Objective: To identify evidence on the role of assertiveness and teamwork and the application of aviation industry techniques to improve patient safety in inpatient obstetric care.

Data Sources: Studies limited to research with humans in English language retrieved from CINAHL, PubMed, Social Science Abstracts, and Social Sciences Citation Index, and references from reviewed articles.

Study Selection: A total of 13 studies were reviewed, including 5 studies of teamwork, communication, and safety attitudes in aviation; 2 studies comparing these factors in aviation and health care; and 6 studies of assertive behavior and decision making by nurses. Studies lacking methodological rigor or focusing on medication errors and deviant behavior were excluded.

Data Synthesis: Pilot attitudes regarding interpersonal interaction on the flight deck predicted effective performance and were amenable to behavior-based training to improve team performance. Nursing knowledge was inconsistently accessed in decision making. Findings regarding nurse assertiveness were mixed.

Conclusions: Adaptation of training concepts and safety methods from other fields will have limited impact on perinatal safety without an examination of the contextual experiences of nurses and other health care providers in working to prevent patient harm. JOGNN, 35, 538-546; 2006. DOI: 10.1111/J.1552-6909.2006.00074.x

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High-risk domains are those in which error and accident have potentially catastrophic consequences (Gaba, 2000; Knox, 2003; Rochlin, 1999). Health care organizations are high-risk domains by virtue of their increasing patient acuity, technical complexity, and fundamental dependence on human beings to execute care (Institute of Medicine [IOM], 2004). Communication problems are consistently identified as a leading cause of system breakdown in patient care (IOM, 2000, 2001, 2004; Simpson & Knox, 2003). Likewise, the July 2004 Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Sentinel Event Alert highlighted the significant contribution of communication problems to potentially preventable perinatal morbidity and mortality (JCAHO, 2004).

In other high-risk domains (such as aviation and nuclear operations), safe operations are characterized by a collective sense of agency for maintaining safety and a mutual understanding that all team members will state their observations, opinions, and recommendations, and actively solicit and consider input from other team members (Knox, 2003; Rochlin, 1999; Simpson & Knox, 2003). In health care, however, fundamental and longstanding problems with interprofessional relationships have been well documented (Espin & Lingard, 2001; Iacono, 2003; Thomas, Sexton, & Helmreich, 2003; West, 2000; Zwarenstein & Bryant, 2004).

The major thrust of the patient safety movement has been toward replacing the focus on individual culpability for error (“blame and shame” culture) with a systematic search for, and elimination of, the organizational problems that allow human errors to result in patient harm (IOM, 2000, 2001, 2004; Simpson & Knox, 2003; West, 2000). However, Rochlin (1999)
proposed that a single-minded focus on neutralizing error and risk interferes with the maintenance of safe operations by obscuring the effect and importance of individual and collective action. Safety is more appropriately conceptualized as a social construct of collective agency that is essential to understanding and managing evolving, and frequently unpredictable, threats. Knox (2003) and Henneman and Gawlinski (2004) conceptualized safety as a dynamic process in which the role of health care providers is to create safety by actively seeking potential sources of harm and deflecting them from the patient.

Health care providers must promote safety by actively seeking potential sources of harm and deflecting them from the patient.

In the inpatient obstetric setting, this active role of identifying and deflecting the slips, trips, lapses, organizational problems, and latent system failures that will inevitably place the patient in harm’s way (Gaba, 2000; West, 2000), falls disproportionately on the nurse as the primary gatekeeper of observations, interventions, treatments, and often the management of labor (IOM, 2004; James, Simpson, & Knox, 2003). However, in their review of patient safety, human factors, and adverse obstetric events, Simpson and Knox (2003) identified the following repetitive themes in near misses and injuries: “Concern was expressed, but not directly. The problem was stated, often not clearly. A proposed action didn’t happen. A decision was not reached or acted upon.” (p. 243) and identified assertive communication as “the key to maintaining safe operations,” (p.234) in the high-risk domain of inpatient maternity care.

Several recent studies have documented what Gaba, Singer, Sinaiko, Bowen, and Ciavarelli (2003) described as “problematic” attitudes toward safety practices and teamwork in health care environments. Sexton, Thomas, and Helmreich (2000) noted that research is needed to better understand health care provider attitudes that may be amenable to intervention, as work in aviation psychology has demonstrated that attitudes regarding stress, hierarchy, teamwork, and error are not only predictive of safe performance in high-risk conditions but also sensitive to intervention via targeted training. The purpose of this review is to identify knowledge gaps, what is known, and opportunities for research regarding the role of assertiveness and teamwork and the application of aviation training techniques to improving patient safety in inpatient obstetric care.

The Problem: What is Known About the Presence and Effects of Assertiveness in Teams?

Theories of organizational safety have been applied to health care environments (Gaba, 2000). Normal accident theory (NAT) focuses on the complexity and “tight coupling” of system components as sources of accidents. From a NAT perspective, accidents are inevitable because the root causes of accidents can be traced to latent properties of the organizational system which, when triggered, result in a cascade of events which is not always caught by the system’s technical or procedural defenses; and in fact, the addition of new defenses into the system may increase risk by increasing system complexity (Gaba). Application of human factors theory has demonstrated that communication patterns, team function, workload, and coping mechanisms affect both individual and group ability to identify evolving problems and make appropriate management decisions in complex decision-making situations (Carthey, de Leval, & Reason, 2001; Helmreich, Foushee, Benson, & Russini, 1986; Schaefer, Helmreich, & Scheidegger, 1995).

Highly reliable organizations manage the tendency toward accidents through collective agency for identifying and managing continuously evolving threats. That is, all operators are charged with scanning continuously for threats, and for speaking up when they identify potential threats, regardless of their status in the hierarchy or their defined role on the work team. This collective sense of agency is generated by the intensity of operations, identification and elimination of underperformance, and disciplined practice in managing, planning, anticipation, communication, and teamwork (Gaba, 2000; Rochlin, 1999; Weick, 2002).

When high reliability, normal accident, and human factors theories were applied to practical experience in aviation and other high-risk domains, assertiveness was identified as a key skill for creating patient safety and effective teamwork in the obstetric environment (Knox, 2003; Leonard, Graham, & Bonacum, 2004; Simpson & Knox, 2003). However, importing concepts and methods from other fields without understanding the experiences of nurses in the context of health care teams is not likely to overcome long-standing interprofessional conflict. Understanding nurses’ perceptions of their own use of assertiveness and the factors that facilitate or constrain their effectiveness or their sense of agency is therefore a critical component of building and maintaining safe patient care systems.

Assertiveness occurs when “an individual provider asserts their opinion [through questions or statements of opinion] during critical times” (Thomas, Sexton, & Helmreich, 2004), or “individuals speak up and state their information with appropriate persistence until there is a clear resolution” (Preston, 2003).
Review of the Literature

A literature search was conducted of PubMed, CINAHL, Social Science Abstracts, and the Social Sciences Citation Index. The search was limited to English language and human studies using the terms “patient safety,” “medical error,” “interprofessional relations,” “physician-nurse relationships,” “communication,” “safety,” “obstetrics,” “assertion,” and “adverse events,” “teamwork climate,” “teamwork and medicine,” “medical error and team communication,” “human factors,” and “situation awareness.” Titles and abstracts of 285 articles were screened for relevance to the research question, and additional references were identified from the reference lists of selected articles. Research articles from peer reviewed journals and book chapters were considered for inclusion. The majority of the literature on medical error was focused specifically on medication error, and these studies were excluded from the review, as were editorials and opinion pieces.

From the initial screening, 42 articles were selected for further evaluation of methodological quality and applicability to the question. No additional relevant citations were identified. Five aviation studies regarding safety attitudes, teamwork, and communication management were included in the review, as well as two studies comparing the safety attitudes of medical and aviation personnel and two studies of medical teamwork attitudes.

An additional search of PubMed using the search terms “assertive behavior” and limited to English language and human studies was done. The literature in this area was focused on deviant or criminal behavior, or both and was therefore excluded from review. Finally, a search of PubMed using the medical subject headings assertive behavior and “nurse” retrieved 180 citations, 171 of which were opinion pieces. Three were excluded for inadequate methodology, leaving four studies of nurse assertiveness and two studies of nurse decision making for review.

Critique of Selected Studies

Human Factors in Aviation Safety

Much of the interest in communication in health care has been generated through application of concepts from the aviation industry safety model of crew resource management (CRM) to the health care setting. The CRM movement grew out of recognition that human (rather than weather or equipment) factors were responsible for the majority of accidents and incidents in aviation (Helmreich, 2000). Aviation psychology researchers demonstrated that pilots’ attitudes affected performance and were amenable to modification through specifically structured team training (Helmreich & Foushee, 1993; Helmreich et al., 1986; Stout, Salas, & Fowlkes, 1997).

In the late 1970s, the aviation industry began to recognize the need to attend to issues of leadership, command, communications, and decision making in the cockpit in order to improve safety performance (Lauber, 1993). NASA investigators developed an attitudes survey from interviews with pilots and retrospective reviews of accident and incident data and began collecting attitude data on a large group of pilots. In 1986, in a study comparing pilots’ survey data with ratings of pilot flying performance conducted by check airmen, Helmreich et al. (1986) demonstrated an empirical link between pilot performance and pilot attitudes regarding the effects of fatigue, stress, and team function on their decision-making ability. Investigators performed a discriminant analysis of 18 self-reported cockpit management attitudes and found that 15 of the attitude statements were strongly predictive of pilot effectiveness.

Pilots who recognized that fatigue, stress, and poor communication were detrimental to performance in the cockpit and who valued fostering inquiry and communication were rated more effective by the check airmen. Less effective pilots displayed attitudes described as “macho” or “right stuff,” indicating limited awareness of their personal and decision-making limitations. Although this study was small, it was the first to correlate psychometric testing of nonpersonality traits with pilot performance and was the foundational study for subsequent work in aviation and medical safety attitudes measurement. Of note, no demographic information was included in the report, and there were probably a limited number of women and minorities in the sample.

Once human factors were established as important performance variables in aviation, the industry became interested in issues of situation awareness, communication, shared mental models in decision making, and whether training targeting these issues could improve aircrew safety profiles. Bowers, Jentsch, Salas, and Braun (1998) looked at communication styles in high- and low-performing teams and noted that high-performing teams engaged in more planning statements, asked more questions, and repeated commands more frequently than low-performing teams. Likewise, Stout, Cannon-Bowers, Salas, and Milanovich (1999) found that effective teams engaged in advance planning, which was correlated with the development of shared mental models of the situation and engaged in more efficient communication in high-workload conditions. Stout et al. (1997) also examined the effect of targeted training on team performance, and they demonstrated significant positive changes in attitudes, knowledge, and coordinated performance in the flight simulator after completion of didactic training on communication, assertiveness, and situation awareness.

This group of studies provides continued support for the emphasis on questioning and assertiveness that has been central to CRM training over the past 25 years. It is
important to note, however, that these were all simulation studies, and the population from which the samples were drawn from was remarkably homogeneous male undergraduate students (Stout et al., 1999), male undergraduate aviators (Bowers et al., 1998; Stout et al., 1997), and military aviators (Bowers et al.). The generalizability of findings is also limited by self-selection bias and small sample sizes.

In a retrospective review of civilian incident report data from actual flights, Jentsch, Barnett, Bowers, and Salas (1999) found that when the captain (rather than the first officer) was flying the plane, more errors went unchallenged and individual and crew situation awareness was lost more frequently. Lack of assertiveness was a factor in 20% of cases in which the first officer was not effective in correcting the captain’s errors. This study particularly highlighted the high cognitive task load carried by the captain when he or she was both flying the plane and holding overall responsibility for strategic decision making, an observation that may translate to the performance of health care team leaders in dynamic clinical environments.

**Comparing Attitudes on Teamwork in Aviation and Health Care**

In two studies of teamwork attitudes in health care, the University of Texas Human Factors Group documented significant variation in perceptions of teamwork across types of care providers (Table 1). The researchers modified well-established surveys of core attitudes regarding teamwork, communication, hierarchy, error, and stress from aviation psychology studies to measure corresponding attitudes in health care providers. An operating room questionnaire was used to survey surgical and anesthetic attending physicians, nurses, and residents in four countries over a 3-year period (Sexton et al., 2000). An intensive-care unit questionnaire was used to survey physicians and nurses in four urban medical centers in the Houston area over a 2-year period (Thomas et al., 2003). Results from both cross-sectional studies indicated significant differences in attitudes about hierarchy and teamwork, with lower status providers (i.e., junior residents and nurses) more likely to report problems with communication and working relationships.

In a similar study, Gaba et al. (2003) compared safety climate indicators in medical personnel in 15 Northern California hospitals to that in naval aviators at the Naval Postgraduate School. They found a much higher rate of “problematic responses,” (defined as responses indicating a lack of or antithetic to safety climate) in health care providers (nurses, physicians, and administrators) than in naval aviators. Of particular concern was that problematic response rates were even higher in the “high-hazard” hospital domains of emergency, operative, and intensive care.

All three of these studies were conducted by experts in applying human factors research to the health care environment. However, they also shared the limitations of having a relatively low response rate from health care providers, particularly physicians, and may have been affected by both self-selection and response bias.

Recognition of the commonalities between aviation and health care has led to numerous calls for adaptation of the CRM model to medicine (Hamman, 2004; Helmreich, 2000; IOM, 2001, 2004; Schaefer et al., 1995). However, the foundation of CRM was on understanding performance problems from the pilots’ perspective (Helmreich & Foushee, 1993). While the three comparison studies documented a problem with safety and teamwork attitudes in hospitals, very few studies to date have explored the nature of teamwork or decision making from the perspective of health care providers.

**Influences on Teamwork in Health Care**

Thomas, Sherwood, Mulhollem, Sexton, and Helmreich (2004) conducted a qualitative study of teamwork in the neonatal intensive-care unit. From their analysis of transcribed focus group data and field notes from a purposive sample of 36 neonatal intensive care providers, the concept of “team” was highly variable among providers. However, factors cited as influencing “working together” fell into three major categories: provider characteristics (personal attributes, reputation, and expertise), workplace factors (staffing, work organization, and work environment), and group influences (communication, relationships, and team).

Similarly, in a qualitative study of critical-care nurse decision making, Bucknall (2003) identified three environmental influences on nurse decision making: patient situation, availability of resources, and interpersonal relationships (Table 2). In their ethnographic study of critical care, Manias and Street (2000, 2001) observed that nurses’ knowledge was subjugated to medical knowledge, inconsistently accessed during decision making, and legitimated through reference to policy and procedure rather than experiential or scientific data.

**Nurses’ knowledge was subjugated to medical knowledge, inconsistently accessed during decision making, and legitimated through reference to policy and procedure rather than data.**

While these studies satisfied general issues of qualitative rigor, participants may not have revealed full
information in a focus group setting, and observations in the decision-making studies were fairly brief. These studies, like the attitudes and safety climate surveys, did not establish an empirical link between provider teamwork attitudes or interpersonal behaviors and patient outcomes.

**Assertive Behavior in Nurses**

Two studies of assertiveness in professional nurses had conflicting results. Gerry (1989) found that nurses in a small, semi-purposive sample drawn from a British hospital rated themselves more assertive outside of work than at work and demonstrated a trend toward conflict.
<table>
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<th>Authors, Date</th>
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<td>Manias and Street</td>
<td>6: 2 managers, 2 CNS, 2 staff nurses</td>
<td>RNs from same critical care unit</td>
<td>Critical ethnography, professional journaling, participant observation, interviews, focus groups</td>
<td>Differing value placed on policies and protocols: nurses used policy and protocol to legitimate their knowledge and to resist, MDs primarily relied on own knowledge and experience; nursing knowledge frequently subjugated to medical knowledge; nursing knowledge inconsistently accessed in decision making, physician-nurse game was evident</td>
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<td>Bucknall (2003)</td>
<td>18</td>
<td>Two critical care nurses from each category (staff nurse, CNS, associate charge nurse) in three hospitals</td>
<td>Naturalistic observations and semi-structured interviews; each participant observed for 2 hr, semi-structured interview within 24 hr of observation; content analysis of transcribed text</td>
<td>3 categories of environmental influence: patient situation, availability of resources, interpersonal relationships; nature of problem determines type, speed, and complexity of decisions; resources directly affected autonomy, workload, and quality of care; more knowledgeable nurses expressed more comfort with collaboration; Significant disharmony with junior medical staff</td>
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<td>Report A: no correlation between positive assertion and caring skills, no significant correlation between negative assertion and caring skills except in the component of accessible caring, negative assertion behavioral test correlated with accessible caring skills; Report B: no correlation between sex role orientation and positive or negative assertion</td>
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<td>Kilkus (1993)</td>
<td>500</td>
<td>Random sample of active RN licensees in Minnesota, 64% response rate</td>
<td>Rathus assertiveness schedule, demographics; descriptive correlational analysis</td>
<td>Nurses older than 60 less assertive; no difference based on gender, entry level, or years of experience; inconsistent results for specialties</td>
</tr>
<tr>
<td>Gerry (1989)</td>
<td>99: 33 nursing sisters, 33 staff nurses, 33 enrolled nurses</td>
<td>Semi-purposive convenience sample of British nurses; 6 nurses interviewed</td>
<td>34-item questionnaire with qualitative comments; six respondents willing to interview randomly selected; 30 min interviews were audiotaped</td>
<td>Nurses reported they were assertive in wanting to know personal rights and were interested in constructive criticism, less likely to refuse unreasonable requests or ignore demands; tendency toward conflict avoidance but would be able to challenge a senior colleague in the patient’s interest; less assertive at work than outside work but viewed assertion as important for communication and safety at work; facilitators uniform, confidence, knowledge; barriers tradition, training, hierarchical structure</td>
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avoidance. Tradition, training, and hierarchical structure of the work environment were barriers to assertive behavior, and knowledge, confidence, and their uniforms were facilitators. Kilkus (1993) found that nurses randomly sampled from the population of licensed nurses in Minnesota had mean scores in the moderately assertive range on the Rathus Assertiveness Scale, but nurses employed in hospitals had lower mean assertiveness scores than nurses working in outpatient settings, public health, and schools of nursing. Nurses working in administration, education, and mental health had the highest mean assertiveness scores. In a recent study, McCartan and Hargie (2004a, 2004b) found no correlation between sex role orientation or caring skills and positive and negative assertive behaviors.

All of these studies have significant threats to validity, including self-selection bias, response bias on self-reported measures, lack of power analysis. Some limited the construct of assertive behavior to refusal of an unreasonable request or accusation. No studies established an empirical link between assertive behavior and patient outcomes.

State of the Science & Directions for Research

When viewed together, high reliability, normal accident, and human factors theories indicate that errors will continue to occur in the provision of medical care, and a single-minded focus on “system” level functions for preventing error may actually increase the potential for harm to occur (Knox, 2003; Rochlin, 1999; Weick, 2002), suggesting the need to improve medical teamwork and communication as a key strategy for preventing patient harm.

There is good evidence from the aviation industry that operator attitudes about teamwork, hierarchy, error, and stress affect performance in settings involving two or more persons engaged in dynamic decision making (Bowes et al., 1998; Helmreich et al., 1986). Planning and communication improve flight team performance (Bowes et al.; Stout et al., 1999), and lack of assertiveness was demonstrated in 20% of cases in which captain errors went uncorrected (Jentsch et al., 1999). Attitudes have also been shown to be amenable to targeted training interventions designed to improve the crew’s ability to catch and recover from errors (Stout et al., 1997), but it is unclear how generalizable the results of simulation training are to actual duty performance, and these studies were conducted with highly homogeneous participants samples.

Evidence is growing that there are significant problems with safety and teamwork attitudes in health care environments (Gaba et al., 2003; Sexton et al., 2000; Thomas et al., 2003), and that nurses’ contributions to decision making are undervalued and underutilized (Bucknall, 2003; Manias & Street, 2000, 2001). There is conflicting evidence about the “actual” assertiveness of professional nurses. Importantly, the hypothesized links between safety attitudes, interpersonal behaviors, and patient outcomes have yet to be established.

By virtue of their continuous contact with patients and families as the primary bedside provider of care, perinatal nurses are uniquely positioned to see, evaluate, and act upon changes in the patient’s condition. However, retrospective reviews of obstetric accidents demonstrate repeatedly that, at best, communication problems are a factor in the development of bad outcomes and, at worst, nurses’ concerns are not stated clearly or are ignored (JCAHO, 2004; Simpson & Knox, 2003). There is substantial evidence that the relationship between nursing and medicine is troubled in many settings (IOM, 2004; Thomas et al., 2003; Zwarenstein & Bryant, 2004). If left unattended, the troubled nature of nurse-physician relationships is likely to undermine the potential gains from team training in the medical arena.

The application of CRM principles to the health care environment is a promising concept, but the baseline data required for development of effective team training interventions has yet to be established (Thomas & Helmreich, 2002), and the transfer of CRM techniques across settings has been problematic even within the aviation industry (Helmreich, Merritt, & Wilhelm, 1999). There is also wide variation in providers’ understanding of the meaning of “teamwork” and “collaboration” (Henneman, Lee, & Cohen, 1995; Manias & Street, 2000; Rosenstien, 2002; Thomas et al., 2003; Thomas, Sherwood, et al., 2004), and these concepts need to be clarified to enhance comparability of findings in future studies.

Future research should document the effectiveness of team training interventions in promoting effective communication and coordination in dynamic patient care situations.

A challenge for health care providers in general and obstetric providers in particular is how to effectively measure patient safety. Traditionally, quality assurance has focused on using morbidity and mortality as quality indicators. Current practice is to combine morbidity and mortality with benchmarking of certain positive indicators of quality, such as cesarean delivery rate or time to 1st dose of antibiotic. However, measuring patient safety is really measuring something that doesn’t happen (errors, poor care, or bad outcome), which is much harder to conceptualize and make visible than negative outcomes (Schulman, 2002; Simpson, 2005). This is particularly true in perinatal care, where the generally healthy nature of the patient
population makes mothers and their infants extremely resilient to even major physiologic insults. Focusing only on traditional quality indicators of morbidity and mortality in obstetrics results in under examination of threats to safety and quality (Simpson) and new measures are needed. Links between provider attitudes, targeted interventions, and both old and new quality indicators have yet to be delineated.

Several areas of research require attention to enhance the patient safety profile for inpatient obstetric care. These areas include the problems that different types of providers experience in working to provide safe care and prevent patient harm, improving techniques for measuring the quality of care, and documenting the effectiveness of team training interventions in promoting effective communication and coordination in dynamic patient care situations. Only when we have examined these three issues with well-designed research will we have a secure platform for providing the safe care every childbearing family deserves.

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