

## **Step 5: Construct Quality Measures and Analytic Variables**

Four steps are involved in constructing the PHDS-PLUS quality measures and evaluating these measures for various subgroups of children using your PHDS-PLUS survey and administrative data based analytic variables:

- 5.1 Calculate core PHDS-PLUS quality measures**
- 5.2 Calculate core PHDS-PLUS analytic variables**
- 5.3 Calculate any alternative versions of the quality measures**
- 5.4 Evaluate quality measurement results for subgroups of children**

Guidelines for each of these steps are provided below.

### **STEP 5.1: Calculate Core PHDS-PLUS Quality Measures**



#### **WHAT IS THE PURPOSE OF THIS STEP?**

The purpose of this step is to develop both child-level and group-level scores for each of the core PHDS-PLUS quality measures that were outlined in Step 1 of this manual and summarized in greater detail in Table 5.1.

#### **In this step you will:**

- Learn about the core PHDS-PLUS quality measures
- Recode child level PHDS-PLUS survey responses
- Calculate child and group level quality measure scores
- Specify and assign “good care” cut-points to each measure



## **GUIDELINES AND ISSUES TO CONSIDER**

### **Learn about the PHDS-PLUS Quality Measures**

Table 5.1 describes each of the nine core PHDS-PLUS quality measures. Each measure is derived using anywhere from two to 18 PHDS-PLUS survey responses. The nine core measures are:

1. Anticipatory guidance and parental education provided by doctors or other health care providers
2. Provision of written or other types of health information to parents on caring for their child, preventing injuries, and ensuring optimal development
3. Assessment of parent concerns about child learning, development, and behavior and provision of specific information for parents with concerns
4. Follow-up for children at risk for developmental, behavioral, or social delays
5. Assessment of the well-being of parents and safety within the family
6. Assessment of smoking, alcohol, and drug use in the home
7. Coordination of care for children requiring multiple types of health care services or seeing more than one health care provider
8. Provision of family-centered care that respects, listens to, and partners with parents
9. Helpfulness of care provided to parents

**Table 5.1: PHDS-PLUS items included in each quality measurement topic**

Quality Measure	Topics Included in Quality Measure	PHDS-PLUS Survey Items <sup>1</sup>	# of Items
<p><b>1. Anticipatory Guidance and Parental Education from Doctor or Other Health Care Providers</b></p>	<p><b>All respondents (Items 3a-h):</b> Assesses whether a core subset of AAP-recommended anticipatory guidance topics are discussed, including child’s growth and development, behaviors to expect, physically caring for the child, reading and playing with child and helping child grow and learn, making house and car safe and preventing child from injury, issues related to child care and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).</p> <p><b>Age Specific Items:</b></p> <p><b>3–9 Months:</b> Assesses whether age-specific anticipatory guidance topics are discussed, including breastfeeding, issues related to food and feeding, sleeping positions and sleep area, night waking and fussing, child’s responses and communication, how to avoid burns.</p> <p><b>10–18 Months:</b> Assesses whether age-specific anticipatory guidance topics are discussed, including nutrition, bedtime routines, preventing bottle mouth, child’s communication, child’s independence, guidance and discipline techniques, what to do if child swallows poisons, and parent education about toilet training.</p> <p><b>19–48 Months:</b> Assesses whether age-specific anticipatory guidance topics are discussed, including nutrition and eating habits, bedtime routines, child’s social interactions and communication skills, child’s independence, guidance and limit setting, what to do if child swallows poisons and other safety issues, and toilet training.</p>	<p><i>Section 6: 3–9 Month Old Section- 1-15 (Ga1-Ga15ai)</i></p> <p><i>Section 6: 10–18 Month Old Section- 15 (Gb1-Ga18ai)</i></p> <p><i>Section 6: 19–48 Month Old Section-- (Gc1-Gc15ai)</i></p>	<p>15</p> <p>18</p> <p>15</p>
<p><b>2. Health Information</b></p>	<p>Assesses whether information provided outside/inside the doctor or other health provider’s office (mail, in clinic pamphlets, videos, etc.) on the following: safety tips, health care utilization tips, developmental information.</p>	<p>Section 11: 1-3 (H1-H3)</p>	<p>3</p>
<p><b>3. Ask About and Address Parental Concerns</b></p>	<p>Assesses whether providers routinely ask parents about their concerns about their child’s learning, development, and behavior and if parents who have concerns received specific information addressing their concerns (<b>Items in Section 7: Questions #5 and #7</b>) used to determine whether parents have concerns.</p>	<p>Section 6: 6, 7a (D16, D17A)</p>	<p>2</p>
<p><b>4. Follow-Up for Children at Risk for Developmental Delays</b></p>	<p>For children who are determined to be at risk for developmental, social, or behavioral delays (<b>Items Section 7:Question #5</b>)*, whether some type of appropriate follow-up health care occurred. Follow-up items include testing of child’s learning development and behavior, referral to specialist, whether a doctor or other health</p>	<p>Section 8: 1 (D18A-D18D)</p>	<p>4</p>

<sup>1</sup> Items listed are based on Appendix 1. Items in parentheses are based on the Appendix 3.

	provider noted a concern that should be watched carefully.		
<b>5. Assessment of Well-Being of Parent(s) and Safety Within the Family</b>	Assesses whether health care providers talk with parent about their own well-being and safety within the family, including depression, emotional support, and whether there are firearms in the home.	Section 10: 3-5 (AF1-AF5)	3
<b>6. Assessment of Smoking and Substance Use in the Family</b>	Assesses whether health care providers talk with parent about smoking, alcohol, and drug use in the family.	Section 10: 1-2 (AF1-AF2)	2
<b>7. Care Coordination</b>	Assesses whether children requiring more than one type of health care service received needed help coordinating care.	Section 2: 4a (A7)	1
<b>8. Family-Centered Care</b>	Parent reports that child's health care provider delivers care in a family-centered manner, including respect, understanding specific needs of child and concerns of parent, building confidence in the parent, explaining things in way the parent can understand, and showing respect for a family's values, customs, and how they prefer to raise their child.	Section 9 (FC1-FC6)	6
<b>9. Helpfulness of Care Provided</b>	Parent report of how helpful all information from child's health care providers was in specific areas of parenting.	Section 12 (E1-E4)	4

\*See Table 5.4 for information on determining if a child is at high or moderate risk for developmental, behavioral, or social delays.

## **Recode child level PHDS-PLUS survey responses**

### ***Recoding Step 1: Map Items to Quality Measures***

Map the items to each of the corresponding quality measures, as shown in Table 5.2. The question numbers correspond to the core survey, which is included in Appendix 1. If you added questions and renumbered the survey, the question numbers in your survey may differ.

### ***Recoding Step 2: Create New Items: Recode Response Options Used to Score Quality Measures***

Prior to creating scores for the quality measures, create new items in order to assign a quantitative value to survey item response options (e.g., "yes" vs. "no"). Recode the response options for each survey item used in a quality measure so that the values fall between **0 and 100**, where zero indicates quality health care was not received and 100 indicates quality health care was received. Be sure not to recode the original items in the data set. Rather, you should create new items in case you make a mistake. Use the following Table 5.2 as a guide to rescore

each of the items. Missing responses are NOT given a valid score and are NOT included in the calculation of the quality measure.

***Important Note:*** There are two versions shown for how to score the anticipatory guidance and parental education (AGPE) quality measure presented in Table 5.2.

- Version A is the average proportion of topics that parents reported was discussed. This measure answers the question of how many recommended AGPE topics, on average, are discussed, regardless of whether parent questions were answered.
- Version B uses a scoring algorithm that weights each response option according to whether the parents' informational needs about that topic were met. The item only receives full credit if a topic was discussed and the parent's questions were answered. This version measures the degree to which parents' informational needs were met on the anticipatory guidance items.

The version you decide to use should be based on your research questions and goals for the study. You might even want to create both versions and compare the results.

**Table 5.2: Recoding of Response Options for Quality Measures Survey Items**

Quality Measure	PHDS-PLUS Survey Items	Original Response Options	Recoding of Response Options
<p><b>1. Anticipatory Guidance and Parental Education from Doctor or Other Health Care Providers</b>  <i>Version A: Average proportion of topics parents report were discussed</i></p>	<p>Section 6: 3–9 Month Old Section- 1-15 (Ga1-Ga15ai)            Section 6: 10–18 Month Old Section- 15 (Gb1-Ga18ai)            Section 6: 19–48 Month Old Section-- (Gc1-Gc15ai)</p>	<p>1=Yes, the topic was discussed            2=No, the topic was not discussed</p>	<p><b>100</b>  <b>0</b></p>
<p><i>Version B: Average proportion of topics parents report were (a) discussed or (b) not discussed nor did the parent wish to discuss with their child’s health care provider</i></p>	<p>Same as above</p>	<p>1=Yes, the topic was discussed            2=No, the topic was not discussed  <i>Follow-up question asked of those for which the topic was not discussed:</i>            1=Yes, I wish the topic had been discussed            2=No, I did not wish the topic had been discussed</p>	<p><b>100</b>  <b>0</b>  <b>100</b></p>
<p><b>2. Health Information</b></p>	<p>Section 11: 1-3 (H1-H3)            Section 8: 1 (D18A-D18D)</p>	<p>1 = Yes            2 = No</p>	<p><b>100</b>  <b>0</b></p>
<p><b>3. Ask About and Address Parental Concerns</b></p>	<p>Section 6: 6, 7a (D16, D17A)</p>	<p><i>For those parents who respond "not at all" to all items in question #5, Section 7 (D5-D15) AND "no" to question #7, Section 7 (D17)</i>            Score Question #6, Section 7 (D16)            1 = Yes            2 = No  <i>For those parents who respond "a little" or "a lot" to one or more items in question #5, Section 7 (D5-D15) AND/OR "yes" to question #7, Section 7 (D17)</i>            Score Question #7a, Section 7 (D17A)            1 = Yes            2 = No</p>	<p><b>100</b>  <b>0</b>  <b>100</b>  <b>0</b></p>
<p><b>4. Follow-Up for Children at Risk for Developmental Delays</b></p>	<p>Section 8: 1 (D18A-D18D)</p>	<p>1 = Yes            2 = No</p>	<p><b>100</b>  <b>0</b></p>
<p><b>5. Assessment of Well-Being of Parent(s) and Safety Within the Family</b></p>	<p>Section 10: 3-5 (AF1-AF5)</p>	<p>1 = Yes            2 = No</p>	<p><b>100</b>  <b>0</b></p>

<b>6. Assessment of Smoking and Substance Use in the Family</b>	Section 10: 1-2 (AF1- AF2)	1 = Yes	<b>100</b>
		2 = No	<b>0</b>
<b>7. Care Coordination</b>	Section 2: 4a (A7)	1 = Yes	<b>100</b>
		2 = No	<b>0</b>
<b>8. Family-Centered Care</b>	Section 9 (FC1-FC6)	1 = Never	<b>0</b>
		2 = Sometimes	<b>0</b>
		3 = Usually	<b>100</b>
		4 = Always	<b>100</b>
<b>9. Helpfulness of Care Provided</b>	Section 12 (E1-E4)	1 = Very helpful	<b>100</b>
		2 = Helpful	<b>75</b>
		3 = Somewhat helpful	<b>25</b>
		4 = Not at all helpful	<b>0</b>
		5 = We did not discuss	<i>Missing</i>

### ***Recoding Step 3: Parents Who Answered Minimum Number of Items for Each Quality Measure***

Parents must have answered at least **half** of the items that are included in the quality measure to have a score calculated for that measure. If a parent answered less than half of the items in that measure, their score is considered to be missing.

For Quality Measure 7: Helpfulness of Care Provided, parents are instructed to rate how helpful the counseling or discussion for a specific topic was only if the parent and doctor talked about the topic. If a doctor or health care provider did not talk with the parents about learning to protect the child from injury, the parent could not validly report how helpful the counseling was. Thus, a parent had to report having talked with the doctor about at least two of the four counseling topics included in the "Helpfulness" Quality Measure to receive a valid score.

The last column in Table 5.2 lists the total number of items to be answered per quality measure. For this purpose, sub-items (lettered items within the same item number) are counted as an individual item. If a measure has an odd number of items, round up.

### **Create Scores for Each Quality Measure**

Once you have finished recoding steps 1–3, you are ready to calculate a score for each quality measure for each child included in the study. A total of three different scoring methods is used to calculate the quality measures. The scoring methods used for each of the quality measures are described in Table 5.3 below, followed by examples so you can see exactly how the measure is calculated.

**Table 5.3: Algorithms for Creating Quality Measure Scores**

Quality Measure	Minimum # of Items Parents Must Answer	How Quality Measure Is Calculated
<p><b>1. Anticipatory Guidance and Parental Education from Doctor or Other Health Care Providers</b>  <i>Version A: Average proportion of topics parents report were discussed</i></p> <hr/> <p><i>Version B: Average proportion of parents indicating that all topics were (a) discussed or (b) they already had information on topics that were not discussed.</i></p>	<p>3–9 mos: 7            10–18 mos: 8            19–48 mos: 7</p> <hr/> <p>Same as above</p>	<p>Average proportion of “yes, item was discussed” responses.</p> <hr/> <p>Average proportion of “yes, item was discussed” or “no, item was not discussed and parent noted they did not wish it had been discussed” responses.</p>
<p><b>2. Health Information</b></p>	<p>2</p>	<p>Average proportion of “yes” responses.</p>
<p><b>3. Ask About and Address Parental Concerns</b></p>	<p>2</p>	<p>Proportion of parents who are asked about their concerns and/or who receive specific information to address their concerns.</p>
<p><b>4. Follow-Up for Children at Risk for Developmental Delays</b></p>	<p>2</p>	<p>Risk-specific scoring. Proportion of parents whose children received follow-up care addressing child’s risk for developmental, behavioral delays.</p> <p><u>Moderate Risk</u>: Parent said yes at least once to any of follow-up questions (24a-e).  <u>High Risk</u>: Parent said yes to both 24c and 24e OR said yes to any of the following: 24a, 24b, or 24d</p>
<p><b>5. Assessment of Well-Being of Parent(s) and Safety Within the Family</b></p>	<p>2</p>	<p>Average proportion of “yes” responses.</p>
<p><b>6. Assessment of Smoking and Substance Use in the Family</b></p>	<p>2</p>	<p>Average proportion of “yes” responses.</p>
<p><b>7. Care Coordination</b></p>	<p>1</p>	<p>Proportion of parents who report help in coordinating care among these different providers or services.</p>
<p><b>8. Family-Centered Care</b></p>	<p>3</p>	<p>Average proportion of “always” or “usually” responses across all of the items in the measure.</p>
<p><b>9. Helpfulness of Care Provided</b></p>	<p>2</p>	<p>Mean score across all recoded items for a score between 0–100.</p>

\*See below for algorithm to determine if child is at high, moderate, low, or no risk for developmental, behavioral, or social delays.



**Scoring algorithm for child’s risk of developmental, behavioral, or social delays**

Identifying children at risk: Questions 15–17 are derived from the Parents Evaluation of Developmental Status (PEDS) tool. Specific concerns that parents have about their children at specific ages can be an indication of a child’s risk for developmental/behavioral delays. Children whose parents have one or more “indicator” concerns (parent said “yes” or “a little”) are identified as being at risk. Overall, the PEDS has an age- and concern-specific scoring algorithm. The following table describes the scoring algorithm used to identify children as high, moderate, low, and no risk of developmental/behavioral delays. The scoring algorithm is specific to three age-groups: 3–17.99 months, 18–35.99 months, and 36–48 months.

Children whose parents have noted concerns for only one indicator item are at moderate risk for delays. Children whose parents note two or more concerns to indicators items are at high risk for delays.

**Table 5.4: Risk Category**

<b>Age of Child</b>	<b>High Risk</b>	<b>Moderate Risk</b>	<b>Low Risk</b>	<b>No Risk</b>
<b>3–17.99</b> mos.	Parent noted “a lot” or “a little” concern to <b>two or more</b> of the following items: ➤ 15a ➤ 15b ➤ 17a	Parent noted “a lot” or “a little” concern to <b>one</b> of the following: ➤ 15a-b ➤ 17a with any other concerns to any PEDS item	Parent noted “a lot” or “a little” concern to <b>one</b> or more of the following: ➤ 15c ➤ 16a-c ➤ 17b-c ➤ If parent <u>only</u> noted a concern to 17a	Parent noted “not at all concerned” to all PEDS items
<b>18–35.99</b> mos.	Parent noted “a lot” or “a little” concern to <b>two or more</b> of the following items: ➤ 15a-c	Parent noted “a lot” or “a little” concern to <b>one</b> of the following: ➤ 15a-c	Parent noted “a lot” or “a little” concern to <b>one</b> or more of the following: ➤ 16a-c ➤ 17a-c	Parent noted “not at all concerned” to all PEDS items
<b>36–48</b> mos.	Parent noted “a lot” or “a little” concern to <b>two or more</b> of the following: ➤ 15a-c ➤ 16b	Parent noted “a lot” or “a little” concern to <b>one</b> of the following: ➤ 15a-c ➤ 16b	Parent noted “a lot” or “a little” concern to <b>one</b> or more of the following: ➤ 16a ➤ 16c ➤ 17a-c	Parent noted “not at all concerned” to all PEDS items

### EXAMPLE 5.1: HEALTH INFORMATION QUALITY MEASURE

Here is the scoring for Joel, Anne, and Steve for *Quality Measure #2: Health Information*. This quality measure includes items 14a-d.

Their responses were as follows:

Joel:	14a. Yes	14b. No	14c. Yes	14d. No
Anne:	14a. Yes	14b. Yes	14c. Yes	14d. Missing
Steve:	14a. Yes	14b. Missing	14c. Missing	14d. Missing

Their responses are given the following values:

Joel:	14a. 100	14b. 0	14c. 100	14d. 0
Anne:	14a. 100	14b. 100	14c. 100	14d. No value
Steve:	14a. 100	14b. No value	14c. No value	14d. No value

Therefore, their scores on the Quality Measure are:

$$\text{Joel: } \frac{\text{Numerator}}{\text{Denominator}} = \frac{100 + 0 + 100 + 0}{4} = \frac{200}{4} = \mathbf{50}$$

$$\text{Anne: } \frac{\text{Numerator}}{\text{Denominator}} = \frac{100 + 100 + 100}{3} = \frac{300}{3} = \mathbf{100}$$

Steve: No score since he did not answer at least two of the four items included in the quality measure

*Notice that Item 14d. was not included in Anne's score (numerator or denominator) since her response was missing. Also, a score was not given to Steve since he did not answer the minimum number of items required.*

### EXAMPLE 5.2: HELPFULNESS OF CARE PROVIDED

Here is the scoring for Ted's answers to the items for *Quality Measure #7: Helpfulness of Care Provided*. This measure includes items 13a-d.

Responses and corresponding values:

13a. Somewhat helpful	25
13b. Very helpful	100
13c. Not at all helpful	0
13d. Helpful	75

Ted's score for the Quality Measure is:

$$\frac{\text{Numerator}}{\text{Denominator}} = \frac{(25 + 100 + 0 + 75)}{4} = 50$$

**EXAMPLE 5.3: FOR FOLLOW-UP CHILDREN AT RISK OF DEVELOPMENTAL DELAY**

Here is the scoring for Jack, Janet, and Chris for *Quality Measure #3: Follow-up for Children at Risk of Developmental Delay*. This measure is comprised of items 24a-e and is scored only for those children who have been identified as being at risk for a developmental delay.

Jack and Janet are both at high risk for developmental delay. Chris and Larry are both at moderate risk for developmental delay.

Their responses were as follows:

Jack (high risk):	24a. Yes	24b. No	24c. Yes	24d. No	24e. No
Janet (high risk):	24a. No	24b. No	24c. Yes	24d. No	24e. Yes
Chris (mod. risk):	24a. No	24b. No	24c. No	24d. No	24e. Missing
Larry (mod. risk):	24a. Yes	24b. Missing	24c. Missing	24d. Missing	24e. Missing

Therefore, their scores on the quality measure are:

Jack: **100** (*answered "yes" to at least one of the necessary items*)

Janet: **100** (*answered "yes" to both 24c and 24e*)

Chris: **0** (*did not answer "yes" to any of the items*)

Larry: **100** (*answered "yes" to at least one item, even though the remaining were missing*)

## **Create a Group-Level Score for each Quality Measure for the Unit Being Measured**

Once scores are calculated for each individual child on each quality measure, these individual-level scores need to be combined into a score for the entire unit you are interested in measuring, such as a health plan, provider, or total population sampled. This is done by averaging all of the individual scores on a quality measure.

$$\text{Group-level score} = \frac{\sum \text{each individual respondents' quality measure scores}}{\# \text{ of individuals with a quality measure score}}$$

In other words, the group-level score is an average score for all respondents for whom a score could be calculated on that measure. Therefore, the denominator for the group-level score for the quality measure is NOT the total number of respondents; rather, it is the number of children whose parent answered at least half of the items for that quality measure.

### **EXAMPLE 5.4: Group-Level Score**

Let's say that you are scoring Quality Measure #2: Health Information for the Happy Health Plan, and Charlie, Lynn, Polly, and Sam are the children in the health plan whose parents have responded to the survey. (Forget about small numbers for the moment.)

The individual quality measure scores for each of the respondents are as follows:

Charlie = 75

Lynn = 100

Polly = 0

Sam = no score (only answered 1 of the 4 items included in the quality measure)

The group-level score for Quality Measure #2 is:

$$\text{Score} = \frac{75 + 100 + 0}{3} = \frac{175}{3} = \mathbf{58.33}$$

Notice that Sam was not included in the calculation (numerator and denominator) since he did not have an individual score for the quality measure.

All of the group-level scores for each quality measure are calculated in this manner. Note that most statistical packages can calculate these scores for you automatically.

### Example 5.5: Overall Quality Scores:

Here are examples of scores on each of the eight quality measures for three different children. Notice how each of the versions of the overall quality scores tells a slightly different story.

<b>Quality Measure</b>	<b>Jill</b>	<b>Jose</b>	<b>Jack</b>
#1 (Version A)	93.3	87.5	68.7
#2	100.0	100.0	75.0
#3*	<i>missing</i>	100.0	<i>missing</i>
#4	83.3	100.0	83.3
#5	100.0	100.0	0.0
#6	82.5	92.5	70.0
#7	81.3	62.5	75.0
<b>Overall Quality Score</b>	<b>90.1</b>	<b>91.8</b>	<b>62.0</b>
Meets the "Average Across All" Threshold (mean score of 75+ across all quality measures)	yes	yes	no
Meets the "On Every" Threshold (score of 75+ on every quality measure)	yes	no	no

\*Only scored for children who are at risk for a developmental, behavioral, or social delay

Even though the overall mean score for Jose is greater than Jill's score, Jill met the 75-point threshold on ALL of the quality measures, whereas Jose only scored 62.5 on the "Helpfulness of Care" measure, falling below the 75-point threshold.

## **STEP 5.2: Calculate core PHDS-PLUS analytic variables**



### **WHAT IS THE PURPOSE OF THIS STEP?**

#### **In this step you will:**

- Calculate the analytic variables you have decided to use in reports of your PHDS-PLUS findings based on Step 2.4, 2.5, and 3.2.**

Your analytic variables are constructed using three sources of data:

- Survey responses from items included in the core survey that are not used in the quality measures. These items are included to provide additional information about children and families included in the PHDS-PLUS sample and include topics on:
  - Utilization of the health care system (e.g., emergency room, doctor's office, and hospital visits)
  - Doctors asking about and addressing parents' concerns
  - Whether the child has had one person whom parents consider a personal doctor or nurse
  - Socio-demographic characteristics of child and parent
- Administrative Data: These are the data collected when pulling the sampling frame for the entire sample.  
For example:
  - Whether the child has had a Health Plan Employer Data and Information Set (HEDIS)-defined well-visit
  - Type of program in which child is enrolled (FFS, managed care)
  - Continuous enrollment
- Supplemental Items: These are additional survey items you may have decided to include in the PHDS-PLUS during Step 2.4. As with the analytic items from the care survey, these items provide additional information about the children in the sample and their parent(s).  
For example:
  - Children with Special Health Care Needs Screener
  - Screener for maternal depression
  - Impact of care on parental confidence as parent
  - Financial barriers to care

These data can be used to provide descriptive information about the sample on their own, and they also can be used to stratify the results of quality measures using cross-tabulations. Cross-tabulations often can present the results in a way that is easier to understand and can make the results more actionable for quality improvement because they highlight the quality of care findings for specific groups.

## **STEP 5.3: Calculate any alternative versions of the quality measures**

### **WHAT IS THE PURPOSE OF THIS STEP?**

**In this step you will:**

- Consider other options for scoring PHDS Quality Measures
- Calculate alternative measures

### **GUIDELINES AND ISSUES TO CONSIDER**

It is often helpful to look at information from different angles and perspectives to gain a more complete, multidimensional picture. The 0–100 quality measure scores discussed in this section are only one way to assess your PHDS-PLUS results. There are a variety of options for scoring and combining the quality measures on the PHDS-PLUS. Think about your research questions and which of the scoring methods outlined here best answer those questions and will make a compelling story. Be creative when approaching your scoring. While we have provided recommendations here, there is no “one-size-fits-all” method when it comes to scoring data.

Additional ways to consider scoring the PHDS-PLUS measures include:

1. **Threshold Measures:** Proportion of children above and below a specific “threshold” score
2. **“All or Nothing” Measures:** Proportion who received all or none of recommended care
3. **Negative Indicator Measures:** Proportion of children who did NOT receive recommended care
4. **Overall Composite Quality Measures:** Proportion of children who received a threshold level of care across more than one quality measure

**1. Threshold Measures:** Proportion of children above and below a specific “threshold” score

Once you have created the mean scores for each of the quality measures, it may be helpful to identify those who received a threshold level of care. The threshold scoring method creates a binomial measure using the mean-based measure scores and assesses how many people received a certain level of an aspect of care.



Table 5.5 below provides some options for creating threshold measures.

**Table 5.5: Threshold Scores for Each Quality Measure**

Quality Measure	Threshold Score for Quality Measure- Used for Determining that Sufficient Level of Quality of Care was Received
1. Anticipatory Guidance and Parental Education	
<i>Version A: Average proportion of topics parents report were discussed</i>	Parent responded yes to discussions of about <b>80%</b> or more of the topics. <i>Quality measure value: 80.0</i>
<i>Version B: Average proportion of parents indicating that all topics were (a) discussed or (b) they already had information on topics that were not discussed</i>	Parent responded, "Yes, item was discussed" or "No, item was not discussed" and "I did not wish the topic was discussed" to <b>all</b> topics <i>Quality measure value: 100.0</i>
2. Health Information	Parent responded "Yes," they had seen or heard information about all of the items. <i>Quality measure value: 100.0</i>
3. Ask About and Address Parental Concerns	n/a (This measure is already a proportion measure)
4. Follow-Up for Children at Risk for Developmental Delays	n/a* (This measure is already a proportion measure)
5. Assessment of Well-Being of Parent(s) and Safety Within the Family	Parent responded "Yes" to being asked about at least <b>2 of the 3</b> of the family assessment items. <i>Quality measure value: 66.7</i>
6. Assessment of Smoking and Drug Use in the Family	Parent responded "Yes" to <b>both</b> items about smoking and substance use in the home. <i>Quality measure value: 100.0</i>
7. Care Coordination	n/a (This measure is already a proportion measure)
8. Family-Centered Care	Parent responded "Usually" or "Always" across all of the items. <i>Quality measure value: 100.0</i>
9. Helpfulness of Care Provided	Parent responded, <i>on average</i> , that the care received from their child's health care provider was "Helpful" or "Very helpful" across all of the items. <i>Quality measure value: 75.0</i>

Though these thresholds are recommended by CAHMI based on their experiences with the measures, you may want to experiment with adjusting the thresholds to various levels depending on how you hope to use the data and your expectation about what care can and should be received. For example, you may want to raise the threshold bar once everyone becomes accustomed to the measurement process and has sufficient

time to implement a quality improvement strategy. Be sure to adjust your interpretation of each threshold score when doing so.

**2. “All or Nothing” Measures:** Proportion who received all or none of recommended care

A second possibility for scoring your quality measures is to see how many children and their parents are receiving all aspects of anticipatory guidance and counseling, reported their care as being usually or always helpful, or that the care was usually or always provided in a family-centered manner. These measures provide information on how consistent and comprehensive the care is that young children receive. Table 5.6 below lists examples for constructing “all or nothing” PHDS-PLUS quality measures.

**Table 5.6: All or Nothing Threshold Scores for Quality Measures**

Quality Measure	Threshold Score for Quality Measure- Used for Determining that a Sufficient Level of Quality of Care was Received
1. Anticipatory Guidance and Parental Education	
<i>Version A: Average proportion of parents reporting that “yes” the topics were discussed</i>	Parent responded “Yes” to discussing <b>all</b> of the topics for a given age group.
<i>Version B: The degree to which parents noted that their informational needs were met</i>	Parent responded, “Yes, item was discussed and questions were answered” or “No, item was not discussed but I already had information about this topic” to <b>all</b> topics for a given age group.
2. Health Information	Parent responded “Yes,” they had seen or heard information about all of the items.
3. Ask About and Address Parental Concerns	n/a
4. Follow-Up for Children at Risk for Developmental Delays	n/a
5. Assessment of Well-Being of Parent(s) and Safety Within the Family	Parent responded “Yes” to discussing <b>all</b> of the family assessment items.
6. Assessment of Smoking and Drug Use in the Family	Parent responded “Yes” to <b>both</b> items about smoking and substance use in the home.
7. Care Coordination	n/a
8. Family-Centered Care	Parent responded “Usually” or “Always” to <b>all</b> of the items asking about family-centered care.
9. Helpfulness of Care Provided	Parent responded that the care received from their child’s health care provider was “Helpful” or “Very helpful” on <b>all</b> of the items.

**3. Negative Indicator Measures:** Proportion of children who did NOT receiving recommended care

The measures described in Step 5.1 tell you whether children receive recommended care. You can also create measures that highlight care that children did not consistently receive. For this scoring method, instead of looking at who did get care, you are looking at who did not get care. This approach provides information for doctors and health care providers on missed opportunities to provide aspects of recommended care.

For example, instead of reporting that 39.2% of parents indicated that their child’s doctor or health care provider discussed all topics included in the Anticipatory Guidance and Parental Education quality measure, you could report that 60.8% of parents indicated that their child’s doctor or health care provider did not discuss one or more of the anticipatory guidance topics with them. You use the same score, but report it in a different way.

<b><u>Measure</u></b>	<b><u>Positive Indicator</u></b>	<b><u>Negative Indicator</u></b>
Anticipatory Guidance and Parental Education	% of parents responding “yes, items were discussed” to <u>all</u> items	% of parents responding “no, item was not discussed” to <u>one or more</u> of the items
Follow-Up for Children at Risk for Developmental Delays	% of parents responding “yes” to <u>at least one</u> of the items	% of parents responding “no” to <u>all</u> of the items
Family-Centered Care	% of parents responding “usually or always” to <u>all</u> items	% of parents responding “never” or “sometimes” to <u>at least one</u> item

**4. Overall Composite Quality Measures:** Proportion of children who received a threshold level of care across more than one quality measure

You may find it useful to combine the information from two or more quality measures into composite quality measures. Such composite measures provide a signal of whether children usually or always received all aspects of recommended care included in the composite measure. As with the individual quality measures, several methods can be used to create composite measures, depending on the message you are trying to convey.

1. Overall Quality Threshold Measure: As with the threshold measures for the individual quality measures, an overall threshold composite measure provides an

easily interpretable outcome of whether the child received the recommended care across each quality measure. There are two primary ways to calculate the Overall Quality Threshold Score:

- a. Overall "Average Across All" Threshold Score:  
To create this measure, children are categorized into two groups according to whether they have (1) an overall mean score of 75 points or above across all quality measures, or (2) an overall mean score below 75 across all measures. This measure indicates the proportion of children who meet the 75-point threshold and, *on average*, "usually" or "always" received all aspects of recommended care.
  - b. Overall "On Each" Threshold Score:  
To create this measure, children are categorized into two groups according to whether they have (1) an overall mean score of 75 points or above on each quality measure or (2) an overall mean score below 75 on one or more quality measures. This measure indicates the proportion of children who meet the 75-point threshold *on each* measure. This scoring method indicates whether a child "usually or always" received all aspects of recommended care.
2. Overall Negative Indicator Score: Both of the threshold scores listed above could be presented as the percent of children who received all aspects of recommended care less often than "usually" or "always." Basically, this would be the children who either had a score of less than 75 points for the Overall "Across All" Threshold Score or scored below the threshold on one or more of the Quality Measures for the Overall "Within Each" Threshold Score.

For instance, if 69.0% of children met the 75-point threshold for the Overall "Across All" Threshold Score, then 31.0% of children fell below the threshold, indicating that, on average, they received recommended care less often than "usually" or "always." When making a point about the quality of care experienced it is sometimes helpful to highlight the negative rather than the positive, to emphasize a point.



## **Step 5.4: Evaluate quality measurement results for subgroups of children**

The core PHDS-PLUS also includes additional topic areas that are extremely useful for analyses. Following is a list of the topic areas and the subtopics included within each. See Appendix 1 and Appendix 3 for specific survey questions relevant to each topic.

### 1. Health Care Utilization

- Emergency room visits
- Doctor office/clinic visits
- Overnight hospital visits
- Whether child has personal doctor or nurse

These items provide useful information about where a child has been for care. At a minimum, basic frequencies should be run for these items as well as stratified by demographic characteristics. In previous research, having a personal doctor or nurse has been linked with a higher quality of care and is one important way to examine the results.

### 2. Assessment of Child's Health

- Risk of developmental, behavioral, or social delays
- Asking about and addressing parents' concerns
- Developmental assessment by doctor

As discussed previously, the Parent Evaluation of Developmental Status (PEDS), is included in the PHDS-PLUS and assesses a child's risk for developmental problems. While this measure is used to create a valid denominator for the *Quality Measure #3 Follow-Up for Children at Risk*, it is also a useful lens through which to examine the various quality measures. Children at high or moderate risk tend to score lower on several of the measures. These data also may be very useful in conducting analyses with other supplemental data.

### **Example 5.6: Recommended Cross-Tabulations**

(items from core survey)

- Percent of concerned parents who were asked about their concerns
- Percent of concerned parents who were given specific information by their child's health care providers to address those concerns
- Quality measures by:
  - Whether child has a personal doctor or nurse
  - By age group
  - By gender of child
  - By educational level of parent
  - Whether child is first-born child in household

### 3. Demographic information about parent and child

- Information about child
  - Gender
  - Race/ethnicity
  - First-born child
  - Age
- Information about parent/family
  - Gender
  - Age
  - Number of children in household
  - Relationship to child
  - Education

All results can be stratified by basic demographic information. Demographic information can be important in quality improvement reports. Providers can use the information to evaluate their own behavior and detect differences in care between various demographic groups. However, the level of detail may be overwhelming in consumer reports. You may choose only to highlight striking results in a consumer report.

### Analyses Using Administrative Data

Administrative data are used to determine which children are eligible to be included in the study. If you recall from *Step 3: Prepare for Survey Administration*, age and continuous enrollment status are usually required to be part of the sample. Other data are often included in the original sampling file as well. When developing your

analysis plan, determine which administrative variables you would like to keep and use for analytic purposes.

While utilization of health care, that is, having had a well-visit, is not a requirement for sampling, you may find it helpful to examine differences in scores based on *types* of well-visits children had in the past year. For example, one state Medicaid program examined differences in the prevalence of parents having discussed the anticipatory guidance topics with their child's health care provider by type of well-visit, including Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) well-visits and any other type of well-visit.

Use these variables to stratify the Quality Measure results to gain insight into the process measures of well care that you may be currently calculating. You may also want to examine these variables against some of the other analytic topics measured in PHDS-PLUS.

### Supplemental Items

Thus far, the suggestions for additional analyses have concentrated on areas that are measured using the core PHDS-PLUS survey. However, there are several additional topics included in the supplemental item section of the survey that may be of interest to you or your organization. Two topic areas in particular have generated a great deal of interest: (1) identifying children with special health care needs and (2) a screener to identify parents at risk for depression. Both of these areas can be used to examine the Quality Measures and additional areas in greater depth.

#### **1. Identifying Children with Special Health Care Needs**

CAHMI has developed a screener to identify children and adults with special health care needs. This screener operationalizes the federal Maternal and Child Health Bureau's definition of special health care needs using a consequences-based approach. This approach is not condition-specific as with other approaches and identifies children across the range and diversity of chronic conditions and special needs. This allows a more comprehensive assessment of health care system performance than is attainable by focusing on a single diagnosis or type of special need. In addition, the relatively low prevalence of chronic conditions and special needs among children often makes it problematic to find adequate numbers of very young children with specific diagnoses or types of special needs. In many cases, an approach that is not specific to a given condition makes it possible to identify enough children to enable statistically robust quality comparisons across the health care system and/or providers. For more information on the screener, please refer to the Children With Special Health Care Needs Screener User's Manual published by CAHMI. ([www.cahmi.org](http://www.cahmi.org))

#### **2. Screening for Risk of Parental Depression**

Parents at risk for depression are:

- less likely to report receiving care
- more likely to take a child to the emergency room



## Additional Tips and Resources

### Statistical Analyses

When comparing performance or scoring among different groups, statistical analyses are required to test and see if the differences are meaningful and real. However, the statistical test that is used will depend on the type of data you are testing. It is beyond the scope of this manual to be a statistical primer, therefore we suggest that when you compile your team you identify someone to be the lead person for these analyses. As an introduction to those analyses, the following table lists three of the most common statistical tests used in the analyses described in this section. Your vendor may also be able to provide these services.

**Table 5.7: Typical Statistical Tests Run in Quality Health Care Reporting**

Type of Comparison	Statistical Test	Example Research Question
1. Differences in mean scores between two groups	T-test	Do parents who are at risk for depression have a lower mean score on the Quality Measure of Helpfulness of Care than parents who are not at risk for depression?
2. Differences in mean scores between three or more groups	Analysis of Variance (ANOVA)	Are there differences in the mean scores for the Quality Measure of Assessment of Well-Being for Parent(s) and Safety Within the Family by racial/ethnic groups (e.g., white, African American, Hispanic, other)
3. Differences in binomial scores for two or more groups (e.g., cross-tabulations of threshold scores)	Chi-square ( $\chi^2$ )	Are parents of children with special health care needs more likely to meet the threshold for having discussed the anticipatory guidance topics than parents of children without special health care needs?