



ASTHMA IMPACT

A brief guide to the PROMIS® Asthma Impact instruments:

PEDIATRIC	PARENT PROXY
PROMIS Pediatric Item Bank v2.0 Asthma Impact	PROMIS Parent Proxy Item Bank v2.0 – Asthma Impact
PROMIS Pediatric Item Bank v1.0 – Asthma Impact*	PROMIS Parent Proxy Item Bank v1.0 – Asthma Impact*
PROMIS Pediatric Short Form v2.0 – Asthma Impact 8a	PROMIS Parent Proxy Short Form v2.0 – Asthma Impact 8a
PROMIS Pediatric Short Form v1.0 – Asthma Impact 8a*	PROMIS Parent Proxy Short Form v1.0 – Asthma Impact 8a*

*Retired measure

ABOUT ASTHMA IMPACT

The PROMIS Asthma Impact item banks assess self-reported symptoms and impacts specific to asthma that are not adequately captured by other general item banks. Asthma specific symptoms include cough, wheeze, shortness of breath, and avoidance of triggers. Asthma is also associated with impacts such as missing school or activities with other children. All measures assess asthma impact over the past seven days.

Asthma impact instruments are available for pediatric self-report (ages 8-17) and for parents serving as proxy reporters for their child (youth ages 5-17).

INTRODUCTION TO ASSESSMENT OPTIONS

There are two administration options for assessing asthma impact: short forms and computerized adaptive test (CAT). When administering a short form, instruct participants to answer all of the items (i.e., questions or statements) presented. With a CAT, participant responses guide the system’s choice of subsequent items from the full item bank (17 items in total). Although items differ across respondents taking a CAT, scores are comparable across participants.

Some administrators may prefer to ask the same question of all respondents or of the same respondent over time, to enable a more direct comparability across people or time. In these cases, or when paper administration is preferred, a short form would be more desirable than a CAT. This guide provides information on all asthma impact short form and CAT instruments.

Whether one uses a short form or CAT, the score metric is Item Response Theory (IRT), a family of statistical models that link individual questions to a presumed underlying trait or concept of asthma impact represented by all items in the item bank. When choosing between CAT and a short form, it is useful to consider the demands of computer-based assessment, and the psychological, physical, and cognitive burden placed on respondents as a result of the number of questions asked.



VERSION DIFFERENCES

Some PROMIS domains have multiple versions of instruments (i.e. v1.0, v1.1, v2.0). Generally, **it is recommended that you use the most recent version available which can be identified as the instrument with the highest version number.** In most cases, an instrument that has a decimal increase (v1.0 to v1.1) retains the same item-level parameters as well as instrument reliability and validity. In cases where a version number increases by a whole number (e.g., v1.0 to v2.0), the changes to the instrument are more substantial.

For asthma impact, v2.0 pediatric and parent proxy measures replaced v1.0. The v2.0 measures changed from using response scores of 0-4 to use 1-5 (item IDs amended with an “r”). The calibrations between v1.0 and v2.0 are identical as is the item content on short forms.

DIFFERENCES IN CURRENTLY AVAILABLE SHORT FORMS

Pediatric and Parent Proxy Short Forms

There is 1 pediatric and 1 parent proxy short form for asthma impact. Items were selected based on content and psychometric characteristics.

SELECTING A PEDIATRIC OR PARENT PROXY INSTRUMENT

In selecting whether to use the pediatric or parent proxy instrument for this domain, it is important to consider both the population and the domain which you are studying. Pediatric self-report should be considered the standard for measuring patient-reported outcomes among children. However, circumstances exist when the child is too young, cognitively impaired, or too ill to complete a patient-reported outcome instrument. While information derived from self-report and proxy-report is not equivalent, it is optimal to assess both the child and the parent since their perspectives may be independently related to healthcare utilization, risk factors, and quality of care.

WHICH CALIBRATION SAMPLE SHOULD I USE?

The PROMIS Parent Proxy instruments have two calibration samples – parent proxy and parent proxy without Local Dependence. The former includes calibrations for all items. This is the default calibration sample. If you aren’t sure which calibration sample to use, utilize this one. The parent proxy without Local Dependence does not include calibrations for some items. When using the Scoring Service, use the default calibration sample (e.g., “Parent Proxy”). Other calibration samples may exist from past research.



SCORING THE INSTRUMENT

Short Forms: PROMIS instruments are scored using item-level calibrations. This means that the most accurate way to score a PROMIS instrument is to use the HealthMeasures Scoring Service (https://www.assessmentcenter.net/ac_scoring-service) or a data collection tool that automatically calculates scores (e.g., Assessment CenterSM, REDCap auto-score). This method of scoring uses responses to each item for each participant. We refer to this as “response pattern scoring.” Because response pattern scoring is more accurate than the use of raw score/scale score look up tables included in this manual, it is preferred. Response pattern scoring is especially useful when there is missing data (i.e., a respondent skipped an item), different groups of participants responded to different items, or you have created a new questionnaire using a subset of questions from a PROMIS item bank.

Each question usually has five response options ranging in value from one to five. To find the total raw score for a short form with all questions answered, sum the values of the response to each question. For example, for the pediatric 8-item form, the lowest possible raw score is 8; the highest possible raw score is 40 (see all short form scoring tables in Appendix 1). **All questions must be answered in order to produce a valid score using the scoring tables.** If a participant has skipped a question, use the HealthMeasures Scoring Service (https://www.assessmentcenter.net/ac_scoring-service) to generate a final score.

Locate the applicable score conversion tables in Appendix 1 or 2 and use this table to translate the total raw score into a T-score for each participant. The T-score rescales the raw score into a standardized score with a mean of 50 and a standard deviation (SD) of 10. Therefore a person with a T-score of 40 is one SD below the mean.

For the pediatric Asthma Impact 8a short form, a raw score of 18 converts to a T-score of 48.4 with a standard error (SE) of 3.0 (see scoring table for the 8a short form in Appendix 1). Thus, the 95% confidence interval around the observed score ranges from 42.5 to 54.3 (T-score \pm (1.96*SE) or 48.4 \pm (1.96*3.0)).

CAT: A minimum number of items (5 for peds and parent proxy CATs) must be answered in order to receive a score for the Asthma Impact CAT. The response to the first item will guide the system’s choice of the next item for the participant. The participant’s response to the second item will dictate the selection of the following question, and so on. As additional items are administered, the potential for error is reduced and confidence in the respondent’s score increases. The CAT will continue until either the standard error drops below a specified level (on the T-score metric 4.0 for peds and parent proxy CATs), or the participant has answered the maximum number of questions (12), whichever occurs first.

For most PROMIS instruments, a score of 50 is the average for the United States general population with a standard deviation of 10 because calibration testing was performed on a large sample of the general population. You can read more about the calibration and centering samples on HealthMeasures.net (<http://www.healthmeasures.net/score-and-interpret/interpret-scores/promis>). The T-score is provided with an error term (Standard Error or SE). The Standard Error is a statistical measure of variance and represents the “margin of error” for the T-score.

Important: A higher PROMIS T-score represents more of the concept being measured. For negatively-worded concepts like asthma impact, a T-score of 60 is one SD worse than average. By comparison, a depression T-score of 40 is one SD better than average.

STATISTICAL CHARACTERISTICS

There are four key features of the score for asthma impact:

- **Reliability:** The degree to which a measure is free of error. It can be estimated by the internal consistency of the responses to the measure, or by correlating total scores on the measure from two time points when there has been no true change in what is being measured (for z-scores, reliability = $1 - SE^2$).
- **Precision:** The consistency of the estimated score (reciprocal of error variance).
- **Information:** The precision of an item or multiple items at different levels of the underlying continuum (for z-scores, information = $1/SE^2$).
- **Standard Error (SE):** The possible range of the actual final score based upon the scaled T-score. For example, with a T-score of 52 and a SE of 2, the 95% confidence interval around the actual final score ranges from 48.1 to 55.9 (T-score $\pm (1.96*SE) = 52 \pm 3.9 = 48.1$ to 55.9).

The final score is represented by the T-score, a standardized score with a mean of 50 and a standard deviation (SD) of 10.

PREVIEW OF SAMPLE ITEM

Figure 1 shows an adult asthma impact item from the full item bank as it would appear to a study participant during data collection in Assessment Center. Several formats for presenting the items are available for computer-based administration through Assessment Center.

Figure 2 is an excerpt from the paper version of the pediatric eight-item short form. This is the paper version format used for all asthma impact instruments. It is important to note that the CAT is not available for paper administration.



Figure 1

In the past 7 days.....		Never	Almost Never	Sometimes	Often	Almost Always
5304R1	I felt scared that I might have trouble breathing because of my asthma.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
2bR2	My chest felt tight because of my asthma.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Figure 2



FREQUENTLY ASKED QUESTIONS (FAQs)

Q: I am interested in learning more. Where can I do that?

Review the HealthMeasures website at www.healthmeasures.net.

Q: Do I need to register with PROMIS to use these instruments?

No.

Q: Are these instruments available in other languages?

Yes! Look at the HealthMeasures website (<http://www.healthmeasures.net/explore-measurement-systems/promis/intro-to-promis/available-translations/117-available-translations>) for current information on PROMIS translations.

Q: Can I make my own short form?

Yes, custom short forms can be made by selecting any items from an item bank. This can be scored using the Scoring Service (https://www.assessmentcenter.net/ac_scoring-service).

Q: How do I handle multiple responses when administering a short form on paper?

Guidelines on how to deal with multiple responses have been established. Resolution depends on the responses noted by the research participant.

- If two or more responses are marked by the respondent, and they are next to one another, then a data entry specialist will be responsible for randomly selecting one of them to be entered and will write down on the form which answer was selected. Note: To randomly select one of two responses, the data entry specialist will flip a coin (heads - higher number will be entered; tails – lower number will be entered). To randomly select one of three (or more) responses, a table of random numbers should be used with a statistician's assistance.
- If two or more responses are marked, and they are NOT all next to one another, the response will be considered missing.

Q: What is the minimum change on a PROMIS instrument that represents a clinically meaningful difference?

To learn more about research on the meaning of a change in scores, we suggest conducting a literature review to identify the most current information. The HealthMeasures website (<http://www.healthmeasures.net/score-and-interpret/interpret-scores/promis>) has additional information on interpreting scores.



APPENDIX 1 – SCORING TABLES

It is recommended that you use the most recent version available which can be identified as the instrument with the highest version number

Asthma Impact 8a - Pediatric v2.0		
<i>Short Form Conversion Table</i>		
Raw Score	T- score	SE*
8	31.5	5.2
9	35.8	4.0
10	37.7	3.9
11	39.7	3.5
12	41.2	3.3
13	42.6	3.2
14	43.9	3.1
15	45.1	3.0
16	46.2	3.0
17	47.3	3.0
18	48.4	3.0
19	49.5	3.0
20	50.5	3.0
21	51.5	3.0
22	52.5	3.0
23	53.6	3.0
24	54.6	3.0
25	55.6	3.0
26	56.6	3.0
27	57.6	3.0
28	58.7	2.9
29	59.7	2.9
30	60.8	2.9
31	61.8	2.9
32	62.9	2.9
33	64.0	3.0
34	65.2	3.0
35	66.4	3.1
36	67.8	3.2
37	69.2	3.3
38	70.9	3.6
39	72.8	3.8
40	76.2	4.5

SE* = Standard Error on T-Score



Asthma Impact 8a - Parent Proxy v2.0		
<i>Short Form Conversion Table</i>		
Raw Score	T-Score	SE*
8	32.0	6.0
9	39.0	4.0
10	41.0	3.0
11	43.0	3.0
12	44.0	2.0
13	46.0	2.0
14	47.0	2.0
15	48.0	2.0
16	49.0	2.0
17	50.0	2.0
18	51.0	2.0
19	52.0	2.0
20	53.0	2.0
21	54.0	2.0
22	55.0	2.0
23	56.0	2.0
24	58.0	2.0
25	59.0	2.0
26	60.0	2.0
27	61.0	2.0
28	63.0	2.0
29	64.0	2.0
30	65.0	2.0
31	66.0	2.0
32	67.0	2.0
33	68.0	2.0
34	69.0	2.0
35	70.0	2.0
36	71.0	2.0
37	73.0	2.0
38	74.0	3.0
39	76.0	3.0
40	80.0	5.0

SE* = Standard Error on T-Score

All scoring tables are based on default Parent Proxy calibrations.



APPENDIX 2 – SCORING TABLES FOR RETIRED MEASURES

Asthma Impact 8a - Pediatric v1.0		
<i>Short Form Conversion Table</i>		
Raw Score	T- score	SE*
0	31.5	5.2
1	35.8	4.0
2	37.7	3.9
3	39.7	3.5
4	41.2	3.3
5	42.6	3.2
6	43.9	3.1
7	45.1	3.0
8	46.2	3.0
9	47.3	3.0
10	48.4	3.0
11	49.5	3.0
12	50.5	3.0
13	51.5	3.0
14	52.5	3.0
15	53.6	3.0
16	54.6	3.0
17	55.6	3.0
18	56.6	3.0
19	57.6	3.0
20	58.7	2.9
21	59.7	2.9
22	60.8	2.9
23	61.8	2.9
24	62.9	2.9
25	64.0	3.0
26	65.2	3.0
27	66.4	3.1
28	67.8	3.2
29	69.2	3.3
30	70.9	3.6
31	72.8	3.8
32	76.2	4.5

SE* = Standard Error on T-Score



Asthma Impact 8a - Parent Proxy v1.0		
<i>Short Form Conversion Table</i>		
Raw Score	T-Score	SE*
0	32	6.0
1	39	4.0
2	41	3.0
3	43	3.0
4	44	2.0
5	46	2.0
6	47	2.0
7	48	2.0
8	49	2.0
9	50	2.0
10	51	2.0
11	52	2.0
12	53	2.0
13	54	2.0
14	55	2.0
15	56	2.0
16	58	2.0
17	59	2.0
18	60	2.0
19	61	2.0
20	63	2.0
21	64	2.0
22	65	2.0
23	66	2.0
24	67	2.0
25	68	2.0
26	69	2.0
27	70	2.0
28	71	2.0
29	73	2.0
30	74	3.0
31	76	3.0
32	80	5.0

SE* = Standard Error on T-Score

All scoring tables are based on default Parent Proxy calibrations.