

SPECIAL ARTICLE

A History of Pediatric Specialties

The following is the third article in this series. Drs. Haggerty and Green describe the history of the development of academic general pediatrics including the history of the Ambulatory Pediatric Association. They discuss the role of this field in education and research in the prevention and treatment of disease as well as study of and contribution to the societal issues that affect child health.

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History of Academic General and Ambulatory Pediatrics

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ABSTRACT

Academic general pediatrics and ambulatory care are closely linked to the development of the Ambulatory Pediatric Association, an organization with nearly 2000 members active in teaching, patient care, and research. Primary care, behavioral-developmental pediatrics, prevention, health promotion, community pediatrics, socioeconomic issues, cultural and ethnic diversity, advocacy, research in education, social issues, and environmental health lie within the purview of general pediatrics. In part, because of their teaching and patient care obligations, but also due to a lack of fellowship research training, many general pediatrics faculty have had difficulty in accomplishing significant research. By supporting fellowship training in general pediatrics, The Robert Wood Johnson Foundation General Pediatrics Academic Development Program and the current fellowship program supported by the Bureau of Health Manpower are important efforts to remedy this deficiency. The sciences basic to general pediatrics research include epidemiology, biostatistics, and the behavioral sciences. In addition, general pediatrics research often borrows from other sciences and collaborates with investigators

in other disciplines. Partnerships between general pediatrics divisions and practicing pediatricians for teaching and research, e.g. the Community Education in Community Settings program, provides a realistic educational program for future pediatricians. The Pediatric Research in Office Setting network is another important vehicle for translation of research into the practice of general pediatrics. The steady growth of the Ambulatory Pediatric Association over the past four decades is testimony to the creativity, adaptability, and verve that has characterized the discipline of general pediatrics. (*Pediatr Res* 53: 188–197, 2003)

Abbreviations

AAP, American Academy of Pediatrics
APA, Ambulatory Pediatric Association
CHIP, Child Health Initiative Program
COR, Collaborative Office Rounds
HHS, Health and Human Services
PECS, Pediatric Education in Community Settings
PROS, Pediatric Research in Office Settings

Before World War II, most pediatric faculty were generalists, even as some academicians were developing subspecialties. As the latter became engaged full-time in a subspecialty,

the need arose for other faculty to provide patient care and teaching in general pediatrics, especially in the outpatient department. Whereas *general pediatrics* is what practicing pediatrician do, this review deals largely with its academic aspects, now usually called *academic general pediatrics*.

Early in the 1950s, faculty responsible for managing outpatient departments, differentiating themselves from the developing subspecialties, began to hold informal discussions at the

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DOI: 10.1203/01.PDR.0000042457.58902.F2

spring Pediatric Research meetings. In 1953, Dr. Barbara Korsch, then director of the pediatric outpatient department at Cornell, convened a group of about 30 such pediatricians at the May meeting of the Society for Pediatric Research and the American Pediatric Society at Old Point Comfort, Virginia. At that time, she was the pediatric director of the Comprehensive Care Program that emphasized health services research and medical education reform at Cornell University Medical School. Dr. Korsch was influenced by the psychoanalyst David Levy, who pioneered the psychosocial approach in well-child clinics in the New York City Health Department, and by Milton J.E. Senn, foreshadowing the emphasis on the psychosocial aspects of pediatrics by academic generalists. She has continued to be a leader in general pediatrics, emphasizing the doctor-patient relationship and interviewing skills as basic to all pediatric practice and to the comprehensive care of children with chronic physical disorders, themes that have continued to be central in general academic pediatrics.

That informal gathering in 1953 and in subsequent years led, in 1960, to the formation of a society focused on the nonhospital care of children. Dr. Richard Olmsted, the first president of the organization, had trained with Dr. Donel Dunphy at Yale, and they were in pediatric practice together for a time in Connecticut. Subsequently, they became full-time directors of outpatient departments, and later chairs of medical school departments of pediatrics at Oregon and Iowa, respectively. This linkage between pediatricians who practice general pediatrics and the faculty who teach it is another continuing thread in this field.

Because academic general pediatrics is closely linked to the development of the APA, a historical review of that organization and its scientific programs provides an understanding of the current status and wide-ranging contributions of general pediatrics to the health and welfare of children. As recorded in *The History of the Ambulatory Pediatric Association* (1), "this first gathering considered ways of interesting and preparing other staff members and students in the health supervision of well children, teaching the psychological and emotional aspects of pediatrics, and generally improving the standards of out-patient care for children with common illnesses." Although the original organization's name (Association for Ambulatory Pediatric Services) was chosen carefully with better services for children considered noncontroversial, the term *ambulatory* caused much debate. To include other aspects of nonhospitalized pediatric services, e.g. emergency rooms, community health centers, and private office practices, the word *ambulatory* was considered preferable at the time to the alternate suggestion of the Society of Out-Patient Directors, even though the major organizers of this group held such positions.

In 1968, the organization changed its name to the APA. By omitting the term *services*, the organization wished to emphasize that research and teaching were major activities of its members as well as providing services to children.

The association, which now has nearly 2000 members, consists largely of pediatricians as well as other members of the health professions and other individuals who are actively engaged in teaching and patient care or research in ambulatory pediatrics. By the 1970s, it was a vigorous group, holding its

annual meetings in conjunction with the Society for Pediatric Research and the American Pediatric Society. Today, it is one of the sponsoring members of the Pediatric Academic Societies. In the 1970s, spirited debates occurred at the annual meetings over universal entitlements to health care, boycotts of infant formula companies, access to legal abortion, and whether the goals of the organization should include advocacy as well as research and education.

Clearly, the majority of its members have opted for advocacy as part of the organization's agenda. This commitment has led to advocacy being introduced as a part of some pediatric residency programs, usually a responsibility of the divisions of general pediatrics. From its founding, its members have included nurses, social workers, behavioral scientists, and a few practicing pediatricians, as well as full-time pediatric academicians. Such faculty members now constitute the largest division in many pediatric departments. Although sound investigative work was being done by a few of the pioneers, many general pediatrics faculty have had difficulty in accomplishing significant research, in part, because of their heavy teaching and patient care obligations compounded by a lack of fellowship research training.

The General Pediatrics Academic Development Program, begun in 1978 and supported by The Robert Wood Johnson Foundation, was an important effort to remedy this situation (2). Dr. Robert Haggerty, director of this program, had emphasized the need for research in his presidential address to the APA and throughout his career. Over 100 general pediatrics faculty received training in that 2-y fellowship program over a 10-y period before the program ended. A 15-y follow-up study found that two thirds of these Robert Wood Johnson trainees were in full-time academic positions.

Today, other sources of support for fellowship training in general pediatrics include The Robert Wood Johnson Foundation's Clinical Scholars Program, their Generalist Faculty Scholars training program, as well as grants from the Bureau of Health Manpower Training of the Department of HHS. However, the survey cited above found that fewer than 30 fellows were currently enrolled in such 3-y training programs in the United States. Although a number of shorter fellowship programs exist, they rarely provide adequate research training for an academic career. It is now generally accepted that 3 y of training after completion of residency is required by most fellows to prepare for an academic career in all subspecialty areas, including academic general pediatrics. The sciences basic to general pediatrics research are epidemiology, biostatistics, and the behavioral sciences. In addition, research in general pediatrics often borrows from other sciences and collaborates with investigators in other disciplines.

As duties of these faculty members grew to include well-newborn nurseries, often the emergency room, the continuity clinic, adolescent medicine, and behavioral pediatrics in some institutions, the term *general pediatrics* began to be used as the name of these divisions. Although more than 90% of these divisions in pediatric departments are now called *general pediatrics*, changing the name of the APA to substitute "general" for "ambulatory," though often proposed, has been opposed by the majority of the members. In this case, tradition

outweighs accurate description of the current status. According to a national survey, the clinical responsibilities of academic divisions of general pediatrics include continuity clinics in 96%, outpatient department in 87%, community programs in 79%, student fellowships in 61%, adolescent unit in 60%, normal newborns in 52%, chronic disease clinics in 47%, inpatient unit in 45%, urgent care center in 44%, development/behavior in 37%, residency program in 36%, and emergency program in 28% (3).

The best definition today is that *general pediatrics* is what most practicing pediatricians do, but academic general pediatric faculty have the additional roles of teaching, research (in both clinical and health services), and advocacy for better child health services. A unifying theme has been the holistic approach that considers all of the factors that affect a child's health and includes all organ systems. This is not to say that organ subspecialists, such as cardiologists or nephrologists, or etiologic subspecialists, such as infectious disease specialists, do not provide care for the whole child, but the generalist is an integrationist and coordinator of knowledge from other specialties as well as a provider of services not in the province of any other specialty, such as well-child care with an emphasis on health promotion.

Approximately 30–40% of general pediatric visits are for acute illnesses, usually viral, respiratory, or gastrointestinal; an additional 3–10% for chronic physical illness; and another 30–40% for well-child supervision, with little time devoted to the care of hospitalized children. General pediatricians provide a medical home for children, involve the family in family focused care, and collaborate with other physicians, nurses, dentists, allied health professionals, and educators to help ensure comprehensive care, especially for children who have complex chronic physical diseases. That general pediatricians deal with common problems that affect large numbers of children, usually out-of-hospital, is another unifying theme.

Academic divisions of general pediatrics vary greatly, but all are involved in teaching and in providing patient care to the nonhospitalized child and, in some instances, for sick children in hospital. Although behavioral and developmental pediatrics and adolescent medicine have become subspecialties in the academic community, with their own professional organizations, journals, and subspecialty certification boards, the practicing generalist will continue to provide most of such care in the community. In some institutions, these subspecialties, as well as pediatric emergency pediatrics, are sections in a division of general pediatrics. Most members of these newer sub-boards, still relatively few in number, are members of a faculty and not in community-based practices. The process of splitting off behavioral, developmental, adolescent, and emergency pediatrics from academic general pediatrics, while probably inevitable, has fragmented the field in a way that the authors find unfortunate inasmuch as research methods cross all these subspecialties and the central theme of general pediatrics is integration of services for the child. Often, the same child has problems that cross all of these subspecialty fields.

Most of the teaching sites for general pediatrics in pediatric departments serve poor families, usually covered for their medical insurance by Medicaid or the new CHIP and present more social

and economic concerns along with their medical problems than children seen in private practice. Although learning how to deal with such social problems is an important part of being a pediatrician today, along with the need to learn advocacy techniques, this educational experience has been criticized by some as inadequate to prepare pediatricians for practice in the community where most patients are from middle-class families and covered for medical insurance by Blue Cross/Blue Shield or private insurance and have fewer, or at least different, social-psychological problems. This gap has led to the development of partnerships between general pediatric divisions and practicing pediatricians for teaching and research. The PECS program, initially developed by Drs. Evan Charney and Kenneth Roberts at the University of Massachusetts and later adopted by many other departments, represents both an important university-practitioner interaction in many communities and a more realistic education for future pediatricians (4).

Primary care is another term that has become popular in the past decade. Most general pediatricians provide primary care, defined by the Institute of Medicine's report on the future of primary care as "the provision of integrated health care services by clinicians who are accessible for addressing a large majority of personal health needs, developing a sustained partnership with patients and practicing in the context of family and community" (5). The primary care specialties are pediatrics, general internal medicine, family medicine, and usually obstetrics as well. An increasingly popular pathway to primary care is the combined pediatrics–general internal medicine program. One difference between family medicine and pediatrics is that general pediatricians usually do not provide actual care for the adults in the family but maintain a family focus while providing out-of-hospital care. Primary care pediatrics has been given visibility with the publication of a major textbook *Primary Pediatric Care*, by Dr. Robert Hoekelman (6), first published in 1978 and now in its fourth edition. This, together with the authors' earlier textbook, entitled *Ambulatory Pediatrics*, have helped define the field and provided a basis for teaching.

Thus, general pediatrics is very broad in scope and eclectic in its knowledge base, borrowing content from pediatric subspecialties, family medicine, internal medicine, psychiatry, the allied health professions, and the basic biologic sciences. Some general pediatricians have a special interest in research, in administration, and special areas such as child behavior and development, adolescent medicine, school health, allergy, neurodevelopmental problems, or public health. Hospitalists are hospital-based, general pediatricians who care for children admitted to the hospital with acute illnesses.

Because of its eclectic background and utilization of research from many other fields, it is often difficult to trace precisely the contributions made by general pediatrics to practice and the health of children. As a borrower of knowledge developed by other disciplines, general pediatrics is often involved in the application of new advances to populations of children. The many new immunizations are a good example. Although they usually are developed by infectious disease experts, it is the generalist who, by and large, must see that they are introduced into the child population. Generalists also participate in the clinical trials that prove efficacy and effec-

tiveness of treatments developed by subspecialists. An important new vehicle for translation of research into the practice of general pediatrics is the PROS, a network of over 1500 practicing pediatricians who do research with common protocols developed by their members in their office-based practices (7).

The following discussion is an effort to separate the original contribution, such as development of a vaccine by a subspecialist, from its application to large groups of children, the contribution of the generalist. We have referenced some but not all the topics listed, merely to prevent the bibliography from becoming book-length. We regret that space limitations result in omission of many other cogent references.

CONTENT OF GENERAL PEDIATRICS

Health supervision: prevention and health promotion. Prevention and health promotion are high on the agenda of general pediatrics. The publication *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, now in its second edition, was developed by multidisciplinary expert panels to help pediatricians and other professionals meet the preventive and health promotion needs of infants, children, and adolescents (8). It was directed by Dr. Morris Green, one of the early leaders of the APA. In his career he has emphasized the need for comprehensive care of children with chronic physical disorders. His early training was with Dr. Julius B. Richmond, an early member of the APA whose career has spanned almost all of general pediatrics. Dr. Richmond promoted the field of child development as the basic science of pediatrics. Later, he headed a major child psychiatry program and was the Surgeon General of the United States, who initiated the decennial report on goals of health for the nation in the publication *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* (9). This seminal publication emphasized health promotion as well as health services as the means by which the nation would improve its health status. It was thus natural for Dr. Green to lead the effort to define new guidelines for health supervision in children. In general pediatrics, as in most fields, progress can be traced from a few early leaders to their students and then to the broader profession. *Bright Futures* represents a culmination of the work and thinking of many such early leaders. In its anticipatory guidance section, topics addressed include the promotion of healthy habits, nutrition, and lifestyles; prevention of injury and violence; oral health; sexuality education; social competence; mental health; constructive family relationships; and community participation. Although the cumulative knowledge base of health supervision has grown substantially, much additional research is needed to prove the effectiveness of currently recommended practices.

In our textbook, *Ambulatory Pediatrics* (10), the first textbook to be so titled, first published in 1968 and now in its fifth edition, we emphasized prevention of illness and promotion of health as the lynchpins of general pediatric practice. The well-child visit has changed considerably from its origin in health departments in rural areas sponsored by the Commonwealth Fund (11). The popularity among parents for the four major functions of child health visits—assessment, immunizations, counseling, and referral—remain. It is unfortunate that

so little research has been done on the effectiveness of the total package, a major need and hopefully an important task for the new Child Health Research Center, initiated by the American Academy of Pediatrics.

Notable contributions to specific pediatric preventive practice have been made in child abuse (12), the new morbidity (13), injury prevention (14), screening for genetic disorders, immunization (15), poisoning (16), the vulnerable child syndrome (17, 18), adaptation to divorce and bereavement, adoption, stress-related disorders, pain management, maternal and infant attachment (19), the efficacy of a doula [a woman who is experienced in providing continuous emotional support of a mother during labor (20)], the psychosocial aspects of chronic physical disease (21, 22), community pediatrics (23), children of parents with mental illness, mood disorders, prevention of mental illness (24), the classification of children's mental illnesses (25), attention deficit disorder, school-age pregnancy (26), obesity, conflict resolution, and prevention of smoking and substance abuse. Increasingly, environmental hazards posed by chemicals and contaminated food are recognized prevention issues and now represent one of the new fields of general pediatrics. As each of these new and important topics is developed, a major issue is how to continue to add increasingly to the limited time and compensation for these general pediatric practice roles. A few studies have demonstrated that group meetings are one way (27) but the logistics of organizing these and the reluctance of most families to participate in them have hindered progress. The addition of new personnel such as pediatric nurse practitioners (28) and child development specialists (as in "Healthy Steps") is another way, but there remain economic barriers that preclude their widespread adoption.

When the specialty of pediatrics arose in the late 19th century and well into the 20th century, infectious diseases were the major threat to child health. Although new infections and resistant organisms continue to be problems, several new threats to child health have been recognized. Today, major social threats to children include divorce, reduction in neighborhood cohesiveness, weakening of family relationships, family violence, homelessness, the growing influence of the media (television, movies, and the Internet), decrease in the time parents spend with their children, both parents working, adaptation of immigrant families, inadequate schools, and the dramatic increase in the number of children being reared by grandparents. Over 25% of the nation's children live in one-parent households, almost 11 million mothers who have preschool children work outside the home, over 10% of children are without health insurance, and one-in-four infants and toddlers are poor. Social and community pediatrics are terms used to define the efforts of general pediatrics to study and develop interventions to deal with these new problems, usually in conjunction with other disciplines and with public policy interventions as well as individual pediatric services (29). A recent initiative of the Dyson Foundation is support of divisions of general pediatrics for enhancement of pediatric resident training through the addition of community experiences.

Behavioral-developmental pediatrics. No field offers more challenge or promise for future pediatric practice than the prevention of mental illness and behavior disorders. Developmental,

behavioral, or learning problems are present in 20–25% of the nation's children—a higher frequency than that of any other chronic disease. As with other aspects of general pediatrics, there is a growing interest in identifying psychosocial risk factors, many of which contribute to several emotional disorders, and in early intervention strategies. The recently published *Diagnostic and Statistical Manual for Primary Care (DSM-PC), Child and Adolescent Version* (25) provides a much-needed nosology and diagnostic codes for psychosocial disorders encountered in primary care practice. A major deterrent to the psychotherapeutic role of the pediatrician continues to be the lack of adequate reimbursement by insurance plans or other third-party payers as well as limited training in most residency programs.

Although the number of faculty in the biobehavioral and developmental aspects of pediatrics has increased substantially in recent years, those trained in research methodology remain in short supply. The knowledge base for biobehavioral pediatrics is a blend of the medical, biologic, behavioral, and social sciences. Elements of this background applicable to the practice of general pediatrics include psychosocial development; parent-child and family relationships; the influence of family styles and ethnic and cultural backgrounds on parenting practices; reactions of children of various developmental stages to illness, death, and divorce; psychometric tests to assess academic aptitude and achievement; opportunities for preventive intervention; counseling at-risk families; and psychotherapeutic principles useful for the general pediatrician.

The prevention, early detection, and management of psychosocial problems by the pediatrician include risk assessment; anticipatory guidance and support during family crises; the evaluation and treatment of common behavioral disorders such as temper tantrums, breath-holding spells, hyperactivity, or sleep problems; developmental disabilities such as mental retardation; somatic complaints such as persistent headache, fatigue, or abdominal pain; child abuse or neglect; eating disorders; coping with chronic illness; school problems; promotion of social skills; anger control; and self-hypnosis, relaxation and other pain control modalities.

Because pediatric practitioners are often less confident of their ability to diagnose and manage behavioral problems than other presenting complaints, in 1989, the Maternal and Child Health Bureau provided grants for COR groups as an effective mechanism for continuing education in the behavioral aspects of general pediatrics. COR groups, which consist of eight to 10 pediatric practitioners, meet once or twice a month with a behavioral pediatrician and a child psychiatrist as co-moderators to discuss the management of patients seen in one of the participant's practice.

Clinical issues. Antimicrobials and the introduction of several new vaccines have dramatically changed general pediatric practice. School or learning problems, behavioral-developmental complaints, social disorders, violence, sexually transmitted diseases, and chronic physical illness now represent a larger component of pediatric morbidity and will require an increasing amount of the pediatrician's time than in previous decades.

The 1994–1995 National Health Interview Survey on Disability found that 15–18% of children in the United States had chronic physical health conditions that adversely affected their

function. The provision of more continuity and integration of care for the increasing number of children who have chronic physical, neurologic, developmental, and mental disorders remains a challenge for the general pediatrician (22).

Integrated team care. General pediatric care is in transition from solo to group practice, team care, and integration of office with community-based services. Currently, only about one out of four pediatricians is in solo practice. Collaboration with other physicians, nurses, nurse practitioners, social workers, teachers, parents, and community human service workers facilitates the optimal management of the multiple social, economic, and cultural factors that contribute to the new morbidity. Pediatricians still find it difficult, however, to receive payment for risk assessment, counseling, coordination of care, and multidisciplinary group participation, especially with behavioral, family, and social problems.

Because of the complexity of many of the problems and health issues encountered in general pediatric practice, care given in the office must often be complemented or supplemented by community-based services such as nurse home visits; school curricula that promote good health habits and social skills, conflict resolution, and anger control; the Women, Infants and Children Program (WIC), which provides nutritional services; child protection agencies; special education programs; family support services; marriage counselors, mental health clinics; developmental care centers; preschools, early intervention programs; and parent education classes.

Community pediatrics. Embodying a concern for a population of children, a community, or some defined group, the community pediatrics concept marries the traditional roles of public health and clinical pediatrics by developing new services and advocating for child health policies.

Pediatric care should be part of a seamless system, integrated with other health and human services, such as child care centers, early intervention programs, mental health clinics, schools, and public health services that attend to all the children in a community (30, 31). The community role of the general pediatrician may include participation in a community health clinic, adoption service, school health program, child-care center, Head Start program, migrant labor camp, at-risk youth intervention efforts, or a juvenile justice center. Community service may include direct care to an individual child or planning and evaluation of programs for a population of children (22, 23). Learning disorders, behavior problems, special health needs, chronic illnesses, or technology dependency offer the general pediatrician special opportunities for collaboration with educators.

Contextual pediatrics refers to the practice of viewing a child, his or her family, and the community as a continuum, recognizing that health, educational, sociocultural, environmental, and economic variables cannot be assessed in isolation. The adjectives “family-centered” and “community-based” have now entered the lexicon of pediatric care.

Socioeconomic issues. To a significant extent, social and economic issues determine the health status of the nation's children. Along with family income disparity and poverty, disruptive changes in the family are among the largest contributors to childhood morbidity and mortality. In 1997, 19.9% of

children under the age of 18 y in the United States were living in poverty. The number of children who live in step-, merged, foster, or homeless families or with their grandparents has steadily increased.

Cultural and ethnic diversity. Children being seen by pediatricians today have much more diverse cultural, ethnic, linguistic, and religious backgrounds than a decade ago. It is estimated that in the 2020s, almost one-half the children living in the United States will be of Latino, African-American, Asian, or Native American heritage. These population trends mandate changes in pediatric education to prepare physicians and their associates to deliver culturally effective health care.

Advocacy. The AAP's Washington office has coordinated the advocacy efforts of individual practitioners and has served as the official advocacy organization of the APA, although individual members of APA have been active in advocacy at the federal as well as local level. The membership of the AAP includes the vast majority of pediatricians with most in general pediatric practice. The members of the APA are largely in academic health centers and include other disciplines. With children or adolescents who have a long-term disorder, the general pediatrician's advocacy role may include enlisting expert help; communication with other professionals; awareness of interactions; changes or crises in the family; accessibility; and coordination/integration of the management plan. In addition to these vital individual and community efforts and those of other advocacy groups, the Federation of Pediatric Organizations and its seven constituent organizations are effective advocates at the national level. The APA is one of its seven members. The 1997 State Child Health Insurance Program (SHIP), Title XXI, which extended health benefits to children in low-income families not eligible for Medicaid, is one constructive product of such advocacy. Advocacy training will be increasingly included in pediatric residency training programs as a requirement.

PEDIATRIC EDUCATION

Research in education for general pediatrics. Among pediatric faculty, the general pediatrician has been the primary contributor in developing and evaluating new educational programs. Starting with comprehensive care programs at Cornell University and University of Colorado, the family health program for first-year students at Case Western Reserve, and the use of well-child clinics for teaching child development at UCLA in the early 1950s, medical education for medical students was in great ferment. There was a perceived need to augment knowledge of the family, social problems, preventive services, and care of common diseases in the curriculum content that had been previously truncated because most clinical education was in hospital in-patient wards. Although pediatricians were not the sole innovators of these initiatives, all these programs included families with young children and had pediatricians as faculty. There were also descriptive efforts to define the experiences of the students and to draw some conclusions as to program effectiveness.

Research on student learning, however, was not assigned the highest priority. When the Family Health Care Program was begun at Harvard and the Children's Hospital of Boston in 1955, research was a high priority (30). Some of the research

was on clinical issues as noted below, but there was also a random controlled trial, in which students were assigned to the 2-y program during their third and fourth years, caring for an assigned family. The control group, students who did not know they were being followed (those were the days before investigational review boards), as well as the students in the program were evaluated on a number of parameters. Some of these were traditional grades because some faculty believed that time away from traditional work would lead to lower achievement. They need not have worried inasmuch as there was no difference.

It was difficult, however, to show areas in which the students in the experimental program did better. A small difference in career choice was found, with more of the students in the program selecting medical specialties (medicine, pediatrics, and psychiatry) than those in the control group. Most of the participating students felt that they learned more than nonparticipants about family problems and how to use allied health workers to augment the care of the physician. This program also engaged pediatric residents in family continuity care. Soon, therefore, continuity care programs became the rule in most pediatric residency programs, and they are now required by the residency review committee. It is not clear that such research played much of a role in fostering this requirement; however, the early comprehensive care and continuity demonstration programs raised enough interest to have become the norm. It is clear that implementation of observations and research into policy is not a straight line.

The 1978 Report of the Task Force on Pediatric Education (31) (a group representing all the national pediatric societies and chaired by Dr. Henry Kempe) recommended that increased attention in pediatric education be given to biopsychosocial and developmental problems, adolescent health, and the care of children with chronic handicapping disorders as well as other underdeveloped areas in pediatric education. More recently, the Future of Pediatric Education II report (32) reaffirmed and extended these recommendations to include the need for pediatricians to become more culturally competent, for enhancement of the scientific foundation of pediatric medical education, and for greater community-based residency experiences.

In 1996, the APA published a comprehensive report entitled "Educational Guidelines for Residency Training in General Pediatrics." The same year, requirements of the Residency Review Committee for Pediatrics were revised to strengthen the preparation of general pediatricians.

The future academic vitality of general pediatrics will require further growth of qualitative and quantitative research in general pediatrics. Although actively cultivated for about four decades, a tradition of research is yet to reach full maturity. That achievement requires the continuing development of the present generation of general pediatric investigators in both academic and community settings and the availability of competitive academic general pediatrics training fellowships. Although empirical research presentations at national pediatric research meetings have steadily increased, a shortage of trained investigators in general pediatrics remains.

Although much of general pediatrics research has been related to patient care, other studies have centered on health

services, child development, behavior, and education. In addition to the basic biologic sciences, investigators in general pediatrics draw upon the fields of epidemiology, statistics, genetics, anthropology, sociology, psychology, law, and political science.

Establishment by the APA in 1961, 1 y after its founding, of a national scientific forum for presentation of research by its members helped launch research in general academic pediatrics. General pediatricians now have opportunities to submit papers for possible presentation at the annual meetings of the Pediatric Academic Societies, the Society for Adolescent Medicine, the Society for Developmental and Behavioral Pediatrics, the Society for Developmental Pediatrics, and other academic and professional societies. General pediatrics research has also been stimulated by establishment of the PROS network and the recently launched quarterly *Journal of the Ambulatory Pediatric Association*.

Health services research. Advancement of health services research has been one of the unique contributions that general pediatrics has made to child health as a medical specialty. Developed more out of public health with strong contributions by economics and sociology, health services research is another example of how general pediatrics has borrowed from other disciplines. The first paper given to a scientific meeting of the APA was a study of the emergency clinic (33). That and subsequent studies have defined the nature of the problems that come to this facility as being largely acute but non-life-threatening illnesses, chiefly in poor and minority children, underserved by mainstream medicine and often from families with multiple social problems.

Several studies have demonstrated the importance of recognizing psychosocial problems in the emergency room, including the need to 1) evaluate so-called "accidents" for possible child abuse, 2) remedy gaps in immunizations, and 3) counsel parents about establishing a more consistent medical home. Most of these studies have concluded that it would be preferable if such children were cared for in other facilities that are not primarily organized to deal with serious, life-threatening illnesses. The emergency room is a very expensive place to care for children who have a common and often mild illness or to provide consistent follow-up care.

As a result, general pediatricians developed alternative services closer to the patient's home and focused on primary care, integration with well-child supervision, and readily available social services. These programs have included community health centers (34), school health services (35), nurse home visiting (36), mobile clinics for children (37), migrant health clinics (38), adoption and foster care services, and care for immigrant children, as well as ways to improve the care of children in pediatric hospital out-patient clinics. Technical reports that have facilitated such care include computerized records to aid in follow-up, inclusion of suitable laboratory facilities in these settings, and the appropriate use of personnel other than pediatricians. Most studies of these services have shown their effectiveness, such as reduced hospital days, higher immunization rates, better compliance with medical recommendations, and greater patient satisfaction. In the administration of immunizations known to be effective, but often not reaching all of the children in

vulnerable populations, the concept of "missed opportunities" was developed by general pediatricians (12). Using improved records to identify individual children who were underimmunized, recognition that the past contraindications for immunizations are now considered invalid, addressing the other causes of low immunization rates, and then considering any visit to a health facility as an opportunity to immunize the child, has significantly improved rates. Immunizations, the most cost-effective preventive measure for children, have had a profoundly positive impact on child health.

One of the largest controlled trials of the efficacy of "comprehensive" care was carried out by Alpert and his colleagues (39) at The Children's Hospital of Boston in the 1960s. The research design was rigorous, recruiting a group of nearly 1000 lower-middle-class families from those who had no personal physician, but who used the hospital emergency room for all their care. The families were randomly assigned, one third to a group practice in the family health care program, about a third of the original sample to two control groups, one of which received the same "attention," *i.e.* repeated interviews to ascertain health status and the same use of services as the experimental group and the other, a "nonattention" control group who were not interviewed until the end of the 3-y experiment. This innovative nonattention control group was included to determine whether merely interviewing families changed their use of services. It did not. The experimental group received care from a pediatrician who remained with the family for the duration of the study, a nurse who functioned much as a nurse practitioner, and a social worker, with consultation available from a psychiatrist as needed. The control groups received care that was technically equivalent but was given in the emergency room where there was no physician continuity and little attention to psychosocial issues. Thus, it was a test of the package of continuity, comprehensive, coordinated, and family focused care, compared with episodic emergency room care.

There were a number of positive findings: fewer illnesses, especially among black children, fewer hospitalizations, higher number of health maintenance but fewer illness visits, and lower number of laboratory tests and prescriptions. There were more social-psychiatric conditions found among this needy group. As important as anything was the demonstration of the importance of social scientists as research colleagues in general pediatrics. Toward the end of the experiment, the national Medicaid program was introduced and many of the families left the program, demonstrating the difficulty of carrying out well-planned, controlled trials when unplanned large-scale social policies overwhelm such studies. This study, as rigorous in design as any laboratory one, set a standard for research in general pediatrics (39).

Ways to improve the operation of pediatric clinics were the focus of several studies, including 1) appointment strategies to decrease appointment failure, 2) compliance with medical advice, and 3) computer systems.

Development of the pediatric nurse practitioner (28) was a major contribution of general pediatrics in the last three decades. Begun in Colorado by an academic general pediatrician and a pediatric nurse, the concept spread rapidly during the

1960s and 1970s. Although, initially, most pediatric nurse practitioners worked in pediatric outpatient departments and community health centers, they are now also used in many private pediatric practices. A number of variations in the amount of training and degree level of nurse practitioners were studied. Currently, most are 2-y programs at the master's level, but some early programs reported good success with a shorter course (typically 8–12 mo), including at least half the time working in a general pediatric practice. No degree was conferred at the end of these courses. Evaluations generally have been positive, with high satisfaction reported by the pediatrician, nurse, and patient. It has been difficult, however, to show improvement in the health of children cared for by a team of pediatrician and nurse. Cost savings have not been great because the nurse, although paid less per hour than the pediatrician, spends more time with families.

The nurse practitioner's role varies in different practices, but usually involves much of the well child visit, especially the assessment of growth and development and counseling about development and behavior. In some practices, the pediatric nurse practitioner does the initial screening of acute illnesses. There are now well over 5000 pediatric nurse practitioners in the United States. Although tensions have risen, in some areas, over the issue of independent practice, a real collaborative team spirit exists in most practices. Most evaluations have demonstrated that an expansion of services occurs when care is provided by such a team, presumably resulting in better care.

Integration of services is another area of health services research that remains a priority in the new millennium (40). For the last 30 y, the United States has developed a plethora of new programs to deal with specific disorders (*i.e.* cystic fibrosis, spina bifida, congenital heart disease, etc.) or populations. Although well intended, such programs often make integration difficult for both clinicians and patients, with separate eligibility rules and funding streams whose regulations preclude their use for any but the narrowest of services. Many children have two or more conditions, requiring that they go to multiple places and often with different eligibility and payment plans. In addition, many subspecialty programs do not deal with the psychosocial problems that are usually the same independent of the chronic physical disorder. Recognizing the problems that these separate initiatives have caused, integration of some of these programs has been pioneered by general pediatricians with the help of a The Robert Wood Johnson Foundation and input from economists, public health administrators, and lawyers. The results are mixed. In some communities, selected categorical services have been integrated, for instance in Rochester, NY, eight previously separate programs have been integrated with a common eligibility but the barriers have been formidable. Each program and subspecialty tends to protect its turf and resists integration.

PROS. PROS is a vehicle for conducting research on problems seen predominantly in general pediatric practice (7). More than 1500 pediatricians have participated in one or more research protocols. The model is one exemplified by the Breese-Disney practice in Rochester, NY. For over 30 y, this private practice group has studied a number of practical issues seen in children who have streptococcal disease. They defined

what swabs were best for culturing streptococci, the efficacy of office cultures, and the effectiveness of various antibiotics in the treatment of streptococcal disease. Charney built on this model by enlisting nearly 100 practitioners in the Rochester area in studies such as 1) compliance with prescribed penicillin and 2) efficacy of antimicrobial prophylaxis to prevent otitis media, a study that has been widely adopted in the United States (41).

The AAP extended this model to recruit pediatricians from across the country to participate in office-based research. One of the most quoted studies was the definition of age of onset of puberty in a large sample of girls, demonstrating that the current age is nearly 2 y younger than that reported previously. Whether this reflects sample bias or better nutrition or other factors is not known (42). The PROS network has studied how to manage the infant younger than 3 mo of age who has fever (see below). With the new National Child Health Research Center sponsored by the AAP, PROS can become a major laboratory for research, including random controlled intervention trials.

Social issues have been major targets of research by general pediatricians, in part, because most academic pediatricians work with socially disadvantaged populations where the relation of social factors has a more visible effect on health and receipt of health care. Foster care and adoption, including international adoptions, have been important topics for general pediatricians. General pediatrics has been a leader in developing standards for adoption and foster care based on clinical experience. One of the major studies of international adoption examined the infections present in children brought from other countries (43). This study, which illustrates the diverse nature of general pediatrics, was done by a leading infectious disease pediatrician, but the majority of research on adoption services is conducted by divisions of general pediatrics and by practicing pediatricians who also use the findings. Although adoption and foster care services have repeatedly been shown to have many problems, little prospective research has been done on ways to improve their outcomes.

Poverty (more recently termed *income disparity*) has been the focus of several studies because it looms so large as a cause of mortality and morbidity everywhere in the world. Indeed, in the United States, income disparity probably is even more important than absolute poverty in adversely affecting child health. Pediatricians cannot solve these problems alone, but they can conduct the research to highlight their impact on health and be a partner in advocacy for their alleviation.

Violence and injuries, major causes of childhood morbidity and mortality, have been studied by general pediatricians (44, 45). As with other social disorders, the causes of injuries and violence usually lie outside the strictly biologic field, but the resultant problems are brought to the medical system for care. Violent injuries are four times more likely to be seen by the medical system than by the police. Successful treatment and prevention require a multidisciplinary intervention. Violence is a relatively new focus of research, although prevention of accidents (now preferably called injuries) has engaged the interest of general pediatricians for some time. Borrowing from studies done in the social sciences, general pediatricians have developed recommendations for prevention of violent injuries

and identified the relation between child abuse and later emotional problems. Indeed, abused children often grow up to be the perpetrators of violence. These studies have led to reasonable recommendations to treat abused children by providing them the cognitive skills to deal with aggressive situations. General pediatricians have led the way in proposing more strict gun control laws to prevent this form of violence. Neither of these approaches, however, has been evaluated as carefully as needed. For their scientific validity, studies of violence and injuries require representative samples of children.

General pediatricians have been the major researchers in the field of poison prevention. One of the papers in the first APA meeting was on incorporating poison control centers into pediatric residency training to help future practitioners learn how to use such resources (46). The centers were developed by generalists and have usually been administered in divisions of general pediatrics. Research accomplished in these centers has demonstrated 1) the efficacy of ipecac-induced emesis once a poisoning has occurred and 2) promoted the development and use of safety caps to prevent poisonings. The success of these measures has been demonstrated by the significant reduction of deaths due to poisoning in children that has occurred.

Prevention of burns by requiring flame-retardant nightwear and reducing scalding burns by setting the hot water heater temperature lower, another success story of research followed by advocacy for public policy changes, was carried out by academic general pediatricians. Promotion of bicycle helmets has also been successful in reducing head injuries from bicycle accidents. It was a practicing general pediatrician who first pushed for a state law to require infant car seats to prevent motor vehicle occupant injuries. Although injuries remain the leading cause of death in children and adolescents 1 through 21 y of age, remarkable advances in understanding the causes of these injuries and their successful prevention have been major efforts in general pediatrics.

Environmental health hazards generally have been more the province of public health, but lead poisoning has been, to a much greater extent, a focus of clinical general pediatrics. This probably occurred because of the early demonstration of lead poisoning in pediatric hospitals in patients with severe encephalopathy. As the emphasis shifted to prevention; however, general pediatricians demonstrated the danger of lead in dust and of lead paint as a source of poisoning and developed screening programs to detect asymptomatic cases. Other environmental sources of indoor toxins, such as second-hand smoke, asbestos, radon, and allergens, have been less frequently studied by generalists, but the president of the APA in 2000, Dr. Ellen Crain, made environmental health the topic of her presidential address and issued a challenge to generalists to enter this field. Counseling of parents about these hazards, however, has been incorporated in the well-child care provided by generalists.

Behavioral problems, being so prevalent, have been at center stage in many general pediatric research efforts. With the decline in the frequency of many traditional disorders, one of the authors began to use the phrase "the new morbidity" to have a quick way to refer to these and social problems. The other author first used the term *the vulnerable child*. Several

studies demonstrated the high frequency of behavioral problems in the general population, with two to three times greater frequency in children who had chronic physical diseases. This work led to the concept of the need for noncategorical, *i.e.* general, pediatric care for such children with an emphasis on the psychosocial problems for which most children who have chronic physical disease are at-risk.

Clinical research in general pediatrics. Fever in young infants has been a challenging clinical issue for the generalist. Although rare, life-threatening complications occur and are difficult to diagnose. Many generalists such as McCarthy at Yale (47) have sought to separate those infants who have such life-threatening illnesses from the vast majority whose illnesses are self-limited. The economic cost and the trauma to the child of doing extensive laboratory work (that usually proves no serious illness) on all such children has made this a high priority area. The Yale group developed criteria to identify those children with potentially severe but treatable illness. Identification of such children is a major role of the generalist. Although a perfect solution has not been found, great progress has been made.

Otitis media, the most common acute illness among children seen in office practice, has been studied by many specialties. The singular contribution of the generalist has been to carry out random control trials of antimicrobial prophylaxis (38). The efficacy of this treatment of children who have had repeated episodes led to widespread use of such preventive medication. Although there now is concern that this practice may be one of the factors that has contributed to resistant bacteria, prophylaxis is still used by most practitioners.

General care of the newborn, including breast-feeding, bonding, and the use of the doula during labor, has been an area of research by general pediatricians. Care and follow-up of the low-birth-weight baby also has become a role for the generalist, even in many academic centers.

Pain management, including the use of self-hypnosis for migraine and other disorders as well as more humane circumcision and the use of analgesic medication for painful treatments and serious illnesses, such as malignancies, has often been the province of the generalist, both as researcher and deliverer of services.

International aspects. The APA in the United States was the first so-labeled professional association. Subsequently, several other countries have founded such societies. The ones known to the authors include those in Spain, the Philippines, and Japan. In the establishment of all these societies, members turned to the leaders of the U.S. organization for guidance. There are now sections of general pediatrics within several national pediatric societies with goals similar to those labeled "ambulatory." In the future, there should be a fertile field for collaborative research between these national organizations, allowing needed studies on such topics as international adoptions, differences in social policies that affect child health, and comparison of different procedures for managing clinical disorders. Research has not been a major focus for most of the ambulatory pediatric associations in other countries.

SUMMARY

This review of developments in the field of general pediatrics is by no means complete, but it gives a sense of the breadth of research, education reform, and service innovations accomplished by general pediatricians, both those in academic departments and in community-based practice. Common themes noted in this review that characterize general pediatrics are prevention; attention to frequent or common problems of children, especially infectious diseases; social, behavioral, and developmental problems; integration of services for children involving a team of professionals; and advocacy for public policy changes. The recent increase in interest in environmental health as a cutting edge issue for generalists is an example of the way general pediatrics continues to change.

What does the future hold for generalists, especially those in academia? We believe that more sophisticated research is one of the greatest needs. This will require more and better-trained pediatricians and fiscal support from foundations and federal sources. With more well-trained research workers in general pediatrics, the number of generalists heading pediatric departments should increase. This is needed to give the field the role models for young people to emulate and to balance pediatric departments that are often largely hospital and subspecialty based. As children's needs change, as they have in the past 50 y, general pediatrics will change. Although the nature of these changes is difficult to predict, an enduring characteristic of general pediatrics is that it will be based on the needs of children, not on a predefined set of knowledge, skills, or technologies. If general pediatricians keep the needs of children paramount in defining the field, the future will be bright for the generalist, even in an era of increasingly narrow specialization. The tremendous vitality that the APA has sustained and steadily enlarged over the past four decades offers quantitative and qualitative testimony to the creativity, adaptability, relevance, vision, and verve that characterize the flourishing discipline of general pediatrics.

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