Which Physicians Are Providing Health Care to America’s Children?

Trends and Changes During the Past 20 Years

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Background: Although pediatricians and family physicians are trained in the care of children, previous studies have revealed significant differences in the medical care and specialty referral patterns each provides. During the 1990s, several developments in the population and the health care system (eg, aging of the population and increases in Medicaid managed care) may have resulted in changes to the proportion of children seeking care from one or the other specialty.

Objective: To determine any changes in the proportion of office visits for children from birth through the age of 17 years provided by pediatricians or family physicians from 1980 to 2000.

Design: Analysis of the National Ambulatory Medical Care Survey data sets from 1980 to 2000. During our years of interest, the total number of visits sampled ranged from 2524 to 9151. Visits were analyzed for physician type and patient age.

Results: There have been marked changes in the proportion of office visits to general pediatricians vs family physicians during the 1990s. Overall, the percentage of all nonsurgical physician office visits for children from birth through the age of 17 years made to general pediatricians increased significantly, from 56.2% in 1990 to 64.2% in 2000 ($P<.001$). During the same period, the percentage of all nonsurgical physician office visits for children from birth through the age of 17 years made to family physicians declined significantly, from 33.7% in 1990 to 23.9% in 2000 ($P<.001$). Visits to pediatric specialists, as a proportion of all visits, increased significantly, from 1.6% in 1980 to 4.5% in 2000 ($P<.001$).

Conclusions: Pediatricians are providing more primary care visits for children in the United States, and this trend has accelerated during the past 5 years. These findings have implications for the cost of care, the physician workforce, and the training of future physicians. It is unknown if these changes have had a positive or negative impact on the health of our nation’s children.


Most primary health care for children in the United States is provided by pediatricians and family physicians. Families usually choose, for various reasons, a physician from one or the other specialty as the primary care physician for their children. Although physicians in both specialties are trained in the care of children, previous studies have revealed significant differences between them in the medical care and specialty referral patterns they provide.

For editorial comment see page 13

These differences imply that any significant changes in the proportion of children cared for by pediatricians or family physicians will have an impact on multiple aspects of the health care system, including service use patterns and the physician workforce. During the 1980s, the proportion of visits by children to pediatricians and family physicians was thought to have remained relatively static. However, during the 1990s, several new developments in the health care system took place. Continued modification of the Medicaid program, including the establishment of managed care as the prevailing Medicaid system, the development of the Child Health Insurance Program, the federal Vaccines for Children program, and other changes may have had an impact on parents’ choices of primary care physicians for their children. Previous studies have demonstrated that pediatricians are more likely than family physicians to participate in the Vaccines...
for Children program, but it is unknown if this has had an effect on the specialty of physician from whom children receive care. There has also been an increase in the absolute number of specialists in the United States providing care to children. The change in the proportion of care provided by these physicians is unknown.

This study determines any changes in the proportion of office visits for children from birth through the age of 17 years provided by pediatricians, family physicians, or specialists, from 1980 to 2000, and explores the implications for any that may have occurred.

**METHODS**

The study was approved by the Medical Institutional Review Board at The University of Michigan. This research uses data from the National Ambulatory Medical Care Survey (NAMCS), conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The surveys use a physician-patient encounter or visit as the sampling unit. These visits describe the patients and practices of office-based physicians in the United States, excluding anesthesiologists, pathologists, and radiologists. Visits made in hospital settings are excluded (unless the physician has a private office in a hospital). To assess trends in physician use for patients from birth through the age of 17 years, we analyzed all available NAMCS data from 1980 through 2000. The surveys were conducted in 1980, 1981, 1985, and 1989 to 2000.

The NAMCS uses a multistaged probability sampling strategy that selects a stratified systematic sample of physicians classified as office-based patient care by either the American Medical Association or the American Osteopathic Association.16-20 The process involves probability samples of primary sampling units (PSUs), physician practices within PSUs, and patient visits within practices. Primary sampling units are geographic segments composed of counties, groups of counties, county equivalents (such as parishes or independent cities), or towns and townships (for some PSUs in New England) within the 50 states and the District of Columbia. The first-stage sample includes 112 PSUs. The second stage consists of a probability sample of practicing physicians selected from the Masterfile maintained by the American Medical Association and the American Osteopathic Association. Within each PSU, all eligible physicians were stratified by 15 groups: general and family practice, osteopathic, internal medicine, pediatrics, general surgery, obstetrics and gynecology, orthopedic surgery, cardiovascular diseases, dermatology, urology, psychiatry, neurology, ophthalmology, otolaryngology, and a residual category of all other specialties. The final stage is the selection of patient visits within the annual practices of sample physicians. This involves 2 steps. First, the total physician sample is divided into 52 random subsamples of approximately equal size, and each subsample is randomly assigned to 1 of the 52 weeks in the survey year. Second, a systematic random sample of visits is selected by the physician during the reporting week. The sampling rate varies for this final step from a 100% sample for small practices to a 20% sample for large practices, as determined in a presurvey interview.21

The rate of response to the surveys ranged from 63% to 78% during the 20-year period. Presurvey interviews were conducted to assess physician specialty and practice location, size, and type. A systematic random sample of visits was selected within one randomly chosen week for participating physicians. Depending on the practice size, the sampling rate varied from 100% to 20% of patient encounters or visits during that 1-week period. During our years of interest, the total number of visits sampled ranged from 20790 to 71594 per year. For visits made by children younger than 18 years, who were seen by a nonsurgical physician, the number of visits sampled ranged from 2524 to 9151 per year. In total, 76 106 visits were for children younger than 18 years during our study years of interest. Visit estimates presented in these analyses were calculated using weights used by the NAMCS to correct for physician nonresponse and to provide nationally representative patterns of practice.

For each sampled visit, the physician or the physician’s staff member would complete the survey form, which summarized patient characteristics, including age, sex, ethnicity, and race; primary type of insurer; referral status for the current visit; major reason for this visit; clinical services provided during the visit; International Classification of Diseases, Ninth Revision, Clinical Modification code; visit disposition; and duration of the visit.

Our primary variables of interest were patient age, race, and ethnicity and physician specialty. For ease of presentation, we categorized visits by children into 4 age categories: (1) younger than 1 year, (2) aged 1 through 4 years, (3) aged 5 through 9 years, and (4) aged 10 through 17 years. For physician specialty, the NAMCS provided strata information and specific physician specialty groups based on classifications from the American Medical Association and the American Osteopathic Association. For this study, we used visits by physicians in self-declared nonsurgical specialties. We categorized the nonsurgical physicians into 1 of 4 categories: (1) pediatric generalists; (2) family physicians, including physicians in family practice and general medicine; (3) pediatric specialists; and (4) nonpediatric specialists.

To account for the complex survey design, Stata, version 7.0, statistical software was used to calculate SEs for the NAMCS estimates.22 To assess for significant trends over time within a physician category, we conducted logistical regression analyses using survey years as the only indicators. We used 99% confidence intervals to assess differences among the proportions of visits provided by physician categories.

**RESULTS**

Following a period of relative stability in the 1980s, there have been marked changes in the proportion of office visits to general pediatricians vs family physicians during the 1990s. Overall, the percentage of all nonsurgical physician office visits for children from birth through the age of 17 years made to general pediatricians increased, from 56.2% in 1990 to 64.2% in 2000. This increase is statistically significant (P<.001). In addition, the trend during the 1990s, shown in Figure 1, is positive and sig-
Visits to pediatric specialists increased significantly, from 1.6% in 1980 to 4.5% in 2000 (P<.001).

Significant (P<.001) changes were noted for children aged 1 through 4 years during this period (Figure 2). In 1980, 70.6% of all office visits by children in this age group were made to pediatricians, compared with 26.3% to family physicians. By 2000, pediatricians accounted for 79.0% of these visits, compared with only 14.8% for family physicians (P<.001). There was a significant increase in the proportion of visits to pediatric specialists between 1980 and 2000 (0.6% vs 3.3%; P<.001).

Figure 3 shows the trends in the provision of care for nonsurgical physician office visits for children aged 5 through 10 years. In 1980, 59.8% of visits were to pediatricians and 30.7% were to family physicians. By 2000, 66.0% of visits were to pediatricians and 23.4% were to family physicians. The proportion of care provided by specialists did not change significantly (P<.001) between these years.

The group aged 11 through 17 years represents the only group in which the proportion of nonsurgical physician office visits to family physicians was greater than that to pediatricians. However, during the past 20 years, the difference has narrowed markedly (Figure 4). In 1980, 51.0% of visits for these children were to family physicians, while 26.3% were to pediatricians. By 2000, the proportion of visits had become statistically similar, with 40.4% of visits to family physicians and 37.4% to pediatricians. There was a significant increase in the proportion of visits to pediatric specialists between 1980 and 2000 (2.3% vs 4.6%; P<.001).

Our findings demonstrate that there has been a significant shift between 1980 and 2000 in the proportion of physician office visits made to pediatricians and family physicians by children younger than 18 years. For children as a whole, and for almost all age subgroups, pediatricians have seen an increase in the proportion of total visits, while family physicians have experienced a decrease. The trend was most marked in older children. These changes occurred while the relative proportion of pediatricians in the US physician workforce only changed from 6.7% in 1980 to 7.2% in 1998.

There are several potential demographic and policy-related reasons for this shift to have occurred. The population of the United States is aging, and life expectancy has continued to increase during the past 20 years. This fact, coupled with a relatively stable birth rate in the United States, has resulted in the absolute number of children remaining relatively stable but composing an ever-decreasing proportion of the overall population. As such, it follows that they would make up a smaller proportion of the patient base for physicians who care for patients across the lifespan. In effect, as physician patient panel size has stabilized, a proportion of children may be crowded out of family physician practices. Furthermore, the continued reduction in the number of family physicians providing obstetrical care may affect the number of newborns entering family physician practices.

**COMMENT**

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There is also a financial incentive for family physicians to care for older patients with private insurance and Medicare rather than younger patients with Medicaid insurance, because the reimbursement rates for Medicaid are relatively low. For example, relative to Medicare physician fees, Medicaid fees decreased by 14.3% between 1993 and 1998.20

This shift in the proportion of office visits to pediatricians has some significant implications for the health care delivery system. Previous studies have demonstrated various different patterns of child health care provision between pediatricians and family physicians. Some of these can have significant cost implications. For example, one study27 found that family physicians more frequently (than pediatricians) prescribe higher-cost antibiotics to treat ear infections in children. Schwartz et al28 found that family physicians were more likely than pediatricians to prescribe antibiotics for children with acute purulent rhinitis of short duration.

Other differences between the specialties may have additional implications. Several investigators have found variation in the management of specific clinical conditions. Finkelstein et al29 found significant differences between pediatricians and family physicians in the diagnosis and care of children with asthma, the most common chronic disease of childhood. Family physicians were less likely to recommend daily peak flow measurement, but were more likely to order diagnostic testing and to send children for specialty referral.6 With regard to the mental health care of children, Rushton et al7 reported that family physicians were more likely to use medications in the care of children with depression and less likely to refer for specialty care than pediatricians.

An area with many studies documenting differences between family physicians and pediatricians in clinical practice and perspective is childhood immunizations. Several studies1-3 have examined the variation between physicians in the 2 specialties regarding the rate of adoption of new immunization recommendations. Others have found lower immunization rates in the practices of family physicians than pediatricians,13 and that pediatricians are more likely to adhere to the federal Standards for Immunization Practice,14 including vaccinating children during chronic illness and follow-up visits.26 Family physicians are also less likely to participate in immunization registries.30

The other major finding is the increase in the proportion of visits to pediatric specialists from 1980 to 2000. During this period, there was a marked increase in the number of pediatric subspecialists, from 2248 to 12627, and several new subspecialties were recognized. As new discoveries in pediatric care continue to be developed, the demand for subspecialties is likely to increase. However, the delineation of the spectrum of care between general pediatricians and subspecialists is unclear. This issue has implications for the training requirements of general pediatricians and the continued scarcity of pediatric subspecialists.

Regardless of their clinical implications, our findings imply significant financial and workforce implications for the health care system.31 Patient management decisions regarding the use of specific testing modalities and the choice of medications have a financial impact for public and private sector payers. Differences between specialties for the threshold of referral and choice of referral site will have an impact on physician workforce use. Although a recent study32 has used the NAMCS data set to examine referral from primary care physicians, it did not analyze the data by specialty of the referring physician. Similarly, another study33 using the NAMCS found a 22% increase in child visits to primary care physicians between 1979 and 1994. However, this study also did not analyze the data by primary care specialty.

There are nonphysician health professionals who provide health care to children. However, this study only analyzes visits to physicians. The NAMCS data set does not contain information to allow comparisons with these other health professionals.

In conclusion, pediatricians are providing more primary care physician visits for children in the United States, and this trend has accelerated during the past 5 years. These findings have implications for the cost of care, the physician workforce, and the training of future physicians. It is unknown if these changes in proportion of care delivered by pediatricians or family physicians have had a positive impact on the health of our nation’s children. Future studies are required to determine the presence of any specific health outcome differences related to the varying patterns of care delivery between pediatricians and family physicians.

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