

Measuring patient safety climate: a review of surveys

J B Colla, A C Bracken, L M Kinney, W B Weeks

Qual Saf Health Care 2005;14:364–366. doi: 10.1136/qshc.2005.014217

See end of article for authors' affiliations

Correspondence to:
J B Colla ScD, Department of Community and Family Medicine, Dartmouth Medical School, 7251 Strasenburgh Hall, Hanover, NH 03755, USA; Judith.Colla@dartmouth.edu

Accepted for publication 27 June 2005

Objective: Five years ago the Institute of Medicine recommended improving patient safety by addressing organizational cultural issues. Since then, surveys measuring a patient safety climate considered predictive of health outcomes have begun to emerge. This paper compares the general characteristics, dimensions covered, psychometrics performed, and uses in studies of patient safety climate surveys.

Methods: Systematic literature review.

Results: Nine surveys were found that measured the patient safety climate of an organization. All used Likert scales, mostly to measure attitudes of individuals. Nearly all covered five common dimensions of patient safety climate: leadership, policies and procedures, staffing, communication, and reporting. The strength of psychometric testing varied. While all had been used to compare units within or between hospitals, only one had explored the association between organizational climate and patient outcomes.

Conclusions: Patient safety climate surveys vary considerably. Achievement of a culture conducive to patient safety may be an admirable goal in its own right, but more effort should be expended on understanding the relationship between measures of patient safety climate and patient outcomes.

High hazard industries such as aviation, nuclear energy, and shipping pay considerable attention to assessing safety. Historically, their safety measures have been based on retrospective data of employee fatalities and injuries. Recently, driven by the awareness that organizational, managerial, and human factors rather than simply technical failures are prime causes of accidents,¹ these industries have focused on predictive measures of safety. One particular focus is the evaluation of “safety climate”, a term that generally refers to the measurable components of “safety culture” such as management behaviors, safety systems, and employee perceptions of safety.²

Because the healthcare industry involves high risk for morbidity and mortality, it is considered to be a high hazard industry. Five years ago the Institute of Medicine (IOM) recommended that healthcare organizations should work to enhance their patient safety culture.³ Since then, surveys measuring patient safety climate in healthcare organizations have begun to emerge.

While researchers have reviewed surveys available to measure organizational culture in health care^{4,5} and have identified characteristics of tools available for measuring patient safety climate,⁶ there has been no systematic review of instruments measuring the safety climate within the healthcare setting. We therefore sought to identify, review, and report on available surveys with an eye toward their association with patient outcomes.

METHODS

A Medline search was conducted to identify and review surveys used to measure patient safety climate in healthcare settings; abstracts were reviewed, papers selected, references searched, websites visited, and authors contacted. This process identified 13 surveys, four of which were excluded (one that measured general organizational climate,^{7–9} one that was a checklist rather than a survey,¹⁰ and two that measured organizational aspects of employee safety^{11–15}). The history, purpose, intended audience, theoretical framework, content, and psychometrics of the remaining nine surveys were reviewed. Three of the authors (JC, LK, AB) independently reviewed the content of each survey to identify empirically the most common domains covered and to

determine whether each survey covered each domain completely, partially, or not at all. Through Web of Science, in addition to Medline, we also independently reviewed the literature available for each survey to determine the psychometrics performed and to identify how these surveys have been used in research studies, especially whether there had been any studies assessing the relationship between measured patient safety climate and patient outcomes.

No ethics committee approval was necessary for this review.

RESULTS

The nine surveys reviewed were designed to be used in different types of settings: five for general evaluation of patient safety climate in healthcare settings, two for within hospital units, and two for use in specific healthcare locations (table 1). Seven were designed for individuals to complete while two were designed for teams to complete together (Strategies for Leadership: An Organizational Approach to Patient Safety (SLOAPS)¹⁶ and Medication Safety Self Assessment (MSSA)¹⁷).

All the surveys used a 5-point Likert scale, mostly to measure respondents' attitudes about various aspects of patient safety. Two (SLOAPS and MSSA) measured the degree to which safety actions had been implemented to address patient safety concerns. There was a large range in the number of items to be completed (from 19 to 194).

Seven of the nine surveys evaluated five common dimensions of patient safety climate: leadership, policies and procedures, staffing, communication, and reporting. Most also addressed other dimensions of patient safety climate.

The quantity and quality of psychometric testing varied considerably across surveys. They were not reported at all for the SLOAPS¹⁶ or Culture of Safety Survey (CSS)¹⁸ but were comprehensive and sound for the Veterans Administration Patient Safety Culture Questionnaire (VHA PSCQ),¹⁹ the Hospital Transfusion Service Safety Culture Survey (HTSSCS),²⁰ the Hospital Survey on Patient Safety (HSOPS),²¹ and the Safety Attitudes Questionnaire (SAQ).²²

These surveys have been used primarily for intra- and inter-institutional comparisons. Three have also been used to compare the safety climate in a healthcare setting with that

Table 1 Patient safety climate surveys: summary of characteristics

	Name of survey								
	SLOAPS	PSCHO	VHA PSCQ	HSOPS	CSS	SAQ	SCS	MSSA	HTSSCS
Setting appropriate for use	General	General	General	General	General	Multiple units	Multiple units	Pharmacy	Transfusion
General characteristics									
To be completed by individuals	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
No of items (demographics not included)	58	82/32	71	42	34	60	19	194	27
Uses 5-point Likert scale	Yes	Yes	Yes	Yes	Partial	Yes	Yes	Yes	Yes
Measures implementation of actions	Yes	No	No	No	No	No	No	Yes	No
Common dimensions covered									
Leadership	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Partial
Policies and procedures	Yes	Partial	Yes	Partial	No	Partial	Partial	Yes	Partial
Staffing	Yes	Partial	Yes	Yes	Partial	Yes	Partial	Yes	No
Communication	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reporting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Total no of dimensions	9	5 (16)	13	12	4	6		20	8
Psychometrics performed									
Item analysis	No	Partial	Yes	Yes	No	Yes	Partial	No	Yes
Exploratory factor analysis	No	No	Yes	Yes	No	Yes	No	No	Yes
Confirmatory factor analysis	No	Yes	Yes	Yes	No	Yes	Partial	No	Yes
Cronbach's alpha	No	No	0.45–0.90	0.63–0.83	"Poor"	0.68–0.81	"Good"	0.44–0.84	0.61–0.85
Test/retest reliability	No	No	No	No	Yes	Yes	Partial	No	No
Correlated composite scores across dimensions	No	No	Yes	Yes	No	Yes	No	Partial	Yes
Analysis of variance across services	No	Yes	No	Yes	No	Yes	Yes	Partial	Yes
How used in studies									
Intra institutional comparisons	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Inter institutional comparisons	No	Yes	No	Yes	Yes	Yes	Partial	Yes	Yes
Inter industry comparisons	No	Yes	No	No	No	Yes	Partial	No	No
Association with reporting rates	No	No	No	Yes	Yes	Yes	No	Yes	No
Association with process measures	No	No	No	No	Yes	Yes	No	No	No
Association with patient outcomes	No	No	No	No	No	Yes	No	No	No
Pre v post intervention studies	Partial	No	No	No	No	Yes	No	No	No

SLOAPS, Strategies for Leadership: An Organizational Approach to Patient Safety;^{16, 24, 31} PSCHO, Patient Safety Cultures in Healthcare Organizations;^{25, 32} VHA PSCQ, Veterans Administration Patient Safety Culture Questionnaire¹⁹ (McKnight and Lee, unpublished data, September 2001); HSOPS, Hospital Survey on Patient Safety;^{21, 33} CSS, Culture of Safety Survey;¹⁸ SAQ, Safety Attitudes Questionnaire;^{22, 23, 26, 34–39} SCS, Safety Climate Survey⁴⁰ (10 item version called Safety Climate Scale^{24, 40}); MSSA, Medication Safety Self Assessment;^{17, 41} HTSSCS, Hospital Transfusion Service Safety Culture Survey.²⁰

in aviation (SAQ²³ and Safety Climate Survey (SCS)²⁴) and naval aviation settings (Patient Safety Cultures in Healthcare Organizations (PSCHO)²⁵).

Only two have been used to evaluate associations between patient safety climate scores and process measures theorized to be associated with improved patient outcomes. Contrary to expectation, favorable scores on the CSS were not associated with the adoption of best practices and expert opinion.¹⁸ Favorable scores on four out of six dimensions of the SAQ were associated with lower nurse turnover.²⁶

Only the SAQ has been used to explore the relationship between safety climate scores and patient outcomes. Favorable scores were associated with shorter lengths of stay, fewer medication errors, lower ventilator associated pneumonia rates, and lower bloodstream infection rates.²² They were also associated with lower risk adjusted patient mortality rates.²⁶

DISCUSSION

A number of surveys that measure patient safety climate are available. They vary considerably with regard to general characteristics, dimensions covered, psychometrics performed, and uses in studies.

Although it was not our intention to endorse one survey over another, these results can provide general guidance in the choice of an appropriate instrument. Firstly, users should prefer surveys that have been shown to be reliable by comprehensive and sound psychometric testing. Secondly, survey selection should depend on its purpose. For example, for use in a particular setting or for a particular condition (such as the ICU or for the purposes of improving transfusions), a survey that has already been used to evaluate

that setting or condition might be preferred. Alternatively, for considering the association between climate and patient safety outcomes, the survey that has been most extensively used for this might be chosen.

Our findings are limited in several ways. Firstly, the measurement of patient safety climate is a dynamic field and we did not report on surveys currently under development but not yet published. Secondly, some aspects of the surveys that we examined—for instance, psychometrics or current use in clinical trials—may have been performed but are not yet published. Thirdly, many surveys had several iterations, making it difficult to pinpoint specific characteristics of any one. Finally, some may believe that improvement of patient safety climate is an admirable goal in its own right, even if evidence linking it with actual patient improvement is limited.

Given the findings of the IOM reports on patient safety, efforts to improve patient safety are critical. However, managers would be remiss if they anticipate that measures of patient safety climate reliably indicate patient safety outcomes. Organizational climate is a challenge to change.²⁷ Even though others have shown a relationship between organizational climate scores and employee safety in other high hazard industries,^{28–30} health care is fundamentally different. In the healthcare setting unsafe practices are experienced by the customer rather than by the employee, and are reimbursed by a third party but frequently do not entail expense to the employer.

While surveys of safety climate may detect employee concerns about patient safety and may help foster communications around the topic of patient safety, there is only limited evidence that survey scores are related to patient safety outcomes. Until more evidence is available, administrators

and policymakers should be cautious in the interpretation of these surveys.

ACKNOWLEDGEMENTS

The authors acknowledge the contributions of collecting and organizing data by Diana M. Luan, RN, MPA, MS, Doctoral Candidate, Center for the Evaluative Clinical Sciences, Dartmouth College, Hanover, NH; Health Science Specialist, Field Office, Veterans Health Administration, National Center for Patient Safety and Quality Scholars Program, Veterans Administration Medical Center, White River Junction, VT, USA.

Authors' affiliations

J B Colla, Department of Community and Family Medicine, Dartmouth Medical School, Hanover, NH, USA

A C Bracken, Departments of Pediatrics and of Internal Medicine, Dartmouth Medical School, Hanover, NH, USA

L M Kinney, Veterans Health Administration, White River Junction Field Office, National Center for Patient Safety, White River Junction, VT, USA

W B Weeks, Veterans Administration National Quality Scholars Fellowship Program; White River Junction Field Office, National Center for Patient Safety; Veterans' Rural Health Initiative, Veterans Administration Medical Center, White River Junction, VT, USA; Departments of Psychiatry and of Community and Family Medicine, Dartmouth Medical School, Hanover, NH, USA

This work was supported in part by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development Service (project no. REA 03-098).

None of the authors has any potential conflict of interest.

Dr Weeks is the Principal Investigator at the Veterans Administration Medical Center, White River Junction, VT, USA. The views expressed in this article do not necessarily represent the views of the Department of Veterans Affairs or the United States government.

REFERENCES

- 1 Weick K, Sutcliffe K, Obstfeld D. Organizing for reliability: processes of collective mindfulness. *Res Organ Behav* 1999;**21**:81–123.
- 2 Guldenmund F. The nature of safety culture: a review of theory and research. *Saf Sci* 2000;**34**:215–57.
- 3 Kohn LT, Corrigan JM, Donaldson MS. *To err is human: building a safer health system*. Washington, DC: National Academy Press, 1999.
- 4 Scott T, Mannion R, Davies H, et al. The quantitative measurement of organizational culture in health care: a review of the available instruments. *Health Serv Res* 2003;**38**:923–45.
- 5 Gershon RRM, Stone PW, Bakken S, et al. Measurement of organizational culture and climate in healthcare. *J Nursing Admin* 2004;**34**:33–40.
- 6 Nieva VF, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. *Qual Saf Health Care* 2003;**12**(Suppl II):ii17–23.
- 7 Clarke SP, Rockett JL, Sloan DM, et al. Organizational climate, staffing, and safety equipment as predictors of needlestick injuries and near-misses in hospital nurses. *Am J Infect Control* 2002;**30**:207–16.
- 8 Aiken LH, Patrician PA. Measuring organizational traits of hospitals: the Revised Nursing Work Index. *Nurs Res* 2000;**49**:146–53.
- 9 Aiken LH, Sochalski J, Lake ET. Studying outcomes of organizational change in health services. *Med Care* 1997;**35**(11 Suppl):NS6–18.
- 10 Spath P. *Patient safety improvement guidebook*. Forest Grove, OR: Brown-Spath & Associates, 2000.
- 11 Gershon RRM, Karkashian CD, Grosch JW, et al. Hospital safety climate and its relationship with safe work practices and workplace exposure incidents. *Am J Infect Control* 2000;**28**:211–21.
- 12 Felknor SA, Aday LA, Burau KD, et al. Safety climate and its association with injuries and safety practices in public hospitals in Costa Rica. *Int J Occup Environ Health* 2000;**6**:18–25.
- 13 Gershon R, Vlahov D, Felknor S, et al. Compliance with universal precautions among healthcare workers at three regional hospitals. *Am J Infect Control* 1995;**23**:225–36.
- 14 Griffin MA, Neal A. Perceptions of safety at work: a framework for linking safety climate to safety performance, knowledge, and motivation. *J Occup Health Psychol* 2000;**5**:347–58.

- 15 Neal A, Griffin MA, Hart PM. The impact of organizational climate on safety climate and individual behavior. *Saf Sci* 2000;**34**:99–109.
- 16 Voluntary Hospitals of America. *Strategies for Leadership: An Organizational Approach to Patient Safety* 2000.
- 17 Institute for Safe Medication Practices. *Medication Safety Self-Assessment for Community/Ambulatory Pharmacy*, 2000. Available from <http://www.ismp.org/survey>.
- 18 Weingart SN, Farbstein K, Davis RB, et al. Using a multihospital survey to examine the safety culture. *Jt Comm J Qual Saf* 2004;**30**:125–32.
- 19 Burr M, Sorra J, Nieva VF, et al. *Analysis of the Veteran's Administration (VA) National Center for Patient Safety (NCPS) FY 2000 Patient Safety Questionnaire*. Rockville, MD: Westat, under contract to Barents/KPMG, 2002. Contract No. 290-96-0004. Sponsored by the Agency for Healthcare Research and Quality.
- 20 Sorra J, Nieva VF. *Psychometric analysis of MERS-TM Hospital Transfusion Service Safety Culture Survey*. Rockville, MD: Westat, under contract to Barents/KPMG, 2002. Contract No. 290-96-0004. Sponsored by the Agency for Healthcare Research and Quality.
- 21 Sorra J, Nieva V. *Psychometric analysis of the Hospital Survey on Patient Safety*. Rockville, MD: Westat, under contract to BearingPoint, 2003. Contract No. 290-96-0004. Sponsored by the Agency for Healthcare Research and Quality.
- 22 Sexton JB, Thomas EJ, Helmreich RL, et al. *Frontline assessments of healthcare culture: Safety Attitudes Questionnaire norms and psychometric properties*. Austin, TX: The University of Texas Center of Excellence for Patient Safety Research and Practice, 2004. Technical Report No. 04-01. Grant No. 1P01HS1154401. Sponsored by the Agency for Healthcare Research and Quality.
- 23 Sexton JB, Thomas EJ, Helmreich RL. Error, stress, and teamwork in medicine and aviation: cross sectional surveys. *BMJ* 2000;**320**:745–9.
- 24 Pronovost PJ, Weast B, Holzmueller CG, et al. Evaluation of the culture of safety: survey of clinicians and managers in an academic medical center. *Qual Saf Health Care* 2003;**12**:405–10.
- 25 Gaba DM, Singer S, Sinaiko A, et al. Differences in safety climate between hospital personnel and naval aviators. *Hum Factors* 2003;**45**:173–85.
- 26 Sexton JB. *A matter of life and death: social psychological and organizational factors related to patient outcomes in the intensive care unit*. Dissertation. Austin, TX: University of Texas, 2002.
- 27 Zammuto R, Krakower J. Quantitative and qualitative studies of organizational culture. *Res Organ Change Devt* 1991;**5**:83–114.
- 28 Helmreich RL. Cockpit management attitudes. *Hum Factors* 1984;**26**:583–9.
- 29 Helmreich RL, Merritt A, Sherman P, et al. *The Flight Management Attitudes Questionnaire (FMAQ)*. Austin, TX: NASA/University of Texas/FAA, 1993. Technical Report No 93-4.
- 30 Roberts KH. Managing high-reliability organizations. *Calif Manage Rev* 1990;**32**:101–13.
- 31 Wong P, Helsingier D, Petry J. Providing the right infrastructure to lead the culture change for patient safety. *J Qual Improve* 2002;**28**:363–72.
- 32 Singer SJ, Gaba DM, Geppert JJ, et al. The culture of safety: results from an organization-wide survey in 15 California hospitals. *Qual Safe Health Care* 2003;**12**:112–8.
- 33 Westat. *Survey Guide for the Hospital Survey on Patient Safety*. Rockville, MD: Westat, 2003. Contract No. 290-96-0004. Sponsored by the Agency for Healthcare Research and Quality.
- 34 Flin R, Fletcher G, McGeorge P, et al. Anaesthetists' attitudes to teamwork and safety. *Anaesthesia* 2003;**58**:233–42.
- 35 Helmreich RL, Schaefer HG. Team performance in the operating room. In: Bogner M, eds. *Human error in medicine*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1994:225–53.
- 36 Itoh K, Abe T, Andersen HB. A survey of safety culture in hospitals including staff attitudes about incident reporting. In: Johnson CW, eds. *Proceedings of the Workshop on Investigation and Reporting of Incidents and Accidents*, Glasgow, UK July, 2002:144–53.
- 37 Itoh K, Abe T, Andersen HB, et al. A questionnaire based survey of safety culture in Japanese hospitals. *Proceedings of the 15th Triennial Congress of the International Ergonomics Association*, Seoul, Korea August, 2003.
- 38 Schaefer HG, Helmreich RL. *The Operating Room Management Attitudes Questionnaire (ORMAQ)*. Austin, TX: NASA/University of Texas, 1993. Technical Report No. 93-8.
- 39 Sexton JB, Thomas EJ, Grillo SP. *The Safety Attitudes Questionnaire (SAQ) guidelines for administration*. Austin, TX: The University of Texas Center of Excellence for Patient Safety Research and Practice, 2003. Technical Report 03-02. Grant Nos 1P01HS1154401 and U18HS116401. Sponsored by the Agency for Healthcare Research and Quality.
- 40 Sexton JB, Thomas EJ. *The Safety Climate Survey: psychometric and benchmarking properties*. Austin, TX: The University of Texas Center of Excellence for Patient Safety Research and Practice, 2003. Technical Report 03-03. Grant Nos 1P01HS1154401 and U18HS116401. Sponsored by the Agency for Healthcare Research and Quality.
- 41 Smetzer JL, Vaida AJ, Cohen MR, et al. Findings from the ISMP Medication Safety Self-Assessment for Hospitals. *Jt Comm J Qual Saf* 2003;**29**:586–97.