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Periodic Use of Inhaled Steroids in Children With Mild Persistent Asthma: What Are Pediatricians Recommending?

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Although asthma treatment guidelines recommend daily inhaled corticosteroid (ICS) use for all persistent asthma, pediatricians may recommend alternative treatment plans for children with mild persistent disease. The authors administered a survey of pediatricians to describe prescribing patterns for mild persistent asthma. More than 99% of providers agreed that periodic ICS could be effective for some asthma patients. Overall, 129/251 providers (51%) reported prescribing daily ICS to most patients with mild persistent asthma, whereas 78 (31%) reported recommending periodic ICS for most such patients. Providers with patient populations ≥ 25% black were significantly less likely to report prescribing daily ICS (odds ratio, 0.3; 95% confidence interval, 0.2-0.6) for mild persistent asthma. Further research is needed on the effectiveness of periodic ICS use for children with mild persistent asthma and on underlying reasons for differing provider practice patterns.

Keywords: mild persistent asthma; treatment guidelines; inhaled corticosteroids; leukotriene modifiers

Introduction

National asthma treatment guidelines recommend the daily use of inhaled corticosteroids (ICS) as first-line controller therapy for all children with persistent asthma.[1] Despite these recommendations, underuse of ICS among children with asthma is common.[2,3] Studies published in 2000 and 2001 found gaps in pediatrician adherence to national asthma guidelines.[4,5] Lack of agreement was the factor most highly associated with nonadherence to recommendations for daily ICS.[4]

Several years have elapsed since these studies, and important changes in the management of pediatric asthma have occurred. A new class of asthma controller medications, leukotriene modifiers (LM), has become available. The use of controller medications for patients with persistent asthma has also become a standard measure of quality of care in pediatrics.[6] However, underuse of ICS by patients continues despite recent surveys in which clinicians reported prescribing inhaled steroids to 80% of asthma patients[7] and not usually using LM as first-line therapy for persistent asthma.[8] The factors leading to ICS underuse remain poorly understood.

Additionally, a recent randomized trial found that symptom-based, periodic ICS therapy was effective in a selected group of adults with mild persistent asthma,[9] and a recent interactive poll of physicians demonstrated disagreement in the recommendations

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for treatment of mild persistent asthma in adults.[10] In children, anecdotal reports suggest that some pediatricians recommend periodic or symptom-based ICS use instead of daily ICS use for some children with persistent asthma. In addition, the newly revised National Heart, Lung, and Blood Institute asthma guidelines state that daily treatment only during specific periods of risk may be considered for some children.[1]

The purpose of this study was to provide an understanding of how primary care pediatric clinicians are prescribing ICS and LM for children with mild persistent asthma and of what drives decisions to prescribe these medications. Our aims were to (1) describe providers' beliefs and self-reported patterns of prescribing regarding ICS and LM to treat mild persistent asthma and (2) identify provider characteristics associated with not routinely prescribing daily year-round ICS for children with mild persistent asthma.

Methods

This study was conducted as part of the Parent Asthma Communication Experiences (PACE) project, a study of children with persistent asthma in 2 populations in eastern Massachusetts: Neighborhood Health Plan, a Medicaid-predominant health plan; and Harvard Vanguard Medical Associates, a multispecialty provider group. Children aged 2 to 12 years were identified as having probable persistent asthma if they met any of the following criteria (used by the Health Employer Data Information Set) based on their computerized health care use and medication data during a 12-month period: (1) at least 4 asthma medication dispensing events, (2) at least 1 emergency department visit or hospitalization for asthma, or (3) at least 4 ambulatory visits with asthma as a principal diagnosis.[6] We surveyed all nonspecialist physicians and advanced practice clinicians who were either named in a separate survey of parents of children in the PACE project or identified through computerized data as either the child's primary care provider or asthma care provider. Those providers who did not see general pediatric outpatients at least 8 hours a week were excluded.

We developed a 28-item self-administered survey using cognitive pretesting with a convenience sample of 10 pediatricians. We mailed the survey in November 2005, enclosed a $20 gift certificate, and sent 2 additional waves of surveys to initial nonresponders. The study protocol was approved by the institutional review board of Harvard Pilgrim Health Care. The survey asked respondents to report on their prescribing pattern for patients with mild persistent asthma by estimating the percentage of these patients to whom they prescribe daily year-round ICS, ICS seasonally or for short periods, or LM using 5 categories, 0% to 25%, 26% to 49%, 50%, 51% to 75%, or 76% to 100%. Providers were asked to estimate what percentage of their patients on daily ICS were adherent to at least 80% of recommended doses, and providers' estimation of adherence was considered high if providers estimated that ≥ 50% of their patients took at least 80% of their recommended doses. Respondents were asked whether more than 25% of their patient population was black, Hispanic, Medicaid-insured, or low English proficiency. Providers were also asked their type of practice setting, year of graduation from medical or professional school, and race/ethnicity.

The primary outcomes were the providers' self-reported patterns of prescribing ICS or LM for mild persistent asthma. Initially, providers were categorized as prescribing daily ICS or LM to either <50% or ≥ 50% of patients. Within the group prescribing daily ICS to <50% of patients, we further dichotomized responses based on the self-report of prescribing seasonal or periodic ICS to <50% or ≥ 50% of patients. Bivariate associations between prescribing practices and provider or patient population variables were evaluated using χ^2 tests. Multivariate logistic regression was used to identify independent predictors of prescribing practices. Analyses were conducted in SAS, version 9.1 (SAS Institute, Cary, North Carolina).

Results

A total of 251 of the 344 eligible providers completed the survey (response rate, 73%). The survey participants had diverse practice types and patient populations (Table 1). Almost all respondents (250/251) agreed with the statement that ICS could be effective for some patients with asthma when used seasonally or for short periods of time such as weeks or months. A total of 129 respondents (51%) said that they prescribed daily, year round ICS to ≥ 50% of patients with mild persistent asthma (Table 2).

Table 1. Pediatric Provider Demographics

Provider Characteristic	n (%)
All providers	251
Practice type	
Community health center	105 (42%)
Hospital-based clinic	23 (9%)
Multispecialty group	67 (27%)
Single-specialty group	55 (22%)
Demographics of patient population—more than 25% of patients are	
Black	68 (29%)
Hispanic	112 (46%)
Medicaid-insured	155 (63%)
Low English proficiency	102 (43%)
Years in practice	
<10 years	30 (12%)
10-20 years	84 (34%)
>20 years	132 (54%)
Provider race/ethnicity	
White	195 (78%)
Black	10 (4%)
Hispanic	15 (6%)
Asian	25 (10%)
Unknown/declined to answer	6 (2%)

Seventy-eight respondents (31%) reported that they prescribed periodic ICS to ≥ 50% of patients with mild persistent asthma. The remainder of respondents (18%) reported prescribing neither daily nor periodic ICS for ≥ 50% of patients with mild persistent asthma.

Overall, only 38 (15%) providers reported prescribing LM to the majority of their patients with mild persistent asthma. Among all respondents, the most common approach to prescribing LM was to use LM in addition to ICS (91% of respondents). Other commonly reported approaches, which were not mutually exclusive, were LM monotherapy if patients had trouble taking daily inhalers (47%) and LM monotherapy for mild asthma (39%). When asked the most important reason they might prescribe LM instead of ICS, 47% of providers said it was because LM were easier for families to use, whereas 18% said it was parental concerns over ICS side effects.

In bivariate analyses, providers whose reported patient populations were more than 25% black were less likely than other providers to report prescribing daily year-round ICS to ≥ 50% of their patients with mild persistent asthma (38% vs 58%, $P = .006$; Table 2). There was no significant difference in the reported ICS prescribing patterns based on other reported patient demographics, provider race, number of years in practice, or practice location. Providers who estimated their patients' adherence as high (63% of respondents) were more likely to report prescribing daily ICS to patients with mild persistent asthma (56% vs 45%), but this difference did not reach statistical significance ($P = .09$). Providers whose patient populations were >25% black and those in hospital-based clinics and single-specialty practices were more likely than others to prescribe LM to most patients with mild persistent asthma (Table 2).

In multivariate analyses, providers whose patient populations were >25% black were less likely to report prescribing daily ICS (odds ratio [OR], 0.3; 95% confidence interval [CI], 0.2-0.6) and were more likely to recommend LM for mild persistent asthma (OR, 3.3; 95% CI, 1.3-8.0). In contrast, in multivariate analyses, the odds of prescribing daily ICS or LM to most patients with mild persistent asthma were not associated with the type of practice setting, the provider's estimate of adherence among their patient population, or the reported percentage of Hispanic, Medicaid-insured, or low English proficiency patients in the provider's population.

Discussion

Almost half of pediatric providers in this study reported not prescribing daily ICS to children with mild persistent asthma, in contradiction of national guidelines that have been in place for many years. Almost all providers felt that seasonal or periodic use of ICS could be effective for some patients with asthma. A minority of providers reported recommending LM to most patients with mild persistent asthma.

This study was unique in providing a current picture of pediatric providers' self-reported recommendations for controller medication use. We found that a decade after national recommendations for asthma treatment were first issued, divergence from recommendations for daily ICS use in persistent asthma is still widespread. Our finding that almost half of providers do not recommend daily ICS for mild persistent asthma is in accord with a 2001 survey in which only 53% of providers said they prescribed

Table 2. Reported Pediatrician Practice Patterns for Mild Persistent Asthma

Practice Characteristic	Provider Reported Recommendation to ≥ 50% of Patients With Mild Persistent Asthma					
	Percentage Prescribing Daily ICS	*P*	Percentage Prescribing Periodic ICS	*P*	Percentage Prescribing LM	*P*
Overall	51		31%		15%	
Demographics of patient population						
≥ 25% of patients are black	38	.006	40	.08	24	.04
<25% of patients are black	58		28		13	
≥ 25% of patients are Hispanic	54	.6	41	.3	14	.8
<25% of patients are Hispanic	50		34		15	
Practice type						
Community health center	52	.5	30	.6	13	.009
Hospital-based clinic	65		22		22	
Multispecialty practice	52		36		6	
Single-specialty practice	45		35		27	
Provider's estimate of patient population's adherence to daily ICS[a]						
High	56	.09	31	.7	14	.6
Low	45		33		16	

Note: ICS = inhaled corticosteroid; LM = leukotriene modifiers.
a. High estimation of adherence was defined as estimating that ≥ 50% of patients prescribed daily ICS used at least 80% of the recommended doses.

daily ICS to patients with daily asthma symptoms more than 90% of the time.[4]

We were particularly interested in the extent to which pediatricians recommend periodic, rather than daily, ICS use for patients with mild persistent asthma. Almost all respondents in our study said they considered periodic ICS an effective treatment strategy for some children with asthma. Several recent trials in adult asthma patients are providing evidence in support of such a treatment approach.[9,11,12] This survey was conducted before these studies were published, suggesting that provider recommendations for periodic ICS use were widespread even prior to this evidence. In addition, the 2007 asthma guidelines recommend step-down therapy with consideration of periodic therapy if asthma control is achieved.[1] However, this recommendation was consensus based, with insufficient data (grade D evidence). Our findings illustrate that this practice pattern is quite common among general pediatricians and further underscore the need for controlled studies of periodic or symptom-based ICS therapy for children with mild persistent asthma.

This is also one of the first studies to describe the use of LM for children with asthma in primary care settings. Only 15% of providers in our study reported using LM for most patients with mild persistent asthma, and most providers felt that LM should be used in conjunction with ICS. However, providers did indicate that they would consider the use of LM in place of ICS because of relative ease of administration, and we observed variations in the reported use of LM based on providers' type of practice setting and patient demographics.

Providers who reported caring for higher percentages of black patients were less likely to prescribe daily ICS for mild persistent asthma and were more likely to report prescribing of LM compared with other providers. These findings, particularly with respect to LM recommendations, differ from a study of the Ohio Medicaid population in which LM prescriptions were more common among white and nonurban children.[13] Provider perception of their patient population's adherence to daily ICS therapy did not seem to account for these differences in reported recommendations for ICS or LM. Underuse of asthma medications in minority populations has been well described,[14-17] and a prior study has shown that race and site of care were associated with clinician nonadherence to asthma guidelines.[18] However, the underlying reasons for the differences we observed, as well as the possible contribution of such differences to disparities in asthma treatment outcomes, remain unclear and warrant further study.

Our study had several limitations. We did not include the National Asthma Education and Prevention Program definition of mild persistent asthma in the survey and we did not assess familiarity with the treatment guidelines, so we cannot say whether each provider had the same patients or symptoms in mind when reporting their practices for such patients. We also did not examine the actual prescription practices of the providers and relied solely on self-report. Because providers tend to overestimate their adherence to recommended practices, this might have led to overreporting of daily ICS prescribing for mild persistent asthma. Finally, this study included only providers in Massachusetts, but past studies have found that asthma practice patterns in Massachusetts did not differ markedly from those in other regions.[19]

In conclusion, many pediatric providers we studied do not recommend daily ICS for most children with mild persistent asthma and almost all believe that periodic ICS may be effective for some asthma patients. This highlights an area of divergence between providers' beliefs and recommendations and national guidelines and quality measures for asthma. Further research is needed on the effectiveness of periodic or as-needed ICS use for children with mild persistent asthma, on reasons for variation in provider prescribing of controller medications, and on interventions to reduce disparities in the care of children with asthma.

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References

1. National Asthma Education and Prevention Program Expert Panel Report 3 (EPR-3). Guidelines for the diagnosis and management of asthma—summary report 2007. *J Allergy Clin Immunol*. 2007;120:S94-S138.
2. Adams RJ, Fuhlbrigge A, Finkelstein JA, et al. Use of inhaled anti-inflammatory medication in children with asthma in managed care settings. *Arch Pediatr Adolesc Med*. 2001;155:501-507.
3. Lozano P, Finkelstein JA, Hecht J, Shulruff R, Weiss KB. Asthma medication use and disease burden in children in a primary care population. *Arch Pediatr Adolesc Med*. 2003;157:81-88.
4. Cabana MD, Rand CS, Becher OJ, Rubin HR. Reasons for pediatrician nonadherence to asthma guidelines. *Arch Pediatr Adolesc Med*. 2001;155:1057-1062.
5. Finkelstein JA, Lozano P, Shulruff R, et al. Self-reported physician practices for children with asthma: are national guidelines followed? *Pediatrics*. 2000;106:886-896.
6. National Committee for Quality Assurance. *HEDIS 2003*. Washington, DC: National Committee for Quality Assurance; 2003:25-28.
7. Garbutt J, Bloomberg G, Banister C, et al. What constitutes maintenance asthma care? The pediatrician's perspective. *Ambul Pediatr*. 2007;7:308-312.
8. Rastogi D, Shetty A, Neugebauer R, Harijith A. National Heart, Lung, and Blood Institute guidelines and asthma management practices among inner-city pediatric primary care providers. *Chest*. 2006;129:619-623.
9. Boushey HA, Sorkness CA, King TS, et al; National Heart, Lund, and Blood Institute's Asthma Clinical Research Network. Daily versus as-needed corticosteroids for mild persistent asthma. *N Engl J Med*. 2005;352:1519-1528.
10. Kraft M, Israel E, O'Connor GT. Clinical decisions. Treatment of mild persistent asthma. *N Engl J Med*. 2007;356:2096-2100.
11. American Lung Association Asthma Clinical Research Centers; Peters SP, Anthonisen N, Castro M, et al. Randomized comparison of strategies for reducing treatment in mild persistent asthma. *N Engl J Med*. 2007;356:2027-2039.
12. Papi A, Canonica GW, Maestrelli P, et al; BEST Study Group. Rescue use of beclomethasone and albuterol in a single inhaler for mild asthma. *N Engl J Med*. 2007;356:2040-2052.
13. Wilson SE, Leonard A, Moomaw C, Schneeweiss S, Eckman MH. Underuse of controller medications among children with persistent asthma in the Ohio Medicaid population: evolving differences with new medications. *Ambul Pediatr*. 2005;5:83-89.
14. Lara M, Akinbami L, Flores G, Morgenstern H. Heterogeneity of childhood asthma among Hispanic children: Puerto Rican children bear a disproportionate burden. *Pediatrics*. 2006;117:43-53.
15. Lieu TA, Lozano P, Finkelstein JA, et al. Racial/ethnic variation in asthma status and management practices among children in managed medicaid. *Pediatrics*. 2002; 109:857-865.

16. Smith LA, Hatcher-Ross JL, Wertheimer R, Kahn RS. Rethinking race/ethnicity, income, and childhood asthma: racial/ethnic disparities concentrated among the very poor. *Public Health Rep*. 2005;120:109-116.
17. Finkelstein JA, Lozano P, Farber HJ, Miroshnik I, Lieu TA. Underuse of controller medications among Medicaid-insured children with asthma. *Arch Pediatr Adolesc Med*. 2002;156:562-567.
18. Ortega AN, Gergen PJ, Paltiel AD, Bauchner H, Belanger KD, Leaderer BP. Impact of site of care, race, and Hispanic ethnicity on medication use for childhood asthma. *Pediatrics*. 2002;109:E1.
19. Lozano P, Grothaus LC, Finkelstein JA, Hecht J, Farber HJ, Lieu TA. Variability in asthma care and services for low-income populations among practice sites in managed Medicaid systems. *Health Serv Res*. 2003;38:1563-1578.