#### Use of Health-Related Quality of Life Measures to Assess Individual Patients

#### July 24, 2014 (1:00 – 2:00 PDT) Kaiser Permanente Methods Webinar Series



Ron D.Hays, Ph.D. drhays@ucla.edu

#### Physical Functioning and Emotional Well-Being at Baseline for 54 Patients at UCLA-Center for East West Medicine



MS = multiple sclerosis; ESRD = end-stage renal disease; GERD = gastroesophageal reflux disease.

#### Significant Improvement in all but 1 of SF-36 Scales (Change is in T-score metric)

	Change	t-test	prob.
PF-10	1.7	2.38	.0208
RP-4	4.1	3.81	.0004
BP-2	3.6	2.59	.0125
GH-5	2.4	2.86	.0061
<b>EN-4</b>	5.1	4.33	.0001
SF-2	4.7	3.51	.0009
<b>RE-3</b>	1.5	0.96	.3400 ←
EWB-5	4.3	3.20	.0023
PCS	2.8	3.23	.0021
MCS	3.9	2.82	.0067

# Effect Size

#### (Follow-up – Baseline)/ SD<sub>baseline</sub>

Cohen's Rule of Thumb:

ES = 0.80 Large

### **Effect Sizes for Changes** in SF-36 Scores



PFI = Physical Functioning; Role-P = Role-Physical; Pain = Bodily Pain; Gen H=General Health; Energy = Energy/Fatigue; Social = Social Functioning; Role-E = Role-Emotional; EWB = Emotional Well-being; PCS = Physical Component Summary; MCS = Mental Component Summary.

0.11 0.13 0.21 0.24 0.30 0.35 0.35 0.36 0.41 0.53

# Defining a Responder: Reliable Change Index (RCI)



 $SEM = SD_{hl} \times \sqrt{1 - r_{xx}}$ 

*Note:*  $SD_{bl}$  = standard deviation at baseline  $r_{xx}$  = reliability

## Significant Change

$$\frac{X_2 - X_1}{(\sqrt{2})(SD)\sqrt{(1 - r_{xx})}} >= 1.96$$

# Amount of Change in Observed Score Needed To be Statistically Significant

$$(\sqrt{2})(SD)\sqrt{(1-r_{xx})}(1.96)$$

*Note:*  $SD_{bl}$  = standard deviation at baseline and  $r_{xx}$  = reliability

# Amount of Change Needed for Significant Individual Change



PFI = Physical Functioning; Role-P = Role-Physical; Pain = Bodily Pain; Gen H=General Health; Energy = Energy/Fatigue; Social = Social Functioning; Role-E = Role-Emotional; EWB = Emotional Well-being; PCS = Physical Component Summary; MCS = Mental Component Summary.

## 7-31% Improve Significantly

	% Improving	% Declining	Difference
PF-10	13%	2%	+ 11%
RP-4	31%	2%	+ 29%
<b>BP-2</b>	22%	7%	+ 15%
GH-5	7%	0%	+ 7%
<b>EN-4</b>	9%	2%	+ 7%
SF-2	17%	4%	+ 13%
<b>RE-3</b>	15%	15%	0%
EWB-5	19%	4%	+ 15%
PCS	24%	7%	+ 17%
MCS	22%	11%	+ 11%



## Computer Adaptive Testing (CAT)







12

# PROMIS Measures

- Adult Health Measures
  ✓ More than 1,000 individual items (questions)
  ✓ 51 distinct item banks or scales
  ✓ 20 languages
- Pediatric Health Measures
  ✓ More than 150 items (questions)
  ✓ 18 distinct banks or scales
  ✓ 8 languages



# The PROMIS Metric

- T Score
  - Mean = 50
  - SD = 10
  - Referenced to US General Pop.
  - -T = 50 + (z \* 10)

## www.nihpromis.org



Are you able to get in and out of bed? Are you able to stand without losing your balance for 1 minute? Are you able to walk from one room to another? Are you able to walk a block on flat ground? Are you able to run or jog for two miles? Are you able to run five miles?

# Normal Distribution

Within 1 SD = 68.2%, 2 SDs = 95.4%; 3 SDs = 99.6%



# Reliability Target for Use of Measures with Individuals

- Reliability ranges from 0-1
  - 0.90 or above is goal
- SE = SD (1- reliability)<sup>1/2</sup>
- Reliability =  $1 (SE/10)^2$ 
  - Reliability = 0.90 when <u>SE = 3.2</u>
  - 95% CI = true score +/- 1.96 x SE

I was grouchy [1<sup>st</sup> question]

- Never	[39]
- Rarely	[48]
- Sometimes	[56]
- Often	[64]
- Always	[72]

Estimated Anger = 56.1 SE = 5.7 (rel. = 0.68)

#### I felt like I was ready to explode

### [2<sup>nd</sup> question]

- Never
- Rarely
- Sometimes
- Often
- Always

### Estimated Anger = 51.9 SE = 4.8 (rel. = 0.77)

- I felt angry [3<sup>rd</sup> question]
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

Estimated Anger = 50.5 SE = 3.9 (rel. = 0.85)

#### I felt angrier than I thought I should [4<sup>th</sup> question]

- Never
- Rarely
- Sometimes
- Often
- Always

### Estimated Anger = 48.8 SE = 3.6 (rel. = 0.87)

- I felt annoyed [5<sup>th</sup> question]
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

Estimated Anger = 50.1SE = 3.2 (rel. = 0.90)

- I made myself angry about something just by thinking about it. [6<sup>th</sup> question]
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

Estimated Anger = 50.2 SE = 2.8 (rel = 0.92)

### PROMIS Physical Functioning vs. "Legacy" Measures



# Person Fit

- Large negative  $Z_L$  values indicate misfit.
  - one person who responded to 14 of the PROMIS physical functioning items had a  $Z_L = -3.13$
  - For 13 items the person could do the activity (including running 5 miles) without any difficulty.
    - But this person reported a little difficulty being out of bed for most of the day.

# Person Fit

Item misfit significantly related to:

- Longer response time
- More chronic conditions
- Younger age

Sample FAST-Feedback report for Sue Smith, a patient who sees Dr. Fischer, has recently quit smoking, is not getting enough physical activity, and has low physical health-related quality of life and normal mental health-related quality of life.

#### Sue Smith-

Congratulations! You stopped smoking. That's great! It is important to keep up your motivation to stay quit! Did you know that after remaining tobacco free for 1 year, your risk of heart disease is half way back to normal? Please let Dr. Fischer, or anyone in GIMO, know if you need any help to remain tobacco free.

You may not be getting enough *physical activity*. Did you know that many health organizations, including the Centers for Disease Control, recommend that you get 30 minutes of moderate activity, or 20 minutes of vigorous activity, at least 5 days a week. Dr. Fischer agrees. Some examples of moderate activities are:

Walking fast Mowing the lawn Riding a bicycle on level ground Playing doubles tennis

Being physically active makes you less likely to get:

Diabetes Heart disease Colon cancer High blood pressure

Physical activity can also improve your mood and increase the amount of energy you have. It is also a great way to reduce stress and prevent weight gain after you quit smoking!

You may want to talk with Dr. Fischer today about ways that you can increase your *physical activity*.



The chart on the left compares your *physical* and *emotional* **health** to the average person living in the United States.

There are many reasons that **physical health** can be lower than average, including injuries and medical conditions such as arthritis. There may be things you can do, such as physical therapy and rehabilitation, and different kinds of exercise, like yoga, that can improve your physical health. Please think about some of the things that may be limiting your activity and talk with Dr. Fischer today about how you can feel better.

Your emotional health is in the normal range. If you ever feel like you need help with your mood or stress, please let Dr. Fischer or anyone in GIMO know.

Hess, R., et al. (in press). A randomized controlled trial of the functional assessment screening tablet to engage patients at the point of care. <u>Journal of General Internal Medicine</u>.

# PROMIS CAT Report

#### Computerized Adaptive Test (CAT) Report

Date: 01-Nov-10

Your age: 50

Yourgender: Male

Computerized Adaptive Tests: Depression, Physical Function

Your score on the Depression CAT is 70. The average score is 50.

Your score indicates that your level of Depression is higher (worse) than:

98 percent of people in the general population

96 percent of people age 45-54

98 percent of males

Your score on the Physical Function CAT is 33. The average score is 50.

Your score indicates that your level of Physical Function is higher (better) than:

· 6 percent of people in the general population

9 percent of people age 45-54

5 percent of males

Your scores for the CATs you completed are shown below.

The diamond + is placed where we think your score lies. This diamond is placed on your T-Score, which is a standardized score that is based on an average score of 50, based on responses to the same questions in the United States general population. The T-score also has a standard deviation of 10 points, so a score of 40 or 60 represents a score that is one standard deviation away from the average score of the general US population.

The Standard Error (SE) is a statistical measure of variance and represents the possible range of your score. The lines on either side of the diamond in your profile report show the possible range of your actual score around this estimated score. It is very likely that your score is in the range of these lines.



"Implementing patient-reported outcomes assessment in clinical practice: a review of the options and considerations"

Snyder, C.F., Aaronson, N. K., et al. <u>Quality</u> of Life Research, 21, 1305-1314, 2012.

- HRQOL has rarely been collected in a standardized fashion in routine clinical practice.
- Increased interest in using PROs for individual patient management.
- Research shows that use of PROs:
  - Improves patient-clinician communication
  - May improve outcomes

# Thank you



<u>drhays@ucla.edu</u> (310-794-2294) Powerpoint file available for downloading at: <u>http://gim.med.ucla.edu/FacultyPages/Hays/</u>

# Appendix: Dartmouth COOP Charts

#### DAILY ACTIVITIES

During the past 4 weeks...

How much difficulty have you had doing your usual activities or task, both inside and outside the house because of your physical and emotional health?

