

Measurement Issues by <u>Ron D. Hays</u> UCLA Division of General Internal Medicine & Health Services Research (June 30, 2008, 4:55-5:35pm)

Diabetes & Obesity Disparities in Health Care Systems Conference, Bethesda, MD

#### **Evaluation of Health Outcomes**

- Monitoring population (and subgroups)
- Clinical trials
- Clinical practice
- Observational studies ←

### Potential Factors in Health Disparities

- Community
  - Cultural norms and practices related to health care use
- Health care organization
  - Processes of care and policies
- Health care professional
  - Decision making, training, screening/assessment, knowledge, bias
- Patient
  - Attitudes, behavior, education, lifestyle, cultural





#### Process of Care

• Expert Consensus

- Quality of Care "If Then" Indicators

- % of patients with diabetes with one or more HbA1c tests annually
- Patient reports about communication

   In the last 12 months, how often did your doctor explain things in a way that was easy to understand?

# **Outcomes of Care**

- Clinical
  - % of patients with diabetes with most recent HbA1c level >9.0% (poor control)
- Patient global rating of health
  - Would you say that in general your health is:
    - Excellent
    - Very good
    - Good
    - Fair
    - Poor

### 2002 CAHPS 3.0 Medicare Managed Care Survey

- Getting care quickly (4 items)
- Getting needed care (4 items)
- Office staff helpfulness (2 items)
- Plan customer service (3 items)
- Provider communication (4 items)

Differences in Reports about Care: African Americans (n = 8,791) vs. Whites (n = 101,189)

- Getting care quickly
- Getting needed care
- Office staff (-1, E
- Plan customer service (-5, ES = 0.13)
- Communication

$$(-6, ES = 0.21)$$
  
 $(-2, ES = 0.08)$   
 $(-1, ES = 0.04)$ 

(+1, ES = 0.07)

M. Fongwa et al. (in press). Reports and ratings of care: Black and white Medicare enrollees. <u>Journal of Health</u> <u>Care for the Poor and Underserved</u>.

# Equivalence of Survey Data

- Missing data rates were significantly higher for African Americans on all CAHPS items
- Internal consistency reliability did not differ
- Plan-level reliability estimates were significantly
  lower for African Americans than whites
- M. Fongwa et al. (2006). Comparison of data quality for reports and ratings of ambulatory care by African American and White Medicare managed care enrollees. Journal of Aging and Health.

# Missing Data Rates (%)

	M	ail	Ph	one
	White	AA	White	AA
Get Care Quickly	8	14	7	8
Get Needed Care	10	16	9	10
Staff	4	7	3	5
C. Service	9	19	10	10
Communication	3	6	4	5

#### Intraclass Correlation and Reliability

Model	Reliability	Intraclass Correlation					
One- way	$\frac{MS_{BMS} - MS_{WMS}}{MS_{BMS}}$	$\frac{MS_{BMS} - MS_{WMS}}{MS_{BMS} + (k-1)MS_{WMS}}$					
Two- way fixed	$\frac{MS_{BMS} - MS_{EMS}}{MS_{BMS}}$	$\frac{MS_{BMS} - MS_{EMS}}{MS_{BMS} + (k-1)MS_{EMS}}$					
Two- way random	$\frac{N(MS_{BMS} - MS_{EMS})}{NMS_{BMS} + MS_{JMS} + MS_{EMS}}$	$\frac{MS_{BMS} - MS_{EMS}}{MS_{BMS} + (k-1)MS_{EMS} + k(MS_{JMS} - MS_{EMS})/N}$					
BMS = Between Ratee Mean Square							
VMS = Within Mean Square JMS = Item or Rater Mean Square EMS = Ratee x Item (Rater) Mean Square							

## Health-Plan Level Reliability

	White	AA
Get Care Quickly	0.93	0.90
Get Needed Care	0.94	0.91
Office Staff	0.90	0.89
Customer Service	0.88	0.83
Communication	0.90	0.86

#### Spearman-Brown Prophecy Formula

alpha y = 
$$\left( \frac{N \cdot alpha}{1 + (N - 1) * alpha} \right)$$

N = how much longer scale y is than scale x

#### Hypothetical Multitrait/Multi-Item Correlation Matrix

	<u>Trait #1</u>	<u>Trait #2</u>	<u>Trait #3</u>			
Item #1	0.80*	0.20	0.20			
Item #2	0.80*	0.20	0.20			
Item #3	0.80*	0.20	0.20			
Item #4	0.20	0.80*	0.20			
Item #5	0.20	0.80*	0.20			
Item #6	0.20	0.80*	0.20			
Item #7	0.20	0.20	0.80*			
Item #8	0.20	0.20	0.80*			
Item #9	0.20	0.20	0.80*			

\*Item-scale correlation, corrected for overlap.

# **Confirmatory Factor Analysis**

- Observed covariances compared with those generated by hypothesized model
- Factor loadings
- Correlations between factors
- Model fit (statistical and practical)

## **Fit Indices**



	Physical Health	Mental Health	Evaluations of Care
Physical functioning	0.69 (0.25)		
Role-physical	0.81 (0.53)		
Pain	0.69 (0.88)	0.12 (0.02 <sup>3</sup> )	
General health perceptions	0.56 (0.39)	0.28 (0.34)	
Emotional well-being		0.86 (0.93)	
Role-emotional		0.62 (0.44)	
Energy/fatigue	0.38 (0.22)	0.56 (0.69)	
Social functioning	0.41 (0.45)	0.35 (0.36)	
Doctor			0.96 (0.97)
Overall			0.93 (0.92)
Access			0.81 (0.80)
Wait time			0.75 (0.79)
Choice			0.73 (0.78)
Plan			0.70 (0.70)

a. Not statistically significant.

#### Parameter Estimates (standardized) for Confirmatory Factor Analytic Model Constraining Factor Loadings and Correlations to Be Equal for English and Spanish Respondents

	Physical Health	Mental Health	Evaluations of Care		
Physical functioning	0.69 (0.51)				
Role-physical	0.81 (0.78)				
Pain	0.69 (0.68)	0.12 (0.12)			
General health perceptions	0.56 (0.53)	0.28 (0.27)			
Emotional well-being		0.86 (0.80)			
Role-emotional		0.62 (0.57)			
Energy/fatigue	0.37 (0.37)	0.56 (0.56)			
Social functioning	0.41 (0.48)	0.35 (0.41)			
Doctor			0.96 (0.97)		
Overall			0.93 (0.93)		
Access			0.81 (0.81)		
Wait time			0.75 (0.80)		
Choice			0.73 (0.75)		
Plan			0.70 (0.74)		

NOTE: Estimated correlations for English and Spanish respondents, respectively, were as follows: physical and mental health (r = .45), mental health and patient evaluations of care (r = .23), and physical health and patient evaluations of care (r = .06).

#### Differential Item Functioning (2-Parameter Model)



Summary of DIF analyses of the depression item bank: Education, gender and age groups.

Item	Item Item Item Wording		Anchor Item		Type of DIF, if Present		DIF After Bonferroni/B-H Adjustment*			Magnitude (Expected Item Score Difference: NCDIF)				
			Sex	Educ	Age	Sex	Educ	Age	Sex	Educ	Age	Sex	Educ	Age
3	EDDEP03	I felt that I had no energy	$\checkmark$				U	U					.039	
4	EDDEP04	I felt worthless	$\checkmark$	$\checkmark$				U						
5	EDDEP05	I felt that I had nothing to look forward to	$\checkmark$	$\checkmark$				U			U			.031
6	EDDEP06	I felt helpless		$\checkmark$		NU		NU						
7	EDDEP07	I withdrew from other people		$\checkmark$	$\checkmark$									
9	EDDEP09	I felt that nothing could cheer me up		$\checkmark$		U		U						
13	EDDEP13	I felt that other people did not understand me		$\checkmark$	$\checkmark$	U								
14	EDDEP14	I felt that I was not as good as other people	$\checkmark$	$\checkmark$	$\checkmark$									
16	EDDEP16	I felt like crying		$\checkmark$		U		U	U			.074		.065
17	EDDEP17	I felt sad		$\checkmark$		NU								
19	EDDEP19	I felt that I wanted to give up on everything	$\checkmark$	$\checkmark$				U						
21	EDDEP21	I felt that I was to blame for things	$\checkmark$	$\checkmark$										
22	EDDEP22	I felt like a failure			$\checkmark$		U							
23	EDDEP23	I had trouble feeling close to people		$\checkmark$		U		U						
26	EDDEP26	I felt disappointed in myself	$\checkmark$		$\checkmark$									
27	EDDEP27	I felt that I was not needed	$\checkmark$	$\checkmark$				U						
28	EDDEP28	I felt lonely	$\checkmark$	$\checkmark$	$\checkmark$									
29	EDDEP29	I felt depressed		$\checkmark$	$\checkmark$	U								
30	EDDEP30	I had trouble making decisions	$\checkmark$	$\checkmark$										
31	EDDEP31	I felt discouraged about the future	$\checkmark$	$\checkmark$				U						
35	EDDEP35	I found that things in my life were overwhelming		$\checkmark$				U						.026
36	EDDEP36	I felt unhappy		$\checkmark$	$\checkmark$	U								
39	EDDEP39	I felt I had no reason for living		$\checkmark$										
41	EDDEP41	I felt hopeless	$\checkmark$		$\checkmark$		NU							
42	EDDEP42	I felt ignored by people		$\checkmark$										
														21





Figure 2. Test response functions for gender, education and age.

