

# A Measurement Tool to Assess Culture Change Regarding Patient Safety in Hospital Obstetrical Units

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## Abstract

**Objective:** Clinical error in acute care hospitals can only be addressed by developing a culture of safety. We sought to develop a cultural assessment survey (CAS) to assess patient safety culture change in obstetrical units.

**Methods:** Interview prompts and a preliminary questionnaire were developed through a literature review of patient safety and "high reliability organizations," followed by interviews with members of the Managing Obstetrical Risk Efficiently (MORE<sup>OB</sup>) Program of the Society of Obstetricians and Gynaecologists of Canada. Three hundred preliminary questionnaires were mailed, and 21 interviews and 9 focus groups were conducted with the staff of 11 hospital sites participating in the program. To pilot test the CAS, 350 surveys were mailed to staff in participating hospitals, and interviews were conducted with seven nurses and five physicians who had completed the survey. Reliability analysis was conducted on four units that completed the CAS prior to and following the implementation of the first MORE<sup>OB</sup> module.

**Results:** Nineteen values and 105 behaviours, practices, and perceptions relating to patient safety were identified and included in the preliminary questionnaire, of which 143 of 300 (47.4%) were returned. Among the 220 cultural assessment surveys returned (62.9%), six cultural scales emerged: (1) patient safety as everyone's priority; (2) teamwork; (3) valuing individuals; (4) open communication; (5) learning; and (6) empowering individuals. The reliability analysis found all six scales to have internal reliability (Cronbach alpha), ranging from 0.72 (open communication) to 0.84 (valuing individuals).

**Conclusion:** The CAS developed for this study may enable obstetrical units to assess change in patient safety culture.

**Key Words:** Patient safety, culture change, obstetrics, MORE<sup>OB</sup>, hospital

Competing Interests: See Acknowledgements.

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## Résumé

**Objectif :** L'erreur clinique au sein des hôpitaux de soins actifs ne peut être traitée qu'en élaborant une culture de la sûreté. Nous avons cherché à concevoir un sondage d'évaluation culturelle (SEC) permettant d'évaluer les modifications apportées à la culture de sûreté des patientes au sein des unités obstétricales.

**Méthodes :** Des scénarios d'entrevue et un questionnaire préliminaire ont été élaborés par l'intermédiaire d'une analyse documentaire portant sur des organisations « hautement fiables » et vouées à la sûreté des patientes, le tout étant suivi d'entrevues menées auprès de membres du programme Approche multidisciplinaire en prévention des risques obstétricaux (AMPRO<sup>OB</sup>) de la Société des obstétriciens et gynécologues du Canada. Trois cents questionnaires préliminaires ont été postés et 21 entrevues et 9 groupes de discussion ont été menés auprès du personnel de 11 hôpitaux participant au programme. Pour soumettre le SEC à un essai pilote, 350 sondages ont été postés au personnel des hôpitaux participants et des entrevues ont été menées auprès de sept infirmières et de cinq médecins ayant rempli le sondage. Une analyse de fiabilité a été menée auprès de quatre unités ayant rempli le SEC avant et après la mise en œuvre du premier module AMPRO<sup>OB</sup>.

**Résultats :** Dix-neuf valeurs et 105 comportements, pratiques et perceptions liées à la sûreté des patientes ont été identifiés et inclus dans le questionnaire préliminaire; 143 des 300 questionnaires préliminaires (47,4 %) ont été retournés. Grâce aux 220 sondages d'évaluation culturelle nous ayant été retournés (62,9 %), nous avons pu dégager six échelles culturelles : (1) sûreté des patientes à titre de priorité pour tous; (2) travail d'équipe; (3) valorisation des individus; (4) communication ouverte; (5) apprentissage; et (6) habilitation des individus. L'analyse de fiabilité a constaté que ces six échelles présentaient toutes une fiabilité interne (Cronbach alpha), allant de 0,72 (communication ouverte) à 0,84 (valorisation des individus).

**Conclusion :** Le SEC élaboré aux fins de cette étude pourrait permettre aux unités obstétricales d'évaluer le changement en matière de culture de sûreté des patientes.

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## INTRODUCTION

The significant problem of clinical error in acute care hospitals, reported by the Institute of Medicine (2000),<sup>1</sup> the National Institute of Health (2000),<sup>2</sup> and the Canadian Adverse Events Study (2004),<sup>3</sup> can only be addressed through developing a culture of safety.<sup>1-3</sup> Culture consists of shared values (what is important) and beliefs (how things work) that interact with an organization's structures and control systems to produce behavioural norms (the way we do things around here).<sup>4,5</sup>

Behavioural psychologists have identified organizations that carry out complex high risk activities with exceptional safety records as HROs.<sup>6-9</sup> In HROs, a culture of safety is a practised priority; teamwork and accountability are the norm; continuous learning and training occurs from reviewing of events; effective communication provides clarity of roles, responsibilities, and relationships; and, in emergencies, decisions on safety issues can be made at any level of the organization.<sup>6-11</sup>

The Society of Obstetricians and Gynaecologists of Canada, recognizing the importance of promoting patient safety, established a working group to explore strategies in this regard in the fall of 2000. The result was the MORE<sup>OB</sup> Program, intended to assist hospitals in creating and sustaining a culture where (1) patient safety is everyone's first priority; (2) there is trust and respect for all health care workers; and (3) effective communication is highly valued.

To assess the impact of this program on directing the culture in hospital-based obstetrical units toward patient safety, a robust objective measurement tool to measure culture change was required. The purpose of the present study was to develop and validate a culture assessment survey tool that would assess culture change in patient safety in hospitals participating in the MORE<sup>OB</sup> Program.

## METHODS

The research was divided into four phases addressing four purposes. The purpose of Phase I was to develop an extensive list of behaviours and practices potentially essential to the development of a patient safety culture. The purpose of Phase II was to identify the behaviours and practices from Phase I that health care providers across Canada deemed

most important to a patient safety culture. This was accomplished through a questionnaire, interviews, and focus groups. The purpose of Phase III was to develop the CAS based on the results obtained in Phase II and to pilot test the CAS at 10 hospital sites across Canada. The purpose of Phase IV was to determine the reliability of the CAS by conducting a reliability analysis of the CAS results from four hospitals that completed the CAS twice within 12 months.

Phase I consisted of a review of publications relating to patient safety and best practices within health care environments and to the principles of HROs. This was followed by key informant interviews with members of the MORE<sup>OB</sup> Program development team (physicians and nurses). From the review and interviews were generated a questionnaire and interview/focus group prompts.

In Phase II, 300 questionnaires were mailed to MORE<sup>OB</sup> participants at eight hospital sites selected to represent a diversity of unit sizes, geographic locations, and tertiary levels of care. Twenty-one interviews were conducted with health care providers at these sites who had participated in the questionnaire (6 physicians, 14 nurses, and 1 midwife). Six initial focus groups were conducted including health care providers from each of the eight hospital sites. After completion of these focus groups, a need for increased participation from physicians was identified, and an additional three hospital sites were invited to participate in focus groups. This resulted in a total of nine focus groups including a total of 72 participants (8 obstetricians, 4 family physicians, 41 nurses, 4 midwives, 5 hospital administrative directors, and 10 manager-educators).

Phase III enabled the pilot testing of the CAS in 10 of the 11 hospital sites from Phase II that chose to continue. A total of 350 copies of the CAS were mailed. Twelve interviews were conducted across five of these hospital sites, with involvement of seven nurses and five physicians, each of whom had completed the CAS prior to the interview.

Phase IV was a reliability analysis of the CAS completed by four hospital sites; each completed the CAS twice, once prior to the implementation of the MORE<sup>OB</sup> Program and once following the completion of the first MORE<sup>OB</sup> Program module.

A computer search and analysis of peer-reviewed articles and reports of medical associations was conducted, focusing on articles relating to (1) patient safety issues; (2) best practices within health care environments; and (3) principles of HROs. The literature review was followed by key informant interviews with members of the MORE<sup>OB</sup> development team, which included two physicians, two nurses, and one administrator.

### ABBREVIATIONS

CAS	culture assessment survey
HRO	high reliability organization
MORE <sup>OB</sup>	Managing Obstetrical Risk Efficiently

**Table 1. Hospital sites participating in the development of the CAS**

Hospital	Level	MORE <sup>OB</sup> participants	CAS development questionnaire	Interview	Focus group	CAS test questionnaire	Interview	Psychometric analysis
A	2	78	X	X	X	X	X	
B	2	79	X	X	X	X	X	
C	1	78	X	X	X	X		
D	1	18	X	X	X	X		
E	1	22	X	X	X	X		
F	1	21	X	X	X	X		
G	3	135	X	X	X	X	X	
H	3	133	X	X	X	X		
I	3	170			X	X	X	
J	2	94			X	X	X	X
K	2	130			X			
L	2	97						X
M	2	154						X
N	2	50						X

An organizational development firm experienced in measurement tool development (Kinect, Toronto, ON) was employed to develop the CAS. In developing the survey, it was recognized that it would be used in all obstetrical unit environments, including level 1 hospitals (providing care to low-risk pregnant women and newborns), level 2 hospitals (providing care to moderate-risk patients, but not operating neonatal intensive care units), and level 3 hospitals (providing care to patients at high risk and operating neonatal intensive care units), and involve all obstetrical and administrative staff, including physicians; nursing and midwifery staff; and administrative, clerical, and other support staff.

The 33 centres enrolled in the MORE<sup>OB</sup> Program were invited to participate in the development of the CAS. Among these, 11 volunteered for this additional task. These 11 Canadian hospital sites, representing a diversity of unit sizes, geographic locations, and tertiary levels of care, participated in various aspects of the development of the CAS (Table 1).

### Questionnaire

The two-part questionnaire, based on the literature review and key informant interviews, included a list of behaviours and practices important to a patient safety culture. Part A included a list of 17 value statements with five corresponding behaviours and practices. Respondents were asked to select the three they believed to be most important in the context of the statement provided. Part B included two value statements: (1) "I know that patient safety is a priority in my unit when . . .," and (2) "I know that patient safety is a priority in my hospital when . . .," with 10 corresponding behaviours

and practices for each. The respondents were asked to select the five they felt were most important in the context of the statement.

A total of 300 questionnaires were mailed to eight hospital sites (hospitals A to F in Table 1), where they were distributed to each MORE<sup>OB</sup> participant for completion.

### Interviews

To identify additional behaviours and practices that health care providers believe affect patient safety, 21 structured interviews were conducted with staff (14 nurses, 6 physicians, and 1 midwife) of the eight hospitals that participated in the questionnaire. All interviews were conducted by one of the authors (N.B.), either by telephone or in person.

The interview prompts were based on eight patient safety values derived from the literature: respect, trust, teamwork, feeling valued, open communication, blame-free working environment, patient safety as a priority, and patient safety as a shared responsibility. The interviewees were asked to consider their experience with members of their obstetrical unit while orally completing eight open-ended statements, including: "I know I am respected when . . .," "Teamwork in my work environment means . . .," "I will know I am working in a blame-free environment when . . .," and "I will know patient safety is a priority in my unit when . . ."

To increase the participants' comfort level with the interview and to increase their trust that the information they shared would remain anonymous, the interviews were not tape recorded; instead, the interviewer took notes to provide a written transcript.

**Table 2. Partial list of behaviours and practices identified as important to the development of a patient safety culture through the development of the CAS****Valuing Individuals**

My opinion/input is regularly sought.

We treat each member of our unit with equal respect.

When a concern is raised there is an effort to act on it and/or feedback is received.

We communicate with each other in a respectful manner.

We are open to hearing each other's points of view.

Staff suggestions for improving patient safety are seriously considered.

**Empowering People**

We take the initiative to solve problems faced in our daily work without waiting to be told.

I have the skills to manage an emergency safely until someone else arrives to assist or assume management.

I have the knowledge to identify when someone is about to do something that might threaten patient safety.

I am comfortable intervening if I see someone about to do something that might threaten patient safety, regardless of their level of authority.

I feel free to question the decisions or actions of others, regardless of their level of authority.

We are encouraged to report errors, even those that are caught and corrected before affecting the patient.

**Patient Safety is Everyone's Priority**

We participate in regular drills to prepare for common emergency situations.

Caregivers, managers, and administrators regularly discuss unit issues, patient care concerns, and potential solutions together.

Learning from patient safety occurrences (e.g., near miss, incident, adverse event) is shared with the entire unit staff.

When a patient safety issue is reported it is acted upon in a timely manner.

We review our safety procedures and protocols regularly.

We have a well-structured process to report unexpected events (errors, near misses).

We have a well-structured process to report potential patient safety hazards.

**Teamwork**

We overcome individual differences to pull together in the interest of the patient.

Multidisciplinary meetings about patient care are a normal part of our practice.

When things do not go well with a patient, we meet as a multidisciplinary group to discuss the issues involved.

When things do not go well with a patient, we work together to identify ways to reduce or prevent the chance of recurrence.

We keep one another appropriately informed about the patient's condition.

Input from all disciplines regarding patient care is welcomed and respected.

**Open Communication**

We are able to communicate our points of view without fear of reprisal.

I am comfortable sharing my observations or concerns in multidisciplinary patient review meetings.

There is a feeling of openness and trust in our unit.

We are informed about changes that are made as a result of a patient safety occurrence.

There is open discussion of the results of patient care reviews so that all members of our unit learn from the experiences of others.

Patients are included in discussions and decisions regarding their care.

**Learning**

Clinical errors and near misses are used as learning opportunities to improve and prevent recurrences.

We receive in-service training to update skills and proficiency using the equipment and technology in our unit.

The focus of patient care reviews is on identifying system problems and not on individual blame.

Clinical management processes are examined to identify where errors might be made and how they can be prevented.

We have made improvements as a result of our learning from near misses.

We have made improvements as a result of learning from past clinical errors.

## Focus Groups

Three additional hospital sites were subsequently invited to participate in the CAS development process to expand the number of focus groups and to engage additional health care providers. Nine semi-structured focus groups were conducted with a total of 72 participants (8 obstetricians, 4 family physicians, 41 nurses, 4 midwives, 5 hospital administrative directors and 10 manager-educators) from the 11 hospital sites (hospitals A to K in Table 1).

The focus group prompts were similar to the interview prompts. The facilitator of the focus groups (N.B.) took detailed notes and compiled transcripts.

The data derived from the questionnaires, interviews, and focus groups were initially modified by eliminating those behaviours and practices considered unimportant by the majority of respondents. The remaining behaviours and practices were grouped into categories based on the HRO principles and the values that the MORE<sup>OB</sup> Program identified as being required to build a culture of patient safety. (A partial list of behaviours and practices identified as important to the development of a patient safety culture through the development of the CAS is shown in Table 2.)

Ten of the 11 hospital sites that participated in the focus groups chose to participate in the pilot test. A total of 350 copies of the CAS were mailed to the hospital sites for distribution to MORE<sup>OB</sup> participants at each site. A feedback form was included with the questionnaire to help identify questionnaire items that seemed ambiguous to respondents or items that were difficult for respondents to answer. The form also created a means to gauge respondents' impressions of the assessment overall.

During the distribution of the CAS, participants at all 10 hospital sites were invited to participate in interviews. Scheduling proved difficult, and participants from only five of the hospitals volunteered to be interviewed. Ultimately, 12 interviews were conducted, including interviews with seven registered nurses and five physicians; each of these individuals had completed the CAS prior to the interview. The interviews sought to capture the participant's comprehension of the items (i.e., what the respondent believed the CAS item described and what specific words and phrases within the CAS meant to the respondent), as well as an understanding of the construction of the rating of the items (e.g., which disciplines within the unit and what experiences and situations did the respondent think of when rating the items). Other questions within the interview addressed overall impressions of the CAS and how it could be used to change a unit's patient safety culture.

The responses to CAS items from each hospital unit were reviewed to identify any items that were rated inconsistently

by respondents within each discipline as well as across disciplines. The information gained from the feedback form and from the interviews was also considered in the review of the responses to the proposed CAS items.

Four hospital obstetrical units completed the CAS both at Time 1 (prior to the unit's participation in the first MORE<sup>OB</sup> Program module) and at Time 2 (following the first MORE<sup>OB</sup> Program module). Two of the authors (J.W. and J.F.) performed the reliability analysis of the CAS.

## RESULTS

Nineteen values and 105 behaviours, practices and perceptions relating to patient safety issues within health care environments were identified in the initial literature review and interviews.

All invited hospitals agreed to participate in the development and testing of the CAS.

Among the 300 questionnaires that were sent to the eight hospitals invited to participate in this phase, 143 questionnaires were returned, for a response rate of 47.7%.

Among the respondents, 78.7% were registered nurses, 6.8% were obstetricians, 3.5% were family physicians, 7.5% were midwives, and 3.5% did not identify their profession. This distribution of respondents is reflective of the multidisciplinary composition of the hospital participants involved in the program.

After behaviours and practices considered unimportant by the majority of respondents were eliminated, the revised list of behaviours and practices was sorted into categories based on the HRO principles and the values the MORE<sup>OB</sup> Program identifies as being required to build a culture of patient safety. These categories reflected the HRO and MORE<sup>OB</sup> patient safety values of teamwork, individual empowerment, communication, patient safety as a priority, continuous and shared learning, and valuing individual contributions. The six categories were reviewed by MORE<sup>OB</sup> team members to identify any behaviours and practices not central to developing a patient safety culture, and these were eliminated from the list. This resulted in a final six categories, referred to as cultural elements in the CAS, that influence patient safety within a hospital obstetrical unit: patient safety as everyone's priority; teamwork; valuing individuals; open communication; learning; and empowering individuals. A description of each of the six CAS elements is shown in Table 3.

Among the 350 copies of the CAS mailed to the invited 10 hospital sites, 220 were returned for a response rate of 62.9%. Of those who returned the CAS, 76.8% were registered nurses, 15.5% physicians, 4.1% administration staff, and 2.3% midwives; 1.4% did not identify their profession. This distribution was representative of the professional participation in the program.

**Table 3. CAS element descriptions**

Element	Description
Patient safety is everyone's priority	When patient safety is a priority there is active participation and pro-activity by all unit members in achieving a patient safety culture. There are well-structured processes in place to report, discuss, and learn from patient safety occurrences, hazards, and procedures and these processes are followed consistently by all members of the unit.
Teamwork	Teamwork requires that unit members demonstrate key teamwork behaviours and attitudes, including a commitment to collaboration and the regular sharing of knowledge and information with team members across disciplines, taking initiative proactively to offer assistance and support when needed, and overcoming individual differences in the interest of the patient.
Valuing individuals	When people are valued, their input, contributions, and points of view are sought and welcomed, and their knowledge and skills are appreciated. Members treat one another with respect.
Open communication	Open communication requires frequent and accurate information shared across disciplines, the inclusion of all disciplines in the discussion of patient care reviews, and the inclusion of patients in discussions regarding their care. It also requires openness and trust within the unit that results in the freedom to ask questions and raise concerns.
Learning	Learning includes the sharing of experiences and the pursuit of professional development in a non-punitive, blame-free environment that allows learning from errors and near-misses, and the discipline and follow-through to ensure the learning takes place.
Empowering people	When people are empowered they have the skills and knowledge to perform effectively, they are trusted and expected to make decisions, they take responsibility, and they intervene as they see fit.

**Table 4. Means and internal consistencies (Cronbach's alpha) of the scales at Times 1 and 2**

Scale	Time 1		Time 2	
	Mean	$\alpha$	Mean	$\alpha$
Valuing individuals	3.27	0.84	3.48	0.90
Empowering people	3.40	0.75	3.64	0.81
Patient safety	2.76	0.83	3.13	0.90
Teamwork	3.00	0.77	3.28	0.83
Open communication	3.10	0.72	3.38	0.83
Learning	3.16	0.79	3.45	0.86
Total	3.11	0.95	3.39	0.97

In response to the interviews, 15 CAS statements were reworded to reduce redundancy and to clarify the meaning of the statements so that respondents would interpret them consistently. The response choice scale was changed from a 1 to 4 ranking system to a 1 to 5 system.

Personnel at the four invited obstetrical units completed 313 CAS Time 1 (pre-MORE<sup>OB</sup> module 1) and Time 2 (post-MORE<sup>OB</sup> module 1). The responses to individual items tended to be normally distributed. The means of individual items ranged from 2.00 to 4.13 and the means of the scales measuring the patient safety elements ranged from a

low of 2.76 to a high of 3.64 (Table 4). Because the means ranged near the mid-point of 3, there was room for movement to detect changes in subsequent administrations of the CAS and therefore enhance the discriminatory power of the CAS.

All differences between mean scores from Time 1 to Time 2 were statistically significant ( $P < 0.001$ ). The means of all the scales increased from Time 1 to Time 2, and the differences ranged from 0.21 (valuing individuals) to 0.37 (patient safety). All six scales of the CAS were found to have sufficient internal reliability.

Internal consistency reliabilities at Time 1 ranged from 0.72 (open communication) to 0.84 (valuing individuals) and for the whole instrument the internal consistency was 0.95. Reliabilities at Time 2 were higher than at Time 1 and ranged from 0.83 to 0.90 (Table 4). All of the scales were intercorrelated ( $P < 0.001$ ) at both the Time 1 (Table 5) and Time 2 (Table 6).

## **DISCUSSION**

The six elements identified in this study do not represent all behaviours required to build a patient safety culture. For example, the cultural elements of job satisfaction and stress recognition were identified in the research of Sexton et al.<sup>12</sup> The six elements emerging in our research likely reflect the patient safety culture arising from the MORE<sup>OB</sup> Program.

**Table 5. Intercorrelations of scales at Time 1**

Scale	Valuing individuals	Empowering people	Patient safety	Teamwork	Open communication	Learning
Valuing individuals	1.000					
Empowering people	0.687	1.000				
Patient safety	0.517	0.558	1.000			
Teamwork	0.74	0.643	0.698	1.000		
Open communication	0.771	0.704	0.664	0.788	1.000	
Learning	0.62	0.587	0.797	0.754	0.731	1.000

For all correlations  $P < 0.001$

**Table 6. Intercorrelations of scales at Time 2**

Scales	Valuing individuals	Empowering people	Patient safety	Teamwork	Open communication	Learning
Valuing individuals	1.000					
Empowering people	0.754	1.000				
Patient safety	0.74	0.741	1.000			
Teamwork	0.822	0.78	0.815	1.000		
Open communication	0.828	0.763	0.807	0.88	1.000	
Learning	0.756	0.748	0.865	0.834	0.824	1.000

For all correlations  $P < 0.001$

Test–retest reliability and internal consistency are two types of reliability frequently used in test development. Test–retest reliability measures the degree to which responses remain the same over time and reassures us that responses to a test or questionnaire are not random. This measure is only effective, however, if there is no intervention between the first and second test. In the case of the CAS, retest data were collected following an intervention (participation in the first MORE<sup>OB</sup> Program module); therefore, internal consistency rather than test–retest reliability is a more appropriate measure of reliability in this case. “Internal consistency” means that all the items in an individual scale correlate highly with each other. A corollary to this is that each scale’s items should correlate more highly with items in the same scale than with items in other scales. Where items in one scale correlate very highly with items in another scale they are in part measuring the same thing and are not truly independent scales, as was found in our research at Time 1 at the start of module 1 (Table 6). In the case of the CAS, a degree of intercorrelation was anticipated because some scales identified by the research as critical to a culture of patient safety required similar items to be measured. For

example, behaviours related to the scale of open communication are equally pertinent to teamwork, and yet the two scales have significant differences that justify their being considered as separate entities.

Reliabilities can range from 0 (no reliability) to 1.00 (absolute reliability). Reliabilities of 0.71 and higher are considered good because this means that the items have at least 50% of the variance in common. The items as a group may measure (or correlate with) a number of variables, but 50% or more of the scale score measures the same variable.

In developing the scales to measure the cultural elements, items were selected because of their face validity. The fact that the reliabilities of the scales are all above 0.71 further supports the rationale for the scales, as does the finding of significant differences between the scale score means.

## **CONCLUSION**

The cultural assessment survey tool as a whole, and its six scales, as tested in this study, are internally consistent. The development of this tool may not only enable the further analysis of a larger number of obstetrical units participating

in MORE<sup>OB</sup> in monitoring change in patient safety culture, but may be useful to individual hospitals in assessing change in their patient safety culture.

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