

Insights into Participant's Experiences in Multidisciplinary Medical Trauma  
Simulation-Based Team Training

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Mary Ann Severson

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Dr. James Brown and Dr. Catherine Twohig, Co-Advisors

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## **Abstract**

A transformational culture change is needed in healthcare to reduce the number of preventable medical errors resulting in patient injuries and deaths in U.S. hospitals each year. Although multidisciplinary team training is a high priority for healthcare professionals seeking to improve communication and collaboration, very few healthcare professions' staff development programs integrate teamwork principles in their programs and few offer opportunities to practice the necessary technical and nontechnical skills that are needed for efficient communication and teamwork.

The purpose of this qualitative descriptive study was to better understand the experiences of multidisciplinary medical trauma Simulation-Based Teamwork Training (SBTT) and debriefing. The insights have important organizational implications for training of healthcare teams and patient safety implications. SBTT and debriefing, specifically to train teamwork and communication skills, are powerful methods to increase safety and effectiveness in healthcare.

*Keywords:* crew resource management (CRM), debriefing, simulation-based training, teamwork

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## **Chapter 1 - Introduction**

Josie King, an 18 month old girl, died on February 22, 2001 due to a combination of medical errors. She had been hospitalized at Johns Hopkins Hospital in Baltimore, Maryland with first and second degree burns. After several weeks in the pediatric intensive care unit (PICU), she recovered very well and was scheduled for dismissal to return home (King, 2009). According to Greenhouse, Kuzminsky, Martin & Merryman (2006), two days before she was to return home, Josie died from “severe dehydration and misused narcotics” (Greenhouse et al., 2006, p.63). Josie’s mother, Sorrel King stated:

Among the great lessons of Josie’s tragedy are the need for uniformly balanced communication between parents and caregivers, constant awareness of the possibility of human and system errors in the delivery of care, and the establishment of additional safeguards against errors (Children’s Hospital of Pittsburgh press release, June 9, 2006).

Although healthcare uses advanced technology and state of the art equipment, breakdowns occur within the system. These breakdowns and failures in communication continue to occur regularly in healthcare settings. Ineffective communication affects safety and quality more than anything else according to Leonard, Frankel, Simmonds & Vega (2004). Dunn et al. (2007) found that communication failure is one of the most common contributing factors in 65% of sentinel events (healthcare mistakes that result in serious injury or death to the patient) as reported to the Joint Commission for Accreditation of Hospital Organizations (JCAHO) since 1995.

Bethune, Sasirekha, Sahu, Cawthorn & Pullyblank (2011) found in studies of operating room performance, up to 30% of all sentinel events (see Glossary for

definition) were the result of communication failures. These findings were based on an analysis of a number of operating room performance studies. Dunn, Mills, Neily, Crittenden & Bagian (2007), conducted a study of the Department of Veterans Affairs (VA) and found breakdowns in communication were a contributing factor “in approximately 75% of more than 7,000 root cause analyses reported to the National Center for Patient Safety (NCPS) database” (p.318). Investigators including Salas, Almeida, Salisbury, King, Lazzara, Lyons, Wilson, Almeida, & McQuillan 2009; Dunn et al., 2007, concluded that ineffective communication and inadequate teamwork contributed to medical errors and patient harm in studies of closed malpractice claims from various clinical settings.

Kohn, Corrigan, & Donaldson (Eds.), (2000) argued that medical errors are frequently connected to breakdowns in communication and people make fewer mistakes when they work in teams. Interdisciplinary teamwork is a high priority for healthcare professionals to develop effective communication and team collaboration. Few health care professions integrate teamwork principles into their staff development programs. Few organizations incorporate team training into their organizational culture. A limited number of organizations offer opportunities to practice the technical and nontechnical skills necessary to promote effective communication and teamwork.

### **Problem Statement**

The report *To Err is Human: Building a Safer Health System*, (Kohn et al., 2000) noted that the U.S. health care system is in the wake of other high risk industries in ensuring basic safety. In the view of Kohn et al.:

1. More people die from medical errors in hospitals each year than the fatalities from motor vehicle accidents, breast cancer, or AIDS.
2. Medical errors are the eighth leading cause of U.S. deaths.
3. 98,000 – 100,000 deaths in the U.S. each year are attributed to medical errors.
4. Total national costs (lost income, lost household production, disability, and health care costs) of preventable adverse events (medical errors resulting in injury) are estimated to be between \$17 billion and \$29 billion, of which health care costs represent over one-half (p.1, Executive Summary).

“Preventable medical injuries account for more than 100,000 deaths per year, which is a million lives over the past decade” (Consumers Union, 2009, Executive Summary, p.1). In other words, injuries or deaths from medical mistakes continues and are comparable to one Boeing 787 Dream liner aircraft crashing every day and killing all passengers and crew on board.

### **Purpose of the Study**

The purpose of this study is to better understand multidisciplinary medical trauma SBTT and debriefing experiences. I hope to gain insights that will enhance efforts to design innovative, well-structured SBTT and debriefing experiences that will lead to effective communication, teamwork, reduced medical errors, and enhanced patient safety. This study provided an opportunity for me to understand multidisciplinary SBTT and debriefing experiences from the perspectives of the participating members of the trauma

team. Arafeh, Snyder-Hanson, and Nichols, (2010) argued that debriefing is vital to

SBTT:

Debriefing is a crucial part of simulation-based training and has been reported to be where most of the learning occurs (p.308). It is the process whereby the healthcare team can reexamine the clinical encounter to foster development of clinical reasoning, critical thinking, judgment skills and communication through reflective learning processes (p. 302).

This research study focused on the individual participants' perspectives of the experiential SBTT and debriefing process and encouraged learners to reflect on their overall experience. Gathering specific insights, themes, and patterns from the participants will inform the need for future research, best practice, and provide guidelines for developing innovative methods for future medical and nursing organizational staff development and for healthcare organizations to integrate teamwork into organizational culture.

### **Significance of the Problem**

Kohn et al., (2000) have reported the magnitude of the problem of medical errors is patient safety. In the 1999 report titled *To Err is Human; Building a Safer Health System* (Kohn et al., 2000), medical errors are the eighth leading cause of U. S. deaths; 100,000 U.S. deaths have been attributed to medical errors; and the total national costs (lost income, lost household production, disability, and health care costs) of preventable medical errors resulting in injury are estimated to be between \$17 billion and \$29 billion (p. 1, Executive Summary).



Congress created a Center for Patient Safety within the Agency for Healthcare Research and Quality (AHRQ). The purpose of AHRQ is to set standards, communicate with members about safety, and develop interdisciplinary team training programs that create a culture of safety across disciplines. Kohn, Corrigan & Donaldson (2000) stated:

People make fewer errors when they work in teams. When processes are planned and standardized, each member knows his/her responsibilities as well as those of teammates and members look out for one another noticing errors before they cause an accident. In an effective interdisciplinary team, members come to trust one another's judgments and attend to one another's safety concerns (p. 173).

According to Musson & Helmreich (2004), "Training to improve teamwork is a new concept for medicine, particularly for physicians who are trained largely to be self-sufficient and individually responsible for the care they deliver" (p. 25). Along the same lines, Leonard, Graham, & Bonacum (2004) acknowledged, "Nurses are taught to be very broad and narrative in their descriptions of clinical situations, whereas physicians learn to be very concise and get to the headlines quite quickly" (p. i86). Leonard et al., (2004) explained:

Hierarchy, or power distance, frequently inhibits people from speaking up. Authoritarian leaders, who reinforce large authority gradients, create unnecessary risk. Effective physician leaders flatten the hierarchy and make it seem safe to speak up (p. i86).

Kohn et al., (2000) advocated using appropriately adjusted team training and aviation-based crew resource management (CRM) concepts including simulation-based training (SBT) in healthcare to improve communication and teamwork. Some organizations have begun to offer aviation-based CRM programs to health care

organizations in order to change existing safety cultures and attitudes, similar to the successful FAA-mandated CRM training in aviation.

### **Rationale for the Study**

Designing evidence-based teamwork training programs and creating environments with open communication is not an easy process in healthcare. The investigators listed below have shown a number of studies related to nurse-physician collaboration, but the strategies to improve these relationships are missing. The literature referred to below has validated simulation-based training as a highly effective tool for teaching technical skills, however, there is limited evidence for using SBT as a strategy for teaching non-technical skills like communication and teamwork (Savoldelli, Naik, Park, Joo, Chow, & Hamstra, 2006; Salas, Wilson, Burke, & Wightman, 2006; Arafeh, Snyder-Hanson, & Nichols, 2010; Klipfel, Gettman, Johnson, Olson, Derscheid, Maxson, Arnold, Moehnke, Nelson, & Vierstraete, 2011; Raemer, Anderson, Cheng, Fanning, Nad Karni, & Savoldelli, 2011). Investigators including Klipfel et al., 2011; Salas & Rosen (2008); Savoldelli, Naik, Park, Joo, Chow, & Hamstra (2006), have shown that debriefing is vital to learning but a limited number of studies have been done. There is a need for more research in the area of debriefing especially with its importance to learning effective communication and teamwork.

Due to the knowledge gaps identified above, there is sufficient rationale for further investigation on SBTT and reflective debriefing to develop effective communication, teamwork, improved patient safety, and reduced medical errors. As Oriol (2006) stated: "Healthcare must follow those industries that are leaders in safety where

team training efforts are comprehensive, organization-wide, visible, pervasive, and focused both on employees and consumers” (p. 406). SBTT and learning through debriefing is essential for integrating teamwork and effective communication into the daily workflow of an organization.

### **Implications for Human Resource Development (HRD)**

In many organizations, teamwork is crucial to the successful achievement of organizational goals. The NASA Safety and Mission Assurance investigation report of the Columbia accident recognized organizational causes rooted in the history and culture that were detrimental to safety and reliability including:

1. Relying on past successes as a substitute for sound engineering best practices (e.g. testing to understand why systems are not performing in agreement with requirements/specifications);
2. Organizational barriers prevented effective communication of critical safety information and stifled professional differences of opinion;
3. The lack of integrated management principles across program elements;
4. The evolution of an informal chain of command and decision-making processes that operated outside of the organizations rules (NASA Safety and Mission Assurance Investigation of Columbia Accident, p. 177).

Hoff, Jameson, Hannan, & Flink (2004), described organizational impact in the following statements:

*To Err is Human* places at the core of a successful systems-based approach to reducing error the need for a strong safety culture, appropriate physician leadership and opinion leaders attending to medical errors, the need for simplification and standardization of workflows, and the use of interdisciplinary team approaches in complex delivery systems (p. 4).

As Hoff et al., (2004) stated:

Organizational factors including using information technologies; developing effective team-based approaches to care; providing greater coordination of care; and using standard operating procedures in evidence-based practice and performance accountability to promote patient safety and to error proof systems of care delivery was addressed in the report *Crossing the Quality Chasm* (p. 4).

Salas, et al., (2009) have shown evidence-based, practical, systematic success factors for preparing, implementing and sustaining a team training and performance improvement initiative in organizations. These include:

1. Align team training objectives and safety aims with organizational goals;
2. Provide organizational support for the team training initiative;
3. Get frontline care leaders on board;
4. Prepare the environment and trainees for team training;
5. Determine required resources, time commitment, and ensure their availability;
6. Facilitate application of trained teamwork skills on the job;
7. Measure the effectiveness of the team training program (p. 399-404).

These findings have important organizational implications for team training. The investigators listed below have shown that effective team collaboration across disciplines decreased morbidity and mortality rates, reduced the cost of care, decreased errors, and improved patient satisfaction, improved job satisfaction, diminished job stress, and

reduced nursing staff turnover (Kramer & Schmalenberg, 2003; Manojlovich, 2005; Schmalenberg, Kramer, & King, 2005; Weaver, Granadas, Lassara, Lyons, Salas, Knych, McKeever, Adler, Barker, & King (2010); Maxson et al., 2011; Klipfel, et al., 2011).

This descriptive qualitative study provides qualitative data needed to support an innovative, transformational organizational culture change in the medical community's teamwork philosophy, training and best practice. Although there tends to be agreement on the critical need to develop interdisciplinary team training to develop effective communication and teamwork, there currently are few nursing or medical schools that integrate standardized teamwork principles into their organizational staff development programs and few offer opportunities to practice nontechnical skills like teamwork and communication (Nance, 2004; Oriol, 2006; Maxson et al., 2011). Oriol (2006) concluded innovative team training needs to be:

Integrated into the culture and operations of the organization, be taught and reinforced over and over again so people don't revert back to old behaviors, be data driven so that the program development and revision can be based on actual team performance, and leadership needs to accept and encourage the culture change ( p. 406).

Organizational leadership and physician involvement in healthcare is required for this important organizational culture change, just as the aviation industry learned in the past regarding the implementation of aviation-based cockpit/crew resource management (CRM).

## **Research Question**

The research question for this dissertation is: “How is multidisciplinary medical trauma SBTT and debriefing a transformational learning experience for multidisciplinary trauma team members?” In order to provide some clarity to this overarching research question, I will need to break it down to understand the following questions:

1. Do some or all disciplines find the experience transformational, independent of their role?
2. Is there one specific insight that was learned through this session that may strengthen clinical practice?
3. How did the debriefing experience enhance the learning experience?
4. What are the barriers to effective communication and team collaboration?
5. How has SBTT made a difference in how individuals function on the team?
6. Are there things that keep members of the team from asking for help?
7. Describe any circumstances when one would stop a team leader from doing something of concern?

## **Potential Contributions**

Using a qualitative descriptive research approach and content analysis, I will develop deeper insights into simulation-based team training and debriefing experiences of trauma team members. The single greatest contribution from this research is to better

understand the experiences of multidisciplinary medical trauma SBTT and debriefing experiences. The insights gained will have important implications for organizations in developing training for healthcare teams and implications to promote patient safety within healthcare organizations. Ineffective communication has been found to contribute to medical errors (Kohn et al., 2000). Lessons learned from other high risk industries have demonstrated that implementing standardized methods of communication, creating an environment where everyone interacts collaboratively and feels comfortable speaking up, builds effective communication and team performance.

### **Assumptions**

For the purposes of this study, as the researcher, I assumed that trauma team participants willingly participate in one SBTT session, engage in reflective debriefing discussion afterward, and take part in individual in-depth interviews. As a researcher, I assumed that this particular SBTT and debriefing model is an appropriate design for examining transformational learning among multidisciplinary trauma team members whose motivation is to learn effective communication and team collaboration.

### **Role of the Researcher**

As a researcher who has worked in healthcare for more than 30 years in a variety of roles and responsibilities, I also am personally connected to healthcare as a consumer (along with family and friends). I acknowledge my professional experience and personal interest in this very important issue. I have worked in a variety of positions throughout my nursing career. Those experiences provided me with depth and breadth of knowledge related to the medical community. In my varied roles and responsibilities, I have had

opportunities to teach and to mentor allied health staff to develop their critical thinking skills. After receiving a Master's Degree in Human and Health Services Administration, I worked as a Business Analyst in an internal consulting role within the medical center. It was in this role that my interests began in systems thinking, organization development, process improvement, change management, and transformational culture change. Currently, the goal of the work that I do in the Center for Science of Healthcare Delivery is to focus on and coordinate resources to analyze, evaluate, and implement innovative delivery models that improve the experience and value of the delivery of care. The Organization, Leadership, Policy and Development (OLPD) Ph.D. program at the University of Minnesota has provided me an opportunity to continue my pursuit of lifelong learning by applying the skills that can contribute to both academic knowledge and practice.

## **Glossary**

The following definitions clarify terms and concepts and provide a better understanding of SBTT and debriefing in healthcare:

Adverse Event is “an injury caused by medical management rather than an underlying condition of the patient” (Kohn et al., 2000, p. 29).

Back-up Behavior is defined in the context of aviation's crew resource management (CRM) according to Salas, Sims, & Burke, (2005): “the ability of team members to anticipate the needs of others through accurate knowledge of their responsibilities and to



shift workload among team members to achieve balance during high workload or pressure” (p. 560).

Communication is the exchange of information between a sender and a receiver (Salas et al., 2005). This involves providing brief, clear, specific and timely information. Closed Loop Communication is the practice of repeating back information when one member of the team makes a request of another. Closed Loop Communication is ensuring that information conveyed by the sender is understood by the receiver (Rosen et al., 2008).

Content Analysis according to Patton (2002) is: “A qualitative data reduction and sense-making effort; takes a volume of qualitative material and attempts to identify core consistencies and meanings. The core meanings found through content analysis are patterns or themes. Pattern usually refers to a descriptive finding, while a theme takes more a categorical or topical form” (p. 453).

Crew Resource Management (CRM) as defined by McConaughy (2008):

A training strategy developed by the aviation industry to improve teamwork; uses all available resources, equipment, and people to promote safety and enhance efficiency. Strategies include simulators, lectures and video of competencies ranging from teamwork knowledge, skills and attitudes. The key components of CRM include communication, mutual trust/support, leadership or decision-making and situation awareness (p.97).

Critical Reflection involves an individual thinking about an experience in one of three ways: (a) content reflection is what a person, sees, feels, thinks, and acts; (b) process reflection is why a person perceives, thinks, feels, and acts; (c) premise reflection is why a person sees, feels, thinks, and acts the way they do. Reflection in all three manners may

be involved in a transformative learning experience. Critical reflection is used to validate new assumptions and beliefs as part of the transformative learning experience (Mezirow, 1991).

Culture of Safety according to the Agency for Healthcare Research and Quality (AHRQ) defined the key components as:

1. Acknowledgment of the high-risk nature of an organization's activities and the determination to achieve consistently safe operations;
2. A blame-free environment where individuals are able to report errors or near misses without fear of reprimand or punishment;
3. Encouragement of collaboration across ranks and disciplines to seek solutions to patient safety problems;
4. Organizational commitment of resources to address safety concerns (Agency for Healthcare Research and Quality. National Healthcare Quality Report, 2008).

Briefings set ground rules for open communication, where the team members review their performance without being judgmental. Arafeh et al., (2010) defined briefings as:

When all team members are encouraged to verbalize their thoughts and questions, this will hopefully lead to adoption of more open communication and transparency among healthcare providers. Security is initially established in a briefing where learners are prepared for the simulation experience. It includes a description on the use and value of simulation, an overview of key cognitive, technical, and behavioral concepts that the learner will encounter during the simulation, and discuss components of the debriefing following the simulation (p. 303).

Debriefing was defined by Arafeh et al., (2010) as:

The process whereby the healthcare team can reexamine the clinical encounter to foster the development of clinical reasoning, critical thinking, judgment skills, and communication through reflective learning processes. Debriefing following simulation is an intentional and vital process designed to synergize, strengthen, and transfer learning from an experiential learning exercise (p. 302).

Disorienting Dilemma is the situation that begins the process of transformation. This may be a single, significant event or an incremental accumulation of smaller events that threaten a person's life world through contradiction of existing meaning perspectives (Mezirow, 1991).

Errors are "the failure of a planned sequence of mental or physical activities to achieve its intended outcome when these failures cannot be attributed to chance" (Kohn et al., 2000, p. 54).

Evidence-Based Practice (EBP) is reliance on the partnership among hard scientific evidence, clinical expertise, and individual patient needs and choices. Librarians play an important role in the spread of EBP because of the importance of identifying and retrieving appropriate literature from various sources for use in making health care decisions (Bulletin of Medical Library Association, 2012).

Field Notes are the written account of the observations analogous to the interview transcripts (Merriam, 1998). The content of field notes include (a) verbal descriptions of the setting, the people, the activities; (b) direct quotations or the substance of what people

said; and (c) observer's comments put in the margins or in the running narrative, and identified by underlining or bracketing.

Healthcare is the industry that provides prevention, treatment and management of illness and preservation of physical and mental well-being through a variety of services (Merriam Webster Dictionary, 1998).

Institute of Medicine (IOM) is the organization established in 1970 by the National Academy of Sciences to get members of the appropriate profession to examine policy related to the health of the public (Kohn et al., 2000).

High Reliability Organizations, according to Baker, Day, & Salas (2006) are those that exist in such hazardous environments where the consequences of errors are high but the occurrence of error is extremely low (p.1576).

Interdisciplinary Team is described by Schmalenberg et al., (2005) as members of a group that have varied but complementary experience, qualifications, and skills that contribute to the organization's specific objectives. Interdisciplinary team process expands the multidisciplinary team process through collaborative communication rather than shared communication. In this model team members are involved in problem solving beyond the confines of their discipline.

Learning is defined by Salas & Rosen (2008) as a "constant change in knowledge or performance capacity that is rooted in experience" (p. 6).

Meaning Perspectives as defined by Mezirow (1991):

Provide criteria for judging or evaluating right and wrong, good or bad, beautiful or ugly, true or false, appropriate or inappropriate. Meaningful perspectives also determine our concept of personhood, our idealized self-image, and the way we feel about ourselves (p. 44).

Each meaning perspective has multiple meaning schemes. Meaning Schemes are “the particular knowledge, beliefs, value judgments, and feelings that become articulated in an interpretation” (Mezirow, 1991, p. 44).

Medical Errors were defined by Kohn et al., (2000) as the “failure of a planned action to be completed as intended or the use of a wrong plan to achieve the aim” (p. 1). Errors are caused by faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them.

Medical Team Management and Dynamic Outcomes Management (now called Life-wings): according to Morey, Simon, & Jay, (2000) are all translational research efforts to apply aviation-based crew resource management (CRM) principles to emergency medical care (Morey et al., 2002).

Member Checks is a strategy to enhance internal validity by taking data and tentative interpretations back to the people from whom they were derived and asking them if the results are plausible (Merriam, 1998, p. 204).

Multidisciplinary Team is a group of professionals with varied but complimentary experience, qualifications, and skills that contribute to the achievement of the organization’s specific objectives (Consumers Union, 2009).

Mutual Support/Collective Trust is group members looking out for each other for the good of the team (Salas, et al., 2005).

Pattern is an aspect of data analysis in qualitative research that looks for correspondence between two or more categories to establish a small number of categories (Patton, 2002).

Peer Review is a strategy to ensure internal validity in qualitative research. It is asking a colleague to review some of the raw data to assess whether the findings are plausible based on the data (Merriam, 1998, p.26).

Perspective Transformation according to Mezirow (1991) is:

The process of becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand, and feel about our world; changing these structures of habitual expectation make possible a more inclusive, discriminating, and integrative perspective; and finally, making choices or otherwise acting upon these new understanding” (p. 168).

Qualitative Descriptive Research is a process of understanding based on a distinct research method that is a way to find out what people do, know, think and feel by observing, interviewing, and analyzing documents. Patton (2002) stated, “What people actually say and the descriptions of events observed are the essence of qualitative inquiry” (p. 457). Creswell (1998) defined qualitative research as “an inquiry process of understanding based on a distinct methodological tradition of inquiry that explores a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting” (p. 15).

Purposeful Sampling, according to Merriam (1998), is “based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select the sample from which the most can be learned” (p. 61). Patton (2002) stated:

Cases for study (e.g. people, organizations, communities, cultures, events, critical incidences) are selected because they are information-rich and illuminative; they offer useful manifestations of the phenomenon of interest. Sampling is aimed at insight about the phenomenon, not empirical generalization from a sample to a population (p. 40).

Rapid Response Team (RRT), according to (Jones, De Vita, & Bellomo, 2011), consists of critical care professionals (i.e. critical care nurses, physicians and respiratory therapists). Their focus is preventing a potentially dangerous situation.

Reliability is whether the results are consistent with the data collected. Since the researcher is the primary research instrument of data collection and analysis, the researcher can become more reliable through training and practice (Merriam and Associates, 2002).

Semi-Structured Interview, according to Merriam (1998), is a “guided by a set of questions and issues to be explored, but neither the exact wording nor the order of questions is predetermined” (p. 93).

Sentinel Event is according to The Joint Commission for Accreditation of Healthcare Organizations (JCAHO) is:

An unexpected occurrence involving death or serious physical or psychological injury, “or the risk thereof.” Serious physical or psychological injury specifically includes loss of limb or function. The phrase, “or the risk thereof,” includes any

process variation for which a recurrence would carry a significant chance of a serious adverse outcome. Such events are called sentinel because they signal the need for immediate investigation and response (Sentinel Event Policy and Procedures, January 1, 2012).

Shared Mental Model is a teamwork theory based on understanding team goals, team member tasks, and team coordination to achieve common goals (Salas et al., 2005).

Simulation-Based Training is, according to Salas et al., (2005), a tool or technique for learners to develop skill competencies through practice and feedback in an environment that is representative of the actual operational conditions. Simulations can be low-fidelity (an actor role-playing an actual event or scenario) to high fidelity (learners practice skills in a dedicated location on a life-like computerized mannequin) (Salas et al., 2005). The simulated environment in this study is a dedicated multidisciplinary simulation center focusing on the components of teamwork using communication, mutual support, leadership, decision making, and situation awareness.

Situation Awareness is the ability of team members to use information to develop a common understanding of the task and team environment (Shuffler, Salas, & Xavier, 2010).

Teams consist of interrelated individuals who work together to accomplish a common goal. Teams have meaningful assignments, interdependencies, hold shared and valued objectives, use multiple information sources, possess adaptive mechanisms and perform through intensive communication processes (Salas & Rosen, 2008; Brannick, Salas, & Prince, 1997).



Team Leadership is, according to Salas et al., (2008), “the ability to direct and coordinate activities of other team members, assess team performance, assign tasks, develop team knowledge skills, abilities (KSA), motivate others, plan, organize, and establish a positive team atmosphere” (p. 1003).

Teamwork, according to Baker et al., (2006), is “a set of interrelated knowledge, skills and attitudes (KSA) that facilitate coordinated, adaptive performance” (p.1579).

Teamwork depends on each team member to anticipate the needs of others; adjust to each other’s actions and have a shared understanding of how something should happen (Baker et al., 2006).

Team Training is a set of tools and methods that form an instructional strategy where team members can practice skills and receive feedback (Salas et al., 2008).

Team Strategies & Tools to Enhance Performance (*TeamSTEPPS™*) is, according to King, Battles, and Baker et al., (2006), a systematic approach developed by the Department of the Defense (DoD) and the Agency for Healthcare Research and Quality (AHRQ) to integrate teamwork into practice (King et al., 2006).

Thick Description, as defined by Patton (2002), provides the “foundation for qualitative analysis and reporting and takes the reader into the setting being described in such a way that we can understand the phenomenon and draw our own interpretations about meanings and significance” (p. 437).

Training is systematically gaining knowledge, skills and attitudes (KSA) to develop successful performance (Salas & Rosen, 2008).

Transformational Learning is the process of learning that creates a change in a frame of reference. Frames of reference are structures of assumption through which we understand experiences (Mezirow, 2004).

Triangulation is a procedure for establishing validity through pooled judgment and using outside resources to validate case study materials. Denzin (1970) as cited in Merriam and Associates (2002) identified four types of triangulation: “multiples investigators, multiple theories, multiple sources of data, or multiple methods to confirm emerging findings” (p. 25).

Validity in qualitative research depends on the skill, competence and rigor of the person doing the fieldwork (Patton, 2002).

### **Overview of the Following Chapters**

Chapter Two presents a review of the literature. Here I provide the major areas of review including: team and teamwork, aviation’s crew resource management (CRM) and programs implemented in healthcare using CRM as best practice, simulation-based team training, and reflective debriefing as a transformational learning experience to improve communication and teamwork.

Chapter Three describes the methodology used in this study including the rationale for using a qualitative descriptive design and content analysis to investigate the

experiences of SBTT and debriefing. I cover the sampling and selection of participants. Next, the details of the data collection, data management, and data analysis techniques are described. Finally, internal validity and reliability in qualitative descriptive research is addressed as well as adherence to established guidelines, and conduct for ethical research.

Chapter Four describes the insights found in the qualitative descriptive study using content analysis as described by Merriam (2002) and Patton (2002). The insights are grouped into themes and sub-themes in the voices of the participants.

Chapter Five includes a discussion of the research insights. These are presented in the voice of the participants.

Chapter Six concludes with a brief review of the study, conclusions, and recommendations for future research around SBTT and debriefing for building healthcare teams. The limitations of the research findings are discussed. I describe the significance and implications of the study findings for Human Resource Development (HRD).

## **Summary**

Chapter One provided the tragic story of Josie King, an 18 month old, who died due to a preventable medical error. I believe that one of the important lessons learned from this tragedy is the need for effective communication and teamwork among the healthcare team to promote patient safety. It seems that failures in communication continue to occur regularly in healthcare settings and these lead to medical errors which affect patient safety and quality.

It is heartbreaking that more people die from medical errors in hospitals each year than fatalities from motor vehicle accidents, breast cancer, or AIDS (Kohn et al., 2000). Kohn et al., (2000) reported that medical errors are the eighth leading cause of death. The Center for Patient Safety has begun to set standards, communicate with members about safety, and develop interdisciplinary team training programs that create a culture of safety across disciplines.

The purpose of this qualitative descriptive study was to better understand the multidisciplinary trauma SBTT and debriefing experiences from the perspective of multidisciplinary trauma staff. The insights gained from this study will provide valuable information to enhance efforts to design innovative, well-structured SBTT that will be incorporated into medical, nursing, and allied health staff development programs. These insights will also be integrated into organizations to promote transformational organizational culture change, and offer opportunities to practice the technical and nontechnical skills necessary to promote teamwork and effective communication.

In this study, the research question is: “How is multidisciplinary trauma simulation-based team training and debriefing a transformational learning experience for multidisciplinary team members whose motivation is to learn teamwork and effective communication?” This chapter also includes a glossary of terms to provide a better understanding of SBTT and debriefing.

Chapter Two presents a comprehensive literature review. The major areas include: teams and teamwork, aviation's crew resource management (CRM), simulation-based training (SBT), and debriefing to create high reliability organizations.

## **Chapter 2 - Literature Review**

### **Overview**

The purpose of this chapter is to present the findings from the comprehensive literature review relevant to the research questions. The major areas of focus include teams and teamwork, aviation's crew resource management (CRM) principles, and tools like multidisciplinary trauma SBTT and reflective debriefing to create highly reliable healthcare organizations that promote communication, teamwork, situational awareness and leadership/decision-making.

Patton (2002) described different ways of conducting literature reviews in qualitative research. Patton (2002) stated: "sometimes a literature review may not take place until after data collection; alternatively, the literature review may go on simultaneously with fieldwork, permitting a creative interplay among the processes of data collection, literature review, and researcher introspection" (p. 226). This idea of creative interplay may be an interesting approach to examining SBTT and debriefing in the context of multidisciplinary trauma team communication and teamwork and Mezirow's Transformational Learning Theory.

### **Literature Review Search Criteria and Procedure**

A variety of sources were accessed to obtain information applicable to the literature review. This study was based on a systematic literature review approach that included the following steps and procedures: (a) an initial set of articles were selected for review as a result from using the following electronic databases: GOOGLE SCHOLAR,

MEDLINE, EMBASE, COCHRANE, PROQUEST and CINAHL; (b) the search terms included: debriefing, communication, crew resource management (CRM), high reliability organizations (HRO), human factors, leadership, organization development, patient safety, simulation-based training, team training, and teamwork; (c) additional studies were identified using the search terms *Team Strategies & Tools to Enhance Performance (TeamSTEPPS™)*, *Medical Team Management*, *MedTeams®*, *Dynamic Outcomes Management (now called Life-wings)*, and *Rapid Response Teams (RRT)*; (d) studies were selected for review only if they were published in peer reviewed journals, printed in English-language peer reviewed journals and reported the results of original research studies; (e) in addition to database searches, a targeted search was conducted of two specialized journals: *Joint Commission Journal on Quality & Patient Safety* and *Quality & Patient Safety in Healthcare*.

### **Teams and Teamwork**

Interdisciplinary team training is one of the top priorities for healthcare. In many organizations, people work as part of a team and not just as a group of individuals. Teams have important characteristics. Salas et al., (2005) defined a team as two or more individuals who have meaningful task interdependencies and have to coordinate actions and cooperate so they can accomplish a task (Salas et al., 2005). Teamwork, according to Learner, Magrane, & Friedman (2009), is the “ability of team members to work together, communicate effectively, anticipate and meet one another’s demands, and inspire confidence resulting in a coordinated pursuit of a set of goals” (Learner et al., 2009, p. 320).

In healthcare, fundamental and longstanding problems with teamwork, communication and inter-professional relationships have been well documented (Lyndon, 2006; Thomas, Sexton, & Helmreich, 2003; Baker et al., 2006; Klipfel et al., 2011; Hamman, 2004; Schmalenberg, Kramer & King, 2005). Historically, healthcare staff functioned in separate silos, all trained in separate professions, each with unique skills and yet were required to coordinate and provide safe patient care (Baker et al., 2006; Klipfel et al., 2011; Hamman, 2004). Schmalenberg et al., (2005) described different levels of teamwork in a multisite, evidence-based management practice initiative to identify structures that promote critical care nurse-physician interactions. Schmalenberg et al., (2005) concluded: “The lowest level is characterized by the sequential reporting by each discipline without interaction or dialogue, and was called multidisciplinary by interviewees. The highest level of teamwork, interdisciplinary, is interaction and spirited dialogue occurring between members of differing disciplines” (Schmalenberg et al., 2005, p. 456).

There have been some attempts to promote team behaviors in healthcare. Gaba developed Anesthesia Crisis Resource Management (ACRM) to help anesthesiologists effectively manage crises by working in multidisciplinary teams (Baker et al., 2006). Taking time to get to know each other helps build trust among team members. Trust is an essential ingredient in collaborative relationships (Maxson et al., 2011; Klipfel et al., 2011). Lessons learned from other high risk industries have demonstrated that implementing standardized methods of communication, creating an environment where everyone interacts collaboratively and feels comfortable speaking up if they see



something that is of concern, builds effective communication and team performance. As a result, this creates a learning environment where small problems are potential issues to address more proactively. These situations encourage effective communication. Although there is agreement that interdisciplinary team training is a high priority in healthcare to improve communication, some researchers have discovered that health care providers seldom are taught or provided an opportunity to practice teamwork (Kohn, et al., 2000; Maxson et al., 2011). Teamwork does not come naturally, as the discrepancies in attitudes about teamwork have shown.

### **Attitudes toward Teamwork**

Researchers have found differences in attitudes about teamwork among physicians and nurses. In one study of critical care nurses and physicians, Thomas, et al., (2003) reported that nurses found it difficult to speak up about a concern. Maxson et al., (2011) found that nurses and physicians have significantly different perceptions of clinical decision making. Researchers found differences among staff of differing professional roles that influence team and collaborative relationships. Maxson et al., (2011) found these differences include “patriarchal relationships, time, and lack of role clarification, sex, and culture” (p. 35). These discrepancies in nurse-physician culture and interactions influence attitudes about teamwork.

Shojania, Duncan, McDonald & Wachter (2001) compared attitudes of teamwork among flight crews and operating room staff. Significant differences were found in the level of teamwork perceived by attending surgeons compared with other operating room staff. Shojania et al., (2001) found:

1. A majority of surgical residents (73%) and attending surgeons (64%) reported high levels of teamwork, but only 39% of attending anesthesiologists, 28% of surgical nurses, 25% of anesthesia nurses and 10% of anesthesia residents reported high levels of teamwork.
2. Fifty-five percent of attending surgeons rejected steep hierarchies (determined by whether they thought junior team members should question the decisions of senior team members). In contrast, 94% of airline crew members preferred flat hierarchies.
3. Medical participants were more likely to agree with the statement: Even when fatigued, I perform effectively during critical times. Seventy percent of attending surgeons agreed with this statement, as well as 56% of surgical residents, 60% of surgical nurses, 57% of anesthesia residents, 55% of anesthesia nurses, and 47% of attending anesthesiologists. Twenty six percent of pilots agreed with this statement (Shojania et al., 2001, p. 503)

The magnitude of variation in perceptions of attending surgeons and other staff in the operating room was interesting. Creating innovative strategies for the healthcare team, similar to aviation's CRM may prompt them to view teamwork differently, change their perceptions, and create more effective communication and teamwork.

### **Aviation's Crew Resource Management (CRM)**

Oriol (2006) traced the roots of CRM to the aviation industry. Aviation accident research began near the end of World War II. Cockpit resource management (CRM)

initially centered on improving the technical skills of the pilots. Three major aircraft accidents over a 10 year period of time initiated the urgency for change. In 1979 NASA's Aerospace Human Factors Research Division acknowledged that "most aviation accidents attributed to pilot error or human error were really the result of inadequate communication, leadership, coordination, and decision making skills" (Oriol, 2006, p. 402). Zeltser & Nash (2010) stated, "more than 70% of air crashes involved human error rather than failures of equipment or weather" (p. 13).

Human error can have devastating effects. The first airplane accident investigation was Eastern Airlines, Flight 401, which crashed in the Florida Everglades in 1972. The National Transportation Safety Board (NTSB, 1973) determined that the crew was preoccupied with a faulty light indicator showing a minor nose-gear problem; the aircraft descended unmonitored into the terrain killing 96 passengers and five crew members (NTSB, 1973). In this case, the crew was focused only on the faulty light indicator showing the nose gear problem and became unaware that the plane was quickly descending and losing altitude. This inadequate awareness of the situation resulted in serious consequences.

Another incident, at Tenerife, in the Canary Islands occurred in 1977 when two 747 aircrafts collided on the runway killing 583 people. McConaughey (2008) reported that this incident resulted in the most fatalities in aviation history. The highly skilled KLM pilot caused this tragedy by ignoring crew member concerns that they had not been cleared for takeoff (Kilroy, 1997; NTSB, 1977). This case demonstrated ineffective communication (not listening) and poor leadership.

The third accident was in 1982 when an Air Florida flight crashed on takeoff into the Potomac River in Washington D.C. The NTSB (1982) report attributed the crash to the captain's failure to cancel the takeoff during the early stage when he began to focus on the strange engine instrument readings (NTSB, 1982, Executive Summary page). This is an example of poor leadership and bad decision making. The Department of Defense (DoD) and commercial aviation companies made many changes in the aviation industry after these incidents.

These airplane accident investigations triggered system-wide implementation of CRM. CRM standardized all language for communication. Cockpit procedures changed from hierarchical relationships to flattened collaborative teams to enable team members to speak up if they had a concern. CRM concentrated on effective communication, situation awareness, mutual trust/support, decision making and leadership. These concepts became integrated into the organizational culture and daily workflow with support of leadership. All crew were expected to use all available resources, equipment, procedures and people to promote safety and efficiency (Zelster & Nash, 2010; Salas et al., 2006). CRM "improved communication among the team, which led to safer outcomes" (Awad, Fagan, Bellows, Albo, Green-Rashad, De LaGraza, & Berger, 2005 in Halbesleben, Cox, & Hall, 2010, p. 21). Effective communication and teamwork seemed to create a well understood plan that reduced chances for unavoidable errors. Kohn et al., (2000) advocated for healthcare to use the CRM concepts including SBT for effective communication and teamwork.

Healthcare and aviation have many similarities. Both function in stressful environments, in very complex systems, have highly trained individuals, work under restricted time constraints, require accurate information, and have serious consequences of error (Baker et al., 2006). It is very important for the health care team members to create an environment where individuals can speak freely, express concerns, and share critical language to alert others to unsafe situations as aviation created in the airline industry. Strategies are necessary in healthcare to overcome differences and optimize nurse-physician relationships. In healthcare, CRM principles combined with SBTT create opportunities to practice technical and nontechnical skills in realistic situations, to develop effective communication, better teamwork, excellent leadership, high quality decision-making, situation awareness and back up behavior skills in a safe learning environment (Aggarwal & Darzi, 2011; Maxson et al., 2011; Salas et al., 2006; Savoldelli et al., 2006).

### **CRM Integrated into Healthcare**

Many programs have been implemented in healthcare intended to improve communication and teamwork that were based on the principles of aviation's CRM. These programs include *Team Strategies and Tools to Enhance Performance and Patient Safety (Team STEPPS™)*, *MedTeams®*, *Medical Team Management*, *Dynamic Outcomes Management* (renamed *Life-wings*), and *Rapid Response Teams (RRT)*. At first glance, these programs have CRM components.

*Team Strategies and Tools to Enhance Performance and Patient Safety (Team STEPPS™)* is a systematic approach developed by the department of Defense (DoD) and

the AHRQ. This program is an evidence-based framework that can optimize performance across the health care delivery system (King et al., 2006; Maxson et al., 2011).

*TeamSTEPPS*<sup>TM</sup> uses the CRM approach to teach skills including: (a) leadership/decision-making, (b) situation monitoring, (c) mutual trust/mutual support, and (d) communication (King, Battles, & Baker, 2006).

Additional Department of Defense medical team training programs include *MedTeams*<sup>®</sup> *behavior-based teamwork system*, which was developed by Dynamics Research Corporation, and sponsored by the Army Research Laboratory (Shojania, et al., 2001). According to Shojania, et al. (2001), the goal of *MedTeams*<sup>®</sup> *behavior-based teamwork system* research is to “adapt research in team performance and training from military helicopter aviation to emergency medicine” (p. 504). Each goal links to specific teamwork responsibilities. The *MedTeams*<sup>®</sup> approach avoids errors, catches the error as it happens, and mitigates the consequences of actual errors (Oriol, 2006; Morey et al., 2000; Shojania, et al., 2001). The underlying principles are the same as CRM concepts including team responsibility for patients, a belief in clinician fallibility, peer monitoring, and team members’ awareness of patient status, team member status, and institutional resources. *Medical Team Management* and *Dynamic Outcomes Management* (renamed *Lifewings* in 1999) are other team training programs within the DoD using CRM principles. *Rapid Response Teams* (RRT) began in 1995 with the goal to assess patients at an earlier stage of clinical deterioration by preventing serious adverse events such as cardiac arrests and unexpected deaths (Jones et al., 2011).

The CRM principles provide great tools to promote teams and teamwork. For teamwork to be successful in healthcare, leaders must make a commitment to openly support and show commitment on an ongoing basis. In addition, it is important for the organization to provide opportunities to practice the nontechnical skills in a safe environment. Salas et al., (2005) has shown that simulation –based training improves technical skills. These are the behaviors that will support the transformational culture change needed in healthcare to create highly reliable organizations.

### **Highly Reliable Organizations**

Kohn, Corrigan, and Donaldson (2000) argue that the benefits of CRM are especially evident in high reliability organizations. High reliability organizations, as defined in the glossary, include: nuclear power plants, railroad and seagoing operations, the offshore oil industry, commercial aviation, and military operations (Kohn et al., 2000). Effective communication, collaboration and teamwork is the focus that health care organizations need to embrace to create highly reliable, sustainable, safe organizations as aviation has demonstrated with the CRM model.

For the healthcare industry to become highly reliable, organizations have to move more toward interventions that will move to a culture of patient safety (Baker et al., 2006). According to Baker et al., (2006), high reliability organizations (HROs) are “those that exist in such hazardous environments where the consequences of errors are high, but occurrence of error extremely low” (p. 1576). Roberts and Rousseau (1989) identified eight characteristics of HROs including:

1. Hyper-complex;
2. Tightly coupled;
3. Extreme hierarchical differentiation;
4. Large number of decision makers working in complex communication networks;
5. High degree of accountability;
6. Frequent, immediate feedback regarding decisions;
7. Compressed timeframes; and
8. More than one critical outcome that must happen simultaneously (p. 133).

The first characteristic, hyper-complexity, was defined by Roberts & Rousseau (1989) as “an extreme variety of components, systems, and levels, each having their own standard procedures, training routines, and command hierarchy” (p. 132). Multiple team systems and teamwork is required for successful performance in hyper-complex environments. I agree that healthcare has the characteristic of hyper-complexity as defined by Roberts & Rousseau (1989); my work experience supports that conclusion. Second, the characteristic of tight coupling fits healthcare. Baker et al., (2006) defined tight coupling as “reciprocal interdependence across many units and levels” (p. 1587). Tight coupling means specific tasks performed by one team member are dependent on tasks performed by other team members. An example of tight coupling in healthcare is the care provided in an emergency department. A motor vehicle accident may have a patient who presents with a variety of injuries including fractures, bleeding, and difficulty breathing. The team must assess the difficulty with the airway and breathing before the fractures. This requires coordination for effective team performance and safe care delivery.



Third, is the characteristic of “extreme hierarchical differentiation” (p. 1587). By definition, Baker et al., (2006) stated: “extreme hierarchical differentiation is an organizational structure where levels and roles are clearly differentiated” (p. 1587). The research of Baker et al., (2006) and Roberts & Rousseau (1989) has suggested that “extreme hierarchical differences between physicians and nurses can contribute to dysfunctional communication yielding less than optimal care” (Baker et al., 2006, p. 1588).

Fourth, is that there are a number of people who are responsible for decisions in very complicated communication networks (Roberts & Rousseau, 1989). Healthcare team members constantly make important patient care decisions and these decisions have consequences on the safety of patients. The challenge in healthcare is that physicians and nurses are trained differently in their professions and have learned to communicate differently. There is variation in approaches for conveying information depending on their role” (Baker et al., 2006, p. 1588).

The fifth characteristic of HRO is high degree of accountability. Josie King’s story illustrates this intense accountability in the combination of medical errors. I believe examining the root causes of problems is important rather than targeting blame on individuals. The next characteristic is creating opportunities for frequent, immediate feedback regarding decision making to improve team performance. Another characteristic is that HROs function under very restricted time constraints. Timing in healthcare is crucial because it can mean the difference between life and death.

Finally, according to Roberts & Rosseau (1989), HROs have more than one critical outcome that must happen simultaneously. Interdependencies create a need for bringing activities and outcomes together. To illustrate this interdependency, Baker et al., (2006) provided an example of the delivery of a baby. Some teams function under time constraints. Routine procedures like childbirth can quickly become a stressful time compressed situation if a problem comes up with mom or the baby. Teams need to be able to quickly adapt. Team members may have to be added quickly and integrated into the team. Existing team members may have to take on new roles. It could change from a role of coaching through a normal delivery to conducting an emergency C section. Each member of the labor and delivery team is actively engaged in different aspects of the process, yet their actions are synchronized” (p. 1590).

Teamwork, the CRM framework, and requirements for high reliability organizations (HRO) provide a conceptual framework for the behavioral, cognitive, and affective areas to apply team training to healthcare (Baker et al., 2006). SBTT is a tool that allows both researchers and practitioners to practice technical and nontechnical skills in a safe environment to improve teamwork and communication. The key in this study was to understand the experience of the multidisciplinary trauma SBTT and debriefing sessions for trauma team staff.

### **Simulation-Based Teamwork Training Concepts**

Simulation-based team training (SBTT) is recognized by the Center for Patient Safety, within the AHRQ, as a venue researchers have found as a successful method for promoting interdisciplinary learning to enhance nurse-physician collaboration (Ker,

Mole, & Bradley, 2003; Schmalenberg et al., 2005; Manojlovich, 2005; Thomas et al., 2003; Klipfel, 2011; Aggarwal & Darzi, 2011). Cates (2011) found when simulation was used as a training tool in hospitals funded under a U.S. Department of Defense medical simulation trial program in 2009, the medical error rate decreased from 30% to four percent. Interdisciplinary training promotes respect of the contributions from each discipline by recognizing each other's strengths. Ker et al., (2003) found SBTT developed collegial relationships among pediatric physicians and nurses when problem solving life threatening scenarios together.

Gaba (2004) said "Simulation is a technique, not a technology" (p. i2) that offers a venue for dialogue and active listening to one another's perspectives, thoughts, and practices. Maxson et al., (2011) stated, "high fidelity simulation training in a dedicated simulation center, offered a realistic and experiential environment where learners practice responses to clinical scenarios, debrief and evaluate team performance in the absence of risk" (p. 31). Complex real world situations play out rapidly and demand all cognitive resources of team members. Lessons learned sessions held after the event to analyze why things went as they did are useful. Military flight crews and commercial aviation use this technique with success. Debriefing in addition to SBT is an intervention that can be used to create the transformational culture change that is needed in healthcare.

Aviation's CRM is a technique that medical communities have found useful to improve communication and teamwork in high risk areas including emergency department, operating room, intensive care and labor and delivery (Salas et al., 2009). CRM promotes and reinforces the conscious, learned team behaviors of cooperation,

coordination, and sharing. CRM creates an organizational environment where “specific cooperative and communicative behaviors are defined, acknowledging that technology, communication, and process change need to work in tandem to achieve maximum effectiveness” (Zelster & Nash, 2010, p. 402).

Outside of healthcare, research has shown that teams working together, who are aware of the situation around them, especially in high risk and high intensity work environments, make fewer mistakes than individuals working independently/alone (Learner et al., 2009). Effective situational awareness depends on team members developing accurate expectations for team performance by drawing on a common knowledge base. A shared mental model allows team members to effectively anticipate the needs of others, predict the needs of other team members, and adapt to task demands efficiently. Situation awareness is the foundation for successful decision-making across a broad range of complex and dynamic systems. A few healthcare organizations have implemented staff development programs that were based on the CRM framework to promote communication and teamwork. In addition to the CRM principles, debriefing is one aspect of the SBTT where learners reflect on the simulation. The instructor has the opportunity to teach and provide feedback. A review of the simulation literature has identified the debriefing as the most critical feature of SBT (Arafeh et al., 2010; van Heukelom, Begaz, & Treat, 2010). Studies have shown that without feedback, no learning occurs and with feedback, groups score higher on post-test performance (van Heukelom et al., 2010). There are gaps in the literature about debriefing. Fanning and

Guba (2007) reported that there are very few papers in peer reviewed literature to illustrate debriefing.

### **Debriefing Literature**

Arafeh et al., (2010) reported that the debriefing is a vital part of the SBT and most learning takes place in the debriefing. Debriefing provides the opportunity to examine the clinical encounter to promote clinical reasoning, critical thinking, judgment and communication through reflective learning processes (Arafeh et al., 2010). Critical reflection and discussion are the foundations of Mezirow's Transformational Learning Theory (1998). Many have reported that the personal growth that follows the process of reflecting on an experience is more valuable than the experience itself (Criticos, 1993).

After participating in SBTT, debriefing provides an opportunity to reflect on what participants have learned in the experience. Reflecting on one's own clinical or professional practice, according to Rudolph, Simon, Raemer, & Eppich, (2008), is a crucial step in the experiential learning process. This process helps learners develop and integrate insights from direct experience into later action (Rudolph et al., 2008). One important goal of debriefing, according to Rudolph et al., (2008), is "to help participants understand, analyze, and synthesize what they thought, felt, and did during the simulation to improve future performance in similar situations" (p. 1010). One study conducted by Savoldelli et al., (2006), found that the participants who received a debriefing session after simulation training showed improvement compared to the control group. Rudolph et al., (2008), found that debriefings led to higher levels of retention when learners actively think about, analyze, and discuss what happened. Rudolph et al., (2008) described four

steps to debriefing. First, in the reaction phase learners “blow off steam” (Rudolph et al., 2008, p. 1012) and provide the instructor with a first glimpse of what is most concerning to the trainees. Second, in the analysis phase, the instructor and the trainees discuss and evaluate the trainees’ performance. Third, in the summary phase, trainees discuss lessons learned for future performance. This process of critical reflection and insightful discussion may lead to transformative learning which may improve communication, teamwork, reduce error, and improve patient safety. The debriefing is important to maximize learning and facilitate change both on an individual and system level.

### **Mezirow’s Transformational Learning Theoretical Framework**

The framework of Mezirow’s Transformational Learning Theory and the role of critical reflection have important implications for SBTT and thoughtful reflection (debriefing) in healthcare. Although healthcare is adopting the principles of aviation-based CRM for teamwork training to improve patient safety, more than just participating in the SBTT exercise is necessary. Critical reflection and reflective discussion about the experience is the foundation of Mezirow’s transformational learning theory (Mezirow, 1991). In other words, successful learning results from deep thought about the experience and not the incident itself. Mezirow (1991) described three types of reflection: content reflection, process reflection and premise reflection. Ultimately what is at stake in the SBTT is the higher level of reflective thinking. Transformative learning is the process of effecting change in a frame of reference. Frames of reference are the structures of assumptions through which we understand our experiences. These experiences shape our expectations, perceptions, cognition, and feelings. SBTT is a powerful method to help

one understand the meaning of the experience. Personal awareness of why we think, feel, and act as we do is the key to learning through the debriefing process. Mezirow (1998) describes assumptions in transformational learning theory:

The assumptions about the self (narrative), the assumptions about cultural systems where we live (systemic), assumptions about our workplace (organizational), assumptions about our ethical decision-making (moral-ethical), and assumptions about feelings and dispositions (therapeutic)” (Mezirow, 1998, p. 62).

Mezirow’s transformational learning theory has important implications for SBTT, especially as it involves critical reflection on the experience and thoughtful discussion which may lead to improved communication and teamwork.

At the center of transformative learning theory is the idea that individuals need to understand their experiences to make meaning for them. This understanding is a result of assumptions, associations, feelings, and values. Mezirow called these meaning schemes (1991). When individuals experience a problem that can’t be solved using meaning schemes, they become aware of contradictions and distortions in assumptions. According to Cranton (2002), if individuals critically reflect and examine their contradictions if they are open to new knowledge and assumptions, and if it changes the way that they see things, it is considered transformation in their meaning.

## **Summary**

The literature review provided information about teams, teamwork, attitudes toward teamwork, and the need to build interdisciplinary healthcare teams to promote patient safety. The gap I found in the literature is that there is very little guidance on how

to design and deliver staff development programs to the different disciplines in order to create effective interdisciplinary teams in healthcare.

The literature cited in this chapter provided evidence that SBTT in healthcare provides opportunities to practice communication and teamwork skills just as they would in a real situation. A Multidisciplinary Simulation Center environment provides an interactive, realistic environment to promote training for communication and teamwork. Immediate feedback through the debriefing process provides key learning. I wondered after reading the literature as cited in this chapter, whether SBTT is designed to train the team's weak areas rather than strengths. This strategy may minimize the risks for repeated failure.

The literature review in this chapter provided evidence that learning happens with reflection on the event and debriefing. There is variability in the debriefing literature. The gap I identified was that more is needed to standardize the training for the debrief facilitator. It may be that debriefing skills are learned and improve over time with practice, self-examination, and feedback from doing debriefs. Debriefing requires specialized training, mentoring, and coaching to be effective. If the facilitator was not properly trained or evaluated, it could have negative results on team training.

Teamwork seems to be a very important component of high reliability organizations. The delivery of healthcare requires that healthcare organizations need to act more like high reliability organizations. The easiest way to improve teamwork is through training. The aviation industry and the military have successfully implemented



Crew Resource Management (CRM) to improve teamwork and communication. The programs based on these principles that have been implemented in healthcare are showing improvement (Baker et al., 2006). Mezirow's Transformative Learning seems to be a good process to effect change in frames of reference (1998). SBTT is a powerful tool to help others understand the meaning of an experience.

Chapter Three will describe the research method used for this study, the design and rationale for this study, the data collection methods used, and data analysis techniques.

## Chapter 3 - Method

The purpose of this study was to understand multidisciplinary medical trauma SBTT and debriefing experiences of medical trauma team staff. I selected qualitative research as the methodology for this study since the research question requires in depth in understanding of the experiences of SBTT and debriefing that could not be obtained through positivistic inquiry.

### Qualitative Research Design

The research question for this dissertation is: “How is multidisciplinary medical SBTT and debriefing a transformational learning experience for multidisciplinary trauma team members whose motivation is to learn effective communication and teamwork?” In order to understand the trauma team members’ experiences, I wanted to observe the simulation-based team training and debriefing.

The method used to answer the questions asked in this particular study was a descriptive qualitative study design. In the words of Merriam (1998):

1. For a lack of a better label, the term *Basic, descriptive, or generic qualitative study* refers to studies that exemplify the characteristics of qualitative research. Researchers who conduct these studies, which are probably the most common in education, simply seek to discover and understand a phenomenon, a process, or the perspectives of the world views of the people involved.

2. The descriptive qualitative study in education typically draws from concepts, models, and theories in educational psychology, cognitive psychology, and sociology.
3. The findings are a mix of description and analysis – an analysis that uses concepts from the theoretical framework of the study. The analysis usually results in the identification of recurring patterns (in the form of categories, factors, variables and themes) that cut through the data or in the delineation of a process.
4. The analysis does not lead to building a substantive theory as it does in grounded theory studies. These are not case studies because there is no bounded system or functioning unity that circumscribes the investigation (p. 11).

### **Rationale**

The descriptive qualitative research method is appropriate to this study because the objective is to understand multidisciplinary medical trauma SBTT and debriefing experiences of medical trauma team members. The descriptive qualitative study encouraged rich description of each person's experience with SBTT and debriefing. The debriefing experience gave each participant an opportunity to think about the clinical encounter and helped them grow personally in clinical reasoning, critical thinking, decision making skills, communication, and teamwork.

### **Context and Setting**

This study was conducted in the Multidisciplinary Simulation Center at a large academic medical center in the Midwest. The Multidisciplinary Simulation Center was

chosen for the study because it created a realistic environment. We recreated the expected sights, sounds, smells, and moulage (the art of applying make-up to look like real injuries for the purpose of training emergency response teams) to provide elements of realism. The standardized high fidelity patients added to the realism. The sensory cues delivered a more realistic experience.

Debriefing immediately following the simulation gave the opportunity to be part of the detailed review of the simulation scenario. These skills would be very difficult to train in a rapidly changing environment like an Emergency Department. The Multidisciplinary Simulation Center is designed to create new innovative models for medical education by offering experiential learning by using: (a) standardized patients who are actors who play the role of patients, (b) task trainers which are virtual reality “video games,” and/or (c) high fidelity mannequins who are surrogate patients of a robotic nature. These mannequins have eyes that blink, pupils that react to light, lungs that inflate/deflate, palpable pulses, and vital signs displayed on monitors. When appropriate, mannequins controlled by an operator behind an observation window, can talk and describe symptoms and/or pain.

SBTT is a technique for learners to develop skill competencies through practice and feedback in an environment that is representative of the actual operational conditions (Salas et al., 2005). Simulations can be low-fidelity (an actor role-playing an actual event or scenario) to high fidelity (learners practice skills in a dedicated location on a life-like computerized mannequin) (Salas et al., 2005).

## **Sampling and Selection of Participants**

Sample size depends on what one wants to know, the purpose of the inquiry at stake, what will be useful, what will have credibility, and what can be done within the available time and resources (Patton, 2002). I used purposeful sampling as described by Patton (2002) to obtain the information-rich cases for this study. My interests were to obtain a broad cross-section of participants from a variety of roles. My participants included trauma surgeons, emergency department physicians, residents, nurses, physician assistants, radiology technicians, and venipuncture technicians. I felt that studying information-rich cases provided insights and in-depth understanding that empirical methods would not be able to collect.

## **Inclusion/Exclusion Criteria**

Beginning in 2009, SBTT became mandatory for all staff who are expected to respond to Level I and Level II Traumas in the Emergency Department. Inclusion criteria for this study included a representation of the following roles: senior physicians trained as surgeons; senior and junior physicians in the process of training to be a surgeon; senior physicians trained in emergency medicine specialization; junior and senior physicians in the process of training for specialization of emergency medicine; Registered Nurses licensed to provide patient care; Physician Assistants who are mid-level providers who can examine patients, diagnose them, and provide some treatments, all of which must be signed off by a physician; Respiratory Therapists (RT) who specialize in the respiratory system and conditions of the airway; healthcare personnel trained in emergency medicine technician certification (EMT) or paramedic licensure;

and healthcare personnel specialized skills in emergency and critical care who work on the medical transport helicopter, medical jet transport, or Trauma/Critical Care Intensive Care Units. Twenty three participated in the mandatory SBTT training.

This study followed similar studies where a minimum sample size was recommended “based on expected reasonable coverage of the phenomenon given the purpose of the study” (Patton, 2002, p. 186). I followed Patton’s (2002) recommendation that “The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information richness of the cases selected and the observational/analytical capabilities of the researcher than with sample size” (p. 245).

### **Ensuring Confidentiality of Data and Protection of Human Subjects**

A *Confidential Participant Consent Form* was given to each participant prior to the team training session (see Appendix A). I explained the purpose of this study, how the data would be collected, analyzed, stored, saved, and that all records for this study would be kept confidential. The rights of the human subjects and the ethical implications of the data collection procedure were outlined in a Protection of Human Subjects document. Informing participants of their anonymity and rights to privacy are required to be in compliance with the Institutional Review Board of the two sponsoring organizations. Each participant was asked to sign and date the form and a copy was given to each individual. All information was confidential in the sense that although video with pictures and voices were tape recorded in the SBBT, debriefing, and individual interviews, names were not used as identifiers in transcripts or reports. Data files were

password protected, encrypted on computers, and stored in a locked file to maintain data security.

Participants were informed that they could withdraw from the study at any time. Their performance in the scenarios was not reported to their supervisor. A code number was assigned to each participant and was used as a study identifier. This code was used for all interviews, included on transcripts and field notes, and in sharing results. Names of people were removed and all other identifiers that could possibly be linked back to participants.

### **Data Collection Methods**

The purposeful sample population was selected from the trauma team staff at a Level I Trauma Center in a large academic medical center in the Midwest. Two groups were scheduled to participate in SBTT and this study. Eleven participated in SBTT and debriefing in session one and 12 participated in session two. The Trauma Leadership team invited me to observe the pre-brief session. The lead faculty physician introduced me to the participants. I explained my interest in SBTT and debriefing and the purpose of the study. I explained that I would observe SBTT and debriefing sessions and asked them if they would agree to individual interviews within two weeks after SBTT so that I could learn more about their experiences with SBTT and debriefing. The participants were asked to answer four written questions in preparation for individual interviews (See Appendix B).

A qualitative descriptive study method included working with participants in each step of the process. The focus was to assess teamwork, not technical skills. The objective of this study was to understand the experience of multidisciplinary trauma team staff who participated in SBBT and debriefing. Each SBTT session was four hours in length and included three scenarios based on actual patient incidents. These scenarios were tested quarterly among participants throughout 2012. Please see Appendix C. The Multidisciplinary Simulation Center allowed team members to practice teamwork and communication skills using scenarios based on real incidents in a safe environment and provided an opportunity to debrief with faculty and staff to learn from others' perspectives.

**Direct observation of SBTT session.**

I watched the SBTT in real time from an observation window. I recorded my observations, described the participant's behaviors, and the facilitator's technique to coordinate the training throughout the sessions. The debriefing discussion took place in a separate location within the Multidisciplinary Simulation Center. I also observed and recorded notes in real time throughout the debriefing. First, the Clinical Nurse Specialist (CNS) took time for introductions. All participants introduced themselves by first name and the location where they worked. Next, the participants were given a tour of the Multidisciplinary Simulation Center by the CNS, to familiarize themselves with the physical layout and equipment that they would be expected to work with throughout the experience. The CNS explained the purpose of the exercise. Teamwork and communication were the primary focus, not technical skills. Participants were told that



their performance would not be reported to their supervisor or placed in their personnel record. The CNS provided a briefing on the objectives, plan and expectations of the SBTT exercises. She explained that the exercise would be stopped after 10 to 15 minutes and that the team leader would be expected to report findings and provide recommendations for next steps.

The CNS explained that the group would move to another room after SBTT for a debriefing and discussion of the exercise. The reflection and debriefing provided an opportunity to share their feelings about what went well, what did not go well, and what could be done differently. The CNS and the faculty lead physician reviewed the principles of *TeamSTEPPS*<sup>™</sup> with participants during the briefing. Portions of a videotaped reenactment of the 1977 Florida Everglades airplane crash was viewed to demonstrate the importance of clear, concise communication among the team. I observed the briefing by sitting with the participants in the same room and took field notes but did not participate in the discussion.

Participants walked with the CNS to a room that was equipped the same as the trauma bay in the Emergency Department. A high fidelity mannequin simulated a clinical situation and participants jointly problem solved as if they were in a real situation. The participants worked on one case for approximately 10-15 minutes. Then, the CNS stopped the exercise and conducted a one hour debriefing session with the participants in a designated room at the Multidisciplinary Simulation Center. Portions of the videotape were shown to prompt discussion. I observed the SBTT in real time from an observation

window. It was fascinating to watch how these individuals who had not worked together transformed into a team to problem solve for the safety of the patient.

**Direct observation of the debriefing session.**

Debriefing experiences methodically review what happened and why. Fanning & Guba (2007) found debriefing is a crucial step in clarifying and consolidating the learning gained from simulation-based team-training. The debriefing provided participants an opportunity to analyze and explore their actions and thought processes, emotional states and other information to improve team performance in real situations. The CNS was specially trained in debriefing and led discussion by asking open-ended questions about what went well, what could have been done differently, and what would be best to change. Portions of the video-taped experience were re-played during the debriefing to allow for group reflection, discussion, and learning about the experience. Portions of a video reenactment from a 1977 Florida Everglades airplane crash were re-played to demonstrate gaps in communication and teamwork and the similarities and lessons learned from aviation. I reviewed the taped simulation-based experiences, the videotaped debriefing sessions, and field notes to analyze non-verbal behaviors as well as the discussion.

Throughout the debriefing, I sat in the same room throughout the debriefing session but did not provide feedback or participate in the discussion. Both the SBTT and the debriefing sessions were videotaped. I took field notes throughout the sessions. I asked all participants to answer and return four reflective questions based on their experience.

### **Personal journal.**

I kept a journal throughout this process to document my feelings, personal views, and any bias. Working as a nurse for several years and understanding the importance of remaining objective and keeping personal views separate from the data that is reported, I kept a journal. In the words of Patton (2002), the voice of the participants is the key to this study:

Because the human being is the instrument of data collection in qualitative inquiry, it requires the investigator carefully reflect on, deal with, and report potential sources of bias and error. Systematic data collection procedures, rigorous training, multiple data sources, triangulation, external reviews, and other techniques are aimed at producing high quality qualitative data that are credible, trustworthy, authentic, balanced about the phenomenon under study, and fair to the people studied (p. 51).

Van Maanen (1998) discussed the nature of data, and how preconceptions will need to be contained. A personal journal served as an excellent method for me to be open to participant responses.

### **Written reflection questions.**

The participants were asked to answer and return four written questions in preparation for the individual interviews. The questions were: (a) What is your most important learning? (b) What is something that was hard to learn? (c) What is something that you already knew? (d) What is something you plan to do – a personal change? The responses will be described in more detail in the findings section.

### **Individual interviews.**

Interviews were one of the methods used for gathering data for this study. With the research question in mind, I created an Interview Question Guide following Patton's (2002) recommendation. An Interview Question Guide was created to direct the interviews rather than a specific script. I did not ask every question verbatim. The interview guide was intended to help make the interviewing process more systematic and comprehensive, according to Patton (2002). See Appendix D for the Interview Question Guide. The interview questions were tested with three to five people prior to the participants. This was a valuable step to modify the sequence of questions, potential probes, to see whether or not the interview starts to uncover useful information with some of the questions based on their responses. Additional probes were used to clarify and solicit additional information.

The topics provided areas that were free to explore, probe, and ask questions to clarify and explain that particular subject and to ensure that the same basic lines of inquiry were pursued with each person interviewed. Individual interviews allowed the participants to describe their experiences freely and to enter into the other person's perspective. I asked focused questions to get relevant answers, listening to assess the quality and relevance of the responses, and gave appropriate verbal and nonverbal feedback to the person being interviewed. I provided reinforcement and feedback throughout the interview. In this study the focus was on SBTT and the debriefing for multidisciplinary trauma team members. In a descriptive qualitative study, the collection and analysis of data occur simultaneously. As interviews were conducted, themes

emerged that helped me get better descriptions from following participants. The recurring nature of qualitative research created a dilemma of knowing when enough data have been collected.

I followed the guidelines of Lincoln and Guba (1985) to know when to stop collecting data: (a) Exhaustion of sources; (b) Saturation of categories (continuing data collection produces tiny increments of new information in comparison to the effort expended to get them); (c) Emergence of regularities – a sense of integration; and (d) Overextension – the sense that new information is being unearthed is very far removed from the core of any of the viable categories that have emerged (and does not contribute usefully to the emergence of additional viable categories)” (p. 350). Saturation or redundancy, as Lincoln and Guba (1985) recommended, was a way to determine when to stop interviewing participants. I stopped interviewing after 15 in-depth interviews were completed because I began hearing the similar responses to the interview-guide questions. Participation in the in-depth interviews represented a minimal level of risk. Participants were not compensated for their participation. Throughout the 15 interviews, I began hearing the same themes. When the same themes occurred over and over, I knew I had achieved saturation and stopped any further scheduled interview.

### **Field notes.**

Field-notes regarding the initial impressions were used to guide interpretation in later analysis stages. Transcripts of the participants’ individual interviews were analyzed according to the procedures of content analysis described by Merriam (2002) and Patton (2002). Content analysis, like other qualitative methods of analysis, is iterative and

incremental. Content analysis is a research method for making replicable and valid inferences from texts to the contexts of their use (Krippendorff, 2004). One benefit of content analysis, according to Krippendorff (2004), is that it is context sensitive to allow the researcher “to process textual data that are significant, meaningful, informative, and even representational to others” (p. 41). This approach to analysis involved identifying similarities and differences in the ways participants discussed their experiences in the multidisciplinary SBTT training experience.

### **Data Management**

I conducted 15 individual interviews at times convenient to each participant. Interviews ranged from 30 – 45 minutes. We met in private conference rooms outside of their work area with the intention not to adversely affect patient care or the Emergency Department processes. All participants were audio recorded with their permission. The audio recordings were electronically delivered to one transcriptionist through a confidential file transfer internally. The transcriptionist completed HIPAA training (Health Insurance Portability and Accountability Act (HIPAA) as part of the organization. From the 15 individual interviews, nearly 200 pages of transcription were analyzed. Saturation or redundancy, as Lincoln and Guba (1985) recommended, was a way to determine when to stop interviewing participants. I stopped interviewing after 15 in-depth interviews were completed because I began hearing the similar responses to the interview-guide questions. Participation in the in-depth interviews represented a minimal level of risk. Participants were not compensated for their participation.

All trauma staff participating in SBTT in the Multidisciplinary Simulation Center were videotaped and audio-recorded. The original videotapes/audio-recordings were secured by the Simulation Center staff for 30 days, according to their policy. Audiotapes of the individual interviews were transcribed verbatim by me and a professional transcriptionist. Each transcript was compared to the audiotape to ensure accuracy of transcription.

### **Data Analysis**

Once the transcripts were judged complete, each transcript was read in its entirety to gain an overall impression of the data. Field notes regarding the initial impressions were used to guide interpretation in later analysis stages. A number of investigators report that the challenge of qualitative analysis lies in making sense of enormous amounts of information (Merriam, 1998; Patton, 2002). Patton (2002) also stated: “data analysis involves reducing the volume of raw information, sifting trivia from significance, identifying significant patterns, and constructing a framework for communicating the essence of what the data reveal” (p. 432).

#### **Data reduction.**

Data analysis involved a complex iterative process of making meaning. It involved a process of moving back and forth between bits of data and abstract concepts, between inductive and deductive reasoning, and between description and interpretation. It involved consolidating, reducing, and interpreting what people said and what I had observed. It involved review of the videotaped SBTT experiences and review of the videotaped debriefing, and transcribed individual interviews.

Content analysis is described by Patton (2002) and Merriam (1998) as a data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings. The core meanings are called patterns or themes. Patterns refer to a descriptive finding and a theme is more of a category or topic. Inductive analysis was used in the discovery of patterns, themes and categories in the early stages especially when developing the codebook or figuring out possible categories, patterns and themes. According to Patton, “What people actually say and the descriptions of the events observed are the essence of qualitative inquiry” (p. 457, 2002).

### **Coding process.**

Developing a manageable classification system or coding scheme was the first step of analysis in this study. This involved analyzing the core content of interviews, observations and videotaped SBTT and debriefing to determine what is significant. The categories that emerged from the data were named. A naming scheme described by Merriam (1998) was used to name categories. Each category was used to reflect the purpose of the research by answering the research question. Categories were also exhaustive in that all data that was decided to be important to the study was placed in a theme or sub-theme. I used the coding process outlined by Merriam (1998).

I used Excel spreadsheets for my data and assigned a shorthand designation using numbers, single words, and color to the various parts of the data so that I could easily retrieve specific parts of the data. Coding involved identifying the information about the data and then identifying categories or themes. I also kept track of my thoughts in a field



notebook. A coding system was developed to identify the individual and their role. I kept one copy of this identification system. This provided an opportunity for the researcher to be immersed in the data. Signed consent forms have been stored in a locked file along with results of the study. These will be stored for seven years. I emphasized that participation is voluntary and individuals could withdraw from the interview process at any time. This study has very little risk. The transcripts were reviewed and a code list was developed to characterize their perceptions of the experience.

Validation was conducted with three colleagues and a member of my dissertation committee by comparing codes and reaching agreement on a consensus code list for the next coding stage. All transcripts were coded and relationships among codes were mapped. Categories and sub-categories were identified. These were categorized into themes based on discussions and by the participants in their narratives. The tentative findings were brought back to one participant and asked whether the investigator's interpretation "rings true." While the investigator used different words, the participant was able to recognize their experience in the interpretation and in one case, suggested some fine tuning to better capture their perspectives.

### **Qualitative Validity, Reliability, and Ethics**

Although validity and reliability in a traditional sense are not applicable to qualitative descriptive studies, what should be evaluated is the quality of the results obtained in the study (Creswell, 1998). As a descriptive qualitative study, triangulation and peer reviews were used to ensure quality of this research process. Validity, according to Schwandt, (1997) in Creswell and Miller (2000), is defined as "how accurately the

account represents participants' realities of the social phenomena and is credible to them" (p. 125). Credibility was achieved in this study by systematically analyzing notes from the researcher's observations, the videotaped SBTT and debriefing, and individual interview transcripts. Patton (2002) describes credibility further by the statement:

It depends on the training, experience, track record, status and how the researcher presents themselves, and the philosophical belief in the value of qualitative inquiry which is a fundamental appreciation of naturalistic inquiry, qualitative methods, inductive analysis, purposeful sampling, and holistic thinking (p. 553).

In qualitative research, the concepts credibility, dependability, and transferability have been used to describe various aspects of trustworthiness (Guba, 1981; Lincoln & Guba, 1985; Patton, 2002). To further strengthen the credibility of results, an individual was identified who reviewed my data, my process, and my interpretations.

### **Triangulation.**

I used triangulation, as described by Patton (2002), to verify and validate qualitative data. Patton (2002) stated:

Finding such inconsistencies ought not to be viewed as weakening the credibility of results, but rather as offering opportunities for deeper insight into the relationship between the inquiry approach and the phenomenon under study (p. 556).

I used the process described by Creswell and Miller (2000) where first the preliminary themes or categories were established, then searched for evidence that is consistent with the themes (Creswell and Miller, 2000). I used various methods including observation, written answers to questions, and individual interviews. Self-disclosing my nursing background, assumptions, beliefs, and biases was another part of validity as

personal beliefs, values and biases may shape the inquiry. Using the method of triangulation by making use of multiple data methods like real time observation of SBTT and debriefing, reviewing videotaped SBTT and debriefing, answers to written questions, individual interviews, and/or theories makes it possible to overcome the skepticism that just one single method, or a single perspective interpretation provides. In addition to triangulation, I used the strategies recommended by Merriam (1998) to enhance internal validity using peer review by asking colleagues to comment on the findings as they emerge. It was a very iterative process where I would place my insights into categories and through discussion with my colleague would clarify themes.

#### **Peer review.**

I used peer review of the data and research process, as recommended by Creswell and Miller (2000). I identified three colleagues who were familiar with the research phenomenon. These colleagues provided support, played the devil's advocate, challenged my assumptions, and pushed me to the next step methodologically. Each asked hard questions about methods and interpretations. I also met three times with an academic advisor who provided support, challenged my assumptions, and asked hard questions about my methods and interpretations. As an example, we met every two weeks to review my data, my processes, and interpretations. She questioned my categories and challenged my conclusions. We went back and forth defining and labeling the categories. She suggested that I use the words of the participants. We went back through the coded information to ensure that I captured the essence of what participants said. This step

helped my confidence to articulate my rationale for how I arrived at my interpretation of the insights.

### **Summary**

Chapter Three provided both the theoretical basis for the research methodology of a qualitative descriptive study and the details of how the research was conducted. A qualitative descriptive method as defined by Merriam (1998) was used for this study. Selection of participants was purposeful. The inclusion criteria was to select individuals who could provide information-rich cases. The data collection process was explained. Direct observation, responses to written reflection questions, and individual interviews was described. Interviews were conducted until I reached a point of saturation where I was not finding new data emerging but was hearing experiences of previous participants (Lincoln & Guba, 1985). The data reduction process followed that as described by Merriam (1998). I reviewed quotations from the interviews to formulate themes. Through triangulation and peer review, I validated my insights to ensure integrity of my research.

In Chapter Four I will present themes that emerged from the data. These themes will be presented using the words of the participants.

## **Chapter 4 - Findings**

The purpose of this qualitative descriptive study was to focus on SBTT, debriefing, communication, and teamwork - not technical skills. The debriefing activities after the team training experience provided an opportunity for the participants to reflect on their experiences and share different perspectives with one another. Data were collected by real time observation of SBTT, debriefing, review of the videotapes of the SBTT and debriefing, and individual interviews. Participants were asked to reflect on their SBTT and debriefing experience, and answer and return responses to four questions in preparation for the individual interviews. Nine responded to the written questions; a 60% response rate. These responses are shared in the results.

The responses to the four reflection questions, the video of the simulation experience, and the recorded debriefing were reviewed by me prior to the individual interviews to listen to what the participants were saying and feel what they were experiencing to gain insights and observe non-verbal behavior during the training. I contacted each participant within two weeks after SBTT training and conducted individual interviews. Fifteen individual interviews were conducted and audio recorded with permission.

### **Demographic Data**

The Demographic characteristics of participants are summarized in Table 1. Demographic Characteristics of Participants. One participant refused the individual interview due to scheduling conflicts and scheduled absences, another interview was not

done due to scheduling difficulties. Two participants submitted responses to the interview questions via email and one interview was conducted by telephone due to difficulty meeting face-to-face as participant lived more than forty miles from work and worked night shifts.

### **Role delineation.**

Twenty three staff participated in one of two multidisciplinary medical trauma SBTT in the Multidisciplinary Simulation Center at a large academic medical center. The first session included 11 participants including one consultant attending physician and four physicians in residency training (residents), three Registered Nurses (RNs), two Physician Assistants (PAs), and one Respiratory Therapist (RT). The second session included 12 participants: two consultant physicians, three residents, one RT, and six RNs.

### **Gender.**

There were eight male and two female physicians. There were one male nurse and eight female nurses. There were one male and one female respiratory therapist. There were one male and one female Physician Assistant.

### **Levels of experience.**

The participants had varying levels of experience working in a Level I Trauma Center. The consultants had worked less than five years; the residents' length of experience ranged from one to six years; the two PAs and the RT had less than six months. Nurses had the most experience; the length of time ranged from less than one year to one nurse who had worked more than 30 years in various areas of healthcare.

Residents stated that they previously participated in Multidisciplinary Simulation Center training but the focus was primarily on technical skills, whereas nurses had participated in exercises including technical and nontechnical skills at the Multidisciplinary Simulation Center.

Table 1. Demographic Characteristics of Participants

| Role                  | Number | Gender             | Length of Time Working in Level I Trauma Center |
|-----------------------|--------|--------------------|---|
| Physician             | 3      | Female N=1 (33.3%) | 2- 4 years                                      |
| Resident              | 7      | Female N=0         | < 1 year – 6 years (Mean 1 year)                |
| Physician Assistant   | 2      | Female N=1 (50%)   | < 6 months                                      |
| Nurse                 | 9      | Female N=8 (89%)   | < 1 year – 32 years (Mean 6 years)              |
| Respiratory Therapist | 2      | Female N=1 (50%)   | < 1 year  |

### Content Analysis Insights

Content analysis of the data was conducted using the procedures described by Merriam (2002) and Patton (2002). The overarching theme was: Everybody is Working Together. Sub-themes and Sub-Sub-Themes were identified that are closely linked to support effective teamwork. The sub-themes and sub-sub-themes include:

1. Sub-Theme: Make our Role Clear
2. Sub-Theme: Team Leader: Know the Plan and Share the Plan
3. Sub-Theme: Situation Awareness
4. Sub-Theme: Trust
5. Sub-Theme: Back-up the Team
6. Sub-Theme: Hierarchy Affects the Team
7. Sub-Sub-Theme: Fear of Speaking Up
8. Sub-Sub-Theme: Flattening the Hierarchy Empower Speaking Up
9. Sub-Theme: Use Direct, Closed Loop Communication
10. Sub-Theme: Practice Reinforces Behaviors in Real Life
11. Sub-Theme: Debriefing is the Most Important Part

The overarching theme: Everybody Working Together, the sub-themes, and sub-sub-themes will be described in more detail. Simulation-based team training (SBTT) themes and sub-themes are summarized in Figure 1. Themes and sub-themes.



Figure 1. Themes and sub-themes



Figure 1. Drawing of the overarching theme: Everybody is working together. This is represented by a picture of a trauma team problem solving in simulation based team training. Sub-themes include: make our role clear; team leader: know the plan, share the plan; situation awareness; trust; back-up the team; hierarchy affect the team; fear of speaking up; flattening the hierarchy empowers speaking up; use direct, closed-loop communication; practice reinforces behavior in real life; and debriefing is the most important part.

**Overarching Theme: Everybody is Working Together**

In this study, participants voiced the importance of working together to accomplish a common goal.

“I am always really impressed because I feel like everybody is really working together in these scenarios.” {RN}

There were many positive feelings that people felt valued and part of a team. In the words of the nurse:

“I feel it was the validation that I am as much of the team as everybody else in the room; that coupled with the fact that what I have to say is important, and I need to make sure that people in the room hear what I have to say.” {RN}

“I just felt it was really good. I mean everybody... we are all coming from the same thing. We are all coming from the fact that we are all here for the patient, and we are here for patient safety. To do that we all have to get along as a team, and now we are all a team.” {MD}

“Overall I am really impressed with how everybody is calm and very respectful.” {RN}

“It’s nice to know you are part of a team.” {RN}

“I am always impressed by how well everyone works together and how calm it usually is.” {RN}

“I am a huge advocate. The only thing I would say is it would be nice to have this earlier on versus once everybody is a professional and working at the bedside. To be able to start doing this when you are in your undergrad program, and kind of interacting with these people because it is a team effort, and if you can instill that kind of culture right from the get go that we are all here working together.” {RN}

“Mayo is wonderful in that sense because they are very aware, and spend a lot of time, and a lot of money, and a lot of time educating their staff to get this perspective on board; but the smaller institutions that doesn’t happen so maybe if that was something that was kind of instilled early on because I don’t know how much medical students, and in nursing, they train you realize that it is a team effort, and you are working together, and you need to be an advocate for the patient; but I don’t know how much of that is addressed in medical school.” {RN}

“The most important learning was to get to know the team and learn how to work with the team.” {RN}

“The most important learning was to get assessment and care needed for the patient done the way it should be done.” {RN}

“How to interact with new team members is the most important thing.” {RN}

**Sub-Theme: Make our role clear.**

It was important to clearly delineate individual roles and expectations. Having a clear understanding of expectations enhanced team performance. In the words of the participants:

“I knew the role of the RN but I learned more about the other roles and what to do in a situation where one of the infusion nurses may be absent.” {RN}

“The importance of assigning team roles, articulating the plan, and addressing conflict were all key take home points.” {MD}

“It is most helpful to know and distinctly define the different roles in the trauma bay.” {MD}

“The particular points that I think were useful were the fact that we really have to make our role clear and we have to stay in that role. We can’t just trigger or respond where you can go here or there, to stay in that role, to perform that role to the best of our ability and to communicate effectively.” {MD}

“So, for me particularly as a leader in future where I am leading the trauma, I think to make people, to just kind of throw the team together, give a trajectory of where we are going to go; to communicate that succinctly and to kind of sway people away from panicking and stepping outside their role, it is all useful.” {MD}

“I felt that working on the collegiality between the Emergency Department and trauma consultants in feeling out the roles, technically we’re the airway in medicine and technically they’re the surgical, but we often inform each other, so feeling out how to do that is helpful. We had had a trauma actually right after that and it worked really well.” {MD}

“This has given me an opportunity to assess my skills and understand what is expected of me as an RT. I found the training beneficial and transformational. We were able to identify what could have been done better. Everyone was reminded of their role and expectations. I learned that planning and communication are key and not to be afraid to express concerns to the team leader.” {RT}

**Sub-Theme: Team leader must know the plan and share the plan.**

Participants expressed that a team leader is essential to team function. The team leader must be identified and recognized by the individuals on the team early.

Participants described that the team leader must quickly assemble the team, clearly articulate the goals, advocate a plan based on known information, demonstrate closed loop communication, seek input, and resolve questions or conflict.

In the scenario, the team leader began by introducing himself using his first name, then, encouraged others to introduce themselves by first name. Several participants verbalized that this step validated the importance of each individual and their role on the team. The team leader directed individuals to place a sticker on a visible part of their uniform to display their role. Participants expressed that this effort ensured role clarity among all team members. The team leader empowered individuals to speak up in a clear, loud voice for everyone to hear in the event of concern or apprehension about patient safety. Participants commented on how it seemed that titles were left at the door and everyone was expected to function as a team.

“It is important for the team leader to know the plan and share the plan.” {MD}

“I feel they did a good job because in the beginning, and this is what we do in the real situation too is, before they arrive, they come in and they start by introducing themselves and say, I am going to be the team leader today.” {RN}

“The ability to do team lead role in difficult cases is very important.” {MD}

The two biggest components that affected me and how I function with a team on that specific simulation training is just being in the team leader role and being able to reflect on things I could have done differently and things that went well too in preparation for the next couple of months here. {MD}

**Sub-Theme: Situation awareness.**

Participants expressed the need to get a grasp of the big picture so that they could help accomplish the goal of the team. As one nurse said:

You can see that happening, and so if something is going on in the airway, they are all focused on the airway; but in reality you have couple guys for the airway you should be able to multitask. Those guys do that; but there is still other stuff that needs to be done; and just because you are taking care of it doesn't mean that I have to stand there and watch you. Just some things like that. So I think there is a lot lessons from the dynamic standpoint. I do think so because of that experience. I think with anything in life experience brings a lot of positive assets to your practice. Whether it is how to deal with conflict, treatment modalities, or how you approach the patient. It helps a lot just your comfort level. {RN}

**Sub-Theme: Trust.**

Participants expressed willingness to work as a team if they felt that they can trust and depend on their team members during time of need.

“We had a good level of respect for one another in the room.” {RT}

“Listening to the other team members.” {RN}

**Sub-Theme: Back-up the team.**

Participants verbalized that it was important to understand everyone's role but if back-up is needed, they were there for them. In the words of a nurse:

“We know where they stand. We know where to look for them because there is a specific spot for everybody, and they kind of give the rundown on what’s going to happen. We all have our own spot that we stand in. I don’t know how far that goes back, but in the Trauma Bay there’s a diagram of how that works. Where everybody goes so even if you didn’t hear them, you can look at the sticker, you would know that’s where they are always.” {RN}

**Sub-Theme: Hierarchy affects the team.**

Participants expressed recognition that a hierarchy or power distance among team members affects team function. Those in authority who reinforce authority gradients create unnecessary risk. Effective leaders can empower individuals, flatten the hierarchy and make individuals feel like a valued team member (Leonard et al., 2004). This empowerment and being regarded as a valued part of a team, makes it seem safe to speak up. Participants commented on the negative impact of conflict on team function. Conflict reduced the team’s ability to work together as a team and contributed to individual’s reluctance to speak up. The participants stated that working through SBTT and debriefing gave them the tools that will help them in future situations.

In the words of participants:

“There’s also a hierarchy at play where depending on individual’s relationship with the other people in the trauma bay as well as their role and their own personal characteristics.” {RN}

“It just puts the lab tech person on the same playing field as chief resident, consultant, and flight nurse, whoever it might be. It kind of puts us all in the same room, and we get the same team name.” {MD}

***Sub-Sub-Theme: Fear of speaking up.***

Participants attributed fear as a main contribution to not speaking up:

“We need to express concerns to the team leader and not be afraid to speak up.” {RT}

“Probably inexperience is a barrier to effective communication. The people that haven’t been down there (Multidisciplinary Simulation Center) as much are more afraid to speak up and ask questions.” {RN}

“I think what we are doing in the Simulation Center really is awesome because it does make you feel more comfortable if you haven’t done that.” {RN}

“Some individuals might be hesitant to speak up because they don’t want to be chastised or put down if they are wrong, or even if they are right and someone disagrees with them.” {RN}

“It’s a complicated thing at play that would make one person versus another person feel differently about speaking up.” {MD}

“Conflict slowed down the assessment and decreased the team’s unity and ability to work together. It caused a great deal of confusion.” {RT}

“Sometimes the fast pace that the trauma is running at, the algorithm that the team lead is going through for primary and secondary survey, you don’t want to interrupt and send that off skew or slow things down.” {MD}

“I would say fear that you’re wrong. I am the one making the mistake. I must be missing something.” {RN}

“Fear is probably number one.” {RN}

“You don’t want to be embarrassed, or just the feeling that someone else has already addressed it. It can’t be possible that I am the first one noticing this.” {RN}

“Probably just like it is in high school, you’re afraid to ask a question that it might be a stupid question. You feel like you should have known.” {RN}

“Yes, I’ve been in a situation where I felt reluctant to speak up. I feel that not being afraid to speak up was very clear, and being an advocate.” {RN}

Conflict created tensions among the team. Participants expressed fear in addressing the conflict. In the words of participants:

“The two biggest components that affected me and how I function with a team on that specific simulation training was knowing how to try and help resolve that conflict when there is disagreement between the consultants if that comes up. It was just something that I would not have known what to do. There was that bottom line where that Trauma, Critical Care General Surgery (TCGS) Consultant is in charge and knowing that’s already in place makes things so much simpler, to kind of calm the situation and get things under control.” {MD}

“That probably happens more than we think. I think just kind of seeing that worked through, and discussed, and getting other peoples’ perspectives, and knowing that, hey if you thought these two guys were going at it, and that is totally not appropriate. You’re probably not the only one that is thinking that, and you probably do have a leg to stand on if you needed to like to step in, and some of the nursing staff would probably support you; and I think that is a good thing to know.” {RN}

“I feel that it would just be everyone being on the same page and knowing all of the same information because a lot of it gets easily lost in translation.” {RN}

“I like that they said the idea of having it on the marker board. To have a data collector that just puts those key facts up there because it is very easy to not hear someone holler out one lab value.” {RN}

***Sub-Sub-Theme: Flattening the hierarchy empowers speaking up.***

Giving permission to everyone to speak up is important. According to a physician:

“The one thing that I don’t always hear in the traumas that is a really powerful tool to get beyond that is when you are kind of running the summaries of



everything up to that point with the patients, so we have this gentleman presents with this, this is what we found; does everyone agree? Are we missing anything? It's that last line that often gets left out. That is pretty critical. It gives everyone the opening to speak up if something doesn't sound right. It's probably not perfect but at least you are creating that time so they don't feel like they are interrupting the process or anything. It kind of gives them permission. Not that they need it, but if they feel like they need it then they have it." {MD}

**Sub-Theme: Use direct, closed loop communication.**

Participants expressed the value of standardized communication strategies to enhance team performance:

"From a communication standpoint more than anything, more than knowledge standpoint, I feel that I am a lot better communicator because of it. I am more direct, more closed-loop communication, and more effective. You know, having had the chance to do it before this one, and get some feedback, and try it this time; I know it was completely different. Last year was completely different. It was totally different. I don't think I did that good of a job because it was really open-ended. There was no closed-loop communication. Again, it was completely different. I think I learned a lot from it." {MD}

"I'm going to speak loudly, know my role, and be more assertive." {RN}

"I'm going to express my thoughts and plan more confidently and loud enough for everyone to hear." {RN}

"I plan to communicate better, be louder and clear with whom I'm talking to." {RN}

"I plan to take these experiences and use them to help my practice." {MD}

"Just some of the stuff that they brought up just about communication just stuff that you hear all the time, but kind of reinforcement, and the closed-loop communication; and then that video that they showed about the plane. I thought that was a pretty effective point." {RN}

“Communication was effective but I could have been better. It was eight out of ten. Distractions, open loop communication and misunderstanding acronyms get in the way of effective team performance.” {RT}

“It’s just gives you some tools to deal with scenarios when it comes to, for instance, differences of opinions.” {RN}

“The whole line about the CUS words is always a good one. (I’m concerned, I’m uncomfortable, and it’s a safety issue). The Two-Challenge Rule...” {RN}

“I am not comfortable with this situation. I am concerned about the patient’s safety, all those good things. Those are wonderful lines because, even in my practice, and as you get more experienced you start to feel more comfortable with your gut instinct, but it is nice to have those go to phrases because it is uncomfortable. It’s just plain old uncomfortable. I do feel more confident, but I think that comes with just experience too.” {RN}

“We must use closed loop communication to help the process flow smoothly.” {RN}

“Listen to the team and listen to how everyone thinks.” {RN}

**Sub-Theme: Practice reinforces behaviors in real life.**

Having an opportunity to practice the skills that were described in the briefing was seen as very valuable. The fast pace and hectic atmosphere in the environment of the Emergency Department does not allow staff time to think about how one would handle some situations. The Multidisciplinary Simulation Center provides an opportunity for all members of the team to problem solve together. The debrief session provided all members of the team to share different perspectives. It provided an opportunity for each role to understand what one

another does in the process which appeared to be very beneficial to all members of the team. In the words of the participants:

“This process needs to be practiced over and over to even feel remotely comfortable. I think simulation is wonderful for all involved. I’m a huge supporter of multidisciplinary education and really feel it will improve patient care.” {RN}

“Maybe we do need more opportunities to practice.” {RN}

“Practice - I don’t know how better to reinforce those behaviors in real life.” {RN}

“I feel it is really important, and I am glad we are doing it because a lot of people do need it. I know that there are some people even on our team that are a little afraid of the ER, and so if they have these simulation experiences that will help them get more comfortable” {RN}

“The combined practical hands-on and book knowledge in conjunction with appropriate context was helpful.” {MD}

“They can go back there units in real practice and feel that I am a valued member of this team, and I can speak up if I notice something. So I think the more exposure in those practice situations can only help. That’s how I feel. I feel very strongly that it would be beneficial. Now how do I get everyone down there that’s one thing, but the more we do it the better it can be.” {MD}

**Sub-Theme: Debriefing is the most important part.**

Participants expressed that the debriefing discussion provided them an opportunity to learn from what happened in the scenarios. By sharing tangible insights from the experience and practicing communication and teamwork skills in this safe environment, participants felt confident to speak up:

“Those are things you never forget during the debriefing sessions for the next time. I think that was a really good learning point.” {RN}

“Yeah, absolutely that is one of the big benefits of having that is you can sit down after it is not so stressful and go through it, and not only that critically analyzing your own action, but then what is even more useful is to get the feedback from the other people that they said this and this is what they thought because, for instance, if you are the team leader, you’re just kind of standing back and letting the other people implement your plan; and for instance, if something is not clear, they didn’t understand or they didn’t agree. Something like this, it’s good to know that because everybody thinks differently. ER doctors think different from surgeons, who think different from the nurses, and so it’s good to hear not only from your superiors but also from your colleagues. Nurses are like, “Oh, I couldn’t hear when you said this, or this guy was talking to this guy and it was too much, and couldn’t understand the primary survey.” {MD}

“After the first debrief, it felt like you got to know the team members in that debriefing. You heard people talk in a safe area so now it’s okay to talk and speak up in a less safe and less controlled time and place. I felt it is very beneficial. It was very much helpful for me. I would like to see more of that for our team members up here too.” {RN}

“I think so because so much of our focus as residents is on learning a technical skill or developing your judgment or insight or whatever you want to call it. This is more intangible. It is hard to tell what the outcome or the effect is going to be until you are in a situation with a conflict with the staff or between two staffs. Just things you would do like, “When I am running the trauma, I remember this guy did this good and I thought that was good; and I want to incorporate that or something like that.” In the long run, yes. I think short term it’s kind of hard to tell. I think it will definitely affect some aspect of my practice.” {MD}

“Debriefing is the most important part. Because it allows you time to reflect on things that went well, and didn’t go well, and how you need to change your practice.” {MD}

“It has made me more comfortable with that type of communication with the other team members. Just talking it out in a situation that is totally open to make a mistake, and really talk through it, and if you are not comfortable with something; you can talk about it after and do a little debriefing.” {RN}

“Again, being in that scenario and getting to work through that in a nonthreatening kind of thing goes a long way to make someone a little bit more comfortable when the real thing happens.” {RN}

“That’s a great place to learn in. It’s a great place to go through it. Even having done traumas before, just systems wise step-by-step going through it, I benefited from it.” {RN}

“I can only speak for myself in that at least, at the very least, it makes me aware of my own behaviors, whether I happen to do the right way on every case that I have, definitely I don’t; but I am aware of it, and I think that my attempts are little bit more frequent. I think over time it is just really the awareness and the practice just like anything else. So maybe we do need more opportunities to practice.” {MD}

“I will maintain an awareness of the situation rather than self-consciousness/self-awareness.” {MD}

## **Summary**

The participants provided information-rich data so that I could better understand their experience in SBTT and debriefing. I learned that SBTT and debriefing are powerful training tools for building healthcare teams. The themes, sub-themes, and sub-sub themes supported previous research outlined by the aviation industry’s CRM principles and the concepts that the *TeamSTEPPS*<sup>™</sup> program developed and has been implemented in healthcare.

Given the research question, “How is multidisciplinary medical trauma SBTT and debriefing a transformational learning experience for multidisciplinary trauma team members,” a great deal of insight was gained through this study. Having the training take place in the Multidisciplinary Simulation Center provided a realistic environment. The scenarios were based on actual patient incidents. It seemed difficult for the participants to

stop the exercise when prompted by the CNS. The participants wanted to stay in their role and continue working on the “patient.” The groups that took the time to identify a team leader, introduce themselves, and clearly define roles and responsibilities seemed to work very well together. When the team leader summarized the findings and asked “does everyone agree?” it flattened any perceived hierarchy and gave the team permission to speak up. The examples of the communication framework that participants practiced seemed valuable. These provided the tools to ensure closed loop communication which enhanced teamwork. Conflict seemed to have had a negative effect on team performance. After discussion in the debriefing, it seemed that this experience gave them the tools that they will be able to use when conflict is experienced in the future.

I was very impressed with the insights gained throughout the debriefing session. Sharing individual perspectives was eye opening to the group. Understanding the perspectives of the various members of the team helped build trust. Individuals appreciated hearing one another’s perspectives in the debriefing. Reflecting on the scenario and taking the time to discuss what went well, what could be improved, and what they would do differently was insightful. I was impressed the candidness and openness in sharing individual’s thoughts about their experience in the individual interviews.

The data reduction and sense making process was an iterative process. I looked forward to weekly meetings with colleagues to discuss categories, patterns, themes, and sub-themes. This process confirmed that the qualitative descriptive method was appropriate to answer this research question.

## **Chapter 5 - Discussion and Implications**

The purpose of this study was to understand how SBTT and debriefing are transformational learning experiences for medical trauma team members. Medical trauma team members were asked to participate in SBTT and debriefing at a Multidisciplinary Simulation Center which is part of a large academic medical center. This chapter will discuss the research findings presented in the previous chapter. Implications of the study findings to Human Resource Development (HRD) and patient safety will be discussed.

To answer the research question, “How is simulation-based multidisciplinary medical trauma team training and thoughtful reflection a transformational learning experience for multidisciplinary medical trauma team members,” a qualitative descriptive study was conducted in which 15 participants were interviewed after SBTT and debriefing. A qualitative descriptive study was conducted using content analysis as described by Merriam (1998).

### **Discussion of Insights**

This chapter will highlight the major insights from this study and how these insights align with the current literature on teams, SBTT, and debriefing to build effective teams in healthcare. As I discuss the findings, it will become apparent that there are many additional areas that could be further researched to confirm the findings more broadly and provide further insight into creating high reliable healthcare organizations and teams to promote patient safety.

## **Team Training**

Team training, according to Salas, et al., (2008) is a set of tools and methods that form an instructional strategy where team members can practice skills and receive feedback (Salas et al., 2008). Simulation-based team training (SBTT), according to Salas, Sims, & Burke, (2005), is a tool or technique for learners to develop skill competencies through practice and feedback in an environment that is representative of the actual operational conditions.

The environment in this study is a dedicated Multidisciplinary Simulation Center in a large academic medical center. Salas et al., (2005) described teamwork in five dimensions: team leadership, mutual performance monitoring, adaptability, team orientation, mutual trust, shared mental model, and closed loop communication. The five dimensions are evident in participant experiences although it is not surprising since the experiences were developed to include these concepts. The fact that the participants expressed these five dimensions supports the validity of the five dimensions of teamwork described by Salas et al., (2005).

## **Teamwork**

“Teamwork is central to safety in healthcare, as it is often interactions of healthcare workers that produce effective or ineffective performance” (Rosen, Salas, Wilson, King, Salisbury, Augenstein, Robinson, & Birnbach, 2008, p. 33). Participants noted that effective teams treat one another with respect and acknowledge and recognize members of the team to make them feel valued and an important part of the team. All of the individuals have received extensive training in their respective disciplines, but have



generally not received formal training on how to interact with one another (Rosen et al., 2008). Previous research has recognized that individual competence in clinical skills is not enough; team coordination, communication, and cooperation skills are essential to effective and safe performance (Rosen et al., 2008; Salas et al., 2008).

### **Overarching Theme: Everybody is Working Together**

In reviewing the literature, I expected to create a method to develop team training for healthcare teams to improve patient safety. Investigators described below have suggested that teams consist of interrelated individuals who work together to accomplish a common goal (Salas et al., 2008; Brannick et al., 1997). Teams have meaningful assignments, interdependencies, hold shared and valued objectives, use multiple information sources, possess adaptive mechanisms, and perform through intensive communication processes (Salas & Rosen, 2008; Brannick et al., 1997).

#### **Sub-Theme: Make our role clear.**

Participants noted that understanding the perspectives of others enabled individuals to better understand their roles, responsibilities, and expectations of team members. Salas et al., (2005) found that a team becomes more effective over time as members learn to work together and become more proficient in their task work. Improvement in teamwork may be due to team members developing expectations about each other, establishing procedures for working together, and developing shared knowledge and how to communicate with one another (Dyer, 2003).

**Sub-Theme: Team leader – know the plan and share the plan.**

I believe team leadership is essential for effective team performance. In each of the SBTT scenarios, a leader emerged. Participants defined the attributes of a good team leader as: understanding and articulating specific goals and objectives, having the ability to quickly organize the team, providing clear direction, demonstrating open communication, and showing strong decision making skills. Participants expressed that each member of the team must understand exactly what the team is supposed to achieve. That sense of being so precise is only possible when the goal is clear (Salas et al., 2005).

**Sub-Theme: Situation awareness.**

Inadequate situation awareness has been identified especially in aviation as one of the primary factors in accidents attributed to human error (AHRQ, 2008). Continuous support and trust among team members promotes an awareness of the big picture, the adaptability needed, orientation to being a valuable part of the team, and mutual trust.

**Sub-Theme: Trust.**

Mutual trust is critical to effective team performance (AHRQ, 2008). Many participants expressed the importance that each individual understand what each other does and be willing to provide and get assistance when needed. There are many challenges that prevent team members from providing collective trust to their team members. Participants noted that when feeling busy and overworked it may feel that there is not enough time to work as a team. Although time may be a constraint to effective team function, it is important that individuals understand what each other does and be willing to provide assistance or get additional assistance when needed. Participants

identified lack of time, conflict, and distractions as barriers to effective team function. Several participants expressed that trauma surgeons and emergency department staff rotate frequently. Working with new team members on a daily basis is expected. Developing the ability to quickly and collaboratively work together as a team is a top priority. Participants verbalized that each individual is a valued member of the team and trust and collaboration enable individuals to work together as an effective team.

**Sub-Theme: Back-up the team.**

By backing each other up and reallocating work when necessary, team members become more adaptable, especially during rapidly changing situations and environments like an emergency department.

**Sub-Theme: Hierarchy affects the team.**

Participants expressed that the scenario with conflicting opinions on the treatment plan highlighted how hierarchy can impact team function. “Authoritarian leaders, who reinforce large authority gradients, create unnecessary risk. Effective physician leaders flatten the hierarchy and make it seem safe to speak up” (Leonard, Frankel, Simmonds, & Vega, 2004, p. i86). The research below has shown that hierarchy exists among the healthcare team and effective collaboration between nurses and physicians have been shown to reduce morbidity and mortality rates, cost of care, decrease medical errors, and has improved satisfaction and retention of nursing staff (Maxson et al., 2011; Kramer and Schmalenberg, 2003; Manojlovich, 2005; Thomas et al., 2003).

***Sub-Sub-Theme: Fear of speaking up.***

Participants expressed that there were times when a team member had an emerging concern but felt uncomfortable voicing any safety concerns. The aviation industry discovered similar findings in accident investigations (Oriol, 2006). This study suggested that by clearly specifying language that should be used when observing a matter of concern, the hesitation that people may feel about speaking up can be minimized.

***Sub-Sub-Theme: Flattening the hierarchy empowers speaking up.***

I was really impressed by the description of asking others for input after the summary as a means to give permission for others to speak up. After the summary of findings, it was opened to the group “Is there anything to add?”

***Sub-Theme: Use closed loop communication.***

Despite the best efforts to fully and accurately exchange information, many communication attempts fall short. Similar results have been found in other highly reliable organizations (Baker et al., 2006). The aviation industry created standard communication strategies to improve team performance (Rosen et al., 2008). The participants verbalized that role modeling, practicing closed loop communication, and empowering the members of the team to speak up enhanced team performance.

Closed loop communication is ensuring that information conveyed by the sender is understood by the receiver (Rosen et al., 2008). Communication has been an important factor in maintaining patient safety (Leonard et al., 2004). A few standardized approaches

to this have been described. Most recently it has been recognized that standardized approaches to communication include having participants ask and/or respond to questions.

One model used by AHRQ (2008) includes the “CUS word model.” This provides a structure or framework for communication that reflects “I’m concerned, I’m uncomfortable, this is a safety issue” (AHRQ, 2008). Another model is the SBAR model. The SBAR model provides a structure for communication that reflects the situation, background, assessment, and recommendation (Leonard et al., 2004). Another is the VOMIT model. The VOMIT model provides a structure for communication that reflects the vital signs, origin (hospital or scene), mechanism of injury and significant medical history, injuries found or suspected, and treatments given (AHRQ, 2008, *Team STEPPS™*).

Participants in this study expressed the goal is to ensure that communication between team members is direct, closed loop, targeted, clear, concise and loud enough to hear. Several participants noted that when communicating in an emergent situation, often orders get called out but not directed to anyone in particular so the task does not get done. Participants stated that by providing the team with tools, training, and the opportunity to practice, team members will be able to demonstrate effective communication. Participants commented on how “The Two Challenge Rule,” call-outs, repeat backs, user friendly tools like CUS words, SBAR and VOMIT help the team members focus on the critical information when communicating to others.

Having reliable team members providing necessary support is likely to build trust. The ultimate outcome of collective trust and support is increased patient safety. One way to do this is by following the rules of effective feedback and delivering feedback in respectful, behavioral terms. The focus on quality, patient safety, and the prevention of errors is one way to think about providing collective support and trust. To prevent team members from feeling criticized and becoming angry when receiving support, it is important to clearly state intentions. State that you would like to provide suggestions or support to lesson workload or help improve on current methods. For example, the “Two Challenge Rule” was developed by human factor experts to help the aviation industry prevent disasters caused when otherwise excellent decision makers experience temporary lapses in judgment (AHRQ, 2008). This is about advocating for the patient. The “Two Challenge Rule” helps if team members are unwilling to accept assistance or withdraw support if the situation does not pose a threat to patient safety (AHRQ, 2008). Participants expressed that they are not able to see everything and encouraged team members to challenge colleagues in the clinical environment if they need clarification.

**Sub-Theme: Practice reinforces behaviors in real life.**

The participants expressed that having the opportunity to practice communication and teamwork made them feel more comfortable. I wonder how repeated exposure to SBTT with the ability to practice may impact clinical practice.

**Sub-Theme: Debriefing is the most important part.**

A crucial step in clarifying and consolidating the learning gained from SBTT in healthcare is to methodically review what happened and why. Debriefing provides an

opportunity for participants to explore and analyze their actions and thought processes, emotional states, and their information to improve performance in real situations. One of the most important practices incorporated into SBTT is the debriefing process which is similar to Kolb's (1984) reflective learning. This facilitated discussion is designed to lead learners to reflect upon their actions and reactions during the simulation experience and draw upon key learning moments (Arafeh et al., 2010).

Arguably, Arafeh et al., (2010) believes that debriefing is the most critical component of simulation-based training, yet there is little research that investigates the connection between reflective learning and SBTT. The Multidisciplinary Simulation Center provided a safe environment where exercises based on actual patient incidents are facilitated and video-recorded. Debriefing or thoughtful reflection discussions were facilitated by a CNS who is trained as a debrief facilitator. Portions of the video recorded scenarios are replayed for the learners to discuss. Thoughtful reflection and discussion of the participants' learning may lead to deeper levels of learning, and may increase the likelihood of transfer to the clinical setting. Participants noted that opportunities to work together, reflect on the experience, and discuss what they learned together afterward developed an awareness of their own behaviors and found others' perspectives valuable. Participants applied closed loop communication strategies and tools in the SBTT multidisciplinary simulation-based team training experience. Strategies such as these are a means to promote clear, concise information. Participants noted practice and applying communication skills together was very important.

## **Implications to Human Resource Development (HRD)**

The framework of Mezirow's Transformational Learning Theory and the role of critical reflection have important implications for SBTT and thoughtful reflection (debriefing) in healthcare (1991). Although healthcare is adopting the principles of aviation-based CRM for teamwork training to improve patient safety, I believe that more is necessary than simply just participating in the SBTT exercise. Brookfield (1983) stated "critical reflection is essential to transformational learning; an act of learning can be called transformative only if it involves a fundamental questioning and reordering how one thinks or acts" (p. 139). The content data analysis seemed to indicate that participants did not experience the transformational change in behavior that I initially expected, according to Mezirow's Theoretical framework. I believe the insights of this study support Kolb's Reflective Learning Theory (Kolb, 1984).

## **Kolb's Reflective Learning Theory**

The data analysis s indicated that participants did not experience the transformational change in behavior that I initially expected. Learning took place after the reflection, debriefing, and discussion after each scenario. When used strategically, SBTT can build on prior experiences and improve team performance and reduce medical errors. Teamwork and team training is a hallmark of high reliability organizations such as those in the aviation and nuclear power industries (Rosen et al., 2008). SBTT is interdisciplinary, so that patient scenarios can engage learners at various levels across many different clinical programs and promote the development to inter-professional team-based care.



These insights support Kolb's Learning Theory (1984) in the ongoing cyclical process of "grasping experience – Concrete Experience (CE) and abstract conceptualization (AC) and Reflective Observation (RO) and Active Experimentation (AE) (Kolb, 1984). Participants have reported that the personal growth that follows the process of reflecting on an experience is more valuable than the experience itself (Merriam, 2002).

Kolb developed a theory of experiential learning that has four different stages of learning based on experience. The findings of this study support Kolb's experiential learning (Kolb, 1984) as he described "the process whereby knowledge is created through transformation of experience" (p. 41). Kolb (1984) stated "knowledge results from the combination of grasping and transforming experience" (p. 41). Kolb's Learning Cycle is based on an ongoing cyclical process of "grasping experience – Concrete Experience (CE) and Abstract Conceptualization (AC) and two related modes of transforming experience – Reflective Observation (RO) and Active Experimentation (AE)" (Kolb, 1984, p. 41).

The participants in this study validated Kolb's four stage learning cycle. Participants began by participating together in the scenarios that were based on actual patient experiences. These scenarios were the basis for observations and reflections. The participants' reflections were then assimilated and distilled into abstract concepts from which new implications could be drawn. According to Kolb (1984), an individual can enter at any point but all stages must be followed in sequence for successful learning to take place. Kolb stated that it is not sufficient to have an experience in order to learn but

it is necessary to reflect on the experience (Kolb, 1984). Participants expressed that it was important to work together through the scenario, reflect on the experience, talk about it with each other, make generalizations, and formulate concepts that can be applied to new situations.

Kolb (1984) found that the learning must be tested in new situations and it is important to make the link between theory and action by planning, acting out, reflecting, and relating it back to the theory. According to Kolb (1984), there is no fixed 'start point' in an individual's approach to teaching. He also found that the context that each individual encounters will be very personal to them. Kolb (1984) believed in the Reflective Learning Cycle; there is no check list approach to this reflective practice because teaching contexts, experience, and starting points for reflection vary greatly (Kolb, 1984). Kolb anticipated that this is a guide to help start clarify one's own thoughts and developments and provides a framework for the types of approaches to learn.

The insights from this study support Kolb's Reflective Learning Cycle. There were three steps to the experiential learning. First, individuals worked together to solve a simulated problem (patient incident). The exercise was stopped after 15 minutes. Then, the CNS facilitated a debriefing session. Individuals were asked to discuss their experience. This provided an opportunity to plan, apply, or try out what they learned by practice. I agree with Kolb's Reflective Learning Cycle because the insights from this study confirmed that SBTT is part of the experiential learning cycle in that individuals experience the simulation scenario, then experience a guided debriefing where individuals reflect by reviewing the video-taped scenario together and talk about how

they felt, then they can plan, apply or try out what they learned by deliberate practice and active experimentation.

### **Implications to Patient Safety**

Teamwork is critical for many organizations to achieve their organizational goals. According to Kohn et al., (2000), medical errors are frequently connected to breakdowns in communication and people make fewer mistakes when they work in teams (Kohn et al., 2000). These findings have important organizational implications for team training. This study confirmed that facilitated debriefing of SBTT activities draws learners through a process of understanding their experiences and connecting their learning with translatable lessons to a “real” environment.

In this experiential learning, the debriefing guided learners to verbalize and make sense of their actions during SBTT in a manner that can translate their previous understanding into new patterns of behavior. I believe that healthcare can achieve high reliability organization status by creating effective teamwork and communication. Use of SBTT in healthcare and in other industries can be an effective way to train healthcare staff in a safe environment without harm to others.

When HRD professionals use SBTT, it is important that adequate time be built in for the debriefing process and provide proper training of facilitators to lead learners through the steps of debriefing and reflective learning. Successful debriefing and practice enhance the SBTT for learners and guides them to link successes of their SBTT

experience with improved teamwork and communication on the job. SBTT creates a frame of dynamic learning that is individualized and allows for personalization.

As previously noted, a number of investigators listed below have shown that effective team collaboration across disciplines decrease morbidity and mortality rates, reduce the cost of care, decrease errors, improve patient satisfaction, improve job satisfaction, diminish job stress, and reduce nursing staff turnover (Kramer et al., 2003; Manojlovich, 2005; Schmalenberg, 2005; Weaver, Lyons, Diaz Granados, Rosen, Salas, Oglesby, Augesstein, Birnbach, Robinson, & King, 2010; Maxson et al., 2011; Klipfell, 2011). Salas et al., (2009) have identified evidence-based, practical, systematic success factors for preparing, implementing and sustaining team training and performance improvement initiatives in organizations. According to Salas et al., (2009) these include:

Align team training objectives and safety aims with organizational goals; provide organizational support for the team training initiative; get frontline care leaders on board; prepare the environment and trainees for team training; determine required resources, time commitment; ensure their availability; facilitate application of trained teamwork skills on the job; and measure the effectiveness of the team training program (p. 399 - 400).

As previously noted, Hoff et al., (2004) described organizational impact in the following statements:

*To Err is Human* places at the core of a successful systems-based approach to reducing error the need for a strong safety culture, appropriate physician leadership and opinion leaders attending to medical errors, the need for simplification and standardization of workflows, and the use of interdisciplinary team approaches in complex delivery systems (p. 4).

Organizational factors including using information technologies; developing effective team-based approaches to care; providing greater coordination of care; and using standard operating procedures in evidence-based practice and performance accountability to promote enhanced patient safety and error proof systems of care delivery” are addressed in the report, *Crossing the Quality Chasm* by Kohn, Corrigan, & Donaldson, 2000, p. 4). One strength of this study is the rigorous use of an in-depth qualitative descriptive method through which the participants were enabled by the debriefing process to be candid about their experiences. However, there were some limitations of this study.

### **Limitations**

The most significant limitation of this study is that this study was an intensive intervention at one particular academic medical center. The participants may have been more vocal about their experiences than other groups because SBTT was mandatory. Other medical centers may yield different results due to a difference in the organizational culture. The interview questions were not tested outside of this study. Interviews were brief and limited in length, however, longer interviews were not feasible given the number of practicing clinicians and their time constraints.

### **Summary**

Chapter Five discussed the insights from the study. The demographic data was presented. Content analysis was conducted to understand more about SBTT and debriefing. The overarching theme was Everybody is Working Together. Sub-Themes and Sub-Sub-Themes included: 1) Make my Role clear where clarity was provided to

each role so expectations were understood who was doing what. Leadership was an important piece where the individual who emerged as the team leader would Know the plan and Share the Plan with the team. Another sub-theme was: Hierarchy affects the Team. A sub-sub-theme: Fear of speaking up. Sub-theme: Flattened hierarchy empowers speaking up. Situation Awareness and Trust are principles learned from aviation industry's CRM and the programs implemented in healthcare *TeamSTEPPS*. Another theme: Use Closed Loop Communication provided the tools to enhance effective communication among team members. Sub-Theme: Practice Reinforces Behaviors in Real Life and Debriefing is the Most Important Part.

Chapter Six describes my conclusions based on the insights from this study. I also present my recommendations for further research.

## **Chapter 6 - Conclusions and Recommendations**

### **Conclusions**

Teamwork and effective communication is required for effective patient management. In healthcare today there is an increased specialization of tasks, an intensified complexity, and added risks associated with treatment options. There is a need to ensure appropriate healthcare outcomes, including patient safety. Team members need training to learn how to work together and understand professional roles and responsibilities of each person on the team. SBTT and debriefing can be effective in building healthcare teams and improving patient safety. Healthcare communities can gain from SBTT to reduce errors and improve safety when it is designed and delivered appropriately. Simulation in and of itself does not lead to learning. SBTT is a tool to enhance training. It alone will not lead to improved patient safety. We must focus on proven principles of learning as Kolb outlined. Simulation provides a flexible design that gives learners an opportunity to practice team principles in a safe environment, allows for collection of performance data, and provides feedback regarding performance.

Rosen et al., (2008) argued that training is one of the most flexible and adaptive methods for improving performance in organizations. Kohn et al., (2000) found the training has been one of the main focuses to increase safety in healthcare. According to a number of investigators listed below, simulation-based training (SBT), specifically to train teamwork skills, is a powerful method to increase safety and effectiveness in healthcare (Rosen et al., 2008; Gaba, 2004; Shapiro, Morey, Small, Langfold, Kaylor, Jagminas, Suner, Salisbury, Simon, & Jay, 2004; Morey, Simon & Jay, 2000). In

addition, the debriefing process following SBTT is designed to “synergize, strengthen, and transfer learning from an experiential exercise” (Arafeh et al., 2010, p. 302).

This descriptive qualitative study demonstrated that SBTT and debriefing improved teamwork and communication by reflective learning after participating in an experience in a dedicated Multidisciplinary Simulation Center. As previous research concluded, more than just participation in the experience is necessary to achieve the cultural change required in healthcare to reduce medical errors and improve patient safety. Findings from this research study support Kolb’s Reflective Learning Theory rather than Mezirow’s Transformational Learning Theoretical Model. It seemed that participants learned by problem solving together and discussing their reflections about the experience as a group afterward. Participants expressed that it was important to work together through the scenario, reflect on the experience, talk about it with each other, make generalizations, and formulate concepts that can be applied to new situations. It seemed that learning was linked back to theory and action by planning, acting out, reflecting, and relating it back to the theory.

### **Recommendations for Future Research**

Ongoing research is needed for incorporating SBTT along with debriefing, including medical students, nursing students, respiratory therapy students, and other allied health career students to learn how to engage in teamwork and effective communication to promote patient safety. Insights from this study may lead to new research questions. Examples of questions that could further inform findings from this study include: How can SBTT and debriefing add to building teams in out-patient and in



-patient general care areas, procedural areas, medical and/or surgical areas, obstetrics and gynecology (OB/GYN), Operating Room, Emergency Department, etc.? How does repeated exposure to simulation-based team training affect clinical practice? What value is simulation-based team training to the culture of safety? Longitudinal studies analyzing patient outcomes after simulation-based training is another area of interest for future research. I would like to see more quantitative research on patient outcomes related to effective team training. More systematic and rigorous evaluation of team training is needed to determine its true effectiveness at improving patient safety. How can we help healthcare organizations sustain the effects of effective teamwork and improved communication over time? What top leadership does is very important. What policies and procedures do organizations put in place to support teamwork?

More research is needed in the development of models and theories of debriefing, specifically within the field of SBTT and reflective learning. Analysis and evaluation of debriefing models using both quantitative and qualitative methods is needed. Research must be expanded to include other specialties including: medical, surgical, operating room (OR), emergency department, obstetrics and gynecology, out-patient, and in-patient areas. More studies are needed to understand the training design needed to facilitate SBTT and the process of debriefing. Further research to continue investigating this type of SBTT and debriefing on reflective learning is needed to help with organization culture change. Longitudinal studies are needed to measure how this experience has an impact on clinical practice outcomes. The literature provided very little guidance on how to design and deliver SBTT and debriefing in healthcare. Team training is a priority in healthcare,

but there is not in depth information on how to get there. Most of the literature within healthcare has not adequately addressed the methodology needed to effectively implement team training.

## References

Aggarwal, R. & Darzi, A. (2011). Simulation to enhance patient safety: Why aren't we there yet? *CHEST*, *140*(4), 854 – 858. doi:10.1378/chest.11-0728.

Agency for Healthcare Research and Quality (AHRQ). National Healthcare Quality Report. (2008). *Improving Patient Safety through Simulation Research*. Rockville, MD: US Department of Health and Human Services. AHRQ Publication No. 09-0001. March 2009. Retrieved from <http://www.ahrq.gov/qual/qdr08.htm>

Arafeh, J. M., Snyder-Hansen, S., & Nichols, A. (2010). Debriefing in simulated-based learning: Facilitating a reflective discussion. *Journal of Perinatal Neonatology Nursing*, *24*(4), 302-309.

Awad, S. S., Fagan, S. P., Bellows, C., Albo, D., Green-Rashad, B., De La Garza, M., & Berger, D. H., (2005). Bridging the communication gap in the operating room with medical team training. *The American Journal of Surgery*, *190*, 770-774. doi:10.1016/j.amjsurg.2005.07.018

Baker, D. P., Day, R., & Salas, E. (2006). Teamwork as an essential component of high reliability organizations. *Health Research and Educational Trust*, *41*(4), 1576 - 1598. doi:10.1111/j.1475-6773.2006.00566x

Bethune, R., Sasirekha, G., Sahu, A., Cawthorn, S., & Pullyblank, A. (2011). Use of briefings and debriefings as a tool in improving teamwork, efficiency, and

communication in the operating theatre. *Postgrad Med Journal*, 87, 331-334. doi:10.1136/pgmj.2009.095802.

Brannick, M. T., Salas, E., & Prince, C. (Eds.) (1997). *Team performance, assessment and measurement: Theory, methods and applications*. New York, NY: Psychology Press: Taylor & Francis Group.

Brookfield, S. D., (1983). *Adult Learners, Adult Education, and the Community*. Buckingham, MK: Open University Press.

Cates, L. A., (2011). Simulation training: A multidisciplinary approach. *Advances in Neonatal Care*, 11(2), 95-100.

Consumers Union (May 2009). *To Err is Human – To delay is deadly*. Retrieved from [http://safepatientproject.wpenguine.netdna-cdn.com/wordpress/wp-content/uploads/2011/07/safepatientproject.org-to\\_delay\\_is\\_deadly-2009\\_05.pdf](http://safepatientproject.wpenguine.netdna-cdn.com/wordpress/wp-content/uploads/2011/07/safepatientproject.org-to_delay_is_deadly-2009_05.pdf)

Cranton, P. (2002). Teaching for Transformation. *New Directions for Adult and Continuing Education*, (93), 63-71.

Creswell, J. W., (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA. Sage Publications, Inc.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice*, 39(3), 124 -130. doi:0040-5841/2000.

- Criticcos, C. (1993). Experiential learning and social transformation for a post-apartheid learning future. In Boud, D., Cohen, R. & Walker, D. (Eds.), *Using Experience for Learning* (pp. 159 – 165).
- Dyer, J. (2003). Multidisciplinary, interdisciplinary, and transdisciplinary educational models and nursing education. *Nursing Education Perspectives*
- Dunn, E. J., Mills, P. D., Neily, J. Crittenden, M. D., Carmack, A. L., & Bagian, J. P. (2007). Medical Team Training: Applying crew resource management in the Veterans Health Administration. *The Joint Commission Journal of Quality and Patient Safety*, 33(6), 317-325.
- Fanning, R. M., & Guba, D. M. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare*, 2(2), 115-125.  
doi:10.1097/SIH.0b013e3180315539
- Gaba, D. M. (2004). The future vision of simulation in health care. *Quality & Safety in Health Care*, 13 (Suppl 1), i2 – i10. doi:10.1136/qshc.2004.009878
- Greenhouse, P. K., Kuzminsky, B., Martin, S. C., & Merryman, T. (2006). Calling a condition H(elp). *American Journal of Nursing*, 106(11), 63- 66.
- Halbesleben, J. R., Cox, K. R., & Hall, L. (2010). Transfer of crew resource management training. *Leadership in Health Services*, 24(1), 19 – 28.  
DOI10.1108/17511871111102508.

- Hamman, W. R. (2004). The complexity of team training: what we have learned from aviation and its applications to medicine. *Quality & Safety of Health Care, 13*, i72-i79. doi:10.1136/qshc.2004.009910
- Hoff, T., Jameson, L., Hannan, E., & Flink, E. (2004). A review of the literature examining the linkages between organizational factors, medical factors, and patient safety. *Medical Care Research and Review, 61*(3), 2 – 37. doi:10.1177/1077558703257171
- Jones, D. A., DeVita, M. A., & Bellomo, R. (2011). Rapid Response Teams. *New England Journal of Medicine, 365*, 139-146. doi:10.1056/NEJMra0910926
- Ker, J., Mole, L., & Bradley, P. (2003). Early introduction to inter-professional learning: a simulated ward environment. *Medical Education, 37*(3), 248 – 255.
- Kilroy, C. (1997). *Special report: Tenerife*. Retrieved November 23, 2011 from <http://www.airdisaster.com/special/special-pa1736.shtml>.
- King, S. (2009). *Josie's Story: A mother's inspiring crusade to make medical care safe*. New York, NY: Atlantic Monthly Press.
- King, S. Children's Hospital of Pittsburgh press release. Retrieved January 3, 2012 from <http://www.chp.edu/CHP/060906>
- King, H. B., Battles, J., & Baker, D. P., Alonso, A., Salas, E., Webster, J., Toomey, L., & Salisbury, M. (2006). *TeamSTEPPS™: Team strategies and tools to enhance*

*performance and patient safety*. Rockville, MD: Agency for Health Care Research Quality, 5-20.

Klipfel, J. M., Gettman, M. T., Johnson, K. M., Olson, M. E., Derscheid, D. J., Maxson, P. M., Arnold, J. J., Moehnke, D. E., Nelson, E. A., & Vierstraete, H. T. (2011). Using high fidelity simulation to develop nurse-physician teams. *The Journal of Continuing Education in Nursing*, 42(8), 347-358. doi:10.3298/00220124-20110201-02

Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). *To Err is Human: Building a Safer Health Care System*. Washington D.C.: National Academy Press, 1- 67.

Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, New Jersey. Prentice-Hall, Inc.

Kramer, M., Schmalenberg, C. (2003). Securing “good” nurse-physician relationships. *Nurse Management*, 34(7), 34-38.

Krippendorff, K. (2004). *Content Analysis: An Introduction to its Methodology*. Second Edition. Thousand Oaks, CA. Sage Publications, Inc.

Learner, S., Magrane, D., & Friedman, E. (2009). Teaching teamwork in medical education. *Mount Sinai Journal of Medicine*, 76, 318 – 329. doi:10.1002/msj.20129

Leonard, M., Frankel, A., Simmonds, T., & Vega, K. (2004). *Achieving safe and reliable healthcare: strategies and solutions*. Health Administration Press: Chicago, IL.

Leonard, M., Graham, S., & Bonacum, D. (2004). The human factor: the critical importance of effective teamwork and communication in providing safe care. *Quality & Safety in Health Care*, 13 (Suppl 1), i85-i88.  
doi:10.1136/qshc.2004.010033

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA. Sage Publications.

Lyndon, A. (2006). Communication and teamwork in patient care: How much can we learn from aviation? *JOGNN*, 35 (4), 538 -546. doi:10.1111/J.1552-6909.2006.00074.x

Manojlovich, M. (2005). Linking the practice environment to nurses' job satisfaction through nurse-physician communication. *Journal of Nursing Scholarship*, 37(4), 367-373.

Maxson, P. M.; Dozois, E. J.; Holubar, S. D.; Wroblewski, D. M.; Overman-Dube, J. A.; Klipel, J. M.; & Arnold, J. J. (2011). Enhancing nurse and physician collaboration in clinical decision making through high fidelity interdisciplinary decision making. *Mayo Clinic Proceedings*, 86 (1):31-36.doi:10.4065/mcp.2010.0282



- McConaughey, E. (2008). Crew resource management in health care: The evolution of Teamwork Training and MedTeams®. *Journal of Perinatal & Neonatal Nursing*, 22(2), 96-104.
- Merriam, S. (1998). *Qualitative research and case study applications in education*. San Francisco, CA.: Jossey-Bass.
- Merriam, S. & Associates (2002). *Qualitative research in practice: Examples for discussion and analysis*. San Francisco, Ca.: Jossey-Bass.
- Mezirow, J. (2004). Forum comment on Sharon Merriam's "The role of cognitive development in Mezirow's transformational learning theory". *Adult Education Quarterly*, 55(1), 60-68. doi:10.1177/0741713604268891
- Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly*, 48(3), 185-191.
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 74, 5-12.
- Mezirow, J. (1991). *Transformative dimension of adult learning*. San Francisco, CA.: Jossey-Bass.
- Morey, J. C., Simon, R., Jay, G. D., Wears, R. L., Salisbury, M., Dukes, K. A., & Berns, S. D. (2000). Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the MedTeams® project. *Health Service Research*, 37, 1553 – 1581.

- Musson, D. M., & Helmreich, R. L. (2004). Team training and resource management in health care: Current issues and future directions. *Harvard Health Policy Review*, 5(1), 25 – 35.
- Nance, J. J. (2004). Admitting Imperfection: revelations from the cockpit for the world of medicine. In: Youngberg, B., & Hatlie, M. (Eds). *The Patient Safety Handbook*. 1<sup>st</sup> ed. (pp. 187 – 203). Boston: MA. Jones & Bartlett.
- NASA Safety and Mission Assurance Investigation of Columbia Accident Report. Volume 1, August 2003. Government Printing Office.
- National Transportation Safety Board (NTSB). (1973). *Eastern Airlines Flight 401 Accident Report, NSTB Number AAR-73-14, Aircraft Accident Report*.
- National Transportation Safety Board (NTSB). (1977). *Pan American World Airways Flight 736, NTSB Number DCA77RA014*.
- National Transportation Safety Board (NTSB). (1982). *Air Florida Flight 90 Accident Report, NSTB Number AAR-82/08*.
- Oriol, M. D. (2006). Crew Resource Management: Applications in Healthcare Organizations. *Journal of Nursing Administration*, 36(9), 402 – 406.
- Patton, M. Q. (2002). *Qualitative evaluation and research methods*. Thousand Oaks:CA. SAGE Publications.

- Raemer, D., Anderson, M., Cheng, A., Fanning, R., NadKarni, V., Savoldelli, G. (2011). Research regarding debriefing as part of the learning process. *Society for Simulation in Healthcare*, 6 (7), S52-S57. doi:10.1097/SIH.ob013e31822724
- Roberts, K. H., & Rousseau, D. M. (1989). Research in nearly failure free, high-reliability organizations: Having the bubble. *IEEE Transactions on Engineering Management*, 36,(2), 132-139.
- Rosen, M. A., Salas, E., Wilson, K., King, H., Salisbury, M., Augenstein, J., Robinson, D., & Birnbach, D. (2008). Measuring team performance in simulation-based training: Adopting best practices for healthcare. *Society for Simulation in Healthcare*, 3(1), 33-41.
- Rudolph, J. W., Simon, R., Raemer, D. B., & Eppich, W. J. (2008). Debriefing as formative assessment: Closing performance gaps in medical education. *Academic Emergency Medicine*, 15(11), 1010 – 1016.doi:10.1111/j.1553-2712.2008.00248.x
- Salas, E. Sims, D. E., & Burke, C. S. (2005). Is there a “Big Five” in Teamwork? *Small Group Research*, 36(5), 555-599.doi:10.1177/10464964052771.34
- Salas, E., Wilson, K. A., Burke, C. S., & Wightman, D. C. (2006). Does Crew Resource Management training work? An update, and extension, and some critical needs. *Human Factors*, 8(2), 392-412.

- Salas, E., Klein, C., King, H., Salisbury, M., Augenstein, J. S., Birnbach, D. J., Robinson, D. W., & Upshaw, C. (2008). Debriefing medical teams: 12 Evidence-Based Best Practices and tips. *The Joint Commission Journal on Quality and Patient Safety*, 34(9), 518 – 527.
- Salas, E. & Rosen, M. A. (2008). Beyond the bells and whistles: When simulation-based team training works best. *Forum*, 6-7.
- Salas, E. Almeida, S. A., Salisbury, M., King, H., Lazzara, E. H., Lyons, R., Wilson, K., A., Almeida, P. A., & McQuillan, R. (2009). What are critical success factors for team training in health care? *Joint Commission on Accreditation of Healthcare Organizations*, 35(8), 398-405.
- Savoldelli, G. L., Naik, V. N., Park, J., Joo, H. S. Chow, R., & Hamstra, S. J. (2006). Value of debriefing during simulated crisis management. *Anesthesiology*, 105(2), 279-285.
- Savoldelli, G. (2011). Research regarding debriefing as part of the learning process. *Simulation in Healthcare*, 6(7), S52-S57.doi:10.1097/SIH.ob013e31822724d0
- Schmalenberg, C., Kramer, M., King, C. R., & Krugman, M. (2005). Excellence through evidence: securing collegial/collaborative nurse-physician relationships, part 1. *Journal of Nursing Administration*, 35(10), 450-458.
- Shapiro, M.; Morey, S.; Small, S.; Langfold, V.; Kaylor, C.; Jagminas, L.; Suner, S.; Salisbury, M.; Simon, R.; & Jay, G. (2004). Simulation-based teamwork training

for emergency department staff: does it improve clinical performance when added to an existing didactic teamwork curriculum? *Quality Safety in Healthcare*, 13, 417-421. oi:10.1136/qshc.2003.005447.

Shojania, K. G., Duncan, B. W., McDonald, K. M., & Wachter, R. M. (2001). Making healthcare safer: A critical analysis of patient safety practices. *Evidence Report/Technology Assessment Summary*, 43; 1-668. AHRQ Publication 01-E058. July 18, 2001 (Revised printing).

The Joint Commission. Sentinel Event Policy and Procedures, January 1, 2012. Retrieved on November 23, 2012 from [http://www.jointcommission.org/Sentinel\\_Event\\_Policy\\_and\\_Procedures](http://www.jointcommission.org/Sentinel_Event_Policy_and_Procedures).

Thomas, E. J., Sexton, J. B., & Helmreich, R. L. (2003). Discrepant attitudes about teamwork among critical care nurses and physicians. *Critical Care Medicine* 31(3), 956- 959. doi:10.10971.oj.ccm.00000561183.89175.76

Van Heukelom, J. N., Begaz, T., & Treat, R. (2010). Comparison of post simulation debriefing versus in-simulation debriefing in medical simulation. *Simulation in Healthcare*, 5(2), 91-97. doi:10.1097.SIH.0b013e3181be0d17

Van Maanen, M. (1998). *Researching the lived Experience: Human science for an action sensitive pedagogy* (2<sup>nd</sup> ed.). Ontario: Canada: The Althouse Press.

Weaver, S. J., Rosen, M. A., DiazGranadas, D., Lassara, E. H., Lyons, R., Salas, E., Knych, S. A., McKeever, M., Adler, L., Barker, M., & King, H. B. (2010). Does

teamwork improve performance in the operating room? *The Joint Commission Journal on Quality and Patient Safety*, 36(3), 133-142.

Weaver, S. J., Lyons, R., Diaz Granados, D., Rosen, M. A., Salas, E., Oglesby, J., Augenstein, J. S., Birnbach, D. J., Robinson, D., & King, H. B. (2010). The anatomy of health care team training and the state of practice: A critical review. *Academic Medicine*, 85(11), 1746-1760.

Weaver, S. J., Salas, E., Lyons, R., Lazzara, E. H., Rosen, M. A., DiazGranados, D., Grim, J. G., Augenstein, J. S., Birnbach, D. J., & King, H. B. (2010). Simulation-based team training at the sharp end: A qualitative study of simulation-based team training design, implementation, and evaluation in healthcare. *Journal of Emergencies, Trauma, and Shock*, 3(4), 369-377. doi:10.4103/0974-2700.70754

Zeltser, M. V., & Nash, D. B. (2010) Approaching the evidence basis for aviation-derived teamwork training in medicine. *American Journal of Medical Quality*, 25(1), 13-23. doi:10.1177/1062860609345664

# **Appendix A: Confidential Participant Consent Form**

**University of Minnesota**

**Department of Organization Leadership, Policy and Development**

University of Minnesota IRB# \_\_\_\_\_

Mayo Clinic IRB# \_\_\_\_\_

## **Multidisciplinary Trauma Simulation-Based Team Training Study**

You are being asked to participate in a research study to examine how multidisciplinary trauma simulation-based team training is a transformational learning experience for staff whose motivation is to learn effective communication and teamwork.

We are asking you because you are part of the team called for Level I and II traumas. You have participated in the simulation center training.

The risks associated with this study are minimal. Please understand that your participation is voluntary and you have the right to withdraw from this study or discontinue participation at any time without penalty.

### **Method**

If you agree to participate, the researcher will meet with you within two weeks after training for an interview to understand your perspective about this simulation teamwork experience.

In depth, one hour long interviews will be conducted. Each interview will be audio-recorded and transcribed verbatim by the researcher. The tapes will be analyzed and themes and patterns identified. Each transcript will be coded for anonymity. To ensure validity, interpretations, insights and conclusions will be discussed with peer reviewers.

We are not able to pay you for participating but appreciate your help.

By signing below, you acknowledge having read and understood this statement and agree to this consent. A copy of the signed form will be given to you for your records.

# University of Minnesota

## Department of Organization Leadership, Policy and Development

### Multidisciplinary Trauma Simulation-Based Team Training

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This study will be conducted by Mary Severson, RN. Please contact her at: 507-284-0924 or [Severson.mary@mayo.edu](mailto:Severson.mary@mayo.edu) for any clarification. Co-Advisors for this study are: Dr. Jim Brown at [brown014@umn.edu](mailto:brown014@umn.edu) and Dr. Catherine Twohig at: [twoh0001@umn.edu](mailto:twoh0001@umn.edu) from the University of Minnesota.

I have read all of the above and agree to the terms under confidentiality of information and audiovisual recording.

\_\_\_\_\_  
Signature of Participant

Date \_\_\_\_\_

\_\_\_\_\_  
Signature of Investigator

Date \_\_\_\_\_



## **Appendix B: Written Reflection Questions**

Please complete the following written reflection questions prior to our interview.

1. What is your most important learning?
2. What is something that was hard to learn?
3. What is something that you already knew?
4. What is something you plan to do – a personal change?

## **Appendix C: Simulation-Based Team Training (SBTT) Scenarios**

### **Scenario One:**

A 26 year old female presented to the Emergency Department (ED) after a motor vehicle accident (MVA). The accident involved right angle impact. The patient was 34 weeks pregnant and was experiencing distress. No family or friends present.

### **Scenario Two:**

A 15 year old male presented to the ED after an All-Terrain Vehicle (ATV) accident. The accident involved direct trauma to the neck with a barbed wire fence at a high rate of speed. The patient experienced breathing difficulties and was becoming more unstable. An Emergency Medicine (EM) Consultant and a Trauma, Critical Care, General (TCGS) surgeon had conflicting opinions on the treatment plan. No parents/family present.

### **Scenario Three:**

An 87 year old man presented to the Emergency Department by ambulance. He said he had been “bumped” by a car. He had a compound fracture of his left femur. He initially was conscious but his mental state quickly deteriorated to unresponsive and had no family present. He had a history of chronic atrial fibrillation and was taking a blood thinning medication.

## **Appendix D: Interview Guide**

This is a basic qualitative research study so the interview questions will be semi-structured with open-ended questions. The format is conversational and unscripted probes will be used to obtain further description. The intent of the questions are to encourage the participant to reflect on the debriefing experience as part of multidisciplinary trauma simulation team training and describe their experience in as much detail as they can remember and to give examples to show meaning. The participant may end the interview at any time.

### **Opening Questions:**

1. Tell me about yourself and your role.
2. How long have you worked in your role?
3. At the Multidisciplinary Simulation Center exercise, explain whether you worked with people you had not had a chance to work with previously, or did you work with the same individuals who you work with every day?

### **Core Questions:**

4. What went well?
5. What would you do differently next time?
6. Were you clear what your role and responsibility was throughout the simulation? Please explain
7. Did you feel that others were clear about their roles and responsibilities? Please explain.
8. How has the multidisciplinary simulation team training session enhanced your learning experience?
9. Identify one thing you learned through this session that may strengthen your practice?
10. How did the discussion after the scenario add to your learning experience?
11. How did conflict affect the team?
12. How effective was communication between team members in the scenario?

13. Was any critical information missed by team members?
14. Who was the leader?
15. Did all team members know who the leader was? Please explain
16. What does a good leader do?
17. How did the leader use resources and information?
18. Did the leadership change during the scenario?
19. Describe how other members of the team supported/or did not support the leader?
20. Did you feel comfortable speaking up if you saw something of concern? Please explain
21. What are some of the barriers to effective communication and team collaboration?
22. Did system issues, like incomplete information make your job more difficult?
23. Do some or all disciplines find the experience transformational, independent of their role?