

Differences Between Child and Parent Reports of Symptoms Among Latino Children With Asthma

Marielena Lara, MD, MPH*‡; Naihua Duan, PhD‡; Cathy Sherbourne, PhD‡;
Mary Ann Lewis, DrPH, RN§; Chris Landon, MD*||; Neal Halfon, MD, MPH*‡; and
Robert H. Brook, MD, ScD‡

ABSTRACT. *Objectives.* To determine, in a population of predominantly Latino children with asthma 6 to 18 years old, whether parent and child reports of asthma symptoms with exercise differ and to evaluate the validity of child and parent reports of symptoms.

Design. Data obtained from child and parent interviews; pulmonary function tests (forced vital capacity, forced expiratory volume in 1 second, forced expiratory flow₂₅₋₇₅, peak expiratory flow), and observation of symptoms after exercise.

Setting. Three summer camps for minority children with asthma in Los Angeles County.

Participants. A total of 97 children with asthma (78% Latino, 12% non-Latino White, 9% Other; 6 to 18 years of age) and their parents.

Intervention(s). None.

Primary Outcome Measures. Child and parent reports of cough and wheezing with exercise and pulmonary function tests before and after exercise. While at camp, children underwent spirometry after completing the self-administered survey. The pulmonary function tests were conducted and interpreted according to the pediatric specifications for spirometry, and results >80% of predicted, adjusted for gender, age, height, and race, were considered normal. Six peak expiratory flow rates (PEFR) by peak flow meter also were recorded by trained research assistants immediately before spirometry, and values >80% of predicted based on height were considered normal. To observe child symptoms with exercise, children participated in a relay running race of 200 feet followed by a swimming race of 300 feet. Research assistants measured heart rate and 6 PEFRs using ASSESS portable peak flow meters immediately before and after each exercise. A positive exercise challenge was defined as a 15% reduction in mean PEFR and/or observed asthma symptoms (cough, wheezing, chest pain, asthma attack).

Results. Of the children, 18% reported never having a cough when they exercised, 46% reported having it occasionally when they exercised, and 36% reported having it quite often or always when they exercised. For wheezing, 20% of children reported never having wheezing when they exercised, 35% having it occasionally when they exercised, and 45% having it quite often or always when they exercised. Parents reported fewer symptoms than did their children. Of the parents, 34% reported that their children did not have cough with exercise, 37% reported few to some days, and 29% reported most days or every day. Forty-seven percent of parents reported that their child did not wheeze with exercise in the last 2 months, 35% reported wheezing on a few days to some days, and 17% reported wheezing most days to every day.

Parent and child reports of cough or wheezing after exercise correlated mildly with each other (parent/child cough $r = 0.23$; $\kappa = 0.03$; parent/child wheezing $r = 0.21$; $\kappa = 0.14$). Children were more likely to report cough: 59 of 71 (83%) of children versus 44 of 71 (62%) of parents. The 22 children who reported cough when their parents did not account for most of the disagreement between parents and children. Children were more likely than were their parents to report wheezing; 55 of 69 (80%) children versus 36 of 69 (52%) parents reported that the child wheezed. The 24 children who reported wheezing when their parents did not account for most of the disagreement between parents and children.

Forty-seven percent of the children had a value <80% of predicted for at least one of the four spirometry tests; 29% of mean baseline PEFRs were <80% of predicted. Overall, 86% of the children met one or more of the following: any percent of predicted pulmonary function tests <80% or any symptom or PEFR reduction of 15% after exercise, or other occurrence of nonexercise symptoms during camp.

Almost all child reports of cough and wheezing correlated significantly with the criterion validity criteria. For example, child reports of wheezing were, as expected, correlated negatively with the percent of predicted FEV₁ ($r = -0.28$) and correlated positively with observed symptoms after exercise ($r = 0.3$). On the other hand, neither parent reports of cough nor those of wheezing correlated significantly with any of the pulmonary function tests or symptomatic validity criteria.

Parent reports of wheezing were correlated positively with construct validity variables such as 1) parent reports of child's bother ($r = 0.35$) and activity limitation ($r = 0.23$) because of asthma; 2) more use of rescue or bronchodilator medications ($r = 0.18$); 3) more parent worry about asthma overall ($r = 0.29$); and 4) parent perception of asthma severity being moderate to very severe instead of mild or very mild ($r = 0.28$). Child reports of cough and wheezing were not correlated significantly with

From the *Department of Pediatrics, University of California, Los Angeles, and ‡RAND Health, University of California, Los Angeles/RAND Program on Latino Children with Asthma, Los Angeles, California; the §University of California, Los Angeles, School of Nursing, Los Angeles, California; and the ||Pediatric Diagnostic Center, Ventura, California.

Dr Lara was a Clinical Scholar and a Minority Medical Faculty Fellow with the Robert Wood Johnson Foundation and a recipient of a National Research Service Award by the Agency for Health Care Policy and Research when this study was performed.

An earlier version of this article was presented at the National Meeting of the Ambulatory Pediatric Association in 1995.

Received for publication Mar 3, 1998; accepted Jul 6, 1998.

Reprint requests to (M.L.) RAND Health, 1700 Main St, Box 2138, Santa Monica, CA 90401-2138.

PEDIATRICS (ISSN 0031 4005). Copyright © 1998 by the American Academy of Pediatrics.

almost all of the parent-reported factors hypothesized to be associated with asthma morbidity.

Conclusions. Clinicians and researchers evaluating asthma morbidity in children should elicit child reports of symptoms. More research is necessary to understand discordance between child and parent reports of symptoms and its relationship to asthma morbidity experienced by the child. *Pediatrics* 1998;102(6). URL: <http://www.pediatrics.org/cgi/content/full/102/6/e68>; *childhood asthma, Latino/Hispanic, exercise symptoms, parent perception, child perception*.

ABBREVIATIONS. FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; FEF₂₅₋₇₅, forced expiratory flow between 25% and 75% vital capacity; PEF, peak expiratory flow rate.

Health care providers treating children with asthma should be aware of differences between child and parent reports of symptoms. Previous research on asthma¹⁻³ and other conditions⁴⁻⁷ demonstrates that parent and child reports differ and suggests that children may be more valid reporters than their caregivers.^{8,9} However, for the most part, clinicians and researchers rely on the parent report and/or pulmonary function tests to evaluate the impact of asthma experienced by the child. Discordance in symptom reports may reflect differences between the parent and child in awareness of the child's asthma symptoms and/or psychosocial experience with the illness.^{10,11} Because it is usually the parent who initiates care, these differences in perspective may be associated with differences in use of health services and compliance. Given the rise in child asthma morbidity among poor and minority children,¹²⁻¹⁴ and Latino children in particular,¹⁵⁻¹⁸ it is important to explore differences in parent and child reports of symptoms among Latino children.

In a population of predominantly Latino children with asthma, 6 to 18 years of age, we 1) describe whether parent and child reports of asthma symptoms with exercise differ from each other, and 2) evaluate the validity of child and parent reports of symptoms.

METHODS

Subject Recruitment

During the summer of 1994, we recruited children attending three camps in Los Angeles for poor and minority children with asthma. This method has been used previously.^{19,20} Children were included only if parents indicated that their child had a physician diagnosis of asthma.

Parent and Child Interview Data

A single half-hour parent interview was carried out by telephone by trained bilingual interviewers 1 week or less before children attended camp and after they had been selected for attendance. Parents were asked about 1) child asthma symptoms (frequency of cough and wheezing with exercise in the last 2 months); 2) child functional status and quality of life limitations attributable to asthma (frequency of bother in the last 2 months, limitation of normal activities in the last 2 months, school days lost in the last year); 3) child health care use for asthma (type of medications used in the last 2 months, doctor and emergency department visits for asthma in the last year, hospitalizations for asthma in the last year, whether regular provider is an asthma specialist); 4) parental worry related to asthma (overall, about child activity limitation, medications, and side effects); 5) parental

perception of the child's asthma severity; and 6) sociodemographics. We used a 2-month recall period to test concordance between the child and parent report of symptoms and the parent and the physiologic function tests. We used a 12-month recall to evaluate the relationship of parent reports of symptoms to infrequent events (use of emergency departments, hospitals). Children completed self-administered questionnaires at camp before physiologic testing;²¹ a trained bilingual research assistant was available to answer children's questions (Appendix 1 and 2).

Pulmonary Testing and Clinical Data

While at camp, children underwent spirometry after completing the self-administered survey. The pulmonary function tests (forced expiratory volume in 1 second [FEV₁], forced vital capacity [FVC], forced expiratory flow between 25% and 75% vital capacity [FEF₂₅₋₇₅], and peak expiratory flow [PEF] were conducted and interpreted according to the pediatric specifications for spirometry,^{22,23} and results >80% of predicted adjusted for gender, age, height, and race^{24,25} were considered normal. Six peak expiratory flow rates (PEFR) by peak flow meter also were recorded by trained research assistants immediately before spirometry, and values >80% of predicted based on height²⁶ were considered normal.

To observe child symptoms with exercise, children participated in a relay running race of 200 feet followed by a swimming race of 300 feet. The running and swimming lasted ~1 to 2 minutes each. Research assistants measured heart rate and six PEFRs using ASSESS portable peak flow meters²⁶ immediately before and after each exercise. A positive exercise challenge was defined as a 15% reduction in mean PEFR²⁷ and/or observed asthma symptoms (cough, wheezing, chest pain, asthma attack).

Children also were monitored twice a day on the day of and the day after pulmonary testing for the presence of a standardized list of asthma symptoms. Trained research assistants supervised by asthma clinicians (ML or CL) asked children questions regarding their symptoms that day. All investigators and research assistants were blinded to the parent and child survey responses when they conducted and interpreted the pulmonary function tests and observed the children. The research protocol for the parent and child interviews and the physiologic testing were approved by the UCLA Committee for the Protection of Human Subjects.

Analysis

To evaluate the criterion validity of both parent and child report, we calculated Pearson's correlation coefficients between the reports of cough and wheezing and 1) percent of predicted value of FEV₁, 2) percent of predicted value for mean PEFR, 3) direct observation of exercise intolerance, and 4) presence of other asthma symptoms. Presence of daily asthma symptoms was defined as a positive child report of symptoms to the research assistant or presence of signs or symptoms recorded by the camp asthma clinician that day. In addition, we compared parent and child reports of symptoms to one composite "clinically symptomatic" criterion that was met when any of the percent of predicted spirometry tests (FEV₁, FEF₂₅₋₇₅, FVC, PEF) was <80% predicted, mean PEFR was <80% predicted, or when criterion three or four was met.

To evaluate construct validity, we correlated parent and child reports of symptoms to other measures of asthma morbidity. We hypothesized that parent and child report of symptoms would be related to health care use (medications for asthma, outpatient and emergency department visits, hospitalizations, having an asthma specialist), and functional impairment attributable to asthma (bother, activity limitation, school days lost). In addition, we hypothesized that parent reports of symptoms would correlate with parent worry¹⁰ and perception of the child's asthma severity.

To evaluate agreement between parent and child reports of asthma symptoms, we: 1) calculated Pearson's correlation coefficients between the parent response (scaled 1 to 5) and child responses (scaled 1 to 4) for the cough and wheezing questions with exercise, and 2) calculated κ statistics for cross-tabulations of dichotomized parent and child reports of cough and wheezing. We assigned a value of 0 for a response of "never" for parent and child reports and a value of 1 for a parent's response of "a few days, some days, most days, and every day" and for a child's response of "not very often, quite often, and always." We classified the level of agreement as follows: $\kappa \leq 0$ (no agreement); $0 < \kappa$

≤ 0.2 (poor agreement); $0.2 < \kappa \leq 0.4$ (mild agreement); $\kappa > 0.4$ (moderate to good agreement).^{28,29}

RESULTS

Characteristics of Population

We recruited 100% of all 97 children with a parent-reported diagnosis of asthma. Ninety-five (98%) of the parents completed the telephone survey, and 82 (85%) of children completed the camp survey and 84 (87%) participated in the pulmonary testing and exercise challenge. The majority of children in our sample were boys (60%), reported by their parents as Latino (78%), and born in the United States (94%). The mean age was 10.1 years (SD, 2.2; range, 6 to 18), with 65% being younger than 11 years of age (Table 1). During the previous 2 months, approximately two thirds of children were bothered by asthma, and slightly greater than half were limited by asthma in their normal activities. Approximately half of the parents perceived their child's asthma to be at least moderate. Almost all children used inhaled bronchodilators for asthma symptoms. During the last year, three quarters of the children had seen a doctor for asthma, and 7% had been hospitalized. Forty-one percent had a regular provider who was a children's asthma specialist (Table 2).

Disagreement Between Parent and Child Reports of Asthma Symptoms

Eighteen percent of children reported never having a cough when they exercised, 46% having it occasionally when they exercised, and 36% having it quite often or always when they exercised. Twenty percent of children reported never having wheezing when they exercised, 35% having it occasionally when they exercised, and 45% having it quite often or always when they exercised. Parents reported fewer symptoms than did their children; 34% of par-

TABLE 1. Sociodemographic Characteristics of Population

Child characteristics	
Age ($n = 97$) mean	10.1
Male ($n = 97$) %	60
Child's ethnicity* ($n = 97$) %	
Latino	78
Non-Latino white	12
Other	9
Child's country of birth ($n = 93$) %	
United States	94
Other	6
Language preferred for interview ($n = 82$) %	
English	93
Spanish	7
Parent characteristics	
Mother as respondent ($n = 95$) %	92
Parent's self-reported ethnicity* ($n = 91$) %	
Latino	81
Non-Latino white	14
Other	4
Parent's country of birth ($n = 93$) %	
United States	66
Other	34
Parent's years of schooling ($n = 90$) mean	11.2
Language preferred for interview ($n = 95$) %	
English	65
Spanish	35

* Percentages do not add up to 100 because of rounding.

TABLE 2. Child Asthma Morbidity and Health Care Use as Reported by Parents

	%
Asthma bothered child in last 2 months ($n = 94$)	
Never	35
Once in a while	48
Often	13
All of the time	4
Asthma limited normal child activities in last 2 months* ($n = 93$)	
None of the time	45
A little of the time	31
Some of the time	13
Most of the time	6
All of the time	4
School days last year lost because of asthma ($n = 86$)	
≤ 10 days (2 weeks of school)	69
> 10 days	31
Parent perception of child's asthma severity ($n = 91$)	
Very mild	15
Mild	33
Moderate	40
Severe	9
Very severe	3
Asthma medication use	
Uses bronchodilators ($n = 90$)	91
Takes antiinflammatory drugs ($n = 90$)	47
Both ($n = 91$)	44
Asthma health care visits	
Visited physician in last 2 months ($n = 93$)	55
> 1 physician visit last year ($n = 88$)	75
Visited emergency room last year ($n = 92$)	37
Hospitalized last year ($n = 87$)	7
Type of regular asthma provider ($n = 94$)	
Asthma specialists	41
Non-asthma specialist	59

* Percentages do not add up to 100 because of rounding.

ents reported that their children did not have cough with exercise, 37% reported few to some days, and 29% reported most days or everyday. Forty-seven percent of parents reported that their child did not wheeze with exercise in the last 2 months, 35% reported a few days to some days, and 17% reported most days to every day.

Parent and child reports of cough or wheezing after exercise correlated mildly with each other (parent/child cough, $r = 0.23$, $P = .05$, $\kappa = 0.03$; parent/child wheezing, $r = 0.21$, $P = .08$, $\kappa = 0.14$). Cross-tabulations and κ analyses confirmed these findings (Table 3). Children were more likely to report cough: 59 of 71 (83%) children versus 44 of 71 (62%) parents. Most of the disagreement between parents and children is accounted for by the 22 children who reported cough when their parents did not. Children were more likely than were their parents to report

TABLE 3. Agreement Between Parent and Child Reports of Asthma Symptoms With Exercise

	Cough*		Wheezing†	
	Child Report No	Child Report Yes	Child Report No	Child Report Yes
Parent report				
No	5	22	9	24
Yes	7	37	5	31

* $\kappa = 0.03$; $P = .39$.

† $\kappa = 0.14$, $P = .08$.

wheezing: 55 of 69 (80%) children versus 36 of 69 (52%) parents reported that the child wheezed. Most of the disagreement between parents and children is accounted for by 24 children who reported wheezing when their parents did not.

Pulmonary Testing and Clinical Observation

Forty-seven percent of the children had a value <80% of predicted for at least one of the four spirometry tests; 29% of the children had a PEFr <80% of predicted. The correlation coefficients among the pulmonary function tests ranged from $r = 0.5$ to $r = 0.8$.

The standardized exercise challenge was effective in raising the child's heart rate (34% postrunning and 19% postswimming). Cough was the most common observed symptom after exercise and 9% of the children experienced a $\geq 15\%$ reduction of PEFr. Overall, 86% percent of the children met one or more of the following: any percent of predicted pulmonary function tests <80% while at rest, presence of any symptom or PEFr reduction of 15% after exercise, or other occurrence of nonexercise symptoms during camp (Table 4).

Criterion and Construct Validity

Almost all child reports of cough and wheezing correlated significantly with the criterion validity criteria. For example, child reports of wheezing were, as expected, correlated negatively with the percent of predicted FEV₁ ($r = -0.28$; $P = .03$) and correlated positively with observed symptoms after exercise ($r = 0.3$; $P = .02$). However, neither parent reports of cough nor those of wheezing correlated significantly with any of the pulmonary function tests or symptomatic validity criteria (Table 5).

Parent reports of wheezing were correlated positively with construct validity variables such as 1) parent reports of child's bother ($r = 0.35$; $P = .0008$)

and activity limitation ($r = 0.23$; $P = .03$) attributable to asthma; 2) more use of rescue or bronchodilator medications ($r = 0.18$; $P = .09$); 3) more parent worry about asthma overall ($r = 0.29$; $P = .005$); and 4) parent perception of asthma severity being moderate to very severe, instead of mild or very mild ($r = 0.28$; $P = .008$). Child reports of cough and wheezing were not correlated significantly with almost all of the parent-reported factors hypothesized to be associated with asthma morbidity.

DISCUSSION

In a predominantly Latino sample of children with asthma, we found that parents and children do not report the same symptoms and that children's reports appear to be more valid than their parent's reports. To our knowledge, this is the first study that has evaluated the validity of parent and child reports of symptoms in a Latino population. Our study provides evidence of the criterion validity of child reports and the need to question children directly about their symptoms instead of only depending on the parent as a proxy.

Our findings are consistent with previous studies⁸ indicating that children can be more valid reporters than their parents. In a sample of 52 Canadian children 7 to 17 years old with asthma Guyatt found that for children older than age 11, the child's global rating of symptoms was correlated more significantly with pulmonary function test results and report of symptoms and medication use than were the parents' global ratings of the child's symptoms. With the measures discussed above, we have replicated these findings in a predominantly Latino sample.

Our findings also are consistent with other studies^{2,30,31} demonstrating a relationship between parent reports of symptoms and nonphysiologic measures of asthma morbidity. In a sample of 105 children, 6 to 18 years of age, with asthma, Fritz² demonstrated that parent factor scores of symptom ratings—but not children's ratings—were related to parent reported measures of functional morbidity and health care use. Other investigators^{30,31} also have found that parent reports of health status in children with asthma are related to health care use.

There are a number of limitations to our study. We were not able to compare time-related changes in symptom report to changes in physiologic function. We did not interview children in settings identical to their daily environments nor simultaneously with parents. It is possible that children learned to be more correctly aware of their symptoms than did their parents because of their educational experiences in camp. If parents had received similar "educational experiences," agreement between child and parent might have been better. Because of feasibility constraints, we did not administer parent and child survey items with exactly the same recall time nor conduct time-consuming, more specialized physiologic testing such as a longer exercise challenge or a bronchodilator reversibility test.

More research is necessary both to understand the causes of disagreement between parent and child reports of asthma symptoms and to assess the valid-

TABLE 4. Pulmonary Function Tests and Clinical Observation

Test	%
1) Spirometry* $\leq 80\%$ predicted ($n = 70$)	
FVC	11
FEV ₁	21
FEF ₂₅₋₇₅	37
PEF	21
Any pulmonary function test $\leq 80\%$ predicted	47
2) Mean PEFr† measures immediately before spirometry ($n = 80$)	
$\leq 80\%$ predicted	29
3) Children with asthma symptoms after exercise challenge	
Cough after running ($n = 78$)	18
Wheezing after running ($n = 78$)	5
Cough after swimming ($n = 73$)	10
Wheezing after swimming ($n = 73$)	4
Any symptom after running or swimming ($n = 75$)	33
4) Children with $\geq 15\%$ reduction in PEFr† after running or swimming ($n = 54$)	9
5) Children with other asthma symptoms during camp ($n = 80$)	51
6) "Clinically symptomatic" by criteria 1-5 ($n = 69$)	86

* Spirometry (FEV₁, FVC, FEF₂₅₋₇₅, and PEF) results adjusted for predicted value for age, gender, height, ethnicity.²⁴

† ASSESS portable peak flow results for PEFr.²⁶

TABLE 5. Correlation of Parent and Child Reports of Symptoms to Follow Exercise With Validity Criteria

Criteria	Parent Report		Child Report	
	Cough	Wheezing	Cough	Wheezing
Criterion validity				
FEV ₁ (% predicted)	—†	—	—	−0.28**
Mean PEFr (% predicted)	—	−0.20*	—	—
Exercise-intolerant	—	—	0.36***	0.30**
Other symptoms observed	—	—	0.36***	0.33***
“Clinically symptomatic”‡	—	—	0.23*	0.33***
Construct validity				
Parent report of				
Child bother attributable to asthma	—	0.35***	—	—
Activity limitation	—	0.23**	—	—
More than 1 week of school lost	0.21**	0.21**	—	—
Antiinflammatory use	—	−0.22**	—	—
Bronchodilator use	—	0.18*	—	—
Regular doctor is specialist	—	—	—	−0.29***
Asthma-related visit in last 2 months	0.22**	—	—	—
Child’s asthma moderate to severe	—	0.28***	—	—
Worry about asthma	0.20**	0.29***	—	—
Worry about limitation of activities	—	−0.38***	0.25**	—
Worry about medications	—	−0.25**	—	—

All correlations are in the hypothesized direction, including report of fewer symptoms with use of a preventive, antiinflammatory medication and having a doctor who is an asthma specialist.

* $P < .10$.

** $P < .05$.

*** $P < .01$.

† — Correlation coefficients not significant ($P > .1$).

‡ Meets summary symptomatic criterion (6 from Table 4).

ity of parent and child reports. Preliminary studies indicate that a child’s capacity to detect asthma symptoms may vary and may be related to cognitive or emotional domains. Fritz¹⁹ found that children with higher IQs were better predictors of their PEFrs. Given the reported prevalence of emotional and mental health disorders in children with asthma,^{32,33} future research could test the hypothesis that children’s report of symptoms are associated with their psychosocial state.

We believe that more work needs to be performed in symptom perception to understand how differences in parent and child reports of symptoms influence patient compliance and behavior. Prospective clinical trials and intervention studies that measure morbidity through parent and child report and physiologic testing are necessary. Qualitative studies that ask parents and children to discuss or resolve their reported differences also can shed light on how to interpret parent and child disagreement. In the meantime, to monitor and improve asthma control, clinicians should elicit cough and wheezing reports directly from children. We need to listen more to children with asthma. Only in this way can we evaluate fully the morbidity they experience, optimize health care management, and thus improve their quality of life and capacity to function normally.

ACKNOWLEDGMENTS

We thank Karen Spritzer, MS, for her diligent performance of the analyses; Amanda Kerbs, Adolfo Aguilera, Ramón Díaz, Hilda Fernández, René Rizo, and the staff of the UCLA Community-based Education Program for Latino Children with Asthma for their help collecting the data; Marlene Nishimoto, Linda Escalante, Ana Ríos, Peter Scott, and Carrie Imai for their administrative assistance; Fisons Pharmaceuticals, Rochester, NY, and Healthscan Products, Inc, Cedar Grove, NJ, for donating the peak flow

meters used; and Multispiro, Inc, Irvine, CA, for lending us the portable spirometers.

This work is dedicated to the children with asthma and their parents who participated in this study and, in particular, to the memory of one of these children, who has since died of asthma.

REFERENCES

1. Wood PR, Hidalgo HA, Prihoda TJ, Kromer ME. Comparison of Hispanic children’s and parent’s responses to questions about the child’s asthma. *Arch Pediatr Adolesc Med.* 1994;148:43
2. Fritz GK, Overholser JC. Patterns of response to childhood asthma. *Psychosom Med.* 1989;51:347–355
3. Khampalikit S. The interrelationships between the asthma child’s dependency behavior, his perception of his illness, and his mother’s perception of his illness. *Maternal Child Nurs J.* 1983;12:221–296
4. Thompson RJ, Merritt KA, Keith BR, Murphy LB, Johndrow DA. Mother–child agreement on the child assessment schedule with nonreferred children: a research note. *J Child Psychol Psychiatry.* 1993;34:813–820
5. Achenbach TM, Bird HR, Canino G, Phares V, Gould MS, Rubio-Stipec M. Epidemiological comparisons of Puerto Rican and U. S. mainland children: parent, teacher, and self-reports. *J Am Acad Child Adolesc Psychiatry.* 1990;29:84–93
6. Reich W, Herjanic B, Welner Z, Gandhi PR. Development of a structured psychiatric interview for children: agreement on diagnosis comparing child and parent interviews. *J Abnorm Child Psychol.* 1982;10:325–336
7. Weissman MM, Orvaschel H, Padian N. Children’s symptom and social functioning self-report scales: comparison of mothers’ and children’s reports. *J Nerv Mental Dis.* 1980;168:736–740
8. Guyatt GH, Juniper EF, Griffith LE, Feeny DH, Ferrie PJ. Children and adult perceptions of childhood Asthma. *Pediatrics.* 1997;99:165–168
9. Christie MJ, French D, Sowden A, West A. Development of child-centered disease-specific questionnaires for living with asthma. *Psychosom Med.* 1993;55:541–548
10. Townsend M, Feeny DH, Guyatt GH, Furlong WJ, Seip AE, Dolovich J. Evaluation of the burden of illness for pediatric asthmatic patients and their parents. *Ann Allergy.* 1991;67:403–408
11. Yoos HL, McMullen A. Illness narratives of children with asthma. *Pediatr Nurs.* 1996;22:285–290
12. Halfon N, Newacheck PW. Childhood asthma and poverty: differential impacts and utilization of health services. *Pediatrics.* 1993;91:56–61
- 13.

13. Weiss KB, Wagener DK. Changing patterns of asthma mortality: identifying target populations at high risk. *JAMA*. 1990;264:1682–1687
14. Wissow LS, Gittelsohn AM, Szklo M, Starfield B, Mussman M. Poverty, race, and hospitalization for childhood asthma. *Am J Public Health*. 1988;78:777–782
15. Crain EF, Weiss KB, Bijur PE, Hersh M, Westbrook L, Stein REK. An estimate of the prevalence of asthma and wheezing among inner-city children with asthma. *Pediatrics*. 1994;94:356–362
16. Carter-Pokras OD, Gergen PJ. Reported asthma among Puerto Rican, Mexican-American, and Cuban children, 1982 through 1984. *Am J Public Health*. 1993;83:580–582
17. Lewis MA, Rachelefsky G, Lewis CE, Leake B, Richards W. The termination of a randomized clinical trial for poor Hispanic children. *Arch Pediatr Adolesc Med*. 1994;148:364–367
18. Wood PR, Hidalgo HA, Prihoda TJ, Kromer ME. Hispanic children with asthma: morbidity. *Pediatrics*. 1993;91:62–69
19. Fritz GK, McQuaid EL, Spirito A, Klein RB. Symptom perception in pediatric asthma: relationship to functional morbidity and psychological factors. *J Am Acad Child Adolesc Psychiatry*. 1996;35:1033–1041
20. Punnett AF, Thurber S. Evaluation of the asthma camp experience for children. *J Asthma*. 1993;30:195–198
21. Weston AR, Duncan J, Macfarlane DJ, Hopkins WG. Physical activity of asthmatic and nonasthmatic children. *J Asthma*. 1989;26:279–286
22. Polgar G, Promadhat V. Pulmonary function testing in children: techniques and standards. Philadelphia, PA: WB Saunders Company; 1971
23. American Thoracic Society. Standardization of spirometry: 1994 update. *Am J Resp Crit Care Med*. 1995;152:1107–1136
24. Multispiro, Inc. Multispiro-SX Platinum, Gold, Silver Operations Manual. Irvine, CA: Multispiro, Inc; 1993
25. Hsu KHK, Jenkins DE, Hsi BP, Bourhofer E, Thompson V, Tanakawa N, Hsieh GSJ. Ventilatory functions of normal children and young adults—Mexican-American, white and black. I. Spirometry. *J Pediatr*. 1979;95:14–23
26. Shapiro SM, Hendler JM, Ogirala RG, Aldrich TK, Shapiro MB. An evaluation of the accuracy of Assess and MiniWright peak flow meters. *Chest*. 1991;99:358–362
27. Williams D, Bruton J, Wilson I. Screening a state middle school for asthma using the Free Running Asthma Screening Test. *Arch Dis Child*. 1993;69:667–669
28. Cohen J. A coefficient of agreement for nominal scales. *Educ Psychol Measurements*. 1960;20:37–46
29. Landis JR, Koch GG. The measurement of observed agreement for categorical data. *Biometrics*. 1977;33:671–679
30. Pless CE, Pless IB. How well they remember: the accuracy of parent reports. *Arch Pediatr Adolesc Med*. 1995;149:553–558
31. Lewis CC, Pantell RH, Kieckhefer GM. Assessment of children's health status: field test of new approach. *Med Care*. 1989;27:S54–S65
32. Butz AM, Alexander C. Anxiety in children with asthma. *J Asthma*. 1993;30:199–209
33. Leher PM, Isenberg S, Hochron SM. Asthma and emotion: a review. *J Asthma*. 1993;30:5–21
34. National Center for Health Statistics. 1988 Current Sections, Child Health Supplemental Questionnaires. *Vital Health Stat [10]*. 1989;173
35. Lewis MA, Lewis CE, Leake B, Monahan G, Rachelefsky G. Organizing the community to target poor Latino children with asthma. *J Asthma*. 1996;33:289–297
36. Siegal M. *Knowing Children: Experiments in Conversation and Cognition*. Hove, England: Lawrence Erlbaum; 1991:9–10
37. Pidgeon V. Children's concepts of illness: implications for health teaching. *Maternal Child Nurs J*. 1985;14:23–35
38. Edelbrock C, Costello AJ, Dulcan MK, Kalas R, Conover NC. Age differences in the reliability of the psychiatric interview of the child. *Child Dev*. 1985;56:265–275
39. Friedman W. *About Time: Inventing the Fourth Dimension*. Cambridge, MA: MIT Press; 1990:85–102

APPENDIX 1. Bilingual Parent Survey Measures Used

For the parent questionnaire, we drew from already translated survey items included in the National Health Interview Survey³⁴ and the UCLA Community-based Education Program for Latino Children with Asthma.³⁵ For parent questions, we kept the 2-month and 12-month recall time frames used in the source questionnaires. Before administration, the items were pilot-tested with small focus groups of predominantly Mexican-American par-

ents to evaluate comprehension and cultural and Spanish language appropriateness.

ASTHMA MORBIDITY

Exercise-induced Symptoms

How often has (child's name) been troubled by the following symptoms when hurrying, or running, or playing sports in the last 2 months?

- | | |
|-------------|---|
| a. cough | |
| never | 1 |
| a few days | 2 |
| some days | 3 |
| most days | 4 |
| every day | 5 |
| b. wheezing | |
| never | 1 |
| a few days | 2 |
| some days | 3 |
| most days | 4 |
| every day | 5 |

¿Cuántas veces le han molestado los siguientes síntomas a (nombre del niño/a) cuando se apura, corre o juega deportes en los últimos 2 meses?

- | | |
|----------------------------|---|
| a. tos | |
| nunca | 1 |
| pocos días | 2 |
| algunos días | 3 |
| la mayor parte de los días | 4 |
| todos los días | 5 |
| b. silbido | |
| nunca | 1 |
| pocos días | 2 |
| algunos días | 3 |
| la mayor parte de los días | 4 |
| todos los días | 5 |

Functional Status and Quality of Life

In the last 2 months, how often has his/her asthma caused pain, discomfort or upset?

- | | |
|-----------------|---|
| Never | 1 |
| Once in a while | 2 |
| Often | 3 |
| All of the time | 4 |

¿Durante los últimos 2 meses, cuántas veces su asma le causó sufrimiento, incomodidad o molestia?

- | | |
|--------------------------|---|
| Nunca | 1 |
| De vez en cuando | 2 |
| Muchas veces | 3 |
| Toda la parte del tiempo | 4 |

During the past 2 months, how often did asthma limit or prevent (child's name) from doing usual childhood activities, such as playing with other children or participating in games or sports?

- | | |
|----------------------|---|
| None of the time | 1 |
| A little of the time | 2 |
| Some of the time | 3 |
| Most of the time | 4 |
| All of the time | 5 |

¿Durante los últimos 2 meses, cuántas veces el asma limitó o impidió a (nombre del niño/a) de hacer actividades habituales para los niños/as, tal como jugar con otros niños/as o participar en juegos o deportes?

- | | |
|---------------------------|---|
| Ninguna parte del tiempo | 1 |
| Una poca parte del tiempo | 2 |
| Alguna parte del tiempo | 3 |
| La mayor parte del tiempo | 4 |
| Toda la parte del tiempo | 5 |

How many days of school did (child's name) miss in the past 12 months because of asthma?

_____ days

¿Cuántos días (nombre del niño/a) faltó a la escuela en los últimos 12 meses por asma?

_____ días

HEALTH CARE USE

Medications

Please get the medications (child's name) has taken for asthma in the last 2 months. For each medication, I will ask you the name, instructions for use in the label, the form of medication (e.g. pills, syrup, inhaler), and when the child took it.

- a. Name of medication: _____
 - b. Dosage as appears on label: _____
 - c. Form of medication: _____
 - d. Did the doctor suggest (child's name) take medication
 - prior to exercise 1
 - prior to environment exposure 2
 - as needed 3
 - other: _____
 - e. During the past 2 months, how many days did (child's name) actually take the medication _____ # of days
- Comments: _____

Por favor busque las medicinas que (nombre del niño/a) ha tomado para el asma en los últimos 2 meses. Para cada medicina, le preguntaré el nombre, las instrucciones para su uso que aparecen en la etiqueta, el tipo de medicina (pastillas, jarabe, inhalador) y cuando el niño/a la tomó.

- a. Nombre de la medicina: _____
 - b. Dosis según la etiqueta: _____
 - c. Tipo de medicina: _____
 - d. ¿El médico sugirió que (nombre del niño/a) tomara la medicina:
 - antes de hacer ejercicio 1
 - antes de ser expuesto a provocaciones ambientales 2
 - cuando sea necesario 3
 - Otro: _____
 - e. ¿Durante los últimos 2 meses, cuántos días realmente tomó la medicina? _____ # de días
- Comentarios: _____

Doctor Visits

During the past 12 months, about how many times did (child's name)/you see or talk to a medical doctor or assistant about (child's name)'s asthma? (Do not count doctors seen while in an overnight patient in the hospital).

_____ Number of doctor visits in last 12 months

¿Durante los últimos 12 meses, como cuántas veces (nombre del niño/a) o usted fué o habló con un doctor u otro asistente médico por el asma de (nombre del niño/a)? (No cuente a los doctores que vió cuando se quedó en el hospital por la noche).

_____ Número de visitas al doctor en los últimos 12 meses

Emergency Room Use

How many times has (child's name) gone to the emergency room for asthma?

_____ times in the last 2 months
 _____ times in the last 12 months

¿Cuántas veces (nombre del niño/a) ha ido a la sala de emergencia por su asma?

_____ veces en los últimos 2 meses
 _____ veces en los últimos 12 meses

Hospitalizations

How many times has (child's name) been hospitalized for asthma?

_____ times in the last 2 months
 _____ times in the last 12 months

¿Cuántas veces (nombre del niño/a) ha sido hospitalizado por su asma?

_____ veces en los últimos 2 meses
 _____ veces en los últimos 12 meses

Type of Regular Doctor

What kind of doctor regularly takes care of (child's name)'s asthma?

- Pediatrician 1
- Allergist or pulmonologist 2
- Family doctor 3
- Emergency room doctor 4
- Other: _____ 5
- Does not have a regular doctor 6

¿Que tipo de doctor cuida regularmente el asma de (nombre del niño/a)?

- Pediatra 1
- Alergista o pneumólogo 2
- Doctor de familia 3
- Doctor de sala de emergencia 4
- Otro: _____ 5
- No tiene doctor regular 6

ENVIRONMENTAL EXPOSURES

Is anyone in the household currently smoking cigarettes?

- Yes 1
- No 2

¿Alguién en la casa fuma cigarillos actualmente?

- Sí 1
- No 2

Do you have any of the following inside your home?

- furry pets Yes No
- stuffed animals Yes No
- cockroaches Yes No
- mold Yes No
- dust Yes No

¿Tiene cualquiera de lo siguiente dentro de su casa?

- mascotas peludas Sí No
- animales/juguetes de peluche Sí No
- cucarachas Sí No
- moho Sí No
- polvo Sí No

OTHER PARENT PERCEPTIONS

Worry Overall

During the past 2 months, how much has your child's asthma worried or concerned you?

- Not at all 1
- A little 2
- Somewhat 3
- A great deal 4
- Extremely 5

¿Durante los últimos 2 meses, cuanto le preocupó o inquietó el asma de su hijo/a?

- Nada 1
- Un poco 2
- Algo 3
- Muchísimo 4
- Extremadamente 5

Worry About Medicines

During the past week, how worried or concerned were you about your child's asthma medications and side effects?

- Very, very worried/concerned 1
- Very worried/concerned 2
- Fairly worried/concerned 3
- Somewhat worried/concerned 4
- A little worried/concerned 5
- Hardly worried/concerned 6
- Not worried/concerned 7

Durante la última semana, ¿cuán preocupado/a o inquieto/a estuvo usted sobre las medicinas de su hijo/a y sus posibles efectos?

- Muy, muy preocupado/inquieto 1
- Muy preocupado/inquieto 2
- Bastante preocupado/inquieto 3
- Algo preocupado/inquieto 4
- Un poco preocupado/inquieto 5
- Apenas preocupado/inquieto 6
- Nada preocupado/inquieto 7

Worry About Activities

During the past week, how worried or concerned were you about your child's performance of normal daily activities?

- Very, very worried/concerned 1
- Very worried/concerned 2
- Fairly worried/concerned 3
- Somewhat worried/concerned 4
- A little worried/concerned 5
- Hardly worried/concerned 6
- Not worried/concerned 7

Durante la última semana, ¿cuán preocupado/a o inquieto/a estuvo usted sobre el desempeño de actividades normales de cada día de su hijo/a?

Muy, muy preocupado/inquieto	1
Muy preocupado/inquieto	2
Bastante preocupado/inquieto	3
Algo preocupado/inquieto	4
Un poco preocupado/inquieto	5
Apenas preocupado/inquieto	6
Nada preocupado/inquieto	7

Severity

Overall, how would you rate the severity of (child's name) asthma?

Very mild	1
Mild	2
Moderate	3
Severe	4
Very severe	5

¿En general, cómo estima usted es de severa el asma de (nombre del niño/a)?

Muy leve	1
Leve	2
Moderada	3
Severa	4
Muy severa	5

SOCIODEMOGRAPHICS

Child Ethnicity

To what ethnic group does (child's name) belong?

Latino/Hispanic-American	1
Black/African-American	2
White, non-Latino/Hispanic	3
Asian-American	4
Other: _____	5

¿A que grupo étnico pertenece (nombre del niño/a)?

Latino/Hispanoamericano	1
Negro/Afroamericano	2
Blanco, no Latino/Hispano	3
Asiático-americano	4
Otro: _____	5

Child's Country of Origin

Where was your child born?

City _____
Country _____

¿Dónde nació su hijo/a?

Ciudad _____
País _____

Parent Ethnicity

To what ethnic group do you belong?

Latino/Hispanic-American	1
Black/African-American	2
White, non-Latino/Hispanic	3
Asian-American	4
Other: _____	5

¿A que grupo étnico pertenece —usted?

Latino/Hispanoamericano	1
Negro/Afroamericano	2
Blanco, no Latino/Hispano	3
Asiático-americano	4
Otro: _____	5

Parent's Country of Origin

In what country were you born?

City _____
Country _____

¿En que país nació —usted?

Ciudad _____
País _____

Educational Level

What is the highest grade or year of school that you completed? (circle one)

Elementary	00	01	02	03	04	05	06	07	08
High School	09	10	11	12					
College	13	14	15	16	17+				

¿Cuál es el grado más alto o año que completó en la escuela? (marque uno)

Primaria	00	01	02	03	04	05	06	07	08
Secundaria	09	10	11	12					
Universidad	13	14	15	16	17+				

APPENDIX 2. Bilingual Child Survey Measures Used

The following survey items were selected from Weston²¹ and translated by Marielena Lara (bilingual Spanish native speaker) into Spanish. The English and Spanish items were pilot-tested before use. We did not modify the items to include a specific time frame for child recall of exercise-induced symptoms. Previous research indicates that a child's capacity to conceptualize illness and symptoms³⁶⁻³⁸ is related to age and that preadolescent children can have difficulty with time-related information.³⁹ We believed that more error would be introduced by using previously untested child items and that the younger children in our sample would not be able to understand a specific time frame.

Exercise-induced Wheeze

1. Do you get wheezy breathing when you exercise or play sports?

Never	1
Not very often	2
Quite often	3
Always	4

1. ¿Te da silbido o pito cuando haces ejercicio?

Nunca	1
No muchas veces	2
Bastante	3
Siempre	4

Exercise-induced Cough

2. Do you cough a lot when you exercise or play sports?

Never	1
Not very often	2
Quite often	3
Always	4

2. ¿Toses mucho cuando haces ejercicio?

Nunca	1
No muchas veces	2
Bastante	3
Siempre	4

Differences Between Child and Parent Reports of Symptoms Among Latino Children With Asthma

Marielena Lara, Naihua Duan, Cathy Sherbourne, Mary Ann Lewis, Chris Landon, Neal Halfon and Robert H. Brook

Pediatrics 1998;102:e68

DOI: 10.1542/peds.102.6.e68

Updated Information & Services

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/102/6/e68>

References

This article cites 34 articles, 7 of which you can access for free at:
<http://pediatrics.aappublications.org/content/102/6/e68#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

Genetics

http://www.aappublications.org/cgi/collection/genetics_sub

Patient Education/Patient Safety/Public Education

http://www.aappublications.org/cgi/collection/patient_education:patient_safety:public_education_sub

Epidemiology

http://www.aappublications.org/cgi/collection/epidemiology_sub

Pulmonology

http://www.aappublications.org/cgi/collection/pulmonology_sub

Asthma

http://www.aappublications.org/cgi/collection/asthma_subtopic

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Differences Between Child and Parent Reports of Symptoms Among Latino Children With Asthma

Marielena Lara, Naihua Duan, Cathy Sherbourne, Mary Ann Lewis, Chris Landon, Neal Halfon and Robert H. Brook

Pediatrics 1998;102:e68

DOI: 10.1542/peds.102.6.e68

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/102/6/e68>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 1998 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®

