

## AHRQ GRANT FINAL PROGRESS REPORT

**Title: Improving Patient Safety through Provider Communication Strategy Enhancements**

**Principal Investigator:** Kay Daugherty, RN, PhD  
**Team Members:** Catherine Dingley, RN, FNP, PhD; Co-Investigator  
Mary Derieg, RN, DNP  
Rebecca Persing, RN, DNP  
Denise Johnson, BS  
Amy Irwin, RN, DNP  
Patricia Gabow, MD  
Phil Mehler, MD  
Richard Albert, MD  
Sheri Eisert, PhD

**Organization:** Denver Health Medical Center

**Inclusive Dates of Project:** July 1, 2005 – June 30, 2007

**Federal Project Officer:** Eileen Hogan

**Agency Support:** Agency for Healthcare Research and Quality (AHRQ)

**Grant Award Number:** 1 U18 HS015846

**Author affiliations:** All authors are affiliated with Denver Health Medical Center, Denver, CO.  
*Address correspondence to:* Catherine Dingley, RN, PhD, Department of Nursing Quality, Outcomes, Research, and Evidence-Based Practice, Denver Health Medical Center, 777 Bannock Street, MC 0260, Denver, CO 80204-4507; email: Catherine.Dingley@dhha.org or CDingley@aol.com; project website: <http://www.safecomms.org>

## STRUCTURED ABSTRACT

**Purpose:** The purpose of this study project was to develop, implement, and evaluate a comprehensive team communication strategy, resulting in a toolkit generalizable to other settings of care. The specific aims include implementation of a structured communication tool (SBAR); a standardized escalation process; daily multidisciplinary patient-centered rounds using a daily goals sheet; and team huddles.

**Scope:** The study setting was the 477-bed medical center of Denver Health and Hospital Authority, an integrated urban safety-net system.

**Methods:** Utilizing a pretest–post-test design, baseline and post-intervention data were collected on pilot units (medical intensive care unit, acute care unit, and inpatient behavioral health units). Implementation of the safe communication strategies involved extensive staff education using multiple strategies: presentations by a communication expert, unit-based “fast talks,” visual reminders, SBAR, and communication forms.

**Results:** Analysis of 495 communication events initiated by nursing staff revealed decreased time to treatment, increased nurse satisfaction with communication, and higher rates of resolution of patient issues post intervention. The resultant web-based toolkit (<http://www.safecomms.org>) is available to assist other healthcare organizations in implementing teamwork and communication strategies in their settings.

**Key Words:** Teamwork, communication, patient safety, SBAR, huddles, daily goals sheet, multidisciplinary rounding, escalation process

### PURPOSE

The overarching purpose of this study project is to develop, implement, and evaluate a comprehensive provider team communication strategy for safe practice intervention, resulting in an implementation toolkit that can be generalized to other settings of care. The specific aims include:

1. Implementation of a standardized communication tool, the SBAR (Situation, Background, Assessment, Recommendation), as a guide for communicating changes in patient status
2. Implementation of an escalation process tool to facilitate timely communication
3. Implementation of daily multidisciplinary patient-centered rounds using a daily goals sheet
4. Team huddles each shift to quickly brief staff on unit operational issues

### SCOPE

#### Background

Current research indicates that ineffective communication among healthcare professionals is one of the leading causes of medical errors and patient harm.<sup>1-3</sup> Reviews of reports from the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) reveal that communication failures were implicated at the root of over 70% of sentinel events.<sup>4</sup> The National Council of State Boards of Nursing reports that nurses, when asked to select contributing factors to patient care errors, cited communication issues with physicians as one of the two most highly contributing factors.<sup>5</sup> In a study of 2000 healthcare professionals, the Institute for Safe Medication Practices (ISMP) found intimidation as a root cause of medication error: half of the respondents reported feeling pressured into giving a medication for which they had questioned the safety but felt intimidated and unable to effectively communicate their concerns.<sup>6</sup>

The growing body of literature on safety and error prevention reveals ineffective or insufficient communication among team members as a significant contributing factor to adverse events. In the acute care setting, communication failures lead to increased patient harm, length of stay, and resource use as well as caregiver dissatisfaction and turnover.<sup>7-12</sup> In multisite studies of ICUs, Knaus, Shortell, and colleagues found that specific factors, including poor collaborative communication among nurses and physicians, contributed to increased patient risk-adjusted mortality and length of stay as much as 1.8

fold.<sup>13-15</sup> Other researchers investigated team communication in the operating room, analyzing 421 communication events, and found that communication failures occurred in approximately 30% of team exchanges; one third of these resulted in effects that jeopardized patient safety by increasing cognitive load, interrupting routine, and increasing tension in the OR setting.<sup>2</sup> Lingard and colleagues found that communication problems in their study were relatively straightforward and placed them in the following four categories: communications that were too late to be effective; failure to communicate with all the relevant individuals on the team; content that was not consistently complete and accurate; and communications whose purpose was not achieved – issues are left unresolved until the point of urgency.<sup>2</sup> Examining the outcomes of communication, other researchers found associations between higher nurse-physician communication/collaboration and positive patient outcomes: lower mortality, higher satisfaction, and lower readmission rates.<sup>16-18</sup>

A number of inter-related dynamics make effective communication a challenge among healthcare professionals. First, healthcare is complex and unpredictable, with a variety of disciplinary professionals involved in providing care at various times throughout the day, often dispersed over several locations, creating spatial gaps with limited opportunities for regular synchronous interaction.<sup>7</sup> In addition, care providers often have their own disciplinary view of what the patient needs, with each profession prioritizing the activities in which it acts independently.<sup>7</sup> The organizational structure of healthcare facilities has historically been hierarchical, with significant power distances between physicians and other healthcare professionals, frequently creating a culture of inhibition and restraint in communication rather than a sense of open, safe communication (psychological safety). Differences in education and training among professions often create different communication styles and methods that further complicate the scenario and render communications ineffective. Though teamwork and effective communication are crucial for safe patient care, a gap exists in the educational curricula in most healthcare professions; the focus is primarily on individual technical skills, neglecting teamwork and communication skills.

An additional consideration is the cultural barrier that exists in many organizations, based on the belief that quality of care and error-free performance are the results of professional training and effort, not recognizing the inherent limitations described in human factors science.<sup>3</sup> Human factors related to cognitive overload; the effects of stress, fatigue, distractions, and interruptions; poor interpersonal communications; imperfect information processing; and flawed decision making are known to contribute to errors in healthcare and other complex environments, such as aviation.<sup>3,6</sup> Lack of recognition and understanding of these issues creates a culture of unrealistic expectations and blame, diverting efforts away from effective team-based error management strategies.

To date, intervention-focused research that seeks to improve collaborative communication is lacking.<sup>19</sup> Interventions should focus on integrating the critical attributes of collaboration: open communication, shared responsibilities for planning and problem solving, and shared decision making and coordination as a means to improve patient safety and outcomes.<sup>19,20</sup> Additionally, translating the theories and practices of teamwork and communication from aviation to healthcare is gaining support from a number of researchers who cite common elements in both industries. Training efforts such as crew resource management (CRM) and a focus on the key concepts of leadership, briefings, monitoring, cross checking, decision making, and review and modification of plans have enhanced communication and teamwork, thus providing a vehicle to increase safety and a change in crew attitudes and behavior.<sup>21</sup>

## **Setting and Participants**

This patient safety communication strategy was implemented in the 477-bed hospital of Denver Health and Hospital Authority, an urban public safety-net system that serves many of the priority populations described by AHRQ. This system serves about 160,000 unique users each year, in which approximately 70% of the patients are from minority communities and about 40% of the charges are to uninsured patients, totaling \$280 million in care annually. This study project has a specific focus on three care settings utilized for pilot testing. Phase 1 focused on two settings: the Medical Intensive Care Unit (MICU) and an Acute Care Unit (ACU). Phase 2 focused on behavioral health units: an Adult

Psychiatric Unit, an Adolescent Psychiatric Unit, and an Acute Crisis Service (psych ED). These settings were selected because they each provide a different type of unit organization and staff. Our participants for this study were the healthcare providers on the selected units, including nurses, attending physicians, resident physicians, nurse managers, respiratory therapists, pharmacists, pharmacy technicians, physical and occupational therapists, social workers, chaplains, and dietitians. The ACU has a very diverse patient population, with multiple physician teams (staffed with attendings, residents, and interns/first-year residents) and services (medicine, surgery, and consulting medical or surgical subspecialties) assigned to the unit at a given time. The MICU is a closed unit with fewer physician teams and one primary service (critical care medicine) that has more accessibility to physician consultation. The behavioral health units involve a unique patient population and unit milieu, with a more consistent physician group. This report focuses on specific outcome measures based on Phase 1 results.

## METHODS

### Study Design

Utilizing a pretest–post-test design, this study incorporates baseline data collection, implementation of the team communication interventions, and subsequent data collection and analysis over a period of 24 months. The end goal of developing a user-friendly toolkit was accomplished based on feedback obtained throughout the project and findings from this study, as the materials were revised and adapted over time. Figure 1 provides a visual representation of the project and implementation process.

### Data Sources/Collection

Multiple approaches were utilized in evaluating this implementation project, including:

- Process analysis of communication events: based on observations of communication between healthcare providers
- Evaluation of patient occurrence reports: hospital data from the University Health Systems Consortium web-based occurrence reporting system (Patient Safety Net)
- Hospital Survey on Patient Safety Culture: staff survey responses to the AHRQ-developed safety culture survey<sup>24</sup>
- Evaluation of staff understanding of patient daily goals: brief self-report survey on the individual providers' understanding of the plan of care for the patient
- Focus group interviews with hospital staff

Review of our 2004 and 2005 patient occurrence reports revealed the connection between teamwork, communication, and patient safety. Team factors made up 21% of the contributing factors to the total patient safety occurrences, as reported in our Patient Safety Net system. Furthermore, 85% of team factors related directly to problems in communication between providers (see Table 1). We are currently in the process of doing additional analysis for post-intervention findings for this particular data set. However, this initial finding provided insight into the pervasiveness of teamwork and communication problems within the organization.

This report focuses on the process analysis of communication events both before and after implementation for the Phase 1 study units. Additional results from other evaluation methods will be reviewed in future publications and available through AHRQ as appendices. At the time of the writing of this report, although baseline data on the other measures had been previously collected and analyzed, post-intervention data collection of those same measures remained ongoing. Additionally, because the Hospital Survey on Patient Safety Culture is a tool that measures culture change, the authoring agency suggests an 18- to 24-month interval between measurements.

### ***Process Analysis of Communication Events***

We defined process analysis as focused observations that utilize trained data collectors to record their observations on the communication process within the healthcare team. Our process analysis data collection methods were founded on the concepts of industrial engineering and observational research methodology. The data collection team, composed of nursing staff from various clinical, research, and administrative backgrounds, worked closely with an industrial engineer who was trained in analyzing and improving processes. Guided by the study co-PI and the industrial engineer, the team developed standard data collection guidelines, data collection tools, and coding guides. Initial training involved observation of communication on units in teams of two or more, pilot testing the data collection forms and tools, and debriefing the data collection process. Particular attention was given to team consensus of the various components of the communication events, and observations were reviewed to ensure inter-rater reliability.

The team defined a “communication event” as nurse-initiated communication with another healthcare team member (physician, respiratory therapist, pharmacist, etc.) regarding an existing or potential problem/issue related to a patient’s health status or plan of care. The “communication event” was considered complete once an answer or resolution of the particular patient issue was received. The “event” did not necessarily end in an immediate treatment; however, it did give the nurse further direction for the plan of care. See Figure 2 for a graphic example of a process analysis communication event.

Observations were made by either one or two data collectors who remained on the study unit for 1 to 4 hours at a time at different times throughout the day and night shifts. Stationing observers on the nursing unit allowed the data collectors to record communication events from multiple nurses at one geographic location. Data collectors took field notes on their observations using a standard form, asked questions of healthcare team members to clarify what they were observing, and asked nurses their perceptions of the communication event. Data collected about the communication event included who was communicating; the patient issue or problem; the method of communication (phone, paging, face to face, etc.); any activities taking place during the event (searching for a phone number, traveling to a different part of the unit, finding a part of the medical record, etc.); the amount of time to communicate and resolve the issue; and follow-up questions on the nurse’s perceptions about the resolution of the issue and his/her satisfaction with the communication. The data collection team observed and analyzed 495 discrete communication events: 224 (112 pre intervention and 112 post intervention) on the Medical Intensive Care Unit, and 271 events (135 pre intervention and 136 post intervention) on the Acute Care Unit.

### **Interventions**

The following communication strategies were included in the toolkit interventions:

#### ***Situational Briefing Guide: SBAR***

The implementation of a standardized communication format, the SBAR (Situation, Background, Assessment, Recommendation), was utilized as a situational briefing guide for staff and provider communication regarding changes in patient status or needs for nonemergent events or for related issues or events on the unit, in the lab, or within the healthcare team. SBAR stands for:

- Situation – what is going on with the patient?
- Background – what is the clinical background or context?
- Assessment – what do I think the problem is?
- Recommendation – what do I think needs to be done for the patient?

Because SBAR provides a standardized means for communicating in patient care situations, it is effective in bridging differences in communication styles and helps get all team members in the “same movie.”<sup>3</sup> It provides a common and predictable structure for communication; can be used in any clinical domain; and has been applied in obstetrics, rapid response teams, ambulatory care, ICU, and other areas.<sup>3</sup>

SBAR provides guidelines for organizing relevant information when preparing to contact another team member as well as the framework for presenting the information, appropriate assessments, and recommendations.<sup>6</sup> The SBAR communication tool has been utilized in Institute for Healthcare Improvement (IHI) collaboratives and has been previously endorsed by the American College of Healthcare Executives and the American Organization of Nurse Executives.

A significant component of SBAR is that it encourages the recognition of the expertise of nurses and other care providers to assertively make recommendations to physicians, thus facilitating a nonhierarchical structure. In a recent study of nursing home transfers, implementation of SBAR as part of process improvements to improve transferring patients from an acute care setting to skilled nursing facilities (SNF) has averted previous breakdowns in communication that often resulted in patients arriving with incomplete information and important medications not being available.<sup>3</sup>

In this study project, SBAR was used initially to organize and present information to communicate changes in patient status. However, it was also useful in preparing information and presentation for an anticipated difficult conversation with another staff or provider. As implementation of this standardized communication expanded across units, a number of uses were established. Some units utilized it to provide “kudos” for staff accomplishments; some used it as a framework for report on patients; others utilized it as a means to structure assessments; still others used it to structure succinct email communications. A diagrammatic representation of the SBAR process form and guidelines for use is presented in Table 2.

### ***Team Huddles***

Provider and staff team huddles were implemented on the pilot units as a means to communicate and share information concurrently with the team early in the shift. Team huddles are defined as a quick meeting of a functional group to set the day/shift in motion by commentary with key personnel. It is a “microsystems” meeting with a specific focus based on the function of a particular unit and team. Huddles differ from joint rounding in that, although both strategies aim to improve team communication and patient safety and care, huddles have a primarily operational focus. Huddles are interdisciplinary and include operational and care personnel.

Current literature indicates that daily team huddles result in fewer interruptions in the rest of the day and immediate clarification of issues.<sup>22</sup> Team members know that there is a fixed time when they will have everyone else’s attention. Leonard and colleagues found that daily briefings (similar to those used in huddles) were useful for a team to quickly assess changes in clinical workload, identify relevant issues of the day, and provide a means to prioritize.<sup>3</sup> In a very short time, members of a care team can all be “on the same page” for the day and be assured that relevant issues are addressed.<sup>3</sup>

Guidelines for huddles include the following:

1. Set a standard time each day
2. Use a consistent location
3. Stand up, don’t sit down
4. Mandatory attendance
5. Limit length of huddle to 15 minutes
6. Begin and end on time
7. Attempt to have the same structure everyday
8. Keep the agenda to limited items

Initial pilot testing of huddles occurred within two departments: Radiology and Laboratory Services. Huddle participants included all departmental- and unit-level staff present at the time, typically occurred at the beginning of the day or shift, lasted approximately 9 to 20 minutes, and were led by the shift supervisor or department heads. Huddles were utilized to review pertinent issues of the day (e.g., inoperable equipment or rooms), to go over the day’s schedule, and to plan for possible variations/problems. Information sharing includes relevant system level messages of the day,

information from recent management meetings, and departmental issues or problems. Brief discussion of specific issues, such as errors (e.g., mismarked films) is integrated with a review of the process, system issues, and reminders on how to avoid the errors.

On the nursing units, huddles typically were led by the nurse manager, charge nurse, or clinical nurse educator. Interviews revealed several benefits to huddles. These include the benefits of preparing staff for the shift/day, “face-to-face communication,” immediate response to questions, streamlined resolution and timely response to issues or concerns, efficient dissemination of information, improvement in teamwork and effective communication, and staff involvement in decision making. In some instances, if the huddle was skipped for a particular shift/day, staff took notice and inquired about it. Huddles also served to enhance teamwork and a sense of cohesion for the staff.

### ***Multidisciplinary Rounds using Daily Goals Sheet***

Multidisciplinary rounds were implemented in the MICU with the leadership and support of the Unit Medical Director and Nurse Manager. Rounds are patient centered and may include any staff or provider involved in the patient’s care, such as physicians (attending(s), residents, interns, and sometimes a fellow), respiratory therapists (RTs), physical or occupational therapists, social workers (SWs), pharmacists, the charge nurse, the individual patient’s nurse, and a pastoral care provider. The focus of the rounds includes open and collaborative communication, decision making, information sharing, care planning, patient safety issues, cost and quality of care issues, setting daily goals of care, and communicating with patients and/or with family members as they are able. Information shared during rounds is supplemented by communication at shift changes between the incoming and the outgoing care providers.

The Daily Goals sheet is an interdisciplinary communication tool that serves as a simple way of clarifying work goals among providers. It provides the means for the care team and patient (when able) to explicitly define the goals for the day. The form is typically completed during rounds on each patient, signed by the fellow or attending physician, and given to the patient’s nurse. The care team (physicians, nurses, RTs, and pharmacists) provide input and review the goals for the day. The form is updated as the goals of care change.

Current literature supports the value of multidisciplinary rounding. In a study of multidisciplinary rounding focused on daily care goals in intensive care, Pronovost and colleagues found improved communication among providers, significant improvement in the percent of physicians and nurses who understood the goals of care for the day (from 10% to 95%), and a 50% reduction of ICU length of stay.<sup>23</sup> Prior to utilizing the patient-centered daily goals format, patient care rounds were provider centric and lacked clarity about tasks and care plans for the day; staff often lacked understanding of the tasks they needed to accomplish and the plan for communicating with patients, families, and other caregivers. Physicians and nurses perceived that using this format improved communication and patient care. The benefits of the goals sheet are founded on the theories of CRM (crew resource management), currently used in a number of ICUs participating in Institute for Healthcare Improvement (IHI) and VHA improvement efforts.<sup>23</sup>

### ***Escalation Process***

The intent of the original study proposal was the development and implementation of an escalation process algorithm for provider communication regarding changes in patient conditions for non-code situations. The goal of the escalation process is timely and appropriate communication between nursing staff and providers as changes in patient conditions occur. Previously, no standardized process existed at Denver Health for this purpose, consequently leaving ambiguities in the decision-making process for each type of patient situation. Peer-reviewed case studies revealed that the lack of a standardized, well-defined communication process had led to confusion and delay in appropriate and adequate patient care when the need for escalating a concern exists. These issues are particularly relevant at academic medical centers similar to Denver Health, as the organizational structure includes layers of providers, such as attending physicians, fellows, senior and junior residents, and interns/first-year residents.

However, concurrent to the implementation phase of the project, the organization's Department of Patient Safety and Quality developed a Rapid Response Escalation Criteria. The subsequent form provided nurses with patient parameters for escalation criteria and an outline of which provider(s) to call along with a timeframe and utilized the SBAR for communicating changes in the patient condition. The document served as a guide and a communication tool for identifying the patient's condition that triggered the Rapid Response call and a means for the physician to communicate their assessment and plan of care. Instructions were also provided for the physician for follow up with their senior/attending physician within a 4-hour timeframe. This well-documented, standardized escalation process provides role clarification, clear patient parameters, and a realistic timeframe of when and whom to call that is understood by all healthcare team members.

## **Implementation**

A primary component of the implementation of the communication strategies involved staff and provider education and development. An Implementation Toolkit was developed to provide a guide for the education and integration of communication and teamwork factors in clinical practice. Although specific units served as pilot areas for before and after data collection, it was necessary to involve all departments and a maximum number of staff due to the interdepartmental nature of communication. The challenge to capture a broad audience of healthcare team members mandated the creation of standardized curriculum, teaching materials, and methods that could be used by multiple disciplines in a variety of forums (new employees, department orientation, student rotations, initial education, and ongoing refresher for current employees). Healthcare team members participating in this intervention included nurses, unlicensed assistive personnel, physicians, respiratory therapists, occupational/physical therapists, dietitians, social workers, pharmacists, chaplains, clerical/support staff, and radiology and laboratory staff. The nature of the acute care hospital setting presented particular challenges that required the use of multiple teaching strategies that could first introduce the concepts, then reinforce learning, facilitate translation of the concepts into practice, and sustain the practice changes. See Table 3 for a summary of the various implementation methods. The goals of the education program were to:

- Provide consistent education for all members of the healthcare team on the concepts of teamwork, psychological safety, and open effective communication and their impact on patient safety
- Integrate safe communication strategies in the organizational culture
- Sustain the culture of teamwork, psychological safety, and open effective communication
- Maintain consistency and high quality in all education efforts
- Develop educational tools that allow for flexibility in use and application in diverse practice settings

The education plan is composed of two parts: Initial (Interdisciplinary) Education and Follow-up (Unit/Department) Education. Initial (Interdisciplinary) education provided the opportunity to engage team members and introduce the foundational concepts of human factors, effective teamwork, and communication. To accomplish this, over 650 healthcare providers (representing all healthcare disciplines) attended presentations by a nationally recognized patient safety expert, Dr. Michael Leonard. Through his creative presentation, "real-life" anecdotes, and evidence-based approach to factors impacting healthcare workers practice, Dr. Leonard fostered a commitment from providers to work to improve the organizational culture of patient safety. In addition to the lecture portion of the presentation, attendees participated in interactive group activities. They applied the SBAR format to real-life patient situations and coached each other in communicating patient needs. Involving an outside expert created a certain "buzz" throughout the staff and organization that facilitated interest and involvement in the topic. Feedback surveys of the initial education/presentation were overwhelmingly positive. See Table 4 for a summary of feedback on the presentations.

Follow-up (unit-based) education focused on a review of the initial concepts, practice of effective communication skills, and strategies to create and sustain a culture of patient safety. In contrast to the initial "kick-off" education sessions, follow-up education was a sustained effort over an extended period



(months). Ongoing education and reinforcement of learning were achieved through formal and informal sessions on the patient care unit. A number of educational strategies were utilized, including Fast Talks, worksheets, posters, visual cues and reminders, PowerPoint presentations, unit-level champions, and video presentations of the initial presentation by Dr. Leonard.

### ***Fast Talks***

Fast Talks are a format of presentation that is concise (15 minutes), focused, and taken directly to staff on the unit. Feedback from direct caregivers, managers, and clinical educators indicated the need for practical teaching strategies that could fit into staff's daily work and routine. Key selected topics were presented and discussed with staff as they gathered informally during convenient times during their shift. Efforts were made to include a multidisciplinary group whenever possible. The implementation toolkit includes a Fast Talk notebook of teaching materials for discussion topics on Concept Review, Practice Scenarios, and Practice Implementation. Key concepts are presented on 1 to 2 pages with a headline sentence that conveys the essential implication for practice. Brief, bulleted statements serve as a guide for more detailed review. Discipline/patient population-specific practice scenarios also are included in the notebook. A narrative describes the scenario followed by SBAR format prompts. Participants worked either as a group or individually to structure the required communication. A facilitator guide includes examples of potential communications.

### ***SBAR Blank Communication Forms/Worksheets***

Pads of tear-off sheets were created that included the SBAR, instructions for use, and guide for preparing to contact another team member or provider (see Table 2). Feedback from staff indicated the importance of meeting the needs of both the novice and the expert team member. "Novice" forms included expanded cues for section content. "Expert" forms were more streamlined. These sheets were used for practice/learning or to prepare/organize an upcoming communication about an actual patient situation. Tablets of the communication forms were placed on units in strategic locations (near the phone) and utilized in presentations as handouts.

### ***Concept Posters***

One-line headlines capturing key concepts were developed into laminated posters and placed on units in strategic locations (e.g., nurses station, staff bulletin boards, resident work stations). The posters were utilized by the clinical nurse educators, managers, and unit champions to review key concepts and provide reinforcement of previous teaching during staff meetings and huddles or on an individual basis.

### ***Visual Reminders***

Visual reminders included phone cards, bookmarks, name badge holders, T-shirts, pocket cards, and pocket notebooks; they were developed to provide ongoing reminders and maintain awareness until practice changes were incorporated into the unit/organization culture. These items were also used as incentives for participation in education events or to reward observed practice changes. The visual reminder "giveaways" were particularly effective, as staff and providers were eager to obtain them, they reinforced previously presented concepts, and they provided reminders throughout the day.

### ***PowerPoint Presentation***

Developed for use in presentations such as unit meetings or orientation classes, this format provided a standardized introduction and brief overview of key concepts. The PowerPoint presentations were utilized during staff meetings and orientation of new employees.

### ***Champion Role***

Unit-based champions were identified by unit leadership and served as implementation "experts," reinforcing effective learning strategies and culture change. Champions embraced the key concepts of teamwork and communication, sharing their strategies with other units. Examples include advertising educational events using the SBAR format and developing an "SBAR Kudos" form to recognize coworker contributions to the unit.

## RESULTS

### Principal Findings

Communication events were reviewed and coded by the data collection team post hoc and then entered and analyzed using SPSS 15.0 software. Initial descriptive statistics and frequencies were analyzed for each coded category. During any given communication event, multiple forms of communication and activities could be present, such as an initial phone call with a follow-up face-to-face conversation; thus, communication types are not mutually exclusive categories and were coded as either present or not present for the event. The majority of communication events on the MICU included verbal or face-to-face communications (74.6% of 224 events), whereas the majority of communication events on the ACU included numeric pages with follow-up/return phone calls (61.6% of 271 events). The most common nurse activities observed in both the MICU and ACU at pre- and post-intervention times were waiting for a return phone call after a page was sent or traveling to a different part of the nursing unit either to speak with a provider or to find information (e.g., finding the on-call physician's phone number or gathering the bedside medical record). Of the 495 total communication events observed between the MICU and ACU, 123 events (24.8%) involved a nurse communicating with another team member to clarify the patient's orders or plan of care.

One of the key elements observed in the process analysis was the amount of time it took to communicate and resolve a patient issue between healthcare providers. Nonparametric statistics (Mann-Whitney U) were used to compare pre- and post-intervention times, due to a violation of assumptions for parametric statistics (t test). In the MICU, we observed a significant post-intervention decrease ( $p < 0.01$ ) in the total mean communication/issue resolution time (Table 5). In the ACU, we observed a decrease in the total mean time that, although not statistically significant ( $p = 0.27$ ), may have clinical significance by reducing time to treatment and reducing nursing time spent away from other patient care activities. Given the volume of patients and daily communications that occurs on the ACU, the 21% decrease in average time for post-intervention communications clearly could have positive effects.

Each communication event was further analyzed for "problematic" time that contributed to the total event time. Problematic time was time that nurses spent attempting, but failing, to communicate with the right provider (for example paging/calling the incorrect team) or searching for information to determine the appropriate provider or phone number (system issues). When communication events had problematic time removed, the resulting "adjusted" time was felt to more accurately represent provider-to-provider communication time. The results were similar for adjusted communication time; MICU had a significant decrease in mean adjusted communication time ( $p = 0.01$ ), and ACU had a statistically nonsignificant decrease in mean adjusted communication time ( $p = 0.31$ ). The ranges for post-intervention times, both total and adjusted times, were narrower; had smaller standard deviations; and were therefore more closely clustered around the post-intervention means, indicating a decrease in the lengthy outlier communications found in the pre-intervention data. Table 5 summarizes the mean total and adjusted times observed from the pre- and post-intervention process analysis.

In addition to decreased total and adjusted times for communication/issue resolution, there was an increase in the overall nurse-reported positive perception of communication events. After observation of the communication event, data collectors asked the nurse the following questions: to what extent do you think this patient issue has been resolved, and how satisfied were you with the interaction/communication? Nurses then answered based on a 3- or 4-point Likert scale: not resolved, somewhat resolved, or resolved; and not satisfied, somewhat satisfied, satisfied, or very satisfied, respectively. Resolution and satisfaction scores were then recoded into positive and nonpositive responses (i.e., resolved, satisfied, or very satisfied). Chi-squared analyses of the pre-intervention and post-intervention positive resolution and satisfaction scores revealed, in the MICU, a significant increase in positive resolution scores ( $p = 0.04$ ) and a difference in satisfaction scores approaching significance ( $p = 0.08$ ) and, in the ACU, nonsignificant increases in resolution and satisfaction scores ( $p = 0.13$  and  $0.53$ , respectively).

Positive responses increased for both the resolution and satisfaction questions in the post-intervention period, and the results are summarized in Table 5.

## **Discussion**

Our study demonstrates the value of utilizing teamwork and communication strategies in the patient care setting among healthcare team members. After implementation of the team/communication strategies, communication time surrounding a patient concern or issue was decreased, thus bringing resolution and treatment in a timelier manner. Nurses, the communication initiators, perceived increased satisfaction with the communication and higher rates of resolution of patient issues. Additional collection and analysis of additional data measuring staff perception of the organizational safety culture, the effect of team and communication factors in patient occurrence reports, and staff and provider focus group interviews are ongoing and will provide more insight into the effectiveness of the study interventions.

The toolkit that was developed as a result of this study project provides other healthcare organizations with the means to implement teamwork and communication strategies in their own settings and is available on the web at <http://www.safecomms.org>. The intervention tools are adaptable and can be easily modified to use in a variety of settings. In addition, the toolkit includes an education plan and facilitator guide; a Fast Talk book with case scenarios for nursing, medicine, dietary, lab, physical therapy, social work, and spiritual care; templates for SBAR communication forms/worksheets, concept posters, bookmarks, pocket cards; and a PowerPoint presentation. The toolkit also includes guidelines for a variety of data collection methods used in this project, should an organization wish to evaluate their implementation.

Throughout the study project, a number of “lessons learned” provided insight that could be useful for other organizations considering similar implementation of teamwork and communication strategies. First, it is paramount to secure administrative and clinical support on all management levels, from executive to unit-level support. It was important for management and leaders to demonstrate that teamwork and communication were valued as important factors contributing to patient safety and staff satisfaction. Furthermore, it was important that they provided the means for staff to attend presentations, encouraged additional unit-level education, and facilitated integration of the concepts into practice.

The degree of leadership support varied from unit to unit and clearly made a difference in the integration of the communication strategies into practice. Those areas with less leadership support for this project required more mentoring and coaching from the study team over a longer period of time. In contrast, those units with leaders who embraced the concepts of teamwork and communication integrated the practices into their daily functions in a variety of ways. The engaged leaders role-modeled use of the communication strategies, and their staff responded in like fashion.

We also found that staff were acutely aware of the culture within an organization and on their unit as it relates to psychological safety, reporting patient occurrences, and team communication. Once again, those leaders who were committed to teamwork and open communication set the tone for psychological safety and created an environment for staff to communicate freely and professionally without fear or inhibition. Other units required additional efforts on the part of the study team to help create and point out experiences that demonstrated a safe culture and additional mentoring for the unit leadership.

There also exist a number of challenges to achieving interdisciplinary education and training in an academic setting such as ours. Physician engagement is particularly challenging simply due to the nature of the academic setting with resident rotations, various levels of providers, and the number of physician teams. Our study team developed specific educational strategies that could be presented during existing meeting times, such as noon conferences, resident orientation, and outcomes conferences. The support and engagement of the chief medical resident and chief hospitalist were instrumental in these efforts. In addition, we integrated the perspectives of other disciplines/departments by eliciting their participation in the development of discipline-specific case scenario examples for the curriculum.

Finally, as with other new practices and skills, sustainment must be a consideration in the overall implementation plan. The ability to educate new staff and continue integrating communication practices present a challenge that should be considered early in the planning stage. It is particularly incumbent upon healthcare organizations to incorporate teamwork and communication strategies into staff education and competencies, as few formal education programs across disciplines include them in their curriculum. We have integrated teamwork and communication concepts and skills into department- and unit-level orientation for new staff and nursing skills fairs for current staff, and we are working on integrating them into competency skills testing.

## **Conclusions**

Our study suggests that strategies to enhance teamwork and communication can be successfully implemented in the acute care setting and result in more efficient and effective communication. As ineffective communication among healthcare team members contributes to patient harm and adverse events, interventions and implementation methods become instrumental in preventing negative patient outcomes. This project provided the opportunity to develop, implement, and evaluate an educational program and interventions using multiple measures across diverse patient care units. The resultant toolkit is available on the web and can be adapted to use in a variety of settings. Further efforts to evaluate the strategies using additional measures remain ongoing. Recommendations for future research include implementation of the strategies in different healthcare settings (outpatient clinics, rural hospitals, nonacademic settings); integration of the strategies into simulation projects; longitudinal studies to determine the effectiveness and sustainability of the strategies over time; and utilization of specific patient-centered outcome measures and staff-related measures, such as satisfaction, and recruitment, and retention.

## **Acknowledgments**

Funding was provided by the Agency for Healthcare Research and Quality, Partnerships in Implementing Patient Safety Grants, 1 U18 HS015846. The authors thank Denise Johnson, Karin Rees, and Amy Irwin for their valuable contributions. Special recognition and thanks is given to Michael Leonard, MD, for his insightful consultation and willingness to work closely with us on this project.

## **LIST OF PRODUCTS**

A toolkit was developed as a result of this project that includes the individual communication strategies, education plan, teaching materials, evaluation methods, additional references, and related links. The tools are available online, and we encourage organizations to utilize them as applicable to your settings.

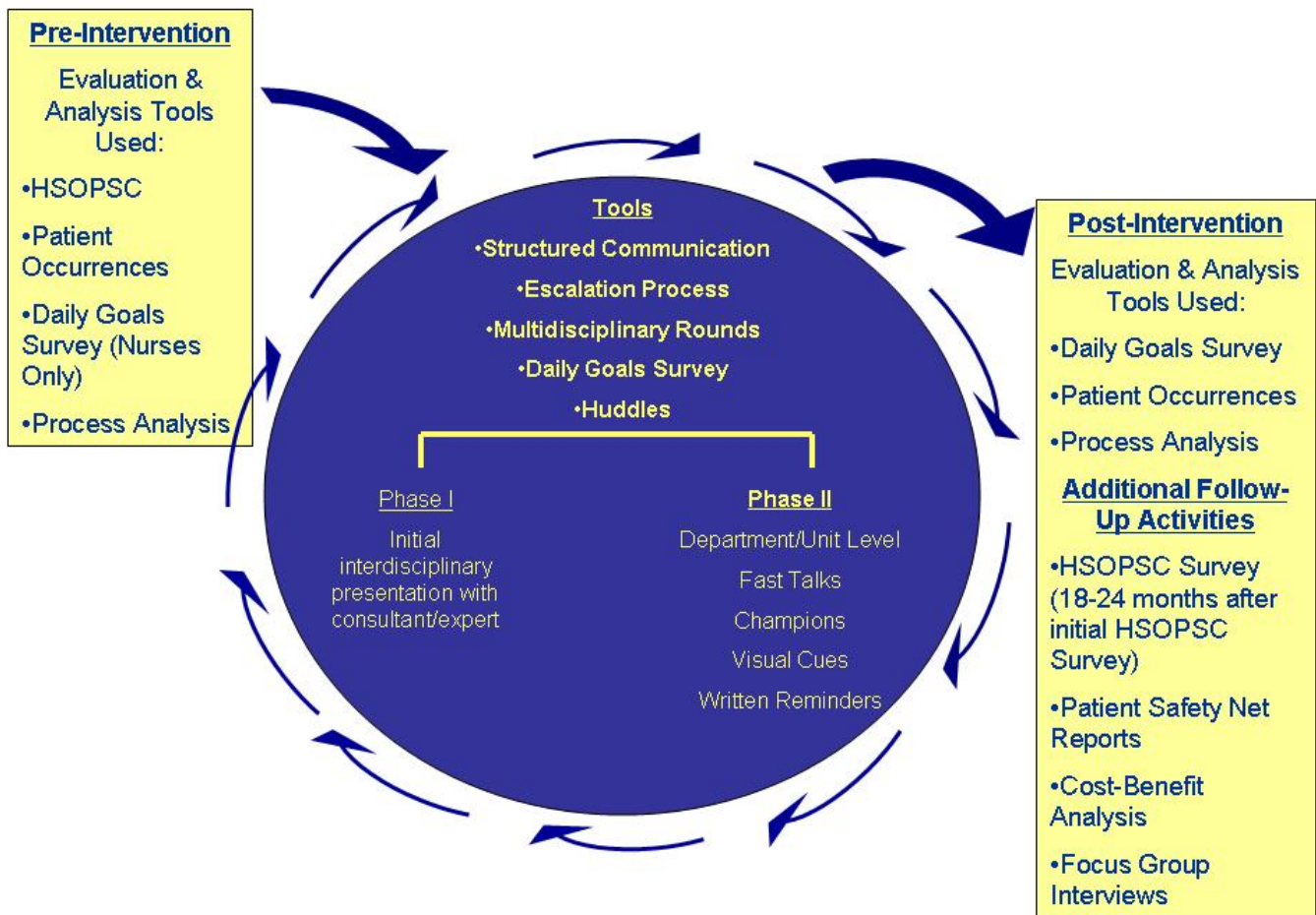
### **Website:**

Improving Patient Safety through Provider Communication Strategy Enhancements. Denver Health Medical Center. <http://www.safecomms.org>

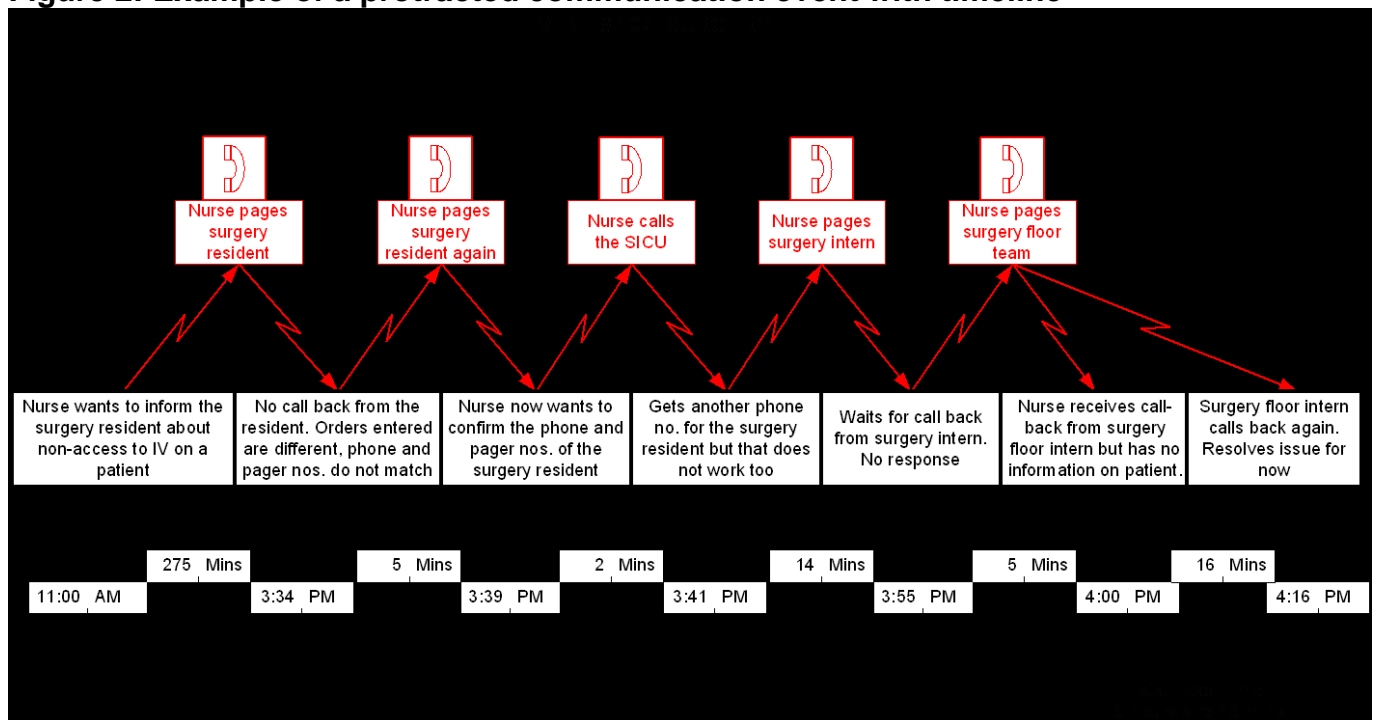
### **Manuscript submission:**

Dingley, C, Daugherty, K, Derieg, M, et al. Improving Patient Safety through Provider Communication Strategy Enhancements. *Advances in Patient Safety: New Directions and Alternative Approaches*. 2007

**Figure 1: Study project process and implementation**



**Figure 2: Example of a protracted communication event with timeline**



**Table 1: Contributing factors in patient occurrence reports, 2004-2005**

<b>Contributing Factors</b>	<b>2004 Risk Manager score</b>	<b>Percent</b>	<b>2005 Risk Manager Score</b>	<b>Percent</b>
1. Team factors	1418	20.9%	1170	20.6%
2. Work environment	1646	24.3%	1326	23.4%
3. Task factors	1995	29.5%	1608	28.3%
4. Staff factors	204	3.1%	161	2.8%
5. Patient characteristics	1211	17.9%	1188	20.9%
6. Organizational/management	183	2.7%	76	1.3%
7. Other	109	1.6%	148	2.7%
<b>Total</b>	<b>6766</b>	<b>100%</b>	<b>5677</b>	<b>100%</b>

**Contributing factors in patient occurrence reports: team factors, 2004-2005**

<b>Team Factors</b>	<b>2004 Risk Manager Score</b>	<b>Percent</b>	<b>2005 Risk Manager Score</b>	<b>Percent</b>
Communication problems between providers	1215	85.7%	988	84.4%
Change of service	41	2.9%	61	5.2%
Cross coverage	35	2.5%	38	3.3%
Shift change	52	3.7%	45	3.8%
Unplanned workload increase	71	5.1%	35	3%
Holiday	4	0.1%	3	0.3%
<b>Total</b>	<b>1418</b>	<b>100%</b>	<b>1170</b>	<b>100%</b>

**Table 2: SBAR communication form/worksheet**



# S•B•A•R

Before you call, be prepared! Be clear and concise, focus on the problem, & only report what is relevant to the current situation!

Be sure you do the following:

- Assess the patient
- Determine the appropriate person to call
- Review appropriate parts of the medical record (ex. flow Sheet, MAR, physician notes/orders, labs)
- Have the medical record available when you call
- Use the following form to organize your conversation

**Situation** – 5- 10 second punch line – What is happening now? What are the chief complaints or acute changes?

*This is \_\_\_\_\_ . I'm calling about \_\_\_\_\_*

---

---

---

**Background** – What factors led up to this event? Pertinent history (ex. admitting diagnosis) & objective data (ex. vital signs, labs) that support how patient got here.

*The patient has \_\_\_\_\_*

---

---

---

**Assessment** – What do you see? What do you think is going on? A diagnosis is not necessary - include the severity of the problem.

*I think the problem is \_\_\_\_\_*

---

---

---

**Recommendation** – What action do you propose? State what the patient needs (get a time frame).

*I request that you \_\_\_\_\_*

---

---

---



**Table 3: Implementation methods for provider/staff education**

		Individual Education	Unit/ Department Education	Organization Education
Initial Expert Presentation - Dr. Leonard	658 participants	•	•	•
Video Presentation - Dr. Leonard	108 participants	•	•	•
Fast Talks	450 participants	•	•	•
Communication Education Notebook		•	•	
Practice Scenarios (multidisciplinary)		•	•	
SBAR Practice Worksheets		•		
Concept Poster Campaign			•	•
Visual Reminders (bookmarks, cards, lanyards, T-shirts)		•	•	•
PowerPoint Presentation			•	•
Champion Role			•	
Web-based Training		•		

**Table 4: Initial expert presentation feedback from participants (Dr. Leonard presentation)**

Question Prompt	N=564 respondents	Percent Agree	Percent Strongly Agree	Percent Positive Responses
This presentation increased my awareness of how human factors can affect errors and patient safety		29.8%	67%	96.8%
This presentation helped me understand the need for open, effective communication in the healthcare team		27%	70%	97%
This presentation helped me realize there may be times when others on my unit do not communicate openly		30.4%	66.4%	96.8%
This presentation helped increase my awareness of barriers to effective communication		29.1%	68.1%	97.2%
I think using SBAR would help facilitate better communication with other care providers or staff		31.5%	66.5%	98%
SBAR is easy for me to understand		33.2%	64.9%	98.1%
SBAR will be understood by others on my unit		44.5%	50.9%	95.4%
SBAR could help decrease communication problems		35.7%	61.8%	97.5%
SBAR could be rolled out on my unit with few problems		48.7%	42.6%	91.3%

**Table 5: Communication process analysis results**

<b>Times for Communication/Issue resolution (minutes)</b>	<b>Pre- Intervention</b>	<b>Post- Intervention</b>	<b>p (1-sided)</b>
<b>Medical Intensive Care Unit</b>	N=112	N=112	
Total Time for Communication - Mean	7.19	<b>3.69</b>	<b>0.007</b>
Total Time - Range	1-312	1-51	
Adjusted Time for Communication - Mean	4.52	<b>3.37</b>	<b>0.01</b>
Adjusted Time - Range	1-55	1-51	
<b>Acute Care Unit</b>	N=135	N=136	
Total Time for Communication - Mean	8.29	<b>6.51</b>	0.27
Total Time - Range	1-136	1-61	
Adjusted Time for Communication - Mean	6.63	<b>5.27</b>	0.31
Adjusted Time - Range	1-135	1-60	
<b>Resolution and Satisfaction</b>	<b>Pre- Intervention</b>	<b>Post- Intervention</b>	<b>p (2-sided)</b>
<b>Medical Intensive Care Unit</b>			
Percent of Positive Nurse Resolution Responses	67.7% (N=99)	<b>80.2%</b> (N=111)	<b>0.04</b>
Percent of Satisfied/Very Satisfied Nurse Responses	85.5% (N=103)	<b>92.8%</b> (N=111)	0.08
<b>Acute Care Unit</b>			
Percent of Positive Nurse Resolution Responses	66.7% (N=135)	<b>75%</b> (N=136)	0.13
Percent of Satisfied/Very Satisfied Nurse Responses	77.1% (N=135)	<b>80.1%</b> (N=136)	0.53

## Literature Cited

1. Woolf, SH, Kuzel AJ, Dovey SM, et al. A string of mistakes: the importance of cascade analysis in describing, counting, and preventing medical errors. *Ann Fam Med* 2004; 2:317-326.
2. Lingard LS, Espin S, Whyte G, et al. Communication failures in the operating room: an observational classification of recurrent types and effects. *Qual Saf Health Care* 2004; 13: 330-334.
3. Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. *Qual Saf Health Care* 2004; 13:85-90.
4. 2005 National Patient Safety Goals. Joint Commission on Accreditation of Healthcare Organizations. 2004. <http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/>
5. National Council of State Boards of Nursing Site. National Council of State Boards of Nursing. November 2004. <http://www.ncsbn.org>
6. Intimidation: practitioners speak up about this unresolved problem (Part I). ISMP Medication Safety Alerts Site. Institute for Safe Medication Practices. November 2004. <http://www.ismp.org/MSAarticles/IntimidationPrint.htm>
7. Zwarenstein M, Reeves S. Working together but apart: barriers and routes to nurse-physician collaboration. *Jt Comm J Qual Improv* 2002; 28:242-247.
8. Fagin C. Collaboration between nurses and physician: no longer a choice. *Acad Med* 1997; 5:295-303.
9. Fisher B, Peterson C. She won't be dancing anyway: a study of surgeons, surgical nurses, and elder patients. *Qual Health Res* 1993; 3:165-183.
10. Kendrick K. Nurses and doctors: a problem of partnership. In: Soothill K, Mackay L, Web C, editors. *Interprofessional Relationships in Healthcare*. London: Edward Arnold; 1995. p.239-252.
11. Larson E. The impact of physician-nurse interaction on patient care. *Holist Nurs Pract* 1999; 13:38-47.
12. Sexton J. Error, stress and teamwork in medicine and aviation: cross-sectional surveys. *Br Med J* 2002; 320:745-749.
13. Knaus WA, Draper EA, Wagner DP, et al. An evaluation of outcome from intensive care in major medical centers. *Ann Intern Med* 1986; 104:410-418.
14. Shortell SM, Zimmerman JE, Rousseau DM, et al. The performance of intensive care units: does good management make a difference? *Med Care* 1994; 32:508-525.
15. Zimmerman JE, Shortell SM, Rousseau DM, et al. Improving intensive care: observations based on organizational case studies in nine intensive care units: a prospective, multicenter study. *Crit Care Med* 1993; 21:1443-1451.
16. Baggs, JG, Schmitt MH, Mushlin AI, et al. Association between nurse-physician collaboration and patient outcomes in three intensive care units. *Crit Care Med* 1999; 27:1991-1998.

17. Baggs, JG, Ryan SA, Phelps CE, et al. The association between interdisciplinary collaboration and patient outcomes in a medical intensive care unit. *Heart Lung* 1992; 21:18-24.
18. Mitchell PH, Armstrong S, Simpson TF, et al. American Association of Critical-Care Nurses Demonstration project: profile of excellence in critical care nursing. *Heart Lung* 1989; 18:219-237.
19. Boyle DK, Kochinda C. Enhancing collaborative communication of nurse and physician leadership in two intensive care units. *J Nurs Adm* 2004; 34:60-70.
20. Baggs, JG. Development of an instrument to measure collaboration and satisfaction about care decisions. *J Adv Nurs* 1994; 20:176-182.
21. Helmreich, PL. On error management: Lessons from aviation. *Br Med J* 2000; 320: 781-785.
22. Harnish V. The daily “adrenaline” meeting. *Catalyst Magazine* 2004; 1-3.
23. Pronovost P, Berenholtz S, Dorman T, et al. Improving communication in the ICU using daily goals. *J Crit Care* 2003; 18:71-75.
24. Patient Safety Culture Surveys. Agency for Healthcare Research and Quality, Rockville, MD. April 2007. <http://www.ahrq.gov/qual/hospculture/>