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### Analysis of current practices in prehospital congestive heart failure care and protocol development to prevent readmission.

Ayushma Neupane

Otterbein University, [ayushma.neupane@gmail.com](mailto:ayushma.neupane@gmail.com)

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**Analysis of current practices in prehospital Congestive heart failure care and protocol  
development to prevent readmission**

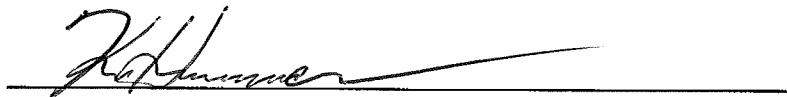
By

Ayushma Neupane, FNP, MSN, APRN

Department of Nursing, Otterbein University

In Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing Practice

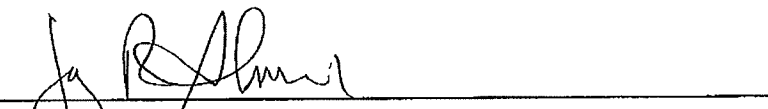
DNP Final Scholarly Project Team:

A handwritten signature in black ink, appearing to read "K. Hummer", written over a horizontal line.

Dr. Kirk Hummer, DNP, MBA, APRN, CNP-Project Team Leader

A handwritten signature in black ink, appearing to read "Chai Sribanditmongkol", written over a horizontal line.

Dr. Chai Sribanditmongkol, PhD, RN, IBCLC, CNS- Project Team Member

A handwritten signature in black ink, appearing to read "Jey Shoemaker", written over a horizontal line.

Dr. Jey Shoemaker, DNP, RN, APRN, CNP, FNP-C, CNE-Project Team Member

## Abstract

Congestive Heart failure patients have the highest readmission rate within 30 days of discharge placing a significant burden on healthcare costs and quality of life for the patient and families. Community Emergency Medical Services are the first to respond to moderate to severe exacerbation of Congestive Heart Failure (CHF) patients' calls. Involving Emergency Medical Services in a preventive approach rather than just responding to exacerbation calls has proven to be effective in pilot studies to prevent heart failure readmissions. The purpose of this Scholarly project was to develop evidence-based recommendations for community Emergency Medical Services' involvement in the management of congestive heart failure patients to reduce the readmission rate. The John Hopkins Evidence-Based Practice Model (JHEBP) was utilized to fulfill the project aim. Utilizing the model following steps and goals were established 1) Review and analyze the evidence on the current practice of community Emergency Medical Services' involvement and treatment of congestive heart failure patients. 2) Develop evidence-based recommendations to reduce CHF readmission in the prehospital setting, and 3) Develop a plan to monitor the effectiveness of recommendations. This project was significant because it helped to create evidence-based recommendations for the reduction of CHF readmission in prehospital settings. Although the recommendations could not be implemented due to the limited time frame of the academic timeline, this study can be considered as a starting point for further implementation and study purposes.

*Keywords: Congestive heart failure, emergency medical services, Emergency Medical Services, prehospital, community, protocol, guideline procedures.*

## **Analysis of current practices in prehospital congestive heart failure care and protocol development to prevent readmission.**

### **Background**

Congestive heart failure is one of the most common diagnoses encountered in a hospital with frequent readmissions. Congestive heart failure (CHF) is a national public health problem in the United States with significant prevalence and mortality (Zhang et al., 2022). It is estimated 5.7 million people in the United States have a diagnosis of congestive heart failure (Zhang et al., 2022). Congestive heart failure is also the most common cause of hospitalization in the United States for people older than 65 years of age and has the highest 30-day re-hospitalization rate, accounting for up to 26.9% of the total readmission rates (Nair et al., 2020). With an increase in the aging population, the substantial healthcare utilization cost burden of CHF is also growing (Zhang et al., 2022). Estimated total healthcare expenditure attributable to heart failure, excluding costs related to comorbidities, is expected to be \$160 billion (Zhang et al., 2022). Therefore, congestive heart failure poses a great financial burden to a nation.

### **General Problem**

The general problem is heart failure readmission has been one of the challenging issues faced by many healthcare facilities. Centers for Medicare and Medicaid Services attempted to reduce readmission by imposing substantial penalties; however, readmission within 30 days is still challenging for many hospitals. To reduce the number of preventable readmissions, the Centers for Medicare & Medicaid Services initiated the Hospital Readmissions Reduction Program in 2012 for hospitals with higher-than-expected readmission rates following admissions with heart failure, though the risk-adjusted readmission rates have started to decline after the initiation, the readmission rates in several hospitals remain high (Nair et al., 2020). A more

efficient approach is required to tackle the frequent readmissions utilizing a multidisciplinary team where Emergency Medical Services could be one of the members of a multidisciplinary team.

Emergency Medical services are vital healthcare members in community settings which include nurses, firefighters, and emergency medical technicians. Emergency Medical Services (EMS) are defined as the system that organizes all aspects of medical care provided to patients in the pre-hospital or out-of-hospital environment (Mehmood et al., 2018). People with moderate to severe Congestive heart failure exacerbations frequently utilize emergency medical services. Chest pain and acute dyspnea are frequent causes of emergency medical services activation (Beygui et al., 2020). Acute heart failure patients are often encountered in emergency departments from 11% to 57% using emergency medical services (Harjola et al., 2022). EMS is a critical component of health systems and is necessary to improve outcomes of injuries and other time-sensitive illnesses (Mehmood et al., 2018). The role of EMS is significantly important to determine medical emergencies and take appropriate measures to improve clinical outcomes by reducing morbidity and mortality. The organization and provision of EMS vary from country to country and sometimes between regions within a country (Mehmood et al., 2018). While there are many models of pre-hospital care, EMS systems are generally fragmented and largely limited to transportation without protocols for field triage, standards of care, or communication with receiving facilities (Mehmood et al., 2018). Developing standard protocols and recommendations to approach congestive heart failure patients can help to bring consistency in care and measurable outcomes to predict the role of Emergency Medical Services and modifications required to reduce heart failure readmissions. The involvement of EMS with a set of protocols to address the need of CHF patients with intention of preventing readmission to the hospital can

have a crucial impact on both the quality of patient life and the reduction of health care cost burden to both hospital and patients.

### **Problem Statement**

Heart failure readmission especially within 30 days of discharge is costly to patients, families, hospitals, and the nation. Heart failure is a significant and progressive syndrome affecting approximately 6 million Americans 20 years of age or older and is expected to impact more than 8 million Americans 18 years or older by 2030 (Hamilton et al., 2022). National data demonstrate heart failure is among the top four principal diagnoses leading to 30-day all-cause hospital readmissions, with a 30-day readmission rate ranging from 22.9% to 56% (Hamilton et al., 2022). The American Heart Association has published evidence-based practice recommendations with a focus on education in the acute care setting regarding appropriate self-care practices and medication regimens that patients should follow at home (Hamilton et al., 2022). Evidence also suggests that in absence of high-quality patient education, appropriate self-care, and routine follow-up with their provider, readmissions are frequent because they can't manage symptoms at home (Hamilton et al., 2022). Caregivers play a pivotal role in ongoing heart failure care and can positively impact patient outcomes (Hamilton et al., 2022). In a prehospital setting emergency medical service can play a significant role in reinforcing those self-care practices and medication regimens as a caregiver to prevent hospital readmissions.

The prevalence of guidelines helps to manage and provide a definite plan for ways to respond and treat under certain circumstances. EMS personnel should follow local protocols regarding actual patient care issues (Journal of Emergency Medical Services [JEMS], 2022). Clinical decision-making skills in Emergency Medical Services are essential because of the growing complexity of emergency medicine and accurate preliminary diagnosis improves the

patient's outcome (JEMS, 2022). It is crucial for EMS to identify CHF exacerbation in a prehospital setting to prevent hospital readmission. There is conflicting evidence that Emergency Medical Services can accurately identify CHF in the field setting (Eckstein & Suyehara, 2002). Previous studies found that Emergency Medical Services correctly identified patients with CHF with accuracy ranging from 70% to 89% (Eckstein & Suyehara, 2002). Developing standard guidelines could potentially allow practice and treatment consistently to achieve better outcomes and quality of life.

### **Problem Relevance**

Heart failure readmission is one of the most frequently discussed topics. Nearly one in four heart failure patients is readmitted within 30 days of discharge and approximately half are readmitted within 6 months, and it has been suggested that about one-quarter of heart failure, readmissions may be preventable (Khan et al., 2021). One of the ways to prevent readmission might be the development of standardized protocols implementation for Emergency Medical Services while addressing CHF patients since Emergency medical services frequently encounter CHF exacerbation patients to transfer to the hospitals. Heart Failure readmissions are frequent, and readmissions also significantly contribute to total hospitalization costs (Kwok et al., 2021). There is a need for a clear action plan in the pre-hospital setting with immediate management and secure transfer to centers adapted to specific patient conditions (Beygui et al., 2020). However, many questions on the scientific and practical aspects of pre-hospital care of acute cardiovascular conditions remain to be addressed in well-powered, clinical trials in the near future (Beygui et al., 2020). Developing an action plan based on evidence-based literature in the pre-hospital setting will pave the path for its implementation and future studies to assess the impact of Emergency Medical Services in heart failure readmission more accurately and reliably.

## Significance of the Project

Preventing heart failure readmission has been one of the top priorities among healthcare facilities. Identifying health system strategies proven to reduce preventable hospitalization would be valuable to patients, medical providers, and healthcare administrators (Ziaieian & Fonarow, 2016). Developing strategies to focus on the modifiable preventable factors that could lead to rehospitalization can significantly lower the financial burden on the hospitals and the quality of life of the patients. Increasing efforts have been focused on reducing 30-day readmissions as they are perceived as a modifiable event after hospitalization, risk-standardized readmission rates are publicly reported, and hospitals face substantial financial penalties (Ziaieian & Fonarow, 2016). In clinical practice, often not enough resources are dedicated to the quality and completeness of the information that patients receive during hospitalization and at discharge, resulting in a series of negative consequences (Mennuni et al., 2017). Emergency Medical Services and emergency medical services are normally the first in line to respond to congestive heart failure exacerbations who can prove to be pivotal in reducing readmission provided with appropriate guidelines and recommendations. There is evidence to suggest that other factors such as socioeconomic status, patient factors, and community factors also play a role in readmission with heart failure (Nair et al., 2020). Evaluation data suggest that community paramedicine programs have a significant impact on readmission rates ( Rural Health information, 2022) A study in New Jersey found heart failure patients without a visit from the mobile integrated health team were 30.3% likely to be readmitted within 30 days and another pilot program in urban Oregon found a readmission rate of 6.3% for program participants, compared to 23.5% of patients who did not participate Rural Health information, 2022). This project will help identify standardized protocols in the field that can be used by Emergency Medical Services to reduce heart failure readmission and



improve congestive heart failure patients. Hospital discharge is often poorly standardized and affected by discontinuity and fragmentation of care, putting patients at high risk of both post-discharge adverse events and early readmission (Mennuni et al., 2017). The fragmentation of care can be minimized by involving and improving emergency medical services approach to addressing congestive heart failure patient's needs, Center for Medicaid and Medicare Services (2021) calculates the payment reduction and component results for each hospital based on its performance during a rolling performance period along with 30 days readmission period and the payment reduction is capped at 3 percent. The findings from the project will have the potential to positively affect the patient, nurses, and Emergency Medical Services, and to the hospital penalty costs.

### **PICO Question**

In Patients with congestive heart failure (P), how does the (I) involvement of Emergency Medical Services in the prehospital setting (C) compared to no Emergency Medical Services (O) affect the readmission to the hospital?

### **Literature Review**

The literature review of this project focused on the protocols utilized by Emergency Medical Services in prehospital settings for the management of congestive heart failure and the effect on readmission rates. The One search feature, available through the Otterbein University Library was utilized to assist the literature search. Several databases utilized for the literature review included Cochrane, CINAHL (EBSCO), Medline, Science Direct, Wiley online library, rural health information Hub, ProQuest Nursing and Allied Health, and PubMed. The One search feature assisted to analyze the articles available through Ohio Link databases. A literature search was performed using key search terms derived from the PICO questions. The search terms used

include Congestive heart failure or heart failure, emergency medical services or Emergency Medical Services or prehospital or community, and protocol or guidelines or procedures or policies. A critical appraisal and synthesis of the literature were completed, and the literature was synthesized for the following: the ability of Emergency Medical Services to respond to congestive heart failure in community settings. A Literature Summary Table is provided (as Appendix B) along with a description below of the evidence from the literature that was synthesized in support of evidence-based practice recommendations.

The literature search yielded 28 articles. All searches were eliminated and limited by content relevancy, year of publications, and English language. Five articles were selected for literature review due to their content specific to DNP scholarly project. Literature was excluded if the information was in a different language and older than 10 years.

### **Synthesis/Review of Literature**

The literature search for the proposed topic was limited with minimal information. Choi et al. (2015) performed a chart review analysis including news articles, expert opinion pieces, and preliminary data from current mobile integrated health care and community paramedicine initiatives. The study concluded that the observations from existing program data suggest that mobile integrated health plans and community Emergency Medical Services systems may prevent congestive heart failure readmissions, reduce EMS frequent-user transports, and reduce emergency department visits (Choi et al., 2015). MedStar Mobile Health Program in Dallas and Fort Worth, focused on 2 areas: community health practice and the congestive heart failure readmission prevention program (Choi et al., 2015). Patients enrolled in the community health practice receive a series of home visits provided by MedStar community paramedicine providers for education in the management of chronic medical conditions, as well as reinforcement of

existing primary and specialty care network resources, the CHF readmission prevention program targets CHF patients in concert with local cardiologists. Compared with the national 2013 median risk-standardized readmission rate of 23% the rate for MedStar was 16.3% for the enrolled participants, a Medicare charge avoidance of \$30,343, and payment avoidance of \$7,620 per participant from October 2013 to February 2015 (Choi et al., 2015). Avoidance of charges and reduced readmission indicates positive outcomes with the involvement of emergency medical services in the prehospital setting for CHF readmission. Choi et al. (2015) also outline the need for expanded psychomotor, diagnostic, and triage skills, in addition to knowledge of cultural sensitivity, chronic disease pathophysiology, and facility with community resources. Recommendations gathered based on Choi et al. (2015) include 1. Successful mobile integrated healthcare and community paramedicine program implementation requires a comprehensive assessment of local healthcare needs before program planning and implementation and must receive buy-in from local primary care providers, community clinics, EMS agencies, and hospitals. 2. There are often regulatory and administrative barriers such as state or local legislation mandating EMS transport for all patient encounters. Directors should involve and gain cooperation from state and local health departments, elected officials, and firefighters' or health care workers' unions. 3. Potential sources of income and reimbursement must be addressed early, especially because the Centers for Medicare & Medicaid Services and most commercial insurance plans currently reimburse EMS providers only for transporting patients. Programs must also address how they will continue operations, training, and quality assurance when initial funding or public interest and support eventually diminish (Choi et al., 2015).

Crebel et al. (2022) conducted an RCT study comparing mobile integrated health (MIH) and transition of a care coordinator (TOCC) with the hypothesis participants in the MIH

intervention arm will have lower 30-day hospital readmission rates and improved quality of life compared with those randomized to the TOCC intervention arm. During the MIH encounter, the medics used a standardized assessment that includes questions specific to the signs and symptoms of HF. Crebel et al. (2022) included “MIH has grown out of a need to better manage patients with HF in the transition from the hospital to home using optimized care coordination and real-time support when symptoms worsen. This need has been acknowledged nationally, with CMS’s recent payment model changes signaling a shift towards an expanded role for emergency medical services-based interventions” as a discussion portion of the study. The study also suggested a need for a more randomized control study.

The study conducted by Harjola et al. (2019) included multinational survey of 104 emergency medical service (EMS) regions from 18 countries. A specific protocol for pre-hospital AHF management was present in 84 regions (80.8%). The prevalence of protocols for chest pain (84 regions, dyspnea 79 regions, was like AHF protocols which more frequently included IV diuretic and nitroglycerine administration (Harjola et al., 2019). Harjola et al. (2019) suggested it may be challenging for Emergency Medical Services to diagnose AHF. Therefore, it is important to develop guidelines with recommendations for heart failure patients’ approach in the prehospital setting.

The study conducted by the California Heart foundation (2017) included a pilot project to ensure that patients continue to improve after their hospitalization, understand and follow their discharge instructions, and obtain the healthcare resources and services needed to reduce the readmission rate by involving community Emergency Medical Services. The post-discharge pilot sites met the key goal of reducing the number of patients readmitted to a hospital within 30 days after discharge. Recommendation based on the study by California Heart foundations includes: 1.

Conducting a community assessment to identify the greatest needs and areas of opportunity (e.g., hospitals with high readmission rates); identifying and engaging key decision makers at the EMS agency, fire department, ambulance service, and hospital to obtain their commitment; and seeking broad clinical involvement tailored to the diagnoses addressed. 2. More Community Emergency Medical Services personnel be trained than projected staffing requires so that Emergency Medical Services are available enough to offset attrition. (California Heart Foundation, 2017).

Mebazaa et al. (2015) developed a consensus paper on the behalf of heart failure association of the European Cardiology Society which suggested in the pre-hospital setting, Acute heart failure patients should benefit from noninvasive monitoring, including pulse oximetry, blood pressure, respiratory rate, and a continuous ECG, instituted within minutes of patient contact and in the ambulance if possible, Oxygen therapy given based on a clinical judgment unless oxygen saturation  $< 90\%$  in which case oxygen therapy should be routinely administered, medical treatment should be initiated based on blood pressure and/or the degree of congestion using vasodilators and/or diuretics (i.e., furosemide). The guidelines recommend early follow-up visit within 2 weeks along with early telephone follow-up within 3 days of discharge and all patients should be followed up by a multi-professional heart failure service to ensure the continuation and up-titration of disease-modifying therapy for heart failure with reduced ejection fraction (HFREF), if appropriate (Mebazaa et al., 2015). Community Emergency Medical Services can be trained and involved in early home visits to reduce heart failure readmission (Mebazaa et al., 2015).

Another important study analyzed the role EMS played in prehospital congestive heart failure patients' treatment approach. Bounds et al (2022) published continuing education activity

regarding the Emergency Medical Services field identification of Congestive heart failure. Field evaluation involves a careful history and physical exam (Bounds et al., 2022). In the field, EMS can assess the patient and initiate treatment but cannot confirm the diagnosis of CHF therefore, the key is to keep the patient upright, provide oxygen, and limit IV fluids (Bounds et al., 2022). The role of EMS is to recognize the signs of severe heart failure, initiate prehospital treatments, and safely transport the patient without delay (Bounds et al., 2022). EMS plays a significant role in the identification and early management of congestive heart failure.

### **Summary of Evidence**

The review of the literature highlighted that readmission of patients with heart failure is increasing and more patients are diagnosed with heart failure each year evidenced by the data from the center for disease control and Prevention (2018), where heart failure was mentioned in 379,800 death certificates and costing the nation an estimated \$30.7 billion in 2012. Patients do not always understand their medications, the disease process, and the signs and symptoms to watch for to elicit a response to mitigate further complications. Studies suggest a multidisciplinary approach is needed to achieve ideal patient care, including the development of a multidisciplinary team, with communication with the patient's primary care provider and institutional discharge protocols may help improve the quality of care and decrease treatment variability in patients to help with hospital readmission (Messerli & Deutsch, 2020). Currently, there are few studies on the efficacy, safety, and cost-effectiveness of mobile integrated healthcare and community paramedicine programs (Choi et al., 2015). Observations from existing program data suggest that these systems may prevent congestive heart failure readmissions, reduce EMS frequent-user transport, and reduce emergency department visits (Choi et al., 2015). Additional studies are needed to support the clinical and economic benefits of

mobile integrated health care and community paramedicine (Choi et al., 2015). With the literature review, there seem to be ample opportunities for more research in the future on the involvement of Emergency Medical Services in the improvement of readmission among congestive heart failure patients. However, there is also enough evidence in existing literature as discussed above which strongly supports the utilization of health care professionals like EMS providers in the community setting with proper and adequate training, resource, and guidelines in evaluating and educating congestive heart failure patients to reduce their risk of unnecessary readmissions. Therefore, it is important to have further studies to implement the success of approaching congestive heart failure patients to reduce the readmission rate.

### **Purpose/ Aim and Goal of the Project**

The purpose of the scholarly project was to analyze the current practice of congestive heart failure prehospital care approach and develop practice guideline recommendations based on literature reviews. The guidelines can be utilized by Emergency Medical Services and emergency medical services in prehospital settings to improve outcomes and reduce the readmissions related to congestive heart failure. The following are the objectives to fulfill the purpose of the project:

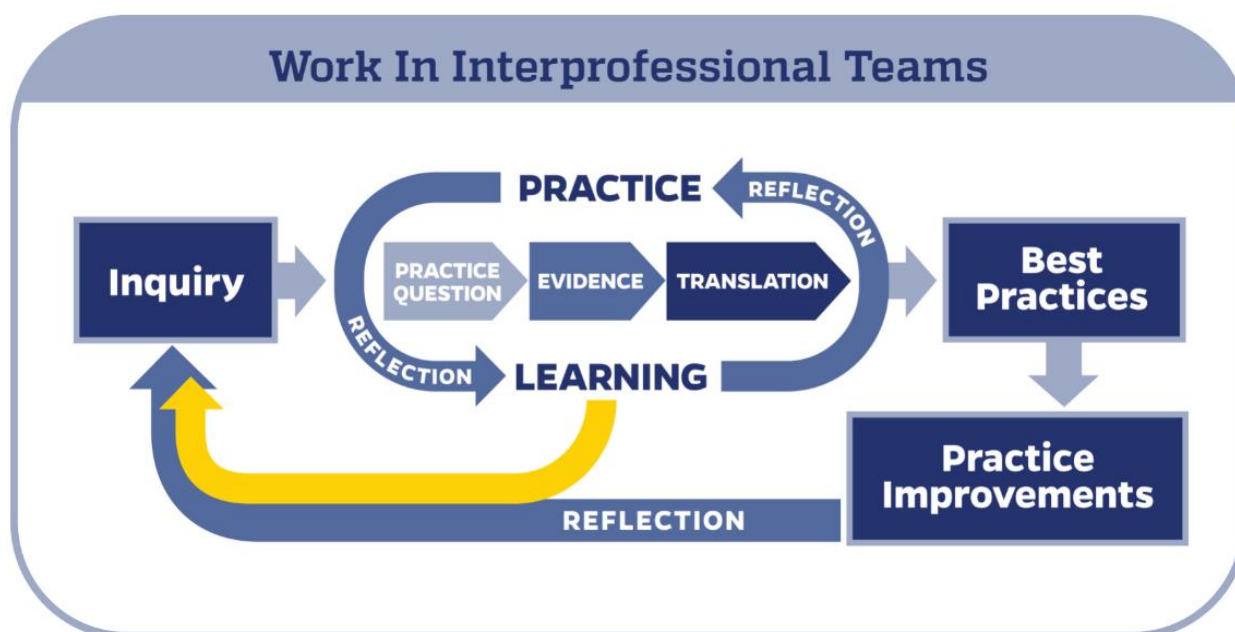
1. To perform a systematic literature review to find out the current practice in prehospital care of congestive heart failure patients.
2. To perform a systematic literature review to create evidence-based practice guidelines for prehospital settings to make recommendations for the prevention of readmission of congestive heart failure.
3. To use Johns Hopkins Nursing Evidence-Based Practice Model to develop a guideline implementation plan.

4. To develop guideline recommendations that can be implemented in the future as they are outside of the project's academic timeline.

### Use and application of the theoretical framework

John Hopkins Nursing Evidence-Based Practice (JHNEBP) Model serves as the guiding framework for this project. Electronic permission was obtained from the Johns Hopkins University School of Nursing (Appendix A). JHNEBP is a powerful problem-solving approach to clinical decision-making and is accompanied by user-friendly tools to guide individual or group use (Dang et al., 2022). The model includes an initial three-step process called, 'PET' to facilitate the successful implementation of current evidence-based literature from inquiry into practice: 1) Practice question, 2) Evidence, and 3) Translation (Dang et al., 2022). Figure 1 depicts and describes each step of the JHNEBP Model from Inquiry through the PET Process.

**Figure 1. The Johns Hopkins Nursing Evidence-Based Practice Model PET Process**



*Note: Figure with permission from John Hopkins University School of Nursing. (2022)*



JHEBP Model PET Process Step 1: Practice Question. The first phase of the JHNEBP PET process began with the identification of a practice problem, from which a practice question was developed and refined to guide the search for evidence. The practice question phase includes six steps: recruit an interprofessional team, define the problem, develop, and refine your EBP question, identify your stakeholders, determine responsibility for project leadership, and schedule team meetings (Dang et al., 2022). An interprofessional team included a project member and advisor along with feedback from the professor was utilized, an extensive literature search was performed to refine the evidence-based practice question. Due to the gap and limited standard protocols prevalent for Emergency Medical Services in the prehospital setting to prevent readmission, the scholarly project was done to make recommendations to update the current practice and initiate the new practice.

JHEBP Model PET Process Step 2: Includes searching for the evidence. The evidence phase of the JHNEBP PET model utilized a five-step process that aided in the facilitation of a thorough literature search. The five steps include conducting an internal and external search for evidence, appraising the level and quality of each piece of evidence, summarizing individual evidence, synthesis of overall strength and quality of evidence, and developing a recommendation for change based on evidence synthesis (Dang et al., 2022). The search was performed with a focus on the PICO question. To find the evidence various databases were utilized, and multiple attempts were made to run and refine the search along with critical appraisal. The details of the evidence can be found in the literature review section. The literature synthesis Table was developed and is included for review in appendix B. The literature suggested positive outcomes from pilot studies with the involvement of mobile-integrated health and community Emergency Medical Services to reduce the CHF readmission rate. Evidence from the literature also

suggested a better outcome with one to two weeks follow-up within a discharge and appropriate training for the Emergency Medical Services along with multiteam involvement.

Process Step 3 is the translation phase which utilizes an eight-step process that aided in the facilitation of the project. This final phase includes determining the fit and feasibility of a recommendation for a transition plan, creating an action plan, securing support and resources to implement an action plan, evaluating a report's outcomes, identifying the next step, and disseminating findings (Dang et al., 2022). The final phase can be achieved in the future by those who have the authority to analyze and implement the recommended protocol.

### **Development and Implementation of Recommendation**

From the literature review as discussed above the following recommendations were developed:

1. Allow mobile integrated health plans and community Emergency Medical Services for a series of home visits at one to two weeks of discharge and telephone follow-up within 3 days of discharge to assess signs of congestion, drug tolerance, start and up-titrate evidence-based therapy with multi-team coordination which includes primary care provider, cardiologist, community clinic and hospital.
2. Series of home visits should focus on education in the management of chronic medical conditions as well as reinforcement of existing primary and specialty care networks by a comprehensive assessment of local healthcare needs before program planning and implementation.
3. Development of standard guidelines is necessary with the recommendation of the heart failure patient's approach in the prehospital setting.

4. Appropriate training should be provided to Emergency Medical Services and adequate staffing should be facilitated to minimize the shortage of workforce in responding to other calls.

### **Recommended Plans for Implementation**

The implementation can be done in the future outside the scope of the project. Posters and PowerPoint presentations with evidence from the literature can be circulated to stakeholders. For implementation purposes, coordination will be required between hospitals and the EMS director. After the assessment of local needs, additional training of Emergency Medical Services, coordination with the hospital and cardiologist, and consent of the patient home visits, and telephone visits can be initiated within 1 week and 3 days of discharge, respectively. In case of complications assessed by Emergency Medical Services' a cardiologist can be contacted and coordination between other teams can be done to prevent potential hospital readmission within 30 days.

### **Recommended Monitoring of Outcomes**

Monitoring the outcome is essential to ensure the effectiveness and success of the developed recommendations which can be done by tracking the data to find out the number of congestive heart failure patients responded to by emergency medical services with recommended time frame home visits and its effect on the readmission rate after the utilization of the recommendations. This information could be collected from the electronic data record. The data should include if the patient was admitted within 30 days of diagnosis of congestive heart failure and responded to by the community Emergency Medical Services with their active participation after discharge.

## **Methods and Project Design**

Based on the aim and purpose of the scholarly project John Hopkins Nursing Evidence-Based Practice model was the most appropriate model for project design. The project utilizes the John Hopkins Nursing Evidence-Based Practice model to develop the recommendations. The JHNEBP model is a powerful problem-solving approach to clinical decision-making (Dang et al., 2022). It is designed specifically to meet the needs of practicing nurses and uses a three-step process PET: practice, evidence, and translation (Dang et al., 2022). The goal of the model is to ensure the latest research findings and best practices are appropriately incorporated into patient care (Dang et al., 2022). Utilizing the model goal for the scholarly project can be appropriately fulfilled.

## **Limitations/Barriers**

Although it is not possible to predict the barriers, there can be circumstances that could negatively affect the project which could include decreased interest overtime, employee turnover, and those mentioned below. Lack of knowledge and information, inadequate time and lots of work and a lack of incentive, as a personal barrier, inadequate organizational support, inadequate consultant and library services, insufficient facilities for sampling, poor access to the samples and methods of doing research, not enough cooperation of the colleagues, poor facilities and counseling were identified as organizational barriers in one of the studies (Ataee et al., 2015). Moreover, further barriers are listed below:

- The study was not able to find any existing protocol and with limited literature available for pre-hospital settings recommendations are partly derived from hospital-based studies and guidelines recommended by the cardiology society.

- The study might be limited due to time constraints and the unavailability of previous literature.

Input from the project team leader and faculty feedback can be crucial to the project's success.

Efforts will be utilized to reduce barriers by developing a timeline to avoid delays and appropriate completion along with effective communication to help accomplish the goal.

### **Timeline of Project Milestones**

Development of the timeline requires the collaboration of the project faculty advisor and student associate investigators, principal investigator, and organizational facilitators of the project. Summer of 2022 involved deciding the topic, literature review and foundation steps for the success of the final Scholarly Project. Fall 2022 involved the development of the project proposal, an oral presentation, and the project proposal defense. The project proposal was approved by the university IRB in November 2022. The data dissemination is expected to be conducted onsite at Otterbein University with faculty, students, and colleagues in April. The expected date of graduation of May 2023.

### **Budget**

The budget for the scholarly project is around \$ 1,400 and is allocated from personal expenses. The budget mainly included office supplies paper, pens, pencils, and printing costs around \$200. Technology costs include \$ 100. Travel and meal cost which includes Mileage, gas, and lunch was \$ 800, and miscellaneous expense of \$ 100.

### **Conclusion**

Community Emergency Medical Services is an integral part of the medical team and are normally the first ones to encounter and respond to a call related to congestive heart failure prior

to the emergency arrival. The utilization of community Emergency Medical Services can play an integral role in filling up the gap and addressing minor issues that could help to prevent readmission. Based on the suggestions from the project advisor and a review of the literature and recommendations from the Heart Failure Association of the European Society of cardiology, the following recommendations were created:

1. Allow mobile integrated health plans and community Emergency Medical Services for a series of home visits at one to two weeks after discharge and telephone follow-up within 3 days of discharge to assess signs of congestion, drug tolerance, start and up-titrate evidence-based therapy with multi-team coordination which includes primary care provider, cardiologist, community clinic and hospital.
2. Series of home visits should focus on education in the management of chronic medical conditions as well as reinforcement of existing primary and specialty care networks by a comprehensive assessment of local healthcare needs before program planning and implementation.
3. Development of standard guidelines is necessary with the recommendation of the heart failure patient's approach in the prehospital setting.
4. Appropriate training should be provided to Emergency Medical Services and adequate staffing should be facilitated to minimize the shortage of workforce in responding to other calls.

Periodic future reviews and implementation of the recommendations in the prehospital setting could decrease hospital readmission rate and increase patient outcomes. This scholarly project is intended as starting point for further study to analyze the evidenced-based outcome of

involving the Emergency Medical Services in prehospital settings with standard protocol and guidelines to respond to and reduce the congestive heart failure readmission rate.

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## Appendix A

### Proof of Permission



Johns Hopkins Nursing  
Center for Evidence-Based Practice

We are happy to give you permission to use the Johns Hopkins Evidence-Based Practice model and tools to adhere to our legal terms noted below.  
*No further permission for use is necessary.*

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2022 JHEBP Tools- Printable Version

2022 JHEBP Tools- Electronic Version

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Would you like to join us?

EBP Boot Camp

## Appendix B

### Literature Review Table

Author/Year	Aim	Study Type	Result
Choi et al (2015)	To find the role of mobile integrated health care and community paramedicine models of health care delivery that use emergency medical services (EMS) personnel to fill gaps in local health care infrastructure	Comprehensive Review	Initial data from established programs seem to support the use of mobile integrated health care and community paramedicine to reduce EMS and ED use while maintaining patient satisfaction. More study will be needed to explore the potential benefits, structure, and outcomes of such programs.
Creber et al (2022)	To compare the effectiveness of two post discharge interventions on healthcare utilization, patient-reported outcomes and healthcare quality among patients with HF.	Pragmatic RCT comparison.	The results of this randomized controlled trial will provide rigorous evidence for patients, caregivers, clinicians and other stakeholders on the comparative benefits and risks of MIH and TOCC on outcomes that are meaningful to patients with HF.

Harjola et al (2022)	To evaluate the association of EMS use with acute heart failure patients' ED management and short-term outcomes.	Sub-analysis	Most acute heart failure patients arrive at ED by EMS.. EMS use is an independent predictor of 30-day mortality.
Mebazaa et al (2015)	To provide consensus paper for guidance to practicing physicians and nurses to manage acute heart failure in the pre-hospital and hospital setting since many treatment are opinion based and few are evidence-based.	Recommendation	Recommendation outlined.
Bounds et al (2020)	To reviews the management of congestive heart failure in the field and highlights the role of interprofessional team members in collaborating to provide well-coordinated care	Continuing education activity	The management of acute CHF is with an interprofessional team that includes an emergency department physician, cardiologist, internist, and intensivist. In the field, EMS can assess the patient and initiate treatment but cannot confirm the diagnosis of CHF.

	and enhance patient outcomes.		
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## Appendix C

### IRB Approval



#### INSTITUTIONAL REVIEW BOARD

- ☒ Original Review  
☐ Continuing Review  
☐ Amendment

Dear Dr. Hummer,

With regard to the employment of human subjects in the proposed research:

**HS # 22/23-18**

**Hummer & Neupane: Impact of multidisciplinary team including EMS in the ...**

#### THE INSTITUTIONAL REVIEW BOARD HAS TAKEN THE FOLLOWING ACTION:

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Approved             | <input type="checkbox"/> Disapproved                       |
| <input type="checkbox"/> Approved with Stipulations*     | <input type="checkbox"/> Waiver of Written Consent Granted |
| <input type="checkbox"/> Limited/Exempt/Expedited Review | <input type="checkbox"/> Deferred                          |

\*Once stipulations stated by the IRB have been met by the investigator, then the protocol is APPROVED.

1. As Principal Investigator, you are responsible for ensuring all individuals assisting in the conduct of the study are informed of their obligations for following the IRB-approved protocol.
2. It is the responsibility of the Principal Investigator to retain a copy of each signed consent form for at least four (4) years beyond the termination of the subject's participation in the proposed activity. Should the Principal Investigator leave the university, signed consent forms are to be transferred to the IRB for the required retention period.
3. If this was a limited, exempt, or expedited review, there is no need for continuing review unless the investigator makes changes to the proposed research.
4. If this application was approved via full IRB committee review, the approval period is one (1) year, after which time continuing review will be required.
5. You are reminded you must promptly report any problems to the IRB and no procedural changes may be made without prior review and approval. You are also reminded the identity of the research participants must be kept confidential.

Signed: Noam Shpancer Date: 10-21-2022  
IRB Chairperson

Miller, Kelly

Mon 3/13/2023 10:59 AM

The addendum has been added to your approved IRB. Nothing more is needed.

Kelly Miller

Academic Administrative Assistant

Psychology Department

Otterbein University

kmiller@otterbein.edu

614.823.1615