

# PROMIS-29 V2.0 Physical and Mental Health Summary Scores

Ron D. Hays



*Karen L. Spritzer, Ben Schalet, Dave Cella*

October 20, 2017, 4:20-4:33pm

ISOQOL, Philadelphia, Grand ABC

Oral Session 208: Measurement in General Populations

# PROMIS-29 V 2.0

- 4 items each
  - Ability to participate in social roles and activities
  - Anxiety
  - Depressive symptoms
  - Fatigue
  - Pain interference
  - Physical functioning
  - Sleep disturbance
- Pain intensity (0–10 numeric rating item)

# Preference-Based Scores Estimated from PROMIS-29

- Indirect (mapping to):
  - EQ-5D-3L
    - Revicki et al., 2009, *Qual Life Res*
    - Thompson et al., 2017 epub, *Pharmacoeconomics*
  - HUI-3 (Hays et al., 2016, *Qual Life Res*)
- Preference scoring functions
  - Craig et al. (2014, *Value in Health*)
  - Hanmer et al. (2015, *Health Qual Life Outcomes*)

# Sample 1: Op4G Panel

- $n = 3,000$
- 51% female
- 60% non-Hispanic White, 17% Hispanic, 14% Black, 9% Asian, 1% other
- Mean age = 46 (range: 18-88 years old)
- 14% less than high school, 31% high school graduates, 28% some college, 47% college degree
- 57% married or living with a partner

# Sample 2: Toluna/Greenfield panel

- $n = 2,000$
- 50% female
- 81% non-Hispanic White, 6% Hispanic, 7% Black, 4% Asian, 2% other
- Mean age = 52 (range: 18-93 years old)
- 3% less than high school, 25% high school graduates, 42% some college, 30% college degree
- 56% married or living with a partner

# Analysis Plan

- Coefficient alpha for 7 multi-item scales
- Factor analyses (exploratory and confirmatory)
- Reliability of weighted composites
  - Mosier's formula
- Correlations among PROMIS-29 “scales”
- Associations of PROMIS-29 Summary Scores with number of chronic conditions and:
  - EQ-5D-3L, HUI-3, PROMIS Global Physical and Mental
  - SF-36v2 PCS and MCS, SF-6D

# Internal Consistency Reliability

Measure	Sample 1	Sample 2
Physical Functioning	0.91	0.93
Fatigue	0.91	0.95
Pain Interference	0.94	0.86
Depressive Symptoms	0.93	0.95
Anxiety	0.90	0.91
Ability to Participate in Social Roles and Activities	0.93	0.96
Sleep Disturbance	0.77	0.88

# Standardized CFA Loadings for Two Factors (Sample 1)

Item	Physical	Mental
Physical function	0.952	
Pain	-0.416	-.456
Social	0.377	0.556
Fatigue	-.046	-.820
Emotional distress		-.795
Sleep disturbance		-.620

Pain (average of pain intensity item and pain interference scale).

Emotional distress (average of anxiety and depressive symptoms).

Estimated correlation between physical and mental health factors was 0.69

Physical Health reliability = 0.94 and 0.95

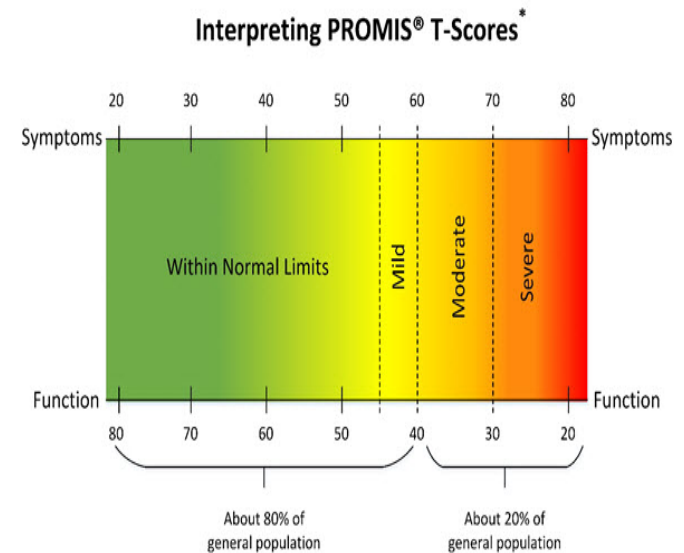
Mental Health reliability = 0.97 and 0.98

(Samples 1 and 2, respectively).



# PROMIS Physical and Mental Health T-scores

- $z\text{-scores} = (T\text{-score} - 50)/10$
- Summary health T-scores =  $10 * (\text{Sum of } z\text{-scores} * \text{scoring coefficients}) + 50$
- Higher score is better health



\*These are general guidelines to aid in interpreting PROMIS® T-scores. Within a given condition or PROMIS domain, thresholds may differ.

## Descriptive Statistics for PROMIS-29 Physical and Mental Health Summary Scores in Sample 1

Variable	Mean	SD	Minimum	Maximum
PROMIS-29 Physical	46.32	9.23	21.60	62.45
PROMIS-29 Mental	45.66	9.49	19.53	62.34
PROMIS Global Physical	44.84	9.40	16.04	67.69
PROMIS Global Mental	46.55	9.70	21.13	67.64

Note: First two rows are summary scores for PROMIS-29; last two rows are PROMIS global health scale scores.

## Descriptive Statistics for PROMIS-29 Physical and Mental Health Summary Scores in Sample 2

Variable	Mean	SD	Minimum	Maximum
PROMIS-29 Physical	48.63	8.95	22.27	61.92
PROMIS-29 Mental	50.20	9.16	20.44	62.24
SF-36v2 PCS	46.12	11.24	8.27	69.38
SF-36v2 MCS	47.68	12.34	-3.59	71.70

Note: First two rows are summary scores for PROMIS-29; last two rows are SF-36 physical component summary (PCS) and mental component summary (MCS) scores.

## Product-Moment Correlations Among PROMIS-29 “Scales”

	Physical Function	Pain	Social	Fatigue	Emotional Distress	Sleep Disturbance
Physical Function	1.0	-.70	0.73	-.59	-.53	<u>-.40</u>
Pain	-.66	1.0	-.69	0.64	0.59	0.49
Social	0.62	-.55	1.0	-.71	-.66	-.47
Fatigue	-.55	0.60	-.61	1.0	0.67	0.54
Emotional Distress	<u>-.34</u>	0.47	-.49	0.63	1.0	0.49
Sleep Disturbance	-.35	0.48	-.52	0.62	0.54	1.0

Note: Sample 1 above and Sample 2 below the diagonal.

# Correlations of Physical and Mental Health Summary Scores with Other Variables (Sample 1)

	PROMIS-29 Physical Health Summary Score	PROMIS-29 Mental Health Summary Score
EQ-5D-3L (predicted from PROMIS global health items)	<u>0.82</u>	0.73
HUI-3	<u>0.73</u>	0.67
PROMIS Global Physical	<u>0.80</u>	0.66
PROMIS Global Mental	0.58	<u>0.64</u>
Number of Chronic Conditions	<u>-.50</u>	-.45

Hypertension, angina, coronary artery disease, heart failure, heart attack, stroke, liver disease, kidney disease, arthritis, migraines, asthma, chronic lung disease, diabetes, cancer, depression, anxiety, alcohol or drug problem, sleep disorder, HIV/AIDS, spinal cord injury, and multiple sclerosis.

# Correlations of Physical and Mental Health Summary Scores with Other Variables (Sample 2)

	PROMIS-29 Physical Health Summary Score	PROMIS-29 Mental Health Summary Score
SF-36 Physical Component Score	<u>0.82</u>	0.38
SF-36 Mental Component Score	0.54	<u>0.82</u>
SF-6D	<u>0.81</u>	0.74
Number of Chronic Conditions	<u>-.53</u>	-.42

SF-6D Mean = 0.71, SD = 0.14; Brazier, J., Rowen, D., & Hanmer, J. (2008). Revised SF-6D scoring programmes: A summary of improvements. Patient Reported Outcomes Newsletter, 48, 16–17. Fall.

Hypertension, angina, coronary artery disease, heart failure, heart attack, stroke, liver disease, kidney disease, arthritis, migraines, asthma, chronic lung disease, diabetes, cancer, depression, anxiety, alcohol or drug problem, sleep disorder, HIV/AIDS, and multiple sclerosis.

# Largest Associations with Chronic Conditions (Sample 1)

- PROMIS-29 Physical Health Means
  - Multiple Sclerosis ( $x = 36$  vs. 46)
  - Arthritis or Rheumatism ( $x = 41$  vs. 47)
  - Angina ( $x = 39$  vs. 47)
  - Heart Failure or CHF ( $x = 38$  vs. 46)
- PROMIS-29 Mental Health Means
  - Depression ( $x = 41$  vs 49)
  - Anxiety, sleep disorder, angina ( $x = 41$  vs 48)

# Conclusions

- These studies provide support for the reliability and validity of the PROMIS-29 Physical and Mental Health Summary scores.
- Further work is needed to evaluate these summary scores in other samples.
- Alternative scoring approaches such as higher-order factor models should be explored.



Funding for HealthMeasures was provided by the National Institutes of Health grant U2C CA186878.





# PROMIS-29 Profile v2.0

Please respond to each question or statement by marking one box per row.

<b>Physical Function</b>		Without any difficulty	With a little difficulty	With some difficulty	With much difficulty	Unable to do
1	Are you able to do chores such as vacuuming or yard work? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Are you able to go up and down stairs at a normal pace? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Are you able to go for a walk of at least 15 minutes? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Are you able to run errands and shop? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Anxiety</b> In the past 7 days...		Never	Rarely	Sometimes	Often	Always
5	I felt fearful .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	I found it hard to focus on anything other than my anxiety .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	My worries overwhelmed me .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I felt uneasy .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Depression</b> In the past 7 days...		Never	Rarely	Sometimes	Often	Always
9	I felt worthless .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	I felt hopeless .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	I felt depressed .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	I felt lonely .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Fatigue</b> During the past 7 days...		Not at all	A little bit	Somewhat	Quite a bit	Very much
13	I feel fatigued .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	I have trouble starting things because I am tired .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# PROMIS-29 Profile v2.0

## Fatigue:

In the past 7 days....

	Not at all	A little bit	Somewhat	Quite a bit	Very much
1 How run-down did you feel on average? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 How fatigued were you on average? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Sleep Disturbance:

In the past 7 days....

	Very poor	Poor	Fair	Good	Very good
3 My sleep quality was: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In the past 7 days...

	Not at all	A little bit	Somewhat	Quite a bit	Very much
4 My sleep was refreshing: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 I had a problem with my sleep: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 I had difficulty falling asleep: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Ability as Participant in Social Roles and Activities

	Never	Hardly	Sometimes	Usually	Always
7 I have trouble doing all of my regular leisure activities with others: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 I have trouble doing all of the family activities that I want to do: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 I have trouble doing all of my usual work (include work at home): .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 I have trouble doing all of the activities with friends that I want to do: .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Pain Interference:

In the past 7 days....

	Not at all	A little bit	Somewhat	Quite a bit	Very much
11 How much did pain interfere with your day-to-day activities? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 How much did pain interfere with work around the home? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 How much did pain interfere with your ability to participate in social activities? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 How much did pain interfere with your household chores? .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PROMIS-29 Profile v2.0

Pain Intensity:

In the past 7 days...

How would you rate your pain on average?.....

☐ 0  
No  
pain

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10  
Worst  
imaginable  
pain