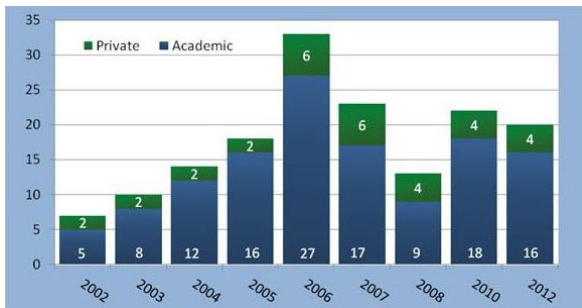
### Growing the Subspecialty

Increasing demand for all dermatologists was documented in the September 2011 Physician Workforce Study undertaken by the Massachusetts Medical Society. These data, collected in anticipation of greater demand for physician services with implementation of the federal Patient Protection and Affordable Care Act, ranked dermatology as one of six specialties facing severe shortages for at least four consecutive years (17). An increasing number of unfilled faculty and fellowship positions reflects the shortage of pediatric dermatologists in the United States (Fig. 4). The SPD newsletter has consistently posted more than a dozen faculty positions every year since 2004 (Fig. 5). Pediatric dermatology was ranked as the third least accessible subspecialty, behind only child psychiatry and developmental pediatrics, in a survey of general pediatricians. A 2009 National Association of Children’s Hospitals and Related Institutions (NACHRI) survey documented a 13.2-week average wait time for patients to get an appointment with pediatric dermatology, the longest for any pediatric subspecialty; the wait time was more

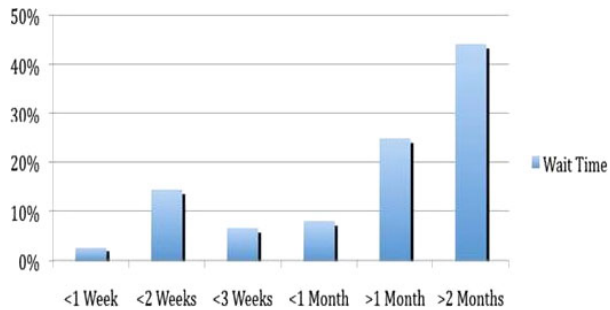


**Figure 4.** Available and filled pediatric dermatology fellowship positions in the United States.





**Figure 5.** Pediatric dermatology positions posted in the Society for Pediatric Dermatology newsletter since 2002.



**Figure 6.** Average wait time for a pediatric dermatology appointment across the United States.

than the 2-week benchmark at 66% of hospitals surveyed (Fig. 6). Despite the demand, interest in the subspecialty has been low, with only 2.1% (233) being board-certified pediatric dermatologists among more than 11,000 dermatologists in the United States.

Several forces have discouraged physicians-in-training from pursuing careers in pediatric dermatology. A 2010 SPD survey of 100 pediatric dermatologists indicated that 74% made the decision to pursue a career in pediatric dermatology during medical school or pediatric residency. Only 17% made this decision during dermatology residency. A majority of dermatology residency applicants begin planning early in medical school for the highly competitive process requiring excellent board scores, research, and publications (18).

For pediatric residents who first discover an interest in pediatric dermatology during their postgraduate training, it is increasingly too late to qualify for a highly competitive dermatology residency position. The timeframe and qualifications for securing a dermatology residency are different from those for pediatric subspecialty fellowship training, typically done during postgraduate year 2 or 3. There has also been a strong financial disincentive for many dermatology programs to accept a candidate with prior postgraduate training since 1999 legislation

limited federal funding for more than one residency (19). Furthermore, four additional years of training may discourage some pediatric residents from pursuing a career in pediatric dermatology.

For many dermatology residents, especially for those with large educational debt, salary discrepancies may be the greatest deterrent to pursuing fellowship training in pediatric dermatology. Salaries that general dermatologists earn, especially dermatologists subspecializing in procedures, cosmetics, or dermatopathology, are significantly higher than those of pediatric dermatologists. Despite the fact that an extra year of training is required to become a pediatric dermatologist, the average salary for pediatric dermatologists in the United States in 2010 was \$203,727, compared with an annual salary for most U.S. dermatologists ranging from \$287,832 to \$385,953 (20).

Postgraduate training in pediatric dermatology has evolved over the past 30 years. Before 1990, most subspecialists were board certified in pediatrics and dermatology. Between 1978 and 1985, a few motivated dermatology residents chose to enhance their training by completing an informal 3-month preceptorship that one of the founding members of the SPD sponsored. Dr. Esterly offered the first unofficial 1-year fellowship, which Dr. Adelaide Hebert completed in 1983. The first ABD-sanctioned fellowship curriculum required 12 months for trainees who completed at least an internship in pediatrics or 24 months for those who had no prior pediatrics training. Because pediatrics residency programs seldom offer a preliminary internship year, few candidates were eligible for the 1-year fellowship. Other candidates were deterred by 2 years of additional training, so a significant number of fellowship positions went unfilled.

To consolidate the time commitment and recruit candidates at an earlier stage, a 5-year combined ABD-ABP pediatric and dermatology residency was attempted at three academic centers. Two of these programs, sponsored by the University of California at San Francisco and the University of Texas at Galveston, recruited a total of seven residents starting in 2003. By the end of 2012, only four had completed joint training because of difficulties integrating rotations across two different ACGME programs. The combined programs are no longer being offered because of overwhelming administrative and scheduling challenges.

To help mitigate the 2-year fellowship disincentive, the ABD proposed a condensed 1-year program for individuals without previous pediatric residency experience. On September 19, 2006, the ABMS approved

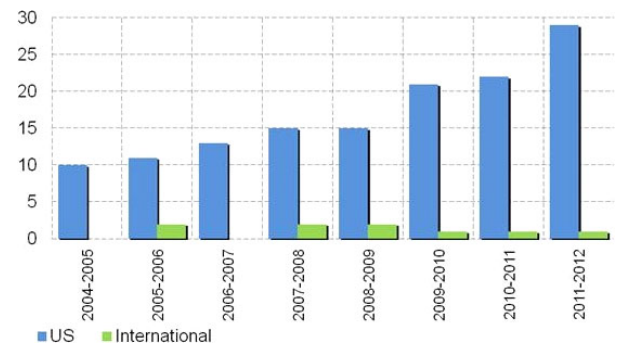
the following requirement for board certification: an ACGME-approved transitional year or an ACGME-approved broad-based year of residency training in emergency medicine, family practice, general surgery, internal medicine, or obstetrics and gynecology, followed by the requisite training and certification in dermatology and then completion of 1 additional year of fellowship training in pediatric dermatology during which 80% of fellowship time is spent in direct pediatric dermatology clinical activity.

Standardization and oversight of the fellowship programs also evolved (Fig. 7). Beginning in 2003, fellowship programs were required to apply for ABD accreditation. During that year, eight pediatric programs were approved. By 2008 the number grew to 17 (Fig. 8), but more than half of the positions went unfilled. The Pediatric Dermatology Fellowship Directors Committee was established a year later, facilitating uniform training logs and leading to a formal match, implemented in 2009 for fellowship positions beginning in 2010, using the San Francisco Match Program. The first match included 22 programs with 28 fellowship positions. Thirteen (46%) of these positions were filled. The next academic year (2011–2012), the match rate improved, with 13 of 19 (68%) programs and 18 of 28 (64%) positions filled. With a critical mass of fellowship training programs, application for ACGME accreditation has been considered. ACGME accreditation has provided uniform standards and enhances oversight for more than 100 fellowship programs in dermatopathology and procedural dermatology, but the majority of pediatric dermatology programs felt that the additional costs and administrative burden outweighed the benefits of participation.

As the workforce shortage became increasingly evident, eligibility expired for certification in pediatric dermatology via the grandfather pathway. This window of opportunity was originally approved as a 5-year period beginning with the first certification examination in 2004. Because examinations were held

biennially, approval for grandfather eligibility was lost after the 2008 examination. A request for ACGME permission to extend the window until the 2010 examination was rejected in March 2009, but was granted the following January after an appeal that stressed the need for additional board-certified pediatric dermatologists to satisfy the workforce shortage. The grandfather pathway to board eligibility officially expired after the October 2010 examination.

Although the number of graduating fellows has been small, 10 of 12 who completed training in 2008 chose academic positions and six (50%) remained at their training institution. In 2009, 9 of 11 fellows chose academic positions, and only 1 remained at her training institution. A 2008 survey of dermatology departments in the United States found that only 31% of dermatology residency programs reported an adequate number of faculty members specializing in pediatric dermatology to satisfy the clinical demand (21). Whereas 25% of programs reported at least one unfilled pediatric dermatology faculty position in 2002, 43% of programs had 34 unfilled faculty positions in 2008, with only 11 fellows in training. The average recruitment time was 4.7 years. Three-fourths of programs considered it difficult to hire or retain pediatric dermatology faculty, citing a shortage



**Figure 8.** Number of pediatric dermatology fellowship programs in the United States and internationally.



**Figure 7.** Evolution of the standardization and oversight of pediatric dermatology fellowship programs.

of qualified candidates as the most common reason. Resident decisions to choose pediatric dermatology as a career were found to be directly related to the number of pediatric dermatologists that their training program employed (21).

Exacerbating the workforce shortage is a geographic maldistribution of board-certified pediatric dermatologists in the United States, including 15 states that have none. Detailed workforce data for ABP-certified pediatric subspecialties have been collected for decades and most recently updated through 2010 (22). This database repeatedly identified pediatric rheumatology as one of the most understaffed fields, especially before 2000, which facilitated funding through the Children's Health Act of 2000 "to evaluate whether the number of pediatric rheumatologists is sufficient to address the health care needs of children with arthritis and related conditions" (23). This report acknowledged a prevalence of 300,000 rheumatic diseases among children in the United States served by fewer than 200 subspecialists, with an average ratio of 0.3 physicians per 100,000 children and an average practice capacity of 443 children. As of December 2010, the number of pediatric rheumatologists grew to 270, still less than the 337 calculated to meet patient care needs (23). Pediatric neurology is another subspecialty with a recognized workforce shortage, with 904 full-time practitioners in the United States in 2002, representing 1.27 per 100,000 children. At that time, the average wait for a new appointment was 53 days (24). Comparative data for pediatric dermatology are limited but indicate a much larger number of children with skin disease and a smaller workforce (Fig. 9 and Table 2). A 2007 survey of pediatricians ranked pediatric dermatology among the three most difficult subspecialty services to access for patient care, with more than 80% reporting a perceived shortage of pediatric dermatologists (25). Surveys that NACHRI

**TABLE 2.** Comparative Supply of Pediatric Medical Caregivers in the United States

U.S. specialty	Per capita supply
Dermatologists	30,000 people
Pediatricians	1,500 people <18 years of age
Pediatric rheumatologists	240,000 people <18 years of age
Pediatric dermatologists	385,000 people <18 years of age

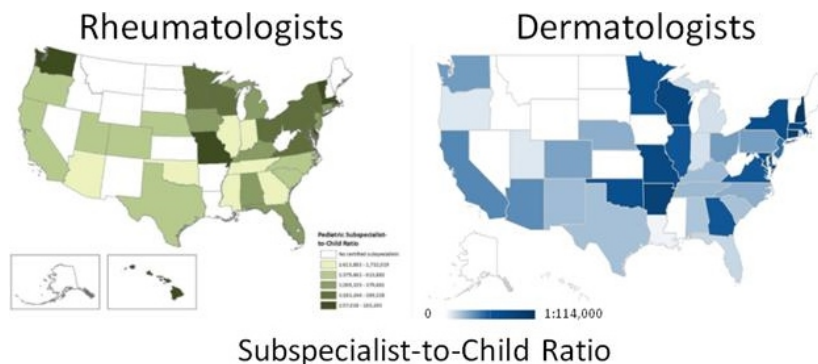
and the SPD conducted in 2010 independently documented the wait for a pediatric dermatology appointment of longer than 60–90 days, longer than for any other pediatric subspecialty (26,27).

Although clinical research in the field has been accumulating, clinical demands and lack of funding have hampered basic research. In 2007, 99% of 70 SPD members surveyed reported limitations to research. The main reason was lack of time, attributable to the high demand for clinical services, a problem that the workforce shortage exacerbated. More than one-third also cited lack of training and 10% cited lack of mentoring as impediments to research. Only 43% of pediatric dermatologists felt qualified to act as research mentors to residents and medical students (28).

### Current Challenges

In addition to the challenges detailed above—an absolute shortage of pediatric dermatologists, inadequate training of primary care providers and general dermatologists, limited medical student exposure, postgraduate training obstacles, a paucity of experienced mentors, and salary inequity—other challenges exist, including a disproportionate number of under-insured patients.

In 2010 the 196 board-certified pediatric dermatologists represented fewer than 2% of more than 11,000

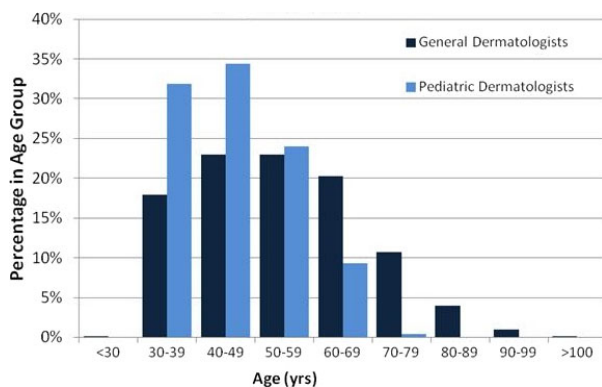


**Figure 9.** Comparative densities of pediatric dermatologists and rheumatologists across the United States.

U.S. dermatologists (29). Sixty-eight percent were female and 32% male. On a positive note, the average age of these practicing pediatric dermatologists was 47 years (range 32–67 years), representing a slightly younger workforce than that of general dermatology (Fig. 10).

Skin diseases in children are common and represent a spectrum of conditions different from those in adults. Ideally, primary care physicians should be able to treat a significant number of these children, but the proportion of pediatric residency training dedicated to learning about the diagnosis and management of dermatologic disease does not reflect disease prevalence. Pediatric residents' and practicing pediatricians' diagnostic errors have been reported to range from 80% to 90% (10,30). The true number of incorrect diagnoses may be lower, but each incorrect diagnosis can lead to inappropriate testing and management, which can result in poorer patient outcomes and higher medical costs. Severe skin disease is not uncommon and can take a heavy toll on a child's and family's quality of life. The pediatric dermatologist workforce shortage most negatively affects these patients.

The shortage of clinicians adequately trained to treat skin disease disproportionately affects children of low-income families. As of 2009, 15 million (21%) American children lived in households below the federal poverty line, and 31 million (42%) lived in low-income households (31). Thirty-nine percent of hospitalizations for children are billed to Medicaid (32), which insures 37 million children (33). Studies have shown that children covered by Medicaid face significantly more barriers to care than children with private insurance. This may be partially because of limitations related to socioeconomic deprivation, but an important cofactor is that many specialists do not accept Medicaid.



**Figure 10.** Age distribution for general and pediatric dermatologists in the United States.

Approximately 80% of general pediatricians accept Medicaid-insured patients, although the wait time for an appointment may be twice as long, at an average of 42 days versus 20 days for those claiming private insurance (34). Access to subspecialty care is much more limited. A 2011 secret shopper survey of follow-up appointment access from a pediatric emergency department in Cook County, Illinois, found a 66% denial rate for patients claiming Medicaid, compared with 11% for privately insured patients (33). Dermatology was among the top three specialties cited as having limited access. In April 2011 the same technique detected a 19% national acceptance rate among dermatologists willing to schedule a new patient appointment for a Medicaid-insured child with eczema (35).

Fee-for-service reimbursement is one of several factors exacerbating the shortage of specialists accepting Medicaid. In 2011 the average reimbursement for a level 3 new patient office visit (Current Procedural Terminology code 99243) was \$99.86 from Medicaid Children's Health Insurance Program, versus an average of \$160 from a private insurance company, and wait times for Medicaid payments often far exceed those for payments from private insurance companies (33).

### Looking Forward

Understanding the broad scope of forces that influence the supply of medical resources can help remedy the shortage of providers and encourage medical advances for children with skin diseases. Solutions are unlikely to be found in simple principles of supply and demand given the complexities of academic and public policy, market forces, and private funding that govern health care. Important factors include educational exposure, training requirements, physician-trainee and graduate training program selection bias, medical center mandates to provide care, payer responsibility to ensure patient access to specialists, relative reimbursements, and medical advances.

### Trainees

Subspecialty exposure and mentorship have been recognized as leading factors in career choice. The ABD and ABP are organizations with the authority to regulate training requirements that can influence these opportunities. Given the shortage of pediatric dermatologists and the elective status of the clinical rotation, few medical students get the chance to interact with experienced faculty. The most recent ACGME-approved Program Requirements for Graduate Medical Educa-



tion in Dermatology (2007) include nonspecific requirements for “adequate” training “to provide knowledge and competence in four broad categories,” including pediatric dermatology (36). Although explicit requirements were also specified for dermatologic surgery training to “be directed by a physician with advanced fellowship training in procedural dermatology or its equivalent” and for dermatopathology training to be “directed by a physician with subspecialty certification in dermatopathology, or its equivalent” (36), no such requirements were included for pediatric dermatology faculty. This document is reviewed every 5 years, but the 2013 draft failed to add a requirement for fellowship-trained or certified pediatric dermatology faculty since the faculty of many dermatology programs do not currently include a pediatric dermatologist. A specific dermatology residency program requirement for faculty certified in pediatric dermatology is essential to ensure adequate mentorship opportunities and a higher level of instruction for more trainees. While such a requirement would put some programs at risk for an ACGME Residency Review Committee (RRC) deficiency citation, lack of a requirement is a relative disincentive. Only with an adequate number of pediatric dermatologists as academic faculty can the Dermatology RRC implement more well-defined requirements for dermatology residents. A subsequent goal would be for the much larger Pediatric RRC to establish requirements for resident rotations in pediatric dermatology, which could ultimately facilitate exposure for medical students. Creation of a standardized electronic curriculum is a realistic alternative to filling faculty positions in all pediatric training programs. The charge of the SPD Education Committee is to develop an online education program for pediatric residents and pediatricians. Once the curriculum is established, a short-term goal is to gain approval from the Pediatric RRC to require participation in this program for all pediatric residents.

A few funded programs have been established to boost exposure and opportunities for mentorship in pediatric dermatology. These include two mentorship programs and two visiting professorships. The Women’s Dermatologic Society provides up to \$2,000 to cover travel and living costs for eligible dermatology residents or junior faculty to work with a senior faculty mentor (<http://www.womensderm.org/grants/mentorship.html>). Since the program’s inception in 2001, several of the mentors have been pediatric dermatologists. Several of the participating trainees have gone on to board certification in pediatric dermatology. The SPD founded a Mentorship Grant program in 2012, providing up to \$4,000 to cover the costs of travel and accommodations to work

with a senior faculty member (<http://www.pedsderm.net/sections/mentorship.php>).

Visiting professorships were designed to provide 2 days of introduction to pediatric dermatology for institutions that lack full-time faculty. The AAP Section on Dermatology sponsors annual awards honoring Dr. Walter J. Tunnessen, Jr. that fund 2 days of lectures, seminars, and rounds with pediatric residents, medical students, and faculty for two pediatric residency programs annually (<http://www2.aap.org/sections/derm/visitprof-derm.htm>). The SPD funds two similar Pediatric Dermatology Visiting Lectureships every year in honor of Dr. Nancy Esterly. U.S. or Canadian accredited dermatology residency programs without access to an expert in pediatric dermatology are eligible (<http://www.pedsderm.net/sections/VisitingLectureship.php>).

Many other strategies could support interest in pediatric dermatology among trainees at all levels. An Internet search for medical student rotations yields only individual program websites. A centralized list of available rotations in pediatric dermatology could help students locate and compare educational opportunities at all participating institutions. The most influential organizations equipped to post this list include the SPD, ABD, ABP, AAP, and AAD. There are other opportunities to increase medical student exposure. Many institutions host dermatology interest groups for students contemplating careers in dermatology. Pediatric dermatologists should be proactively involved with these groups. Likewise, pediatric dermatologists should provide lectures to third-year medical students and encourage participation in clinics during required rotations in pediatrics. They should also offer a subspecialty elective for fourth-year medical students to include clinical exposure and participation in publication-worthy projects (e.g., case reports, reviews, and research).

Given the high proportion of outpatient pediatrician visits for skin-related problems, better education of pediatric residents is critical. Pediatric residency programs are not required to provide training in pediatric dermatology. A positive change was implemented in 2011, when the Pediatric RRC elevated dermatology to the first tier of outpatient electives for pediatric residents. Although this is an improvement, a dermatology rotation is still not considered a requirement or even a core elective because of the recognized paucity of pediatric dermatologists in pediatric training programs (37). Nevertheless, the prevalence of skin disease in pediatric practice mandates such training. For many programs lacking a pediatric dermatologist, implementing an alternative should be a priority. Novel alternatives are Web-based curricula or a series of lectures given by

pediatric dermatologists who travel from their home institutions. Core training in the diagnosis and management of the five diagnoses that account for more than half of all pediatric dermatology consultations (atopic dermatitis, acne, warts, molluscum, vascular birthmarks) should have the greatest effect.

For centers with pediatric and dermatology training, a relationship between the two would be beneficial for both (38). Pediatricians could gain specialty knowledge from dermatologists, and because most dermatologists are primarily trained in internal medicine, dermatologists could gain insight into how to best approach examinations and communication with children and their caregivers. Patients would benefit from more accurate diagnoses and better treatment. Such academic centers might consider devoting specific clinic time so that pediatric and dermatology residents could see patients together (38). This would require additional commitment from a supervising pediatric dermatologist, the willingness of residency programs to devote training time (or an RRC requirement), and cooperation between clinical departments of pediatrics and dermatology.

The dermatology resident selection process represents a strategic opportunity to build the subspecialty. Dermatology training programs that make a conscious effort to consider applicants with prior graduate medical education training in pediatrics or a documented interest in pediatric dermatology can expand their faculty from within. Achieving a critical mass of pediatric dermatologists at a single institution is a likely contributing factor for training future pediatric dermatologists and retaining pediatric dermatology faculty. This strategy has proven effective at several institutions, including the University of California at San Diego, Northwestern University, and the Medical College of Wisconsin.

### **Academic Faculty**

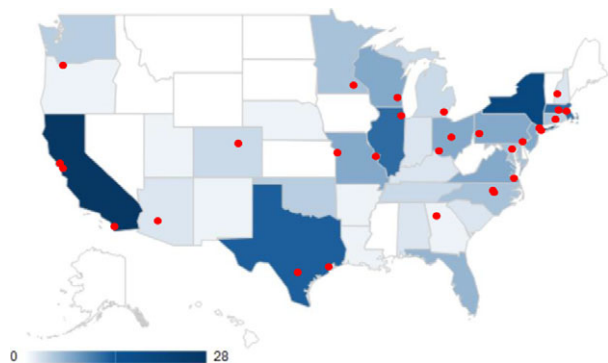
The demand for academic pediatric dermatology faculty has been high, but more than one-third of fellowship positions have gone unfilled, sometimes for several years. Although it may be ideal to inspire and mentor candidates during the early years of medical school, many physicians-in-training do not commit to a specialty until much later. A significant bottleneck in the current pathway to a career in pediatric dermatology is at the point of acceptance into a dermatology residency program.

One solution to this problem is to develop fellowship or certificate programs that allow ABP diplomates to pursue further training in pediatric

dermatology. A fellowship curriculum would reasonably require 3 years, comparable with all other pediatric subspecialty training programs (21). A certificate of added qualifications, similar to that currently offered for sports medicine and medical toxicology, would not produce a fully trained subspecialist, but it would require less training (likely 1 year) and would improve a general pediatrician's competence in the diagnosis and management of common pediatric skin diseases, decreasing referrals to pediatric dermatologists. The addition of board-eligible pediatricians would expand the pool of candidates and provide some flexibility for physicians to choose pediatric dermatology at a later stage of their training. Some have argued that a resident receiving 3 years of training in pediatrics followed by 3 years in a pediatric dermatology fellowship may not have comparable exposure to dermatopathology or procedural dermatology, but a counter to this argument is the higher value of additional exposure to pediatric primary care, the spectrum of pediatric subspecialties, inpatient and intensive care, and exclusion of unneeded training in skin cancer surgery and cosmetic dermatology. Furthermore, because the salary of a pediatric dermatologist is expected to be higher than that of a general pediatrician, the additional training provides a greater financial incentive for a pediatrician than for a resident trained in general dermatology.

An additional logistical hurdle to consider with initiating a new training pathway for pediatric dermatologists is that most ABP-sponsored pediatric subspecialty training programs require a total of 6 years (3 years of fellowship after 3 years of pediatrics residency), compared with the current 5 years for dermatology board-eligible candidates. Alternative certification pathways would require joint ABP-ABD sponsorship and raise several challenges, including funding sources, competition with current traditional pediatric dermatology fellowships, and naming and defining the scope of practice for diplomates trained via different pathways. Any training program outside of the current pathway is controversial, even among pediatric dermatologists, but the SPD plans to formally evaluate the viability of these options.

After completing a fellowship, physicians who choose an academic career help satisfy an important need. Positions for new faculty in well-established departments are generally more attractive and more easily filled than those as the first or only pediatric dermatologist, but to address the geographic maldistribution (Fig. 11), more pediatric dermatologists must make the difficult decision to accept faculty positions as solo pediatric dermatologists. Pediatric



**Figure 11.** Comparative density of pediatric dermatologists across the United States with locations of pediatric dermatology fellowship programs highlighted.

dermatologists considering these positions need to negotiate proactively for sufficient administrative, clinical, and investigational infrastructure support to be successful in a setting that includes caring for a large number of underinsured patients. The SPD hosts sessions at its annual meeting designed to educate fellows and junior faculty about the issues related to negotiating these terms. To underscore the ongoing importance of this subject, the society's 2013 Strategic Plan includes establishing a committee for junior faculty and fellows and another for mentorship.

Additional incentives could help to alleviate the limited access to a dermatologist of Medicaid-insured children. There is current legislation to bring Medicaid payments in line with Medicare. Legislation that extends loan forgiveness to pediatric subspecialists who practice in underserved areas is another option that could help mitigate the financial disincentive. Pediatric dermatology is far more cognitive than procedural and focused on preventative and maintenance care, with the goals of limiting emergency department visits and hospitalizations. But those procedures performed by pediatric dermatologists are performed more cost effectively in the office rather than in the operating room. Data are needed to document these cost savings. The current fee-for-service system that compensates for procedures at two to three times that of cognitive services cannot be sustained under the provisions of the Affordable Care Act of 2010. The level of revenue is the current standard that hospitals and providers use to determine the value of a clinical service. Although it is far easier to quantify revenue than cost savings, analysis of the savings that pediatric dermatologists provide would help quantify the value of the subspecialty.

## CONCLUSION

In the four decades since its inception, the field of pediatric dermatology has witnessed a dramatic evolution and growing clinical demand that has far exceeded the workforce supply. Cultivating interest in pursuing a career in pediatric dermatology to fill the current provider shortage and improve training for medical students and postgraduate physicians-in-training is important for the future of this indispensable field. Finally, alternative training pathways such as the development of pediatric dermatology fellowships and certificates of added qualifications for pediatricians may be options to meet the pediatric dermatology workforce shortage.

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