Title of the Project: Quality Care and Error Reduction in Rural Hospitals

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1. STRUCTURED ABSTRACT

Purpose: This 4-year, rural intervention study was designed to improve patient safety, encourage the disclosure and reduction of error, and identify the *best practices* for error reduction in rural healthcare settings.
Scope: The study focused on interdisciplinary teams of rural healthcare providers and hospital staff across 30 rural hospitals in a nine-state area of the rural west. Studies were designed to (1) explore the relationship between the organizational factors that directly influenced the rural healthcare provider, the delivery of patient care, and the identification, discussion, and disclosure of medical errors, near misses, and adverse events; (2) increase patient safety by developing and implementing an accessible, web-based curriculum that raised awareness, encouraged reporting, and built skills to address errors and adverse events; and (3) assess the impact of interventions on the safety and quality of patient care in rural hospitals.
Methods: This study employed a multi-method approach that included a data sheet for each hospital, three surveys, ongoing key informant interviews, development and provision of a case-driven curriculum, and textual analysis of responses to case studies.
Results: Profound professional differences in definitions of error, limited recognition of error, and systemic barriers impeded patient safety in rural settings. The use of a case-based curriculum promoted changes in recognition, attitudes, and behaviors across professions with respect to errors, and it broadened the scope of patient safety interventions. It resulted in increased collaboration and successful protocols for system-wide dissemination.
Key Words: patient safety, rural, errors, ethics, disclosure, hospital, reporting, interdisciplinary.

2. PURPOSE

This research project had three objectives: (1) explore the relationship between the organizational factors and working conditions that directly influenced the rural healthcare provider, the delivery of patient care, and the identification, discussion, and disclosure of medical errors, near misses, and adverse events; (2) use the data from all research studies to increase patient safety by working with interdisciplinary teams in rural hospitals to develop and implement a web-based intervention, in the form of a curriculum, accessible to rural healthcare providers and designed to raise awareness, encourage reporting, and build skills to address errors and adverse events; and (3) assess the impact of interventions on the safety and quality of patient care in rural hospitals.

3. SCOPE

Background: At the time this project was funded, little was known about the status of patient safety in rural areas or the extent to which urban interventions could be transplanted into rural settings. To respond to this lacuna, our research focused on the working conditions in rural healthcare settings and the factors that

shape recognition, reporting, disclosure, and resolution of patient safety issues, including errors and adverse events. This research agenda directly responded to the needs of rural healthcare providers to know what kinds of errors are most likely to occur, how such problems can be discussed and resolved, and what kinds of resources might be most helpful when trying to increase safety.

Context: This 4-year rural patient safety study was conducted in 30 hospitals in a 9-state area of the rural west. A geographic area of this size offered two important benefits: it ensured the anonymity of participating hospitals, and it allowed us to examine safety issues across different systems.

Settings: The participating hospitals were representative of those found in states with large rural populations; they included acute care facilities (69%) or a combination of acute and long-term care facilities (31%). The majority of hospitals (75.9%) had fewer than 50 acute care beds. Although most hospitals had an on-site pharmacy (82.8%), only 34.5% had an on-site pharmacist full time. In some cases, the pharmacist was on-site only a very limited number of hours per week. All hospitals had access to the internet and email.

Participants: In each hospital, we created interdisciplinary teams of three to five healthcare providers (physician, nurse, pharmacist, and administrators, including quality control personnel) who agreed to participate in an ongoing series of research efforts throughout the grant cycle. One team member served as a key contact, agreeing to facilitate activities and be contacted on a regular basis. One of the studies we conducted, a survey, was administered to staff throughout each participating hospital.

Incidence: According to a report authored by the Institute of Medicine (IOM), medical error ranks somewhere between the fifth and eighth leading cause of death in the United States. The report, entitled *To Err is Human*, noted that more people die as a result of medical errors or mistakes in judgment than die from motor vehicle accidents, breast cancer, or AIDS. When issuing the report in 1999, IOM called for a 50% reduction in errors within 5 years.

Prevalence: Rural America comprises approximately 20% of the US population. Because few studies have focused on patient safety in rural healthcare settings, very little data were initially available to asses the incidence or prevalence of errors or adverse events in rural areas. Our study has yielded important findings that shed light on patient safety in rural settings.

4. METHODS

Study design: This multi-method study was designed to focus on the multifaceted and complex processes and systems within the organization that will have a direct bearing on the development and acceptance of a patient safety culture. The study built on the findings obtained from nine previous studies, conducted by the authors over a 7-year period. As noted by the American

Statistical Association, analysis of a series of small studies cannot only reach strong conclusions, but can also suggest superior ways to implement the intervention, and it may identify the subpopulation of subjects on whom the intervention is most effective. The research agenda included eight sub-studies that employed both qualitative and quantitative methodologies. Participation in this effort was based on self selection, a necessary criteria given both the long-term time commitment needed and the sensitive nature of the topic of patient safety. As data emerged and were analyzed, results and resources were shared with participating team members in each hospital via a website and ongoing emails. This approach helped us forge an ongoing relationship with the research sites, helped inform each successive study, and facilitated system change. The success of this approach was evidenced by that fact that, after nearly 4 years, none of the original hospitals left the study; instead new hospitals joined, and healthcare providers remained actively engaged in the dialogue.

Data source: The data collection instruments included the following: (1) hospital data sheet; (2) a Close Call Pilot Culture Assessment Instrument, developed by the VA National Center for Patient Safety; (3) an open-ended Error Assessment Tool developed by the project investigators; (4) quarterly interviews with the key contacts in each hospital; (5) online/email questionnaires (6) responses to case studies; (7) a staff-wide patient safety survey; and (8) a final evaluation survey.

Each study provided some very specific information about working conditions and patient safety. The hospital data sheet provided basic information about the structure, size, and resources available at each hospital. The Close Call Culture Assessment Instrument provided a landscape view of the research population. The data indicate that the sample is well-balanced, consisting of healthcare providers with, on average, 20-year careers in healthcare and approximately 11 years of experience in their healthcare facilities. The majority of all respondents indicated high satisfaction with their jobs and a high level of concern about patient safety. Most indicated they were “proud” to be working for their facility and most believed their facilities were genuinely concerned about patient safety.

The Error Assessment Tool provided data relative to actual practices – what was actually recognized as an error in each setting and what was reported. The quarterly interviews provided the opportunity to discuss the kinds of patient safety issues that developed in each hospital and the processes used to respond to them. The email questionnaires allowed us to explore information about specific issues, such as pharmacy protocols when questionable or unclear orders for medications were received. The case studies and companion questions, emailed to all team members on a regular basis, helped identify the kinds of events that are recognized as errors and what might be done to respond to them. The Staff Survey provided information on the system-wide recognition and response to errors. And the final Evaluation Survey of participants allowed us to assess the overall impact of the project and the lessons learned.

Interventions: All the participants were assigned a username and password to access a distance learning web-based platform. The platform contained a patient safety curriculum with a variety of resources, such as links to patient safety websites, case studies, articles, and resources pertaining to medical errors and adverse events. The participants rated the curriculum as helpful and relevant, but user statistics indicated that the use was limited and fairly intermittent. When seeking feedback, the healthcare providers reported that time constraints prohibited frequent or consistent use of the curriculum.

To adjust to this constraint, we redesigned the curriculum so that patient safety issues, as well as important concepts, definitions, standards, and other resources, were presented via a succinct, tightly structured case study format. The case study format evolved as a collaborative effort among team members and researchers. The study participants would provide examples of problematic and potentially harmful situations, and the researchers would then shape them into case studies. The format was pilot tested and revised as needed. Over the course of the project, the case studies progressed from depicting the kinds of problems most typically recognized and identified as problematic (medication errors and patient falls) to less easily recognized problems (diagnosis and treatment errors).

Each case study was emailed directly to the research participants who were asked to respond to a series of questions that accompanied each case study. The questions also went through a series of revisions to overcome the initial resistance to identifying depicted issues as errors. When we initially asked if the case contained an error, the healthcare providers were reluctant to identify it as such, even when the case study included the IOM criteria and definition of error. To overcome this resistance, we began asking if the depicted situation has happened or could happen in their settings. We then asked the participants to analyze each case study by identifying the topic, issues, learning points, clinical guides, and room for improvement. The responses were summarized, shared with the participants, and posted on the distance learning platform. Participants were also asked to disseminate the case studies and summaries to staff in their hospitals for further discussion, dialogue, and action.

As part of the intervention, the participants were also given reports of the findings from all the sub-studies on an ongoing basis. This feedback loop allowed participants to compare perceptions with actual findings. This comparison allowed participants to identify needed interventions and gauge progress toward the development of a culture of safety.

Measures: Our interventions were assessed on an ongoing and iterative basis through the responses to the cases and summaries, quarterly interviews, and surveys. We collected information on such variables as interdisciplinary communication and collaboration, participation, awareness and recognition of errors, changes in attitude, changes in hospital policies, use of new approaches

and protocols, processes of measuring errors, and barriers to adopting patient safety interventions.

Limitations: The use of the research clinical trial to obtain causal relationships occupies a place at the top of hierarchy of evidence. For our research, this methodology was not appropriate for both ethical and pragmatic reasons. Our approach, looking at a single question through several prisms, has a long-standing history in many research communities. Triangulation is used to satisfy concerns about validity and reliability, and, when similar results emerge from varying vantage points, their credibility increases.

5. RESULTS

5A. FINDINGS: Our findings can be grouped into three major categories: (1) working conditions and professional barriers that influence the development of a culture of safety; (2) internal and external system or organizational barriers that impact the adoption of interventions; (3) individual level barriers related to cognitive perceptions and behavioral responses to errors.

Working Conditions Barriers: Healthcare providers consistently note the theoretical importance of safety. However, lack of time, interdisciplinary communication, and associated issues, including unequal power relationships, hierarchical decision-making, lack of interdisciplinary interaction, and lack of feedback on error reporting, all emerged as serious barriers to patient safety. These barriers contribute to a culture in which the lack of shared experiences becomes the norm. These conditions result in fundamental differences among the professions in areas such as agreement and recognition of errors, so awareness is needed for these profession-shaped differences in perceptions, attribution of responsibility for patient safety, and willingness to take action when encountering unsafe situations.

Internal System Barriers: Our data indicated that most rural hospitals lacked formal or mandatory systems for reporting close calls, errors, and adverse events. Most rural healthcare providers have never conducted RCA or FMEA analyses, and they report inconsistent opportunities for participation in any other error analysis process. Systems for feedback mechanisms are not well established. Indeed, most healthcare providers lacked familiarity with their hospitals' safety program. Even when safety systems were in place and errors were recognized, such recognition and reporting typically were limited to medication-related errors and adverse events. This focus on medication errors is so linked to patient safety that other kinds of errors, such as those associated with diagnosis and treatment, are rarely recognized, discussed, reported, or disclosed to patients. The lack of recognition and response means that certain kinds of errors were likely to recur.

Furthermore, most healthcare providers also reported inconsistencies in staffing patterns and regular use of part-time locums. These staffing patterns hindered the development and implementation of policies and protocols that heightened levels of safety. Hiring arrangements for physicians seemed to be an issue that requires further investigation. When the physicians were employed by the hospital, the hospital appeared to have some control over the physicians' adherence to standards and protocols. However, when the physicians were self-employed and merely maintained hospital privileges, hospital control over behavior was considerably diminished. Overall, these patterns made it difficult to sustain organizational protocols for patient safety that went beyond recognition and resolution of a narrow spectrum of errors, such as medication-related errors. In this kind of an environment, it is not surprising that the healthcare providers who promoted safety or reported other kinds of errors were seen as “picky” or unduly critical of peers.

External System Barriers: Healthcare providers consistently reported limited access to appropriate guides, standards, and other patient safety resources that were relevant and appropriate in a rural environment. They noted that most clinical guides were written for specialists, whereas most rural healthcare providers were generalists. They also reported that the technological interventions designed for large institutions may not fit the scales of economy that are typical in small places.

Individual-Level Barriers: Our data suggest that there was a fundamental misalignment between what people believe and what they actually do when faced with patient safety issues. This split between cognition and behavior, coupled with the poorly understood construct of patient safety, makes it difficult for rural healthcare providers to consistently recognize and respond to unsafe situations. Even when healthcare providers reported a willingness to take action, they did not consistently recognize, or agree on, situations that required actions. The VA Close Call Culture Assessment provided insights relative to healthcare providers’ *perceptions* about patient safety and error reporting in their healthcare settings. Initial findings appeared quite promising. A majority of the team members indicated that their facility leadership did not punish people who reported safety discrepancies (on a 5-point scale, ranging from disagree strongly to agree strongly; 70.8% agreed strongly, and 23.1% agreed slightly). All the team members agreed, to some extent, that their healthcare settings were genuinely concerned about safety (70.8% agreed strongly, 29.2% agreed slightly), and most of them also agreed that they had an effect on work safety (80% strongly, 16.9% slightly).

Moreover, a majority of the team members agreed with the statement that, when somebody else makes a mistake, they would like to know about it so that they would not make the same mistake (50.8% agreed strongly and 32.3% slightly). Correspondingly, a majority of them agreed that their job performance had improved as a result of learning about mistakes made by other staff members (26.2% agreed strongly, and 52.3% agreed slightly).

Most disagreed (63.1% strongly, 27.7% slightly) with a statement that seeing a coworker making a mistake would negatively affect their respect for that coworker.

Finally, more than half of them believed that, within their facility, good communication flow existed up and down the chain of command (18.5% agreed strongly, 43.1% slightly). In general, respondents appeared more positive than neutral or negative when rating all of these issues. However, when rating good communication flow and learning from the mistakes of others, the significant differences among those who agreed *slightly* as opposed to *strongly* suggested that there may be some concerns.

Similar findings emerged from the Staff Patient Safety Survey administered in participating hospitals. The majority of the healthcare providers also offered positive ratings with respect to their institutional culture on patient safety and error. Most believed that the culture in their hospital was “anyone can make mistakes” (64.5%) and that the error reporting system was open to all employees (86.4%), confidential (69.1%), and impartial (55.7%). Moreover, the majority of the staff reported they felt comfortable (64.7%) or somewhat comfortable (31.5%) discussing the topic of medical errors.

Although the above findings suggest a positive and proactive environment, data from the Error Reporting Tool (consisting of eight open-ended questions) suggested that rural healthcare providers have had limited exposure to, or experience with, medical errors. Most report they have encountered *only* medication-related errors (the wrong time, dose, drug, or mode of delivery), patient falls, and illegible handwriting. Experiences with the reporting and charting of errors were limited to these same types. Similar findings emerged when conducting quarterly interviews in each hospital. Key contacts in each hospital detailed organizational efforts to reduce medication errors and, to a lesser degree, patient falls. They also identified these two areas as issues they would continue to prioritize in their hospitals. Similar findings emerged again when the team members responded to case studies that depicted the kinds of medication-related errors that were described as *most prevalent* in the Error Tool Survey and *most frequent* in the Staff-wide Patient Safety Survey; research participants generally recognized them, identified them as errors, indicated they should be documented via incident reports or in the patient chart, and suggested strategies that would improve patient care.

However, when given case studies that showed *any other kind* of error, such diagnoses or treatment errors, there was no agreement about the nature of the incident, including how it should be resolved, charted, or disclosed. Moreover when, during quarterly interviews, the healthcare providers were asked about the incidence of any errors other than medication-related ones, they uniformly reported that they had “not gone there yet.” As one healthcare provider explained: “Many times, other errors may be more serious than the medication error, but they are more difficult to detect; for example a missed treatment is not

immediately visible to an oncoming nurse, whereas, in our system, a medication not dispensed at the appropriate time is still in the patient's 'med drawer,' so we see it."

5B. OUTCOMES: The multi-method approach provided a fuller appreciation of the factors that influence patient safety in rural healthcare settings. These factors then guided the development of a case-based curriculum intervention. This approach fostered use of a common language and provided common experiences for rural healthcare providers. The language and experiences helped healthcare providers recognize the discrepancy between what they thought about patient safety and what actually occurred in their hospitals. It also allowed them become aware of the differences in perspective among professions. This "reality testing" allowed them to recognize behaviors that increase the risk of errors. This reality testing helped obtain staff-wide support for patient safety initiatives in the rural settings.

Findings from the final evaluation indicated the extent to which the intervention was effective. Attrition was extremely low for the entire 4 years of the project, and all the hospitals remained in the study until the close of the project. Participants found a variety of ways to use the case-based curriculum. The majority of our hospital team members reported that they not only read the weekly case studies and summaries (94.8%) but also shared them frequently with other hospital staff (79.5%), such as chief medical officers, directors of nursing, staff nurses, pharmacists, physicians, risk managers, ethics committee members, or "various departments that could learn from a particular case." The subsequent within-hospital distribution routine was judged as effective by most of our participants (77%) and generally included a combination of methods, such as forwarding electronic copies to other staff, posting paper copies on bulletin boards and in department communication books, and discussing cases in staff meetings, ethics committee meetings, continuing education meetings, and regional network meetings. This methodology proved to be a cost- and time-effective way to disseminate information throughout the hospital system.

Our findings confirm that the weekly case studies resonated with our rural healthcare providers because the cases were practical and responsive to providers' needs and concerns. The majority of our participants reported that the weekly case studies were relevant (92.3%), useful (92.3%), and resembling situations that happen in their hospital (74.3%). Moreover, the case summaries were judged as valuable (93.7%) and as providing information and ideas of which they were previously not aware (71.8%). Furthermore, the majority of our participants reported that the weekly case studies and their summaries had a positive impact on interdisciplinary collaboration (51.4%) and contributed to a change in the organizational safety climate (64.7%).

As a key outcome, the case studies helped the participants overcome resistance to looking at what goes on in their settings. Participants also reported that the case studies gave them a sense of "not being alone." These outcomes were cited as major benefits of participating in this project. Indeed, participants noted that the case studies served as an impetus for discussing and implementing needed policy changes. The awareness gained through participation allowed the healthcare providers to recognize the role that communication and collaboration play in achieving patient safety. Indeed, the vast majority (69.1% to 79.5%) wanted better communication among the various professional groups.

The use of case studies seemed to offer a way to achieve system change. Based on lessons learned from the case studies, the participants engaged their own hospitals in continuing education activities, policy development, and review of current practices and problem, such as frequent readmits to the emergency room, transfer of patients between institutions, and appropriate protocols for discharge.

5C. DISCUSSION: The study was designed to assess what patient safety issues develop in rural settings and identify the conditions, including working conditions, under which system change can occur. The complexity of this goal required a number of different studies. If we had conducted only one or two studies, for example a pretest and posttest, we might not have gained sufficient knowledge about the degree to which errors are recognized, the extent of the professional differences in definition of errors, and the multiple factors that hinder willingness to take corrective action.

Our study showed that three key conditions must be met in order for system change to occur: (1) shared recognition of unsafe practices; (2) belief that the consequences of recognition can be handled; (3) belief that organizational changes, or corrective actions, are possible and will occur. If *any* one of these conditions are not met, resistance to any kind of intervention or action is heightened. The extent to which these conditions influence behavior was showcased by a nurse in our study who had attended a seminar on prevention of wrong-site surgery. Soon thereafter, she was assisting during a knee surgery and she and other staff suspected that the surgeon might be operating on the wrong knee. Despite her training and this nagging doubt, she and her colleagues did not have the courage to challenge the physician.

The patient safety literature calls for the creation of a culture of safety. To achieve such a culture in rural settings, serious barriers or conditions have to be overcome. The power imbalance, such as that experienced by the nurse in the vignette above, is further exacerbated by the scarcity of healthcare providers as well other resources in rural areas. Rural healthcare providers often talk about "being one doctor away from disaster." Just the fear of losing a physician can jeopardize the development or implementation of patient safety initiatives. This unwillingness to take action might complicate interpersonal relationships and

create real consequences for the nursing staff, administration, and pharmacy in terms of their relationships with the medical staff.

For example, throughout the interviews we conducted over the 4 years, members of the nursing staff expressed reluctance to acknowledge medical errors. They noted that it was not within their scope to question doctors. When encountering mistakes, they were to make certain that problems were fixed but not necessarily reported. If nurses did report, they noted that the usual procedure involved referring the issue to the M&M and the medical staff; rarely did they receive any feedback on their reporting. Administrators said they did not have the medical knowledge to question diagnosis and treatment issues, and so they had to rely on the physicians to solve “their own problems.” Physicians reported that they rarely “looked over each others’ shoulders.” Pharmacists, who acknowledged that they frequently changed incorrect orders from physicians, also noted that those incorrect orders were never regarded as mistakes or errors. These conditions create an environment in which it takes great courage to recognize and report errors or advocate adoption of patient safety practices. Just moving from nonrecognition to recognition is a huge achievement and an essential first step toward system change.

These cultural factors underscore the need for both interdisciplinary efforts as well as multi-method approaches to fully explore and respond to the conditions that influence patient safety in rural healthcare settings. Our findings suggest that rural healthcare settings need “change agents” who can drive the pursuit of safe practices. The change agents, in turn, require ongoing feedback about needs and opportunities to experience the consequences of their new knowledge. By continuously sharing the results from the different studies, we created the conditions that supported the examination of both perceptions and behaviors. This feedback loop kept participants involved and helped them see gaps in practices and areas that required attention. This method also served as a reality test. Pharmacists and administrators indicated that, based on information and insights gleaned from the project, their hospital data on errors were probably not accurate. Nurses and physicians noted their surprise at discovering the extent of their differences in both approaching and resolving patient safety issues.

A key issue, and one that really requires serious attention, is the attribution of responsibility for patient safety to nurses. In part, this attribution may reflect the limited definition of what constitutes an error (medication) in most rural settings. When the nurse gives the wrong dose, it is recognized as an error. But when a physician orders a wrong dose, the pharmacist corrects the order and it is not viewed as an error. Errors, other than medication-related ones, can be difficult to recognize. In this context, most errors are attributed to the nursing staff, so overall responsibility for patient safety falls within the realm of nursing. This orientation has not encouraged a thorough examination or appreciation of the scope of the patient safety problem. This finding was evidenced by data from

the patient safety staff survey that show that the same kinds of errors recur with some frequency in rural settings.

The curriculum, wrapped in a case study modality, seemed to overcome, and bring to the fore, some of the barriers that have discouraged system-wide examination of patient safety issues. By depicting situations that occurred with some frequency in rural hospitals, issues were familiar to participants. At the same time, the issues were disconcerting because they represented a widespread lack of quality care. By taking part in the analysis and development of case summaries, healthcare providers became uncomfortably aware of their professional differences in recognition and response to error as well as their tacit acceptance of unsafe care.

Throughout the research cycle, we learned the importance of sensitivity, on the part of the researchers, to the choice of words. Through our previous studies on ethics and rural healthcare, we had learned that a direct question about what ethical issues rural healthcare providers face was met often with silence. In order to discern what such issues might look like in the rural context, we had to rephrase the questions and make them less emotionally loaded.

Likewise, when we first began asking the participating healthcare providers to identify the errors depicted in the case study, the healthcare providers were extremely hesitant to designate issues as errors. Because of this hesitancy, we changed the wording to a more value-free language. The hesitancy was immediately dispelled when we began to ask the participants whether an event similar to the one depicted in the case could occur, or had occurred, in the participants' own settings; "Were you here last week," was a response we heard over and over.

To further neutralize the questions and facilitate involvement, we developed a standard template that asked the participants to identify each case study's central topic, key issues, learning points, appropriate clinical guides and standards, and strategies for improvement. This approach seemed to help the healthcare providers overcome the emotional barriers associated with identifying errors and allowed them to avoid the stigma of denoting errors. This, in turn, helped healthcare providers recognize unsafe situations and begin to envision solutions to unsafe situations.

5D. CONCLUSIONS: Patient safety requires changes in attitudes, beliefs, and behaviors. To achieve such changes, it is important to devise practical and experiential ways that teach healthcare providers what patient safety means and how safer care can be achieved. Our findings suggest that such interventions need to be designed so that healthcare providers can easily and effectively get involved in patient safety efforts. Patient safety researchers need to remember that research and decisions are processes, not events, and so require a broad range of data gathering methods in order to achieve a well-founded and

accurate understanding of the barriers or other factors that influence the adoption of safe practices. For example, we strongly believe that if we had used just one method of contacting or involving the participants in this study, it would have failed or the results would have been meaningless. We learned that quarterly interviews are better done over the phone rather than by email. Case studies are better emailed rather than just posted on a website that requires usernames and passwords.

It is also important to realize that two issues, (1) the profound differences in definition and recognition among healthcare providers and (2) the extent to which interdisciplinary collaboration and dialogue are lacking, pose serious implications for successful patient safety interventions. Even though the majority of participants acknowledged that the project had had a positive impact on interdisciplinary collaboration and dialogue (51.4%), the vast majority still indicated that they would like to see improvements in interdisciplinary, as well as intradisciplinary, communication.

Participation in this study seemed to help healthcare providers recognize the limited extent to which they communicate with one another. The recent trend within the patient safety movement, which is to use technology to help avoid medical errors and adverse events, must be balanced with equal attention to improving and increasing interdisciplinary communication. It is seductive to think that technology will reduce the need to focus on communication. For example, in some of the rural sites, staff meetings and verbal reports at shift changes have been replaced by taped messages. This may seem efficient, but such practice prevents interpersonal dialogue. Our data suggest that the failure to appreciate the need for interpersonal and interdisciplinary communication can seriously impede efforts to improve patient safety.

5E. SIGNIFICANCE: For the future of the patient safety movement, it is important to pay attention to some significant findings that, if overlooked, may stall the process. To make any progress in reducing errors, we have to acknowledge the radically different perspectives among the health professions on definitions, recognition, approaches, resolutions, and responsibilities for increasing safety. We have to learn more about what these different perspectives within the professions mean in terms of recognizing and reporting unsafe situations. Finally, we have to discover how we can help healthcare providers progress from recognition of errors to willingness to take action and adopt safe practices.

Our study suggests that the use of a case-based curriculum shows potential in achieving changes in attitudes and culture and, to some extent, working conditions. This approach seems to be effective for several reasons. First, the process of developing the case studies requires identification of critical issues. Second, the methodology used for analysis of the studies lends itself to systematizing information and providing ongoing education and training on

patient safety. Third, our email approach offers a way to integrate education into a busy working schedule. This integration seems to retain the interest of healthcare providers, keeping them focused and engaged. Thus, patient safety stays on the radar screen. Fourth, the format for accompanying questions (topic, issues, guides, learning points, room for improvement) offered a structured way for participants to play with different scenarios in a nonthreatening and non-shaming way. Fifth, the approach is conducive to generalizability as new situations develop; thus, it can be used for training in other areas, such as pain management.

This study showcases the value of a multi-method approach when dealing with complex and multilayered problems. We learned that knowledge is not enough to change behavior. We learned that access to resources did not ensure their use. We learned that even the best of intentions do not necessarily guarantee follow-through or willingness to take action. We learned that data (such as error reports) are only as valid as the understanding of the concept behind the data. The methodology we employed can be effectively used to identify areas for future research studies.

5F. IMPLICATIONS: At the outset, the fundamental split between nurses and physicians in how they perceive and act on errors needs to be bridged in order to achieve safer care. If these profound differences are not recognized and if healthcare providers lack awareness of them, attempts to improve safety or take action are discouraged and make proactive measures unlikely. Long-term and sustained interventions are needed to help rural settings set reasonable goals and learn how to measure them.

We have to find ways to help healthcare providers move beyond their tradition-based perceptions (i.e., the belief that care in one's hospital is safe) so that they can recognize the full range of errors that actually occur. Our participants identified several areas relative to working conditions that need further improvement in their hospitals. Areas include better communication among medical staff (79.5%); better communication between nurses and physicians (89.7%); better communication between nurses and pharmacists (69.2%); better communication between physicians and pharmacists (69.2%); further improvements in communication with patients (82.1%); and further improvement in interdisciplinary collaboration (79%). Given these reports, serious attention has to be given to designing interventions that increase, rather than decrease, discussion, dialogue, and collaboration.

Our study identifies the importance of figuring out what healthcare providers want to know and what types of evidence they need. There appears to be a need for better access to basic and fundamental resources, such pocket guides, simplified clinical standards, and templates for protocols and policies. Indeed, the participants consistently reported that they did not have adequate access to useful clinical guides, standards of practice, and other resources.

At the same time, the healthcare providers did not consistently use resources that were provided if access was at all problematic. For example, healthcare providers acknowledged that the internet is a wonderful tool, but accessing links and finding and downloading information can be very time-consuming and hard to fit into the daily schedule. This suggests that resources have to be (1) highly relevant; (2) easy to fit into the daily schedule; (3) easy to find; (4) authoritative; and (5) easy to share. Dissemination via email – an affordable, accessible, low-tech approach – emerged as a very good way to meet these conditions in rural settings.

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