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Reducing Door-To-Balloon Time in STEMI via ER Nurse Driven Protocol

Torrie Clontz

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REDUCING DOOR-TO-BALLOON TIME IN STEMI VIA ER NURSE DRIVEN PROTOCOL

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A doctoral project submitted in partial fulfillment
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Reducing Door-To-Balloon Time in STEMI via ER Nurse Driven Protocol

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Abstract

Over 605,000 patients will suffer an ST-segment elevated myocardial infarction in the United States each year. The gold-standard definitive treatment for this is percutaneous coronary angioplasty or the ballooning open and stenting of the blockage. The American Heart Association has set the evidence-based gold standard of 90-minutes from identification of blockage to reperfusion of heart muscle. In a health system in Las Vegas, NV, this goal is frequently missed due to lack of protocols in place to expedite patients towards definitive treatment. The purpose of this evidence-based practice change is to reduce STEMI patient morbidity and mortality via a nursing intervention. The PICOT question addressed by this project is: in STEMI patients, does the use of emergency room nurse-managed protocol improve Door-to-Reperfusion time? Evidence for this practice change involves the use of protocols in hospital systems that improved reperfusion times, and the use of protocols during off hours when reperfusion times lag the most. Delays in ambulance transport were also addressed as this provides opportunities to improve EMS to ER communication and throughput. Despite this evidence, there remains a paucity of research regarding the nurse role in reducing Door-to-Reperfusion time. The clinical implications of the evidence show that creating a process or protocol will reduce Door-to-Reperfusion times and thus STEMI patient morbidity and mortality. It is therefore not a reach to infer that a nurse-driven protocol can achieve this goal and that is what this evidence-based practice change seeks to attain.

Keywords: STEMI, door-to-reperfusion, nurse-managed protocol, emergency nurse, door-to-balloon

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Last and never least, thank you to my family and friends for supporting me through this wild ride. Thank you for understanding my frequent absence and constant need for naps. Thank you for making me laugh and holding me while I cried, even though it was often irrational and all at once. I cannot wait to finally spend more time with you all. Thank you for supporting me through all of my academic pursuits. I am finally done – for now!

Dedication

This project is dedicated to my grandmother who passed in late 2021 due to end-stage heart failure. She is the reason I pursued a career in cardiac nursing and certainly influenced my love for the cardiac cath lab. I can still hear the click of her mechanical heart valve when I close my eyes. I am so grateful to all of the healthcare workers over the years that helped her live a long and healthy life.

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Chapter I: Introduction

For over 15 years the American Heart Association and the American College of Cardiology have amassed a robust body of evidence correlating 90-minute Door-to-Reperfusion times in ST-Elevation Myocardial Infarction (STEMI) patients with decreased morbidity and mortality. This 90-minute national standard is a benchmark against which all accredited chest pain centers are measured within the PCI data registry. As this joint venture seeks to further decrease the goal time to a *golden hour*, the importance of tight teamwork and streamlined protocols is highlighted even further. Though many studies have analyzed processes to reduce reperfusion time, there is a paucity of research that dissects and seeks to improve the nurse role in this process. The aim of this project was to utilize emergency nurse driven protocol in the form of a flowsheet attached to the nurse identification badge (badge buddy). The badge buddy was intended to condense reperfusion time for STEMI patients in the hope of striving towards the one hour intervention goal, thus reducing patient morbidity and mortality.

Background and Significance

The first description of cardiac blood flow was proposed in 1628 by William Harvey but it was not until 1929 that the first cardiac catheterization was performed by Werner Forssman on himself (Bourassa, 2005). Diagnostic cardiac catheterization was introduced by Andre Cournand and Dickinson Richards in the early 1940s and Mason Sones introduced coronary angiography in the 1960s (Bourassa, 2005). Catheter-based coronary interventions or coronary angioplasty and stenting as it is now known, was introduced in the late 1970s by Andreas Greunzig. Despite this revolution in treatment of coronary stenosis, this treatment did not become the gold-standard management for

STEMI until the late 1990s (Smilowitz & Feit, 2016).

In the early twentieth century, STEMI was often fatal with treatment plans that included oxygen therapy, intravenous fluid administration and bedrest (Smilowitz & Feit, 2016). The first successful coronary artery bypass grafting (CABG) procedure was performed in 1960 by Robert Goetz (Melly et al., 2018). Though this procedure became a gold standard of treatment for coronary artery disease, it is not viewed as a treatment of choice for STEMI or as rapid revascularization. Thrombolytic therapy emerged in 1947 when Sol Sherry utilized streptokinase in cardiac patients, however results were poor due to suboptimal dosing (Smilowitz & Feit, 2016). The landmark efficacy of thrombolytic therapy was demonstrated 1984 by New York University (NYU) and Mt. Sinai School of Medicine when 124 acute MI patients received either intracoronary streptokinase, intracoronary nitroglycerin, both, or none (Rentrop et al., 1984). Over 74% of patients receiving streptokinase showed revascularization of the coronary arteries. The *Gruppo Italiano per lo Studio della Streptochinasi nell'Infarto* (GISSI) study was the first to highlight the efficacy of a *golden hour* for coronary reperfusion when patients receiving intravenous thrombolytic therapy had reduced mortality when treated within 1-3 hours of onset (GISSI, 1986).

Andreas Gruentzig performed the first successful percutaneous coronary angioplasty procedure in 1977 on a 38-year-old man with severe stenosis of his left anterior descending (LAD) artery and shortly thereafter, Geoffrey Hartzler, introduced angioplasty as treatment for acute myocardial infarction (Smilowitz & Feit, 2016). Despite this advancement, early trial comparisons of PCI yielded disappointing results when compared to thrombolytic therapy. The Primary Angioplasty in Myocardial

Infarction (PAMI) study randomized 395 patients to either receive immediate PTCA or thrombolytic therapy (Grines et al., 1993). This was the first study to demonstrate the safety, efficacy, and long-term reduced morbidity and mortality associated with emergent angioplasty as compared to other therapies. This technique was further perfected with the advent of bare metal stents. The Palmaz-Schatz stent was the first balloon-expandable, permanent scaffolding placed within a stenosis to hold it open (Smilowitz & Feit, 2016). The stent PAMI trial was the first to demonstrate the efficacy of permanently stenting versus angioplasty alone and showed significant reduction in 6-month mortality following a STEMI event (Grines et al., 1999). This landmark trial and its proceeding studies bolstered a mountain of evidence establishing coronary stenting as the standard of care for STEMI patients (Smilowitz & Feit, 2016).

With PCI and stenting officially cemented as the gold-standard treatment for STEMI patients, studies began to focus on timing of this procedure for best outcomes. “Door-to-Balloon” time emerged in trials, most notably of which is the GUSTOIIb trial, which found that 30-day mortality was reduced to 1% if PTCA was performed within an hour of presentation (GUSTOIIb, 1997). The amassing of evidence towards the importance of timing in STEMI led to the development of STEMI systems and networks, and with this the American College of Cardiology and the American Heart Association joined forces to build guidelines and track hospital metrics via the CATH PCI registry (Smilowitz & Feit, 2016).

The *time is muscle* hypothesis was proposed over fifty years ago by Eugene Braunweld and multiple studies have since demonstrated that the severity and extent of myocardial ischemic injury from coronary occlusion can be reversed by reperfusion

intervention up to three hours after occlusion (Abreu, 2019). Over 605,00 Americans will suffer from a STEMI this year (Virani et al., 2021). Percutaneous Coronary Intervention is a minimally invasive and rapid procedure that reestablishes myocardial perfusion. The timely reperfusion of cardiac muscle has been shown to improve long-term patient trajectory (McNamara et al., 2006). The American College of Cardiology and the American Heart Association have established the evidence-based guideline of 90-minute Door-to-Reperfusion in order to preserve functional myocardium. See guideline here: [AHA STEMI Guideline](#).

The American Heart Association (AHA) in conjunction with the American College of Cardiology (ACC), established the Mission Lifeline program in 2007 with the goal of tracking and improving STEMI care initiatives in healthcare systems across the country. The program has shown to improve patient outcomes by optimizing STEMI system of care networks to reach the gold-standard 90-minute Door-to-Reperfusion goal (AHA, 2018). The 90-minute Door-to-Intervention standard is based on numerous studies dating as early as the 1990s supporting the reduction in morbidity and mortality by expediting definitive reperfusion treatment. The most recent AHA goal is for 60-minute reperfusion in STEMI patients. In order to reach this goal, many healthcare systems will need to address the weak links in their lifeline system and strive to tighten them.

The most recent Mission Lifeline data from 2016 shows that 95.5% of healthcare systems have exceeded the 90-minute gold standard and are averaging 58 minutes to intervention (AHA, 2018). However, some healthcare systems struggle to meet this standard. A healthcare system in Las Vegas, Nevada falls into this category. A study by Wall (2020) was performed within the same healthcare system where the current project

occurred that analyzed factors that created delays in Door-to-Intervention times. One dynamic that directly affected nursing was the extended time from arrival to the ER to departure to the cardiac catheterization lab. It is this metric that the PICOT question sought to improve.

PICOT Question

The PICOT question sought to answer is directed toward how the emergency room nurse can contribute to reducing Door-to-Intervention times; specifically,:

In STEMI patients, does the use of emergency room nurse-managed protocol improve Door-to-Reperfusion time?

Problem Statement

In the study conducted by Wall (2020), a contributing factor towards Door-to-Reperfusion delay within a Las Vegas healthcare system involved lack of emergency room preparation. Emergency room nurses have the second highest rate of turnover in the profession at 18.5% (Nursing Solutions Inc, 2020). Frequent turnover leads to dilution of information and training. Proper education and training are essential to the emergency nurse in caring for STEMI patients. STEMI preparation needs to be rapid and methodical with a team-based approach. The intention of the STEMI badge buddy (Appendix C) was to organize and prioritize STEMI patient cares and preparation. The badge buddy was intended to help cue the nurse on essential tasks and communication with the care team to expedite transfer to the cardiac catheterization lab once the team arrives. Though the cardiac team serves as the expert in patient preparation, during off-hours the ER nurse becomes the lifeline and primary provider of care for these patients. It is therefore paramount that he or she is empowered with the proper tools to perform this role.

Purpose

The purpose of this project was to reduce Door-to-Intervention times in STEMIs, thereby improving patient long-term morbidity and mortality. *Time is muscle* and with each passing moment, STEMI patients permanently lose viable cardiac tissue. Speed and precision are essential components of cardiac reperfusion and this resuscitation chain begins at the first point of patient contact. The intent of this project was to improve direct nursing impact on this chain of survival. The aim was to determine if an educational tool or guide, in this case the STEMI badge buddy, could reduce delay in reperfusion time for STEMI patients.

Organizational “Gap” Analysis of Project Site

A study conducted by Wall (2020) in a Las Vegas, NV healthcare system analyzed multiple factors that contributed to variance in Door-to-Reperfusion times in STEMI patients. One major metric where reperfusion time could be vastly improved was STEMI activation time. Both field activation by EMS and immediate recognition of STEMI by ER staff can expedite the cascade of STEMI team activation, removing barriers to delays in patient reperfusion. What is collectively lacking in all studies is the nurse role in this process. There is a distinct paucity of research on direct nurse impact on STEMI activation and protocol. Thus, this project sought to give nurses a direct role in improving both STEMI time and patient outcomes.

Chapter II: Review of the Literature

Evidence Search Strategy

A literature search was performed via CINAHL, PubMed, Cochrane, and Web of Science. Variables searched for included STEMI, emergency room nurse, flowsheet, and Door-to-Reperfusion with accompanying synonyms: ST-elevated myocardial infarction, myocardial infarction, ER nurse, nurse, tool, process, protocol, flow, toolkit, door to intervention, intervention, door to needle, and door to balloon. Many of these synonyms were found in the keywords sections of studies regarding cardiac interventions. Searches also included a combination of the search terms as follows: STEMI and flowsheet, STEMI and emergency room nurse, STEMI and Door-to-Reperfusion, and finally STEMI, flowsheet, and Door-to-Reperfusion. Wildcard was also used in order to expand search results. The combination of all four search terms was omitted due to lack of existing evidence. The combination of search terms STEMI, flowsheet, and Door-to-Reperfusion yielded a total of 224 journal articles. Exclusion criteria included unpublished articles, articles unavailable in full-text, and those without clear results. Included articles involved quantitative study methods, were available as full-text, and addressed processes that improved door to reperfusion time. The results from the inclusion and exclusion criteria brought the results to ten articles.

The Hierarchy of Evidence for Intervention Studies tool described by Melnyk and Fineout-Overholt (2015) provided a framework to critically appraise and determine the level of evidence for each included study. Studies included systematic reviews, meta-analyses, randomized control trials, case-controls, and cohort studies. The ten qualifying

studies ranged from evidence level I to IV per the Hierarchy of Evidence (Melnyk & Fineout-Overholt, 2015).

Themes from the Evidence

Supporting studies were procured based on their connection to the PICOT question. A majority of studies were selected based on the use of Emergency Department protocols that aimed to reduce Door-to-Balloon time. The bulk of included studies created a workflow, intervention, protocol, or process that improved reperfusion time via hospital or emergency room staff intervention. These are particularly important as this project goal was to determine if an emergency room nurse badge buddy flowsheet can improve Door-to-Balloon time. Thus, they highlighted the need for a specific nurse-driven process.

However, additional factors beyond the emergency department also shed light on the pivotal role of the ER nurse in collaborating with EMS and external departments to coordinate STEMI patient care and expedite treatment. With pre-hospital activation of STEMI patients occurring regularly, it is essential to analyze factors that both delay and accelerate these patients to treatment before they reach the emergency department and reperfusion treatment. The remainder of studies analyze these factors. All studies support the reduction in time to reperfusion via quality improvement processes.

Team Approach

Evidence from the literature supports the use of a skilled team and streamlined processes in providing a rapid transition from Door-to-Balloon. Both Isono et al. (2018) and Khot et al. (2015) utilize team approaches to expedite patients towards PCI. Isono et al. created *Training for Effective and Efficient Activation in Medical Service- Better*

Process (TEAMS-BP) in the emergency department across multiple modalities including physicians, nurses, EKG and radiology techs, and unit clerks that streamlined the order of operations in order to recognize and rapidly activate a STEMI and swiftly transfer to the cardiac cath lab. Khot et al. (2015) utilized an in-house *Emergency Heart Attack Response Team* (EHART) comprised of a mixed-skill nurse team from the emergency department, intensive care unit, and the chest pain unit. These nurses would gather the patient and transport to the cardiac cath lab providing necessary cares and preparation until the STEMI team and cardiologist arrived (Khot et al., 2015). Both processes yielded significant improvement in Door-to-Reperfusion times demonstrating that both nurses and emergency department teams have the power to improve patient outcomes with proper directive. Both studies aimed to show how synergistic team effects and protocols improve Door-to-Balloon times and this is applicable to implementation of an emergency nurse protocol as ER STEMI prep requires the synchrony of the team.

Emergency Room Protocols

When a STEMI patient crosses the ER threshold, the countdown to reperfusion time begins. Ninety minutes is only an adequate amount of time to treat these patients if the condition is rapidly recognized by personnel. Kumar et al. (2020) instituted a comprehensive STEMI protocol (CSP) for rapid activation by the ER. Takakuwa et al. (2009), and Coyne et al (2015) both utilized ER specific protocols particularly as they relate to door to EKG times, while Yiadom et al. (2017) examined the missed case rate for STEMI patients by evaluating door to EKG times retrospectively. Takakuwa et al. (2015) and Coyne et al. (2015) looked very directly at the effect of door to EKG delays on Door-to-Balloon. Takakuwa et al. (2009) discovered that door to EKG time in under

ten minutes reached 100% compliance in chest pain patients after the implementation of a protocol, however Door-to-Balloon time only improved when the cath lab team was on site. These results are also somewhat limited by the smaller sample size.

Coyne et al. (2015) developed a process that improved door to EKG time in walk-in chest pain patients that included a cardiac complaint triage protocol for rapid identification of potential STEMI patients. This study was particularly important because it focused on the essential role of the ER triage nurse in rapidly identifying STEMI patients and expediting activation of the STEMI team and process. Both door to EKG and Door-to-Reperfusion times yielded significant improvement as a result of this protocol.

Yiadom et al. (2017) examined the missed case rate (MCR) in STEMI patients by retrospectively analyzing the proportion of STEMI patients that did not receive an EKG within 15 minutes of ER arrival. The mean door to EKG time on MCR STEMI patients was 31 minutes, correlating with a major delay in STEMI team activation and coronary reperfusion (Yiadom et al., 2017). This study highlighted the essential role of the ER triage nurse in properly identifying potential STEMI patients. The facilities in the study with the lowest MCRs had nurses as the primary point of contact, representing nursing's pivotal role in expediting the Door-to-Reperfusion cascade.

Kumar et al. (2020) evaluated the impact of an emergency department-based comprehensive STEMI protocol bundle on patient morbidity and mortality. The bundle included ER physician activation of the STEMI team, a STEMI safe checklist, immediate cath lab transfer, and radial-first access for catheterization (Kumar et al., 2020). The bundle yielded a reduction in Door-to-Balloon time, incidence of cardiogenic shock, size of infarct, and in-hospital mortality in addition to greater one-year survival (Kumar et al.,

2020). Though this study utilizes a STEMI checklist, it is not described or presented within the discussion. Though a correlation can be made between the use of the flowsheet and improvement of Door-to-Reperfusion, its utilization by nursing is not defined and thus further exploration on a nurse-specific flowsheet for STEMI patients is warranted.

Pre-Hospital Factors

Door-to-Balloon countdown sometimes begins at the patient's front door. Pre-hospital activation of STEMI by EMS via radio telemetry and electronic EKG transmission allows for early recognition and activation of the STEMI team. Studies by Shi et al. (2018) and Hagiwara et al. (2017) address pre-hospital activation and direct door to cardiac catheterization lab transfers. These studies and analyses are important because they represent the limitation in time to definitive treatment to meet the standard due to external factors and they demonstrate the essential need for ER staff to have a streamlined process for patient transfer to intervention. Hagiwara et al. (2017) presents a systematic review analyzing multiple studies and demonstrates that direct ambulance to cardiac catheterization lab transfer reduces door-to-Balloon time and patient mortality. Despite the lack of major emergency room involvement in patient preparation in these instances, the department and nurses in particular, play a pivotal role in the coordination of direct transfer. The ER nurse receives the incoming call from Emergency Medical Services (EMS), along with the EKG transmission. They then become the coordinators of the cardiac team, expediting the process by activating the STEMI process. Though this process is labeled "direct to cath lab," patients still often stop in the ER and are prepared and rapidly expedited for PCI. Shi et al. (2018) inspect delays in EMS STEMI transfers and illustrated how pre-hospital electronic transmission of an EKG expedites patient

transfer for PCI. When the ER is notified about a STEMI and has a process in place to expedite patients towards definitive treatment, they are propelled into action. Both pre-notification by EMS and a nurse-driven flowsheet can synergistically improve Door-to-Balloon times by providing early activation and immediate preparation for treatment upon arrival.

STEMI Activation Protocols

In order to activate the cascade of cares necessary to definitively treat a STEMI patient, there must be a process in place. Both Ginanjar et al. (2020) and Holmes et al. (2008) discuss how system-wide STEMI activation protocols improve Door-to-Reperfusion times by creating a standardized clinical pathway. Ginanjar et al. (2020) utilizes an emergency physician to implement the STEMI pathway in a facility where a STEMI activation protocol had not existed prior. Door-to-Balloon time improved by 130 minutes or 45% revealing how standardized processes can have a major impact on patient outcomes (Ginanjar et al., 2020). Holmes et al. (2008) implemented the Mayo Clinic STEMI protocol to optimize timeliness of PCI that included the first incidence of 10-minute door to EKG, ER activation of STEMI team, and a 30-minute team arrival. Holmes et al. (2008) analyze how STEMI activation protocols decrease Door-to-Balloon time particularly in the setting of off-hours for the STEMI team because PCI registry data demonstrated significantly longer Door-to-Reperfusion times and increased hospital mortality for patients treated during these times. It is paramount to implement excellent rapid STEMI protocols during off hours because there is a delay from the cardiologist and cardiac team coming in from home. Staff in the ER also tends to be less experienced on night shift overall which can contribute to slower times. This study demonstrates an

additional necessity of a flowsheet with a standardized process for ER nurses to prepare STEMI patients for PCI due to wider staff knowledge gap during off hours and greater delays involving the STEMI team. The ER nurse becomes an essential and central component of Door-to-Balloon process expedition. A protocol that guides the ER nurse can promote a seamless and immediate transition from the door to reperfusion therapy. These studies do in fact demonstrate how systems and protocols in general expedite treatment of STEMI patients, however, without specific departmental protocol or flow, there can still be further delays in treatment.

Delays in door to balloon are multifactorial. Sources include EMS lag or lack of pre-hospital notification, prolonged time prior to EKG, and excessive time spent in the ER prior to transport to cardiac catheterization lab. These studies embody the importance of the use of protocols that decrease Door-to-Reperfusion time and thus they contribute evidence that a nursing protocol can improve Door-to-Balloon time. Each of these processes are different and yet they impact Door-to-Reperfusion time. However, a majority of these studies and the literature in general are lacking the element of nurse-driven protocols and interventions. It is not a reach to predict that an emergency nurse-driven protocol can also improve Door-to-Reperfusion time based on the evidence provided in extant interdisciplinary scholarly literature.

Needs Assessment and Description of Project

Evidence within the literature review links standardized STEMI protocol and processes with improved patient outcomes. Thus this project aimed to reduce Door-to-Reperfusion time and improve patient outcomes via utilization of an emergency nurse-driven protocol in the form of a STEMI badge buddy flowsheet. This flowsheet will list

and prioritize STEMI patient nursing cares in order to organize and streamline patient preparation for transfer to the cardiac cath lab for percutaneous coronary intervention (PCI). The availability of the flowsheet in the form of a badge buddy allows for it to be part of the uniform and readily available for staff to reference at all times.

Population

The population for this project included all adult patients ranging in ages 18 to 89 presenting to the emergency department at one of three participating hospitals within the same healthcare system with a diagnosis of ST-elevation myocardial infarction (STEMI). These patients needed to successfully transfer to the cardiac catheterization lab from the emergency department regardless of cardiac catheterization treatment (stent, bypass, or diagnostic angiogram only) in order to meet inclusion criteria. Inpatient STEMIs, cancelled activations, and expirations were excluded due to lack of door-to-door time tracking.

Sponsor and Stakeholders

The primary sponsor for this project included three hospitals within the same healthcare system in Las Vegas, NV. The key stakeholders desiring to improve STEMI patient outcomes included hospital administrators and leadership, STEMI patients and their families, ER clinical staff, cardiac cath lab staff, UNLV nursing, the nursing profession, the multidisciplinary team, and the cardiology community at large.

Organizational Assessment

This hospital system in which the project was executed provides patient care nationwide, operating over 400 acute care hospitals. There is a total of six acute care

hospitals within the system operating in the greater Las Vegas, NV region. This project took place within three of those facilities.

Team Selection

The team for this project was comprised of emergency department nurses employed at the three participating facilities on all shifts. Nurses included in the intervention were those participating directly in STEMI patient treatment and preparation within the ER. Additional team members included the STEMI coordinators who collected and abstracted all data for analysis.

Cost-Benefit Analysis

This project had a zero dollar cost with the potential benefit of improving STEMI patient outcomes.

Scope of Project

The scope of this project included staff education and training on use of the STEMI Prep Protocol badge buddy, implementation of the badge buddy over a three month period within the three ERs, collection, and evaluation of data regarding STEMI door-to-door and door-to-balloon times, and collection and comparative evaluation of three months of data prior to the use of the flowsheet.

Mission, Goals, and Objectives

The mission of this project was to utilize a nurse-driven protocol to reduce Door-to-Reperfusion time in STEMI patients to align with ACC/AHA guidelines. The main goals of this project were to reduce Door-to-Door times by tightening ER processes via the STEMI badge buddy within the three month period, improve ER nurse knowledge of STEMI patient preparation, foster a teamwork approach in patient care, and improve

patient outcomes. The primary objective of this project was to improve STEMI patient outcomes by reducing the time between ER admission and cath lab transfer.

Chapter III: Theoretical Framework

The guiding theoretical framework for this project was the Donabedian model of healthcare quality measurement (Appendix A.). Avedis Donabedian, a physician and health services researcher at the University of Michigan, began developing a conceptual model that could examine and evaluate quality of healthcare (Ayanian & Markel, 2016). This model utilizes the triad of structure, process, and outcome to evaluate quality of care. Structure includes the setting, provider qualifications, and administrative systems that comprise the physical and organizational characteristics of the healthcare action. Process involves the components of delivered care such as services or treatments. Outcome is composed of patient recovery, restoration of health and function, and survival (Ayanian & Markel, 2016). Outcomes can measure individual and collective performance and may be utilized to form an organizational standard of care (Donabedian, 2005).

In applying the Donabedian model to this project, the structure is comprised of the physical hospitals and emergency departments, departmental staff, and physical equipment. Process factors include the process of implementation of an ER nurse STEMI flowsheet. The patient outcomes measured via Door-to-Door and Door-to-Reperfusion times thus directly correlate with the effect of the process factor.

The targeted component of the model that this project sought to improve was process. In the emergency departments within this hospital system, there was a lack of distinct methodical workflow in preparing STEMI patients for cardiac catheterization. Utilizing hospital policy and the ACC/AHA guidelines, a worksheet that organized nursing tasks served to create an organized process that standardized and streamlined STEMI patient care.

Chapter IV: Project Plan

This project design represents quality improvement (QI) in nursing care delivery with a design focused on process improvement. This project was a quantitative study focusing on how the use of an ER nurse STEMI flowsheet worn as a badge buddy could reduce time to cardiac reperfusion. The study compared retrospective data within the same timeframe to determine if the process improvement successfully reduced intervention times. The proposed intervention was simple, clear, and logical, organizing and prioritizing essential nursing processes to prepare a STEMI patient for reperfusion treatment.

Setting

The setting for this project included three emergency departments in community hospitals within the same healthcare system in Las Vegas, NV, a large metropolitan area. Each emergency department averages forty beds and is typically staffed by eleven or more nurses on each twelve hour shift with additional coverage at mid-shifts. Each department has a triage nurse and charge nurse. Each department staffs varying amounts of ER technicians, EKG technicians, CNAs, laboratory staff, and pharmacists. All emergency departments are operational 24 hours a day, seven days a week. Each hospital included in the project has a full-service cardiac cath lab and two of three hospitals also have an open heart program. The hospitals are located in the south, west and north quadrants of the Las Vegas community and have 328, 485, and 336 beds respectively. Participants in the project included ER nurses, ER nurse leadership, STEMI coordinators, and STEMI patients.

Population of Interest

The population of interest for this project included adult STEMI patients transported from the emergency department to the cardiac cath lab and the ER nurses directly involved in the care and preparation of these patients. This project involved over 100 emergency department nurses across three hospitals. Inclusion and exclusion criteria are detailed in chapter two.

Measures, Instruments, and Activities

In order to measure the outcome of this DNP project, the developed STEMI Prep Protocol badge buddy was utilized to determine if there was an improvement in Door-to-Door and Door-to-Balloon times pre and post-intervention. Primary outcome measures included Door-to-Door time before and after use of the flowsheet. Secondary measures included pre and post Door-to-Balloon times.

The instrument utilized in this project is an ER nurse STEMI Prep Protocol flowsheet in the form of a badge buddy that prioritized patient care in order to streamline the preparation process from ER door to cath lab. The instrument was developed utilizing AHA/ACC guidelines and hospital policies. The flowsheet items were selected based on their tendency to cause delay or risk of harm to patient. The flowsheet included cares such as: obtaining an EKG, undressing the patient completely, placing and/or verifying function of two IVs, placing defibrillator pads front and back, providing/verifying administration of aspirin or documenting a contraindication, and verifying consenting party (patient/proxy). The activities for this project included education of ER nurses regarding the purpose and use of the flowsheet, and measurement of pre and post flowsheet STEMI times.

Educational Orientation for Instrument

In order to properly introduce the instrument, education about the badge buddy was provided at all three ERs at both day and night changes of shift huddle. This education was coordinated with ER leadership and was provided more than once within the week in order to reach as many nurses as possible and prevent dilution of information. The education was provided via a short PowerPoint presentation (approximately five minutes) and it included a breakdown of the meaning of the components of the badge buddy along with its distribution to staff.

Timeline

This project was implemented from November 1st of 2021 and concluded January 31st, 2022. Permission to utilize the flowsheet in the emergency departments was obtained from leadership and STEMI coordinators. Staff education regarding the flowsheet began one week prior to implementation. Data was collected from existing Electronic Health Record data for the three month period prior to the intervention and compared with the subsequent three-month interventional period. The project was analyzed and subsequently disseminated in the Spring of 2022.

Project Tasks and Personnel

Project tasks included staff education, provision of badge buddy flowsheet, and collection and evaluation of data. Project personnel included myself, ER nurses, ER leadership, STEMI coordinators, and DNP project committee.

Resources and Supports

Resources and supports for this project included STEMI coordinators, ER leadership, the UNLV DNP project committee, cardiac cath lab staff, and hospital administration.

Risks and Threats

Risks and threats to this project were minimal. The largest risk factor was lack of ER staff compliance or rejection of the project by hospital leadership. An unforeseen risk was the impact of the COVID-19 pandemic on emergency department staffing and resignation coupled with internal disaster ambulance divergence due to the Omicron variant.

Institutional Review Board

The University of Nevada Las Vegas Internal Review Board (IRB) approval was obtained prior to initiating the DNP Project. The official IRB Determination Form was submitted as soon as the proposal was approved.

All participants (STEMI patients) were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which protects the privacy of patients' health information (Modifications to the HIPAA Privacy, Security, Enforcement, and Breach Notification Rules, 2013). Additionally, the DNP student and practice personnel who conducted this project followed the standards of care and hospital policy for nursing in the emergency department. All information collected as part of evaluating the impact of this project was aggregated data from the project participants and did not include any potential patient identifiers.

The risk to patients participating in this project was no different from the risks of patients receiving standard STEMI care. Participant confidentiality was assured by utilizing data that was already abstracted from the electronic health record by a designated employee (STEMI coordinator). All patient identifiers were removed prior to accessing the necessary data to complete the project. All electronic files containing

identifiable information were password protected to prevent access by unauthorized users and only the project coordinators had access to the passwords.

Evaluation Plan

This DNP project was a case control study comparing pre and post intervention door times. The project measured change in Door-to-Door and Door-to-Balloon times after utilization of the STEMI Prep Protocol badge buddy flowsheet. Descriptive statistics were performed both on interval and non-interval data including patient arrival time to ER during cath team on or off hours, day or night shift arrival and mode of arrival. Run charts were utilized to display the mean time data within each month of the project at all hospitals combined. The run charts serve to give a visual analog for mean door times given correlative groups. Linear regression and interactionary tests were performed to determine the effects dependent variables had on each other in the overall time outcomes. The Chi square test was also utilized to determine if there is a correlation between demographic groups and outcomes such as day or night shift door times, mode of arrival and door times, and on or off cath lab shifts and door times. Data was also compared between hospital sites to determine if there was a specific correlation with services offered and Door-to-Balloon speed (i.e. open-heart hospital vs. not).

Both pre and post-intervention data was collected from a pre-existing excel spreadsheet from the STEMI coordinator at each hospital who extracts STEMI patient data from the electronic health record and STEMI time tracking sheet. Data was collected in a Microsoft Excel spreadsheet and included the following data: date of STEMI, Time of STEMI activation, ER arrival (door) time, ER arrival mode (EMS or walk-in), STEMI team on or off time, day or night shift, door to door time, door to balloon time (if

intervention is necessary). Data was collected over a six month period with three months incorporating the intervention. The primary dependent variable was Door-to-Door time with Door-to-Balloon as a secondary variable. Statistical analysis was performed utilizing SPSS software and with the guidance of UNLV's statistician Dr. Song to determine accuracy of statistical tests performed.

Chapter V: Summary of Implementation and Results

Précis

The goal of this project was to determine if nurse driven protocol delivered via an education initiative would successfully decrease treatment times in STEMI patients. The purpose of this project was to reduce the time to definitive treatment for STEMI patients in order to meet or exceed national American Heart Association time goals. The problem examined within the project is the lack of organizational or nurse-empowered protocol to improve delivery of care to this patient population. The creation of this protocol illustrated the positive impact of empowered ER nursing care.

Threats and Barriers

There were numerous threats and barriers to this study. Most of these were foreseen prior to implementation, due in part to the COVID-19 pandemic. The pandemic itself was a major threat and barrier due to its impact on staffing within the hospitals. A large portion of emergency nurses resigned during the implementation of this project creating some difficulty in the education process. The change in IRB process led to numerous delays in the implementation timeline. Obtaining permission to commence the project from the proper corporate entity also proved to be a barrier to initiation of the project. Overall, a majority of barriers simply led to a prolonged timeline and did not necessarily impact the project or results themselves. Threats and barriers that may have effected outcomes of the study include the emergency nurse staffing turnover as education may have become diluted. The rise of the omicron variant and major ambulance delays due to overfilled ERs may also have threatened the results of the

project. Overall, despite accounting for these factors, the project was still rather successful.

Monitoring of the Project

The project was monitored on a monthly basis with data collection from the STEMI coordinators occurring the following Friday after the close of each month. Education and supplies were verified as available in each emergency department to staff every month. Leadership had access to my contact information in order to notify of needs or changes. Data was sorted and evaluated monthly to track progress.

Data Collection

Data was collected monthly for a period of six months from the STEMI coordinators. This data was obtained by the coordinators from the electronic health record (EHR) and STEMI time-tracking log utilized in the ER. Data obtained was deidentified and sorted from the large databases to select only for patients meeting project criteria. The collected data was organized by date, time of page, facility, mode of arrival, door-in time, door-out time, reperfusion time and cath lab off time within Excel spreadsheets.

Data Analysis

Data analysis was performed utilizing IBM SPSS and Microsoft Excel with the assistance of Dr. Huaxin Song, statistician for UNLV school of Nursing. Dr. Song was provided with the Excel spreadsheets in order to complete data analysis. Collaboration with Dr. Song occurred via university e-mail and Zoom meetings. Univariate analysis via descriptive statistical tests along with between-subjects effects tests via ANOVA table were performed utilizing the software. Linear regression model was also applied to the

data to determine the effects of the independent variables on the dependent variables of Door-to-Cath lab and Door-to-Reperfusion times. Chi square testing was also performed to determine association between day/night shift and cath team on/off times.

Overall n number of qualifying STEMIs included 65 prior to intervention and 64 post. Time differences between facilities were not found to be statistically significant during analysis and thus times from all participating hospitals are combined and averaged for final evaluation. Day shift versus night shift times were also not found to be statistically significant or contributory and were thus excluded from final analysis of factors. Chi square testing also revealed that there was not a statistically significant relationship between day/night shift and on/off times for the cath team with a value of 3.017, p -value 0.008.

Factors included and displayed within the run charts are those of statistical significance with p value < 0.05 . They include: arrival via EMS versus POV, cardiac cath team on versus off time, and overall mean time values. The overall Door-to-Cath Lab time decreased by about 8 minutes overall during the intervention period, but more importantly, the standard deviation of times was cut in half. Door-to-Reperfusion times dropped by 5 minutes overall but once more, the standard deviation declined by over half. Linear regression analysis was also utilized to determine the interactional effects of variables versus raw data effects. The purpose of utilizing this model in addition to data was to determine how the data may line up under more ideal, non-pandemic conditions. Using the model, the primary dependent variable of Door-to-Cath Lab time had a predicted value linear regression model change post intervention of -10.542 with a p -value of 0.027. The overall Door-to-Reperfusion (secondary dependent variable) linear

regression-predicted time change post intervention was found to be -18.47 minutes with a *p-value* of 0.03. Under more ideal conditions, the Door-to-Reperfusion time may have had more significant decreases. However, this timeframe cannot necessarily be directly impacted by nursing intervention in the same way that Door-to-Cath Lab can. Overall, times may improve under ideal conditions but the improvement in time despite the conditions is still impactful by comparison.

Table 1 displays the means and standard deviations for raw data:

Table 1

Pre and Post-intervention Time Mean and Standard Deviation

Measure	Pre		Post	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Door-to-Cath Lab				
Time	45.2	32.92	37.23	18.25
Door-to-Reperfusion				
Time	68	38.29	63	16.23

$p < 0.008.$, $n_{pre}=65$, $n_{post}=64$

Figure 1 displays the run chart for Door-to-Cath Lab times:

Figure 1

Average Door-to-Cath Lab Time per Month

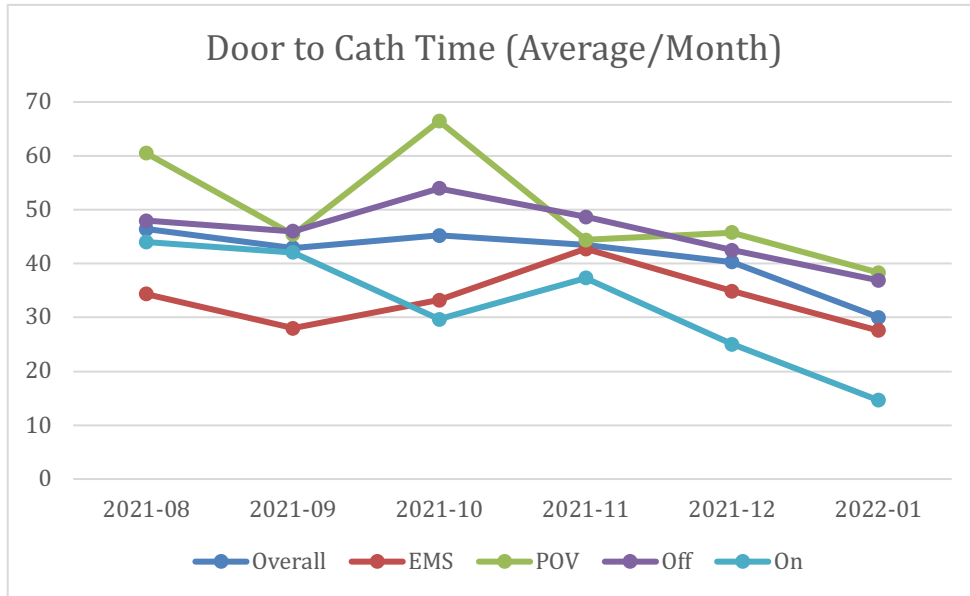
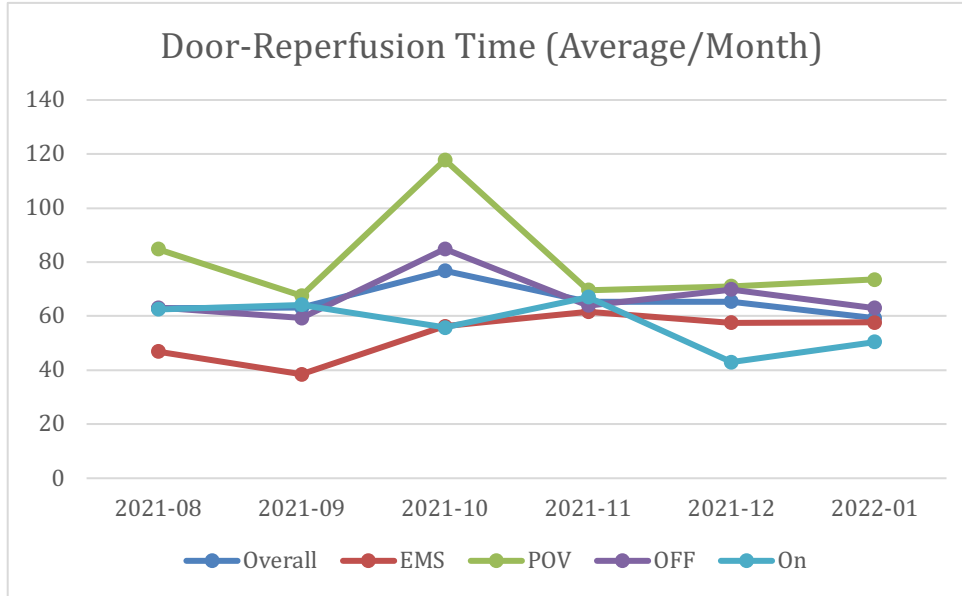


Figure 2 displays the run chart for Door-to-Reperfusion times:

Figure 2

Average Door-to-Reperfusion Time per Month



Project Meaning

Discussion of Results

As displayed in the table and figures above, some of the effects of the change in door times were impacted by the lag in EMS times. This is due to the unexpected event of the omicron variant's impact on emergency room occupancy and ambulance diversion to decompress bursting emergency rooms. Even if a patient was having a medical emergency, at certain times, particularly in December, some hospitals may not have been capable of receiving the STEMI as urgently, thus delaying overall time. Though in general it is typically faster to arrive by ambulance, in this single point in time, mode of arrival did not make a difference. This is an important factor to analyze beyond this project as we ponder the impact of the COVID-19 pandemic on emergency medicine as a

whole. This parameter provides a visual analog of how not only was the virus itself deadly, but so was its impact on emergency care in general. Though the pandemic itself may be waning, its fallout due to delay in medical treatment for other disease processes is certainly felt within the healthcare community.

The most significant factor impacting door times is the presence of the cath team on hospital campus. Though these are the fastest times, likely due to the team's ability to help the ER staff prepare the patient, it is important to note that overall, all Door-to-Cath lab times decreased. It is especially essential to emphasize that the times decreased without the presence of the cath team. This is important because it is the most accurate display of the impact of the education and the ability of emergency nurses to improve cardiac patient outcomes.

Remediation of Problem

These results, particularly those associated with Door-to-Cath lab times, do in fact illustrate that an ER nurse driven protocol can improve Door-to-Cath lab and Door-to-Balloon times in STEMI patients. More importantly, the results highlight the dedication of nurses to improve care despite the added strain of a pandemic. This education could easily be applied to any emergency department and be offered as part of orientation to all oncoming staff members. The accessibility of the education in the form of a badge buddy ensures that staff have a reference on hand whether they are brand new or seasoned.

Connection to the Literature and Theory

This project sought to bridge the gap between existing literature in which hospital protocols and algorithms were created and apply them directly to nurse-driven procedure. Much like the other studies, this project improved STEMI patient reperfusion times via a

protocol. This project differs from other studies as it provides a step-wise visual analog to aid staff in preparing patients. It is also the first study of its kind directed at nursing. This project joins a larger body of research seeking to improve care delivery for STEMI patients and it could certainly be applied within other emergency departments or adapted for use hospital-wide.

The theoretical framework for this project was the Donabedian Model of healthcare quality measurement. In applying the Donabedian model to this project, the structure was comprised of the physical hospitals and emergency departments, department staff, and physical equipment. Process factors included the process of implementation of an ER nurse STEMI flowsheet or the badge buddy. The patient outcomes measured via Door-to-Door and Door-to-balloon times thus directly correlate with the effect of the process factor.

The targeted component of the model that this project sought to improve was process. In the emergency departments within this hospital system, there was a lack of distinct methodical workflow in preparing STEMI patients for cardiac catheterization. Utilizing hospital policy and the ACC/AHA guidelines, a worksheet worn as a badge buddy that organized nursing tasks served to create an organized process that standardized and streamlined STEMI patient care. Overall, this model supported how both structure and this process change improved STEMI patient outcomes.

Improvement of Patient Outcomes

STEMI patients lose viable cardiac muscle with each passing moment. Many studies have been aimed at efforts to improve door-to-reperfusion via processes, algorithms, and protocols. The AHA/ACC guideline for reperfusion is currently ninety

minutes but studies have shown that one hour is truly the benchmark in terms of long term morbidity and mortality for STEMI patients. As this guideline seeks to meet this benchmark at this *golden hour*, many processes must be tightened. This project aimed to improve nursing impact on patient outcomes. Many of the STEMI patients treated within the duration of this project met or exceeded the 60 minute goal time, reflecting an improvement in STEMI patient outcomes. Not only does this have a positive effect on patients but also the nursing profession as a whole. This project illustrates the positive impact of nurse-driven protocol on patient outcomes and was the first of its kind to highlight nursing's pivotal role in STEMI care. Hopefully this, or protocols of its kind, will find its footing among other *golden hour* protocols such as those for trauma, stroke, and sepsis.

Sustainability

This project served as an example of how education and nurse-driven protocol can have a positive impact on patient outcomes. This project is not only sustainable but could certainly be expanded to be included for all ER nurse onboarding, and could be utilized within the entire healthcare system in which it took place. The education is quick, simple, and accessible to nurses at all levels of expertise. Due to low cost both in terms of money and time, this project could be applied to hospitals of all sizes and budgets.

Utilization and Dissemination of Results

Future Scholarly Activity

Future scholarly activity related to this project will include a secondary analysis of the impact of the COVID-19 pandemic on non-coronavirus patient outcomes, particularly as it applies to emergency medicine and STEMI patients. The findings

related to delayed EMS arrival times lends itself well to the overall impact of the pandemic on the healthcare system and seeks to look beyond the impact of coronavirus itself. This lag in emergency service shows how deadly the pandemic was for all emergent presentations.

Other scholarly activity will include a second PDSA cycle that would seek to include this education for all emergency nurse orientation moving forward. This plan would allow for the integration of the badge buddy flowsheet into nursing training to ensure that all nurses receive the education regardless of the project intervention time. Continuously implementing the education would ensure that STEMI times are continuously met and improved along with delivery of care as a whole.

The final main activity related to this project will be the adaptation of the flowsheet for stroke patient care particularly as it applies to mechanical thrombectomy. The badge buddy could then become a two-sided reference to improve the care process for emergencies that must meet a rapid time benchmark.

Plan for Dissemination

The initial dissemination of this project will take place in three parts: sharing of data with STEMI coordinators and cardiac services leadership at the hospital system, poster presentation at the Western Institute of Nursing Conference, and presentation for the Nevada Nurses Association.

Following successful defense of this project, the data will be presented and shared with key stakeholders in the healthcare system in which the project took place. This data will be particularly useful for STEMI coordinators as they seek to continuously improve STEMI times. Sharing the outcomes will likely lead to additional research into how other

links in the STEMI chain of survival can be improved. Though this project focused on nursing, there are certainly other influences on overall time such as EMS delay and cardiologist arrival. This data will not only show the system how nursing care can be improved but how to close other gaps in the continuum as well.

This project will be shared at the Western Institute of Nursing Conference *Creating a Nursing Force for Change* in the form of a poster presentation in Portland, Oregon on April 8th, 2022. This project was chosen as one of the scholarly projects to represent UNLV School of Nursing at the conference and a sponsorship was provided.

This project will be disseminated in the form of a PowerPoint presentation with voiceover along with question and answer segment at the Nevada Nurses Association event *UNLV DNP Project Conference* on April 19th, 2022. This project will be presented along with all graduating DNP students within the cohort.

The final goal for dissemination of this project is publishing to increase both discoverable DNP project knowledge and offer a nursing led protocol that could be applied to any emergency department. As there was a paucity of research regarding the nurse's role in STEMI care, this project seeks to bridge the gap. In order to do so, the information must be accessible publicly. The ultimate goal is for other facilities to find utility in this project and utilize it as a resource to improve patient outcomes.

Conclusion

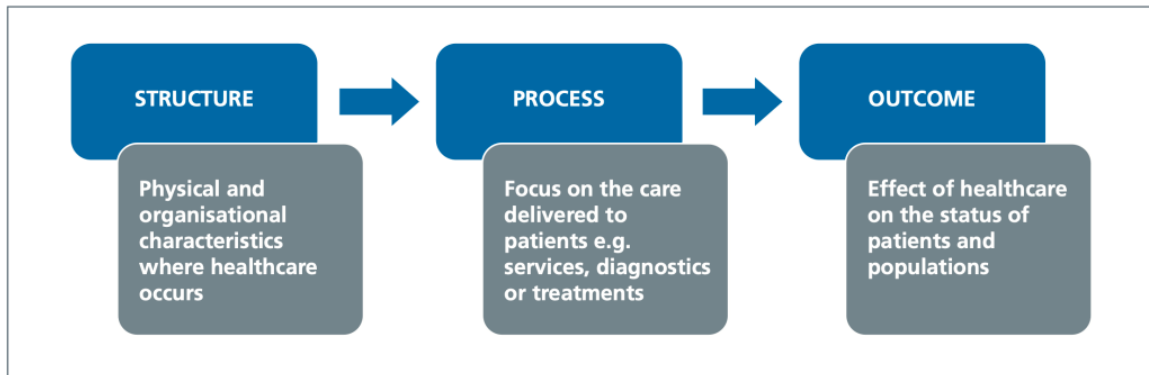
This DNP project sought to determine how emergency nurses can expedite and streamline Door-to-Reperfusion time via the use of a protocol or tool. As time is muscle, emergency nurses play a pivotal role in accelerating patient care for definitive treatment. Though there is a large body of research regarding methods to improve Door-to-

Reperfusion, there exists a paucity of studies that directly address the nurse's role in improving care. This project aimed to establish a protocol involving a wearable flowsheet that can be effective in meeting these care goals thus improving patient outcomes. This nurse-driven protocol successfully improved door-to-cath lab and door-to-reperfusion times in STEMI patients despite the onslaught of the omicron variant in the COVID-19 pandemic. This educational tool is affordable, accessible, and effective and can be utilized to improve STEMI patient times and outcomes widely.

Appendix A

Figure 3

The Donabedian Model



Appendix B

Figure 4

STEMI Prep Protocol Badge Buddy

- STEMI Prep Protocol:
1. 12-lead EKG
 2. Fully undress patient
 3. Defibrillator pads front and back
 4. 2 large-bore IVs
 5. ASA (verify/document/administer)
 6. Consent status (patient/family/MD emergent)

Appendix C

Table 2: Data Collection Spreadsheet

STEMI Data Collection Tool

Date	Time of Page	Mode of Arrival	Month-Year	Door Time	Day Night	Door to CL time (minutes)	Door to Reperf Time (minutes)	Cath Team Off	Pre Post	Location
8/1/21	11:40	EMS	2021-08	11:49	1	33		OFF	Pre	SV
8/1/21	14:46	POV	2021-08	14:38	1	54	69	OFF	Pre	SH
8/1/21	14:24	EMS	2021-08	13:36	1	79		OFF	Pre	CH
8/3/21	0:07	POV	2021-08	23:53	0	61	79	OFF	Pre	SH
8/4/21	10:16	EMS	2021-08	10:24	1	6	24	On	Pre	SV
8/6/21	13:29	EMS	2021-08	13:45	1	25	52	On	Pre	SV
8/6/21	14:30	EMS	2021-08	13:46	1	91		On	Pre	CH
8/8/21	12:26	EMS	2021-08	12:33	1	42	78	On	Pre	SV
8/8/21	17:37	EMS	2021-08	17:43	1	38	62	OFF	Pre	SV
8/14/21	16:00	POV	2021-08	15:40	1	72	85	OFF	Pre	SH
8/15/21	22:01	POV	2021-08	22:01	0	59		OFF	Pre	CH
8/16/21	6:29	POV	2021-08	6:06	0	64	96	OFF	Pre	SV
8/16/21	10:08	POV	2021-08	9:59	1	21	46	On	Pre	SV
8/16/21	14:29	EMS	2021-08	14:25	1	22	34	On	Pre	SH
8/16/21	11:39	EMS	2021-08	11:48	1	14	26	On	Pre	SH
8/16/21	18:35	EMS	2021-08	18:47	1	38	66	OFF	Pre	CH
8/18/21	14:29	POV	2021-08	14:17	1	35	53	On	Pre	SV
8/19/21	15:56	EMS	2021-08	16:09	1	16	37	OFF	Pre	CH
8/20/21	7:51	POV	2021-08	7:42	1	48	77	On	Pre	SV
8/21/21	11:15	EMS	2021-08	11:21	1	30	38	OFF	Pre	SH
8/21/21	17:35	EMS	2021-08	17:40	1	30	56	OFF	Pre	CH
8/22/21	15:53	POV	2021-08	15:34	1	52		OFF	Pre	CH
8/26/21	12:59	POV	2021-08	11:09	1	136	173	On	Pre	SV
8/27/21	22:42	POV	2021-08	22:33	0	37		OFF	Pre	CH
8/28/21	12:19	POV	2021-08	11:38	1	87		OFF	Pre	SV
8/29/21	16:10	EMS	2021-08	16:20	1	17	43	OFF	Pre	SV
9/1/21	12:00	POV	2021-09	11:48	1	20	52	On	Pre	CH

9/2/21	11:13	POV	2021-09	11:08	1	19	53	On	Pre	SV
9/2/21	0:44	EMS	2021-09	0:57	0	36	45	OFF	Pre	SH
9/3/21	22:09	POV	2021-09	22:02	0	49	71	OFF	Pre	CH
9/6/21	12:02	POV	2021-09	11:50	1	79	90	On	Pre	SH
9/8/21	10:24	POV	2021-09	10:15	1	41	64	On	Pre	CH
9/9/21	13:11	POV	2021-09	12:52	1	56	77	On	Pre	SH
9/16/21	12:23	POV	2021-09	12:09	1	46	64	On	Pre	CH
9/22/21	11:04	POV	2021-09	10:13	1	68		On	Pre	CH
9/23/21	20:39	POV	2021-09	20:37	0	53	62	OFF	Pre	SV
9/23/21	13:43	EMS	2021-09	13:51	1	20	32	On	Pre	SH
9/23/21	10:19	POV	2021-09	10:04	1	45	83	On	Pre	CH
9/27/21	12:07	POV	2021-09	11:56	1	30	59	On	Pre	CH
9/29/21	12:01	POV	2021-09	11:41	1	39	68	On	Pre	SV
10/1/21	14:40	POV	2021-10	14:32	1	49		On	Pre	SV
10/2/21	7:31	EMS	2021-10	7:35	1	40	63	OFF	Pre	SV
10/3/21	16:54	POV	2021-10	16:03	1	82	100	OFF	Pre	CH
10/5/21	10:31	POV	2021-10	10:23	1	20		On	Pre	SV
10/6/21	14:34	POV	2021-10	14:29	1	27		On	Pre	SH
10/10/21	12:43	POV	2021-10	12:35	1	47	78	On	Pre	SV
10/11/21	3:31	EMS	2021-10	3:25	0	58	85	OFF	Pre	SV
10/13/21	10:39	EMS	2021-10	10:43	1	20	32	On	Pre	SV
10/13/21	21:08	EMS	2021-10	21:17	0	30	52	OFF	Pre	SV
10/14/21	21:29	EMS	2021-10	21:42	0	11		OFF	Pre	CH
10/16/21	18:18	EMS	2021-10	18:27	1	35	57	OFF	Pre	SH
10/17/21	6:33	EMS	2021-10	6:44	0	47	71	OFF	Pre	SV
10/17/21	8:43	POV	2021-10	8:24	1	36	69	OFF	Pre	CH
10/18/21	13:15	EMS	2021-10	13:20	1	34	67	On	Pre	SV
10/18/21	22:17	EMS	2021-10	22:09	0	80		OFF	Pre	SV
10/19/21	16:28	EMS	2021-10	16:35	1	14		OFF	Pre	CH
10/22/21	15:29	EMS	2021-10	15:40	1	33	58	On	Pre	SV
10/22/21	12:04	EMS	2021-10	12:25	1	11	44	On	Pre	SV
10/23/21	17:54	POV	2021-10	14:32	1	230	271	OFF	Pre	SV
10/24/21	2:20	POV	2021-10	2:15	0	50	90	OFF	Pre	SV
10/27/21	17:36	POV	2021-10	17:14	1	57	99	OFF	Pre	SV

10/27/21	8:40	EMS	2021-10	8:50	1	26		On	Pre	CH
10/30/21	14:45	EMS	2021-10	14:53	1	33	48	OFF	Pre	SV
10/31/21	11:04	EMS	2021-10	11:14	1	35	57	OFF	Pre	SV
10/31/21	13:16	EMS	2021-10	13:21	1	25	41	OFF	Pre	SV
11/1/21	4:47	POV	2021-11	4:33	0	63	94	On	Post	SV
11/1/21	16:11	EMS	2021-11	16:02	1	48	78	OFF	Post	SV
11/3/21	7:03	POV	2021-11	6:48	1	45	54	OFF	Post	SH
11/3/21	13:39	POV	2021-11	13:25	1	35		On	Post	CH
11/4/21	15:13	EMS	2021-11	15:16	1	29	51	On	Post	SH
11/5/21	1:55	EMS	2021-11	1:15	0	63		OFF	Post	CH
11/6/21	4:47	POV	2021-11	4:35	0	53	76	OFF	Post	SV
11/7/21	14:42	POV	2021-11	14:28	1	30	62	OFF	Post	CH
11/8/21	8:24	EMS	2021-11	8:29	1	29	81	On	Post	SV
11/8/21	15:27	EMS	2021-11	15:06	1	80	94	On	Post	SH
11/9/21	15:55	EMS	2021-11	16:07	1	45	54	OFF	Post	SH
11/12/21	13:40	EMS	2021-11	13:47	1	19	43	On	Post	SV
11/13/21	22:08	POV	2021-11	22:00	0	38	68	OFF	Post	CH
11/14/21	20:06	EMS	2021-11	20:54	0	105		OFF	Post	SV
11/15/21	20:43	POV	2021-11	20:22	0	63	83	OFF	Post	SV
11/15/21	8:49	POV	2021-11	8:27	1	59	77	On	Post	SH
11/16/21	5:38	POV	2021-11	5:37	0	28	57	OFF	Post	CH
11/21/21	12:21	EMS	2021-11	12:06	1	33	54	OFF	Post	CH
11/22/21	11:03	EMS	2021-11	11:15	1	12	53	On	Post	SV
11/25/21	15:54	EMS	2021-11	16:00	1	33	54	OFF	Post	SH
11/29/21	14:47	POV	2021-11	14:35	1	30	56	On	Post	SH
11/29/21	13:29	EMS	2021-11	13:32	1	17	54	On	Post	CH
12/2/21	18:33	POV	2021-12	18:26	1	48	71	OFF	Post	SV
12/11/21	21:39	POV	2021-12	21:17	0	40	53	OFF	Post	SH
12/12/21	21:52	EMS	2021-12	21:57	0	37	52	OFF	Post	SV
12/15/21	7:23	POV	2021-12	7:14	1	26	42	On	Post	SV
12/15/21	16:42	EMS	2021-12	16:32	1	41		OFF	Post	CH
12/16/21	0:11	EMS	2021-12	0:00	0	54		OFF	Post	SV
12/17/21	12:01	EMS	2021-12	12:07	1	24	44	On	Post	SH
12/18/21	9:29	POV	2021-12	9:18	1	54	96	OFF	Post	SH

12/19/21	9:59	EMS	2021-12	10:14	1	11		OFF	Post	CH
12/24/21	17:27	POV	2021-12	17:19	1	55	71	OFF	Post	SV
12/24/21	8:44	EMS	2021-12	8:35	1	53	92	OFF	Post	SH
12/25/21	4:35	POV	2021-12	4:24	0	53	92	OFF	Post	SH
12/26/21	16:05	EMS	2021-12	16:28	1	16	36	OFF	Post	SV
12/27/21	1:58	POV	2021-12	1:52	0	47		OFF	Post	SH
12/27/21	22:27	EMS	2021-12	22:21	0	43	64	OFF	Post	CH
12/31/21	17:32	POV	2021-12	17:13	1	43	72	OFF	Post	CH
1/1/22	13:40	POV	2022-01	13:31	1	49	65	OFF	Post	SV
1/2/22	10:44	POV	2022-01	10:25	1	33	82	OFF	Post	CH
1/3/22	11:42	EMS	2022-01	11:58	1	2	58	On	Post	SV
1/4/22	6:02	EMS	2022-01	6:08	0	38	78	OFF	Post	SV
1/4/22	15:30	POV	2022-01	15:19	1	29		On	Post	SV
1/4/22	3:57	EMS	2022-01	3:59	0	39	63	OFF	Post	SH
1/5/22	21:02	EMS	2022-01	21:09	0	32	58	OFF	Post	SH
1/7/22	7:59	EMS	2022-01	8:09	1	15	48	On	Post	SV
1/9/22	10:25	POV	2022-01	10:13	1	47		OFF	Post	SV
1/13/22	7:14	EMS	2022-01	7:17	1	15	36	On	Post	SV
1/14/22	21:00	EMS	2022-01	21:08	0	20	43	OFF	Post	CH
1/15/22	17:51	EMS	2022-01	18:03	1	34	63	OFF	Post	SV
1/17/22	17:08	EMS	2022-01	17:21	1	20	40	OFF	Post	SH
1/17/22	15:03	POV	2022-01	14:58	1	17		On	Post	CH
1/20/22	13:19	EMS	2022-01	13:30	1	4	51	On	Post	SV
1/21/22	9:49	EMS	2022-01	10:07	1	15	56	On	Post	SV
1/21/22	19:56	EMS	2022-01	20:09	1	19	40	OFF	Post	CH
1/22/22	13:53	EMS	2022-01	13:58	1	36	62	OFF	Post	SV
1/24/22	18:48	EMS	2022-01	18:43	1	45	61	OFF	Post	SV
1/24/22	5:39	EMS	2022-01	5:21	0	57	97	OFF	Post	CH
1/27/22	9:55	EMS	2022-01	10:05	1	20	54	On	Post	SV
1/27/22	18:09	EMS	2022-01	18:16	1	37		OFF	Post	SH
1/28/22	4:38	EMS	2022-01	4:48	0	40	55	OFF	Post	SV
1/28/22	17:30	EMS	2022-01	17:15	1	43	75	OFF	Post	CH
1/29/22	1:05	POV	2022-01	0:55	0	55		OFF	Post	SV
1/31/22	7:22	EMS	2022-01	7:38	1	20		OFF	Post	SH

Appendix D

Table 3: Project Timeline

STEMI Prep Protocol DNP Project Timeline by Semester

Activity	Fall: 788-01	Spring: 788-02	Fall: 788-03
Weekly Meeting with Chair, Evaluation of Progress	X	X	X
Weekly Submission of Written Proposal to Chair	X		
Project Proposal and Defense	X		
Meeting with Stakeholders and Obtaining Permissions	X	X	
IRB Submission and Acceptance		X	
Staff Education and Intervention Rollout		X	
Collection of Retrospective Data		X	
Monthly Collection of Prospective Data		X	X
Data Analysis			X
Data and Final Defense Preparation			X
Final Written and Oral Defense			X
Dissemination to Stakeholders and Nursing Profession			X

Appendix E

Detailed Project Tasks and Timeline

Spring: 788-01

Week 1-3: Choose project, project chair, and committee members. Finalize semester plan with DNP advisor. Begin introduction of problem to advisor for feedback and focused improvement. Begin literature review. Review literature. Complete chapter I of Project (problem introduction, problem statement, purpose statement). Submit completed chapter I to chairperson and DNP advisor for review.

Week 3-4: Complete a needs assessment. Draft expected goals, mission statement, and project objectives. Submit completed chapter II to chairperson and DNP advisor.

Week 5-6: Complete theoretical underpinnings research/review and draft portion of Chapter III. Submit chapter III to chairperson.

Week 7-8: Presentation of depression screening instruments to chairperson and advisor.

Week 9-11: Proposal refinement and complete draft with evaluation plans and appendices. Submit completed Chapter IV to chairperson.

Week 12-14: Complete revision and editing. Submit to chairperson for review. Submit Proposal to committee (submit to committee so they have 2 weeks to review). Construct defense powerpoint presentation.

Week 15: Remote meeting with committee for project proposal defense and approval.

Fall: 788-02

Week one: Finalize and complete IRB submission materials. Follow up with faculty mentor for update. Identify the final tasks needed to complete before launch.

Week two: Continue to complete IRB submission and update additional information as requested.

Week 3: Obtain educational materials-badge buddy and complete presentation and materials for launch of project.

Week 4: Await IRB approval. Meet with hospital stakeholders to ensure launch may proceed as planned.

Week 5: Moving forward after IRB approval, obtain pre-interventional data to begin organizing and analysis.

Week 6: Obtain additional permissions to educate staff.

Week 7: Launch education of badge buddy tool at all hospital sites over six days at day and night shift.

Week 8: Begin monitoring utilization of badge buddy and be available to staff for questions and follow-up needs.

Week 9: Continue to monitor rollout of education and badge buddy.

Week 10: Continue to monitor badge buddy and begin to track STEMI “n” number.

Number should be approximately 20 based on previous data.

Week 11: Continue to monitor STEMI numbers. Collect first round of data from STEMI coordinator.

Week 12: Continue to monitor STEMI numbers and rollout.

Week 13: Continue to monitor STEMI numbers, “n” number should be approximately 50.

Week 14: Continue to analyze preliminary findings, touch bases with faculty advisor with results.

Week 15: Semester wrap up and planning for spring project activities. Data collection will continue into the first month of next semester to obtain an “n” number of approximately 100.

Spring: 788-03

Week one: Meet with advisor to establish timeline and plan. Follow up with Faculty mentor for update. Identify the final tasks needed to complete for data collection close.

Week two: Continue to collect data. Begin analyzing November and December data available this week.

Week 3: Meet with advisor and discuss progress towards “n” number of at least 100 for study and discuss statistical method plan.

Week 4: Begin data analysis on final month of collected data and set up meeting with UNLV statistician to determine appropriate statistical tests given “n” number and length of study.

Week 5: Begin statistical analysis of data and continue rewriting manuscript to reflect current study findings and progress.

Week 6: Continue to analyze data and determine outcomes for study, touch base with faculty advisor.

Week 7: Wrap up data analysis and begin evaluating study outcomes, conclusions drawn.

Week 8: Begin to complete manuscript and evaluation of outcomes, share progress with advisor.

Week 9: Submit first draft of manuscript to advisor for edits and meet to discuss evaluation and outcomes for the study.

Week 10: Continue to edit based on feedback from advisor and wrap up discussion of study. Prepare for final submission of manuscript for defense.

Week 11: Final manuscript submitted to DNP advisory team for review. Meet with advisor regarding defense powerpoint preparation.

Week 12: Complete final defense of DNP project at UNLV.

Week 13: Meet with advisory team regarding final edits of manuscript for official submission to graduate college.

Week 14: Wrap up any lingering loose ends for completion of degree or DNP project. Meet with advisor for last time thanking them and the entire team for the incredible experience.

Week 15: Semester wrap up and planning for the future as a DNP.

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Curriculum Vitae

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EDUCATION

University of Nevada, Las Vegas

Doctor of Nursing Practice
Las Vegas, NV

May 2022

- Family Nurse Practitioner
- DNP project: “Reducing Door-to-Balloon Time in STEMI via ER Nurse Driven Protocol”

Concordia University, Irvine

Accelerated Bachelor of Science in Nursing
Irvine, CA

August 2013

- Dean’s Honor Roll, Academic Achievement Award
- Community service chair

University of California, Riverside

Bachelor of Arts in Biology
Riverside, CA

June 2011

- Chancellor’s Scholarship
- Laboratory research assistantship, Le Roch lab

NURSING EXPERIENCE

Valley Health System

Interventional Radiology and Cardiac Catheterization Lab Nurse
Las Vegas, NV

August 2018-Present

- Provide patient education, management, and monitoring during radiologic and cardiology procedures.
- Serve as a resource to procedural departments within three facilities.
- Perform cardiographic stress testing and patient education with collaborating provider.
- Provide vascular access assessment and management as part of vascular access team.

Sunrise Hospital

Adult and Pediatric Cardiac Catheterization Lab Nurse

Las Vegas, NV

February 2018-September 2020

- Provided patient education, management, and monitoring during cardiology procedures including electrophysiology, pediatric cardiography, structural cardiology, and cardiac catheterization.
- Served as staff liaison as LVAD Team leader.

Southern Hills Hospital

Interventional Radiology and Cardiac Catheterization Lab Nurse

Las Vegas, NV

February 2017-April 2019

- Provide patient education, management, and monitoring during radiologic and cardiology procedures.
- Perform cardiographic stress testing and patient education with collaborating provider.
- Served as Patient Safety Officer and the Chair of Evidence-based Practice Committee.
- Performed vascular access procedure under the guidance of the team leader.

University Medical Center

Neurosurgical and Trauma Intensive Care Unit Nurse

Las Vegas, NV

July 2016-July 2018

- Provide patient education, management, and critical care monitoring primarily to patients post-surgically, with neurological conditions, or post-trauma at a level-one teaching facility.
- Nominated by staff for Rapid Response Team and served as a member.
- Served as EPIC conversion Superuser and Skin Team Champion.

Oregon Health and Science University

Emergency and Trauma Services Nurse

Portland, OR

January 2016-July 2016

- Provide patient education, management, and monitoring to adult and pediatric emergency and trauma patients at a level-one trauma, academic facility.
- Participated in the Trauma Research Team.
- Served as superuser for LVAD patients for the department.

Sunrise Hospital

Emergency and Trauma Services Nurse

Las Vegas, NV

October 2013-January 2016

- Provide patient education, management, and monitoring to adult and pediatric emergency and trauma patients at a level-two trauma facility.

- Completed Trauma ICU training program in 2015 and provided bridge emergency to ICU care to multisystem trauma patients.
- Completed a twelve-week critical care preceptorship.
- Volunteered to provide first-aid services as part of the Convention Center ER Team.

Saddleback Memorial Hospital

Cardiothoracic Surgical ICU Student Nurse
Laguna Hills, CA

May-August 2013

- Under the guidance of an expert ICU preceptor, gained 240 hours of exceptional intensive care experience primarily in cardiothoracic surgical patients.

PROFESSIONAL MEMBERSHIP & CERTIFICATIONS

Public Health Nurse APN Certification (CA)

Certifications: AHA BLS, ACLS, PALS, NIH Stroke, TNCC, ATCN, ENPC, BARD
PICC

Member of: AACN, ENA, ACC, JVIR

Licenses: California-RN and PHN, Nevada-RN

PRESENTATIONS

WIN Conference Poster Presentation on DNP Project, April 2022

- UNLV grant recipient

NNA Presentation of DNP Project, April 2022

LEADERSHIP

Neurovascular Excellence Team Nursing Vice President for Spring Valley Hospital 2022

LVAD Team lead and hospital educator for Sunrise Hospital 2019-2020

Evidence-based Practice Team Lead and Patient Safety Officer for Southern Hills

Cardiology 2017-2019

COMMUNITY SERVICE

Care Harbor Los Angeles Los Angeles, CA, October 2013-2016

Provided nursing care to underserved population in the mass free clinic at the LA sports arena

The Circus Project Portland, OR, 2016

Taught circus arts to at risk youth and provided injury prevention consultation

Cirque Mondiale (Cirque du Soleil) Las Vegas, NV, January 2017-2019

Teach circus arts programs to at risk youth and participate in community activities

Train and participate in One Night for One Drop Fundraising event

AWARDS & GRANTS

Chancellor's Scholarship, University of California Riverside, 2007-2011

Dean's Honor Roll, Concordia University Irvine, 2012-2013

Academic Achievement Award, Concordia University Irvine, 2013

WIN Poster Presentation Grant, University of Nevada Las Vegas, 2022