

Transformation to a 0-100 Scale

- Linear mean scores for CAHPS measures are transformed to a 0-100 scale for public reporting
 - Both single items and composites
- 0-100 transformation occurs after calculating the mean score
 - 0 represents lowest possible mean score
 - 100 represents highest possible mean score
- In contract reports, linear mean scores are also reported without transformation (using the original response scale)

Use of Composite Measures

- Scores on questions about the same topic are combined to form composite scores
- Items in a composite are generally given equal weight
 - Exceptions: Getting Needed Prescription Drugs and Care Coordination

Formula for Transformation to a 0-100 Scale

- Let X = the CAHPS score on its original scale, ranging from a minimum value of “ a ” to a maximum value of “ b ”
- A 0-100 score Y can be calculated as

$$Y = \frac{(X-a)*100}{(b-a)}$$

- For item or composite using response options of *Always, Usually, Sometimes, Never*, $a = 1$ (Never), $b = 4$ (Always)
 - *Always, Usually, Sometimes, Never*, convert to 100, 66 2/3, 33 1/3, 0
- For a 0-10 response scale, $a = 0$, $b = 10$
 - Ratings of *10, 4, 1*, convert to 100, 40, 10

Linear Mean Scoring (1-4): Getting Needed Care

	How often is it easy to get appointments with specialists?	How often is it easy to get needed care, tests, or treatment?
Person 1	Always (4)	Sometimes (2)
Person 2	X	Never (1)
Person 3	Usually (3)	X
Average Score	3.5	1.5

Composite score = $(3.5+1.5)/2 = 2.5$

Conversion to a 0-100 Scale: Getting Needed Care Example

- The 0-100 score Y can be calculated as

$$Y = \frac{(X-a)*100}{(b-a)}$$

$$Y = \frac{(2.5-1)*100}{(4-1)}$$

$$Y = \frac{(1.5)*100}{3}$$

$$Y = 50$$

Further Examples of Transformation to 0-100

- Mean score on Getting Appointments and Care Quickly = 3.589

– Transformed score = $[(3.589-1)/(4-1)]*100 = 86.30$



- Mean score on Rating of Health Plan = 8.859
 - Transformed score = $[(8.859-0)/(10-0)]*100 = 88.59$

Special Case: Getting Needed Prescription Drugs

- This composite covers two topics
 - *How often was it easy to use your plan to get the medicines your doctor prescribed*
 - *Ease of filling prescriptions*
- The first topic is assessed by one item. The second topic is assessed by combining two items:
 - *How often was it easy to use your plan to fill a prescription at your local pharmacy*
 - *How often was it easy to use your plan to fill a prescription by mail*

	... local pharmacy	... by mail	Combined item
Person 1	Sometimes (2)	(did not use)	2
Person 2	(did not use)	Always (4)	4
Person 3	Usually (3)	Always (4)	3.5

- The combined pharmacy/mail score is averaged with the first item's score to produce the composite score

Linear Mean Scoring (1-4): Getting Needed Prescription Drugs

	How often was it easy to use your prescription drug plan to get the medicines your doctor prescribed?	Combined pharmacy/mail items
Person 1	Always (4)	2
Person 2	X	4
Person 3	Usually (3)	3.5
Average Score	3.5	3.167

Composite score = $(3.5+3.167)/2 = 3.333$

Conversion to a 0-100 Scale: Getting Needed Prescription Drugs Example

- The 0-100 score Y can be calculated as

$$Y = \frac{(X-a)*100}{(b-a)}$$

$$Y = \frac{(3.333-1)*100}{(4-1)}$$

$$Y = \frac{(2.333)*100}{3}$$

$$Y = 77.77$$

Special Case: Overview of Scoring of Care Coordination Composite

- 6-item composite
- Item 4 has a different response scale than other items
- Item 5 and item 6 are combined
- Details appear on the following slides

Initial Scoring of the Care Coordination Composite

	Response Options
Item 1: Personal MD had medical records or other info about care	Never (1) Sometimes (2) Usually (3) Always (4)
Item 2: How often talk about Rx medications	Never (1) Sometimes (2) Usually (3) Always (4)
Item 3: MD informed about care from specialists	Never (1) Sometimes (2) Usually (3) Always (4)
Item 4: Get needed help to manage care	No (2) Yes, somewhat (3) Yes, definitely (4)
Item 5: MD office follow up to give test results	Never (1) Sometimes (2) Usually (3) Always (4)
Item 6: Got test results as soon as needed	Never (1) Sometimes (2) Usually (3) Always (4)

Care Coordination Composite Example: Initial Responses

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Person 1	Usually	Always	Always	No	Never	Never
Person 2	Always	Sometimes	X	Yes, definitely	Always	Sometimes
Person 3	Sometimes	Usually	Never	X	Sometimes	Never

Further Scoring of the Care Coordination Composite

- Special case: scoring of items 5 and 6
 - Items 5 and 6 are averaged to generate a single item score
- Composite score is the weighted average of five scores:
 - The scores for items 1-4
 - Average of items 5 and 6

Care Coordination Composite Example: Initial Scoring

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Combined 5&6
Person 1	3	4	4	2	1	1	1
Person 2	4	2	X	4	4	2	3
Person 3	2	3	1	X	2	1	1.5
Average Score	3	3	2.5	3			1.833

Care Coordination Composite Example: Creating a Weighted Linear Mean and Rescaling to 0-100

- Composite mean: $(3+3+2.5+3+1.833)/5 = 2.667$
- This is on a 1.2 to 4 scale, unlike other composites:
lowest possible = $(1+1+1+2+1)/5 = 1.2$
- Conversion to a 0-100 scale:
 $Y = [(2.667-1.2)/(4-1.2)]*100 = 52.39$