

Evaluation of a short form for measuring health-related quality of life among pediatric asthma patients

Don A. Bukstein, MD,^a Margaret M. McGrath, MS,^b Deborah A. Buchner, PhD,^c
Jeanne Landgraf, MA,^d and Thomas F. Goss, PharmD^b *Madison, Wis, Washington, DC,
Kenilworth, NJ, and Boston, Mass*

Background: This study was undertaken to derive and validate a short form parent-completed questionnaire to measure health-related quality of life (HRQL) in pediatric asthma patients.

Objective: The objectives of this study were to (1) use stepwise analysis to derive a shorter questionnaire from the original long-form questionnaire and (2) determine the tradeoff in precision between the long- and short-form surveys.

Methods: One hundred eighty-one pediatric asthma patients were enrolled from 4 sites. A parent of each patient completed a general and an asthma-specific questionnaire during routine office visits from June 1995 to January 1997. The questionnaire included the Child Health Questionnaire Parent Form 50, a general HRQL survey, and a 17-item asthma-specific battery assessing daytime symptoms, nighttime symptoms, and functional limitations. All scales were scored from 0 to 100, with higher scores indicating better HRQL. Analysis of variance models were used to derive short-form scales from the 17-item long-form scales, and the final asthma-specific short-form scale structure was confirmed with use of stepwise regression. Scale reliability was assessed with Cronbach's α . Validity of the short-form questionnaire was assessed by comparing mean scale scores according to the level of asthma severity defined by several clinical criteria. Asthma severity was assessed with use of percent predicted FEV₁, frequency and type of symptoms, parent rating of disease severity, physician rating of disease severity, and resource use (emergency department use and hospitalizations). The relative validity of each of the short-form scales was measured by comparing the proportion of variance explained by each of the short-form scales compared with the respective long-form scales.

Results: The 17-item asthma-specific battery was reduced to 8 items, the Integrated Therapeutics Group Child Asthma Short Form. The daytime and nighttime symptom scales for each contain 2 items and the functional limitations scale 4 items. Reliability was greater than 0.70 for each of the short-form scales. The absence of ceiling and floor effects indicates each scale's ability to detect changes at both low and high levels of functioning. Lower (poorer) mean HRQL scores for severe

cases compared with mild cases, for all disease severity indicators, demonstrated clinical validity. Relative validity estimates, comparing the proportion of explained variance of the short-form scales with that of the long-form scales, ranged from 0.85 to 1.20, indicating a similar ability to measure change.

Conclusions: This study documents the development of a brief, multidimensional, 8-item questionnaire for measuring HRQL in pediatric asthma patients. The brevity of the questionnaire makes it practical for use in practice settings and to monitor patients. (*J Allergy Clin Immunol* 2000;105:245-51.)

Key words: Health-related quality of life, pediatrics, asthma, psychometrics, parent report

More than 14 million Americans have asthma, affecting close to 5 million children.^{1,2} Independent of its impact on mortality, pediatric asthma results in significant numbers of hospitalizations and time lost from school and other daily activities and has been associated with poor work and school performance, low self-image of patients, and disruption of family life.³⁻⁶ As the incidence of asthma among children increases with time, the burden of asthma on pediatric patients and their parents is expected to increase.⁷⁻¹¹

With the increasing incidence and burden associated with pediatric asthma, a corresponding interest in measuring the impact of asthma and its treatment on many dimensions of patient functioning and well-being has occurred. This interest has resulted in the development of a number of instruments to measure health-related quality of life (HRQL) in patients with asthma.¹²⁻¹⁷ However, many of these measures have been limited to use in the clinical research setting, and the transition of HRQL assessment to the clinical practice setting has not been reported widely.

To the extent that patient-reported health status augments clinical data, its integration into routine clinical practice may substantially improve the outcomes of care.¹⁸ Thus the use of a standardized HRQL measure would enable clinicians to quickly focus on this important dimension of patient care, allowing them to develop a medical plan directed at improving patient-reported functioning and well-being. The need for better, consistent approaches to measuring and evaluating the patient's perspective during routine clinical visits has been identified recently as a priority.¹⁹

HRQL surveys, which standardize communication between clinicians and patients, can be used to systematically collect such information. However, the use of

From the ^aDean Foundation, Madison, Wis, ^bCovance Health Economics and Outcomes Services Inc., Washington, DC, ^cIntegrated Therapeutics Group Inc, Kenilworth, NJ, and ^dHealthAct, Boston, Mass.

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Reprint requests: Margaret McGrath, MS, Covance Health Economics and Outcomes Services Inc., Suite 200 East, 1100 New York Ave. NW, Washington, DC 20005.

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TABLE I. Comparison of content across questionnaire lengths

Item wording	Long form	Short form
How often over the past 4 weeks has/have:		
a) Your child been wheezy during the day	✓	
b) Your child coughed during the day	✓	
c) Your child complained of being short of breath	✓	✓
d) Exertion (such as running) made your child breathless	✓	✓
e) Your child complained of a pain in the chest	✓	
f) Your child coughed at night	✓	✓
g) Your child been woken up by wheezing or coughing	✓	✓
h) Your child's sleep been disturbed by wheezing or coughing	✓	
i) Your child stayed indoors because of wheezing or coughing	✓	✓
j) His/her asthma stopped your child from playing with his/her friends	✓	
k) Your child's education suffered due to his/her asthma (during school)	✓	✓
l) Asthma stopped your child from doing all the things that a boy or girl should at his/her age	✓	
m) Your child's asthma interfered with his/her life	✓	✓
n) Asthma limited your child's activities	✓	✓
o) Taking his/her inhaler or other treatments interfered with your child's life	✓	
p) Your child's asthma limited your activities	✓	
q) You had to make adjustment to family life because of your child's asthma	✓	

Response options:

All of the time
Most of the time
Some of the time
A little of the time
None of the time

Abbreviations used

CHQ-PF50: Child Health Questionnaire Parent Form 50
ED: Emergency department
HRQL: Health-related quality of life
NHLBI: National Heart, Lung, and Blood Institute
RV: Relative validity

HRQL surveys in everyday clinical practice presents several practical challenges to the clinician in terms of survey selection, data collection, analysis and reporting, and interpretation in real time. Surveys for use in clinical practice must strike a balance between several important criteria, which include brevity, validity and reliability, responsiveness, and low cost.^{20,21} In addition, researchers have noted that the psychometric performance (reliability and validity) of HRQL surveys used at the individual patient level require greater reliability and minimal ceiling and floor effects (the percent of patients scoring at the best and worst possible levels, respectively) to be useful for decision making at the individual patient level.²²

As reported elsewhere, we developed a comprehensive questionnaire for measuring HRQL among pediatric asthma patients.²³ The questionnaire included both general and disease-specific HRQL surveys. Specifically, the Child Health Questionnaire Parent Form 50 (CHQ-PF50)²⁴ and a modified version of the asthma-specific questionnaire of Usherwood et al²⁵ were included to measure HRQL. This previous work documents the reliability and validity of the comprehensive (long-form) measure. However, the respondent burden associated with completing the pediatric asthma long form combined with a general health status survey make it rela-

tively impractical for monitoring patients. Therefore we undertook this study to derive a pediatric asthma short-form survey from the long form that would meet the criteria of validity, reliability, and practicality necessary to be useful for measurement in clinical practice.

METHODS

The purpose of this study was to (1) use stepwise analysis to derive a shorter questionnaire from the original long-form questionnaire and (2) determine the tradeoff in precision between the long- and short-form surveys.

HRQL data collection

The data used for this analysis were originally collected as part of the long-form questionnaire validation work presented previously.¹² The questionnaire and data collection methods are summarized briefly. The long-form questionnaire elicited child and parent sociodemographics and parent perceptions of the child's health. The questionnaire contained general (CHQ-PF50) and asthma-specific HRQL scales. Data were obtained from a cross-sectional assessment of pediatric asthma patients from 4 diverse clinical practices. Patients were treated by both specialist and nonspecialist physicians and reflect a Medicaid, managed-care, and fee-for-service population drawn from diverse geographic regions. Parents of eligible children were asked to complete the HRQL questionnaire during routine office visits between June 1995 and January 1997. Each site's respective Institutional Review Board approved the study protocol.

The asthma-specific scales. Parents completed a 17-item battery (Table I) assessing the impact of asthma on the child's level of functional limitations (8 items), nighttime symptoms (3 items), and daytime symptoms (4 items) and assessing chest pain and interruption of the child's life because of inhaler use (2 items). These items, originally developed by Usherwood et al,²⁵ were modified to stan-

TABLE II. Severity definitions

Clinical measure	Mild	Moderate	Severe
Percent predicted FEV ₁ (%)	≥70	50-69	<50
Physician global rating*	Mild	Moderate	Severe
NHLBI symptom severity	Neither severe nor moderate	Exacerbations (cough and wheezing) 3-6 times per week or asthma signs/symptoms between exacerbations often or nocturnal asthma symptoms 3-8 times per month and not severe	Exacerbations (cough and wheezing) >6 times per week or asthma signs/symptoms between exacerbations almost always or always or nocturnal asthma symptoms 3-6 times per week or nightly
Parent global rating	Not noticeable or mild	Moderate	Severe or very severe
ED use and hospital visits	No ED visits and no hospital admissions	ED visit but no hospital admissions	Hospital admission regardless of ED visit

*Clinicians were asked to complete a single-item clinical global impression of asthma severity.

dardize the recall period and response options and were previously validated.^{12,23} Specifically, the recall period in the modified questionnaire refers to the past 4 weeks and the response options for each item were "all of the time, most of the time, some of the time, a little of the time, and none of the time." Items within scales are summed and linearly transformed from 0 to 100, with higher scores indicating better functioning. Scale scores were computed when at least half the items in the scale were answered.

Measures of asthma severity. Measures of asthma severity were recorded (on a standardized case report form across sites) for each child and included the percent predicted FEV₁, physician rating of asthma severity, parent rating of asthma severity (not noticeable, mild, moderate, severe, or very severe), emergency department (ED) and hospitalization services use (in the past 12 months), and symptom frequency and chronicity defined by the National Heart, Lung, and Blood Institute (NHLBI) to assess asthma severity.²⁶ The frequency of exacerbations (cough and wheezing), asthma signs or symptoms between exacerbations, and the frequency of nocturnal asthma symptoms were combined to create a NHLBI Symptom Severity Index. For all pulmonary function tests, results were obtained before use of bronchodilators.

Medical history (history of comorbid disease), current and previous medications, and resource use data were also recorded. Clinic nurses recorded the history, medications, resource use, and NHLBI symptom data. Physicians were familiar with the patients but did not review questionnaire responses before making a global assessment of severity. (We note that at the time of the study the recommendations of the National Asthma Education and Prevention Program expert panel for a 4-level categorization of severity were not available.)

Thus item reduction analyses use the following clinical measures: percent predicted FEV₁, NHLBI symptom severity, resource use (ED and hospitalization use), and independent evaluations of severity from the physician and parent. These indicators were selected to evaluate severity from several multiattribute data sources.

Categorization of severity. For each of the clinical indicators, severity of the patient's asthma was classified as mild, moderate, or severe. Operational definitions of severity for each measure are provided in Table II.

Statistical analyses

Item reduction. We compared 2 separate approaches to identify the optimal combination of items to represent each short-form scale. First, within each multi-item scale each item was modeled as a function of each severity indicator separately with use of ANOVA. *F* statistics and tests of significance were performed to test the association between each item and each clinical indicator. Next, each *F* statistic was divided by the lowest *F* statistic for that severity indicator (within the scale), resulting in a ratio that indicates the amount of variance explained by each item relative to other items within the scale.^{13,27-29} Items were ranked in terms of amount of variance explained from best to worst, and the top item within the scale was selected. After a preliminary item content for each of the short-form scales was defined, we performed stepwise regression (with use of the SAS [SAS Institute, Cary, NC] selection = stepwise option) to confirm the structure of the short-form scales previously defined by ANOVA models.

Evaluation of short-form scale reliability and validity. After the final item content of each of the short-form scales was confirmed, we assessed each short-form scale's standard psychometric performance, measuring floor and ceiling effects, internal consistency reliability, and validity. The percentage of scale scores at the worst and best possible levels of functioning were computed to assess potential floor and ceiling effects, respectively. The greater the percentage of responses at the floor or ceiling, the less likely the scale will be responsive to declines or improvements, respectively. Internal consistency reliability was estimated with use of Cronbach's α , which ranges from 0 to 1 and is based on the average interitem correlation and the number of items in the scale. Values greater than 0.70 are recommended for group-level comparisons; higher values are recommended for individual-level comparisons.²⁹

Discriminant validity was evaluated by examining mean scale scores by severity level with each severity indicator. We expected to observe a progression from higher to lower scale scores as the level of severity increased regardless of the indicator evaluated.

Relative validity of short form versus long form. For each scale and each severity indicator we used the Student *t* test to analyze differences in group mean estimates (ie, mild vs moderate/severe). Relative validity (RV) estimates were computed from the ratio of pairwise *F* statistics (*F* for the short-form scale divided by *F* for the

TABLE III. Item content of pediatric asthma long and short forms

Long-form item wording	Short-form scale
How often over the past 4 weeks has/have:	
a) Your child been wheezy during the day	
b) Your child coughed during the day	
c) Your child complained of being short of breath	Daytime symptoms (k = 2)
d) Exertion (such as running) made your child breathless	
e) Your child complained of a pain in the chest	
f) Your child coughed at night	Nighttime symptoms (k = 2)
g) Your child been woken up by wheezing or coughing	
h) Your child's sleep been disturbed by wheezing or coughing	
i) Your child stayed indoors because of wheezing or coughing	
j) His/her asthma stopped your child from playing with his/her friends	Functional limitations (k = 4)
k) Your child's education suffered due to his/her asthma (during school)	
l) Asthma stopped your child from doing all the things that a boy or girl should at his/her age	
m) Your child's asthma interfered with his/her life	
n) Asthma limited your child's activities	
o) Taking his/her inhaler or other treatments interfered with your child's life	
p) Your child's asthma limited your activities	
q) You had to make adjustment to family life because of your child's asthma	

TABLE IV. Descriptive statistics and psychometric performance of short-form scales

Scale	No. of items (k)	n	Mean	SD	Range	Percent at floor	Percent at ceiling	Item to total correlations	Item discriminant validity	Internal consistency reliability (α)
Daytime symptoms	2	181	62.15	27.46	0-100	2.8	16.6	0.73-0.73	0.64-0.70	0.84
Nighttime symptoms	2	181	60.50	28.30	0-100	5.5	13.8	0.75-0.75	0.61-0.72	0.86
Functional limitations	4	181	75.73	24.41	0-100	1.1	22.7	0.73-0.87	0.56-0.74	0.92

corresponding long-form scale). RV estimates indicate in proportional terms how much more or less precise a measure is in relation to the standard.^{13,30}

RESULTS

One hundred eighty-one patients ranging from 4 to 14 years old with a mean (SD) age of 9 (3) years were enrolled. Patients were mostly white (78.9%) and male (60.7%) and had asthma for an average of 5 years. Respondents were mostly female (88.3%), biologic parents (93.9%), and currently working outside the home (70.7%) or full-time homemakers (23.6%). Sixty-three percent of the patients had FEV₁ $\geq$ 70%, 9% of the patients had FEV₁ 50% to 69%, and 28% had FEV₁ <50%. The mean percent predicted FEV₁ was 86%.

Because all analyses were performed within scales, the item reduction, psychometric evaluation, and RV (long vs short) results are presented by scale. Items are referred to throughout the results section by item letter as provided in Table I (original long-form survey).

Daytime symptoms

Item reduction. The item that explained the most variance in daytime symptoms varied depending on the severity indicator used. Specifically, item *a* was the highest ranking item for physician rating and percent predicted FEV₁. However, items *c* and *d* were the high-

est ranked items for NHLBI and parent rating, respectively. (Note: Highest ranking is not in reference to disease severity. The "highest ranking item" is the item within the scale that explains the most variance of each clinical indicator.) Therefore the use of the ANOVA models to guide the short-form item selection resulted in selection of items *a*, *c*, and *d* for the short-form daytime symptoms scale, which was confirmed with stepwise regression models.

However, item *a* ("your child been wheezy during the day") was considered potentially problematic on the basis of clinical experience. Specifically, we believed the terminology "wheezy during the day" to be confusing for parents and children alike. Therefore, on the basis of this clinical perspective, we assessed the impact of using a 2-item versus a 3-item daytime symptoms scale. The RV coefficients of the 2-item and the 3-item scale were similar, allowing us to eliminate item *a* from the final 2-item version of the daytime symptoms scale (items *c* and *d*) (Table III).

Psychometric evaluation. We did not observe ceiling or floor effects for the 2-item daytime symptoms scale (Table IV). Cronbach's α for the 2-item daytime symptoms scale was 0.84, which compared favorably with the reliability estimate of 0.86 for the 4-item scale. Mean scale scores for mild cases were significantly higher (better) than for moderate/severe cases across all severity indicators (Table V). For example, mean scores for physician-rated mild cases (75.8) were significantly ($P <$

TABLE V. Mean scale scores by level for each severity indicator

		Severity indicator				
		Percent predicted FEV ₁	Physician rating	NHLBI	ED/hospitalization	Parent rating
Daytime symptoms						
Mild	No.	114	63	91	135	97
	Mean	64.58	75.79	75.82	65.28	75.39
	SD	24.55	22.32	21.87	26.57	23.62
	Range	0-100	25-100	25-100	0-100	0-100
Moderate/severe	No.	27	116	90	45	74
	Mean	53.24	54.74	48.33	53.06	45.27
	SD	21.81	27.27	25.64	28.60	21.57
	Range	25-87.5	0-100	0-100	0-100	0-100
Nighttime symptoms						
Mild	No.	114	63	91	135	97
	Mean	63.82	73.61	73.90	65.37	72.81
	SD	25.35	22.91	22.26	27.91	23.66
	Range	0-100	0-100	12.5-100	0-100	0-100
Moderate/severe	No.	27	116	90	45	74
	Mean	54.17	53.34	46.94	45.83	46.28
	SD	29.62	28.52	27.37	24.71	26.96
	Range	0-100	0-100	0-100	0-100	0-100
Functional limitations						
Mild	No.	114	63	91	135	97
	Mean	80.15	88.79	86.74	79.12	88.14
	SD	19.84	15.36	16.19	23.11	18.56
	Range	25-100	18.8-100	31.3-100	0-100	0-100
Moderate/severe	No.	27	116	90	45	74
	Mean	68.06	68.75	64.58	65.28	60.81
	SD	25.50	25.68	26.28	25.72	21.81
	Range	18.8-100	0-100	0-100	0-100	12.5-100

TABLE VI. Relative precision estimates for short-form scales by clinical criteria

Scale	Percent predicted FEV ₁ rating	Physician rating	NHLBI rating	ED/hospitalization rating	Parent rating
Daytime symptoms	1.22	0.85	0.90	1.15	1.18
Nighttime symptoms	0.90	0.96	0.93	1.09	0.98
Functional limitations	1.20	0.92	1.10	0.86	0.95

.001) higher than for physician-rated moderate/severe cases (48.3).

RV. RV estimates for the 2-item daytime symptoms scale compared with the 4-item daytime symptoms scale ranged from 0.85 for physician rating to 1.22 for percent predicted FEV₁ (Table VI). Thus, for 3 of the 5 severity measures, the 2-item daytime symptoms scale demonstrated increased precision (RV ≥ 1.0) compared with the 4-item long-form scale.

Nighttime symptoms

Item reduction. The item that explained the most variance in nighttime symptoms again varied by severity indicator. Specifically, item *h* was the highest ranking

item for physician rating and percent predicted FEV₁. However, item *g* was the highest-ranked item for NHLBI and parent rating, respectively. Therefore the use of the ANOVA models for item reduction resulted in the selection of both items *g* and *h* for the short-form nighttime symptoms scale, which was confirmed with use of stepwise regression models.

However, item *f*, "your child coughed at night," was considered clinically relevant and generally would result in additional probing between the physician and the parent. Item *h*, "sleep been disturbed by wheezing or coughing," was considered repetitive with item *g*, "your child been woken up by wheezing or coughing." Therefore, on the basis of our desire to minimize redundancy within a

scale, we selected items *f* and *g* for the final 2-item version of nighttime symptoms scale to be further evaluated for psychometric performance and relative validity (Table III).

Psychometric evaluation. We did not observe any ceiling or floor effects for the 2-item nighttime symptoms scale (Table IV). Cronbach's α for the 2-item scale was 0.86, which exceeds standards for group-level comparisons and compares favorably with the 0.92 reliability estimate for the 3-item scale. Mean scale scores for mild cases were significantly higher (better) than for moderate/severe cases across all clinical indicators, except for percent predicted FEV₁ (Table V). For example, mean scores for physician-rated mild cases (73.6) were significantly ($P < .001$) higher than for physician-rated moderate/severe cases (53.3). Although the scores were not significantly different among mild and moderate/severe cases as categorized by percent predicted FEV₁, the trend was consistent with the other criterion variables (ie, 63.8 vs 54.1, $P = .088$ for the mild and moderate/severe cases, respectively).

RV. RV estimates for the 2-item nighttime symptoms scale compared with the 3-item nighttime symptoms scale ranged from 0.90 for percent predicted FEV₁ to 1.09 for ED/hospitalization use (Table VI). Thus the 2-item scale maintained a high degree of precision for predicting HRQL scale scores estimated with use of the 3-item nighttime symptoms scale.

Functional limitations

Item reduction. The item that explained the most variance in the functional limitations scale also varied by clinical indicator. Specifically, item *m* was the highest-ranking item for physician rating and parent rating. However, items *k* and *i* were the highest-ranked items for percent predicted FEV₁ and NHLBI, respectively. Therefore the use of ANOVA models for item reduction resulted in selection of items *i*, *k*, and *m* for the short-form functional limitations scale. Stepwise regression models confirmed items *i*, *k*, and *n*. Because asthma is believed to have such a major impact on functional limitations, we tested a 4-item (*i*, *k*, *m*, and *n*) version of the functional limitations scale to ensure that the final item content was sufficiently representative of the most important areas of limitation (Table III).

Psychometric evaluation. We did not observe ceiling or floor effects for the 4-item functional limitations scale (Table IV). Cronbach's α for the 4-item scale was 0.92, which compares favorably with the 0.95 reliability estimate for the 8-item scale. Mean scale scores for mild cases were significantly higher (better) than for moderate/severe cases across all severity indicators (Table V). For example, mean scores for physician-rated mild cases (88.8) were significantly ($P < .001$) higher than for physician-rated moderate/severe cases (68.8).

RV. RV estimates for the 4-item functional limitations scale compared with the 8-item functional limitations scale ranged from 0.86 for ED/hospitalization use to 1.20 percent predicted FEV₁ (Table VI). Thus the 4-item scale maintained a high degree of precision for predicting

HRQL scale scores estimated with the 8-item functional limitations scale.

DISCUSSION

A large number of patients diagnosed with asthma have episodes when the disease is not well controlled in spite of the observation that these patients are receiving treatment for their disease. Because of this, these patients may have wide-ranging effects on their daily functioning and well-being. Although functioning and well-being may be the most important outcome of medical care from a patient perspective, clinicians may be less aware of important changes in a patient's functioning.³¹ Thus the collection of standardized HRQL data has been proposed as a method of improving the communication of important information about patient functioning and well-being between clinicians and patients, with the goal of improving patient outcomes.^{21,31} We believe that HRQL can be a useful tool for standardizing communication between physicians and patients, potentially leading to improved clinical and functional outcomes.

To date, systematic attempts to assess asthma, particularly among pediatric patients, have focused on measures of lung function. Therefore the use of HRQL measures for assessing functioning and well-being of patients with asthma generally has been limited to clinical trials; these surveys have not made the transition to use in routine clinical practice. Several factors may help to explain this observation. Clinicians historically have been trained to focus on the diagnosis and treatment of anatomic and physiologic abnormalities.³² For these parameters, clinicians routinely rely on explicit measurement and diagnostic criteria. However, clinicians often obtain information on patients' psychologic and social well-being less systematically, frequently relying on more implicit evaluations.³²

There are many potential benefits to using HRQL surveys in routine clinical practice. Limited experiences reported to date highlight the usefulness of HRQL assessment in routine clinical practice.^{22,31,33,34} In addition, given the increasing time constraints for office visits, brief HRQL surveys used at the point of service can help physicians target discussions with patients. Patients are apt to report on a standardized questionnaire limits in functioning that should be brought to the attention of the clinician. In this manner, HRQL surveys represent an opportunity to provide one more objective dimension to a multidimensional measurement approach already familiar to clinicians.²¹

The question of whether HRQL surveys are robust enough for use in everyday clinical practice is an important issue to be addressed. Although HRQL surveys commonly exhibit ceiling and floor effects, other clinical tests used in medicine also exhibit these features.^{32,35} Clinical tests in medicine also differ from each other with regard to their sensitivity, specificity, and false-positive and false-negative rates. We recognize that clinicians have an intuitive understanding of these clinical tests. Likely, as with other common clinical tests, individual

clinicians will differ greatly in the amount of measurement error or diagnostic uncertainty that they are willing to accept in test results or HRQL survey results. However, with the advent of short-form measures, clinicians will have the opportunity to obtain first-hand experience with these tools and develop a better understanding of their use.

Despite these potential barriers to use in clinical practice, some clinicians have reported on their experiences with surveys to monitor HRQL at the individual patient level.^{33,34} To date, these studies have focused primarily on adults, but little work has been reported that is directed at measuring HRQL among pediatric asthma patients who are diagnosed and treated in the real-world clinical practice setting. Despite repeated calls for the development and use of measures at the point of service, we are not aware of previous efforts to develop a reliable, practical short form to allow HRQL assessment of pediatric asthma in routine clinical practice.

We note 2 potential limitations in the development of the short form. First, we note that the recommendations of the NHLBI Expert Panel 2 recommendations were not available at the time this study was designed and implemented. Therefore we do not know what impact the revised severity classifications might have had on our results. Second, this was a cross-sectional study design and responsiveness of the short-form survey to clinical changes could not be evaluated.

The Integrated Therapeutics Group Pediatric Asthma Short Form was developed with the aim of producing an instrument sufficiently short and simple to be feasible for use in busy clinic settings. The 8-item asthma-specific survey tested in this study has been shown to be reliable and valid. The content of the questionnaire addresses experiences of importance to pediatric asthma patients and their parents. The questionnaire's validity was demonstrated with a consistent observation of poorer (lower) scores associated with more severe asthma, regardless of the severity criterion used. We conclude that the Integrated Therapeutics Group Pediatric Asthma Short Form is reliable and valid for measuring HRQL in pediatric asthma patients.

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