THE IMPACT OF CARDIOPULMONARY EMERGENCY RESPONSE REORGANIZATION ON PATIENT SURVIVAL IN A RURAL HOSPITAL

A Thesis
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California State University, Chico

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Nursing

by
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Andrea Sands

Fall 2014

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<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAGE</td>
</tr>
<tr>
<td>Publication Rights ..............................................................................................................</td>
</tr>
<tr>
<td>Acknowledgments .............................................................................................................</td>
</tr>
<tr>
<td>List of Tables .......................................................................................................................</td>
</tr>
<tr>
<td>Abstract ...............................................................................................................................</td>
</tr>
<tr>
<td>CHAPTER</td>
</tr>
<tr>
<td>I. Introduction .....................................................................................................</td>
</tr>
<tr>
<td>Background ......................................................................................................................</td>
</tr>
<tr>
<td>Statement of the Problem ...............................................................................................</td>
</tr>
<tr>
<td>Relevance and Importance to Nursing ...........................................................................</td>
</tr>
<tr>
<td>Conceptual Underpinnings of the Study .......................................................................</td>
</tr>
<tr>
<td>Purpose of the Study .......................................................................................................</td>
</tr>
<tr>
<td>Research Questions .........................................................................................................</td>
</tr>
<tr>
<td>Definitions of Terms .......................................................................................................</td>
</tr>
<tr>
<td>Qualifications of the Researcher ....................................................................................</td>
</tr>
<tr>
<td>Transitional Statements .................................................................................................</td>
</tr>
<tr>
<td>II. Literature Review ....................................................................................................</td>
</tr>
<tr>
<td>Team Training ..................................................................................................................</td>
</tr>
<tr>
<td>Leadership .......................................................................................................................</td>
</tr>
<tr>
<td>Communication ...............................................................................................................</td>
</tr>
<tr>
<td>Coordination ....................................................................................................................</td>
</tr>
<tr>
<td>Transitional Statements .................................................................................................</td>
</tr>
<tr>
<td>III. Research Methodology ..........................................................................................</td>
</tr>
<tr>
<td>Setting/Population/Sample .............................................................................................</td>
</tr>
</tbody>
</table>
CHAPTER PAGE

Ethical Considerations .......................................................... 36
Data Collection Method ......................................................... 39
Data Collection Procedure ..................................................... 40
  Phase 1 .............................................................................. 40
  Phase 2 .............................................................................. 40
  Phase 3 .............................................................................. 41
Data Analysis and Statistical Procedures .............................. 41
Reliability ............................................................................. 42
Transitional Statements .......................................................... 42

IV. Findings ........................................................................... 44
  Population/Sample ................................................................. 45
  Results ................................................................................ 45
    Research Question 1 .......................................................... 45
    Research Question 2 .......................................................... 46
    Research Question 3 .......................................................... 48
    Research Question 4 .......................................................... 50
    Research Question 5 .......................................................... 51
  Researcher Observational Findings ...................................... 53
  Transitional Statements .......................................................... 54

V. Discussion ......................................................................... 55
  Reflection of the Findings .................................................... 55
  Reflection of the Researcher Observational Findings .......... 57
  Limitations of the Study ....................................................... 59
  Implications for Nursing Practice ........................................ 59
  Implications for Nursing Research ...................................... 62
  Implications for Nursing Education ..................................... 63
  Conclusion and Recommendation ....................................... 64

References ............................................................................... 65

Appendix

A. Cardiopulmonary Emergency Response Policy ................... 71
<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research Question 1: Patient Survival at the End of the Cardiopulmonary Emergency</td>
<td>46</td>
</tr>
<tr>
<td>2. Research Question 1: Patient Survival at Discharge</td>
<td>47</td>
</tr>
<tr>
<td>3. Research Question 2: Patient Survival at the End of the Cardiopulmonary Emergency</td>
<td>48</td>
</tr>
<tr>
<td>4. Research Question 2: Patient Survival at Discharge</td>
<td>48</td>
</tr>
<tr>
<td>5. Research Question 3: Patient Survival at the End of the Cardiopulmonary Emergency</td>
<td>49</td>
</tr>
<tr>
<td>6. Research Question 3: Patient Survival at Discharge</td>
<td>50</td>
</tr>
<tr>
<td>7. Research Question 4: Patient Survival at the End of the Cardiopulmonary Emergency</td>
<td>51</td>
</tr>
<tr>
<td>8. Research Question 4: Patient Survival at Discharge</td>
<td>51</td>
</tr>
<tr>
<td>9. Research Question 5: Patient Survival at the End of the Cardiopulmonary Emergency</td>
<td>52</td>
</tr>
<tr>
<td>10. Research Question 5: Patient Survival at Discharge</td>
<td>53</td>
</tr>
</tbody>
</table>
ABSTRACT

THE IMPACT OF CARDIOPULMONARY EMERGENCY RESPONSE REORGANIZATION ON PATIENT SURVIVAL IN A RURAL HOSPITAL

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Survival of in-house cardiac arrest poses a significant danger to inpatients. Unorganized resuscitation response to cardiopulmonary emergencies can delay treatment interventions such as defibrillation. This study investigated the impact of reorganization of a resuscitation team on survival of patients in ventricular tachycardia or ventricular fibrillation before and after a change in cardiopulmonary emergency response policy (CERP). Data were collected retrospectively by reviewing medical records of patients two years prior to the change in CERP (2009-2010) and two years after (2011-2012). Data for five research questions were analyzed using a Fisher’s exact test. There were eight patients (Emergency Department=2, Inpatient=6) that met sample criteria between 2009-2010: two inpatients expired at discharge. There were 11 patients...
(Emergency Department =7, Inpatient=4) that met sample criteria between 2011-2012; one Emergency Department patient expired at the end of the cardiopulmonary emergency and one Emergency Department patient expired at discharge. There was no statistical significance found ($p=1$ and $p=.47$). Improvements to the study design are warranted to determine the impact of changes in the CERP on patient outcomes. Earlier recognition of arrhythmias by telemetry monitoring and, consequently, earlier interventions may help explain higher survival rates at the end of a cardiopulmonary emergency (93.7%) and at discharge (86.6%). Improvements in charting may indicate that pre-assignment of the recorder role and additional education improves documentation accuracy.
CHAPTER I

INTRODUCTION

The American Heart Association (AHA) is the central organization that provides training guidelines to medical personnel in how to respond and deliver appropriate treatment for patients experiencing a cardiopulmonary emergency. Advanced Cardiovascular Life Support (ACLS) was first introduced by the AHA in 1979 (AHA, n.d.). Although ACLS techniques continue to evolve, the goal remains the same: to improve patient outcomes during cardiopulmonary emergencies through training of medical personnel (AHA, 2011). However, survival of in-hospital cardiac arrest (IHCA) continues to pose a significant danger for hospitalized patients. In 2012, only 23.1% of the 209,000 patients who experienced an IHCA were alive at discharge (AHA, 2012).

Time management is critical during cardiopulmonary emergencies. Early interventions such as defibrillation can increase patient survival (Krittayaphong, Saengsung, Chawaruechai, Uompunturak, & Sahasakul, 2009). Thus, resuscitation teams must be organized in a manner that helps them deliver care as quickly and efficiently as possible. The AHA’s Advanced Cardiovascular Life Support Provider Manual (2011) stresses the importance of clear roles and responsibilities as an essential part of an effective resuscitation team. Having clear, well-defined roles and responsibilities during
resuscitation helps team members know what will be expected of them and assists them in anticipating the actions of others.

**Background**

ACLS team guidelines for resuscitation state that the team leader is responsible for assigning roles to team members during the initial phases of a cardiopulmonary emergency (AHA, 2011). This guideline was the foundation of a rural hospital’s 2008 policy directing resuscitation team staff on how to respond to cardiopulmonary emergencies occurring on inpatient units; it specified that the team leader, or physician, had the responsibility to assign other responders roles and tasks after the team arrived at the patient’s bedside. For de-identification purposes, the rural hospital’s policy will be referred to as the Cardiopulmonary Emergency Response Policy (CERP, Appendix A) throughout the study.

As part of ongoing education efforts regarding cardiopulmonary emergency preparation, in 2009, nurses in the rural hospital participated in a simulated training of resuscitation team skills. The nurses found the team leader role assignment guideline to be problematic, despite it being required in the 2008 CERP. When simulation records were reviewed to evaluate the process of role assignment at the time of the arrest, it was found that valuable time was wasted assigning resuscitation team roles and organizing the interventions of each role during the cardiopulmonary emergency event. This led to delays in providing initial treatment, such as defibrillation. The AHA emphasizes the
importance of early CPR and early defibrillation as essential links in the chain of survival; these not only increase chance of survival but also help preserve neurological function of the patient (AHA, 2011).

Due to the simulation results regarding barriers to early treatment, in 2009, the researcher (also the simulation training instructor), along with a team of four registered nurses and a respiratory therapist, began revisions of the 2008 CERP. The objective of the revisions was to provide earlier treatment. In an effort to improve the resuscitation team’s ability to provide earlier treatment, such as defibrillation, a new policy was written to reflect role assignment at the beginning of each shift, prior to the occurrence of a cardiopulmonary emergency event. The policy revision also included adding two nursing roles to the resuscitation team: the helper role and a second medication nurse. The purpose of these additional roles was to provide more licensed nurses to assist with resuscitation efforts. The intensive care nurse role was modified from medication nurse to team coordinator. This new role eliminated the intensive care unit (ICU) nurse from performing tasks and instead directed him or her to focus on assisting the team leader (the physician) with overseeing resuscitation efforts and ensured that the team actions followed current ACLS guidelines. The team coordinator was also assigned the responsibility to assist the physician with monitoring the patient’s response to interventions and guide task delegation appropriately. Lastly, responsibilities of each role were clearly defined in the new policy so each team member was aware of the duties associated with their specific role during resuscitation prior to an occurrence of a cardiopulmonary
emergency event. The other roles and responsibilities of the new policy are described in Appendix A; however, for de-identification purposes, the hospital’s policy is not included.

The new CERP was accepted for use by the hospital’s governing board in late 2010. After the nurses and respiratory therapists were educated on the new policy they participated in a second resuscitation team simulation. The evaluation of patient outcomes from the simulation training was reassuring to staff and educators. Records of the simulation training following the implementation of pre-assigned roles and responsibilities revealed earlier treatment interventions and improved patient outcomes during the scenarios. However, no evaluation took place using actual patient cases that occurred in the hospital post-intervention. In this study, the researcher examined actual patient outcomes using real cases that occurred in the hospital in the two years following the CERP change intervention. The new CERP policy was evaluated by determining the impact of the policy change on the outcomes of patients with an initial arrhythmia of ventricular tachycardia (VT) or ventricular fibrillation (VF).

One purpose of the CERP change was to decrease the time used by the resuscitation team for role and task organization in order to provide defibrillation sooner, which is associated with more positive patient outcomes. According to a study by Krittayaphong et. al (2009), early defibrillation was the most important component of patient survival among inpatients who required defibrillation as a treatment during a cardiopulmonary emergency. Because specific cardiac arrhythmias require different
treatment, it is essential that similar arrhythmias be compared. For this reason, only VT or VF arrhythmias were investigated in this study because both require defibrillation as an early treatment.

The research study sought to determine the impact on patient outcomes after a policy change regarding resuscitation team response in a rural hospital by collecting retrospective data on pre- and post-policy resuscitation outcomes. A quasi-experimental design was used to examine patient outcome data at the end of a cardiopulmonary emergency and at discharge for patients with an initial arrhythmia of VT or VF. As a non-inpatient unit, the Emergency Department (ED) was excluded from the 2010 policy changes. Therefore, patient outcomes in the ED setting were used as a control group to the inpatient data to determine the differences in outcomes for each location. The researcher hypothesized that a resuscitation response using pre-assigned roles and responsibilities would be associated with an increased survival rate of patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency.

Statement of the Problem

Unorganized responses by resuscitation teams to cardiopulmonary emergencies have the potential to compromise patient safety and negatively affect patient outcomes. It is problematic to organize the resuscitation team by assigning roles and responsibilities after the onset of a cardiopulmonary emergency because it delays initial treatment. Early defibrillation and CPR are two critical initial treatments which, when
delivered early, increase patient survival (AHA, 2006). If initial treatments are delayed, patient survival will suffer. Mellick and Adams (2009) concluded, by reviewing the literature pertaining to resuscitation team organization, that patient survival was dependent upon three concepts: the quick arrival of the resuscitation team, a highly organized team, and efficient delivery of treatment.

Relevance and Importance to Nursing

Kohn, Corrigan, and Donaldson’s (1999) report, To Err is Human: Building a Safer Health System, put the issue of patient safety in the health care system under a microscope. The report was both shocking and pivotal in shifting healthcare dialogue and action towards safer system practices. The report changed the focus of blaming errors on the individual, such as the nurse or physician, to analyzing the system in which the error occurred. The notion that the system and its internal processes are faulty or defective leads to individuals making errors. Correcting the faults in the system makes it more difficult for individuals to fail, thus making the patient safer (Leape, 2005). The study is pertinent to the nursing profession because it investigates patient safety from the viewpoint of a system, in this case a hospital policy guiding resuscitation team response.

During cardiopulmonary emergencies, resuscitation nurses work within a team to help deliver care to critically ill patients, which is guided by a system or policy. Because of their experience with resuscitation events, nurses on the team are in an
excellent position to identify potential system failures. In part this is due to their involvement in providing interventions during cardiopulmonary events. They understand the system and how it functions, making their input valuable in finding solutions for internal failures within resuscitation team processes. During the simulation training, resuscitation team nurses in the rural hospital, along with the researcher, identified that the 2008 CERP led to delays in treatment and resulted in patient harm. Findings from this study may help correct system failures in how resuscitation teams organize their responses to cardiopulmonary emergencies and thus improve patient safety.

Conceptual Underpinnings of the Study

This study’s conceptual framework is supported by Tuckman’s (1965) group development model. Tuckman reviewed 50 research articles pertaining to different types of groups which he collectively used to propose a model consisting of four general stages of group development: forming, storming, norming, and performing. The group model was revisited in 1977, when Tuckman collaborated with A.C. Jensen, proposing a fifth and final stage called adjourning (Tuckman & Jensen, 1977). The five stages of group development provide an appropriate framework for cardiopulmonary emergency team development by establishing a sequence of progression in the group toward the ultimate goal of patient survival.
In the first stage of group development referred to as forming, groups focus on orientation related to tasks and interpersonal relationships with other group members (Tuckman, 1965). During storming, the second phase, individuals generate solutions and other group members respond to the suggestions; negative responses can lead to disagreements and difficulties in the group harmony. As communication and boundaries evolve, the group enters the third developmental stage called norming. During the norming stage, the group’s cohesiveness improves, thus helping them to progress to the fourth stage of performing. Because many operational issues have been resolved in previous phases, task delivery during the performing stage is highly efficient. The performing stage is marked by progress towards the group’s goal (Tuckman). The fifth and final stage is associated with the termination of the group’s interactions and activity toward the set goal, and is appropriately named adjourning (Tuckman & Jensen, 1977).

Tuckman (1965) recognized that the rate at which a group progressed through developmental stages was dependent upon the type of group and on the content in each stage. A cardiopulmonary resuscitation team is categorized as a laboratory group. Tuckman describes this type of group as being short lived and thus needing to advance to the final stage of problem solution at a faster rate, compared to other groups that may be longer lived in nature. Although forming is still a necessary stage of all group development, it is possible to minimize the time it takes a group to progress through this stage with the use of manuals, task rules, and other material that helps clarify role and task expectations of a group (Tuckman).
Tuckman’s group development model fits appropriately as a framework to guide this study because it emphasizes the practical application of using a policy, or the CERP in this case, in order to progress through group developmental stages at a faster rate. The CERP was modified in order to pre-assign resuscitation team roles prior to the cardiopulmonary emergency event, thus decreasing the time needed for organization and orientation during the initial forming stage. During the second stage, storming, each member of the resuscitation team is guided by specific responsibilities as written in the CERP. This stage in group development for the resuscitation team is marked by generating solutions for patient survival. It is imperative for the resuscitation team to reach the storming stage as quickly as possible because interventions such as defibrillation are administered during this stage. Next, group development progresses into the norming stage. In resuscitation teams this stage is identified by clearer boundaries, thus improving the group’s ability to work as a team. The clearly defined responsibilities in the CERP not only help with the resuscitation team’s cohesiveness in the norming stage, but also assist in the progression towards the performing stage. During this stage, the resuscitation team is highly efficient in performing the responsibilities of their role and continues to focus on patient survival. The patient’s response to the resuscitative care provided determines patient survival and group development reaches the last stage, adjourning; this stage is signified by the termination of the resuscitation team’s work as a group.
Purpose of the Study

The purpose of this study was to investigate the impact of pre-assigned roles and clearly defined responsibilities of a resuscitation team’s response to cardiopulmonary emergencies on patient outcomes in a rural California hospital. The study compared the outcomes of patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before and after a change in the hospital’s CERP.

Research Questions

The following research questions were investigated in the study.

1. What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for inpatients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared to inpatients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

2. What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared to ED patients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

3. What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared to inpatients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?
4. What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared to inpatients with an initial arrhythmia of VT or VF before a change in CERP (2009-2010)?

5. What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency after a change in CERP (2011-2012), compared to inpatients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

Definition of Terms

*Cardiopulmonary emergency:* A medical emergency event in which a patient requires immediate medical intervention due to deterioration in their heart or lung function, or both.

*Patient outcome:* The survival of a patient at the end of a cardiopulmonary emergency event and at discharge. The two patient outcomes are survival (alive) or death (expired).

*Cardiopulmonary emergency response policy (CERP):* A policy that guides practice and treatment during a cardiopulmonary emergency event.

*Code blue:* A term used as a synonym for a cardiopulmonary emergency event in the rural hospital.
Paper code blue record: A paper carbon copy form used by the resuscitation team recorder to document resuscitation-related details during a cardiopulmonary emergency event in the rural hospital.

Resuscitation team: A group consisting of licensed nurses, doctors, respiratory therapists, and other personnel who work as a team to provide medical treatments for a patient experiencing a cardiopulmonary emergency. Each team member fulfills a role during resuscitation efforts.

Cardiac arrhythmia: A cardiac arrhythmia is an irregularity of electricity in the heart, causing it to beat either too quickly, too slowly, or in an irregular rhythm (Mayo Clinic, 2013).

Pre-assigned roles: Resuscitation team roles that are assigned at the beginning of each shift in the hospital, prior to a cardiopulmonary emergency event.

Clearly defined responsibilities: Responsibilities are clearly written in the CERP so that each team member understands which specific tasks and interventions accompany the role they fulfill.

Qualifications of the Researcher

The researcher is a registered nurse with a baccalaureate of science degree in nursing from California State University, Chico. Currently she is a graduate student pursuing her master of science degree in nursing with a focus on education. She has completed the required coursework of the curriculum, including advanced nursing
research and theory, advanced concepts for adult nursing care, and dynamics of the advanced nursing role. During her nine years of work at a rural hospital in northern California, she has acquired a wide range of experience in acute care. Her work experience includes two years on a medical/oncology floor, four years on a telemetry monitoring unit, and, most recently, three years in the emergency department. In addition, she worked as a professional expert for a community college nursing program in which she supervised nursing students during their clinical rotation.

The researcher gained valuable knowledge of cardiopulmonary emergency response and resuscitation team dynamics through her experiences working as an instructor for the hospital’s education department. During her four years as an instructor she taught a Basic Life Support (BLS) certification course and a simulation course on cardiopulmonary emergency team preparation and response. Both courses focused on basic life support skills, initial treatments, team roles, and appropriate care delivery for a patient experiencing a cardiopulmonary emergency situation. Her experiences in resuscitation team training led her to further want to research the area of cardiopulmonary emergency preparation and response.

Transitional Statements

Resuscitation teams must be organized in a manner that enables them to perform efficiently and provide interventions quickly in order to increase patient survival of in-hospital cardiopulmonary emergency events; this was the goal of changes made to
the cardiopulmonary emergency response policy in a rural hospital in 2010. Norris and Lockey (2012) state that, in order to reduce the risk of resuscitation errors, hospitals must focus on localized policies and team training appropriate for their hospital’s resuscitation team needs. Revisions made to the policy under investigation in this study consisted of adding responders, pre-assigning roles prior to emergency events, clearly defining roles, and increasing team leadership by providing an ICU nurse coordinator role.

This study examined the impact of pre-assigned roles and clearly defined responsibilities on the outcomes of patients involved in a cardiopulmonary emergency in the rural hospital. Specifically, the patients with an initial arrhythmia of VF or VT were included in the study because both require early defibrillation in order to increase survival.
CHAPTER II

LITERATURE REVIEW

Research dedicated to cardiopulmonary emergencies is wide-ranging, mostly focused on topics pertaining to the many medical interventions provided to victims and their impact on survival. An extensive review of the literature was performed to obtain the latest research about cardiopulmonary emergency teams and how the aspects surrounding these teams are associated with the quality of cardiopulmonary resuscitation and patient survival. The databases used for this study were EBSCO-host, CINAHL, MedLine, Science Direct, and PubMed. Databases were accessed mainly through the California State University, Chico online research station. Databases also included the American Heart Association’s online research library and Google Scholar.

The review of literature was limited by searching only for articles written in English. The date range of literature searched was 2003 to 2013; however, some seminal research articles were included. The search terms used were resuscitation, cardiopulmonary resuscitation, cardiac arrest, cardiopulmonary emergency, and code blue. The literature was further refined by adding Boolean operator “and” along with the terms team*, response, organiz*, coordination, and role. Truncation of terms (*) was used so the plural and past tense of the terms would be recognized in the search.
Numerous articles were obtained and reviewed by the researcher for relevancy to the study topic. Additional studies were identified in the cited references of the relevant articles. The review of the literature was focused around the four common themes found throughout the literature: team training, leadership, communication, and coordination.

Team Training

Guidelines for resuscitation training focus on individual skills, the sequence of interventions, and the use of algorithms, in order to guide rescuers in a logical fashion through cardiopulmonary emergency situations. The reality of cardiopulmonary emergencies, however, is they are rarely run alone during in-hospital cardiac arrest (IHCA). Unlike other teams that normally work together as groups, cardiopulmonary emergency teams are at a disadvantage, only working together infrequently (Cooper & Wakelam, 1999). Edwards and Siassakos (2012) state that traditional resuscitation training has had little emphasis on teamwork during cardiopulmonary emergencies until recently; new international guidelines suggest teamwork should be included in training but neglect to recommend a certain type of training. According to Perkins (2007), many healthcare facilities were ahead of these recommendations and had already implemented simulation code team trainings in order to improve cardiopulmonary emergency response times.

The use of simulation in cardiopulmonary emergency team training was found in many of the research articles throughout the literature. Hunziker, Johansson,
Tschan, Semmer, Rock, Howell, and Marsch (2011) described high fidelity simulation as a solution to overcome the inability to research CPR in clinical studies that are limited by medical, logistical, and ethical constraints. Unlike simulation, actual cardiopulmonary emergencies don’t allow researchers to combine variables, apply interventions, and test outcomes in a controlled environment (Hunziker et al.). According to Marsch, Muller, Marquardt, Conrad, Tschan, and Hunziker (2004), information pertaining to the initial phases of actual resuscitation may be biased due to the reliance of data collection on a participant’s memories of the events. An advantage of video debriefing is that it can be combined with simulation to capture objective data about team interactions in real time. Villamaria et al. (2008) add that there is a large lapse in time between emergency events and when resuscitation teams receive feedback and critique in reference to their performance. The use of simulation video recording provides unbiased data and makes observations from the onset of events possible; this allows for timely feedback about performance (Marsch et al.).

In a study by Delac, Blazier, Daniel, and N-Wilfong (2013), a mock code simulation training was developed for a large trauma teaching hospital; later, nursing perception and performance were investigated. A sample of 103 nurses participated in the Five Alive mock code training program over a nine-month period. The training focused on improving the skills of nurses during the first five minutes of the emergency when providing initial treatment that is critical for survival. The unannounced mock code occurred once each month on either the medical, surgical, or telemetry unit of the
hospital utilizing a simulation manikin. During each of the mock code trainings, the nurses participated in two different scenarios (Delac et al.).

Following the scenarios, the nurses participated in a video debriefing and completed a post-survey. When post-survey data were compared to pre-survey data (collected before the program began), the researchers found that, after training, the nurses reported an increase in confidence levels in three areas: their ability to identify a patient exhibiting declining health, to initiate initial treatment prior to the code team arriving, and to operate emergency equipment properly. The researchers evaluated the nurses’ performance by reviewing simulation videos and collecting data of the time it took them to begin CPR and deliver defibrillation. Times during the first scenario were compared to the times in the second scenario. The descriptive data demonstrated that the mock training provided more efficient delivery of interventions in the first five minutes of the second scenario. The nurses exhibited a 65% increase in delivering CPR within one minute and a 67% increase in delivering defibrillation within three minutes during the second scenario as compared to the first. The authors concluded that simulation training, along with a video debriefing, improved performance during the initial minutes of a cardiopulmonary emergency in the second scenario when compared to the first; however, the study is limited because it neglected to investigate actual cases after the program was instituted (Delac et al., 2013). Despite this limitation, this study suggests that repetitive training improves team performance through increased efficiency and demonstrates the use of training as a tool to build confidence in responders.
Fernandez, Pearce, Grand, Rench, Jones, Chao, and Kozlowski (2011) studied the effects of an educational training about teamwork on participants’ resuscitation team behaviors and delivery of patient care during a simulated cardiopulmonary emergency. Participants consisted of fourth-year medical students and emergency residents at Wayne State University. Participants were assigned to a resuscitation team containing four to six people. A total of 45 teams were then randomly assigned to participate in one of two computer-based trainings. The two computer trainings were each 25 minutes long; one focused on information about successful resuscitation teamwork behaviors, while the other training was a placebo. The placebo provided only broad information about different health care teams and simulation as a means of training. The teams participated in two scenarios: cardiac arrest and hemorrhagic shock. The teams’ interactions during scenarios were video recorded and scored by trained raters who had no knowledge of the study or the goals of training. Teamwork and patient care behaviors were measured by raters using checklists containing the type of behavior, the time it took to complete, and how many behaviors occurred. A statement about cardiac rhythm or allergies is an example of a teamwork behavior. An example of a patient care measurement is the time it took to successfully intubate the compromised patient. To increase validity, the scenarios were tested using healthcare providers as pilot participants and checklists were refined prior to the study (Fernandez et al.).

Data were examined using an analysis of covariance method (Fernandez et al., 2011). Results showed the teams that received the teamwork training exhibited 10%
more successful teamwork behaviors than the placebo-trained teams. The teams that received the training intervention also showed a 10% \((p = 0.046)\) difference in patient care behaviors over their counterpart placebo-trained teams. Both results contained \(p\) values of less than 0.05, indicating statistical significance. The authors concluded that the computer-based team training positively affected teamwork and performance during the resuscitation of simulated patients. This study shows the importance of training teams regarding successful teamwork behaviors in order to improve patient care during resuscitation events. It also demonstrates that teamwork and patient care can be improved with the use of a low-cost and easily disseminated education option such as computer-based training. Replication of the study with inclusion of other healthcare providers that respond to cardiopulmonary emergencies may strengthen the validity of the results. The authors also suggest further study to examine the effects of training on patient outcomes (Fernandez et al.).

The objective of a study conducted in 2011 was to examine the impact of a crisis resource management video-based teamwork training on the amount of verbalizations by team leaders and interruptions in chest compressions or no-flow time (NFT) during cardiopulmonary resuscitation (Castelao et al., 2011). Participants were medical students in their last year of training. All of the medical students completed an Advanced Life Support (ALS) course as part of their curriculum. By using their last name, participants were assigned alphabetically to four-person resuscitation teams. There were a total of 44 teams in the study. Teams were assigned to either participate in a 90-minute
crisis resource management (CRM) training or were a part of the control group who received an extra review of ALS skills. The CRM training was developed by a panel of experts in the fields of emergency, anesthesiology, and intensive care medicines. Theory of CRM was presented during the training and students participated in exercises in order to better understand the context of CRM in terms of cardiopulmonary emergency management. The hypothesis of the study was that NFT or hands-off time would be reduced due to improvements in the coordination of the team as a result of applying the CRM principles learned during training (Castelao et al.).

Results demonstrated that NFT rates in the team that received the CRM training were considerably lower than the control team and verbalizations by team leaders occurred more frequently in the CRM team. However, team leadership verbalizations in all four categories (direct orders, undirected orders, planning, and task assignments) were not shown to have statistically significance in regards to lower rates of NFT in the CRM group, as demonstrated by all four p values being greater than 0.05 (Castelao et al., 2011). The p values for the four verbalization categories were equal to 0.061, 0.203, 0.749, and 0.402, respectively. The authors concluded CRM training is associated with the quality of CPR as indicated by a decrease in NFT rates, but further investigation is needed to determine which aspects of the CRM training influence NFT rates (Castelao et al.).
Leadership

Leadership is documented in the literature repeatedly as being a key component in managing the complexity of the many tasks required during cardiopulmonary emergencies (Castelao et al., 2011). There is also repeated evidence that leadership clearly influences performance outcomes in a positive manner (Castelao et al.). A cardiac arrest simulation study by Marsch et al. (2004) confirms that team performance suffers when leadership is absent. Another study found that nurses were less likely to administer defibrillation in the absence of a physician, even if they were adequately trained in defibrillator use and technical skills (Coady, 1999).

There are many important aspects to consider in determining who will fulfill the leadership role during a cardiopulmonary emergency; typically this is determined by hospital policy. Usually physicians fulfill leadership roles because of their advanced knowledge and wide scope of practice. A study examining the attitudes of medical and nursing students in leadership roles during cardiopulmonary emergencies concluded both populations feel inadequate to lead resuscitation teams (Niem-Murola, Makinen & Castren, 2007). Regardless of who fulfills the leadership role, it is important that they be easily identifiable (Anderson, Jensen, Lippert & Ostergaard, 2010).

It is imperative the team leader be effective and skilled at leading resuscitation efforts. Hunziker et al. (2011) suggest five principles of an effective leader during a cardiopulmonary emergency: a) consider the demands of the situation on adequacy of the existing leadership, b) help team members contribute through remarks that are
orientation focused, c) ask questions about perceived problems, d) avoid performing tasks, instead keeping hands off of the patient and delegating tasks, and e) promote information exchange amongst the team. The findings reported the following three research articles reinforce some of these principles.

A classic observational study by Cooper and Wakelam (1999) is cited many times throughout the literature. The purpose of the research was to explore relationships amongst leadership behaviors, task performance, and the dynamics of the resuscitation team. Twenty IHCA cases were videotaped over a 16-month period and included in the study. The study used two observers with a “good” observer-agreement rating. Using a questionnaire, the observers rated the level of structure that leaders built within the resuscitation team during the cases and which behaviors they utilized during the structuring process. Team dynamics and task performance were rated using two separate scales. Observers also rated a leader’s hands-on participation in patient care during the event and compared it to leadership behaviors that were utilized to build structure within the resuscitation team. Data were collected and then analyzed using chi-square statistical testing.

Results found that successful team dynamics \( p = 0.000 \) and task performance \( p = 0.013 \) were strongly associated with the level at which the leaders structured the team. Data revealed that leaders who spent more time participating in hands-on activities related to patient care built structured teams less often \( p = 0.005 \). In this case, the teams were statically less dynamic \( p = 0.028 \) and task performance was less efficient
($p = 0.099$). Because of the small sample size the researchers included confidence intervals of 90-95%; they predicted that the relationship would likely be more significant in a larger sample size. The researchers concluded that teams that perform more efficiently have leaders that focus on the holistic situation of the event, remain free from performing tasks related to patient care, and build structure into the team (Cooper & Wakelam, 1999).

A second study sought to investigate the difference in continuous hands-on time during CPR, amount of leadership utterances, time to CPR, and technical skills by comparing a resuscitation team that received leadership instructions with a team that only received technical instructions (Hunziker et al., 2010). Uninterrupted hands-on CPR and early defibrillation are two benchmarks of high quality resuscitation. Two hundred thirty-seven medical student participants were divided into teams of three and participated in a video-recorded cardiac arrest scenario. Prior to participation in the scenario, all participants watched a 20-minute video on resuscitation algorithms. After their participation in the scenario, they were randomly selected to receive ten minutes of additional instructions on either technical skills or leadership.

Four months later, participants returned and were assigned to teams based on previous similar instruction. At that time, they participated in a second simulation. Video recordings were reviewed and coded by two researchers with no knowledge of the group differences in instructions (Hunziker et al., 2010).
Results illustrated that the two groups were similar, with little differences in performance during the initial scenario prior to the educational intervention (Hunziker et al., 2010). However, during the second scenario, the resuscitation team that received the leadership instructions had a longer length of continuous CPR or hands-on time ($p = 0.001$), a shorter time to the start of CPR ($p = 0.018$), and had more leadership utterances ($p = 0.02$). During the second scenario, the resuscitation teams that had received technical instructions displayed correct arm and shoulder positions during CPR more frequently ($p = 0.003$). The researchers concluded that the leadership instructions were more beneficial than the technical instructions, as evidenced by more leadership utterances and improved CPR performance (Hunziker et al., 2010). This study illustrates the importance of leadership training in order to improve performance of resuscitation teams, specifically the use of direct utterances by leaders in directing the actions of the resuscitation team.

In a third study by Yeung, Ong, Davies, Gao, and Perkins (2012), the researchers investigated the relationship between the quality of CPR and seven leadership factors: a) age, b) gender, c) past leadership training, d) membership in a professional group, e) months since most recent resuscitation training course, f) instructor verses provider status, and g) number of experiences leading a resuscitation team in the past six months. The study included 40 participants consisting of physicians, nurses, and other health professionals with resuscitation certification. Using a questionnaire format, information was collected about the seven leadership factors from each participant prior to them leading a video-recorded resuscitation scenario. Leadership and technical skills
were then scored by two reviewers via information from video recordings and simulation mannequins; the authors reported high inter-rater reliability for the two reviewers (Yeung et al.).

The results demonstrated that the quality of CPR was associated with higher leadership and technical skill scoring (Yeung et al., 2012). Statistical significance was found in the following results when resuscitation teams were led by leaders exhibiting the highest leadership scores: shorter pre-shock pauses ($p < 0.001$), lower hands-off CPR time ($p = 0.01$), and quicker delivery of initial shocks ($p = 0.02$). Leaders with the highest leadership scores showed five common leadership factors: they tended to be older in age, have had a recent resuscitation course, had an instructor status in resuscitation training, belong to a non-physician professional organization, and have had previous leadership training. The authors concluded that a positive association exists between the level of leadership skills and the quality of CPR (Yeung et al.) Future studies may give insight into the differences in content of instructor verses provider training courses and the quality of cardiopulmonary resuscitation, as well as the differences in skill level of physician verses other health professional as team leaders.

**Communication**

There are many forms of communication that are used by resuscitation teams during their interactions while working together. In a study by Husebo, Rystedt, and Friber (2011), both verbal and non-verbal communications used by nursing students
(N=81) during their development of team structure were observed for analysis using an explorative and descriptive design. The students were divided into teams of three. Prior to the simulated scenarios, the students all attended a basic life support training that focused on individual resuscitation skills. The nursing students’ actions involving communication were coded and quantified by the researchers who reviewed 28 video-recorded cardiac arrest scenarios. The researchers also used interaction analysis to investigate the implications of the students’ verbal and nonverbal communication during the coordination of the resuscitation team (Husebo et al.).

The researchers identified three phases in which the nursing students’ coordinated activities within the resuscitation team: a) stating unconsciousness, b) preparing for resuscitation, and c) initiating resuscitation (Husebo et al., 2011). These phases coincided with the steps performed in the BLS sequence for resuscitation. Verbal, non-verbal, and combined communication (both verbal and non-verbal) were categorized as either pertaining to assessment or action. Descriptive analysis was used to present the study findings. During the first phase, most of the students’ communication with other team members was assessment-based, compared to that based on actions (153 verses 34). During the first phase, verbal communication occurred more frequently than non-verbal and combined communications. As the student nurses prepared for resuscitation during the second phase, their coordination efforts were almost exclusively action-based compared to assessment based (108 verses 7). Most of the actions were non-verbal in nature. In the last phase, the students’ communication within the team as they initiated
resuscitation was primarily action-based (187 verses 32), with verbal communication occurring at the highest rate in this phase. Findings demonstrated that different forms of communication used by the nursing students were necessary in order to increase group understanding and progress to the next phase of resuscitation. The students frequently used pointing and direct verbal statements to communicate and clarify how to perform the next step in delivering care to the patient. The researchers concluded that simulation provides an appropriate venue for students to practice these forms of communication (Husebo et al.).

A quantitative study by Bogenstaetter, Tschan, Semmer, Spychiger, Breuer, and Marsch (2009) investigated the causes of transmission errors that were communicated to incoming rescuers joining a simulation of cardiac arrest that was already in progress. Twenty teams comprised of three nurses, one resident physician, and one senior physician each participated in the study. Each team participated in a cardiac arrest scenario using a high-fidelity patient simulator. The scenario began with one nurse at the patient’s bedside; other team members were summoned by the nurse to respond when the patient displayed a VT arrhythmia. The scenarios were video recorded and transcribed. All communication and actions given to an incoming member were the coded by the researchers using three steps: a) all verbal information given to an incoming person was identified (information transmission); b) for each transmission, all the communication and actions prior to the transmission were identified (information
and c) transmission accuracy was assessed by comparing the generated information with the transmitted information (Bogenstaetter et al.)

Descriptive statistics were used to analyze the accuracy of 201 transmissions communicated verbally during the scenarios (Bogenstaetter et al., 2009). The results identified that 18% (36) of transmissions transmitted to incoming rescuers were incorrect. The researchers found that the most frequently occurring type of inaccurate information related to quantities, such as the number of times a medication or defibrillation was administered: all but one of 35 transmission errors were related to either medication or defibrillation. However, if participants committed the information to memory by communicating it aloud in the manner that it would need to be later retrieved, then the information was transmitted incorrectly less often (e.g. “This is the second dose of epinephrine”). The researchers concluded that the information transferred to incoming rescuers joining a cardiac arrest simulation is not completely reliable (Bogenstaetter et al.). Findings of this study may be helpful in designing trainings about communication strategies that decrease the likelihood of errors in communication during cardiopulmonary events.

Coordination

The complex nature of cardiopulmonary emergencies requires several responders to provide interventions simultaneously and efficiently; however, coordinating and planning interventions of multiple team members can be a difficult task under
intense time pressures. Poor team coordination has been identified as a factor in medical errors (Kohn et al., 1999). Errors in coordination during resuscitation events have been associated with decreased survival in IHCA patients (Ornato, Peberdy, Reid, Feeser & Dhindsa, 2012). In a study by Ornato et al. (2012), several errors pertaining to team coordination were identified: a) defibrillation delays of greater than two minutes due to insufficient responders or defibrillator not being immediately available, b) deficits in knowledge of team roles, c) delay in identifying the team leader, and e) deviation from ACLS guidelines.

Adherence to ACLS protocols was the focus of a study by McEvoy, Field, Moore, Smalley, Nietert, and Scarbrough (2013) that reviewed chart data and resuscitation records of 149 patients who had experienced an IHCA. The study examined the relationship between adherence to ACLS algorithms and return of spontaneous circulation (ROSC). A retrospective chart review identified 75 total patients who had a return of spontaneous circulation (ROSC) and 74 patients who did not survive. Researchers examined adherence to ACLS protocols using a checklist. Results found that successful ROSC ($p < 0.01$) correlated positively with the percentage of correct algorithm actions taken during IHCA cases. The study reported that the reverse was also true: incorrect actions or failure to perform suggested algorithm actions were associated with decreased ROSC ($p < 0.01$). The researchers concluded that adherence to ACLS protocols throughout an IHCA event was associated with increased rates of ROSC (McEvoy et al.).
A study by Henderson and Ballesteros (2001) focused on the impact of a change in resuscitation team structure on patient outcomes and quality of care in a level-one trauma center. The original resuscitation team was very informal in nature and was assembled using the patient’s primary physician, along with nurses from the unit where the emergency had occurred. The resuscitation team was revised to include emergency physicians and ICU nurses as dedicated responders to cardiopulmonary emergencies. A chart review was conducted on all patients involved in a cardiopulmonary emergency event in the year before and directly after the implementation of the formal resuscitation team. A total of 220 events were reviewed by researchers. However, because of deficiencies in record keeping by the resuscitation team, available data were limited; only 180 of the events contained information about initial rhythms and 152 contained information on return of spontaneous circulation (ROSC) (Henderson & Ballesteros).

Results reported a statistically significant increase from of 59% ($p = 0.0003$) in the rate of ROSC for patients with perfusing rhythms like bradycardia during the time period following the implementation of the formal resuscitation team (Henderson & Ballesteros, 2001). Patients exhibiting pulseless electrical activity and asystole arrhythmias also had better survival rates as evidenced by a 30% increase ($p = 0.013$) during the same time period. However, results illustrated that the rates in ROSC were statistically insignificant in patients with VF and VT arrhythmias before and after the implementation of the revised code team ($p = 1.00$). The researchers concluded that patient outcomes were positively associated with the implementation of a dedicated and formal
resuscitation team. Improvements in documentation were also found in relation to the formalized team as evidenced by an increase in the number of events that were recorded (Henderson & Ballesteros).

Hunziker et al. (2009) aimed to determine the impact of the team building process during cardiopulmonary emergencies on the team’s adherence to resuscitation guidelines. This study compared teams that were coordinated using an ad hoc process to preformed teams. One hundred teams participated in two different simulated cardiac arrest scenarios; 50 teams consisted of three general physicians each and 50 teams were comprised of hospital physicians. Teams were randomly assigned to participate in one of two scenarios. The cardiac arrests in the first scenario took place with only one physician present and required that the other two physicians be summoned to the event and undergo an ad hoc team building process. The second scenario allowed for preformed team building as the arrest occurred and while all three physician participants were present. The videotaped scenarios were reviewed by two independent reviewers (Hunziker et al.).

Results demonstrated that ad hoc teams performed worse compared to preformed teams, as demonstrated by less hands-on time during CPR, delayed times to defibrillation, and fewer communication statements by leaders ($p < 0.000$) in all three areas) (Hunziker et al., 2009). The researchers concluded that the use of ad hoc team building and failures in leadership negatively affect time to defibrillation and hands-on time during CPR. Because the preformed teams were assimilated shortly before the
cardiac arrest, further research may indicate the impact of preformed teams that have been associated in a group for greater lengths of time (Hunziker et al.).

Role clarity is a necessary component of team coordination. Poor clarity of role assignment is a factor that presents barriers during the coordination and organization of resuscitation teams (Villamaria et al., 2008). Failure to properly distribute tasks is one reason why teams can become distracted from their current tasks and shift their focus to secondary activities such as defibrillator operation, thus unnecessarily interrupting CPR (Tschan, Vetterli, Semmer, Hunziker, & Marsch, 2011). A study by Marsch et al. (2004) investigated 16 cardiac arrest team’s responses to a simulated scenario of VF. Successful resuscitation team performance was reached if the team performed two defibrillated shocks within the first two minutes after the witnessed arrest. If the team failed to deliver two initial shocks but had started CPR within sixty seconds of the arrest and continued without interruption, they were given an additional five minutes to deliver the two shocks in order to be rated as having had a successful team performance. Results found that two-thirds of the resuscitation teams were unsuccessful by failing to deliver CPR and defibrillation. Unsuccessful teams demonstrated significantly less task distribution ($p = 0.035$) and leadership ($p = 0.033$) when compared to successful teams. The researchers concluded that poor resuscitation team performance was associated with the absence of leadership and failures to distribute tasks to team members (Marsch et al.).
The literature review provided information on the current knowledge base about cardiopulmonary emergency teams. Cardiopulmonary emergencies are unplanned events resulting in the need for immediate intervention by resuscitation teams. A consensus in the research is that training needs to shift from an individual to a team-centered focus in order to improve team performance and thus outcomes. The presence of skilled leadership in resuscitation teams was associated with higher quality performances by teams, increased survival rates, and greater adherence to ACLS protocols. Poor communication is described in the literature as a factor contributing to errors during resuscitation events. However, the research demonstrates the necessity of high quality communication as an important aspect of the team-building process.

Decreased survival rate of patients experiencing IHCA is associated with errors pertaining to coordination. The importance of coordination throughout the literature reinforces the need for task distribution, adherence to algorithms, and clarity of roles. However, gaps exist in the research pertaining to the specific structuring of resuscitation teams. The literature studying task distribution among resuscitation team roles is also limited. Although the study by Henderson and Ballesteros (2001) gives insight into the positive impact of a formalized resuscitation team on patient survival of certain groups of patients, further research is needed to examine the effects of pre-assigned roles and explicitly defined responsibilities on patient outcomes.
CHAPTER III

Research Methodology

A quantitative design was chosen to investigate the impact of pre-assigned roles and clearly defined responsibilities of resuscitation team response to cardiopulmonary emergencies on patient outcomes. More specifically, the method chosen for this study was a quasi-experimental design. Grove, Burns, and Gray (2013) state that a quasi-experimental study aims to “… test the effectiveness of nursing interventions that can then be implemented to improve patient and family outcomes in nursing practice” (p. 32). This methodology fits the study well because it compares the outcomes of a sample of patients who experienced a cardiopulmonary emergency in order to evaluate a change made in a hospital’s CERP.

Setting/Population/Sample

The setting in which the study took place is a rural hospital with a total bed capacity of approximately 150. Non-probability sampling was employed in order to identify a specific sample of patients among the population. The population consisted of all patients who experienced a cardiopulmonary emergency during 2009-2012. The sample only included patients who experienced an initial arrhythmia of VF or VT. Non-probability sampling was used to compare similar patient arrest cases; both VF and VT
are similar because they both require defibrillation as an initial treatment intervention. All other arrhythmias were excluded from the study.

Inclusion criteria for the sample consisted of two requirements: an initial arrhythmia of VF or VT, and the patient’s location during the start of the event must have been in the ED or any inpatient unit/department. Cardiopulmonary emergencies that began in the field were excluded from the study, due to the different response policies used in settings outside the hospital. Any records containing documentation indicating that resuscitation efforts were stopped due to the patient’s documented wishes against resuscitation, or decisions by a patient’s legal representative for cessation of resuscitation efforts, were excluded from the study.

Access to the population was obtained by reviewing the paper code blue record of all patients who had a cardiopulmonary emergency from 2009-2012. Further review of each code blue record allowed for access to the sample, or those patients having VF or VT within the hospital or ED. The only demographic data collected was the location in which the cardiopulmonary event occurred. No other identifying demographic data was collected because it was irrelevant to the study purpose and served to protect the confidentiality of the patient’s protected health information.

Ethical Considerations

This study had minimal ethical considerations because it didn’t involve the active participation of human subjects; thus no participant consent was needed.
However, because patient records were reviewed by the researcher, prior authorization was obtained to access patient’s protected health information (PHI) under the Health Insurance Portability and Accountability Act (HIPAA) of 2003 (National Institutes of Health [NIH], 2004). According to Grove et al. (2013), the HIPAA privacy law protects the privacy of individuals’ health information by describing how and under which circumstances health care agencies can use and disclose a patient’s PHI.

Typically, the HIPAA privacy law requires a health agency to get an individual’s authorization in order to release his or her PHI to a researcher (Grove et al., 2013); unfortunately, authorization from patients for this study is impossible because some of the patients were deceased. However, an exception in the law allows a health care agency to disclose a patient’s PHI for research purposes without obtaining authorization from the patient if the Institutional Review Board (IRB) or privacy board waives the need for authorization based on the following three criteria: a) there is no more than minimal risk to the privacy of the patient pertaining to the use or disclosure of PHI, b) the research could not reasonably take place without the waiver of authorization, and c) the research could not reasonably take place without disclosure and use of the PHI (NIH, 2004). The health care agency also has the responsibility to limit the researcher’s access to only the components of the PHI that are minimally necessary to conduct the study. Authorization is commonly waived in research involving retrospective chart review (NIH).
The researcher presented the study and the plan to protect the privacy of PHI to the hospital’s IRB in November 2013. The board authorized the research under the following six conditions: a) only patient records containing a code blue record between 2009-2012 would be accessed; b) no patient names, initials, birthdates, or medical record numbers would be used in the transcription process of patient data, instead the record would be identified by a number to organize data; c) the researcher would not be allowed to make any photocopies of patient records; d) all photocopies made by medical records staff, for viewing by the researcher, would be viewed only in the medical records department and returned to staff for proper disposal prior to the researcher leaving the department; e) only information pertaining to the code blue event could be viewed by the researcher, such as rhythm strips, code blue records, discharge summaries, and/or notes by a physician or nurse describing the code blue event; and f) the researcher’s access to electronic charts would be audited by a hospital representative to ensure there was no inappropriate information viewed that didn’t pertain to a code blue event.

The study also required the approval of The Human Subjects in Research Committee (HSRC) at California State University, Chico. The HSRC considers a study reviewing records as an exemption from full review by the board. Instead of full review, an exempt application was submitted for final approval under the following category: “Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that make identification
of the subjects impossible” (California State University Chico, n.d., p. 1). The approval to begin research was granted on April 11, 2014.

Data Collection Method

The data collection method that was employed in this study is retrospective because the data already existed in patient records. The researcher was the only person who collected data in the study. All data were retrieved by reviewing paper code blue records and electronic charts. The primary source of data collection was the paper code blue record. During a cardiopulmonary emergency event, the recorder documents details on the paper code blue record including location of the arrest, initial arrhythmia, and survival at the end of the code. By reviewing the paper code blue records, the researcher was able to identify the records that met the inclusion criteria. However, because the researcher reviewed the bottom carbon copy of the code blue record, some documentation was difficult to read. In this case, the researcher viewed the original code blue record stored in the medical records department. When information was missing on the paper code blue record due to poor documentation, the researcher used the electronic chart as an alternative in accessing missing information on arrhythmias, locations, and survival. By accessing the patient’s electronic chart, the researcher was able to view rhythm strips, original code blue record forms, discharge summaries, and/or notes by a physician or nurse describing the code blue event. An excel spreadsheet from the Microsoft Office suite (2010) was used to organize the data.
Data Collection Procedure

The procedure to collect data occurred in three phases.

Phase 1

1. All paper code blue records 2009-2012 were collected from the director of the code blue process improvement committee.

2. The researcher placed them in numerical order from earliest to latest event date.

Phase 2

1. Using the paper code blue record, the year and location of each event were transcribed on the Excel sheet for each record as “ED,” “other” (all other units/departments), or “field.” The total population (number of cardiopulmonary emergencies in the rural hospital) was reached by combining all ED with other locations; events that began in the field were excluded from the total.

2. For all records containing “ED” and “other” as the location, the initial arrhythmia was recorded. Arrhythmias were transcribed as “VF,” “VT,” or “other.” The total sample (number of VF or VT arrhythmias in the rural hospital) was reached by combining all VF with VT arrhythmias together; any other arrhythmias were excluded from the total.

3. For VF and VT records, the survival at the end of the cardiopulmonary emergency was recorded. Survival was transcribed as “alive” or “expired.”

4. Only the records meeting sample criteria had data recorded about arrhythmia and survival; the researcher then assigned a number to each record.
Phase 3

1. The electronic records of patients were then accessed in the event that any data were unable to be obtained using the paper code blue record. The researcher only accessed information that was event-related to try to fill in the existing gaps in the data.

2. Finally, the electronic records of patients who were alive at the end of the cardiopulmonary emergency were then accessed to determine if they were alive or expired at discharge.

The researcher has worked as a registered nurse in the hospital and has five years of experience with the electronic chart and nine years of experience working with the paper code blue record form. The researcher met with the electronic chart educator in the hospital for additional education about where in the electronic chart documentation code blue events could be identified. These collective experiences helped the researcher better navigate through the patient’s electronic chart in order to ascertain the necessary data used in the study.

Data Analysis and Statistical Procedures

The researcher consulted with a mathematics professor in order to plan the analysis and statistical procedures for the study. Data analysis began after data were collected by the researcher and transcribed from an excel spreadsheet into contingency tables. The researcher sought the consultation of the same mathematics professor and a bachelor-prepared mathematics student to assist with data analysis using a Fischer’s
exact test. This method was used to calculate an exact $p$ value for patient survival outcomes based on the location of the cardiopulmonary emergency and the time period in which the emergency occurred (either before or after a change in CERP). The $p$ value was used to determine if the survival of patients was statistically significant, based on their location and the time period in which the cardiopulmonary emergency occurred.

Reliability

There was no need for inter-rater reliability because the data were viewed and collected by the researcher only. Because VF and VT arrhythmias occurred less often than other arrhythmias, the sample size in this study was small. As recommended by the mathematics professor, the Fischer’s exact test was the most appropriate statistical procedure due to the small sample size obtained during data collection. In order to increase the reliability of identifying the true sample size, the researcher used the electronic chart to identify the arrhythmias in the event that they were not documented on the paper code blue record.

Transitional Statements

This quasi-experimental research study was designed to evaluate the impact of a change in CERP on patient survival in a rural hospital. Data collection took place over a four-day period after the researcher was granted approval by the HSRC at California State University, Chico. As expected, the research study was exempt from full board review. Collection of data was performed in the manner that was approved by the
hospital’s IRB in order to protect patients’ right to privacy and confidentiality of their health information. After the researcher organized the data, a mathematics professor and bachelor-prepared mathematics student assisted the researcher with data analysis. By using a Fisher’s exact test, the researcher examined the impact of a change in CERP on patient outcomes.
CHAPTER IV

FINDINGS

The purpose of this study was to investigate the impact of pre-assigned roles and clearly defined responsibilities of a resuscitation team’s response to cardiopulmonary emergencies on patient outcomes in a rural California hospital. The study compared the outcomes of patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before and after a change in the hospital’s CERP. Five research questions were investigated. Analyses of the data were performed using a Fischer’s exact test online calculator that computed the $p$ values for each research question. The Fischer’s exact test, more specifically a two-tailed method, utilized nonparametric statistics to analyze the data. This method is used to obtain the exact probability of whether two groups are different with respect to the proportion of subjects (Daniel, 1978). The Fischer’s exact test was chosen because it most appropriate when used in research studies with small sample sizes (Daniel). Both the $p$ values and data analysis were verified for accuracy by a mathematics professor, who is also a specialist in statistics, who has been a consistent consultant during the study.
Population/Sample

The population consisted of all patients who experienced a cardiopulmonary emergency during 2009-2012 in the rural California hospital. There were a total of 268 cardiopulmonary emergency events that occurred either in the field, ED, or an inpatient setting. There were 249 cardiopulmonary emergency events excluded from the study because they began in the field. The sample only included ED and inpatients that experienced an initial arrhythmia of VF or VT from 2009-2012. There were eight patients that met sample criteria from 2009-2010 (ED=2, Inpatient=6), and 11 from 2011-2012 (ED=7, Inpatient=4). All 19 patient records were included in the study because the researcher found no documentation that resuscitation efforts were stopped due to the patient’s documented wishes against resuscitation, or decisions by a patient’s legal representative for cessation of resuscitation.

Results

Research Question 1

What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for inpatients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared to inpatients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

No statistically significant difference exists in regards to patient outcomes between the proportions of inpatients with an initial arrhythmia of VT or VF during a
cardiopulmonary emergency before a change in CERP (2009-2010), compared with inpatients after a change in CERP (2011-2012), because none of the patients expired. A larger sample size is necessary to determine statistical significance (Table 1).

Table 1

Research Question 1: Patient Survival at the End of the Cardiopulmonary Emergency

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient/2009-2010</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Inpatient/2011-2012</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = 1

There is no statistical significant difference in patient outcomes between the proportions of inpatients with an initial arrhythmia of VT or VF at discharge before a change in CERP (2009-2010), compared with inpatients after a change in CERP (2011-2012), based on the sample obtained. However, there is not enough evidence to reject statistical significance between the two proportions at this time. A larger sample size is necessary to determine statistical significance (Table 2).

Research Question 2

What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF
Table 2

*Research Question 1: Patient Survival at Discharge*

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient/2009-2010</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Inpatient/2011-2012</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = .47

during a cardiopulmonary emergency before a change in CERP (2009-2010) compared to ED patients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

There is no statistical significant difference in patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010) compared with ED patients after a change in CERP (2011-2012) based on the sample size. However, there is not enough evidence to reject statistical significance between the two proportions at this time. A larger sample size is necessary to determine statistical significance (Table 3).

There is no statistical significant difference in patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF at discharge before a change in CERP (2009-2010), compared with ED patients after a change in CERP (2011-2012) based on the sample size. However, there is not enough evidence to reject statistical significance between the two proportions at this time. A larger sample size is necessary to determine statistical significance (Table 4).
Table 3

*Research Question 2: Patient Survival at the End of the Cardiopulmonary Emergency*

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency department/2009-2010</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Emergency department/2011-2012</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

*p = 1

*Research Question 3*

What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF?

Table 4

*Research Question 2: Patient Survival at Discharge*

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency department/2009-2010</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Emergency department/2011-2012</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

*p = 1
during a cardiopulmonary emergency before a change in CERP (2009-2010) compared to inpatients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

No statistically significant difference exists in regards to patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared with inpatients after a change in CERP (2011-2012), because none of the patients expired. A larger sample size is necessary to determine statistical significance (Table 5).

Table 5

Research Question 3: Patient Survival at the End of the Cardiopulmonary Emergency

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
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</thead>
<tbody>
<tr>
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<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Inpatient/2011-2012</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = 1

No statistically significant difference exists in regards to patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF at discharge before a change in CERP (2009-2010), compared with inpatients after a change in CERP (2011-2012), because none of the patients expired. A larger sample size is necessary to determine statistical significance (Table 6).
Table 6

**Research Question 3: Patient Survival at Discharge**

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Inpatient/2011-2012</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*\( p = 1 \)

**Research Question 4**

What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010) compared to inpatients with an initial arrhythmia of VT or VF before a change in CERP (2009-2010)?

No statistically significant difference exists in regards to patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency before a change in CERP (2009-2010), compared with inpatients before a change in CERP (2009-2010), because none of the patients expired. A larger sample size is necessary to determine statistical significance (Table 7).

There is no statistical significant difference in patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF at discharge before a change in CERP (2009-2010), compared with inpatients before a change in CERP (2009-2010), based on the sample size. However, there is not enough evidence to reject
Table 7

Research Question 4: Patient Survival at the End of the Cardiopulmonary Emergency

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
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<tbody>
<tr>
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<td>0</td>
</tr>
<tr>
<td>Inpatient/2009-2010</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = 1

statistical significance between the two proportions at this time. A larger sample size is necessary to determine statistical significance (Table 8).

Table 8

Research Question 4: Patient Survival at Discharge

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
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</tr>
<tr>
<td>Inpatient/2009-2010</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

*p = 1

Research Question 5

What is the impact on patient outcomes at the end of a cardiopulmonary emergency event and at discharge for ED patients with an initial arrhythmia of VT or VF
during a cardiopulmonary emergency after a change in CERP (2011-2012), compared to inpatients with an initial arrhythmia of VT or VF after a change in CERP (2011-2012)?

There is no statistical significant difference in patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF during a cardiopulmonary emergency after a change in CERP (2011-2012), compared with inpatients after a change in CERP (2011-2012), based on the sample size. However, there is not enough evidence to reject statistical significance between the two proportions at this time. A larger sample size is necessary to determine statistical significance (Table 9).

Table 9

Research Question 5: Patient Survival at the End of the Cardiopulmonary Emergency

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Inpatient/2011-2012</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = 1

There is no statistical significant difference in patient outcomes between the proportions of ED patients with an initial arrhythmia of VT or VF at discharge after a change in CERP (2011-2012), compared with inpatients after a change in CERP (2011-2012), based on the sample size. However, there is not enough evidence to reject
statistical significance between the two proportions at this time. A larger sample size is necessary to determine statistical significance (Table 10).

Table 10

Research Question 5: Patient Survival at Discharge

<table>
<thead>
<tr>
<th>Location of patient/CERP</th>
<th>Alive*</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency department/2011-2012</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Inpatient/2011-2012</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = 1

Researcher Observational Findings

The first observational finding was 84.2% (16) of patients who met the sample criteria, having had experienced a VT or VF arrhythmia, were on telemetry monitoring devices. The other 15.8% (3) were all patients in the ED and were not initially monitored by the telemetry devices; however, at some point in their diagnostic/treatment course, these patients were placed on telemetry monitoring devices and either a VT or VF arrhythmia was recognized. The importance of this finding will be examined in Chapter 5.

Another observed finding showed charting of the initial arrhythmia was recorded more frequently on the paper code blue record by the dedicated recorder in the two years after the change in CERP (2011-2009). In 2009-2010, the percentage of recorded
initial arrhythmias was 59.7% of the total on paper code blue record, compared to 62% of initial arrhythmias recorded for 2011-2012 cardiopulmonary emergencies. Initial arrhythmias were recorded 75% of the time for the 16 patients that were being monitored on telemetry and experienced a cardiopulmonary emergency from 2009-2012. The importance of these findings will also be examined in Chapter 5.

Transitional Statements

Data were presented for five research questions and researcher observational findings were described.
CHAPTER V

DISCUSSION

This research study sought to determine the impact of pre-assigned roles and clearly defined responsibilities of a resuscitation team’s response to cardiopulmonary emergencies on patient outcomes in a rural hospital. Data pertaining to survival at the end of cardiopulmonary emergencies and at discharge were collected for emergency department patients and inpatients with an initial arrhythmia of VT or VF. Data were then analyzed using a Fischer’s exact test to determine possible statistical significance.

Reflection of the Findings

There was no statistical significance found for any of the five research questions investigated. These results indicate that there was not a difference in patient survival before and after a change in the cardiopulmonary emergency response policy for patients with an initial arrhythmia of VT or VF. A lack of significance in the five questions that were investigated could be potentially due to the small sample size. The small sample size may have severely limited the ability to test the hypothesis that a resuscitation response using pre-assigned roles and responsibilities is associated with an increased survival of the patients exhibiting VT and VF. The small sample size is further examined in “Limitations of the Study.” However, in reflecting upon the findings of this
study, it is essential to acknowledge the inherent flaws found in the design in order to better understand the insignificant findings. The flaws of the study design are presented and compared with similar studies and their findings.

The first flaw in this study’s design restricted the number of research variables and only included VT and VF arrhythmias. Differences in survival of the remaining arrhythmias may have been present but were not investigated. A similar study by Henderson and Ballesteros (2001) did not limit the research variables investigated. Instead, it investigated all arrhythmia outcomes in order to assess the implementation of a formal resuscitation team on the rate of return of ROSC. Analysis of results showed an association between the implementation of the formal resuscitation team with an increase of ROSC for patients exhibiting all arrhythmias except VT and VF. Rates of ROSC for VT and VF in the study were found to be statistically insignificant ($p = 1$). The authors suspected the insignificant finding was a result of the formal team’s central location in the ED. By responding from the ED, it may have caused delays in defibrillation to patients suffering from VT and VF (Henderson & Ballesteros).

A second flaw in the study design is it was under-powered. The power of a study is described as the likelihood that the statistical procedure will identify an effect size, or difference, between two proportions (Grove et al., 2013). Although a power analysis for this study was not performed, it would have been helpful in determining the appropriate sample size needed for the study to detect a small effect size of patient outcomes (Grove et al.). In other words, if the effect size or the degree of differences in
patient survival were small, the study would require a large sample to detect these small differences in relationships.

A third flaw in the study design was the inclusion of all forms of VT in the sample, even when defibrillation may have not been indicated. Certain forms of VT that produce a pulse may not require defibrillation as an initial treatment. This flaw was not recognized by the researcher during the planning of the methodology. Similarly, this error has been overlooked in other research studies. Three earlier studies that found associations between delayed defibrillation and decreased patient survival failed to exclude cardiac arrest cases that didn’t require defibrillation (Fredriksson, Aune, Thoren, & Herlitz, 2006; Hajbaghery, Mousavi, & Akbari, 2005; Skrifvars et al., 2003).

Reflection of the Researcher
Observational Findings

The first researcher-observed finding identified 16 out of the 19 patients in the sample who were being monitored by telemetry when the cardiopulmonary emergency occurred; 15 of these 16 patients (93.7%) survived the cardiopulmonary emergency. Further, survival at discharge occurred in 13 of the 15 patients (86.6%). Earlier recognition of fatal cardiac arrhythmias by telemetry monitoring devices, and consequently earlier interventions, may help to explain the high rates of survival in the case of VF and VT in this sample. This finding can be linked to a previous study by Herlitz et al. (2005). These researchers found that patients in units with monitoring were identified to be in VT or VF 57% of the time, compared to only 45% of the time for patients not being
monitored. The majority of patients on monitored units (90%) received defibrillation within three minutes, compared to patients on non-monitored units (54%) (Herlitz et al.).

The second observational finding by the researcher determined charting of the initial arrhythmia was recorded more frequently on the paper code blue record by the dedicated recorder in the two years after the change in CERP (2011-2009). Although small, any increase in data recorded on the code blue record is important in being able to accurately retell the details of the event. Completeness of charting is also important to future research investigating cardiopulmonary emergencies in the hospital. The researcher suspects the increase in documentation of the initial arrhythmias can be explained by having a pre-assigned documentation recorder who is solely dedicated to the task of documentation and had received extra training on correct documentation. It should also be noted the percent of documented initial arrhythmias for monitored patients was higher than the overall percent for all cardiopulmonary emergencies before and after a change in CERP. The researcher suspects that the higher percentage of documented initial arrhythmias for monitored patients was likely due to recorders having access to information recorded by the telemetry monitoring devices. These devices electronically record arrhythmias while the patient is being monitored, thus providing helpful arrhythmia information that can be recalled at a later time.
Limitations of the Study

A major limitation of this study was the small sample size ($N = 19$), due to the use of only a single hospital site for data collection; the hospital was also rurally located in a small community. The sample size was further limited due to VF and VT occurring less frequently in code blue records than other arrhythmias.

The researcher did not exclude patients from the sample who survived the cardiopulmonary emergency event but may have expired prior to discharge, based on decisions by the patient’s legal representative to not sustain medical treatment due to poor quality-of-life concerns. Details surrounding these patients’ deaths were not investigated and, therefore, the overall survival-to-discharge numbers may have been affected.

Lastly, there was no control over the implementation in the change in CERP during 2011-2012. Initial education was given to each department during staff meetings prior to the start of the change in CERP, but no education has been provided since that time. Newly hired employees from 2011 forward have not received additional education on the roles, besides what is written in the policy itself. It is also unknown to what degree the change in CERP was followed by resuscitation team staff.

Implications for Nursing Practice

Resuscitation teams will continue to respond to cardiopulmonary emergency events throughout acute care settings in order to intervene when patient safety is
compromised. Although there were not statistically significant results found in this study, the current literature suggests several important practice recommendations for resuscitation teams. The practice recommendations discussed below pertain to leadership, coordination, and adherence to ACLS guidelines, each of which is associated with increases in patient survival. The connection between current literature and the revision of the CERP is discussed.

Leadership is imperative in managing the complexities surrounding the many tasks required during cardiopulmonary emergencies (Castelao et al., 2011). Resuscitation teams were found to perform more efficiently when their leaders displayed high quality leadership skills such as the ability to focus on the holistic situation and refrain from tasks related to patient care (Cooper & Wakelam, 1999). An important implication for practice should include high quality leadership. Greater efficiency in team performance is also associated with teams that have an easily identifiable leader (Anderson et al., 2010). There are two main concepts associated with poor resuscitation team performance that should be avoided in practice: delays in identifying the team leader (Ornato et al., 2012), and absence of leadership (Marsch et al., 2004). Given this literature, recruiting and maintaining leaders possessing high quality leadership skills that direct resuscitation teams should be a focus in acute care settings.

Practice recommendations surrounding the coordination of resuscitation teams and adherence to ACLS guidelines are important in the delivery of timely defibrillation and thus increase patient survival. Current research suggests that an inadequate
number of responders and defibrillators not being immediately available can lead to defibrillation delays (Ornato et al., 2012). Assuring that acute care settings have an adequate number of responders and defibrillators that can be quickly accessed is essential to the needs of a resuscitation team in providing timely defibrillation. Pre-formed teams are also associated with greater adherence to ACLS guidelines (Hunziker et al., 2009), which, in turn, correlates with increased rates of spontaneous circulation (Mcevoy et al., 2013). Focusing on interventions that increase coordination of resuscitation teams is valuable to nursing practice because it has potential to increase patient survival.

The revisions made to the CERP organized the resuscitation team prior to a cardiopulmonary emergency by pre-assigning roles and clearly defining responsibilities. The goal of the revised policy was to help the team provide earlier treatment to patients. Tuckman’s (1965) conceptual model of group development appropriately explains that, by using a policy, groups can progress through developmental stages at a faster rate. The CERP establishes a plan for responders prior to a cardiopulmonary emergency so team coordination doesn’t interfere with vital initial treatment interventions to the patient. Many of the practice recommendations related to leadership, coordination, and adherence to ACLS guidelines are encompassed in the CERP. The current literature suggests that these practices are associated with increased patient survival.
Implications for Nursing Research

Implications for future research should include the investigation of different resuscitation team structures on patient survival of in-house cardiac arrest cases. The guiding framework for this study, Tuckman’s (1965) group developmental model, indicates the need for policies that clarify the roles and task expectations of short-lived teams, thus helping them to advance to the final stages of problem solution at a faster rate. Norris and Lockey (2012) emphasize that localized policies must be appropriate for the hospital’s resuscitation team needs in order to reduce the risk of resuscitation team errors. However, nursing research is lacking in regards to the impact of individualized resuscitation policies on patient outcomes.

Future research related to this study should include a quantitative design with adequate power, sample size, and calculated effect size for the outcome variables. Expanding the research variables studied, performing a power analysis, and avoiding confounding variables are all important in addressing flaws in the design of the study. Further research is needed to examine the effects of pre-assigned roles and explicitly defined responsibilities on patient outcomes.

This study did not examine the length of time to defibrillation for patients experiencing a cardiopulmonary emergency in the facility. A previous study indicated pre-formed teams are advantageous because they are associated with less delay in delivery of defibrillation (Hunziker et al., 2009). Further research is necessary to determine the impact of pre-assigned roles and clearly defined responsibilities in resuscitation
teams on the time to defibrillation. Shorter times to defibrillation have also been found for patients on monitored telemetry units (Herlitz et al., 2005). The potential of using telemetry monitoring devices to monitor greater numbers of patients and the impact on patient survival of in-house cardiac arrest should also be investigated. Further research will help determine recommendations for the use of routine telemetry monitoring devices in the acute care setting.

Another suggested topic for research would be to examine the experiences and perceptions of the nurses involved in resuscitation in the facility. Although several nurses at the rural hospital have told the researcher that they liked the new policy, a formal evaluation of changes has not occurred. A qualitative descriptive study analyzing nurses’ experiences and perceptions would help illuminate other aspects of the resuscitation intervention that were not captured by the application of quantitative research methods.

Implications for Nursing Education

Current literature provides important implications for resuscitation team education for nursing students, nursing staff, and other members of resuscitation teams. There is a general consensus in the literature that resuscitation training should focus on teamwork and not individual skills (Castelao et al., 2011; Edwards & Siassakos, 2012; Fernandez et al., 2011). Leadership is an important aspect of teamwork and has been associated with timely defibrillation delivery (Coady, 1999; Hunziker et al., 2009; Yeung
et al., 2012). Given this knowledge, leaders (often physicians) and other members of the resuscitation team should participate in teamwork-related education opportunities.

Simulation provides an appropriate venue for learning related to students’ communication during a cardiopulmonary emergency scenario (Husebo et al., 2011). Simulation should be used as a means to train and educate nurses and nursing students. Simulation training that focused on nurses’ responses during initial minutes of a cardiopulmonary emergency was associated with improved resuscitation performance and confidence (Delac et al. 2013). Training nursing students and nursing staff on the appropriate interventions in the initial minutes of a cardiopulmonary emergency will help provide treatment to patients that is critical for their survival.

Conclusion and Recommendation

There was not a statistical difference found in any of the five research questions investigated. This study was unable to determine the impact of pre-assigned roles and clearly defined responsibilities of a resuscitation team’s response to cardiopulmonary emergencies on patient outcomes. Careful preparation of the study design, including a research team composed of an experienced researcher, an interdisciplinary mix of team members, and a biostatistician, would be useful in future studies of this topic.
REFERENCES


Hunziker, S., Franziska, T., Summer, N.K., Zobrist, R. Spychiger, M., Breuer, ... Marsch, S.C. (2009). Hands-on time during cardiopulmonary
resuscitation is affected by the process of teambuilding: A prospective randomized simulator-based trial. BMC Emergency Medicine, 9(3), 1-10. doi:10.1186/1471-227X-9-3


# CARDIOPULMONARY EMERGENCY RESPONSE POLICY

<table>
<thead>
<tr>
<th>Resuscitation Team/member role</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| **First responder on scene/CPR compression** | 1. Call for help to initiate resuscitation team response  
2. Begin CPR per AHA current guidelines  
3. Switch to two man CPR once RT arrives to provide ventilation  
4. Switch compressors every 2 minutes |
| **Respiratory therapist/CPR ventilation** | 1. Responsible for airway management and ventilating patient as needed  
2. Assists ED physician with intubation as needed  
3. Obtains arterial blood gas levels |
| **Nurse from department where code occurs/helper** | 1. Assists with CPR as needed  
2. Brings crash cart to patient bedside, attaches the electrodes to the patient, and turns on the monitor  
3. Sets up suction equipment  
4. Takes patient vital signs every 5 minutes  
5. Assists with nursing interventions when asked by other team members |
| **Emergency department physician/team leader** | 1. Directs/leads interventions during the event following AHA guidelines  
2. Provides report to patient’s primary physician  
3. Performs intubation as needed |
| **Intensive care unit nurse/team coordinator** | 1. Directs/leads event until ED physician arrives  
2. Follows AHA guidelines to assist physician in appropriate management of medications and treatments  
3. Assists in the coordination of team activities |
<table>
<thead>
<tr>
<th>Resuscitation Team/member role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4. Does not perform tasks instead monitors event, staff interactions, patient response/status</td>
</tr>
<tr>
<td>Definitive care unit nurse/medication nurse</td>
<td>1. Establish and maintain intravenous access 2. Administers medications and defibrillation</td>
</tr>
<tr>
<td>Float nurse/medication nurse</td>
<td>1. Establish and maintain intravenous access 2. Administers medications and defibrillation</td>
</tr>
<tr>
<td>Medical unit or surgical unit nurse/recorder</td>
<td>1. Accurately records all interventions, medications, procedures and personal present</td>
</tr>
<tr>
<td>Primary nurse of the patient</td>
<td>1. Remain on scene and available to give history of the patient to the resuscitation team</td>
</tr>
<tr>
<td>Nursing supervisor/no role on resuscitation team</td>
<td>1. Report to ICU in order to cover ICU nurse’s patient during the event 2. Coordinate the staffing needs of the affected units 3. Facilitate the transfer of the patient to a higher level of care if needed</td>
</tr>
<tr>
<td>Admit/discharge nurse/no role on resuscitation team</td>
<td>1. Report to DCU to cover the DCU nurses patient during the event</td>
</tr>
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