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Comparison of Quality of Care by Specialist and Generalist Physicians as Usual Source of Asthma Care for Children

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ABSTRACT. *Objective.* To determine whether care for children was more consistent with national asthma guidelines when a specialist rather than a generalist was the usual source of asthma care.

Design. Cross-sectional survey.

Setting. Two large managed care organizations in the United States.

Participants. A total of 260 parents of children with asthma.

Interventions. None.

Main Outcome Measures. Parent reports of the physician primarily responsible for asthma care (specialist, generalist, or both equally) and whom they would call (specialist or generalist) for questions about asthma care were used to define usual source of care. We assessed consistency of care with 1997 National Asthma Education and Prevention Program guidelines using 11 indicators in 4 domains of asthma care: patient education, control of factors contributing to asthma symptoms, periodic physiologic assessment and monitoring, and proper use of medications.

Results. In all 4 domains, care was more likely to be consistent with guidelines when specialists were the usual source of care. These differences remained after adjustment for symptom severity, recent care encounters, and parent demographics. Greatest differences for specialist versus generalist management were for use of controller medications (odds ratio [OR] 6.7; 95% confidence interval [CI]: 1.5–30.4), ever having a pulmonary function test (OR 6.5; 95% CI: 2.4–18.1), and having been told about asthma triggers and how to avoid them (OR 5.9; 95% CI: 1.3–26.2).

Conclusions. In these managed care organizations, asthma care in children was more likely to be consistent with national guidelines when a specialist was the primary provider. Greater use of specialists or altering generalist physicians' care may improve the degree to which the care of children with asthma is consistent with national guidelines. *Pediatrics* 2001;108:432–437; *asthma, pediatrics, specialist, usual source of care, quality of care, guidelines.*

ABBREVIATIONS. MCO, managed care organization; EPR-2, Expert Panel Report 2; OR, odds ratio.

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Care for many chronic health conditions is delivered by both specialist and generalist physicians. Depending on the condition and the indicator of care studied, specialists often perform better,^{1–3} but in some cases they do not.⁴ Asthma is the most common chronic illness among children, and care is provided by both generalists and specialists. Although undertreatment and inappropriate therapy are significant contributors to asthma morbidity and mortality in the United States,⁵ the relative advantages of treatment of asthma by specialist or generalist physicians are not well understood. The purpose of this analysis was to determine whether differences in the quality of asthma care for children, assessed as consistency of care with national guidelines,⁵ were related to the degree of specialist involvement in care. We hypothesized that care would be more consistent with these guidelines if a specialist was the usual source of asthma care.

METHODS

Study Design

The study used data from a cross-sectional survey of parents of children with asthma enrolled in 2 large managed care organizations (MCOs) located in the northeastern and midwestern United States during the winter of 1997–1998. Overall goals of the study were to provide information on the current adequacy of treatment of children with asthma and to identify opportunities to improve the quality of care.

Study Participants

Patients were selected from the pool of enrollees in each MCO using claims and centralized pharmacy data. The sampling specifications were to identify at least 300 children aged 5 to 17 years of age with asthma. To ensure a sufficient number of older children, the sampling frame was stratified by age (5–10 years and 11–17 years), with at least 150 children to be selected from each stratum per MCO.

There was a 2-step process for identifying patients with asthma. In the first step, MCOs used administrative or pharmacy data to identify potential patients with asthma. Using administrative data, children were identified who had had 2 or more visits (outpatient or inpatient) for asthma in the last 12 months (ICD-9-CM, 493.x). Pharmacy data were used to identify patients with 1 or more dispensation of a medication commonly prescribed for asthma. The pharmacy dispensation record search used US Food and Drug Administration National Drug Classification codes for medications that included corticosteroids, sympathomimetics, anticholinergics, xanthines, and cromones. In the second step, survey responses were used to exclude children whose parents indicated that they did not have a physician diagnosis of asthma.

The survey used a mailed questionnaire to parents of sampled children, with follow-up efforts by phone and mail. An advance letter, signed by an MCO official, was used to notify parents of the study. The mailed survey was accompanied by a cover letter and stamped return envelope. Respondents were considered ineligible

if the parent indicated that the child did not have a physician diagnosis of asthma or was not currently enrolled in the MCO.

Of 690 patients identified by the 2 MCOs, 607 were eligible (88%). Completed surveys were available for 260 patients (response rate 43%). Reasons for ineligibility included no asthma (76), not enrolled (5), and in 2 cases a language barrier that prevented completion of the survey. There was limited information about characteristics of nonrespondents. At both MCOs, non-response was greater among parents of older children (11–17 years) than younger ones.^{5–10} At 1 of the MCOs, nonresponse was greater among parents of girls than boys (60% vs 49%) and among parents in point-of-service plans (71%) than in health maintenance organization plans (49%).

Survey Measures

The survey included questions drawn from multiple surveys that assessed general health status, asthma symptoms, impact of asthma on physical and mental health, family and patient role functioning, health service use, ratings of the quality of care, asthma-related education and participation in care, self-management abilities, use of treatments and medications, and parent and child demographics.^{6–10}

Indicators of Consistency of Care With Guidelines

The National Asthma Education and Prevention Program, sponsored by the National Heart, Lung, and Blood Institute released updated guidelines called the Expert Panel Report 2 (EPR-2) in 1997. EPR-2 groups care into conceptual domains that include periodic physiologic assessment and monitoring, control of factors contributing to asthma severity, patient education, and proper medication use. The guidelines do not explicitly describe measures that should be used to assess the quality of care or the consistency of care with the guidelines. Focusing on specific recommendations from within these care domains, we identified questions that reflect consistency of care with the guidelines (Table 2). Although certain indicators of care may be classified within more than 1 conceptual domain, we listed each indicator under only 1 domain.

For the indicators of medication use, we examined the frequency of use of reliever and controller medications. Reliever medications are used for short-term relief of symptoms (eg, inhaled β -agonists), and controller medications are those used to achieve long-term control (eg, inhaled corticosteroids or leukotriene modifiers). We considered overuse of inhaled reliever medication as use of the medication more than 4 times per day because no medications in this category are indicated for more frequent use. Also, previous studies have shown that frequent use of these medications is associated with severe illness and poor outcomes.^{11,12} However, we recognize that this definition probably provides an underestimate of overuse because some experts consider use of these medications more than twice weekly as evidence of the need to change therapy.⁵ Long-term controller medications, when indicated for use, are taken daily on a long-term basis to achieve and maintain control of persistent asthma.⁵

Assessment of Usual Source of Asthma Care

We examined 2 different indicators of the usual source of asthma care. First, parents reported the type of provider mainly responsible for the child's asthma care: specialist (pulmonologist, allergist), generalist (pediatrician, family or general practitioner, internist), or both asthma specialist and generalist doctors equally. Second, we asked parents whether they would call the specialist or generalist first for 3 circumstances: child had an asthma attack, parent or child had a question about taking care of child's asthma, or child needed a medication refill. Responses to these 3 questions were grouped as never (0 circumstances), sometimes (1 or 2 circumstances), or always (all 3 circumstances) calls the specialist.

Analysis

Characteristics of the children and their parents were represented as proportions and means. Care indicators were expressed as dichotomous variables (yes/no), and proportions of children with a positive indicator (ie, consistent with EPR-2) are shown. Each indicator of care was examined to determine whether there was a significant difference when a specialist was involved in care at all (yes vs no) using the chi-square test. Indicators with signifi-

cant differences ($P < .10$) from bivariate analyses were examined in additional analyses. The significance level .10 was chosen rather than .05 to allow examination of indicators that might show significant differences after accounting for other patient factors.

We wanted to account for certain factors that, if present, could confound the apparent differences in care seen by physician specialty. For example, when patients have recently seen a doctor, their care may be more likely to be consistent with guidelines than when care encounters have been temporally remote. Also, when patients have been hospitalized, they may be more likely to see a specialist and to have a variety of intensive interventions to improve their subsequent asthma care (eg, nurses, respiratory therapists, written materials that provide information about medication use, or avoidance of triggers). In addition, patients with more symptoms or greater disease severity may have more resources directed to their care. Symptom severity was characterized by stratum (mild intermittent, mild persistent, moderate persistent, and severe persistent) based on symptoms over the 4-week period before survey completion.⁵ Thus, bivariate analyses were conducted to determine whether care was more likely to be consistent with guidelines when there was recent exposure to providers for care (outpatient visit past 3 months), recent hospitalization (past 12 months), or greater symptom severity.

Bivariate analyses were also conducted to examine the care indicators by the usual source of care by parent report of who was primarily responsible for care (specialist, generalist, or both equally) and circumstances in which they would call the specialist before the generalist (never, sometimes, always). Multivariate analyses for each care indicator used logistic regression, with results reported as odds ratios with 95% confidence intervals. Because the 2 source of care variables were highly correlated ($P < .0001$ by χ^2), separate models were developed for each. The multivariate models accounted for symptom severity, parent's race and educational status, recent doctor visits, and recent hospitalizations. Statistical analyses were performed with the SAS statistical software package (version 6.12, SAS Institute Inc, Cary, NC).¹³

RESULTS

Table 1 reports the proportion of patients who saw a specialist for asthma by child and parent characteristics. Of 260 children, 55% were 5 to 10 years old and 45% were 11 to 17; 62% were white and 60% male. A specialist was involved in asthma care for 34% of children. There were a few small differences that were not statistically significant.

According to parent reports, a specialist was primarily responsible for care in 15% of cases, a generalist was responsible in 75%, and care was shared equally for 10%. When asked whom they would call for a flare-up, for a question about asthma, or for a medication refill, 10% would call the specialist for all 3 circumstances and 78% would always call the generalist.

When a specialist was involved in care, even if not with primary responsibility, the consistency of care with guideline indicators was greater in nearly every case (Table 2). Considering whether primary responsibility for asthma care was by specialist, generalist, or both equally, there were significant differences in all domains of care, including appropriate medication use, education and instruction, assessment, and monitoring and control of factors that worsen asthma. For example, use of controller medication was higher in patients treated primarily by specialists compared with generalists (94% vs 72%, $P < .01$), as was having written instructions for managing asthma attacks (69% vs 46%, $P < .05$), having been instructed in use of inhalers (89% vs 69%, $P < .05$) and having had pulmonary function testing (86% vs

TABLE 1. Characteristics of Children With Asthma and Their Parents (*N* = 260)

Characteristic	Percentage With the Characteristic	Percentage of Those With Characteristic With a Specialist Involved in Care*
Child characteristics		
Age (y)		
5–10	54.9	31.1
11–17	45.1	37.8
Race		
White	61.7	37.2
Black	28.5	27.1
Other	9.9	44.0
Sex		
Male	60.1	34.7
Female	39.9	34.6
Symptom severity		
Mild intermittent	28.4	30.1
Mild persistent	23.7	37.7
Moderate persistent	26.8	37.7
Severe persistent	21.0	31.5
Parent characteristics		
Education		
Not high school graduate	4.7	18.2
High school graduate	17.6	31.1
Some college	43.8	30.6
College graduate	33.9	41.4
Employment		
Working full-time	64.7	31.1
Working part-time	12.9	42.4
Homemaker	16.9	39.5
Other (including unemployed, retired, disabled)	5.5	30.8

* Child sees a pulmonologist or allergist for asthma care. For example, 31.1% of children ages 5–10 saw a specialist, and 37.8% of those aged 11–17 saw a specialist. Differences in whether a child saw a specialist, by child and parent characteristic, were not statistically significant ($P > 0.05$) by χ^2 or χ^2 test for trend.

48%, $P < .05$). Care in patients managed equally by a specialist and generalist appeared intermediate compared with primary management by a specialist or generalist. For patients with care shared equally, significant differences compared with specialists were seen only for having had pulmonary function testing and use of long-term control medication.

There was a tendency for care to be more consistent with guidelines in children whose parents were more likely to call a specialist than a generalist for asthma care questions, including calls during flare-ups, calls with questions about asthma, and calls for medication refills. For example, daily use of controller medication was reported for 68% of children whose parents always called a specialist but only 36% ($P < .02$) when parents would always call a generalist. Likewise, patients were more likely to have received instruction on how to use an inhaler (92% vs 69%, $P < .05$) or to have had a pulmonary function test (88% vs 47%, $P < .0001$) when parents would call a specialist rather than a generalist.

In most cases, indicators of care were more consistent with guidelines when children had had a recent doctor visit (past 3 months) or had been hospitalized in the previous year (data not shown), so these vari-

ables were included in the multivariate models. In multivariate analyses (Table 3), after adjustment for parent demographics, symptom severity, and recent health care encounters, the odds of favorable indicators of care were consistently greater when asthma management was primarily by a specialist compared with a generalist (ORs 2.14–6.71). When care was shared equally by specialists and generalists, in most cases, there was a slightly greater chance (not statistically significant) of favorable indicators of care compared with primary management by a generalist. Multivariate models also showed, after adjustment, that there was a consistently greater chance of favorable indicators of care when parents would call specialists rather than generalists for asthma questions and care (ORs 2.88–8.11). In most cases, results were intermediate when parents would call specialists for certain indications and generalists for others.

DISCUSSION

In this study, asthma care for children in managed care was more likely to be consistent with national guidelines when a specialist physician, rather than a generalist, was the usual source of asthma care. Advantages of specialist involvement persisted after adjustment for parent demographics, symptom severity, and recency of care. This result was most evident when parents stated that they relied more on specialists than generalists. Although care by specialists appeared to be better than that by generalists, there was room to improve consistency of care with guidelines for both groups.

Our results are consistent with previous studies that have shown inconsistency of care with guidelines for children with asthma¹⁴ and advantages of specialists in the delivery of asthma care, especially in patients with previous acute health care encounters. A recent cross-sectional study in a large managed care organization³ showed that most patients with moderate or severe asthma symptoms treated by allergists received antiinflammatory therapy (92%), compared with less than half of patients of generalists (42%). In a study of patients who had used an emergency department¹⁵ and were then randomly assigned to allergist referral versus usual care, the patients in the allergist group were 3 times more likely to use anti-inflammatory medications and had a 42% reduction in subsequent emergency department use over 6 months. In another study of children cared for by allergists versus primary care physicians, the patients of allergists had better quality of life, as assessed by SF-36. Reasons for these differences in outcome were not examined.¹⁶ Better asthma care may result from better knowledge of treatment elements included in national asthma guidelines. Doerschug and colleagues¹⁷ demonstrated that asthma specialists performed better than general and family physicians on a multiple-choice test about asthma guidelines in areas of pharmacology and prevention.

For care of medical conditions other than asthma there is evidence that specialists offer certain advantages for select conditions, but the advantages are not universal. In a recent review of the medical literature,

TABLE 2. Indicators of Care by Physician Specialty of Usual Source of Asthma Care (Percentage of Patients)

	Specialist Involved		Primary Asthma Responsibility			Calls Specialist First		
	Yes (n = 88)	No (n = 169)	Generalist (n = 191)	Both Equally (n = 27)	Specialist (n = 38)	Never (n = 202)	Sometimes (n = 33)	Always (n = 25)
Assessment and monitoring								
Pulmonary function test performed	79.3*	42.8	47.8‡	65.4*	86.1	46.7§	81.8	88.0
Instruction with a peak flow meter	77.6*	54.5	57.5‡	69.6	82.9	57.2§	78.1	84.0
Control of factors contributing to asthma severity								
Trigger identification and avoidance	89.7*	67.7	69.4‡	84.0	94.3	72.4§	78.8	95.8
Medication adjustment before exposures	76.1*	46.7	49.2‡	72.0	77.8	51.3§	66.7	88.0
Patient education for a partnership								
Written asthma care plan for asthma attack	58.8	47.3	46.1*	64.0	68.6	48.7§	51.6	76.0
Written asthma care plan for days without an attack	68.6*	55.4	54.8*	69.2	80.0	55.6§	78.1	76.0
Medication adjustment for flare-up	87.4*	68.5	68.5‡	83.3	91.7	70.6§	84.4	96.0
Knowledge of what to do for flare-up (very good or excellent)	31.0*	24.5	65.4*	76.9	82.9	66.3	68.8	88.0
Instruction with MDI	82.8*	66.7	68.9‡	76.0	88.9	69.4§	75.8	92.0
Doctor involves you in decisions	87.2	78.4	77.9	84.6	91.2	78.5§	90.6	95.8
Pharmacologic therapy								
Use of controller medication	83.9*	67.9	72.2‡	75.0*	94.3	68.7§	93.8	88.0
Daily controller use (when used at all)	56.2*	31.6	33.3‡	50.0	57.6	36.2§	43.3	68.2
Use reliever $\leq 4 \times /d$ (when used at all)	88.6	90.1	—¶	—	—	—	—	—

* $P < .05$.‡ $P < .01$ for difference compared to specialist. For comparisons of generalist versus both equally, only "Told how to adjust meds before exposures" was statistically significant ($P < .05$).§ $P < .05$ by χ^2 test by trend.|| $P < .10$.

¶ Values not reported because no significant difference with specialist involvement.

TABLE 3. Multivariate Models* of Care Indicators and Parental Reliance on Specialists

	Managed Primarily by‡		Would Call Specialist for Care§	
	Both Equally OR (95% CI)	Specialist	Sometimes OR (95% CI)	Always
Assessment and monitoring				
Pulmonary function test performed	2.29 (0.88–5.95)	6.53 (2.36–18.1)	5.97 (2.23–16.0)	7.92 (2.22–28.2)
Instruction with a peak flow meter	1.38 (0.51–3.71)	2.93 (1.12–7.65)	2.57 (1.02–6.52)	3.12 (1.01–9.71)
Control of factors contributing to asthma severity				
Trigger identification and avoidance	1.58 (0.48–5.13)	5.92 (1.34–26.2)	1.25 (0.48–3.27)	7.07 (0.91–54.9)
Medication adjustments before exposures	2.12 (0.80–5.63)	3.11 (1.29–7.50)	2.10 (0.91–4.88)	6.02 (1.68–21.5)
Patient education for a partnership				
Written asthma care plan for asthma attack	1.55 (0.61–3.94)	3.00 (1.33–6.75)	1.0 (0.44–2.26)	3.94 (1.45–10.7)
Written asthma care plan for days without attack	1.34 (0.51–3.47)	3.77 (1.51–9.42)	2.58 (1.02–6.54)	2.88 (1.06–7.84)
Medication adjustments for flare-ups	1.96 (0.60–6.39)	4.20 (1.19–14.8)	2.55 (0.88–7.41)	8.11 (1.04–63.2)
Knowledge of what to do for flare-up (very good or excellent)	1.49 (0.54–4.08)	2.14 (0.82–5.61)	1.10 (0.47–2.55)	3.16 (0.89–11.2)
Instruction with MDI	1.25 (0.45–3.46)	2.97 (0.98–9.05)	1.29 (0.47–2.55)	4.11 (0.92–18.3)
Doctor involves you in decisions	1.32 (0.40–4.28)	2.48 (0.70–8.80)	2.68 (0.75–9.63)	5.73 (0.73–44.8)
Pharmacologic therapy				
Use of controller medication	0.58 (0.22–1.54)	6.71 (1.48–30.4)	4.90 (1.10–21.8)	3.00 (0.82–10.9)
Daily controller use (when used at all)	1.77 (0.57–5.51)	2.46 (1.06–5.72)	1.04 (0.44–2.48)	3.59 (1.28–10.0)

* Adjusted for symptom severity, parent race, parent education, recent hospitalization, and recent office visit.

‡ Reference group is Generalist, OR = 1.

§ Reference group is Never, OR = 1.

Harrold¹ reported that specialists have more knowledge of selected conditions, were more likely to use medications associated with better survival, were more likely to comply with screening guidelines, and achieved better outcomes for some but not all disorders. The authors also noted that specialists use more resources, including ordering more tests and having greater inpatient length of stay. Generalists, on the other hand,² perform better on tests of general medical knowledge and do better in some areas of health promotion and disease prevention, risk behavior

counseling, and recognition and management of psychosocial problems. The Medical Outcomes Study,⁴ a prospective observational study, compared outcomes in patients cared for by specialists with those in patients cared for by generalists for 2 common chronic conditions (hypertension and non-insulin-dependent diabetes mellitus). This study demonstrated that, with a few minor exceptions, there were no meaningful differences in health outcomes for patients with either condition when care was provided by specialists or generalists, including ad-

justed mortality after 7 years. Thus, to optimize patient outcomes, policies for deploying specialists and generalists must be considered separately for different chronic conditions.

Although the medical literature provides evidence that specialists generate better process and outcomes than generalists in the care of some chronic conditions,² there has been little attention to whether the advantages of specialist care are related primarily to training and experience or whether there are barriers to certain care practices in generalist practice settings. For example, primary care clinics are organized around short visits, designed to evaluate a diverse range of problems. Nonphysicians generally are involved in ensuring patient flow.¹⁸ Thus, the time-consuming and complex tasks of providing disease management plans, health education, and follow-up for patients with chronic illness are the responsibility of primary care physicians, for whom time pressures may preclude adequate attention. On the other hand, specialist clinics include appointment systems that allocate more time for specialist physicians who focus primarily on a single system and employ specifically trained ancillary staff for chronic disease management.¹⁸ A study using focus groups of clinicians caring for children with asthma found that barriers exist to use of asthma guidelines, including lack of awareness, familiarity, or agreement with the guidelines. In addition, the authors found that lack of time, self-efficacy, and outcomes expectancy precluded adherence. This study did not examine specialists, but follow-up studies might focus on differences in barriers between a specialist and generalist.¹⁹

There are limitations to this study. First, we did not account for all factors that determine whether patients saw a specialist for asthma. Factors that lead a patient to specialists may also lead them to attract better care and adhere to recommended treatments. For example, a patient who aggressively seeks a specialist referral may be more likely to see the specialist and to demand certain types of care. Patients with more education may be more likely to believe that there are advantages to specialists and to seek their advice.

In addition, there may be factors such as illness severity that encourage primary care physicians to refer their patients. In this study, we found that patients who saw specialists differed in some characteristics, including symptom severity, age, race, and the education and work status of the parents. Adjustment for these factors in multivariate models did not change the finding that the degree of specialist involvement in care was related to better care. However, other unmeasured factors may be associated with the observed care patterns. Because the data were cross-sectional, we could not demonstrate an association of the reported quality of care with patient outcomes. All data were from parent report, a source of data that can be affected by recall. Parents who were glad to have a specialist care for their child may have been more generous in their reports of care, which in turn might exaggerate the study findings. The survey response rate was only fair, and

because study respondents typically differ from nonrespondents, we may not have a representative sample of patients in the MCOs. Also, because the study was conducted in only 2 MCOs with a small number of specialists represented, generalizability to other MCO and non-MCO populations may be limited. Although we assessed the degree to which specialists were involved in care, we did not assess all relevant aspects of the relationship, including the duration of specialist involvement or the frequency of visits. If specialists, on average, provided care over a longer period of time or had more frequent contact with patients, these factors could have provided more opportunity to achieve care that is consistent with guidelines. Because we grouped generalists together (pediatricians and family practitioners), there may be important differences in care between these groups that we did not discern. Our study was conducted at the end of 1997, the year in which the second iteration of the guidelines was released. There may not have been sufficient time for all physicians to adapt their practices to these guidelines, even if they agreed with them. However, the conceptual groupings for types of care and many of the specific details of the care are quite similar to the recommendations of the first version of the guidelines released in 1991.

Using national guidelines as a standard, this study suggests that there is room to improve the quality of asthma care for children in managed care. If these results are typical of care in the United States, then efforts should be taken to improve performance. Treatment strategies could be developed for both generalists and specialists to improve patient care. Solutions that emphasize practice improvement by generalist physicians or strategies that shift care to specialists may also be effective ways to improve the overall quality of care for children with asthma. A strategy of shifting care to specialists is unlikely to be universally embraced because it would probably increase short-term costs of care. Indeed, we do not know whether programs to enhance generalist practice can provide equivalent care. Research is needed to determine whether shifting care from generalists or enhancing their ability to deliver care for chronic diseases can improve the overall care of children with asthma.

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McCarthy M. Virtual wizards. *Pacific Sun.* February 21-27, 2001

Submitted by Student

**Comparison of Quality of Care by Specialist and Generalist Physicians as Usual
Source of Asthma Care for Children**

Gregory B. Diette, Elizabeth A. Skinner, Theresa T. H. Nguyen, Leona Markson,
Becky D. Clark and Albert W. Wu

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