

4-2019

## Addressing Disparities in Nurses' Understanding of Congestive Heart Failure

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DOI: <https://doi.org/10.31979/etd.rzjj-8gh3>

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**Addressing Disparities in Nurses' Understanding of Congestive Heart  
Failure**

by  
David Tomas Palecek  
April 26, 2019

## ABSTRACT

### PROJECT TITLE: ADDRESSING DISCREPENCIES IN NURSES' UNDERSTANDING OF CONGESTIVE HEART FAILURE

Congestive heart failure (CHF) continues to affect millions of people a year and remains one of the leading causes of re-hospitalization in the US. Within the Central San Joaquin Valley (CSJV) the incidence of CHF remains significantly higher than the rest of California. In order to ensure appropriate patient care and outcomes registered nurses (RNs) must have a thorough and full understanding of the disease process and its associated symptomatology. This study aimed to find if the implementation of an interactive multimedia educational program focusing on all aspects of CHF could improve RNs education and understanding of CHF. It is crucial that RNs taking care of patients at the bedside are comfortable in both identifying and treating as well as performing patient education on CHF. The study aimed at finding if an interactive multimedia educational program focusing on the application of didactic material in an interactive case study could effectively improve RN understanding of CHF. If effective RNs caring for patients with CHF will be able to better provide patient care and education resulting in improved patient outcomes, self-care, and quality of life.

David Palecek

April, 2019



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Failure**

by  
David Tomas Palecek

A project  
submitted in partial  
fulfillment of the requirements for the degree of  
Doctor of Nursing Practice  
California State University, Northern Consortium  
Doctor of Nursing Practice  
April 26, 2019

APPROVED

For the California State University, Northern Consortium  
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## ACKNOWLEDGMENTS

I would like to thank my chair Dr. Susan McNiesh, committee members Dr. Stu Glassner and Dawn Jones and my family for all of their support and encouragement.

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## CHAPTER 1: INTRODUCTION

Congestive heart failure (CHF) affects over 5.8 million people in the United States alone and is the leading cause of 30-day hospital re-admissions in the US. In excess of 39.2 billion dollars a year is spent on providing care and educating patients with CHF (Go et al. 2013). The California Health Care Safety Net Institute (SNI) through the California Healthcare Foundation (CHCF) created a pilot project, the Lean Core Measure Improvement project (LEAN) to improve the overall efficiency and quality of care. Specifically, the goal was to improve the efficiency and quality of care by following the guidelines set by the Centers for Medicare and Medicare Services (CMS) to improve the National Hospital Quality Measures (NHQM) 30-day re-admission rates by decreasing 30-day re-admission rates of patients with CHF. Ideally the utilization of LEAN would improve the overall care and coverage of CHF core measures in primary care areas (Wu, Liu, & Belson, 2013). The LEAN process creates a comprehensive CHF process of care for organizations to implement changes to improve care for patients with CHF in the inpatient setting. Programs such as LEAN demonstrate the importance of appropriate CHF care and education. Nurses' ability to provide appropriate patient care and education is enhanced when they complete a topic specific education and training program. Nurse education and understanding of CHF can be improved by the creation and implementation of an educational program, which will serve as both an educational tool and resource to improve nurses' understanding of CHF. Nurses' early identification and understanding of treatment and CHF symptomology can aid in improvement of efficiency and quality of care. With an increased understanding of CHF nurses will be able to better

provide patient care and education resulting in improved patient outcomes, self-care, and quality of life for patients diagnosed with CHF.

According to Center for Disease Control and Prevention (CDC) cardiovascular disease costs are estimated to reach \$37,489,426,828 a year in California with an estimated cost of \$808,862,366 in Fresno County alone (Brown, Gonzalez & Sandhu, 2015). The heightened prevalence of CHF within the Central San Joaquin Valley (CSJV) makes it a pertinent issue, which needs to be addressed at not just a state level but a local level as well. Local hospitals and clinics face many challenges when educating and providing direct care to patients diagnosed with CHF. Prevention Quality Indicators (PQI) completed for CHF related hospitalizations in California found a 225.59 cases per 100,000 residents vs. 307.43 cases per 100,00 residents in the CSJV (Bengiamin, Capitman, & Nyandoro, 2011). These statistics demonstrate a 35% higher incidence of CHF in the CSJV in relation to the rest of California.

Local hospitals and clinics face many challenges when educating and providing care for patients diagnosed with CHF. Financial burden is placed on local CSJV hospitals, as there is a high incidence of CHF re-admissions post-discharge, the high incidence is multifactorial, as there is both a higher incidence of CHF in the CSJV than the rest of California and many of local hospitals lack the resources to provide appropriate patient education. Patient outcomes and quality of life would improve greatly if adequate education and care is provided to them by nurses who have a strong didactic and skills-based training program that improves their critical thinking and disease understanding, allowing them to be better prepared, quicker at identifying issues, and educating patients with CHF.

The overall goal of the project was to create an educational program that would successfully improve nurse understanding, education, and ability to care for patients diagnosed with CHF. If the educational program proved to be successful in terms of positive outcomes, it could be used as a foundation to create similar educational programs on CHF that can be implemented in other hospitals and organizations around the state and country. Patient education and understanding of CHF is crucial. The study aimed at finding if an educational program aimed at improving nurse understanding of CHF could successfully improve nurse understanding, confidence, and ability to care for patients with CHF.

### **Theoretical Framework**

The theoretical framework, utilized throughout the investigation and exploration process of this DNP project, was Patricia Benner's novice to expert theory (Alligood, 2014). Patricia Benner's novice to expert theory is comprised of five differing levels of nurse acquisition of practice skills: novice, advanced beginner, competent, proficient, and expert. Advancement throughout these five levels is based on the nurse's personal experience in their given field of practice. According to a study by Mahramus and colleagues (2013) discrepancies in nurse education and experience may have a direct correlation with the overall ability of nurses to care for and educate patients diagnosed with CHF. Benner's novice to expert theory was utilized to frame and educational intervention and research within this project, aimed at nurses caring for patients diagnosed with CHF.

### **Theory Origination**

Patricia Benner began developing her novice to expert theory in 1979 after becoming the lead project director of a federally funded project at the University of California, San Francisco (UCSF), the Achieving Methods of Interprofessional Committee Consensus Assessment and Evaluation (AMICAE) project (Benner, 1982). The AMICAE project was aimed at improving understanding and establishment of differences in nursing practice based on nurse's clinical reasoning and experience. Benner based the project on the Dreyfus model of skill acquisition, which utilized five different levels of competency (Benner, 1982). In 1984 Benner published her findings and theory in her book titled, *From Novice to Expert Excellence and Power in Clinical Nursing Practice*.

### **Theory Concepts**

According to Benner there are five primary levels of skill acquisition nurses potentially go through in their career. The five primary levels are; novice, advanced beginner, competent, proficient, and expert (Alligood, 2014).

The first level, novice, describes nursing students. Students have little to no experience in a particular field of practice. They are just beginning to learn, for example, a nurse extern is a nursing student who is in their first couple of semesters of nursing school who begin to be exposed to a particular area of practice through a work study program giving them valuable experience and exposure. Thus, nursing students who are just beginning their nursing program are classified as novice (Altmann, 2007). Their experience is limited to the little exposure they have experienced thus far in their nursing school and beginning their clinical rotations; it can be safely assumed that they are beginning the process of acquiring skills.



The second level, advanced beginner, pertains to new graduates or nurses who may have moved to a new area of practice and have had only a few months to a year of experience (Alligood, 2014). Within this level, nurse's performance becomes marginally acceptable as they are able to understand how to perform tasks but are unable to fully grasp the reasoning behind each task that they perform. For example, a new-graduate from nursing school who has been working for six months on a particular floor and has gained basic skills such as starting peripheral lines or inserting foley catheters, however they do not grasp the full concept behind why the tasks were completed. They have a general understanding of patient care and have acquired more skills; they understand how to insert lines and perform other tasks; however, they may not fully understand the indications or contraindications for line insertion. It is important to note that even though nurses moving from one area of practice to a new area of practice are considered advanced beginners, the learning curve would be far shorter than that of new graduates within the same level.

In the third level, competent, the nurses have gained sufficient clinical experience that they are able to predict patient outcomes, and critical thinking skills begin to develop (Alligood, 2014). Care for the patient becomes more cohesive and holistic. For example, an experienced telemetry nurse is caring for a patient with CHF exacerbation, he/she is able to recognize that the patient has fluid in their lungs which will likely result in issues with their breathing. In anticipation the nurse will call the physician and discusses ordering a medication to remove excess fluid, preventing the patient from developing issues with their breathing.

In the fourth level, proficient, nurses have gained enough clinical experience and education to see the patient and situations surrounding the patient as a whole entity and not in pieces; their critical thinking skills have matured (Gardner, 2012). The nurse is capable of balancing care and education of both the patient and the patient's family members with little difficulty, taking into account the patient's history. For instance, a patient has been started on two new medications for blood pressure. The patient is started on a beta-blocker and a thiazide diuretic, and the patient has a history of 2<sup>nd</sup> degree heart block. Rather than giving the beta-blocker the nurse informs the ordering physician, since the nurse knows that the beta-blocker could potentially cause the patient to go into a life-threatening rhythm, such as 3<sup>rd</sup> degree heart block. In this way the nurse uses critical thinking skills and knowledge from clinical situations and experiences to guide modification in care to appropriately respond/address issues in patient care.

In the fifth and final level, expert, nurses have gained enough experience and education that they are able to predict situational outcomes before they occur (Altmann, 2007). Nurses who are experts are able to handle and deal with unexpected events, situations, and patient education with relative ease. They have a deep fluid understanding of each specific situation, no longer relying on "analytical" principles and tools to guide care. They are able to intuitively care for and treat each unique individual as a whole, not just system by system. The only way a nurse can become an expert is through skill acquisition from years of clinical experience and education **and** the understanding of how to care for the patients based on their individual uniqueness (Gardner, 2012). If a nurse fails to be able to care for the individual or grasp the whole picture and understand the patient's individual uniqueness, he or she tends not to reach the two highest levels of

attainment, acting more as technician than a nurse who understands the cohesiveness of each specific human system, remaining dependent on analytical principles to guide patient care.

The more experience the nurse has, the higher the level of attainment the nurse will be able to achieve (Altmann, 2007). Experience is established through attainment of a well-developed educational foundation and direct clinical experience (Altmann, 2007). Real life experiences and situations aid in creating a foundation for nurses who have attained the two highest levels of Benner's theory to draw from. Prior real-life experiences and situations foster the transition from one level to the other. In practice, patient specific case-studies and simulation can have an added value in provoking heightened critical thinking skills. Critical thinking skills which may have taken months or years to be exposed to and develop in direct patient-nurse care, improving self-confidence and overt situational specific knowledge.

Discrepancies in nurse education and experience may have a direct correlation with the ability of nurses to care for and educate patients diagnosed with congestive heart failure (CHF). Experienced nurses transitioning to a new area of practice or unit may need increased education and experience to gain both confidence and ability when caring for and providing education to patients with CHF (Gardner, 2012). In contrast, nurses who fall within the last two levels, proficient and expert, may need little education (Gardner, 2012). This is a result of an accumulation of prior clinical experiences and situations that has taught the nurse to appropriately handle many differing situations through the comparison of learned experiences. Valuable insight is provided by nurses within the last two levels as they act as direct and indirect mentors for nurses falling

within the initial three levels, as well as providing invaluable insight into the barriers they encounter when providing education and care to patients diagnosed with CHF. Thus, it is crucial that the study be administered to nurses across the continuum, from novice to expert. Nurses who have become experts can be used in the development and implementation of future educational programs to provide direct linkage to current best practice in the field and invaluable one-on-one simulation to nurses who are within the first three levels.

Utilization of Patricia Benner's novice to expert theory demonstrated the effectiveness of the implemented intervention, by demonstrating if nurses within all experience levels had an improved systematic and situational understanding of CHF after study completion.

### **Theory in Practice**

Since the development and publication of the novice to expert theory by Patricia Benner in 1984, her theory has been utilized successfully in countless nurse-based research studies and projects aiming at describing a particular phenomenon in nurse care or education. More specifically, studies based in academia at the university level and clinically in the in-patient and out-patient settings have used novice to expert theory to study nurses' skills acquisition.

Benner's theory has applications in almost all areas of nursing and can be successfully applied throughout the many organizations and entities of nursing. For example, the American Association of Critical Care Nursing (AACN) organization requires applicants to have set number of clinical hours to apply for professional certification, the applicant must have practiced/ worked 1750 hours of intensive care unit

(ICU) hours within the past two years with 875 hours minimum reflecting hours worked within the year preceding these requirements signify competency. The AACN utilizes these requirements as exemplars to guarantee applicants have mastered important concepts unique to critical care.

Other professional nurse organizations that certify RNs have similar requirements. This allows for standardization and acts as a steppingstone for nurses as they move through the three higher tiers of Benner's theory and acquire further skills. In summary, novice to expert theory has been used frequently as a framework for research involving nurses' skills acquisition both pre and post licensure as well as framing for assessment of nurses for certification and clinical ladder programs.

### **Relevance to Setting and Practice**

As nurses gain experience their skills, patient care, and critical thinking improve. The primary population of the study is RNs who provide direct patient care/education to patients with CHF in the in-patient setting. The study's population consisted of a small pool of nurses. There was no pre-screening of participants, in order to guarantee that a wide range of RN's with differing experience levels were included in the study

It is crucial to note how many years each participant had practicing nursing on the studied telemetry floor. It is possible that some of the nurses have had years of experience working on other floors, however have recently transferred to the telemetry floor, their lack of telemetry floor experience drops them in a lower level of Benner's theory than they may have been before. For example, an emergency room (ER) nurse with 10 years of experience recently transferred to the telemetry floor within the past 6 months, they now must learn and become familiar with caring for a different type of patient. According

to Benner's theory the nurses would now have to obtain/acquire skills, skills that are specific to telemetry nursing, such as being able to read specific heart arrhythmias before they became competent in their new role/area of practice. For example, at a prior time the ER nurse had to be able to recognize life-threatening arrhythmias such as ventricular tachycardia and ventricular fibrillation, however in addition now he/she will need to be able to recognize all the additional non-life-threatening rhythms as well.

According to Benner's theory nurses within the higher levels should have improved understanding of core concepts and be able to provide more specific, appropriate, and better patient care than nurses within the lower levels.

### **Relevance to DNP Project**

Patricia Benner's novice to expert theory is the most applicable theory in the chosen population as the theory was created specifically to address the development of skills and education nurses professionally. Initially behavioral, cognitive, and constructive theories were considered for use in the project's framework.

Two humanistic theories initially showed promise, however both were eventually ruled out due to lack of relevance to the chosen population. The two theories that were considered were Maslow's hierarchy of needs and self-actualization and Carl Roger's learner centered perspective. However, the largest issue with these theories was that they were both centered on teacher-student learning and not the development of an individual within an actual intra-professional setting. Both theories did a great job addressing general development and individual education, however their generality eventually rendered them unusable. Benner's theory's specificity to nursing and the nursing

profession made it the most applicable and relevant choice to create the theoretical framework of this particular research project.

## CHAPTER 2: REVIEW OF LITERATURE

The increasing incidence and overall prevalence of CHF within the United States demonstrates the need for appropriate CHF education directed at both nurses and patients. The following review of literature explores multiple studies, focusing on educator-to-nurse education and nurse-to-patient education and their respective educational programs. It was crucial to find comparisons between more traditional/conventional forms of education and newer forms of “modernized” education, such as voice over PowerPoints and videos to demonstrate which methods were the most effective in providing nurse education. This was important to demonstrate if there was; (1) a need for re-vamped educational programs which utilized mixed-media, such as interactive case studies and simulation that could increase nurse’s knowledge of CHF more so than traditional programs and, (2) was there a improvement between newer educational programs and improved nurse understanding of CHF and did patients who were educated by nurses who completed these programs have improved outcomes as evidenced by decreased hospital re-admission rates and improved patients outcomes.

Articles were found by using the search function on California State University’s online library database, OneSearch. Key words and phrases such as, “CHF, RN, RN education of CHF, patient education of CHF, and changes in CHF education”. Once articles were found and deemed to be applicable they were then saved, reviewed, and organized by theme. Organization of the following text begins with studies focusing on the implementation of new CHF educational programs for nurses and the positive/negative found within the studies, ending with studies describing effective vs. ineffective nurse-patient education of CHF.



### **Studies Aimed at Nurses' Understanding of CHF Care Principles**

Mahramus and colleagues (2013) conducted a quasi-experimental repeated measure quantitative study on the effectiveness of a newly created educational program on heart failure (HF) for nurses. The study had a convenience sample of 150 nurses from a large tertiary hospital system in the southeastern United States (U.S.). A comprehensive three-and-half hour-long educational program on heart failure (HF) was created. The educational program was derived from current HF literature and focused on the nurse's knowledge of heart failure education principles (NKHFE). The educational program focused on teaching the nurses basic principles of heart failure care, including important concepts to promote effective nurse-to-patient education. The educational program was offered eight times at three different sites over a two-month period. Pre and post tests were administered in combination with a post-educational program teach back session. A final 3-month post-program test was sent directly to participants' emails. Once completed, exams were emailed back to study administrators. The statistical package for the social services (SPSS), version 10.0 was utilized to find the means and standard deviation of pre and post test scores. Paired t-tests were implemented to prove the statistical significance of study results. The authors reported a significant difference between pre and post test scores. This was demonstrated by the study's findings that nurse knowledge of congestive heart failure improved with the completion of the devised educational program, self-care principles and knowledge can be sustained and even increase over time. A strength of the study was the large convenience sample size, (n=150) and that it explored long-term knowledge retention. This was demonstrated with a posttest directly after program completion and three-months post-program. Limitations

of the study were the lack of participants outside the tertiary system and the low percentage of participants who completed the three-month -program completion posttest.

Sterne and colleagues (2014) created a quantitative one-group pretest-posttest cohort study looking at the effectiveness of an educational HF program for nurses, which utilized a convenience sample of 45 nurses from a community hospital in the US Northeast. A thirty-minute PowerPoint educational program was created based on the Joint Commission and American Heart Association's (AHA) guidelines for HF care. When attending the educational PowerPoint presentation participants completed the nurses' knowledge of heart failure education principles survey both pre-and-post program completion to gauge participant understanding and improvement of understanding HF. Survey results were analyzed with, SPSS 10.0. Pretest-posttest scores were compared by way of paired t-tests, which demonstrated the mean and standard deviation test scores allowing the authors to determine the overall effectiveness of the implemented educational program. The authors found a substantial increase in nurse posttest scores, confirming program effectiveness. In addition, there was a fifty percent decrease in the total percentage of 30-day hospital re-admission rates of patients with HF 3-months post educational program completion. A strength of the study was that the educational programs content validity was verified by six HF experts and four HF educators. A weakness of the study was the small convenience sample size of 45 nurses.

Hart and colleagues (2013) devised a psychometric study that compared two different versions of a survey on HF to find which of the two was most effective in determining nurses' understanding of HF. The study's implemented design was two-phase and non-experimental. The study utilized a convenience sample of 122 nurses from

an inpatient healthcare system in southeastern US. Two different versions of the nurse knowledge of heart failure self-management principles survey were created, one based on a Likert scale and the other a dichotomously scored version. The study was completed in two phases. In phase one, participants were given one version of the survey and had two weeks to complete and return the completed survey to the unit's breakroom. In phase two the other version was administered and participants had two weeks to return the completed surveys to the unit breakroom.

Prior to survey administration demographic information including age and race were collected. Internal consistency reliability was found utilizing the Kuder-Richardson evaluation method for the dichotomously scored version and Cronbach's alpha for the Likert version, utilizing item level statistics to find survey questions that were not psychometrically strong. The authors found that the Likert version of nurse knowledge of heart failure self-management principles survey was substantially stronger psychometrically than the dichotomously scored version. A strength of the study was its large sample size. A limitation of the study was that the psychometric assessment was conducted in a homogenous sample, of predominantly middle-aged Caucasian women in multiple hospitals in the same medical system in the US. Including a more ethnically diverse sample population would add increased generalization of study results to a broader population.

Gerdes and Lorenz (2013) completed a retrospective chart review study at a Midwest Veterans Administration (VA) hospital over a two-year period observing the effectiveness of two different educational programs and their effectiveness in reducing 30, 60, and 180-day post-discharge readmissions for patients with HF. The control

program was a traditional inpatient educational program that was a bedside face-to-face program. The second program was the traditional program with an additional outpatient three hour-long interdisciplinary educational program. The study's intervention was aimed directly at patients with CHF to find which intervention yielded a greater amount of improved outcomes. The interdisciplinary educational team was comprised of a pharmacist, physical therapist, psychologist, nurse practitioner and two HF nurses.

Study findings were entered directly into Excel then transferred to SPSS version 10.0 the responses from both the control group and implementation group were analyzed based on each groups specific descriptors. ANOVA was utilized to find the statistical significance of hospital readmissions between both groups. Results were analyzed and the authors found that hospital re-admission rates were substantially lower in the group with the additional outpatient interdisciplinary component than the traditional control group. A strength of the study was the use of current recommendations from evidenced based practice and findings to support a multidisciplinary approach to patient care and disease management of HF. Weaknesses of the study were a small sample size (n=106) and the majority of study participants were predominantly African American and Caucasian. Thus, findings were not fully generalizable to other ethnicities.

### **Studies Aimed at Improving Nurses' Understanding of CHF Patient Education**

Smeulders and colleagues (2010) created a study to find if newer forms of outpatient patient education improved follow-up and overall self-management compared with a conventional education program currently in use. The study was comprised of a two-group randomized control study with a 12-month follow-up period with a convenience sample of 317 patients from six different hospitals in the Netherlands. Two

programs were created a control program with regular outpatient appointments and a trial group that underwent a six-week long self-management HF program. The six-week program was a two-and-half hour class once a week that focused on medical, social, emotional, and self-management education of HF. Self-care behavior and quality of life were assessed with European heart failure self-care behavior scale (EHFScBS). The Rand 36-item health survey (RAND-36) and the Kansas City cardiomyopathy questionnaire (KCCQ) were used to demonstrate overall cardiac quality of life. Results were analyzed with SPSS, version 12.0.1; analysis was based on two-sided tests, mean group scores and the overall standard deviation of scores. The authors reported increased self-care behaviors, and increased quality of life 3-months post intervention for the trial group; incidentally these scores were not reflected in the 6-month and 12-month follow-up scores.

A strength of the study was the finding that social and emotional self-management is equally important as medical management when educating patients with HF. By incorporating psychosocial aspects of care with medical management teachings, patients became more well-rounded and overall patient outcomes improved. A limitation of the study was the use of self-reporting measures to gauge physical activities and tolerance, rather than a more an objective test such as direct observation by the study's principle investigators.

Boyde and colleagues (2018) created a randomized controlled study with a convenience sample of 200 patients with HF from a large tertiary hospital in Brisbane, Australia to find the effectiveness of two different patient-centered teaching programs. The authors devised two educational heart failure programs one being the control

program a traditional educator-patient program where education was given one-on-one between the nurse and patient and two being a multimedia program. The aim of the study was to see if the multimedia program resulted in improved self-care behaviors and reduction in total number of hospital readmissions over a 12-month period compared to the more traditional/ conventional program currently in use within the hospital.

The multimedia program included an initial needs assessment and the development of an educational plan, supplemented with videos, verbal discussions, and patient teach-back. A written educational manual was included for patient reference. The Dutch heart failure knowledge scale (DHFKS) and the self-care of heart failure index (SCHFI) were used to establish a baseline patient knowledge, administered at start of program and then to gauge self-adequacy at the 28-day, three months, and 12-month mark.

Results were analyzed with SPSS, version 10.0 and PASW for Windows version 18.0. Heart failure re-admission rates were compared by using Pearson's chi-squared test, with calculation of the odds ratio to relative risk. The DHFKS and SCHFI scores were analyzed via non-parametric tests, which were then analyzed to find means and standard deviation after post-hoc analysis. The authors found that the mixed multimedia program reduced risk of hospital readmissions by almost a third (30%) with increased self-adequacy, supporting the effectiveness of a mixed multimedia program for patients with HF. A strength of the study was the sample size (n=200) and the development of a well referenced, modernized, up-to-date, and effective educational tool. Limitations of the study were that the SCHFI question answers were self-reported by study participants leaving room for response inference in that study participants may not have taken the

time to read and answer all the questions accurately/appropriately and that the study took place in a single hospital.

Ghosh and colleagues (2013) devised a quantitative cohort survey study to find which barriers patients encounter most when receiving CHF education. The study used a convenience sample of 235 patients diagnosed with CHF from three different communities and socioeconomic standing. A medical questionnaire was created which included demographic information, patient diagnoses, and use of online search engines and familiarity with computers. Computer literacy was quantified to find if lack of familiarity resulted in lack of online resource use and access. The questionnaire was comprised of questions based off of different subsets of barriers experienced by patients in relation to education of CHF in the inpatient and outpatient settings. The questionnaire was then administered at three tertiary care referral centers which each represented a distinct socioeconomic and educational background. The three tertiary centers served as both CHF and cardiology clinics. The medical questionnaire was administered in each clinic prior to participants being seen by their provider.

The SPSS, version 10.0 was utilized to find the statistical significance of each surveyed question. Univariate descriptive statistics were used to show the distribution, frequency, mean, and range of both participants' questionnaire responses and demographic profile. Question means and standard deviations were calculated independently. The authors found that almost half (42.7%) of the participants were not using online CHF resources due to a lack of appropriate computer literacy. Study strengths were the large sample size of 235 participants and the well-written straightforward, simple, and easy to respond to survey questions. Weaknesses were the use of

vague questions to distinguish socioeconomic class and the inclusion of only three clinics in the study demographic.

### **Gap Analysis of Strengths and Weaknesses in Current Literature**

Sterne and colleagues (2014) study demonstrated the effectiveness of a new updated PowerPoint guided educational program as it was linked with increased nurse retention of CHF teachings. Findings also included a fifty percent decrease in 30-day hospital re-admission rates of patients with CHF post-program implementation.

Mahramus and colleagues (2013) created a comprehensive multi-media HF program for nurses, which demonstrated increased material retention; follow-up surveys demonstrated that nurses maintained long term knowledge retention as far as 3-months post-program completion. Hart and colleagues (2013) created a study focusing on which testing methods garnered the most nurse involvement and found that the Likert scale was far more effective than any other form of testing to gauge nurse understanding of HF principles.

### **Studies Aimed at the Effectiveness of Different Nurse-Patient Educational Methods**

Gerdes and Lorenz (2013) and Smeulders and colleagues (2010) demonstrated that educational programs that encompassed a more complete review of CHF had improved outcomes compared with prior older versions of similar educational programs. Boyde and colleagues (2018) concluded that patients have greater retention of HF education when they complete a multi-mixed media educational program compared to more traditional methods, such as paper handouts or one-to-one education at time of discharge. Ghosh and colleagues (2013) patient directed study was important to gauge



which barriers patients with CHF encounter to aid in the appropriate framing of the portion of the educational program aimed at teaching RNs important patient concepts of necessary patient education, which all patients with CHF should receive during nurse-patient education to prevent future disease exacerbation.

In review the review of literature, I found that educational programs focusing on improving nurse understanding of CHF yielded improved understanding and comfort in educating and caring for patients with CHF. This was evident in Mahramus and colleagues (2013) with the implementation of a multimedia educational program, however it lacked the whole case situation, as the program did not have any case studies or simulation for participants to apply what they had learned. These findings support the need for the development and implementation of nurse focused educational programs within the CSJV. Other findings included the increasing relevance of technology and the effectiveness of different mixed media educational programs in combination with traditional forms of nurse-patient education in increasing patient understanding of CHF within both the outpatient and inpatient setting. Unfortunately, there were few recent studies found addressing nurse education of CHF. The majority of studies focusing on nurse education of CHF were prior to 2010. The lack of recent studies exploring new guidelines and current EBP in nurse education of CHF, demonstrates the need for further studies and exploration. This project aims at addressing this lapse in recent studies by finding the effectiveness of an educational program based on the most up to date and current guidelines, with the intent of improving nurse education and patient outcomes by providing study participants with a “whole” situation educational experience.



### CHAPTER 3: STUDY METHODOLOGY

The overall goal of this quantitative research study was to find if an educational program which encompassed all aspects of nurse understanding, care, and patient education on CHF, in the context of an interactive online program would improve overall nurse understanding of congestive heart failure (CHF). The mixed multi-media program was aimed at providing participants an interactive experience in which they were able to clinically correlate what they had learned in the core didactic material to situations they would experience in providing direct bedside care to patients with CHF.

#### **Design and Sample**

A quantitative quasi-experimental repeated measures study, within group, pre-test and post-test design was used to demonstrate and evaluate RNs knowledge of CHF pre- and post educational program completion. After both the hospital and affiliated institutional board (IRB) approval were obtained for the study, a convenience sample of RNs (n=64) was recruited from the two telemetry floors within the large Central San Joaquin Valley (CSJV)) county hospital chosen to participate in the study. The study was introduced during the floor evening and morning pre-shift report over a seven-day period, from February 16<sup>th</sup> - February 23<sup>rd</sup> to allow ample time for all RNs working on the floor to hear about the study. When nurses conduct research involving other nurses or patients, their health and safety must be first considered before any research begins to lower the risk of any potential harm affecting the physiological, physical, or cognitive well-being of study participants (Barr & Welch, 2012). Therefore, it must be made explicitly clear that participation in the proposed project will not hinder, impede, or affect participants position in the department in any possible way. It was made clear that participation in the

study was voluntary and anonymous. The study put emphasis on allowing participants to complete the educational program at their own convenience in a stress and anxiety environment. After introduction the presenter presenting the study left the room and informational handouts were left for potential participants with additional study information and specific instruction on how to access the online program. The recruitment process was done in this manner to protect the privacy of the study's participants. Only telemetry RNs who had an associate degree in nursing (ADN) or bachelor degree in nursing (BSN) RNs working on the hospital's two telemetry floors were eligible to participate in the study

### **Setting**

The setting for this study was an online securely hosted website with an origin in the western United States. At the time of the study the website was hosted on a secure domain and server on a stationary desktop. Participants were able to access the study from any work or personal computer that had Internet access. This allowed participants to complete the 50-55-minute study within their own personal time constraints in the privacy of their own home or other chosen location.

### **Procedure**

The informational pamphlet left for participants after the study's introduction included direct instruction on how to access the study's secure website. The website domain was [www.CHFED.com](http://www.CHFED.com). The website was password encrypted; once accessed participants entered the provided password, GOCHF to start and complete the study. Study participants had a 12-day period to login and complete the online program. The program was available to study participants from February 24<sup>th</sup>, 2019 – March 8<sup>th</sup>, 2019.

After March 8<sup>th</sup> the website was removed and the password was changed and website removed to protect the integrity of the educational program and study.

### **Educational Intervention**

The interactive multi-mixed media website was comprised of a 5-minute 11 question pre-test, a 30-minute long didactic program and a 15-minute long interactive 10 question case study, and a 5-minute post-test. The educational program focused on the “big” picture, providing participants with all important concepts of CHF education to promote increased understanding in not just one area of CHF, to promote improved clinical judgement and critical thinking skills focusing on every aspect of CHF. The study’s educational program was created to promote a systemic whole understanding of CHF by the study’s participants. This was done with the intention of preparing RNs to better handle all patients’ potential clinical situations and issues that arise when providing direct patient care.

The didactic program was comprised of five main subject headings; (1) Anatomy of the Heart (comprised of multiple diagrams and images with 3-minutes of voice over describing basic anatomy of the heart) (2) pathophysiology of CHF (comprised of a 6-minute video on the pathophysiology of CHF) (3) systolic dysfunction and diastolic dysfunction (comprised of a 10- minute PowerPoint with voice over describing the difference between systolic vs. diastolic dysfunction) (4) Medications for Treatment (comprised of a 8-minute PowerPoint describing medication and their interaction with the heart voice) (5) Education of Patients (6-minute voice over PowerPoint describing, fluid, activity, and dietary modifications crucial for preventing future CHF exacerbations). All material in the didactic portion of the educational

program was derived from standards, protocols, and procedures from the Heart Failure Society of America (HFSA) American College of Cardiology (ACC), and the American Heart Association (AHA). The program was comprised of two case studies with an estimated total completion time of 15-minutes. Each case study featured scenario specific questions caring for a single patient from presentation to emergency room (ER), through their hospital stay and their eventual discharge home. Multiple scenarios were presented in the two case studies, this was done to promote the actual clinical application of concepts covered in the didactic portion of the educational program. Please see Figure 1. for an example question from one of the two case studies.

#### Interactive Case Study Question 1

A 59-year-old male presents to the emergency department (ED) complaining of worsening shortness of breath over the past two weeks. He has a history of prior myocardial infarct (MI) with reduced ejection fraction (EF) and hypertension. Over the past 2 weeks he has noticed increased leg swelling and shortness of breath (SOB) on exertion (walking more than 500 ft, lifting 10 lb bag of groceries, and walking up small flights of stairs). Around 7 days ago he began to experience SOB when lying in bed at night as a result he began using multiple pillows, two days ago his SOB escalated and he begun to sleep sleeping upright in a recliner to relieve his SOB. This morning he developed a wet cough with frothy pink-tinged sputum prompting him to present to the ED. He is a daily smoker (1 pack-week x 30 years)

VS: HR: 105 beats/minute, Irregular BP: 142/78 mmHg PaO2: 92% (RA) RR: 26 TEMP: 37.8 C

Question 1: Based on his presentation what additional lab and diagnostic testing would you like to see? Please select all that apply:

- A.) Chest x-ray
- B.) Troponin
- C.) C-reactive protein
- D.) Echocardiogram
- E.) MET 10
- F.) Lactic acid
- G.) ABG
- H.) ECG
- I.) Myoglobin
- J.) BNP

Answer: A,D,E,G,H,J Based off of the patient's presentation, symptoms, and prior history of reduced EF all of the following testing is necessary to help find if the patient is having a CHF exacerbation.

Rationale: Checking a chest x-ray (check for cardiomegaly / pulmonary congestion, ABG (2/2 r/o hypoxia), echocardiogram (to find estimated EF, ECG (2/2 r/o arrhythmia / cardiomegaly), MET 10 (check electrolytes /kidney function, and BNP (to find if patient is fluid overload) are all vital diagnostic/lab tests to help prove or disprove if the patient has CHF.

Figure 1.1 Case study question 1

After the submission of each response to each individual question the correct response and rationale were given. The study included fill in, multiple choice and select all of the above questions. The case study included an x-ray film, 12-lead EKGs, lab values that was interpreted throughout the case study. Each case study question was taken directly from the didactic material to aid in improved concept understanding and to foster improved clinical correlation between the didactic material and actual application in practice.

### **Intervention Effectiveness**

The effectiveness of the educational intervention to improve nurse education and understanding of CHF was measured using an identical pre-program and post-program test. The test was comprised of 10 multiple-choice questions. These ten questions were created based on five core areas crucial in providing appropriate care and understanding of CHF by nurses. These five core areas were derived from the American Heart Association's (AHA) 2017 guidelines for the appropriate care, treatment, and education of patients with CHF. The five core areas were; (1) pathophysiology of CHF (2) pharmacology/medications for CHF (3) systolic vs diastolic dysfunction and associated

symptomology (4) laboratory tests specific to CHF and (5) patient education.

Interventional effectiveness will be found by the comparison between the pre-test and post-test scores.

### **Data Collection**

The pre-test and post-test answers were relayed from the website to a secure email after each individual participant completed the pre-test and post-test. Once received participant answers were exported into Microsoft Excel in numerical order from participant 1 to 64 to prepare for data analysis.

### **Data Analysis**

Once received all of the participants answers were inputted and entered according to their coinciding question in Microsoft Excel on a new workbook file titled, “CHF Education Test Results”. Both the pre-test and post-test questions numbers 1-10 were inputted on the same horizontal and vertical axis’s in numerical form (1) if the correct answer was chosen and (0) if the incorrect answer was chosen. For data analysis IBM’s Statistical Package for the Social Sciences (SPSS) Statistics Version 24.0 SPSS was utilized for analysis of the mean, percentage, and standard deviation of all questions.

For questions 1-11 of the pre-test and 1-10 post-test the Microsoft Excel workbook file, CHF Education Test Results was imported directly into a new SPSS dataset titled, “CHF Education Test Results Analysis” in IBM’s SPSS Statistics Version 24.0. Once imported each question was analyzed individually and then grouped together as pre-test and post-test groups. The analysis of the mean, percentage, and standard deviation of all questions was collected.



Question number 11 on the pre-test asked participants, “How many years of telemetry nursing experience do you have?” question answers were; a.) 0 – 6 months b.) 6 months – 2 years c.) 2 years – 5 years d.) 5 years – 10 years, and e.) 10 + years. Options A, B, C, D, E were inputted alongside each individual’s response to the test questions numerically as either an 1,2,3,4, or 5 to allow for the appropriate analysis of the participants total number of years working as a nurse on the telemetry.

Analysis via paired t-tests was completed on each question of both pre-test and post-test answers to prove the overall statistical significance set priori at  $p < 0.05$ . Once analyzed, percentages were inputted into Microsoft Excel graphs were created depicting question responses and their respective results.

Question 11 on the post-test was analyzed individually, it asked, “How helpful would you rate the educational material and case study in helping you better understand CHF?” Responses to the question were separately inputted on a different horizontal and vertical axis on a separate workbook file as the answers were based on a numerical 1-4 Likert-scale, responses were; helpful (1), somewhat helpful (2), little help (3) or not helpful (4). Once inputted each of the responses for question 11 were itemized and graphed according to the total numbers of responses 1,2,3, or 4. Microsoft Excel was used to create a graph demonstrating the post-test question 11 findings.

### **Ethical Considerations and Bias**

The study aimed at creating a stress-free learning environment by allowing participants to access the program at their own convenience on their own personal computer. Transparency was endorsed throughout the recruitment process. When introduced at the pre-shift meeting the study proctor discussed the study at length

focusing on its purpose, procedure, risk/benefits, and made a point that informed consent would need to be provided prior to study start. Participants were provided an initial informational page on the websites homepage which described the program. Consent was garnered once participants clicked the “yes I consent to participate in the study” once selected they were able to begin the educational program. Biases were removed as no personal information was collected and study participants remained anonymous. No personal demographic information was gathered or provided by the study’s participants.

## CHAPTER 4: STUDY RESULTS

This study was conducted to determine the effects of an online interactive mixed media educational program on registered nurses (RNs) knowledge of congestive heart failure (CHF). The study's program utilized a 10-question pre-test and post-test to demonstrate if the study's educational program was an effective tool to improve nurse understanding of CHF. The results of the program and its associated interventions are discussed in further detail in the following text.

Pre-test and post-test results were received via email directly after the successful completion of each educational program by each of the 64 participants ( $n = 64$ ). Once received all of the answers were entered according to their coinciding question in Microsoft Excel on a new workbook file titled, "CHF Education Test Results". The file was then imported into SPSS 10.0 for analysis, evaluation, and to find program effectiveness.

### **Educational Intervention Effectiveness**

To find study effectiveness a paired samples  $t$ -test was conducted to determine the overall effect of the educational program on mean test scores. The results of the analysis demonstrated a statistically significant increase in post-test scores compared to pre-test scores ( $p < 0.05$ ),  $t(64) = -1.968$

A statistically significant increase in correct responses was found between the pre-test versus post-test scores in all 10 questions ( $p < 0.05$ ). All five core didactic areas demonstrated notable improvement in scores post-program completion. Microsoft Excel was utilized to create graphs depicting study participants responses, study population demographics, and their respective results. The following text narrative utilizes both

graphs, charts, and diagrams to visually demonstrate study analysis and associated outcomes.

### **Characteristics of Participant Sample**

There was a potential participant pool of 147 RNs. A total of 64 RNs entered the study and (100.0%) of the participants completed the educational protocol. The average mean years of participant telemetry nursing experience was 1.8 years (Table 1.1). The participant pool had a low average mean of experience as the two selected telemetry floors had a high RN turn-over and poor RN retention rate, resulting in a low mean of years telemetry nursing experience in the participant group.

Table 1.1 Demographic characteristics of RNs who participated in online program.

<b>Demographic characteristics of Participants</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>n</b>
Years of telemetry nursing experience	1.843	1.91	0-10	64

Comparison between the number of years of participant experience and their pre-test scores was demonstrated in percent correct in Figure 1.2 (Pre-test). Comparison between the number of years of participant experience and their pre-test scores in percent correct was demonstrated in Figure 1.3 (Post-test). Per chart results there were a total of 12 (n=12) participants with 0 – 6 months telemetry nursing experience they scored an average of 62.5% correct on the pre-test and 85.0% on the post-test. The following 38 participants (n=38) had 6 months – 2 years of telemetry nursing experience they scored an average of 71.8% on the pre-test and 92.3% on the post-test. The third group contained 10 participants (n=10) they had 2 years – 5 years of telemetry nursing experience scoring an average of 80.0% pre-test and 96.0% post-test. The second to last group of participants was comprised of 3 participants (n=3) who had 5 years – 10 years of nurse telemetry

nursing experience scoring 86.7% on the pre-test and 100.0% on the post-test. The final group of participants had 10 + years of nursing telemetry. There was only 1 participant (n=1) in this group the single participant scored a 90.0% on the pre-test and a 100.0% on the post test. The findings depicted in Figure 1.1 and Figure 1.2 demonstrate that nurses with more nursing experience had higher pre-test and post-test scores than those participants with less telemetry nursing experience, however it is crucial to note that the last two years of experience ranges had a small sample size (n=4).

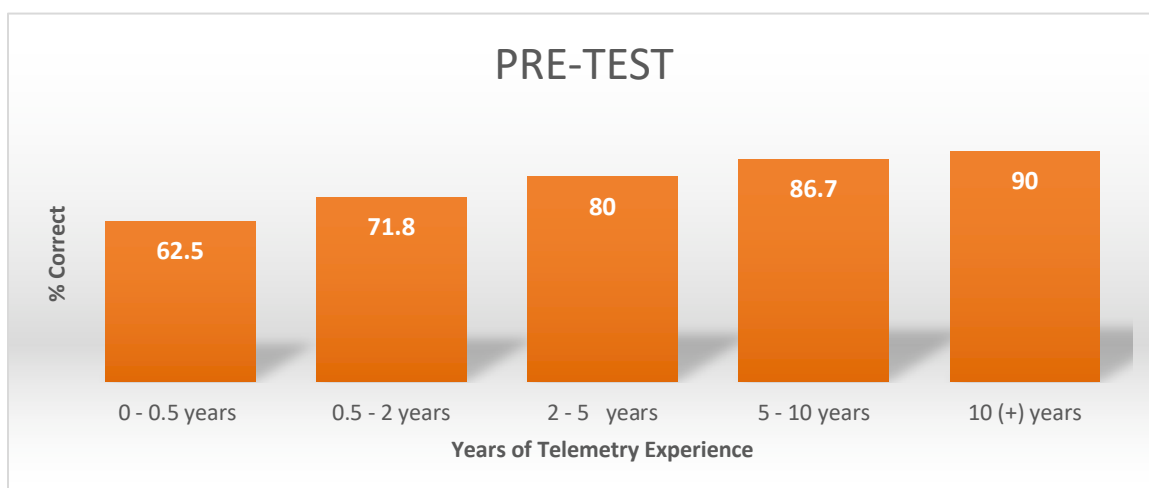


Figure 1.3 Pre-test

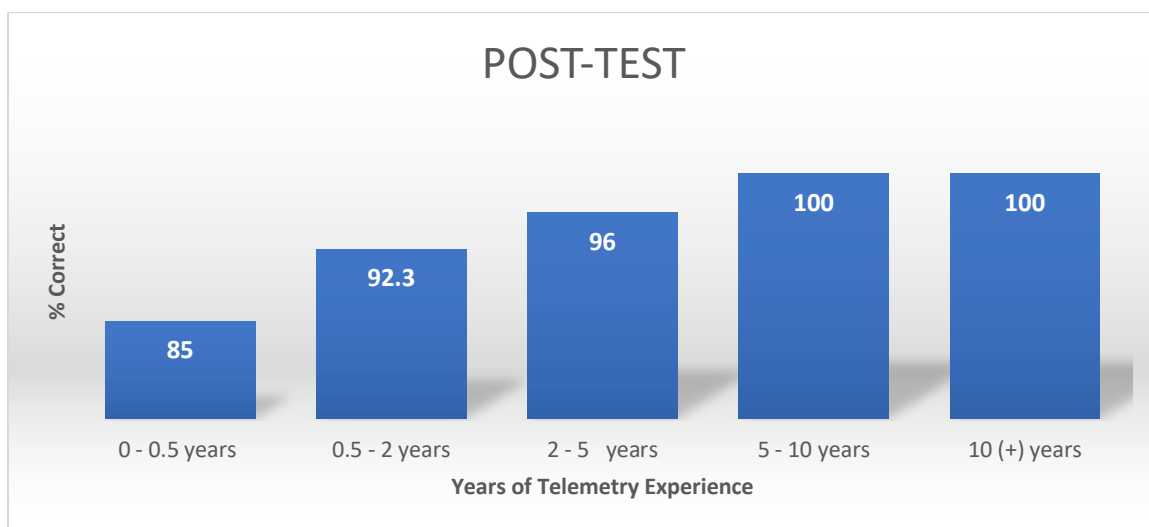


Figure 1.4 Post-test

The study found a 16.46 % improvement in post-educational program completion scores in relation to pre-test scores (Figure 1.5). This demonstrates that completion of the educational program yielded an improved understanding of CHF by RNs as demonstrated by improved post-program scores. Both correlation and causation were found in relation to the successful completion of the educational program and evidenced by an improvement in the post-program completion test results.

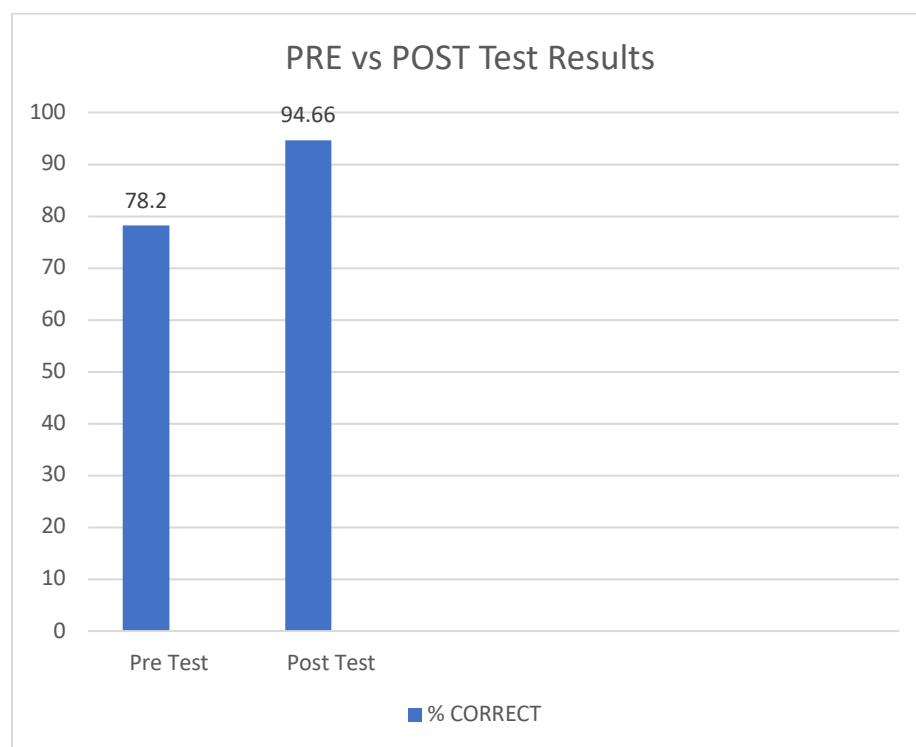


Figure 1.5 Pre vs. posttest results

### Statistical Significance

Utilization of SPSS 10.0 to run a comparison paired samples test between PRESUM and postSUM scores allowed for the appropriate collection and analysis of the mean, standard deviation, and to find if the study's results were statistically significant.

The marginal significance of the study was found to be 0.000 (Sig. (2-tailed) = 0.000), making the study's findings statistically significant, supporting the projects hypothesis, that a mixed-media educational program can improve nurse understanding of CHF. As demonstrated by Chart 1.2 (Paired samples test).

Paired Samples Test						
					df	Sig. (2-tailed)
Pair 1	PRESUM - postSUM				63	.000

Paired Samples Test							
		Paired Differences					t
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		
					Lower	Upper	
Pair 1	PRESUM - postSUM	-1.96875	.97539	.12192	-2.21240	-1.72510	-16.147

Chart 1.2 Paired samples test

### Participant's Perception of Educational Intervention

Question 11 of the post-test was used as a polling question. This was done by creating answers using a Likert-scale to gauge how beneficial the study's participants felt the study was in improving their base knowledge of CHF. Figure 1.6 (Post-educational program participant survey) demonstrates that when polled 89% (n=57) found the educational program to be helpful while 11% (n=7) found the program to be somewhat helpful in improving their understanding of CHF. None of the participants 0% (n=0) selected little help or no help as a possible descriptor to describe program benefit in

relation to its helpfulness in contributing to their understanding of CHF. By asking participants to rate the educational program we were able to see how each individual participant truly felt about the overall helpfulness of the program.

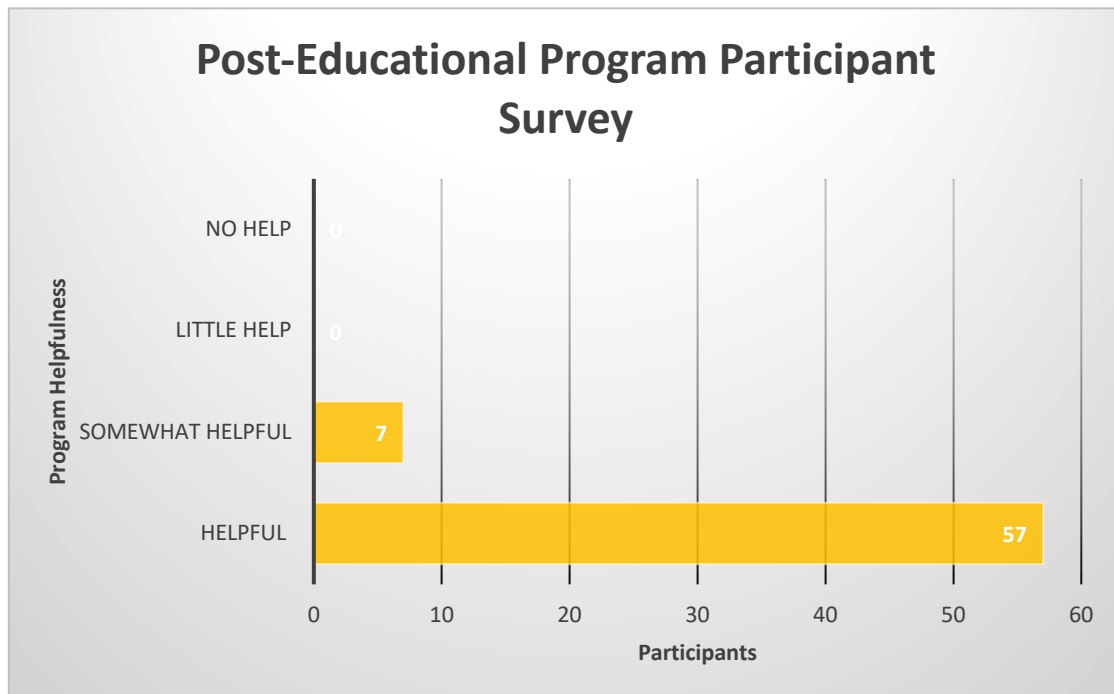


Figure 1.6 Post-educational program participant survey

In review, study results demonstrated a positive correlation between the implemented educational program and an improvement in post-test scores of study participants ( $n = 64$ ). The more years of telemetry nursing experience the higher the scores the participants obtained in relation to participants with less telemetry nursing experience. While numbers in each of the studies groups were small they demonstrated a direct link between the more years of telemetry nursing experience and higher pre-test and post-test scores. The most compelling result findings were a 16.46 % improvement in post-educational program scores in relation to pre-test scores, with a P value = 0.00



proving the statistical significance of the study as demonstrated by the improvement of nurse knowledge in relation to CHF.

## CHAPTER 5: DISCUSSION OF FINDINGS

The purpose of the study was to find if an online multi-media educational program based on the AHA 2017 guidelines for the appropriate treatment, education, and care of patients with CHF could successfully improve nurse understanding of CHF. Pre-test score results demonstrated that there were areas in which participants lacked a thorough understanding of important CHF concepts. The three most heavily missed CHF related concepts on the pre-test were; (1) symptoms associated with systolic and diastolic dysfunction (2) sodium restrictions per the AHA 2017 guideline recommendations and (3) fluid restrictions per the AHA 2017 guideline recommendations. Pre-test results demonstrated that nurses completing the program needed further insight and education on the current AHA 2017 guidelines, CHF symptomatology, and general patient education, to promote appropriate patient care and education.

Completion of the multi mixed-media educational program by study participants yielded a significant increase in post-program completion test scores as evidenced by a 16.46% increase over pre-program test scores. The study's interactive case study and didactic material was created to promote increased understanding and heighten the situational awareness of nurses caring for patients with CHF.

This study adds to the current body of literature describing effective programs used to provide nurse education, demonstrating that educational programs which methodically create interactive real life "situations" through the utilization of interactive simulations and case studies are well received by nurses. As demonstrated by the findings of Gerdes and Lorenz (2013) and Smeulders and colleagues (2010) educational programs that encompassed a more complete review of CHF had improved outcomes compared

with prior older versions of similar educational programs. They also found that educational programs focusing on improving nurse understanding of CHF yielded improved understanding and comfort in educating and caring for patients with CHF. This was evident in a study by Mahramus and colleagues (2013) that studied the implementation of a multimedia educational program, however it lacked the whole case situation, as the program did not have any case studies or simulation for participants to apply what they had learned.

Study findings suggest that the interactive situational nature of the program garnered increased interest and nurse involvement compared to more traditional educational programs due to its ability to actively engage the learner and tie in covered concepts and material into real-life situations. Participants had the informal opportunity to share their feelings and thoughts via email post-program participation. Participants endorsed that they had increased engagement and program interest compared to traditional classroom oriented didactic educational programs. With the modernization of computer programs and increased availability of the Internet, online educational programs are becoming more and more prevalent in nursing specific education due to their ease of use and virtual availability. Programs which utilize a “first-person” format can now be utilized to create online simulations for nurse education. It is important that we further study the implementation of such program in future studies.

### **Limitations**

The results of this study suggest that the use of an interactive mixed-media educational program improves RNs’ overt understanding of the disease process, knowledge, and their ability to provide appropriate care and education to patients with

CHF. However, the study was limited by three primary factors; (1) its small sample size (2) lack of participant demographic information and (3) data collected from only one institution within one geographic area. The study's results found that the mean years of participant nursing experience working in telemetry was 1.84 years, demonstrating that RNs with more than two years of telemetry nursing experience were heavily underrepresented in the study's participant sample. Other demographic data was not collected within the study. The study was limited by not collecting further demographic data on participants; gender, education, ethnicity, and total years of general nurse experience which would have allowed for further grouping of findings and improve generalizability of study results.

### **Further Research**

Further investigation of the use of online mixed-media educational program is needed, using a larger sample size, with further demographic description, and utilizing a number of geographic settings. Potential areas of exploration include adding additional simulation and scenarios to garner more critical thinking. The addition of an interactive or real-life simulation would allow the study to foster improved concept application, critical thinking, and clinical judgment in the context of a real-life situation. It would allow the further application of the didactic program core teachings and created a "whole" situation learning environment. Study participants would be placed in an "as-if" or "as-in" situation allowing them to further apply teachings and garner improved material understanding and improved future utilization in direct nursing practice. In addition to allowing RNs from other areas of the hospital to participate as well

incentivizing program participation such as providing continuing education (CE) would further aid in increased participants size and the overall generalizability of study findings.

An item analysis of years of telemetry nursing experience, the assessment of long-term study effectiveness, and patient outcomes are three other areas of further research.

Nursing experience is important to note as it will allow the study to demonstrate how years of nursing experience effects program outcomes, the receptiveness of the program by participants, and will allow more specific generalizability to aid in future program development specific to nurses' specific experience level. For example, an educational program for new telemetry nurses would have different core concepts than programs for telemetry nurses with 5-10 years of nursing experience.

Future studies should include additional methods to demonstrate program effectiveness within clinical practice. This will allow the study to demonstrate the longevity of program outcomes. This could be done by comparing how many CHF re-admissions occurred 12 months pre-program implementation with how many CHF re-admissions occurred 12 months post-program implementation. Not only will this measure demonstrate program effectiveness, it will also demonstrate if the program interventions were sustainable, proving the longevity of program outcomes.

Future investigation should also aim to find if interactive study's improve RN comfortability and confidence in caring for patients with CHF then more traditional didactic only based educational programs. Future studies should also aim to measure patient outcomes This can be demonstrated by data collection which correlates with decreased length of hospitalization and re-admission rates of patients with CHF post-

program implementation. Decreased length of hospitalization and re-admission rates results in large cost-savings for hospitals.

### **Benner and Skills Acquisition**

As described by nurse theorist Patricia Benner, nurses develop and further their skills and overall understanding of patient care through the conjunction of two important intertwined core concepts; (1) repeated experiences of caring for patients and (2) a strong didactic and educational foundation/background (Alligood, 2014). The study found this to be true as it provided that an educational program that fostered the actual application of learned materials, intertwined with the didactic knowledge, the program allowed RNs to improve their understanding of CHF through the actual application of learned materials in interactive clinical scenarios, resulting in improved understanding of CHF core principles and necessary nurse-to-patient education.

### **Conclusion**

Congestive heart failure (CHF) continues to affect over 5.8 million people in the US and remains the number one cause of 30-day hospital re-admissions in the US (Go et al. 2013). The high incidence of CHF demonstrates the need for RNs to understand the disease process, symptomatology, and key concepts that patients with CHF need to be educated on. By increasing RN understanding of CHF they are more prepared to provide disease appropriate and competent patient care. Thus, it is crucial that RNs taking care of patients at the bedside are further educated to identify and treat as well as perform patient education on CHF. The study's findings suggest that an interactive multi-media educational program is effective method in improving RN understanding of CHF.

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## APPENDICES

## APPENDIX A: PARTICIPANT INFORMATION SHEET

**Educational Study of Heart Failure Education at Community Medical Center**  
**David Palecek, Study Coordinator**  
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**STUDY PARTICIPANT INFORMATION SHEET FOR PARTICIPATION IN RESEARCH  
STUDY**

It is presumed that congestive heart failure (CHF) affects over 5.8 million people in the United States alone and is the leading cause of 30-day hospital re-admissions in the U.S., in excess of 39.2 billion dollars a year is spent on providing care and educating patients with CHF (Go et al. 2013). Studies are needed to find if integrated educational programs pertaining to CHF completed by nurses can improve nurse understanding, care, and confidence, leading to the overall improvement of patient care.

The purpose of this study is to examine and quantify the positive effects of an educational program on congestive heart failure (CHF) for registered nurses at Community Medical Center (CMC). The overarching theme of the project is to find if there are areas which nurses could benefit additional education in, in regards to CHF. Similar studies have been completed at other facilities and health networks with positive effect and findings. However, this study is NOT being conducted on behalf of CMC, nor does CMC offer any sponsorship or endorsement for this research study. Instead this project is being completed as part of a research project conducted by doctoral nursing student employed through CMC.

You are being asked to participate in the study as you are a telemetry nurse employed in CMC who can provide valuable insight. Participation in this one-time study is completely voluntary and anonymous. Signing up for the online HLC and completion of the educational program will be regarded and considered as given consent. There are NO consequences/ repercussions for completing or not completing the educational program; your employment status will be completely unaffected. If you begin the educational program and wish to stop participating you may leave the HLC at any time without submission. Please note that there are ten multiple choice questions if you choose to leave any questions blank it will still allow you to complete the program without answering all the specific questions.

The study has been approved by the Community Medical Center Institutional Review Board. There will be no monetary compensation, any additional form of payment, or exchange for completing the educational program. Additionally, this study is receiving no external funding. Total completion time for completing the educational program is generally less than 60 minutes.

Should you in any case wish to obtain further information regarding this study or its results, you may contact the principal investigator, David Palecek, via email at [davidpalecek@mail.fresnostate.edu](mailto:davidpalecek@mail.fresnostate.edu)

Go, A., Mozaffarian, D., Roger, V., Benjamin, E., Berry, J., Borden W., Bravate D. & Dai, S. (2013). Heart disease and stroke statistics- 2013 update. *American Heart Association*. 127(1)

## APPENDIX B: PRE-TEST / POST-TEST

**Pre-Test / Post-Test**

- 1.) According to the American Heart Association (AHA) individuals with both hypertension and congestive heart failure (CHF) should limit their salt (NaCl) intake to no more than how many mg's per day?
  - a.) 1500 mg/day
  - b.) 2200 mg/day
  - c.) 1250 mg/day
  - d.) 3000 mg/day
- 2.) What is the 1<sup>st</sup> line medication prescribed for patients diagnosed with congestive heart failure (CHF) per AHA guidelines. Hint: It acts by afterload of the heart?
  - a.) Angiotensin Converting Enzyme-Inhibitors (ACEs)
  - b.) Beta-Blockers
  - c.) Angiotensin-Receptor Blocker (ARBs)
  - d.) Calcium Channel Blockers (CCBs)
- 3.) Which of the following cardiac biomarker predicts negative progression or improvement in patient's fluid status in patients with congestive heart Failure (CHF).
  - a.) Brain-natriuretic Peptide (BNP)
  - b.) C-reactive Protein (CPK)
  - c.) Myoglobin
  - d.) Troponin
- 4.) Which of the following symptoms are most associated with left ventricular heart failure?
  - a.) no peripheral edema, pulmonary edema, orthopnea, rhonchi
  - b.) crackles, S4 heard during auscultation, orthopnea
  - c.) crackles, dyspnea, S3 heard during auscultation
  - d.) peripheral edema, rhonchi, orthopnea
- 5.) Which of the following symptoms are most associated with right ventricular heart failure?
  - a.) peripheral edema, dyspnea, S4, normal EF
  - b.) pulmonary edema, regular heart size, low EF, pink frothy sputum
  - c.) peripheral edema, tachycardia, S3, frothy sputum
- 6.) At what percentage dose a patient's ejection fraction (EF) have to be less than for a patient to be diagnosed with congestive heart failure (CHF).
  - a.) EF = 30%
  - b.) EF = 40%
  - c.) EF = 20%
  - d.) EF = 50%
- 7.) When educating patients regarding weight gain and the importance of daily weight monitoring, how many kilograms (kgs) can a patient gain in one week before it may indicate water/fluid retention?
  - a.) 0.2-1.0 Kg/week
  - b.) 1.0- 2.0 Kg/week
  - c.) 1.3-2.2 Kg/week
  - d.) 1.5-2.0 kg/week
- 8.) Which one of the following is not a modifiable risk factor in preventing recurrence/development of congestive heart failure (CHF).
  - a.) Hypertension
  - b.) Smoking
  - c.) Alcohol use
  - d.) Hyperlipidemia
- 9.) Which of the combination of medications is most commonly prescribed for patients diagnosed with congestive heart failure (CHF)? Hint: One affects preload the other afterload.
  - a.) ARB, Beta-blocker, Inotrops
  - b.) ACEI, Beta-blocker, Inotrops



c.) ACEI, ARB, Beta-blocker

d.) ACEI, CCB, Beta-blocker

10.) According to the American Heart Association (AHA) individuals with congestive heart failure (CHF) should maintain a diet which is;

a.) low Na, low fat

b.) high Na, low fat

c.) low Na, high fat

d.) high Na, low fat

11.) How many years of telemetry nursing experience do you have?

a.) 0 – 6 months

b.) 6 months – 2 years

c.) 2 years – 5 years

d.) 5 years – 10 years

e.) 10 + years

1.) According to the American Heart Association (AHA) individuals with both hypertension and congestive heart failure (CHF) should limit their salt (NaCl) intake to no more than how many mg's per day?

a.) 1500 mg/day

b.) 2200 mg/day

c.) 1250 mg/day

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2.) What is the 1<sup>st</sup> line medication prescribed for patients diagnosed with congestive heart failure (CHF) per AHA guidelines. Hint: It acts by afterload of the heart?

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3.) Which of the following cardiac biomarker predicts negative progression or improvement in patient's fluid status in patients with congestive heart Failure (CHF).

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4.) Which of the following symptoms are most associated with left ventricular heart failure?

a.) no peripheral edema, pulmonary edema, orthopnea, rhonchi

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c.) crackles, dyspnea, S3 heard during auscultation

d.) peripheral edema, rhonchi, orthopnea

5.) Which of the following symptoms are most associated with right ventricular heart failure?

a.) peripheral edema, dyspnea, S4, normal EF

b.) pulmonary edema, regular heart size, low EF, pink frothy sputum

c.) peripheral edema, tachycardia, S3, frothy sputum

d.) pulmonary edema, dry cough, pink frothy sputum

6.) At what percentage dose a patient's ejection fraction (EF) have to be less than for a patient to be diagnosed with congestive heart failure (CHF).

a.) EF = 30%

b.) EF = 40%

c.) EF = 20%

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7.) When educating patients regarding weight gain and the importance of daily weight monitoring, how many kilograms (kgs) can a patient gain in one week before it may indicate water/fluid retention?

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- 9.) Which of the combination of medications is most commonly prescribed for patients diagnosed with congestive heart failure (CHF)? Hint: One affects preload the other afterload.
- a.) ARB, Beta-blocker, Inotrops
  - b.) ACEI, Beta-blocker, Inotrops
  - c.) ACEI, ARB, Beta-blocker
  - d.) ACEI, CCB, Beta-blocker
- 10.) According to the American Heart Association (AHA) individuals with congestive heart failure (CHF) should maintain a diet which is;
- a.) low Na, low fat
  - b.) high Na, low fat
  - c.) low Na, high fat
  - d.) high Na, low fat
- 11.) How helpful would you rate the educational material and case studies to helping you better understand CHF?
- a.) helpful
  - b.) somewhat helpful
  - c.) little helpful
  - d.) not helpful

Questions derived from the following sources.

#### References

[http://www.heart.org/HEARTORG/Congestive Heart Failure Guidelines 2017](http://www.heart.org/HEARTORG/Congestive-Heart-Failure-Guidelines-2017)

<https://www.acc.org/education-and-meetings/products-and-resources/guideline-education/heart-failure>  
 Hunt, S., Abraham, W., Chin, M., Feldman, A., Francis, G., et al. (2009). 2009 focused update incorporated into the acc/aha 2005 guidelines for the diagnosis and management of heart failure in adults a report of the American college of cardiology foundation/American heart association task force on practice guidelines developed in collaboration with the international society for heart and lung transplantation. *Journal of the American College of Cardiology*, 53(15), E1-E90.

Joint Commission on Accreditation of Health Care Organizations, The. (2010). *Heart failure core measurement set*. Retrieved September 12, 2018 9, 2015, from [http://www.jointcommission.org/Performance Measurement](http://www.jointcommission.org/Performance-Measurement)

Nicholson, C. (2014). Chronic heart failure: Pathophysiology, diagnosis and treatment. *Nursing Older People*, 26(7), 29-38.

APPENDIX C: EDUCATIONAL WEBSITE SCREEN SHOT AND  
EXAMPLE QUESTION(S)

Dashboard Support Logout

CHF Study Introduction

Pre-Test

PRE-TEST ✓✓

Anatomy of the Heart

Anatomy of the heart

Pathophysiology of CHF

Pathophysiology Of Heart ✓✓

Video Lesson ✓✓

Systolic Dysfunction

Systolic Dysfunction ✓✓

Diastolic Dysfunction

Diastolic Dysfunction ✓✓

Medications for Treatment

Medications for treating CHF ✓✓

Case Study #1

Interactive Case Study ✓✓

## Systolic Dysfunction

**LEFT HEART FAILURE**

**Backward failure**  
↓ LV output  
↓ pulmonary congestion<sup>①</sup>  
(see pulmonary edema)

**Forward failure**  
↓ LV output  
↓ systemic perfusion<sup>②</sup>  
(see cardiogenic shock + MI)

Clinical manifestation	
↑ RR	SOB
Dyspnea	Hypoxemia
Cough	Crackles/wheeze
Orthopnea	S <sub>3</sub> + S <sub>4</sub>
PND	Pulsus alternans
Pallor	

Clinical manifestation	
Cool, pale extremities	Fatigue
↓ Exercise tolerance	Anxiety
↓ Urinary output	S <sub>3</sub>
Angina	

Hemodynamic presentation	
↑ PAD	↑ HR
↑ PAWP	↓ CO

Hemodynamic presentation	
↓ CO	Variable BP
↓ PP	↑ HR, ↑ SVR

MEDICAL-SURGICAL NURSING: CARDIOVASCULAR CARE NURSING

### NURSING MNEMONICS & TIPS

## LEFT-SIDED HEART FAILURE

### "DO CHAP"

**D** **DYSPNEA**  
May be precipitated by minimal to moderate activity; also occurs during rest.

## Physical Assessment

**! General :** After ambulating 50 feet is talking in short sentences taking in small breaths, positive cough w/frothy septum

**! Heent:** Normo - cephalic. PERLLA

**! Respiratory:** chest rise with symmetrical chest wall

expansion, upper lung fields are clear to auscultation, bilateral lower lung field are coarse - diminished with fine crackles bilaterally

**! Cardiovascular :** Tachycardia (heart rate in the 110s), w/occasional PVCs, faint S3 systolic murmur, bilateral radial and pedal pulses are 3+/4 strength, extremities appear well perfused, moderate- pitting peripheral edema 2+/4.

**! Gastrointestinal:** Soft, Rounded, Non-tender, Non- distended, normoactive bowel sounds to all four abdominal quadrants

**! Lymphatics:** No lymphadenopathy to neck, axilla, groin. **! Musculoskeletal:** Moving all extremities w/o issue

**! Integumentary:** Warm, Dry, No rashes or lesions

**! Neurologic:** Alert and Oriented x4

Which of the following findings are associated with a diagnosis of CHF? Please

select all that apply:

A.) dyspnea after ambulation B.) pink frothy sputum

C.) bilateral peripheral edema D.) S3 heart sound

E.) irregular heart rate

F.) bilateral lower lobe fine crackles heard during auscultation

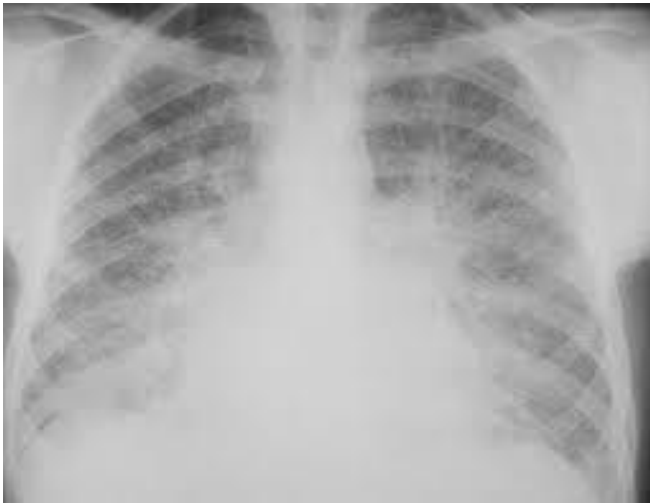
**A.) Dyspnea after ambulation**

**Submit Your Answer Continue Case Study**

**Correct Answer:**

All of the above answers are supportive of CHF

What does the chest x-ray below demonstrate?



! A: Cardiomegaly  
! B: Pulmonary Congestion ! C: Fluid Overload  
! D: Heart Failure

A. ) Cardiomegaly

**Submit Continue**

## APPENDIX D: IRB / GENERAL APPROVAL



November 16, 2018

David Palecek, RN  
 CNN III  
 Community Regional Medical Center  
 2823 Fresno St.  
 Fresno, CA 93721

RE: Nurse Discrepancies in Congestive Heart Failure Education

IRB #2018071

**Exempt Certification**

CERTIFICATION DATE: November 16, 2018

EXPIRATION DATE: November 15, 2021

Dear Mr. Palecek:

All documents for the above-referenced study were reviewed by the Chairman of the Community Medical Centers Institutional Review Board on November 16, 2018. On the basis of the information presented in the study documents, the IRB Chairman determined that this research activity is exempt from 45CFR46. The only involvement of human subjects will be in:

**Category 1:** Research conducted in established or commonly accepted educational settings, involving normal education practices, such as research on regular and special education instructional strategies, or research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods, and

**Category 2:** Research involving the use of educational tests (cognitive, diagnostic, aptitude, or achievement), survey procedures, interview procedures, or observation of public behavior, unless: information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and any disclosure of the subjects' responses outside of the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

You must use the enclosed information sheet for all participants.

P.O. Box 1232, Fresno, California 93715-1232 • [www.communitymedical.org](http://www.communitymedical.org)

Community Regional Medical Center • Clovis Community Medical Center • Fresno Heart & Surgical Hospital • Community Behavioral Health Center  
 California Cancer Center • Community Health Center-Serra • Community Substance & Transitional Care Center

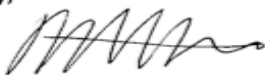


The Institutional Review Board has reviewed this study from an ethical and human subjects protection standpoint. You may need to also obtain operational approval from the facility and/or facility sites where study activities take place.

Exempt Certifications are valid for three years from the date of certification. The study must be re-certified by the expiration date if work is to continue. Also, re-certification is required before implementing any changes involving human subjects.

If you have any questions, please do not hesitate to contact the IRB Office at (559) 499-6553.

Sincerely,



Robert Libke, MD  
Chairman, Institutional Review Board

This is to certify that:

**David Palecek**

Has completed the following CITI Program course:

**Basic/RefresherCourse-HumanSubjectsResearch** (CurriculumGroup) **Human  
Subjects Protection Training** (Course Learner Group) **1 - Stage 1** (Stage)

Under requirements set by:

**University of California, San Francisco**

Completion Date Expiration Date Record ID

15-Apr-2018 14-Apr-2021 25775687



August 16, 2018

To whom it may concern,

David Palecek has my permission to complete collect data, and administer his educational program on the Cardiovascular Progressive Care Unit (CPCU) from December 2018 through May 2019.

Please feel free to contact me regarding any questions or concerns.

Thank you

A handwritten signature in black ink that reads "Terry Nye RN".

Terry Nye RN, MSN Manager of CPCU/8 West  
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