# Lessons in Safety Climate and Safety Practices from a California Hospital Consortium

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## Abstract

The Patient Safety Consortium included a group of 26 diverse hospitals in or near California. In 2001 and 2002, many consortium hospitals were surveyed using the Patient Safety Climate in Healthcare Organizations (PSCHO) tool to present quantitative measures of hospital safety climate and qualitative reports on safety practices over 2 years. Investigators engaged in discussions with consortium hospitals to elicit reports about their patient safety activities. Overall quantitative measures of safety climate remained approximately the same over the 2 years, although in some specific survey areas climate appeared to improve. Hospitals reported a range and mix of patient safety activities. While considered an essential enabler of safety, cultural change takes time. Significant hospital efforts appear to be underway, and attention to a number of lessons from past patient safety efforts may benefit future undertakings.

## Introduction

Interest in patient safety has been heightened by Institute of Medicine reports, recommendations from the Joint Commission on Accreditation of Healthcare Organizations, Leapfrog Group standards, and recent legislation such as California's S.B. 1875 (2000), which required hospitals to implement a formal plan to reduce medication errors in their facilities. This heightened interest has increased pressure on hospitals to reduce medical errors. Hospitals have responded to this pressure by creating new systems and initiating activities for improving patient safety and safety culture. Much of this activity has not been documented.

AHRQ-sponsored research provided the Patient Safety Consortium, a group of 25 diverse hospitals in California and 1 hospital in Nevada, an opportunity to participate in surveys to measure the safety climate, benchmark results, and identify their own strengths and weaknesses. Hospitals in the consortium also shared recommended practices from their efforts to respond to the results of the survey and generally to improve patient safety. In this paper we report on the level of and change in the strength of safety climate among consortium hospitals from 2001 to 2002 and on the patient safety practices reported by participating hospitals.

411

# Measuring safety climate and safety practices

Measuring, assessing, and improving patient safety are high priorities for healthcare organizations.[1–2] Yet, many facilities resort to internal benchmarking using homegrown surveys. In general, this prevents hospitals from tracking their status in relation to their peers and from knowing whether their results indicate that their facility has a strong safety culture. Due to perceived deficiencies in available instruments for measuring safety climate, Stanford University's Center for Health Policy and Center for Primary Care and Outcomes Research (CHP/PCOR) and the Patient Safety Culture Institute (PSCI) at the Veterans Affairs (VA) Palo Alto Health Care System developed the Patient Safety Climate in Healthcare Organizations (PSCHO) survey, a tool that includes aggregated concepts and questions from existing instruments.[3–7] This tool assesses current attitudes and experiences of hospital personnel about the safety climate in their organizations.

Stanford CHP/PCOR and the VA Palo Alto PSCI previously described the PSCHO safety climate survey instrument and its development, and reported methods and results from its implementation in 2001 among all employees and work units in a diverse set of 15 consortium hospitals.[8] This was the first survey to study attitudes and experiences indicative of safety climate in hospitals using the following methods:

- Surveying all hospital employees, including senior managers, physicians, and other employees

- Examining multiple hospitals of different types

- Applying a rigorous sampling strategy

- Tracking nonresponders

The first goal of this paper is to report on changes over time in patient safety climate among hospitals surveyed twice. Approximately 13 months after the first survey implementation, we surveyed a group of 18 consortium hospitals, including 12 hospitals that participated previously. We examined survey results to determine which attitudes and experiences varied by hospital, job class, and clinical status and which varied over time among these 12 hospitals, as measured by the PSCHO instrument. Because the participating hospitals made patient safety a high priority and implemented a variety of initiatives to improve safety culture, we hypothesized that the rate of problematic responses to the same set of questions would be lower in 2002 than in 2001.

The sampling strategy for the second implementation of the survey was identical to the one used for the first: at each hospital we targeted 100 percent of the hospital's physicians and senior managers (defined as department head or above), and a 10 percent random sample of all other employees (designed to be different groups of employees in each year). Logistical issues required small

variations to this sampling strategy in some hospitals.[*] Excluding undeliverable surveys, the total survey sample size in the 12 hospitals was 5,685 in 2001 and 6,090 in 2002. The response rate was 46 percent (2,643 respondents) in 2001 and 45 percent (2,753 respondents) in 2002.

Personnel at the consortium hospitals were aware of survey results and were engaged in a variety of other patient safety activities during the study period. Following each implementation of the PSCHO survey, we presented hospital-specific and aggregated results from the surveys to senior management groups from each hospital, asking standardized questions designed to elicit interpretation and reaction to the results and to promote discussion of past and current patient safety activities. In addition, teams of hospital executives conducted annual self-assessments of current safe medication practices using the Institute for Safe Medication Practices tool, and hospitals shared and discussed results with investigators.[9] Participating hospitals received ongoing information about national patient safety activities through a Patient Safety Consortium list-serve and project Web site (http://healthpolicy.stanford.edu/PtSafety). They participated in conference calls to discuss survey results as well as specific topics of interest, including implementation of computerized physician order entry systems. Hospitals also participated in annual Patient Safety Consortium conferences, where hospital representatives and experts discussed and shared documentation of recommended practices on topics such as building a business case for safety, the role of senior management in creating safe cultures, and designing and implementing safe medication plans. These activities suggest the possibility of change between the two surveys.

These activities also provided strong opportunities to gather qualitative information, based on hospital experiences, about the areas of greatest progress, the areas of greatest continuing difficulty, and some of the critical factors considered necessary to improve safety culture and patient safety more generally. The second goal of this paper is to report on findings from these discussions.

# Safety climate in hospitals, 2001–2002

## Overall survey results

The 2002 PSCHO survey consisted of 32 questions, each of which could be answered by respondents in ways suggesting a strong safety climate or a weak safety climate. Respondents also could provide neutral answers. We term the responses indicating weak safety climate "problematic responses." We found that while the majority of respondents answered in ways indicating a strong safety

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[*] In 2001, 3 of the 12 hospitals employed different sampling strategies. Two hospitals surveyed less than 100 percent of physicians. One large hospital sampled 250 of their top-admitting physicians, and the other hospital randomly sampled 20 percent of their physicians. In a third hospital, we received too few responses from physicians to analyze them as a separate category. In 2002, 3 of the 12 hospitals employed different sampling strategies. Two large hospitals sampled their 200 highest physician admitters plus all hospitalists, and another large hospital excluded volunteer and contract physicians. Also in 2002, 8 of the 12 hospitals conducted some teaching. Four of these elected to survey house staff physicians, and four did not.

climate, a substantial minority of respondents (18 percent on average across all hospitals, personnel, and questions) gave problematic responses. A similar percentage provided neutral responses. Average problematic responses across all personnel and questions among hospitals in 2002 ranged from 13.0 percent to 20.9 percent, approximately the same as in 2001. In 2001 and 2002, we also found that senior managers, especially nonclinician senior managers, were significantly *less* likely to give problematic responses than frontline workers, and that clinicians were *more* likely to give problematic responses than nonclinicians.[8] We compared responses among hospital personnel to responses among personnel from another high-reliability organization, naval aviation. This analysis showed that problematic responses among hospital personnel were 3 times higher on average across all questions than among naval aviators and up to 12 times greater on specific questions.[10]

## Change in response

Although the overall share of problematic responses across all hospitals and personnel to the 27 questions that were asked in both survey implementations remained similar between the two years, there were some areas where significant improvement was noted (Table 1). In particular, the rate of problematic response declined by almost 2 percent among questions that focused on organization and management issues. Employees reported significant improvement on questions that asked about whether patient safety decisions were made at an appropriate administrative level, whether employees had enough resources to provide safe patient care, and whether they had observed a coworker do something that appeared unsafe for a patient. Problematic responses also increased significantly in some areas between 2001 and 2002. A larger percentage of personnel felt that they lacked time to complete tasks safely, that asking for help was a sign of incompetence, and that it was easy for clinicians to hide mistakes.

The difference between senior managers and frontline personnel in the average percentage of problematic responses across all questions increased significantly from 2001 to 2002. Frontline workers had a rate of average problematic response across all questions 4.7 percentage points higher than that of senior managers in 2002, compared to 3.3 percentage points in 2001. Attitudes among physicians also changed, frequently becoming more negative.

In all, these results point to the potential for meaningful changes over time, but a longer time series and probably a larger sample of hospitals will be necessary to determine whether true changes have occurred.

## Lessons from efforts to improve safety practices

We now turn to describing hospital reports of activities and strategies around patient safety. Increased regulatory and payer pressures have encouraged hospital leaders to undertake efforts to improve patient safety and safety culture. These changes often require significant investment of time and money, and hospital priorities vary widely. Also, since current knowledge about how to improve safety

**Table 1. Problematic responses to questions included in both survey implementations**

| Patient Safety Culture in 12 California Hospitals 2001–2002 | | | |
|---|---|---|---|
| **Question** | **2001 % Problematic response** | **2002 % Problematic response** | **Difference by year** |
| In my department, disregarding policy and procedures is rare. | 14.7 | 14.5 | -0.2 |
| Patient safety decisions are made at the proper level by the most qualified people. | 15.7 | 10.0 | -5.7** |
| Good communication flow exists up the chain of command regarding patient safety issues. | 17.2 | 12.9 | -4.2 |
| Reporting a patient safety problem will not result in negative repercussions for the person reporting it. | 11.3 | 8.6 | -2.7 |
| Senior management has a clear picture of the risk associated with patient care. | 20.8 | 18.0 | -2.8 |
| My department does a good job managing risks to ensure patient safety. | 8.0 | 6.7 | -1.3 |
| Senior management has a good idea of the kinds of mistakes that actually occur in this facility. | 21.0 | 19.1 | -1.9 |
| Senior management provides a climate that promotes patient safety. | 14.9 | 13.3 | -1.6 |
| Asking for help is a sign of incompetence. | 3.8 | 5.9 | 2.1* |
| Telling others about my mistakes is embarrassing. | 35.8 | 35.3 | -0.5** |
| It is hard for doctors or nurses to hide serious mistakes. | 29.4 | 33.9 | 4.5** |
| I am less effective at work when I am fatigued. | 4.0 | 8.1 | 4.1 |
| Senior management considers patient safety when program changes are discussed. | 12.6 | 12.0 | -0.6 |
| Compared to other facilities in the area, this facility cares more about the quality of patient care it provides. | 9.8 | 11.7 | 2.0 |
| My department follows a specific process to review performance against defined training goals. | 14.8 | 13.4 | -1.5 |
| I will suffer negative consequences if I report a patient safety problem. | 7.6 | 8.1 | 0.5 |

**Table 1. Problematic responses to questions included in both survey implementations, cont.**

| Patient Safety Culture in 12 California Hospitals 2001–2002 | | | |
|---|---|---|---|
| **Question** | **2001 % Problematic response** | **2002 % Problematic response** | **Difference by year** |
| If people find out that I made a mistake, I will be disciplined. | 28.2 | 28.2 | -0.1 |
| I am rewarded for taking quick action to identify a serious mistake. | 32.5 | 25.5 | -7.0 |
| Individuals in my department are willing to report behavior which is unsafe for patient care. | 9.8 | 8.6 | -1.2 |
| I am asked to cut corners to get the job done. | 18.2 | 17.3 | -0.9 |
| Loss of experienced personnel has negatively affected my ability to provide high quality patient care. | 52.7 | 50.6 | -2.1 |
| I have enough time to complete patient care tasks safely. | 9.3 | 20.6 | 11.3** |
| I have witnessed a coworker do something that appeared to me to be unsafe for patient care. | 39.3 | 38.3 | -1.0** |
| In the last year, I have witnessed a coworker do something that appeared to me to be unsafe for the patient in order to save time. | 27.2 | 25.3 | -1.9** |
| In the last year, I have done something that was not safe for the patient. | 8.3 | 10.8 | 2.5 |
| I am provided with adequate resources (personnel, budget, and equipment) to provide safe patient care. | 50.2 | 31.3 | -19.0** |
| I have made significant errors in my work that I attribute to my own fatigue. | 7.1 | 11.4 | 4.3 |
| OVERALL AVERAGE | 19.41 | 18.49 | -0.92 |

\* The difference in rate of problematic responses 2001-2002 is significant at *P* < 0.05.
\*\* The difference in rate of problematic responses 2001-2002 is significant at *P* < 0.01.

is generally not codified and is highly context-dependent, organizational learning requires new knowledge creation rather than straightforward transfer of best practices.[11] Thus, we cannot report standardized evidence of hospitals' response to these new standards, nor can we present a specific recipe for improvement. We nevertheless believe lessons learned from the diverse hospitals of the Patient Safety Consortium may be generally applicable and valuable as guidelines for other health care organizations attempting to improve safety culture.

Hospitals reported a wide range of patient safety improvement activities, including adoption of error-reducing technologies, patient safety committees, educational programs, self-assessments, and other organization-wide initiatives. However, hospital reports on the results of these activities appeared to be mixed, most often dependent on success in the implementation phase. Overall, we found that leadership, creativity, established reporting processes and communication channels, combined with meaningful data on the effectiveness of improvement initiatives and attention to implementation issues, were essential to improving patient safety in participating hospitals.

## Remember, implementation matters

Medication errors received significant attention among consortium hospitals because they have been identified as common and devastating.[12, 13] Among widespread efforts to reduce medication errors, implementation of computerized physician order entry (CPOE) systems was the most significant and in many ways the most challenging for participating hospitals. All consortium hospitals were engaged in some stage of implementing CPOE. In general, hospitals that were part of a larger network—VA hospitals and large teaching hospitals—tended to be further advanced than other consortium members. However, most participating hospitals were currently using information technology systems that could support CPOE functionality.

During a conference call in 2002, Dr. David Classen, a physician and health information technologies expert as well as a consultant to the Stanford Patient Safety Consortium project, led a discussion with consortium hospitals about the benefits and challenges of CPOE. He counseled that the impact of CPOE systems is related more to the success of implementation than to the specific product selected. "To enhance chances of adoption," he suggested, "hospitals need a plan for implementing and sustaining the system." Organizational factors identified in discussion as critical to successful implementation of CPOE include strong medical and executive leadership; sponsorship and input from physician, pharmacy, and nursing leaders; a committed clinical informatics expert or champion; clear and well-documented implementation planning; commitment to making significant workflow changes; and ongoing support and maintenance.

One innovative approach to enhancing adoption of a CPOE system at a teaching hospital involved residents training house staff. One advantage to this design was that residents had intimate familiarity with the daily clinical activities for which the CPOE would be used. Thus, they could transfer knowledge efficiently and effectively. An important additional advantage was that this approach reversed traditional roles between residents and physicians and facilitated future interactions. Research indicating reluctance of junior colleagues to raise safety issues in the presence of senior faculty underscores the potential benefit of this innovation.[14] In contrast, some hospitals attempted to require use of a CPOE system with penalties for noncompliance. In one case, physicians rebelled, and the hospital ultimately withdrew the plan.

## Equip leaders to champion patient safety

One core message conveyed by hospitals was the importance of having a well-trained, charismatic leader who champions patient safety. Employees, and the safety climate, respond to clear and consistent messages from the chief executive (and from an executive-endorsed patient safety officer). Where program implementation efforts faltered, patient safety officers often attributed problems to lack of buy-in and support from the chief executive or medical officers.

A consistent message was a necessary but not sufficient precondition of successful implementation. Effective leadership required active engagement with employees at all levels of the institution. For example, one chief executive reported that he personally reviewed and signed off on each and every root-cause analysis performed in his facility.

More often than not, hospitals reported that simple, familiar activities produced the largest effect. Activities such as hospital staff breakfasts with senior leaders once a month in which staff were invited to raise safety concerns created an informal environment that provided valuable insights about safety concerns at the front line and allowed employees to directly observe the leadership's commitment to patient safety.

A few facilities took this commitment a step further and tied patient safety performance goals to management compensation. One such facility set a short-term patient safety performance goal of a 20-percent reduction in medication errors, falls, and skin breakdown, measured by chart review. There was some concern among hospital managers that tying compensation to reducing errors would reduce reporting of adverse events. However, participating hospitals reported no substantial change in the ratio of reported-to-measured errors.

CEOs, particularly those who are physicians without management training, were often inadequately prepared to champion new initiatives and to engage employees actively in this effort. On the other hand, manager-CEOs without clinical training faced greater challenges in understanding risks at the front line. Without leadership featuring both sets of skills, hospital safety efforts such as those described herein are unlikely to improve safety culture. Activities such as Leadership WalkRounds™ [15] or the Leveraging Front Line Expertise program (which was developed and piloted within the Patient Safety Consortium) provide structured programs in which hospital executives spend time in various units to enable them to learn about safety concerns at the front lines in their hospital. Such activities also help to build relationships with hospital personnel and to foster an open safety culture. Consortium hospitals that implemented Leveraging Front Line Expertise reported beneficial results, including enhanced trust between the executives and frontline personnel and insights about how to target safety improvement efforts.

## Provide systematic communication channels

Beyond committed leadership, hospitals believed that a culture of safety must be consistently communicated across the system. Key elements of this message

included (1) articulation of safety as the primary priority, even at the relative expense of production or efficiency; and (2) a nonpunitive environment. These elements also have been identified by other high-reliability organizations, including naval aviation, as important to safety culture in their domains.[16–18]

Regular communication channels helped convey important messages from leadership and enabled frontline workers to register concerns. "Team rallies," "huddles," "patient safety rounds," breakfast meetings, and newsletters were innovative tools described by Patient Safety Consortium participants as the primary methods for communicating with staff. They highlighted the need for facilities to use the channels consistently so that employees know when and how to expect communication.

Not all communication channels were equally effective. An employee satisfaction survey at one facility found substantial discontent about communication, despite considerable effort and plentiful information provided by senior managers. Employees felt the information from senior managers was not meaningful. Based on feedback from frontline workers, senior managers initiated at all levels of the organization 5- to 10-minute team huddles through which leaders communicated to managers and through which managers communicated to staff. This facility reported that huddles have been an effective means of communicating quickly. When an event occurred and the facility wanted to change procedures quickly, all employees were informed within approximately 1 day, and staff anticipated the procedural changes. The facility also required senior managers to submit content for the team huddles on a weekly basis, to ensure that information was consistently delivered from all executives to frontline staff.

## Open and close the improvement loop

Concern regarding the effectiveness of reporting systems in hospitals has generally centered on creating a blame-free environment and overcoming fear of repercussions. Our PSCHO survey results provide evidence of the need to address these issues in practice. In 2002, 7.8 percent of the respondents from the 12 hospitals agreed with the statement, "I will suffer negative consequences if I report a patient safety problem," and slightly less than 28 percent agreed with the statement, "If people find out that I made a mistake, I will be disciplined."

Consortium hospitals identified an equally important issue regarding reporting. Simply providing opportunities for employees to report problems is not sufficient. Rather, the organization must view reporting as a process, starting with establishing a nonpunitive environment and ending with feedback to employees about actions taken as a result of reported concerns.

One hospital described learning this lesson the hard way. It implemented and promoted a hotline for reporting safety concerns. Initial call volume outpaced hospital capacity to respond, and lack of communication about an intention to correct the problem resulted in a precipitous decline in calls along with increased skepticism among employees. This hospital learned the importance of swift follow-up, including acknowledgment and public recognition.

Facilities that succeeded in establishing a clear and precise blame-free policy reinforced the message that medical errors are system errors, and not individual errors. The focus of reporting in these facilities was on educating employees and correcting systemic problems through activities such as root-cause analysis. When a significant event occurred, the facility performed a root-cause analysis or similar activity and included those individuals involved in the event on the root-cause analysis team. One consortium participant stated, "It does not take long to get the message around the hospital that employees do not lose their jobs if they make a mistake."

## Think outside the box

Creative thinking played an integral role in responding successfully to errors. One hospital reported an example in which a certain medical product was the source of confusion and potential errors. Hospital personnel determined that employee education and better labeling were not sufficient preventive measures.

This hospital received a shipment of TB syringes with an orange stripe on the package. An e-mail was circulated among the clinical nurse specialists that warned coworkers about the new TB syringes because they looked like insulin syringes. The message made its way to the chief nurse executive, who shared the message with a vice president, who immediately pulled the syringes off of the shelves. Insulin syringes had always been orange, and this easily could have caused an error. The hospital tried to find another vendor but discovered that an international standards-setting organization had changed the color of syringes based on the needle size; all 25-gauge needles were now labeled with an orange stripe. The hospital explored options and found that the 27-gauge needle had a blue stripe. The hospital replaced all of its TB syringes with 27-gauge needles. Confusion among 25-gauge, orange syringes was clearly a potential problem in other facilities, and shortly after the incident the Institute for Safe Medication Practices published a warning about this problem.[19] This example demonstrates the need for innovation and creativity in seeking solutions.

## Turn data into information

Reams of unprocessed data are not useful for improvement purposes. Data need to be analyzed, succinctly reported, and tracked over time to identify and prioritize problems. Measurement is vital, but limited staff with limited budgets cannot measure and react to very large quantities of data. Several consortium hospitals reported falling into this trap at some point in time.

Instead, data can be used to examine and emphasize an organization's priorities. For example, one consortium participant from a large multihospital network created an injury graph that listed mistakes that had injured patients. In order to prepare this graph for a quarterly management meeting with 600 managers, she utilized 1 year of data from the hospital system's incident reporting database. Based on this analysis, she categorized injuries by hospital. She communicated the problem to managers at a management meeting by applying colored-coded stickers on each attendee's packet to represent one of the events.

The consortium participant then asked managers with red stickers to stand up, and told them that they represented a patient who was harmed last quarter at the facility. She continued this process for four calendar quarters. At the end, all of the managers were standing, and each had a powerful visual image of the number of patients who had been harmed by a mistake at the organization over the past year. The visual image helped motivate the organization to set system goals for reducing patient injuries. While other consortium participants raised concerns about challenges from their legal departments for use of data in this manner, this hospital determined the benefit was worth the risk.

Organizations that collect and review data regularly may be better equipped to respond quickly and to rectify problems. Employees at one consortium facility examined data on adverse events and realized that patient falls were a problem. As they reviewed the data, employees noticed that most falls were occurring in one particular unit. They found out that the slipper-socks distributed to patients were turning around when worn so that the treads were on top of the foot; in some cases the socks were turned inside out. Staff researched the issue and located slipper-socks that had treads all the way around. The facility also made a few basic changes, such as adding nightlights and reducing clutter in hospital rooms. As a result, falls decreased significantly.

## Use carrots instead of sticks

Recognition of effort through simple and inexpensive ideas like giving out pens or mugs in association with patient safety training or goal achievement seemed to motivate entire hospitals. Consortium participants also reported employee enthusiasm for games such as "Patient Safety Trivial Pursuit." These activities to promote awareness did not necessarily occur during meetings, but were integrated into the hospital environment.

Hospital administrators also received positive feedback from employees when they gave staff greater ownership of patient safety goals and education. One hospital created an "education chain" by giving employees the opportunity to train peers on safety issues. As a result, trainers became more involved in reinforcing patient safety practices on a daily basis.

# Conclusion

Our safety climate survey results provide the most complete available information in an observational study on the attitudes and experiences of workers regarding the following issues: the safety climate in hospitals, how perceptions of safety climate differ among hospitals, and how safety climate changed from 2001 to 2002. While findings suggest modest improvements in some areas between 2001 and 2002, these results are still not definitive, as there were too few hospitals in our sample and too short a period of time between assessments to identify true change.

No single intervention to improve safety culture and patient safety was systematically implemented by hospitals or tested by this survey or other methods. Rather, participating hospitals reported and shared ongoing initiatives to improve safety. While knowledge about how to improve safety culture is largely not codified and is context-dependent, and therefore is difficult to transfer among institutions, recommendations shared among Patient Safety Consortium participants revealed lessons that may be useful for other hospitals contemplating efforts to improve patient safety. Examples illustrate that necessary actions are neither surprising nor revolutionary. Rather, Patient Safety Consortium hospital participants emphasized that developing a culture of safety and safer hospitals requires pervasive and consistent effort over time. It will also require investment in the technological infrastructure to support safe and effective care.

Continued effort should be devoted to improving the culture of safety in hospitals. Further study of hospital efforts to improve safety culture is also needed. Particularly useful would be better knowledge about mechanisms by which senior managers can most successfully transmit their commitment to safety and gain awareness of safety risks in clinical workplaces of greatest hazard.

Health care institutions may need to make substantial changes in structures and procedures to achieve safety climates consistent with other high-reliability organizations such as naval aviation or nuclear power.[20] Surveys such as the PSCHO instrument provide a useful tool to examine interventions aimed at improving safety climate and their effects on patient outcomes and other measures of hospital performance. Cooperative and sustained networking opportunities, which allow facilities to share recommended practices and to learn from the experience of other organizations, can motivate and enhance hospital efforts in patient safety.

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