Review of Patient Safety Culture Survey Measures Completed by Healthcare Providers

Ron D. Hays, Ph.D.

October 21, 2014 (12:00 - 1:00)

44th Presentation of the UCLA Center for Maximizing Outcomes and Research on Effectiveness (C-MORE)

Live Webinar at: <u>https://uclahs.webex.com/</u> Meeting Number: 809 345 589 Meeting Password: uclacmore



http://cmore.med.ucla.edu/index.htm

05/11/2010 Robert Kaplan, PhD

How Do We Interpret Unexpected Findings From Large Clinical Trials?

06/08/2010 Brian Mittman, PhD

Achieving the Promise of CER: The Role of Implementation Science

07/13/2010 Benjamin Craig, PhD

Comparing Health Outcomes in Comparative Effectiveness (CHOICE) Research: Do preferences matter?

Motivation for Today's Topics

- Agency for Healthcare Research and Quality (AHRQ) Safety Culture Conference funded by R13 to:
 - Jason Etchegaray, Ph.D.
 - University of Texas-Houston Medical School

• Held October 2, 2014

Putting Safety in Context*

Advances in medicine have led to positive outcomes:

- Most childhood cancers are curable
- AIDS is now a chronic disease
- Life expectancy has increased 10 years since the 1950s

However, sponges are still found inside patients' bodies after operations.

**Note:* Slide from Comprehensive Unit-based Safety Program (CUSP) http://www.ahrq.gov/professionals/education/curriculum-tools/cusptoolkit/index.html

Health Care Defects in U.S.*

- 7% of patients suffer a medication error²
- On average, every patient admitted to an intensive care unit suffers an adverse event^{3,4}
- 44k—99k die in hospitals/year as the result of medical errors⁵
- half a million develop catheter-associated urinary tract infections, resulting in 13,000 deaths/ year⁶
- Nearly 100k die from health care-associated infections (HAIs)/year and the cost of HAIs is \$28 to \$33 billion/year⁷
- Sok—62k deaths from central line-associated blood stream infections/year⁸

Patient Safety Culture Measures

- AHRQ Hospital Survey on Patient Safety Culture (HSOPSC or SOPS)
 - <u>http://www.ahrq.gov/legacy/qual/</u> <u>patientsafetyculture/hospsurvindex.htm</u>
- Safety Attitudes Questionnaire (SAQ)
 - <u>https://med.uth.edu/chqs/surveys/safety-</u>
 <u>attitudes-and-safety-climate-questionnaire/</u>
- Patient Safety Climate in Healthcare Organizations (PSCHO) Survey
 - <u>http://www.midss.org/content/patient-safety-</u>
 <u>climate-healthcare-organizations-pscho</u>

AHRQ Hospital Survey on Patient Safety Culture (HSOPSC or SOPS)

- 42 items measuring 12 domains
 - Supervisor/manager expectations (k = 4)
 - Organizational learning/Cont. improve (k = 3)
 - Teamwork within units (k = 4)
 - Teamwork across units (k = 4)
 - Communication openness (k = 3)
 - Feedback/comm. about error (k = 3)
 - Non-punitive response to error (k = 3)
 - Staffing (k = 4)
 - Management support for safety (k = 3)
 - Handoffs/transitions (k = 4)
 - Frequency of events reports (k = 3)
 - Overall perceptions of patient safety (k = 4)

2012 Comparative Database

- 1,128 hospitals
 - 66% non-teaching
 - 80% non-government
- 567,703 hospital staff respondents
 - Mean of 503 surveys/hospital
 - 53% response rate
- Respondents
 - 35% registered nurse, or licensed vocational nurse/ licensed practical nurse
 - 11% technician (e.g., EKG, lab, radiology)
 - 8% administration/management
 - 6% attending, resident, physician assistant, or nurse practitioner

Areas of Strength for Most Hospitals

Four areas of strength emerged. Percent positive is the percentage of positive responses (e.g., Agree, Strongly agree) to positively worded items (e.g., "People support one another in this unit") or negative responses (e.g., Disagree, Strongly disagree) to negatively worded items (e.g. "We have safety problems in this unit"). The four areas with the highest percent positive responses were:

- 1. *Teamwork Within Units (average 80 percent positive response)*—the extent to which staff support each other, treat each other with respect, and work together as a team.
- Supervisor/Manager Expectations and Actions Promoting Patient Safety (average 75 percent positive response)—the extent to which supervisors/managers consider staff suggestions for improving patient safety, praise staff for following patient safety procedures, and do not overlook patient safety problems.
- 3. Organizational Learning—Continuous Improvement (average 72 percent positive response)—the extent to which mistakes have led to positive changes and changes are evaluated for effectiveness.
- 4. *Management Support for Patient Safety (average 72 percent positive response)*—the extent to which hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority.

Areas in need of Improvement

- Non-punitive response to error (44% positive)
 - Staff feel that their mistakes and event reports are not held against them and that mistakes are not kept in their personal file.
- Handoffs and tradeoffs (45% positive)
 - Important patient care information is transferred across hospital units and during shift changes
- Staffing (56% positive)
 - Enough staff to handle the workload and work hours are appropriate to provide best care.

Safety Attitudes Questionnaire (SAQ)

- 30 items measuring 6 domains
 - Safety climate (k = 7)
 - Teamwork climate (k = 6)
 - Perceptions of management (k = 4)
 - Job satisfaction (k = 5)
 - Working conditions (k = 4)
 - Stress recognition (k = 4)

Patient Safety Climate in Healthcare Organizations (PSCHO) Survey

- 31 items measuring 7 domains
 - Senior managers' engagement (k = 7)
 - Organizational resources (k = 3)
 - Overall emphasis on patient safety (k = 3)
 - Unit safety norms (k = 7)
 - Unit support/recognition for safety effort (k = 4)
 - Fear of blame (k = 2)
 - Fear of shame (k = 5)

Qualitative Observations (HSOPSC)

Response options

Please indicate your agreement or disagreement with the following statements about your work area/unit.

Think about your hospital work area/unit…	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
1. People support one another in this unit	. 🛛 1	\square_2		4	\square_5
2. We have enough staff to handle the workload	. 🔲 1	\square_2		4	\square_5
3. When a lot of work needs to be done quickly, we work together as a team to get the work done	. 🛛 1	 2	 3	4	\square_5
4. In this unit, people treat each other with respect	. 🔲 1	\square_2		4	\Box_5
5. Staff in this unit work longer hours than is best for patient care	. 🔲 1			 4	

Qualitative Observations (SAQ)

7



Qualitative Observations (PSCHO)

х

- 🔶 🧭 http://www.midss.org/sites/default/files/pscho_surve ♀ ∽ ぐ 🛛 🤗 midss.org

👍 🚹 Facebook 🧃 Hambones Barbeque

INSTRUCTIO For the following statements, please answer if you "strongly disage	NS pree," "disagree," "neither agree nor disag	ree," "agree,"	
or "strongly agree." If you wish to change an answer, fill in the s	uare for your preferred answer and circl	le it.	
SECTION I			
This set of statements relates to your experiences regarding pati unless otherwise noted.	en <mark>t saf</mark> ety in your unit <i>and</i> at your facility	r as of today,	
Some statements refer to "my unit." Physicians and other care pre- statements based on their experiences in their service, such as statements based on their experiences in the work unit where the or Ambulatory Care Blue Team.	oviders who are not unit-based should re nedicine or surgery. All others should re y spend the majority of their time, such a	espond to these spond to these is ICU, 6 South,	
Definition: Patient Safety – Activities to avoid prevent or correc	Definition: Patient Safety Activities to avoid prevent or correct adverse		
patient outcomes which may result from the delivery of healthcar	e.	rongly Agree	
	Neither Agree nor Disa	aree	
•	Disagree	9.00	
1. Good comm <mark>unication flow exists</mark> up and down the chain of com	nand regarding Strongly Disagree		
2. I am provided with adequate resources (personnel, budget, safe patient care	and equipment) to provide		
3. Senior management supports a climate that promotes patie	nt safety		
4. Senior manag <mark>ement h</mark> as <mark>a cl</mark> ear picture of the risks associa	ed with patie <mark>nt car</mark> e		
5. My unit takes <mark>the time</mark> to id <mark>e</mark> ntify and assess risks to ensure	patient safet <mark>y </mark> 🗆 🗆		

_ 0

Reliability

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

Alpha Reliability Formulas



Reliability Formulas

	Model	Reliability	Intraclass Correlation	
	Two-way random	$\frac{N(MS_{BMS} - MS_{EMS})}{NMS_{BMS} + MS_{JMS} - MS_{EMS}}$	$\frac{MS_{BMS} - MS_{EMS}}{MS_{BMS} + (k-1)MS_{EMS} + k(MS_{JMS} - MS_{EMS})/N}$	
	Two- way mixed	$\frac{MS_{BMS} - MS_{EMS}}{MS_{BMS}}$	$\frac{MS_{BMS} - MS_{EMS}}{MS_{BMS} + (k-1)MS_{EMS}}$	
	One- way	$\frac{MS_{BMS} - MS_{WMS}}{MS_{BMS}}$	$\frac{MS_{BMS} - MS_{WMS}}{MS_{BMS} + (k-1)MS_{WMS}}$	
ILL BMS = Between Ratee Mean Square N = n of ratees			uare N = n of ratees	
WMS = Within Mean Square k = n of items or raters				
	JMS = Item or Rater Mean Square EMS = Ratee x Item (Rater) Mean Square			

r_{wg} (i)

- $1 (Sx_j^2 / sigma_{EU}^2)$
 - Within-group interrater reliability for Xj (Proportion of non-error variance)
 - $-Sx_i^2$ = observed variance on X_i
 - Sigma_{EU}² = variance on X_j if all judgements were due to random measurement error
 - Expected error variance based on uniform distribution.
 - (NCAT² 1)/12
- James et al. (1984, J App Psych)

Item-scale correlation matrix

	<u>Depress</u>	<u>Anxiety</u>	<u>Anger</u>
ltem #1	0.50*	0.50	0.50
Item #2	0.50*	0.50	0.50
Item #3	0.50*	0.50	0.50
Item #4	0.50	0.50*	0.50
Item #5	0.50	0.50*	0.50
Item #6	0.50	0.50*	0.50
Item #7	0.50	0.50	0.50*
Item #8	0.50	0.50	0.50*
Item #9	0.50	0.50	0.50*



*Item-scale correlation, corrected for overlap.

Item-scale correlation matrix

	<u>Depress</u>	<u>Anxiety</u>	<u>Anger</u>
ltem #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

	<u>Depress</u>	<u>Anxiety</u>	<u>Anger</u>
Item #1	0.80*	0.00	0.00
Item #2	0.80*	0.00	0.00
Item #3	0.80*	0.00	0.00
Item #4	0.00	0.80*	0.00
Item #5	0.00	0.80*	0.00
Item #6	0.00	0.80*	0.00
Item #7	0.00	0.00	0.80*
Item #8	0.00	0.00	0.80*
Item #9	0.00	0.00	0.80*

*Factor loading.

Validity

Does scale represent what it is supposed to be measuring?

- Singer et al. (2009)
 - Hospitals (91 hospitals, 18,223 respondents) with better safety climate overall had lower relative incidence of patient safety indicators
 - PSIs recommended by AHRQ Quality Indicators Support Team (see Appendix for list)
 - 2004 MEDPAR data
 - Frontline personnel's (not senior manager's) perceptions of better safety climate were associated with lower incidence of patient safety indicators

New Directions

- Standardized General Population Metric
- Category Response Curves
- Computer Adaptive Testing
- Differential Item Functioning
- Linking of Different Measures

T-score Metric

T Score referenced to US Hospitals

- Mean = 50
- SD = 10
- -T = 50 + (z * 10)





always. Indeed, the item depicted in Figure 2, item 31, was 1 of the 5 items dropped from the communication scale based on the CTT analyses.

The information curve provides an indication of the amount of information the scale yields at different points along the underlying continuum. Information is inversely related to

Because the participation rate was 50%, some caution is warranted in interpreting the study results. Nonetheless, separate analyses of a CAHPS® item similar to item 276 revealed that the negative wording of this item confuses respondents. As a result, when CAHPS® 3.0 was released, the item was worded in terms of being seen within 15 minutes ۲



Item Responses and Trait Levels



www.nihpromis.org

Computer Adaptive Testing (CAT)







PROMIS Physical Functioning vs. "Legacy" Measures



Differential Item Functioning (DIF)

- Probability of choosing each response category should be the same for those who have the same estimated scale score, regardless of other characteristics
- Evaluation of DIF by subgroups

DIF (2-parameter model)



Linking of Difference Patient Safety Culture Measures

- Equipercentile linking of scores
 - Scores associated with equivalent %
 - X scores and Y scores correspond to same number of SDs above or below the mean
 - Matches two cumulative distribute functions to each other either via smooth functions or nonparametrically

- IRT linking
 - Map onto logistic scales

Linking Assumptions

Instruments are measuring essentially the same thing (unidimensional)

 Scores from the two instruments are highly correlated (> 0.80); compare actual with estimated scores

• Subgroup invariance (standardized root mean square deviation)

Etchegaray & Thomas (2012)

- R-squared for SAQ teamwork = 54%
- 0.83 + 0.34* HSOPSteamwork + 0.51* HSOPScommun.
- R-squared for SAQ safety = 42%
- 1.63 + 0.65* HSOPorganizational learning
- Correlations among SAQ and HSOPS
 - Etchegaray & Thomas (2012) Table 4
 - Predominantly unidimensional
 - 8.2, 1.28 and 0.96 are 1st 3 principal components
 - If two factors rotated 2nd factor shows common variance among 5 HSOPS scales
 - Teamwork within, non-punitive, number of events reported, expectations, and staffing

Bibliography

- DiCuccio, M. H. (2014). The relationship between patient safety culture and patient outcomes: A systematic review. J Patient Saf, epub.
- Etchegary, J. M., & Thomas, E. J. (2012). Comparing two safety culture surveys: Safety Attitudes Questionnaire and Hospital Survey on Patient Safety. BMJ Qual Sat, 21, 490-498.
- Morello, R. T. et al. (2013). Strategies for improving patient safety culture in hospitals: A systematic review. BMJ Qual Saf, 22, 11-18.
- Sammer, C. E., Lykens, K., Singh, K. P., Mains, D. A., & Lackan, N. A. (2010). What is patient safety culture? A review of the literature. Journal of Nursing Scholarship, 42, 156-165.
- Sexton, J. B. et al. (2011). Assessing and improving safety climate in a large cohort of intensive care units. Crit Care Med, 39, 934-939.
- Sexton, J. B. et al. (2006). The Safety Attitudes Questionnaire: Psychometric properties, benchmarking data, and emerging research. BMC Health Services Research, 6, 44.
- Singer, S. et al. (2009). Relationship of safety climate and safety performance in hospitals. Health Services Research, 44, 399-421.
- Singer, S. et al. (2007). Workforce perceptions of hospital safety culture: Development and validation of the Patient Safety Climate in Healthcare Organizations Survey. Health Services Research, 42, 1999-2021
- Sorra, J. S., & Dyer, N. (2010). Multilevel psychometric properties of the AHRQ hospital survey on patient safety culture. BMC Health Services Research, 10, 199.

Thank You!



drhays@ucla.edu (310-794-2294). http://gim.med.ucla.edu/FacultyPages/Hays/

Appendix: 12 PSIs in Singer et al. (2009)

- Complications of anesthesia
- Decubitus ulcer
- Inatrogenic pneumothorax
- Infection due to medical care
- Postoperative hip fracture
- Postop hemorrhage or hematoma
- Postop physio metabol derangmnt
- Postop respiratory failure
- Postop PE or DVT
- Postop sepsis
- Postop wound dehiscence
- Accidental puncture/lacertaion

Previous CMORE Talks http://cmore.med.ucla.edu/index.htm

05/11/2010 Robert Kaplan, PhD

How Do We Interpret Unexpected Findings From Large Clinical Trials?

06/08/2010 Brian Mittman, PhD

Achieving the Promise of CER: The Role of Implementation Science

07/13/2010 Benjamin Craig, PhD

Comparing Health Outcomes in Comparative Effectiveness (CHOICE) Research: Do preferences matter?

08/10/2010 Robert Brook, MD, ScD *Can We Establish a Business Case for Comparative Effectiveness Research?*

09/14/2010 Brennan Spiegel, MD MSHS, FACG Introduction to Cost-Effectiveness Analysis: How to Figure out if the Juice is Worth the Squeeze.

10/12/2010 Michael Ong, MD, PhD

Comparative Effectiveness Research on Reducing Heart Failure Readmissions.

11/09/2010 Teryl Nuckols, MD *Utilization of care as a criteria for comparative effectiveness research.*

12/14/2010 Francesco Chiappelli, PhD Toward Clinically Relevant Complex Systematic Reviews (CRCSR's), and beyond: Recent Milestones and Remaining Challenges.

01/11/2011 Ken Wells, MD, MPH *Community-partnered comparative effectiveness research in mental health.*

02/08/2011 John Adams, PhD Physician Cost Profiling.

03/08/2011 Mark Litwin, MD MPH *Caring for the Uninsured in California with Prostate Cancer.*

04/12/2011 Katherine Kahn, MD, PhD

Approach to the Evaluation of the Effectiveness of Decision Support Systems for Advanced Imaging Procedures.

05/10/2011 Patricia Ganz, MD

Comparative Effectiveness and Studies of Breast Cancer Outcomes and Quality.

07/12/2011 Lisa Rubenstein, MD

Quality Improvement and Implementation Science in the Era of Comparative Effectiveness.

08/16/2011 Sarah Starks

Cost and Effectiveness of Full Service Partnerships: Assertive Community Treatment of Severe Mental Illness

09/13/2011 John Romley, PhD

Hospital Spending and Inpatient Mortality: Evidence from California.

10/18/2011 Emmett Keeler, PhD

Cost effectiveness of lung cancer screening in the NLST.

11/08/2011 Ian Coulter, PhD

Overview and Critique of Comparative Effectiveness Research.

12/20/2011 Pamela Davidson, PhD

Improving Safety through Intervention, Innovation, Policy Analysis, and Workforce Development.

01/17/2012 Cheryl Damberg, PhD

Potential Unintended Consequences in Pay for Performance Programs.

02/21/2012 Ron Anderson, PhD

The State of Comparative Effectiveness Research at the National Level

03/20/2012 Roger Lewis, MD, PhD Adaptive Clinical Trials

04/17/2012 Dominick Frosch, PhD

Communicating Comparative Effectiveness Research Results to Patients

05/15/2012 Kevin Grumbach, MD

The Translational Research Challenge: Improving the Health of the Community.

06/19/2012 Robin Clarke, MD

Incorporating Stakeholders: Examining the Medical Home Through an Adaptation of the Modified Delphi Process.

07/17/2012 David Reuben, MD

UCLA Alzheimer's and Dementia Care: Comprehensive, coordinated, patient-centered.

08/21/2012 Brian Mittman, PhD

"Methods Matter": Goals and Content for the First PCORI Methodology Report and Standards.

- **09/18/2012 PCORI Discussion Panel on Patient-Engagement (Tim Carey and Paul G. Shekelle)** How can we meet or surpass the bar raised by PCORI on stakeholder engagement in our research - from study design to dissemination.
- **10/16/2012 Christopher Saigal, MD MPH** *Improving Decision Making at the Point of Care: Opportunities and Challenges.*

12/4/12 Douglas Bell, MD PhD
Value of Information: A Brief Summary.
Lenore Arab, Phd, MS
PCORI Update: Board of Governors Recap

01/15/2013 Wendy Slusser, MD How to Build Stakeholder Engagement into Studies

02/19/2013 Lenore Arab, PhD MS What PCORI Wants: An Open Discussion of PCORI Reviews, PCORI Reviewers, and PCORI Successes.

03/19/2013 Mellissa Withers, PhD, MHS *Qualitative Research.*

04/16/2013 Bruce Dobkin, MD

UCLA Wireless Health Institute can Help Investigators.

05/21/2013

Alison Hamilton, PhD, Brian Mittman, PhD, and Gail Wyatt, PhD

Studying Effectiveness and Implementation of Evidence-Based, Research-Developed Programs in Routine Care Settings: Tradeoffs and Challenges in Study Designs and Methods.

11/5/2013 Matthew Press, MD MSc *Collaboration Between Clinicians: Assessing its Quality and Impact*

12/17/2013 José Calderón, MD

Improving diabetes health literacy by animation.

2/18/2014 Amy D. Waterman, PhD Expanding Living Donor Transplantation Through Improved Education.

3/18/2014 Rich Baker, MD

The 30% solution? Challenging an underlying assumption of the ACA and its implication for successful health reform.

4/15/2014 Loren Miller, MD MPH

Recurrent urinary tract infections among women: comparative effectiveness of 5 prevention and management strategies using a Markov chain Monte Carlo model.

5/20/2014 Adam Richards, MD

Health Equity Metrics to Ameliorate Health Disparities Inequity: A User's Guide.

6/17/2014 Ka-kit Hui, MD

The Potential Value of the Integrative Health Paradigm in Health Outcomes Research.

9/16/2014 John Adams, PhD

Using Item Response Theory to Summarize Health Care Quality Measures.