WHOLE IN ONE HEALTH

Self-Rated^

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https://labs.dgsom.ucla.edu/hays/pages/presentations

# Disclosures

Ron D. Hays declares no conflicts of interest


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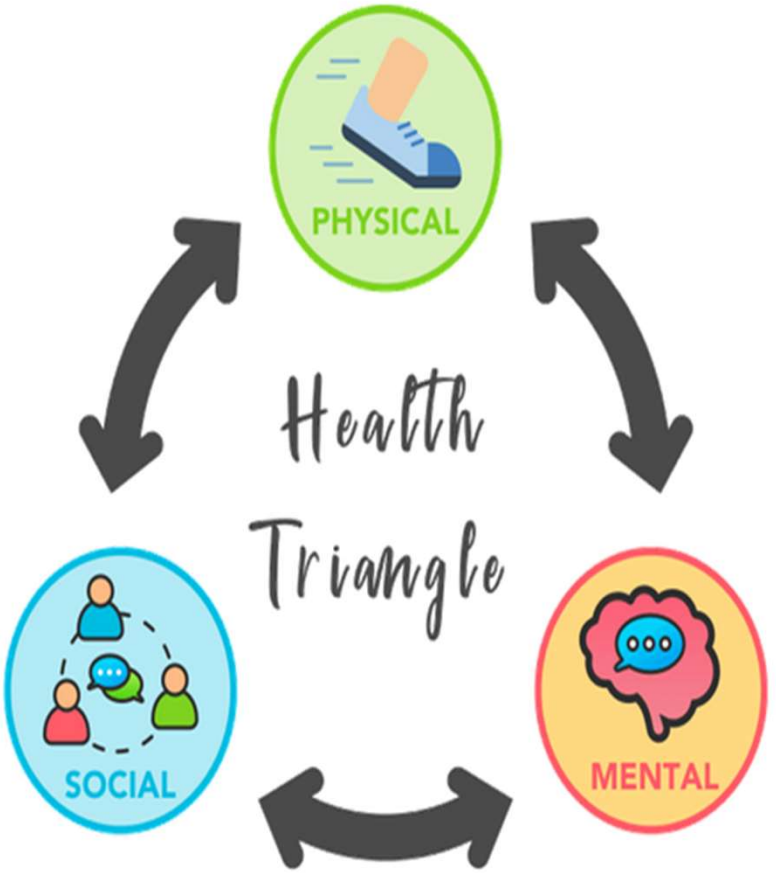
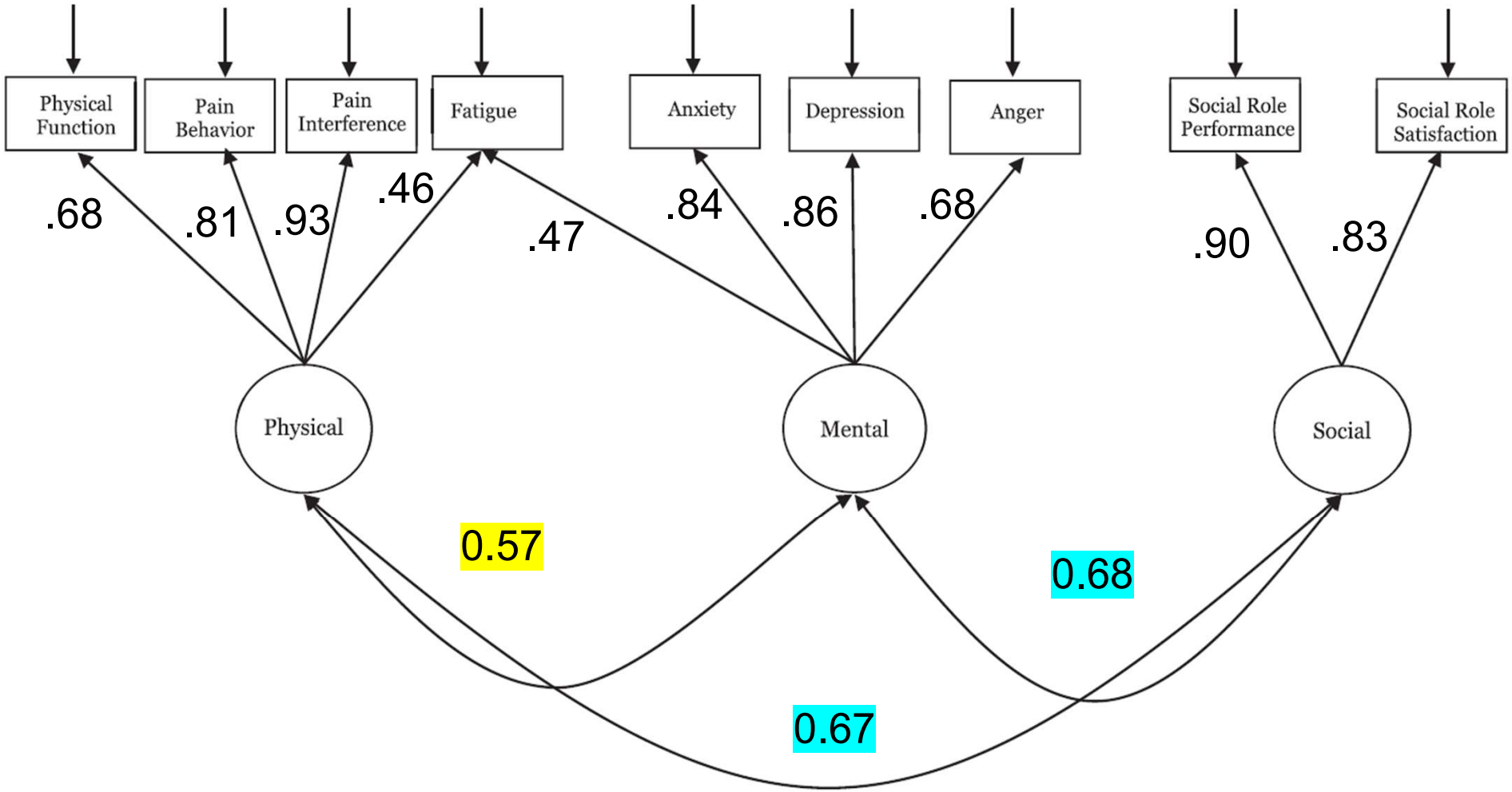
# Patient-reported Outcome Measures

- Patient reports about
  - Functioning and well-being in physical, mental, and social health domains
- Health-related quality of life



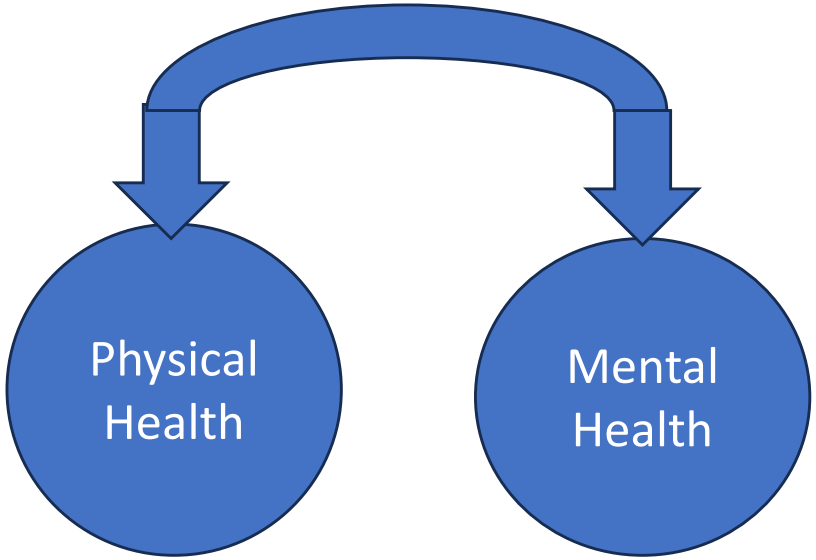
# Confirmatory Factor Analysis of Patient-Reported Outcomes Measurement Information System (PROMIS®)




Carle et al. (2015)

# Physical and Mental Health Dimensions

- Correlations of 0.60 and larger between physical and mental health factors have been consistently found.




Hays & Stewart (1990); Essink-Bot et al. (1997); Hays et al. (2018)


SF-36

- "Physical Health" scales
  - Physical function
  - Role-Physical
  - Bodily pain
  - *General health perceptions*
- "Mental Health" scales
  - Mental health (emotional well-being)
  - Role-Emotional
  - *Energy*
  - *Social function*

Even though physical and mental health are positively correlated

Summary scores for SF-36 derived from uncorrelated (orthogonal) two factor (physical and mental health) solution, resulted in negative scoring weights.

$$
\begin{aligned}
\text{PCS-z} = {} & (\text{PF-z}^*.42) + (\text{RP-z}^*.35) + (\text{BP-z}^*.32) + \\
& (\text{GH-z}^*.25) + (\text{EN-z}^*.03) + (\text{SF-z}^*-.01) + \\
& (\text{RE-z}^*-.19) + (\text{MH-z}^*-.22) \\
\text{MCS-z} = {} & (\text{PF-z}^*-.23) + (\text{RP-z}^*-.12) + (\text{BP-z}^*-.10) + \\
& (\text{GH-z}^*-.12) + (\text{EN-z}^*.24) + (\text{SF-z}^*.27) + \\
& (\text{RE-z}^*.43) + (\text{MH-z}^*.48)
\end{aligned}
$$

PF = physical function; RP = role limitations-physical, BP = bodily pain, GH = general health perceptions, EN = energy, SF = social function; RE = role limitations-emotional, MH = mental health

Ware, Kosinski, & Keller (1994)

# 536 Primary Care Patients Initiating Antidepressant Treatment

- 3-month improvements in "Physical Health" measures
  - Physical functioning, role—physical, pain, general health perceptions)

  of 0.28 to 0.49 SDs.

- SF-36 Physical Component Summary Score (PCS) did not improve because worse scores for "Mental Health" measures
  - Mental health, role—emotional, energy, social function.

*Simon et al. (1998)*

# 194 adults with Multiple Sclerosis

- Lower scores than the general population on "Mental health" measures:
  - Mental health (↓ 0.3 SD, small effect size)
  - Role—emotional (↓ 0.7 SD, medium effect size)
  - Energy (↓1.0 SD, large effect size)
  - Social functioning (↓1.0 SD, large effect size)

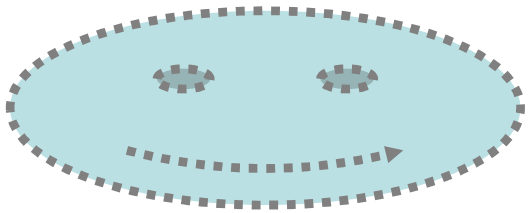
- SF-36 Mental Component Summary Score (MCS) was only 0.2 SD lower because scores were even worse for "Physical health" measures
  - physical functioning, role—physical, pain, general health perceptions.

Nortvedt et al. (2000)

# Farivar et al.(2007) weights (Correlated Factor Model)

PCS_z = (PF_z * .20) + (RP_z * .31) + (BP_z * .23) +
(GH_z * .20) + (EF_z * .13) + (SF_z * .11) +
(RE_z * .03) + (EW_z * -.03)

MCS_z = (PF_z * -.02) + (RP_z * .03) + (BP_z * .04) +
(GH_z * .10) + (EF_z * .29) + (SF_z * .14) +
(RE_z * .20) + (EW_z * .35)



OPEN

# Measuring What Matters Most

## *Considering the Well-Being of the Whole Person in Health Care*

*Barbara G. Bokhour, PhD,*† Dawne Vogt, PhD,‡§ and Benjamin Kligler, MD, MPH‖¶*

Med Care, December 2024 vol. 62 (12) Supplement

# Whole Person Health Definitions

- Moving from what's the matter with you to what matters to you and embracing the notion that **engaging with the whole person**, not just the physical body but the **emotional, mental, and spiritual aspects** is critical to healing.
  - Veteran's Health Administration

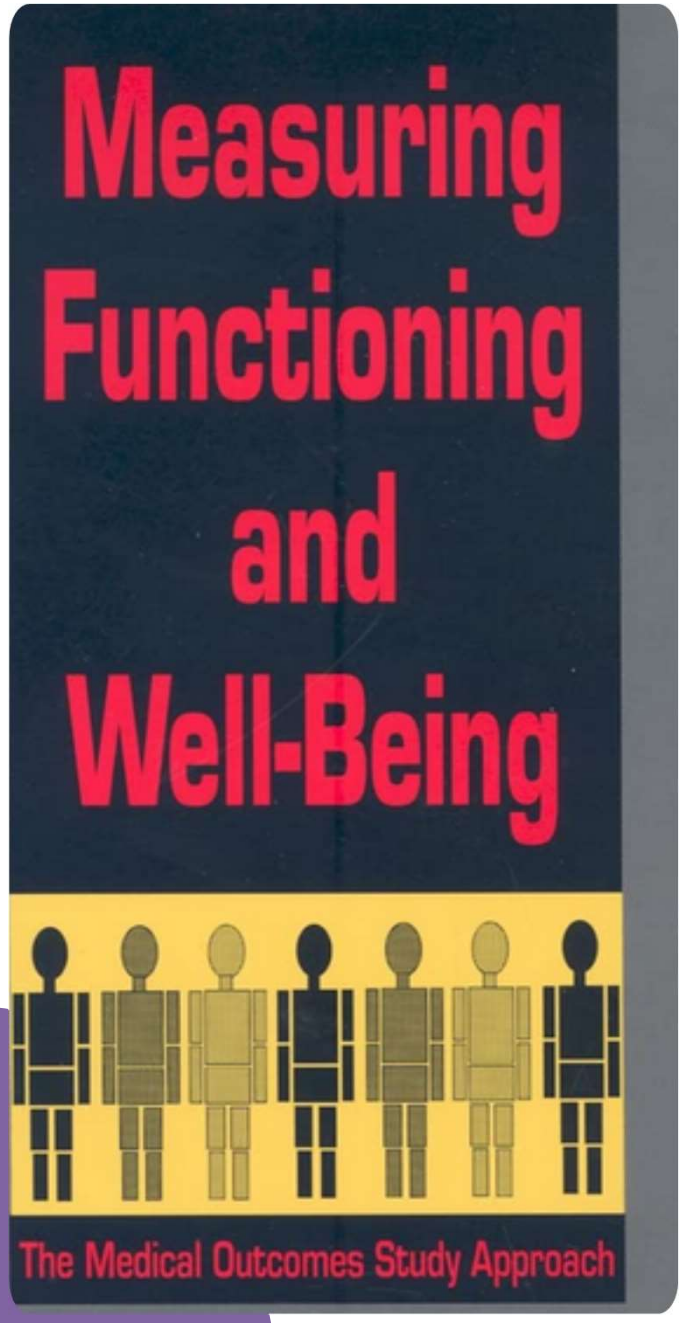
# Whole Person Health Definitions

- supporting the health and well-being of each person across multiple domains—**biological, behavioral, social, and environmental**.
  - National Center for Complementary and Integrative Health (NCCIH)

# Whole Person Health Definitions

- Whole health is **physical, behavioral, spiritual, and socioeconomic wellbeing** as defined by individuals, families, and communities.
  - National Academies' Committee on Transforming Health Care

1992




# Self-Rated Health = Functioning and Well-Being


- Wells, K. B., Stewart, A. L., Hays, R. D., Burnam, M. A., Rogers, W., Daniels, M., Berry, S., Greenfield, S., & Ware, J. E. (1989). The functioning and well-being of depressed patients: Results from the Medical Outcomes Study. Journal of the American Medical Association, 262, 914-919
- Stewart, A. L., Greenfield, S., Hays, R. D., Wells, K., Rogers, W. H., Berry, S. D., McGlynn, E. A. & Ware, J. E. (1989). Functional status and well-being of patients with chronic conditions: Results from the Medical Outcomes Study. Journal of the American Medical Association, 262, 907-913
- Stewart, A. L., Sherbourne, C. D., Wells, K. B., Burnam, M. A., Rogers, W. H., Hays, R. D., & Ware, J. E. (1993). Do depressed patients in different treatment settings have different levels of well-being and functioning? Journal of Consulting and Clinical Psychology, 61, 849-857.
- Stewart, A. L., Hays, R. D., Wells, K. B., Rogers, W. H., Spritzer, K. L., & Greenfield, S. (1994). Long-term functioning and well-being outcomes associated with physical activity and exercise in patients with chronic conditions in the Medical Outcomes Study. Journal of Clinical Epidemiology, 47, 719-730.
- Hays, R. D., Wells, K.B., Sherbourne, C. B., Rogers, W. H., & Spritzer, K. (1995). Functioning and well-being outcomes of patients with depression compared to chronic general medical illness. Archives of General Psychiatry, 52, 11-19.

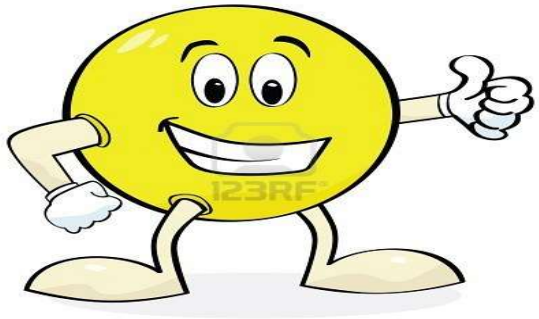
International Society for Quality-of-Life Studies

"exploring wellbeing and happiness"

- Hedonic or Experienced
  - Emotional states or mood over a short time.
  - "Did you experience anger during a lot of the day yesterday?"

- Eudemonic
  - Perceived purpose and fulfillment
    - "Is your life worthwhile?"

- Evaluative
  - Overall appraisal of one's life
  - "How satisfied are you with your life?"
  - "How would you rate your quality of life



L.D. Bjørndal, R.B. Nes, N. Czajkowski, E. Røysamb. The structure of well-being: a single underlying factor with genetic and environmental influences. Qual Life Res 32, 2805-2816.



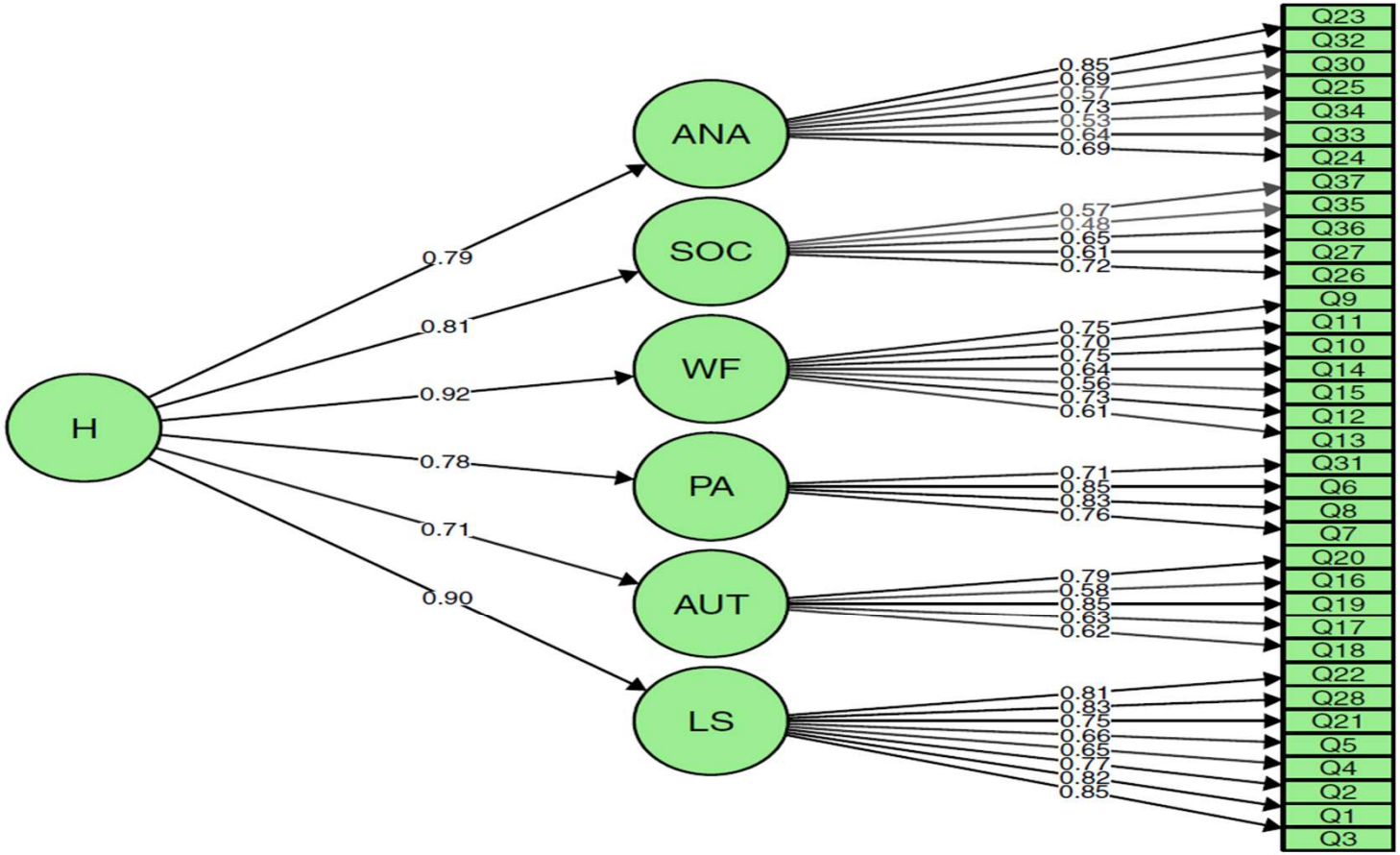
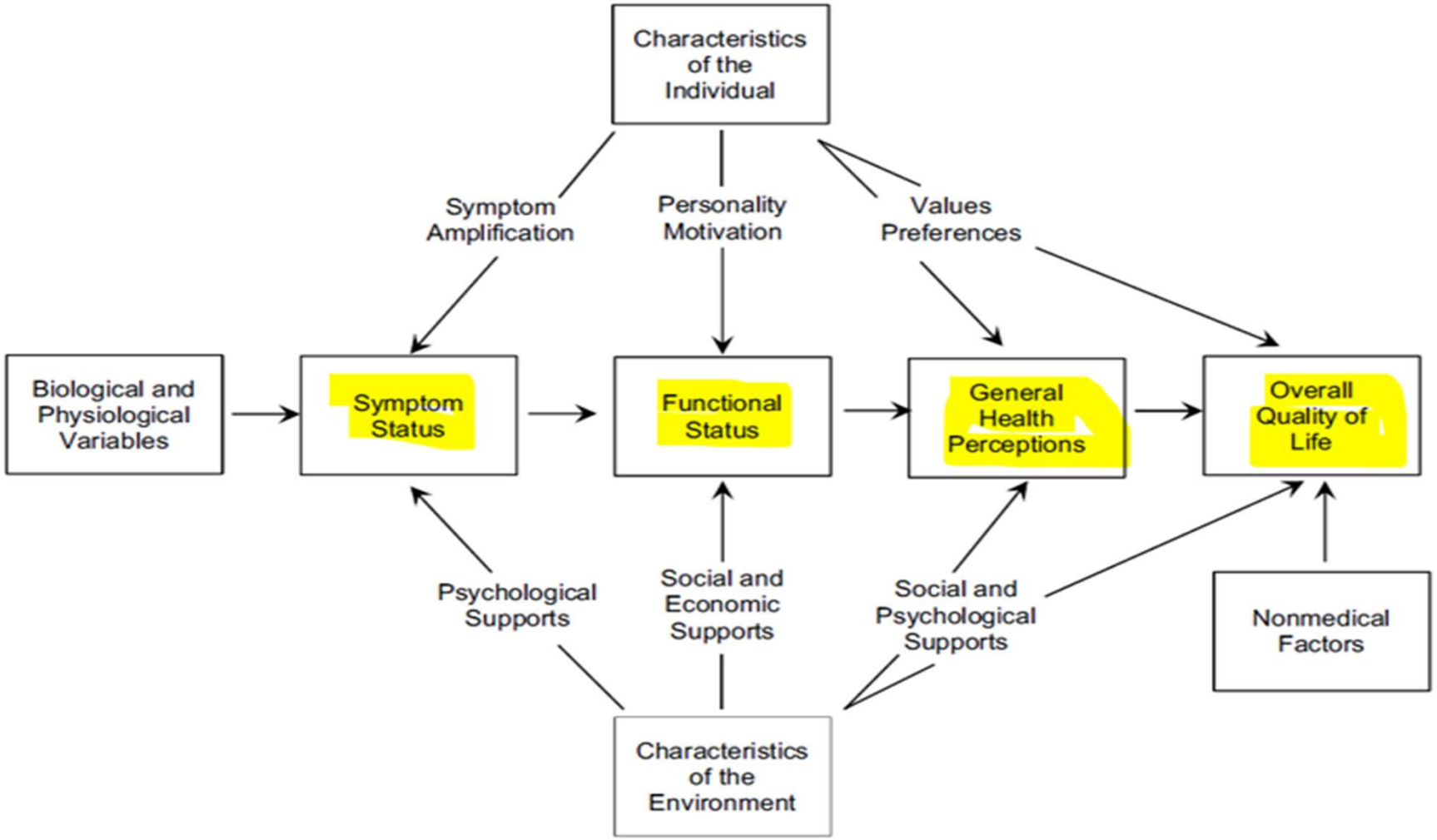
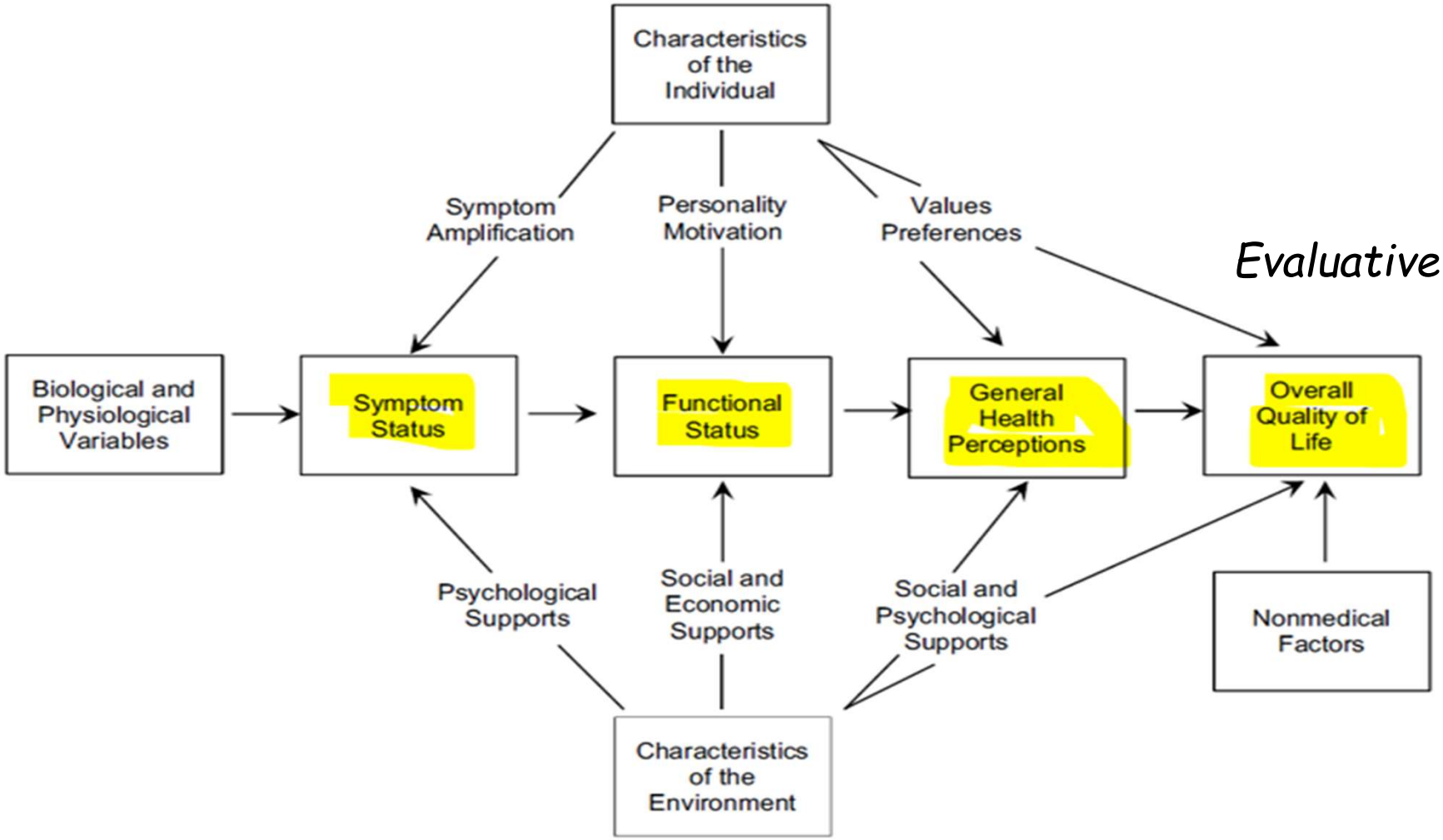



**Fig. 1** CFA Results of Model with Six First-Order Factors and One Higher-Order Factor. *ANA* absence of negative affect; *SOC* social; *WF* well-functioning; *PA* positive activation; *AUT* autonomy; and *LS* life satisfaction. The plot depicts the standardised factor loadings. The CFA was conducted in the QoL 2019 sample

# Wilson and Cleary (1995)



# Wilson and Cleary (1995)




*Evaluative well-being*

# Spiro and Bossé (2000)

"For decades, social scientists have observed significant relations between self-reported health status and subjective wellbeing….well-being and health-related quality of life overlap (p. 299).

Relations between health-related quality of life and well-being: The gerontologist's new clothes? *International Journal of Aging and Human Development*, 50, 297-318.

# Vickrey et al. (1995) Multiple Sclerosis Quality of Life Measure

**Table 2.** PROMAX rotated two-factor solution for MSQOL-54 scales and weights for composite scores[a]

| Scale | Standardized regression coefficients | |
|---|---|---|
| | Physical health factor | Mental health factor |
| Physical function | 0.71 | −0.10 |
| Health perceptions | 0.69 | −0.10 |
| Energy/fatigue | 0.49 | 0.24 |
| Role limitations — physical | 0.48 | 0.25 |
| Pain | 0.47 | 0.11 |
| Sexual function | 0.35 | 0.21 |
| Social function | 0.50 | 0.32 |
| Health distress | 0.48 | 0.41 |
| Overall quality of life | 0.31 | 0.51 |
| Emotional well-being | −0.08 | 0.82 |
| Role limitations — emotional | −0.09 | 0.70 |
| Cognitive function | 0.18 | 0.42 |

[a] Inter-factor correlation = 0.66.

# **Overall Rating of Quality of Life** Regressed on PROMIS global health and EQ-5D-3L items in PROMIS Sample 1 (Adjusted $R^2$ = 0.69)

| | Standardized Beta | t-statistic | p-value | Zero order correlation* |
|---|---|---|---|---|
| Satisfaction with social activities and relationships | 0.27 | 36.34 | <0.0001 | 0.68 |
| Physical health | 0.20 | 16.98 | <0.0001 | **0.70** |
| General health | 0.18 | 15.07 | <0.0001 | 0.69 |
| Mental health | 0.17 | 20.34 | <0.0001 | 0.64 |
| Perform social activities and roles | 0.12 | 14.50 | <0.0001 | 0.67 |
| Usual activities (EQ-5D-3L) | 0.04 | 5.36 | <0.0001 | 0.50 |
| Physical functioning | 0.03 | 3.19 | 0.0014 | 0.50 |
| Pain | 0.02 | 2.69 | 0.0072 | 0.44 |
| Self-care (EQ-5D-3L) | 0.01 | 2.67 | 0.0077 | **0.29** |
| Emotional problems | 0.01 | 0.90 | 0.3701 | 0.48 |
| Mobility (EQ-5D-3L) | 0.01 | 0.84 | 0.6807 | 0.40 |
| Pain/discomfort (EQ-5D-3L) | 0.00 | 0.48 | 0.6298 | 0.42 |
| Anxiety/depression (EQ-5D-3L) | 0.00 | 0.19 | 0.8507 | 0.46 |
| Fatigue | -0.01 | -1.76 | 0.0789 | 0.50 |

Palimaru & Hays (2017)

## **Overall Rating of Quality of Life** regressed on PROMIS global health items and HUI3 utility score in PROMIS Sample 2 (Adjusted $R^2 = 0.75$)

| | Standardized Beta | t-statistic | p-value | Zero order correlation* |
|---|---|---|---|---|
| Physical health | 0.39 | 22.04 | <.0001 | **0.82** |
| General health | 0.27 | 16.45 | <.0001 | 0.79 |
| Mental health | 0.11 | 7.94 | <.0001 | 0.66 |
| Satisfaction with social activities and relationships | 0.09 | 6.01 | <.0001 | 0.64 |
| Perform social activities and roles | 0.06 | 4.37 | <.0001 | 0.62 |
| Physical functioning | 0.03 | 2.58 | 0.0101 | 0.56 |
| HUI-3 | 0.03 | 2.19 | 0.0287 | 0.48 |
| Pain | 0.01 | 0.64 | 0.5235 | **0.36** |
| Fatigue | 0.01 | 0.93 | 0.3504 | 0.48 |
| Emotional problems | 0.00 | -0.33 | 0.7437 | 0.39 |

* *All p's < 0.0001*

# Self-reported Health Scoring Options

**Multiple Scores (Profile)**

**Physical and Mental Health Summary Scores**

**Single Score**

- Preference-based score
  - (0 = dead, 1 = “perfect health”
  - HUI-3, EQ-5D-5L,SF-6D, PROPr
- SF-36 total score (Lins & Carvalho, 2016)

# Single summary self-reported health score

- **CDC Behavioral Risk Factor Surveillance System items**
  - Would you say that in general your health is excellent, very good, good, fair, or poor?
  - During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

  - Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?
  - Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

Yin, S., Njai, R., Barker, L., Siegel, P. Z., & Liao, Y. (2016)

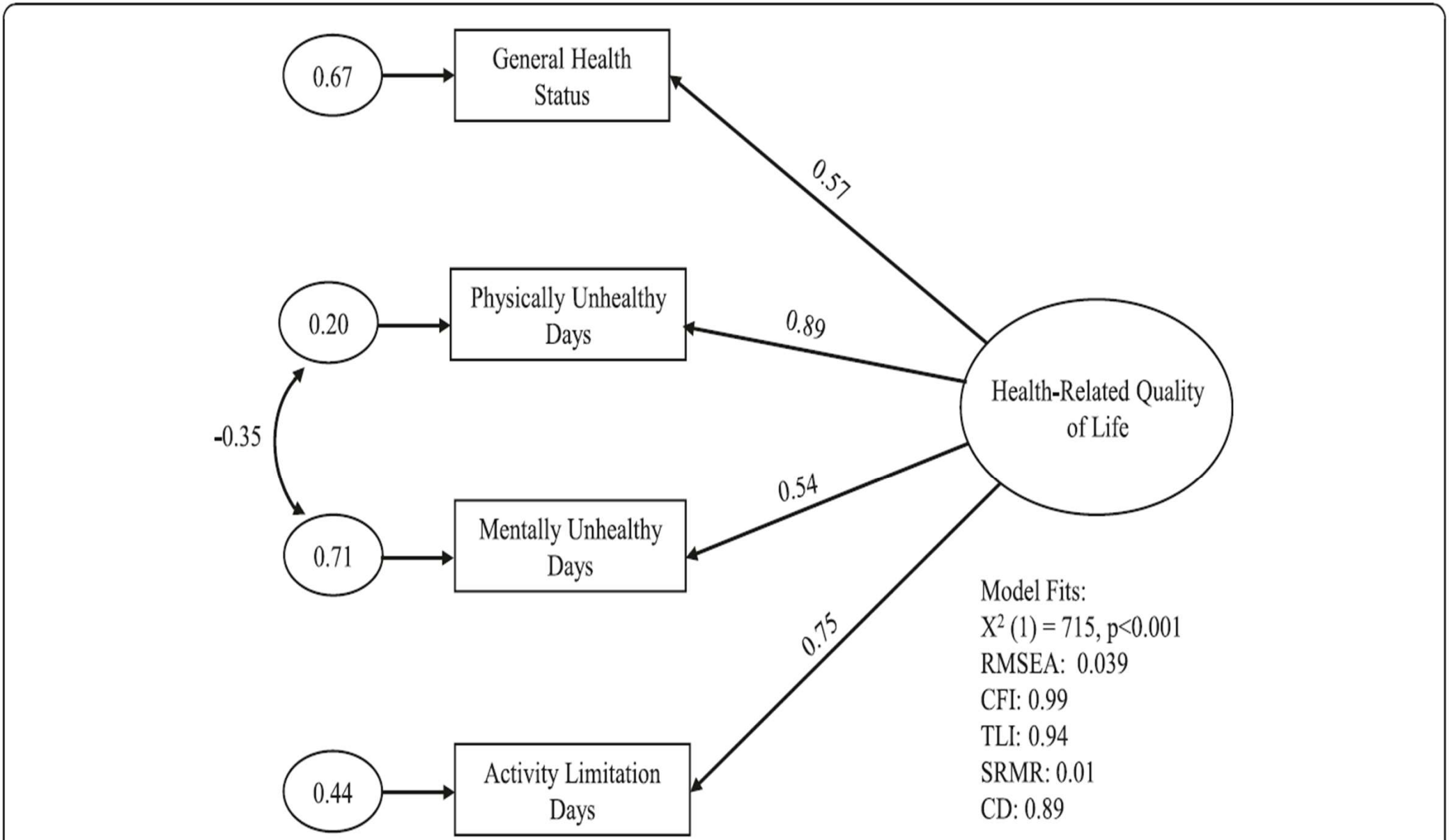



**Fig. 1** Final one-factor model for the CDC HRQOL-4, BRFSS 2013. Standardized factor loadings from the latent construct (represented by the large oval) to its measures (represented by rectangles) are shown beside the single-headed arrows. The small ovals represent error variances unexplained by the model. The curved double-headed arrow represents correlations between error variances

# Measures (50 items)

- **PROMIS®-29+2**
  - Physical function (4 items)
  - Pain interference (4 items)
  - Pain intensity (1 item)
  - Fatigue (4 items)
  - Depressive symptoms (4 items)
  - Anxiety (4 items)
  - Sleep disturbance (4 items)
  - Ability to participate in social roles and activities (4 items)
  - Cognitive function (2 items)
- **PROMIS social isolation** (4 items)
- **Personal well-being index** (10 items)
- **EQ-5D-5L** (5 items)

Hays, Rodriguez et al (2024)

# Personal Well-Being Index

How satisfied are you with:

1) Your standard of living?

2) Your health?

3) What you are achieving in life?

4) Your personal relationships?

5) How safe you feel?

6) Feeling part of your community?

7) Your future security?

8) Your spirituality or religion?

9) Overall, how satisfied are you with your life as a whole these days?"

0= Not satisfied at all, 10 = Completely satisfied

10) Overall, to what extent do you feel the things you do in your life are worthwhile?"

0 = Not at all worthwhile, 10 = Completely worthwhile

International Wellbeing Group. (2013). *Personal wellbeing index* (5th ed.). Australian Centre on Quality of Life, Deakin University.

# EQ-5D-5L ($5^5$= 3,125 states, -0.573 to 1.00)

- Mobility
- Self-care
- Usual activities
- Pain/discomfort
- Anxiety/depression

e.g., No problems; slight problems; moderate problems; severe problems; unable

# KnowledgePanel® Sample (1256 adults with back pain)

| Variable | Sample % | General Population |
|---|---|---|
| **Female** | 52 | 51 |
| **Age** | | |
| 18-29 | 10 | 20 |
| 30-44 | 20 | 26 |
| 45-59 | 23 | 24 |
| 60-94 | 47 | 30 |
| **Education** | | |
| Did not graduate high school | 7 | 10 |
| High school degree or general education diploma (GED) | 28 | 29 |
| Some college or AA degree | 29 | 26 |
| Bachelor's degree or higher | 36 | 35 |
| **Race/ethnicity** | | |
| Non-Hispanic White | 74 | 62 |
| Hispanic | 10 | 17 |
| Non-Hispanic Black | 8 | 12 |
| Other | 8 | 9 |
| **Marital status*** | | |
| Married or living with a spouse | 65 | 51 |
| Never married | 16 | 34 |
| Divorced | 11 | 10 |
| Widowed | 6 | 6 |
| Separated | 2 | ? |
| **Working full time** | 36 | 71 |

General population estimated from March 2022 Supplement to the Current Population Survey except for marital status.

## Mean, Standard Deviation, and Reliability of the Measures

| Scale | Mean | Standard Deviation | Reliability |
|---|---|---|---|
| Physical function | 46 | 9 | 0.94 |
| Pain interference | 54 | 9 | 0.96 |
| Pain intensity item | 56 | 10 | 0.68* |
| Fatigue | 52 | 10 | 0.94 |
| Sleep disturbance | 52 | 9 | 0.88 |
| Ability to participate in social roles and activities | 52 | 9 | 0.95 |
| Social isolation | 49 | 11 | 0.93 |
| Anxiety | 51 | 10 | 0.91 |
| Depressive symptoms | 50 | 10 | 0.94 |
| Cognitive function | 51 | 8 | 0.82 |
| Personal well-being/Life satisfaction | 6.8 | 2.2 | 0.94 |
| EQ-5D-5L | 0.77 | 0.23 | 0.77* |

Note: All measures except for personal well-being and the EQ-5D-5L are reported on a T-score metric (mean = 50 in the U.S. general population). The possible range of the personal well-being score was 0 to 10. The mean EQ-5D-5L in the U.S. for an online sample (Jiang et al., 2021) was 0.80 (SD = 0.24).
Internal consistency reliability is reported for the 10 multi-item scales and 6-month test-retest reliability (stability) is reported for the EQ-5D-5L and the pain intensity item (indicated with * above

7-item PWB index mean = 67 in the sample vs. 75 in the Australian gen. population.

# Impact Stratification Score (ISS)

- ISS Parts
  - PROMIS-29 physical function (4 items, 1-5)
  - PROMIS-29 pain interference (4 items, 1-5)
  - PROMIS-29 pain intensity (1 item, 0-10)
- ISS Score
  - Higher is worse
  - Possible range: 8-50
    - Mild: 8-27
    - Moderate: 28-34
    - Severe: 35-50

Deyo, R. A., Dworkin, S. F., et al. (2014). Report of The NIH Task Force on research standards for chronic low back pain. Spine, 39(14), 1128-1143.

**Standardized Confirmatory Factor Loading Matrix for PROMIS-29+2, EQ-5D-5L, Personal Well-being, and Social Isolation Measures from the Bifactor Model (Estimates from Model Excluding EQ-5D-5L shown within parentheses)**

| Scale | General Health | Physical Health | Mental Health |
|---|---|---|---|
| Fatigue | -.81 (-.81) | | |
| Ability to participate in social roles and activities | 0.78 (0.78) | | |
| Depression | -.77 (-.77) | | -.38 (-.35) |
| Personal well-being | 0.75 (0.75) | | 0.30 (0.31) |
| Anxiety | -.72 (-.71) | | -.28 (-.25) |
| Social isolation | -.69 (-.68) | | -.44 (-.48) |
| Sleep disturbance | -.69 (-.69) | | |
| EQ-5D-5L | 0.68 | | |
| Cognitive function | 0.63 (0.63) | | |
| Pain interference | -.62 (-.62) | -.70 (-.70) | |
| Pain intensity | -.52 (0.52) | -.57 (-.57) | |
| Physical function | 0.52 (0.52) | 0.55 (0.56) | |

Blank cells indicate that the loading was not estimated.

# ISS and 6 Other Pain Impact Measures

Standardized factor loadings on pain latent variable

- 0.782 (RMDQ) to 0.870 (ISS)

Graded Chronic Pain Scale (GCPS) disability score.

Oswestry Disability Index (ODI)

PEG (Pain intensity, interference with Enjoyment of life, interference with General activity)

Roland-Morris Disability Questionnaire (RMDQ)

Short form of the Orebro Musculoskeletal Pain Questionnaire (OMPQ)

Subgroups for Targeted Treatment (STarT) Back Tool

Hays, Herman et al. (2024)

# Whole-Person Health Index for 2025 NHIS

- Would you say your health in general is excellent, very good, good, fair, or poor?
- How would you rate your quality of life, focusing on what matters most to you?
- How would you rate your social and family connections?
- In general, how healthy is your overall diet?
- How would you rate your physical activity, **compared with people in your age group**?
- How would you rate your ability to manage stress?
- How would you rate your sleep?
- How would you rate your **ability to find meaning and purpose in your daily life**?
- How would you rate your **ability to manage your health, focusing on aspects of your health that matter most to you**?

*Answer categories: Excellent, very good, good, fair, and poor*

# Measurement of Whole Person Health

- Separate the "means" from the "ends"
  - Use **whole person health (WPH)** to represent the **end** goal or outcome—i.e., the thing (concept, construct) we want to improve and/or maintain: the whole person's health.
  - Use **whole person health determinants (WPHD)** to represent what can be intervened upon to maximize WPH—i.e., the **means**.
    - Includes physical and mental health diagnoses and social determinants of health

Herman, P. M., Rodriquez, A., et al. (2024).

# 2025 NHIS Whole-Person Index

Would you say your health in general is excellent, very good, good, fair, or poor?
How would you rate your quality of life, focusing on what matters most to you?
How would you rate your social and family connections?
How would you rate your sleep?
How would you rate your ability to find meaning and purpose in your daily life?

# 2025 NHIS Whole-Person Index

Would you say your health in general is excellent, very good, good, fair, or poor?
How would you rate your quality of life, focusing on what matters most to you?
How would you rate your social and family connections?
How would you rate your sleep?
How would you rate your ability to find meaning and purpose in your daily life?

In general, how healthy is your overall diet?
How would you rate your physical activity, compared with people in your age group?
How would you rate your ability to manage stress?
How would you rate your ability to manage your health, focusing on aspects of your health that matter most to you?

# Stephen Blumberg, Ph.D.
# Director, Div. Health Interview Statistics

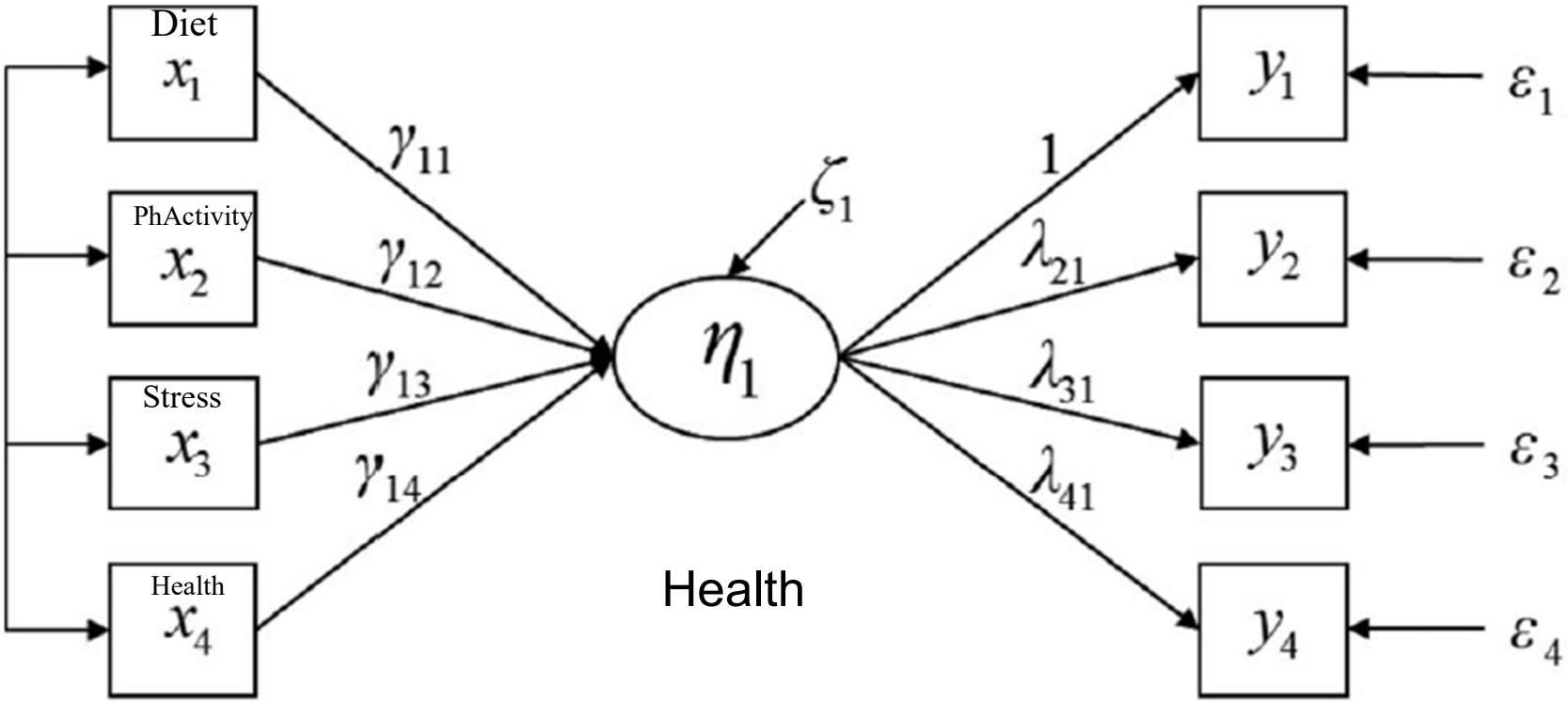
- "I don't think it is so easy to separate WPH from WPH determinants. e.g., poor health can lead to sleep disturbances, but choices about sleep schedules and duration can lead to poor health. And I am not yet convinced that an index for WPH needs to be supported by evidence of a single underlying dimension.

- CFA would hypothesize that one's underlying health drives responses to the individual items on an index…. But if we were looking at physiological organ-systems functioning, and we measured the health of the heart, the lungs, the nerves, the bones, and the kidneys separately, they would be correlated, but what would the underlying factor be?

- It would be more informative, perhaps, to know that one or more of the measures were diminished …, and to have an index score that reflects that.

- Maybe a WPH index should look at the whole of all of the components in an integrative way, not just the pieces of those components that are related to an underlying global health factor."

# Formative ("causal") versus Reflective ("effect") indicators




Bollen KA, & Diamantopoulos A. (2017). In defense of causal-formative indicators: A minority report. Psychol Methods,22(3):581-596.

# NIH Whole Person Initiative

National Center for Complementary and Integrative Health (NCCIH)

National Heart, Lung, and Blood Institute (NHLBI)

National Institute on Aging (NIA)

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

National Institute of Allergy and Infectious Diseases (NIAID)

National Institute of Biomedical Imaging and Bioengineering (NIBIB)

National Institute of Dental and Craniofacial Research (NIDCR)

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)

National Institute on Drug Abuse (NIDA)

National Institute of Environmental Health Sciences (NIEHS)

National Institute of Mental Health (NIMH)

National Institute of Nursing Research (NINR)

National Cancer Institute (NCI)

Division of Program Coordination, Planning and Strategic Initiatives

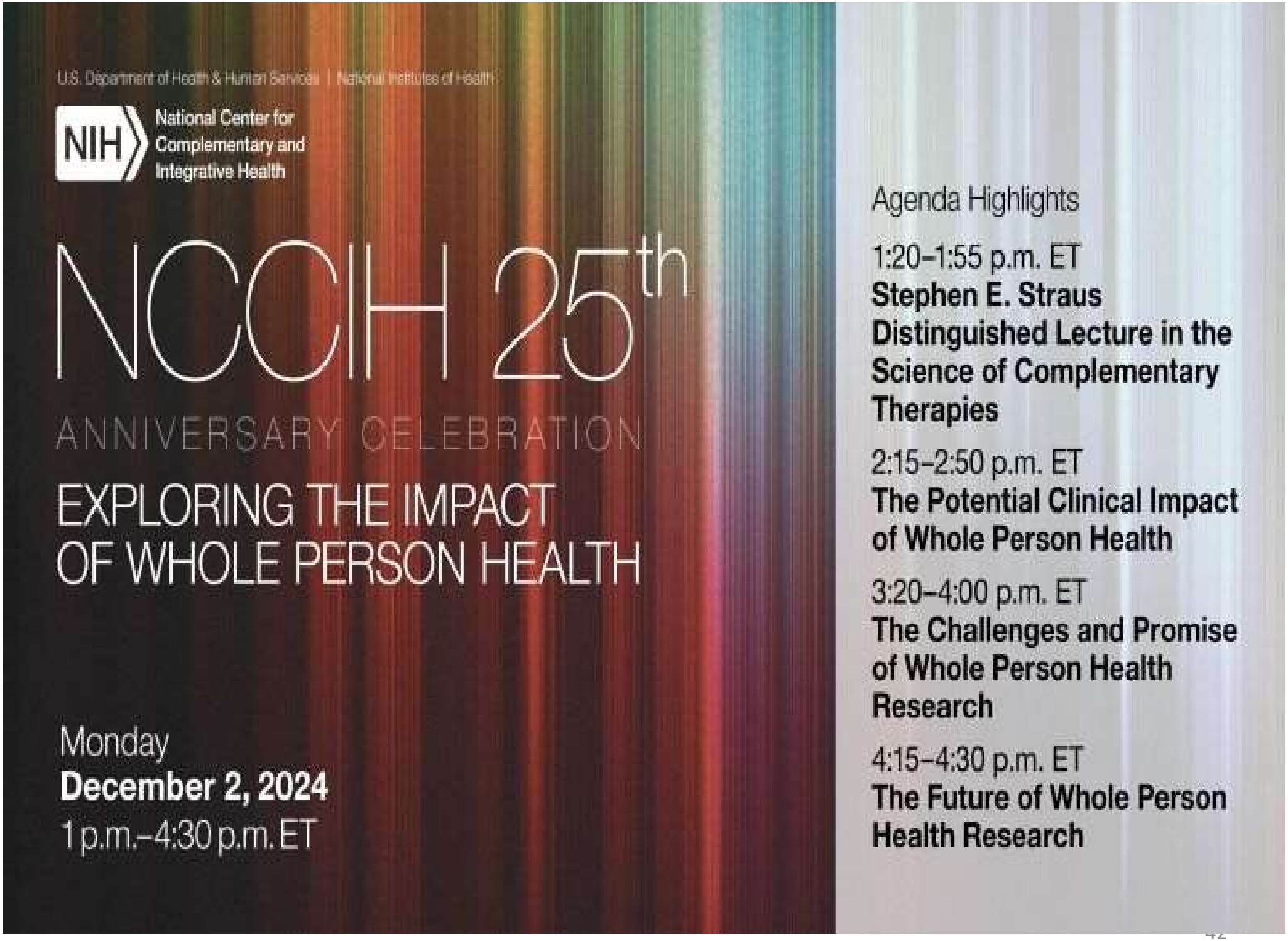
Office of Disease Prevention (ODP)

Office of Behavioral and Social Sciences Research (OBSSR)

Office of Dietary Supplements (ODS)

Office of Data Science Strategy (ODSS)

Office of Research on Women's Health (ORWH)


U.S. Department of Health & Human Services | National Institutes of Health
NIH
National Center for Complementary and Integrative Health
NCCIH 25th
ANNIVERSARY CELEBRATION
EXPLORING THE IMPACT OF WHOLE PERSON HEALTH
Monday
December 2, 2024
1 p.m.–4:30 p.m. ET
Agenda Highlights
1:20–1:55 p.m. ET
Stephen E. Straus Distinguished Lecture in the Science of Complementary Therapies
2:15–2:50 p.m. ET
The Potential Clinical Impact of Whole Person Health
3:20–4:00 p.m. ET
The Challenges and Promise of Whole Person Health Research
4:15–4:30 p.m. ET
The Future of Whole Person Health Research

# NCCIH December 2 2024 Event

As presenter of the 2024 Stephen E. Straus Distinguished Lecture in the Science of Complementary Therapies, Dr. Patricia M. Herman, senior behavioral and social scientist at RAND, will discuss the economics of whole person health and make the case for transforming health care from a disease-centric approach to a whole person model. In her talk, "The Economic Impact of Whole Person Health," Dr. Herman will explore health and health care utilization for a hypothetical patient over her life from age 40 to 80 years under two care scenarios: conventional care versus a whole person care approach. She will illustrate how an investment beginning in early middle age to support a healthy diet, physical activity, and stress management can plausibly lead to improved health and well-being, as well as reduced health care spending.

Whole person health involves examining interconnections among all organs and systems of the body, as well as the effects of multicomponent interventions across physiological, behavioral, social, and environmental domains. Our conventional approach to health care is disease centric and tends to separate patients' health by body systems, treating each independently and "efficiently"—e.g., minimal time with a provider, reliance on medication, and little investment to support behavioral and lifestyle improvements. Meanwhile, the United States has the most expensive health care in the world, with some of the worst outcomes.

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# Thank you..