

Changes in the Daily Practice of Primary Care for Children

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Background: The environment in which medicine is practiced has changed in the past 2 decades, but little information has been available on how the day-to-day practice of primary care for children has changed during this period.

Objective: To identify aspects of primary care practices for children that are undergoing substantial changes.

Design: Analysis of National Ambulatory Medical Care Surveys from 1979 to 1981, 1985, and 1989 to 1994.

Participants: Primary care practitioners recorded data on 58 488 child visits.

Main Outcome Measures: Characteristics and insurance status of children, physician activities during visits, and disposition after visit.

Results: Child visits to primary care physicians increased by 22% between 1979 and 1994. The mean age of children visiting primary care physicians decreased from 6.7 years in 1979 to 5.7 years in 1994 (P for trend, $<.001$). The ethnic diversity of child visits increased primarily as a

result of an increasing proportion of visits by Hispanic (6.0% in 1979 to 12.6% in 1994, P for trend, $<.001$) and Asian patients (1.6% in 1979 to 4.1% in 1994, P for trend, $<.001$). Medicaid and managed care increased dramatically as sources of payment. Changes in physician activities included an increase in some preventive services, changes in the most commonly encountered medications, and an increased mean duration of patient visits (11.8 minutes in 1979 to 14.2 minutes in 1994, P for trend, $<.001$).

Conclusions: These data may assist in the development of educational and research initiatives for physicians caring for children. The declining proportion of adolescent visits may present physicians with challenges in the care of adolescents. Physician prescribing practices showed changes without evidence of a benefit to child health. The increased ethnic diversity and provision of preventive services were associated with an increased mean duration of primary care visits. The increased duration of child visits may conflict with the managed care emphasis on physician productivity.

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PRIMARY CARE physicians have come under increasing scrutiny owing to their central role in the provision of medical services.^{1,2} Understanding changes in primary care practice patterns in the care of children has implications for the training and continuing education of physicians,³⁻⁵ the management of physicians' practices,^{6,7} and child health in the United States.^{8,9} Little is known about how changes in the practice environment have been reflected in changes in the practice of physicians. We hypothesized that the day-to-day practice of primary care for children may have changed during the past 20 years as a result of changes in the environment in which primary care for children was practiced.

Several important aspects of the health care environment have changed in the last 20 years. The child population in the United States has become increasingly heterogeneous, with increased racial and ethnic diversity and an influx of non-English-speaking immigrants. Recent changes in health care financing, including the rapid growth of health maintenance organizations

and the expansion of Medicaid, also may have influenced the practice of primary care for children.¹⁰ Physicians have more medications to choose from in recent years than in the past.¹¹⁻¹³ Guidelines for preventive services, including both screening and counseling, have dramatically broadened primary care physicians' obligations.¹⁴⁻¹⁶

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Previous studies have characterized aspects of physician practice patterns in primary care for children.^{3,17,18} As early as 1935, Aldrich¹⁹ reported on the composition of private-practice pediatrics. More recent work using nationally representative data has focused on training of physicians and physician workforce,²⁰ but much has changed in the environment in which children are cared for since the publication of these studies. To our knowledge, there have not been any previous studies using nationally representative data that have examined how child primary care practice has changed over time.

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METHODS

Data for this study came from NAMCS for all the years the survey was administered between 1979 and 1994, specifically 1979 to 1981, 1985, and 1989 to 1994.²¹ Conducted by the National Center for Health Statistics (NCHS), these surveys characterized the patients and practices of office-based physicians in the United States. Details of the design of the sampling techniques used in the NAMCS survey have been published.²² The sampling process used American Medical Association and American Osteopathic Association master lists of all non-federally employed US physicians defined as "office-based" and principally involved in patient care. Physicians from these lists were selected through random sampling stratified by geographic area and specialty. Among eligible physicians, annual participation rates have varied from 72% (1992) to 78% (1981). For each participating physician, approximately 30 patient visits during a randomly selected week were sampled systematically. The surveys included between 33 598 (1994) and 71 594 (1985) annual outpatient visits to between 1345 (1991) and 2879 (1985) physicians. This study focused on visits by patients younger than 18 years to physicians who identified their primary specialty as general practice, family medicine, pediatrics, or adolescent medicine. Our analysis of child visits to primary care physicians was based on a total of 58 488 office visits to approximately 2000 physicians during the 16-year period of the surveys.

Examining time trends permits the identification of specific aspects of physician practices undergoing change as well as an estimation of the magnitude of change. The identification and quantification of changes in practice patterns may help to efficiently target educational and primary care research resources. If physician practices are changing, then it is important to understand the effect of those changes on child health through clinical research. In addition, the training and continuing education of primary care physicians should reflect the changing demographics and clinical aspects of practice.

To identify specific aspects of primary care for children that have been changing and to quantify the magnitude of those changes, we analyzed the National Ambulatory Medical Care Surveys (NAMCS) from 1979 to 1994. These data provided a nationally representative, visit-based perspective on primary care practices during these 16 years.

RESULTS

CHILD VISITS TO PRIMARY CARE PHYSICIANS

In the 16 years covered in this study, there was a 22% increase in child visits to primary care providers, from an estimated 87 million in 1979 (95% CI, 79-95) to 111 million in 1994 (95% CI, 103-119). During this period, the resident child population in the United States increased by 6%, from 63.7 million to 68 million.²⁶ The percentage of all child office visits that were to primary care providers increased from 71% in 1979 to 78% in 1994 (P for trend, $<.001$) (**Figure 1**). The percentage of all primary care child visits to pediatri-

DEFINITION OF VARIABLES

For each patient visit, physicians completed encounter forms detailing patient demographics, expected source of payment, clinical diagnoses, reason for the visit, current over-the-counter and prescribed medications, the clinical services provided during the visit, and visit disposition and duration. Participating physicians were individually instructed on how to complete the survey by an NCHS field representative. Visits were defined as any patient encounter with a physician except those made by telephone or outside the physician's office.

Diagnoses were coded according to the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)*²³ and up to 3 diagnoses may be recorded, including the principal diagnosis. To illustrate the changes in principal diagnosis between 1979 and 1994, we used diagnosis clusters designed to simplify and make more clinically relevant the large number of ICD-9 codes used in primary care.²⁴ Starting in 1980, NAMCS recorded up to 5 medications (prescription and nonprescription) listed by the physician and these were coded according to a classification system developed at NCHS. We replaced commercial drug names provided in NAMCS with the corresponding generic compounds for our analysis.

Physician services provided during a visit included selected diagnostic and screening tests as well as counseling services. Physician responses were limited to the check boxes provided by NAMCS (including "none" and "other") which

increased from 59.5% in 1979 to 71% in 1994 (P for trend, $<.001$). The number of pediatricians in the United States increased substantially during this period, from 27 582 in 1980 to 41 906 in 1994, while the number of family and general practitioners increased by a smaller amount, from 60 049 to 73 163.²⁶

The mean age of patients younger than 18 years visiting a primary care physician declined from 6.7 years in 1979 to 5.7 years in 1994 ($P<.001$) (**Table 1**). The proportion of visits by children younger than 6 years increased from 53.2% of visits in 1979 to 57.9% of visits in 1994 ($P<.001$), while the proportion of visits by adolescents (aged 13-17 years) decreased from 19.1% of visits in 1979 to 15.1% of visits in 1994 ($P<.001$). These changes paralleled changes in the US age-specific population: the population younger than 5 years increased by 20.7% while the adolescent population decreased by 7.6%.²⁶

The population of patients became more ethnically and racially diverse (Table 1). Visits by non-Hispanic white patients declined from 84% of all child visits in 1979 to 75% in 1994. The proportion of black patient visits remained relatively stable. The proportion of Hispanic and Asian patients increased substantially. These changes paralleled changes in the US population, which show a doubling of the Hispanic and Asian child populations.²⁶

PAYMENT SOURCE IN PRIMARY CARE

The NAMCS survey began collecting information on expected source of payment in 1985 (**Figure 2**). There was a dramatic decrease (from 51% to 10%) in the proportion of child

have changed over time, thus limiting longitudinal analyses. For these data we present analyses during shorter time periods, based on availability. The response options for counseling in NAMCS are generic categories such as “diet,” “exercise,” and “development,” and do not necessarily correspond with pediatric-specific counseling issues such as toileting or sleep.

Expected source of payment was recorded by participating physicians starting in 1985 and includes the following categories: HMO/prepaid, Medicare, Medicaid, private/commercial, other government, self-pay (including deductibles, copay, and full pay), no charge, and other. Multiple check boxes were used if payments came from multiple sources. For our analysis of changes in the expected source of payment, we reported on the HMO/prepaid, Medicaid, private/commercial, and self-pay groups. These categories accounted for 93.8% of visits during the period of the study when insurance information was available.

Duration of visit was defined as the entire time the physician spends with the patient and did not include time spent waiting or time spent receiving care from a nonphysician. This item was intended to record the total face-to-face contact between patient and physician.

Visit disposition was recorded as one of 6 response options available to the physician: return as needed, return by appointment, telephone follow-up, return to referring physician, refer to other physician, admit to hospital, and no follow-up planned.

ANALYSIS

For each visit record, the NCHS provided a visit weight calculated from the physician and visit sampling rates, adjusted for nonresponse. Statistical aggregation using these visit weights allowed extrapolation to national patterns of practice. We employed NCHS relative SE figures to calculate 95% confidence intervals (CIs) for these national estimates.²¹ Patient characteristics, including age, sex, insurance status, race/ethnicity, and diagnoses were presented as time series of proportions or means. Physician activities during visits, including the frequency of tests and treatments, current medications, visit duration, and patient disposition, were also presented as time series. Although we often highlighted comparisons between the earliest and most recent years, time series were evaluated by ordinary least squares regression over all available years. To quantify changes over time, we employed a series of linear models that include time (survey year) as the only predictor variable. For visit duration, services provided, and visit disposition, we additionally reported the effect of year adjusted for patient age, race/ethnicity, region, and sex. Regression coefficients for survey year were interpreted as indicative of a statistically significant trend if $P \leq .05$ for a 2-tailed test.

To show changes in diagnoses over time, we calculated the difference in the proportion of visits with the most common diagnosis clusters in 1979 and 1994. The same method is employed to illustrate changes in the use of common medications between 1980 and 1994. Statistical significance was determined using the Student *t* test.²⁵

visits that were classified by NAMCS as self-pay (P for trend, $<.001$), though this category likely represented a combination of visits by both uninsured and privately insured patients with indemnity plans.²⁷ This trend was offset by large increases in visits where the payor was Medicaid (from 10% to 21%) or a managed care company (from 12% to 31%). Visits by privately insured patients also increased during the same time period, but not as dramatically.

CLINICAL CHARACTERISTICS OF PATIENTS

The diagnoses of children presenting to primary caregivers remained relatively stable (**Table 2**). The top 10 diagnosis clusters accounted for 70% of visits in 1979 and 1994. The increase in visits for asthma (1.8% in 1979 to 2.2% in 1994) was not statistically significant ($P = .16$). Sinusitis and psychiatric diagnoses increased dramatically. A 10-fold increase in the diagnoses of attention-deficit disorder and attention-deficit/hyperactivity disorder, from 0.14% of visits in 1979 to 1.3% in 1994 ($P < .001$) accounted for most of the increase in psychiatric diagnoses (included under the diagnosis cluster depression/anxiety/neuroses).

PREVENTIVE SERVICES PROVIDED DURING PRIMARY CARE VISITS

We reported the proportion of visits receiving counseling as the percentage of visits coded as well-child or general physical examination. The frequency of counseling of any type reported during well-child visits increased from 39.1% of visits in 1979 to 71% of visits in 1994 (P for trend, $<.001$).

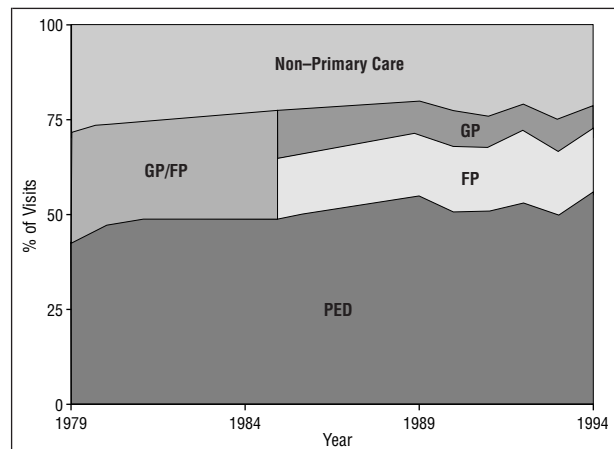


Figure 1. The percentage of visits by patients younger than 18 years to primary care physicians in the United States by specialty, 1979 to 1994. GP indicates general practitioner; FP, family practitioner; and PED, pediatrician. The National Ambulatory Medical Care Surveys did not distinguish between family practitioners and general practitioners prior to 1985.

Dietary counseling, the most common form of counseling in child primary care, occurred in 15.7% of visits in 1979 and 22.9% of visits in 1992 (**Table 3**). Smoking counseling in adolescents increased from 0.7% of visits in 1989 to 1.7% of visits in 1994 (P for trend, $<.001$).

Vaccinations were among the most frequently used preventive services in child visits. Vaccines were administered at 33.1% of well-child visits in 1980 and at 48.1% of well-child visits in 1994. The proportion of well-child visits where more than 1 vaccine was administered increased from 17.6% in 1980 to 27.3% in 1994 (P for trend, $<.001$).

Table 1. Characteristics of Child Visits to US Primary Care Physicians, 1979-1994

Year	Mean Patient Age, y	Visits by White Non-Hispanics, %	Visits by Black Non-Hispanics, %	Visits by Hispanics, %	Visits by Asian Non-Hispanics, %
1979	6.7	84.1	8.1	6.0	1.6
1980	6.3	82.2	10.1	6.4	0.7
1981	6.0	81.6	11.9	5.0	1.1
1985	5.5	82.6	7.8	7.1	1.5
1989	5.2	77.4	10.2	8.5	3.5
1990	5.4	78.2	8.4	5.7	3.8
1991	5.4	72.7	13.6	9.6	3.4
1992	5.6	68.1	14.9	12.3	4.4
1993	5.6	78.1	7.5	10.5	3.5
1994	5.7	74.8	8.4	12.6	4.1
Change per decade	-0.4	-7.4	0.6	3.5	2.3
95% CI	(-0.5 to -0.3)	(-8.1 to -6.7)	(0.1 to 1.1)	(3.1 to 4.0)	(2.0 to 2.5)

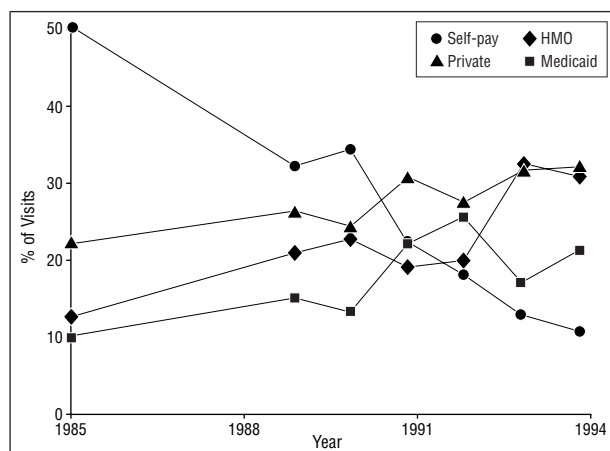


Figure 2. The percent of child visits to primary care physicians by expected method of payment, 1985 to 1994. HMO indicates health maintenance organization.

Blood pressure screening for patients older than 3 years increased dramatically from 14.8% of all primary care visits in 1979 to 25.8% in 1994, while Papanicolaou screening for female adolescents (aged ≥ 13 years) remained constant (2% in 1992).

DURATION OF PRIMARY CARE VISITS

The mean duration of child visits to primary care providers increased from 11.8 minutes in 1979 to 14.2 minutes in 1994 (P for trend, $<.001$). The mean duration of visit increased for each of several categories we analyzed including race/ethnicity, the provision of preventive services, and insurance. The mean duration of visit for Hispanic patients (15.9 minutes in 1994) was consistently longer than the mean duration of visit for non-Hispanic visits (14.0 minutes in 1994) ($P<.001$). The provision of preventive services also was associated with an increased duration of visits during the period of the study. In 1994, the mean duration of visits without any reported counseling was 13.2 minutes, while the mean visit duration when counseling was provided was 15.2 minutes ($P<.001$). Visits in which a vaccine was provided were consistently longer than visits in which no vaccine use was reported (16.7 minutes vs 13.8 minutes, respectively, in 1994; $P<.001$). Finally, visit duration increased among all categories of insurance, but the increase in visit duration was less

dramatic in visits where the expected source of payment was a managed care organization. In 1994, the mean duration of managed care and Medicaid visits was 13.9 minutes while the remainder of visits (private, self-pay, and other) had a mean duration of 14.5 minutes ($P=.08$ for both comparisons).

MEDICATIONS IN PRIMARY CARE PRACTICE

Over time, there was a stable proportion of child visits in which patients were reported to be receiving 1 or more prescriptions or over-the-counter medications (63% in 1980 and 65% in 1994). The mean number of medications noted at primary care visits for children did not change between 1980 and 1994 (1.0 medications in 1994).

Changes in the most frequently used medications during child visits during the study period are presented in **Table 4**. Only 5 of the most common medications used in a child visit in 1980 were still among the top 10 medications used in 1994. Amoxicillin remained the most frequently used medication in child visits to a primary care provider, and the frequency of use doubled in the time period under investigation. The proportion of visits in which an antibiotic was noted increased from 26.2% in 1979 to 30.8% in 1994 (P for trend, $<.001$). The use of aspirin declined dramatically and the use of acetaminophen had a corresponding increase. β -Agonists became the second most common medication used in child visits. Methylphenidate (Ritalin, Ciba-Geigy Corp, Summit, NJ) showed a dramatic increase in use by primary care providers from 1980 (0.01%) to 1994 (1.4%) ($P<.001$).

VISIT DISPOSITION

Children were infrequently admitted to hospitals from the physician's office and this did not change significantly over time (0.4% in 1994). The proportion of patient visits referred to another physician increased from 2.4% in 1979 to 3.3% in 1994 (P for trend, $.02$).

COMMENT

The practice of primary care for children changed considerably between 1979 and 1994. Changes in visit demographics included a younger average age, increasing racial and ethnic diversity, and changes in patients' insurance status.

Table 2. Most Frequent Diagnosis Clusters for Child Visits to US Primary Care Physicians, 1979 and 1994

Diagnosis Clusters	1979		1994	
	Rank	% of Visits	Rank	% of Visits
General medical examination	1	23.2	1	21.5
Acute upper respiratory tract infection	2	19.6	2	17.2
Otitis media (acute and chronic)	3	10.6	3	12.0
Acute lower respiratory tract infection	4	3.5	4	5.3
Lacerations, contusions, and abrasions	5	3.0	9	2.1
Diarrhea, gastroenteritis	6	2.4	6	2.3
Dermatitis and eczema	7	1.9	10	1.9
Allergic reactions	8	1.9	20	0.7
Nonfungal infections of skin	9	1.9	16	0.9
Asthma	10	1.8	7	2.2
Sinusitis (acute and chronic)	18	0.7	5	2.9
Chronic rhinitis	11	1.5	8	2.2
Depression/anxiety/neuroses	22	0.6	11	1.7

Table 3. Duration and Preventive Services Provided for Child Visits to US Primary Care Physicians, 1979-1994

Year	Mean Visit Duration, min	Blood Pressure Check, %*	Percentage of Well-Child Visits With†	
			Diet Counseling‡	Vaccines Provided
1979	11.8	18.6	15.7	...
1980	12.4	16.3	19.0	33.1
1981	12.2	16.5	20.0	34.7
1985	12.8	19.1	11.9	26.0
1989	12.6	14.1	...	30.1
1990	12.6	16.5	...	26.2
1991	13.8	26.2	35.8	34.7
1992	14.3	20.9	22.9	31.7
1993	14.0	25.2	...	39.9
1994	14.2	25.8	...	48.1
Change per decade (unadjusted)	12.5	3.9	8.6	3.2
95% CI	(11.5-13.5)	(3.1-4.7)	(6.7-10.4)	(1.4-5.0)
Change per decade (adjusted)§	12.7	4.7	8.4	3.0
95% CI	(11.7-13.6)	(3.9-5.5)	(6.5-10.2)	(1.2-4.7)

*Blood pressure check for children older than 3 years.

†Ellipses indicate data not available.

‡Diet counseling data are not available for 1989-1990 and 1993-1994.

§Adjusted for changes in age, race/ethnicity, region, and sex over time.

Changes in physician actions during child visits included the use of new medications, increased provision of preventive services, and an increased duration of visit.

During the study period, the average age of patients younger than 18 years visiting primary care physicians decreased. Visit rates by age group paralleled changes in the age-specific US population.²⁶ Infant and preschool-age visits increased while adolescent visits remained constant. This change in demographics contributed to the decline in adolescent visits as a proportion of practice. Previous studies have documented barriers to adolescent primary care.^{28,29} Our results indicated that primary physicians' practices were increasingly oriented toward younger children. The decrease in the proportion of adolescent visits to primary care physicians may have contributed to the lack of confidence in caring for adolescents experienced by pediatricians as noted by Fisher and colleagues.²⁹

The increase in Hispanic and Asian patient visits paralleled the growth of these segments of the population.²⁷ The increasing visits by minority children to physicians un-

derscores the importance of recent initiatives to reverse the trend of the decreasing entry of minority physicians into pediatrics.³⁰ In addition, efforts to improve primary care physicians' awareness of the impact of cultural issues on child health have been important steps toward addressing these changes in the demographics of practice. Finally, recent initiatives in adult clinical research to include minorities should be extended to child clinical research.

Our data on changes in the source of payment for visits were consistent with previous work. The increase in Medicaid payments reflected expansion of eligibility as well as declining employment-based private insurance for children during the period of this study.¹⁴ The increase in managed care as a source of payment is likely to continue and the implications of this trend for child health are not certain. There has been concern that children with chronic illnesses may be at a significant disadvantage in managed care systems,³¹⁻³³ and the widespread movement to convert Medicaid to managed care will mean that many of these children will soon be covered by managed-care insur-

Table 4. Most Frequent Medications for Child Visits to US Primary Care Physicians, 1980 and 1994

Medication	1980*		1994	
	Rank	% of Visits	Rank	% of Visits
Amoxicillin	1	7.1	1	15.7
Erythromycin	2	5.6	9	1.6
Oral penicillin	3	4.3	8	1.9
Ampicillin	4	3.6	>100	0.04
Brompheniramine maleate	5	3.3	15	0.9
Aspirin	6	2.6	>100	0.08
Trimethoprim-sulfamethoxazole	7	1.8	4	3.2
Diphenhydramine	8	1.8	12	1.2
Triprolidine hydrochloride	9	1.5	>100	0.06
Acetaminophen	10	1.4	3	4.4
Albuterol	...	...	2	5.0
Amoxicillin/clavulanate	...	...	5	2.8
Ibuprofen	>100	0.04	6	2.1
Cefaclor	...	...	7	2.0
Methylphenidate	>100	0.01	10	1.4

*Ellipses indicate not applicable.

ance.³⁴ These trends reinforce the importance of clinical research directed at determining best practices in the care of children and the relationships between types of insurance and health outcomes for children.^{8,35}

Our data on blood pressure measurement, vaccination rates, and counseling services suggested that physicians provided more preventive health services for children in 1994 than in 1979. This finding was consistent with other reports.³⁶ During the past 2 decades, numerous guidelines and practice recommendations have been published.^{19,37,38} The increase in preventive services may reflect the success of these guidelines and the increase in attention to preventive services in training programs. The increase in preventive services may also be due to changes in reimbursement over the period studied. The effect of these increases in preventive services on child health and the costs of care are largely unknown.⁸

The most frequently encountered diagnoses in primary care for children did not change substantially, but there were some notable exceptions. Visits with a diagnosis of sinusitis, for example, increased during the period studied; this may be due to changes in the epidemiology of sinusitis or increased awareness of the diagnosis among physicians.³⁹ The decrease in the visits classified as upper respiratory tract infection and the increase in visits classified as otitis, lower respiratory tract infection, and sinusitis may represent a shift in physician labeling of respiratory tract infections toward those that are treated with antibiotics. The increase in the diagnoses of attention-deficit disorder and attention deficit with hyperactivity has been documented elsewhere,⁴⁰ and our observations showed how this diagnosis became one of the most common diagnoses made by primary care physicians caring for children. The decline in lacerations, contusions, and abrasions may have been the result of prevention initiatives or a shift to the use of urgent care centers and emergency departments for minor trauma.

More than half of children and adolescents left their physician's office with a medication, though the rate of medication use as a percentage of visits remained steady over time. Previous work documented the increased use of antibiotics among physicians caring for children as well as

the increased use of more expensive broad-spectrum antibiotics.⁹ This changing pattern of antibiotic use has not been supported by clinical evidence of improved outcomes, and may be responsible for the rising prevalence of drug-resistant bacteria.⁴¹ In recent years, new therapies for asthma and the increased diagnosis of attention-deficit disorder placed β -agonists and methylphenidate on the list of most frequently prescribed medications for children. Controversies in the proper use of these medications highlight the importance of further outcomes research and educational initiatives for primary care physicians.^{15,16,42}

The increase in the mean duration of patient visits was an important finding. The 20% increase in the duration of primary care visits for children between 1979 and 1994 remained significant even after adjusting for changing patient and practice characteristics. In addition, our data were consistent with time-motion studies of primary care pediatricians reported in 1980 and 1996.^{36,43} The temporal association between the increase in preventive services and the increase in the duration of visits seen here was supported by the work of Norkin Goldstein and colleagues.³⁶ While this increase in preventive services and time spent with patients was encouraging, these trends may conflict with demands from managed-care organizations to increase physician productivity. The nearly one quarter of child visits to primary care providers covered by Medicaid also will be subject to these productivity demands as Medicaid moves to a managed-care model. Our results indicate that physicians providing preventive services to Hispanic patients would be at greatest risk of experiencing productivity pressures, and productivity evaluations may need to be adjusted accordingly. Because the increase in managed care is likely to continue, alternative methods for providing preventive services may become increasingly important if these services are to be provided at current or increased levels.

This study had several limitations. The visit-based approach of the NAMCS provided us with the opportunity to analyze certain aspects of the practice of physicians. We were not able to assess the nature of care provided over time to individual patients. In addition, we were unable to assess the practices of specialists, nurse practitioners, emergency

department physicians,⁴⁴ and hospital-based physicians who also provided outpatient care to children. Changes in the survey design restricted our ability to follow some measures during the period of the analysis. Measures with relatively low frequencies such as counseling and some racial and ethnic categories demonstrated year-to-year fluctuations that may be caused in part by a relatively high SE in comparison with the size of the estimate. In addition, we were unable to explore methods that may have increased efficiency and services provided without increasing duration of visit. Although the data from NAMCS are collected independently of billing, changes in reimbursement during the study period may have influenced physician reporting of certain activities, particularly preventive services, by increasing awareness of these aspects of practice.

Numerous forces influence the practice of primary care for children, but little national data have been available on how primary care physicians' practices have changed over time. This study of primary care practice patterns in the care of children has documented several important changes in how children in the United States have been cared for by physicians. The decrease in the proportion of adolescents and the increase in the proportion of ethnic minorities present specific challenges to primary care physicians. Educational initiatives designed to address the needs of these groups may assist physicians in managing these changes in practice demographics. The increase in the diagnosis of attention-deficit disorder, the concomitant use of methylphenidate, and the increase in antibiotic use represent changes in practice that have occurred in the absence of research demonstrating a benefit to child health. Further research into the effect of these changes on child health is indicated. The increased ethnic diversity of patient visits and the increased provision of prevention services have placed increased demands on physicians, and this may have been reflected in the increased amount of time physicians have been spending with their patients. This increase in the duration of a child visit may conflict with the emphasis on physician productivity seen in managed care.

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