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Assessing Prevalence of Known Risk Factors in a Regional Central Kentucky Medical Center Heart Failure Population as an Approach to Assessment of Needs for Development of a Program to Provide Targeted Services to Reduce 30 Day Readmissions

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Christeen Ivy Broaddus, Student

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Final DNP Project Report

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Capstone Overview

Heart failure (HF) is a chronic and progressive condition with costly ramifications affecting both the individual and the acute care facilities caring for them. The HF population is associated with high readmission rates resulting in decreased quality of life for this patient population and increased healthcare costs. With the purpose of promoting high quality care, the Affordable Care Act revised the Social Security Act to include a value based purchasing program which financially rewards hospitals with excellent outcomes and penalizes those with lower than average outcomes as compared to other hospitals nationally. One indicator tied to this reimbursement is HF patient readmissions within 30 days of discharge. The changes in reimbursement guidelines have intensified efforts to identify a means to consistently improve HF outcomes and reduce 30 day readmission rates.

The focus upon reduction of HF readmission rates has resulted in the implementation of various predictive instruments used to assess the risk level for HF patients' readmission within 30 days after discharge from the acute care environment. Increased adoption of the electronic medical record (EMR) in the acute care setting has facilitated seamless access to patient data through electronic reports (predictive tools) that can predict the risk for readmission of HF patients. This information could allow care teams to individualize the HF patients' plans of care with the goal of providing the patients with the resources needed to prevent future hospitalizations. Manuscript 1 analyzes existing tools designed to predict the risk of readmission for HF patients including the benefits and short comings of each tool. These predictive tools have been designed for global use nationally, for hospital systems and for use at a single facility. Single facilities have reported the use of the EMR to conduct a needs assessment with the purpose of defining the characteristics that are significant for defining the HF population served at that hospital. An electronic tool designed to predict patients at high risk for readmission for that setting included those criteria. Those electronic predictive instruments have displayed excellent outcomes. The facility specific tools were implemented at the time of admission to the acute care setting, allowing for

timely identification of those HF patients at high risk for readmission within 30 days post discharge. Identification of patients at high risk patients resulted in development of individualized plans of care at the time of admission, continued review and revision of the plans of care during the hospital stays to meet any changes in patients' conditions, and provision of resources at the time of discharge designed to allow the patients to remain in the community setting. Decrease in HF patient readmission rates was reported after implementation of these predictive tools.

Manuscript 2 is provides a formal report of an investigation which involved the performance of a needs assessment to define the characteristics of the HF patient population admitted to a Central Kentucky regional acute care facility through a retrospective chart review. The needs assessment served to determine the demographic, physiologic, and laboratory characteristics at time of admission. The analysis revealed which HF population characteristics were significantly associated with readmissions to the hospital, providing the facility the means to develop f an electronic tool designed to predict the HF patients at risk for readmission within 30 days at the time of admission.

Manuscript 3 is a policy change proposal which focuses on the benefit of providing palliative care services to patient populations not customarily considered for these interventions including the HF population. This paper demonstrated the benefit of integrating palliative care services into the HF patient's plan of care at the time of diagnosis and integrating the services into the patient's plan of care with any admission into the acute care setting. Kingdon's multiple streams model was used as a framework for analyzing the potential of adopting a Palliative Care Information Act nation-wide.

Identifying Heart Failure Patients at High Risk for Readmission Utilizing a Population Specific Electronic Predictive Instrument

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Abstract

Background: Heart Failure (HF) is a chronic condition associated with high economic and personal costs. Nationally, patients with a HF diagnosis comprise a group of patients admitted to the acute care setting frequently. Due to the chronic and progressive nature of HF, some hospitalizations are unavoidable, but others can be avoided through identification of patient risk for admission and appropriate outpatient management. In an effort to improve the quality of care, CMS has begun reporting of the HF readmission rates within 30 days post-discharge, and it has established financial rewards or penalties linked to these rates. Instruments developed to predict the risk for readmission have been implemented with varying success.

Purpose: The purpose of this article is to analyze the reasons for variations in predictive qualities of existing instruments used to predict HF readmissions, and propose the use of an electronic predictive instrument to be used at the time of patient admission in a community for that specific heart failure patient population.

Conclusion: Reasons for variations in predictive qualities of existing instruments used to predict HF readmissions could include lack of inclusion of importance assessment variables, implementation of a prediction instrument late in the hospital stay rather than at the time of admission, and use of static instruments that are not adjusted for the patient population served. Performance of a needs assessment of the HF population within a facility can allow for inclusion of population specific variables within a predictive instrument, and development interventions targeted at decreasing HF readmissions. Clinical Implications: Use of valid electronic predictive instruments adjusted for population needs early in a patient admission can provide a means for targeting HF patients at high risk for readmission. This will allow for development of an individualized plan of care transitioning the patient back into the community with the resources needed to reduce incidence of readmissions.

Identifying Heart Failure Patients at High Risk for Readmission Utilizing a Population Specific Electronic Predictive Instrument

Heart failure (HF) is a chronic condition found in over five million Americans greater than 20 years of age, and prevalence is projected to increase 46 percent by 2030. The incidence of HF is staggering, with a lifetime risk of roughly 20 percent for those over 40 years of age (Go et al., 2013). Approximately 280,000 people die annually from HF, with about one half of those persons dying within the first five years of diagnosis (Centers for Disease Control [CDC], 2012). According to the most recent HF readmission data published on the Hospital Compare website (CMS, 2013), the average national readmission rate is 24.7 percent. Additionally, treatment of the HF patient is costly. The individual lifetime cost of HF care averages between $100,000 and $118,000, with roughly $80,000 being accrued in the acute care setting (Dunlay et al., 2011).

The cost of healthcare in the United States imposes a burden on the federal, state, and personal budgets, and hospital readmissions comprise a significant part of the spending. Therefore, CMS proposed the Hospital Readmission Reduction Program (HRRP) with the purpose of reducing hospital readmissions related to heart attacks, pneumonia, and HF. The HRRP developed a financial reward and penalty process related to individual organization readmission rates. Hospitals with readmission rates within 30 days after discharge above the national average are penalized by withholding Medicare payment between 1-2%. In 2013, over 2000 hospitals were penalized with the forfeited amount totaling $280 million (Yu, Esbroeck, Farooq et al., 2013). Fiscal year 2015 payment determination will change under the hospital inpatient quality reporting (IQR) program. CMS will add three claims-based readmission measures, one of which is the 30 day readmission rate for HF. Facilities will be penalized through reduction in payment if high 30 day readmission rates are experienced by the patients they admit (CMS, 2012; Medicare, 2013). Therefore, reduction of HF readmissions is a priority for patients and the organizations serving them.

Models designed to predict readmissions have been established with the purpose of targeting high risk patients and reducing readmission rates. Unchanging readmission rates have lead to an increased focus on predictive readmission instruments. Additional resources will be required to develop reliable instruments for the future (King, 2013). Multiple concerns with existing predictive instruments have been voiced including reliance upon historical data, lack of inclusion of important variables impacting readmissions, implementation of the instruments at the time of discharge, and use of instruments that cannot be adjusted to reflect specific patient populations (King, 2013; Yu, Esbroeck, Farooq et al., 2013).

The purpose of this paper is to analyze the evidence that establishes the predictive qualities of instruments designed to identify the degree of readmission risk of HF patients admitted to the acute care setting. Routine use of an electronic predictive instrument adjusted for a specific patient population at the time of patient admission (point of care) will be proposed. The predictive point of care readmission risk instrument would be populated from data entered into the electronic medical record (EMR). The electronic model can provide the care team with the capacity to identify high risk HF patients close to the time of admission, therefore assisting in timely plans of care and interventions to reduce HF readmission rates.

Model Overview

There are two models which are routinely used to predict readmissions. The first model type is the claims-only model. This is the model utilized by CMS, and has not been found to be a consistent predictor of readmissions (Hamill et al., 2011). The claims-only model utilizes administrative data including basic demographic data and comorbidities. A major deficit of these data is that it is not complete or available until the patient is discharged from the acute care setting. Because of this delay,

the patient's plan of care cannot be impacted during their current hospital stay (Philbin & DiSalvo, 1999).

Many claims-only models have been developed from data comprised from a multitude of hospitals. It precludes identification of hospital type or protocols in place as a source of readmission risk. There can also be coding discrepancies between facilities, which can lead to varied results and interpretations (Hamill et al., 2011).

The second model is the claims-clinical model which includes the administrative data from the claims-only model with the addition of limited physiologic (heart rate, ejection fraction) and laboratory data. Like the claims-only model, data derived from the claims-clinical model are time delayed and not specific to the population it serves (Hammill et al., 2011). When compared to the effectiveness of the claims-only model, there was an improvement in predictive qualities; however, the low number of clinical variables used decreased its effectiveness (Hammill et al. 2011).

A major deficit in the readmission risk models based on Medicare and Medicaid claims data is the exclusion of those individuals without insurance. According to the World Health Organization, those individuals with socioeconomic factors such as lack of health insurance or medication coverage may find it harder to adhere to a medical plan of care (Brown & Bussell, 2011). To exclude this population in the development of risk models neglects a sub-population which may be a significant contributor to readmission rates.

The LACE model is a predictive instrument used at the time of discharge which was developed to predict readmissions in high risk patients, including the HF population (Yu, Esbroeck, Farooq et al., 2013; Fraioli, 2013). The LACE index uses both primary and administrative variables including of length of stay, acuity of admission, co-morbidities, and emergency department visits in the previous 6 months to obtain a LACE score from 1 – 19. A score greater than 10 would identify patients at high risk for readmission and trigger individualized discharge planning. This model was proven effective in predicting

HF readmissions, but has not been tested to validate its effectiveness in reducing readmissions (Walraven, Dhalla, Bell, et al., 2010). When compared to the CMS endorsed HF predictive instrument and Charlson score, the LACE model displayed a superior predictive qualities. Time of implementation could be a potential shortfall of this instrument in reducing HF readmission rates (Au, Mcalister, Bakal, et al., 2012).

The Center for Outcome Research (2013, [CORE]) developed an online risk for readmission instrument which can be accessed via internet or as a phone application. This instrument includes limited demographic, comorbidity, physiologic, and laboratory variables. Limitations of this instrument include assumptions of performance of the treating facility, the instrument provides an estimate of readmission risk, and the CORE does not provide guidelines regarding use of the estimates.

Models for predicting heart failure readmissions have been developed utilizing targeted clinical criteria commonly assessed for heart failure patient populations. For example, in the past some investigations have chosen to use a single patient characteristic such as blood urea nitrogen (BUN) or preserved systolic function (PSF) to predict HF readmissions (Filipattos et al., 2007). Although this information provides a good starting point for validating predictive qualities, it leaves a large gap in identifying other individual patient needs or characteristics that might increase the risk of readmissions or future hospitalizations. While it could be argued that this single predictor could trigger providers to risk stratify patients, the single result leaves room for error by omission and is not time effective.

Use of psychosocial criteria in addition to patient demographic and clinical data has been explored to determine if these variables increase the predictive ability for HF patient readmissions. Psychosocial factors selected included smoking, alcohol use, living alone, depression/anxiety, and use of home health or visiting nurse services. When these factors were included in Yale or Inpatient Evaluation Center scores, the ability to predict readmissions significantly increased (Logan, Freeman, Choi et al., 2013).

Health care systems located in a single geographic area have created risk prediction models that are comprised of criteria specific for the HF patient populations in that region have also been developed and implemented successfully. Parkland Health and Hospital System in Dallas, Texas have developed a predictive model (named the e-Model) which has reduced Medicare HF patient readmission rates by 35-45 percent, and all HF patient readmissions by 20 to 30 percent. The e-Model extracts 31 patient factors which serve to evaluate individual patient socioeconomic status, laboratory data, and physiologic factors (Hethcock, 2011; Amarasingham et al., 2010). When a high risk HF patient is identified, the E-model automatically notifies key personnel such as case managers so that patient specific plans of care and discharge plans with appropriate interventions can be immediately initiated.

The University of Pennsylvania Health System has successfully implemented an automated instrument developed by researchers at the Perelman School of Medicine designed to identify patients at risk for readmission at the time the patient is admitted to the acute care setting. This research team determined patients admitted to the facility two or more times in 12 months were more likely to be readmitted within 30 days of discharge. Patients demonstrating this characteristic are flagged in the electronic record by their names, and when this flag is double clicked, detailed patient information important to planning patient discharge can be accessed. The care team targets the flagged patients and implements individualized interventions aimed assisting the patient to return to the community successfully, thus avoiding readmission. Common interventions include enhanced patient education, pharmacist reconciliation of discharge medications, increased provision of home services, and follow up phone calls (University of Pennsylvania School of Medicine, 2013).

Development of a hospital specific instrument designed to decrease/eliminate heart failure patient readmissions within 30 days was developed by researchers at the Intermountain Heart Institute at the Intermountain Medical Center. Theses researchers developed the IMRS-HF instrument after analysis of over 6,000 electronic medical records from discharged HF patients between 1999 –2011.

This instrument provided a score based upon extraction of patient data at the time of admission. Validation of the instrument was performed for 459 patients. Results demonstrated males with a score of 15 on a scale of 1-19 were 8.5 times form likely to be readmitted within 30 days and that women with a score of 5-9 on a 0-9 were twice as likely to be readmitted as those with a score of 0-3. The hospital reported is developing a process for integrating the risk for readmission score with the discharge planning process (Science Daily, 2013).

Practice Implications

The EMR has greatly changed the world of quality care. Targeted patient information can now be extracted and organized into user specific reports at any point during the hospital stay. The unique patient data contained in each EMR can provide an accurate, timely source of patient characteristics identifying those heart failure patients at high risk for readmission at that organization resulting in appropriate implementation of individualized plans of care by the care team at the time of admission addressing the indicators likely to cause future patient hospitalizations.

Identification of heart failure patients at high risk for readmission through use of an electronic predictive instrument and implementation of an individualized discharge plan at the time of admission would not only benefit patients and hospitals. It could also facilitate establishment of a healthcare culture in which routine collaboration and communication between community and hospital resources provides patients with optimal health and quality of life.

Conclusion

Healthcare providers must work with patients to establish a plan of care that effectively treats their individualized needs while simultaneously improving their quality of life. Individualization of the discharge plan of care is necessary for the HF population secondary to the presence of variability in comorbidities and unique individual needs.

Use of an effective predictive instrument indicating high risk for readmission driven by assessment of patient specific data from the EMR at the time of admission would help to prevent HF patient readmissions 30 days post discharge. Identification of the significant characteristics of the heart failure patients readmitted to the acute care facility would assist that organization in developing an effective instrument for predicting those readmissions. Utilization of an EMR based point of care readmission risk model developed for the heart failure population will facilitate identification of patients at risk for readmission upon admission. It will identify significant individual patient needs which require immediate intervention as well as interventions at the time of discharge. Allowing for individualized care plans to be effectively established prior to discharge could lead to improved self-care, provision of appropriate community resources, and adherence to the treatment plan. Development of an electronic readmission risk instrument would be of benefit to hospitals and the HF patients they serve.

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Assessing Prevalence of Known Risk Factors in a Regional Central Kentucky Medical Center Heart Failure Population as an Approach to Assessment of Needs for Development of a Program to Provide Targeted Services to Reduce 30 Day Readmissions

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Abstract

Objectives:

1. Determine demographic, physiologic, and laboratory characteristics at time of admission of the heart failure (HF) population in a regional acute care facility in Central Kentucky through review of patient electronic medical records.
2. Determine which HF population characteristics are significantly associated with readmissions to the hospital.
3. Provide identification of the statistically significant common characteristics of the HF population to this facility so that they may work towards development of an electronic risk for readmission predictive instrument.

Design: Retrospective chart review.

Setting: Regional acute care facility in Central Kentucky.

Participants: All patients (n = 175) with a diagnosis or history of HF (to include diagnosis related group (DRG) codes 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.1, 428.41, 428.23, 428.43, 428.31, 428.33, 428.1, 428.20, 428.22, 428.30, 428.32, 428.40, 428.40, 428.42, 428.0, and 428.9; The Joint Commission, 2013) admitted to the acute care setting of a regional hospital in the Central Kentucky area between the dates of January 1, 2013 and July 31, 2013. Eligible participants were identified via an electronic discharge report listing all patients discharged during the study time period with a HF code.

Main Outcome Measure: A chart review was performed to define the HF population within the regional acute care facility. Abstracted information was collected on data instruments (Appendices A,B, and C) and analyzed to define the overall HF population (n = 175). The data was then analyzed to determine significance between patient characteristics (demographic, physiologic, and laboratory) and 30 day

readmissions. The data was examined both on the individual patient level and independent of patient level looking at each admission independently.

R**esults:** An in depth description of the HF patient population in this facility was obtained. Several patient characteristics including a history of anemia, COPD, ischemic heart disease, diabetes, and the laboratory values creatinine and BNP outside of the reference range were found to have a significant association with 30 day readmissions. Discharge to a skilled nursing facility (SNF) was also found to be a significant predictor of 30 day readmissions. Some social variables such as marital status were not found to have a significant relationship to 30 day readmissions.

Conclusion: This investigation is a stepping stone to creating an electronic tool designed to reflect the characteristics of HF population admitted to a single facility and predict risk of HF readmissions within 30 days at the time of admission. Implementation of a plan of care designed to meet the needs of this HF population as well as identify those patients at high risk for will allow for provision of a comprehensive and timely individualized plan of care to reduce the incidence of 30 day readmissions.

Assessing Prevalence of Known Risk Factors in a Regional Central Kentucky Medical Center Heart Failure Population as an Approach to Assessment of Needs for Development of a Program to Provide Targeted Services to Reduce 30 Day Readmissions

Heart failure (HF) is a chronic condition which is accountable for a substantial number of hospital admissions/readmissions every year. It is estimated that about 5.7 million individuals in the United Sates have HF. Roughly 280,000 people die annually from HF, with about one half of those persons dying within the first 5 years of diagnosis (Center for Disease Control (CDC), 2012).

The Hospital Quality Alliance (2008) states that 24.5 percent of HF patients admitted to the hospital for treatment are readmitted within 30 days of discharge. The individual lifetime costs of HF averages between $100-118K, with roughly 80K of those dollars being accrued in the acute care setting (Dunlay et al., 2011). The high HF readmission rate and cost of care for HF readmissions has triggered concentrated efforts to develop interventions designed to reduce HF readmission rates via means such as telemonitoring and structured follow-up phone calls post discharge from the acute care setting. However, despite these efforts, readmission rates have remained elevated, prolonging both the economic and individual strain that HF inflicts (Ross et al., 2010).

HF is a condition in which exacerbations occur with increased frequency in conjunction with non-adherence to treatment plans, making it necessary for individuals with HF adhere strictly to their medical treatment plan (Nielson et al. 2009). Self-care confidence, or self-efficacy, is a moderator of self-care maintenance and management (Buck et al., 2011; Lee, 2009). An individual's ability to avoid hospitalization is affected by self-care management, including instruction related to diet, activity, medication administration, weight, appropriate follow up with medical personnel, and recognition of signs and symptoms that the heart failure is worsening (Riegel et al., 2009; Marti et al., 2013). It has been shown that individuals with HF have improved outcomes when their plan of care is individualized to their specific needs including medications and teaching (Wal, Jaarsma, & Veldhuisen, 2003).

Therefore, it is incumbent upon healthcare organizations to identify an effective means of individualizing care and establishing this plan of care prior to discharge from the acute care setting.

Development of an instrument with the ability to identify patient risk factors known to predict readmission to the hospital for each HF patient during an acute stay could assist hospitals to develop individualized needs based discharge plans of care designed to support the patient in their ability to self-care in order to prevent future hospital admissions. Inconsistency in facilities' development of individualized HF discharge programs, and failure to clearly define the population which they serve have contributed to the failure of current and past interventions directed at reducing HF readmissions (Butler & Kalogeropoulos, 2012). Therefore, identification of characteristics that place individual patients at risk for readmission through use of a screening process designed to identify patient characteristics predictive of readmission in the acute care setting would provide an effective means of capturing clinical information to drive development of an effective discharge plan.

The characteristics of the HF patient population in the acute care setting are captured through documentation of the patient's clinical condition in the medical record. Through careful analysis of HF patient characteristics including specific demographic, laboratory, and physiologic data (specific variables delineated in appendices A and B), trends can be assessed to identify those characteristics which are related to hospital readmissions. The electronic medical record makes it possible to extract patient characteristics and data points automatically, allowing for the creation of a point of care (POC) risk for readmission instrument which could identify HF patients exhibiting characteristics that place them at risk for rehospitalization. Timely identification of high risk patients would automatically initiate patient specific discharge plans that may include interventions such as smoking cessation counseling, and facilitate implementation of individualized plans of care at time of admission. Therefore, generation of an electronic POC predictive readmission instrument for HF patients is a realistic and valuable goal.

Purpose and Aims

The purpose of this investigation was to evaluate demographic, physiologic, and laboratory characteristics at time of admission of the HF population in a regional acute care facility in Central Kentucky through review of patient electronic medical records. The medical record of each HF patient admitted to the hospital for the first and second quarter of 2013 was abstracted to determine if any of the variables common to HF patients (listed in Appendices A, B, and C) were present. Statistical analysis determined which variables are significantly common to the readmitted HF population for the hospital. Patients admitted to the hospital demonstrating presence of the statistically significant variables are at greatest risk for future readmissions. Therefore, an electronic instrument comprised of these variables can be utilized to predict future readmissions within 30 days at the time of admission. An individualized plan of care addressing the identified patient risks can be initiated at the time of admission with the goal of providing the patient with education, resources, and follow-up to prevent readmissions after discharge.

Background and Significance

The overwhelming incidence of HF rates and rehospitalizations necessitates a change in practice. Hospital readmission rates will affect not only patient outcomes but financial reward also. The Deficit Reduction Act of 2005 implemented a Value Based Purchasing (VBP) program through CMS. This Inpatient Quality Reporting (IQR) program requires hospitals to report the outcomes of targeted outcome measures, and pay for reporting will occur based upon each hospital's achievement level as compared to other hospitals nationally. High achieving hospitals can receive a financial reward of up to 2% of their Medicare reimbursement, and low achieving hospitals could be penalized up to 2% of their Medicare reimbursement. In 2014, a new monitoring domain including 30 day re-admission rates for HF patients will be included in the VBP program. Hospitals must pro-actively reduce these readmission

rates to ensure they receive financial rewards in the future (CMS, 2012). Therefore, reduction of HF re-admissions is a priority for patients and the organizations serving them.

Individuals have attempted to develop instruments and strategies to identify HF patient who are at risk for readmission via clustering comorbidities and patient characteristics with the intention of creating a model to predict patient risk for readmission. In the past, the following characteristics have frequently been utilized to define the population "at high risk for readmission": a) diabetes mellitus, b) hypertension, c) coronary artery disease, d) depression, e) chronic kidney disease, f) ejection fraction ≤30%, g) past myocardial infarction, h) hospitalization within the last 1 year, i) age, j) gender, and k) race, marital status (Whellan et al., 2013; Ross et al., 2008; Allen et al., 2011; Kansagara et al., 2011).

Historically models/instruments designed to predict HF patient readmissions have been found to be ineffective. Data used to populate the predictive instruments is obtained from various sources ranging from administrative data and real-time administrative data, to primary collection data. Variations in sources and data inclusion can lead to exclusion of important variables (Kansagara et al., 2011). An example of a common exclusion in predictive models for HF readmissions is socioeconomic variables such as drug use. Such exclusions may lead to omission of important factors in predicting the likelihood of readmission. (Philbin & DiSalvo, 1999).

Some instruments designed to predict readmissions are ineffective because they are utilized after patient discharge and do not include variables related to patient condition during the hospital stay. To be effective in predicting HF readmissions, real-time administrative data is most beneficial when it is collected and analyzed prior to discharge (Ross, Mulvey et al., 2008). A disadvantage of the retrospective quality of administrative data is its inability to provide a complete, clear, individualized picture of a patient's clinical condition upon admission and integrate that patient information with the patient's demographic information when determining the likelihood of future readmission (Philbin & DiSalvo, 1999).

Standardized predictive instruments for HF readmissions have not proven to be effective. The predictive instruments have been faulted secondary to their inability to identify variables or patient characteristics that can be used universally to accurately predict HF patients at risk for readmission to the acute care environment (Ross, Mulvey et al., 2008; Butler, & Kalogeropoulos, 2012). This issue does not imply that predictive models are ineffective, but rather emphasizes the need for every facility to perform a needs assessment of their unique HF population. A discrepancy of past models to predict HF readmissions from hospital to hospital stems from the lack of model specificity to the facility which it serves (Kansagara et al., 2011). Facilities must identify those facility specific HF patient demographics and physical/psychosocial conditions that significantly describe the patients readmitted to the hospital within 30 days. One instrument most likely will not prove valid in all facilities, because the HF population's characteristics specific to each hospital can be unique and will change over time. The HF patient population demographics, physical conditions, and psychosocial factors for each facility can be assessed and the significant variables related to patients' readmissions within 30 days can be determined. A predictive instrument specific to that organization's HF patient population can be developed and implemented.

It is important to remember that development of a model/instrument that predicts readmissions will not in and of itself reduce HF readmission rates or improve HF patient outcomes. The realization of the need for a predictive instrument is the first step in preventing readmissions. Identification of the patients at highest risk for readmission in that facility will allow for development of individualized treatment plans comprised of interventions based upon the assessments of risk for each patient in addition to following standardized HF protocols. That evidence of risk should then be applied to the right patient at the right time through development of a plan of care specific to that patient' needs (Butler, & Kalogeropoulos, 2012). This individualized plan of care can result in a discharge plan begun at the time of admission designed to support the patient in the home/community environment

and prevent further readmissions. For example, those without health insurance will most likely require interdisciplinary action between the social worker and provider to ensure that discharge medications are as affordable as possible, and assistance programs are accessed prior to discharge (Kansagara et al., 2011).

Advent of the electronic medical record (EMR) has served as a catalyst for change in communication of healthcare data. The EMR can facilitate facility specific, readmission predictive instruments. This instrument will develop reports that display essential patient information through automatically generated reports specific to a patient population such as the HF population. Target patient information can be automatically extracted and compiled into a customized report at the point of care (POC) without consumption of any man hours. The report can then be used to identify patient specific needs and initiate interventions which will further support self-care during the immediate post-discharge period in the ambulatory care setting.

Facilities such as Parkland Health and Hospital System in Dallas, Texas have employed their EMR to develop a instrument which predicts mortality and 30 day readmission risk for HF patients. This instrument which they have titled the e-Model extracts 31 patient factors which serve to evaluate individual patient socioeconomic status, laboratory data, and physiologic factors. The data extracted identifies HF patients who are “high risk”, and those patients are flagged to clinicians and case managers. The high risk patients are followed and their plan of care individualized to include interventions such as more detailed discharge instructions or arranging for home health. The e-Model has proven effective in identifying those individuals at high risk for 30 day mortality or readmission, and has produced a 25 percent reduction in HF readmissions since its implementation (Hethcock, 2011; Amarasingham et al., 2010).

Mount Sinai Medical Center in New York City formed the Preventing Admissions Care Team (PACT). The team uses the EMR to identify those individuals at risk for readmission. PACT utilizes social

workers and nurse practitioners to implement individualized interventions early after admission for those individuals at high risk for readmission designed to minimize the need for future hospitalizations. With PACT, the facility has experienced a drop in readmissions from 30 to 12 percent and emergency room visits have decreased by 63 percent in those individuals enrolled in the PACT program (Minich-Pourshadi, 2012).

Cincinnati Children's Hospital Medical Center has also initiated use of predictive models with their EMR after years of collecting information on their population. They have stated that utilizing predictive models is a shift in concentration being reactive to proactive. The EMR helps to make this culture shift more plausible; this is an exciting time for medicine (Minich-Pourshadi, 2012).

There is evidence to suggest certain interventions be included at discharge for all HF patients, hence the advent of core measures. However, those individuals with HF who experience readmissions often have existing and possibly contributory comorbidities that need special attention. This could include the individual with poorly controlled diabetes, those on an angiotensin converting enzyme inhibitor (ACEI) who may benefit from spironolactone, or those individuals who need extra assistance such as home health at discharge (Krumholz et al., 2000). A predictive instrument will aid in identifying these individuals who require further individualized care.

In order for a predictive instrument or model to be effective, it must be representative of the population it serves. This investigation will assist in defining the HF population in this regional facility and will aid in the development a predictive instrument for HF readmissions. With the information gleaned from the predictive instrument, those individuals identified as high risk can be quickly identified and individualized care initiated.

Methods:

Study Design

This was a retrospective study. All demographic, physiologic, and laboratory data displayed in Appendices A and B were abstracted from the EMR of all HF patients admitted to an acute care facility from January 1, 2013 through June 31, 2013.

Study Population

Both men and women over 18 years of age with a documented diagnosis of HF by a physician or nurse practitioner during the patient's acute hospital stay were potential participants for this study. While some studies which examine the effectiveness of a predictive instrument or model exclude or include certain populations such as Medicare patients or the geriatric population, this investigation included all HF patients as means to get a true picture of the characteristics of the HF population in this facility.

Sample

The subjects of this study were obtained from a sample of all patients with a diagnosis or history of HF (to include diagnosis related group (DRG) codes 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.1, 428.41, 428.23, 428.43, 428.31, 428.33, 428.1, 428.20, 428.22, 428.30, 428.32, 428.40, 428.40, 428.42, 428.0, and 428.9; The Joint Commission, 2013) admitted to the acute care setting of a regional hospital in the Central Kentucky area between the dates of January 1, 2013 and June 31, 2013. Eligible participants were identified via an electronic discharge report listing all patients discharged during the study time period with a HF code.

Procedures

Eligible study participants were identified via an electronic discharge report listing all patients discharged during the study time period with either a primary or secondary HF code (to include DRG codes 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.1, 428.41, 428.23,

428.43, 428.31, 428.33, 428.1, 428.20, 428.22, 428.30, 428.32, 428.40, 428.40, 428.42, 428.0, and 428.9; The Joint Commission, 2013). The record for each HF patient was reviewed and data elements displayed on the data collection instruments illustrated in Appendices A, B, and C. History and physicals for the index (initial) admission and initial consultation notes present in the patient's EMR will be used to determine presence of comorbidities (Appendix A; Ross et al., 2008). Pertinent demographic data (Appendix B) and laboratory and physiologic data (Appendix C; Amarasingham et al., 2010) were extracted from the EMR. In values such as systolic blood pressure where multiple values were available, the first recorded value in the facility, to include emergency department values were utilized for data collection. Any data entered or scanned into the EMR from an outside source at time of admission including transferring hospitals and first responders such as emergency medical service (EMS) were not used in this study. The patient data was entered onto an electronic spreadsheet as illustrated in Appendices A, B, and C, thus displaying the patient characteristics captured in this study.

Readmissions were defined as any hospital admission to the acute care setting for any cause post discharge from the acute setting (including 23 hour observation patients), and were tracked at 30 days. Predictive instruments such as the Tabak Mortality Score for Heart Failure exist to predict in-hospital mortality for HF, and have demonstrated validity in multiple settings. For this reason, mortality was not the focus of this current investigation (Amarasingham et al., 2010).

Evaluation

Statistical Analysis

From January 1, 2013 to June 31, 2103 there were a total of 175 patients admitted with a HF diagnosis and a total of 301 admissions. Data was manually abstracted from the individual charts and recorded on appendices A, B, and C on a password protected computer. All 175 patients were included in descriptive data analysis to define the HF population. Chi-square and Fisher's Exact test were used to evaluate significance of variables in association with 30 day readmissions.

Results

Descriptive statistics of all patients admitted (n = 175) Table 1

The HF patient population (n = 175) admitted to an acute care facility between January 1, 2013 through June 30, 2013 was predominantly Caucasian (94%) with a high percentage of patients using Medicare as the payer for the hospitalization (88%). There was an overall even distribution of males (n= 76) and females (n = 99). Of the admitted patients, 59% were single. Patients who expired on their first admission (n = 7) were included in this group analysis to get a general picture of the entire population.

Co-morbidities for the 175 HF patients are displayed in tables 1 and 2. Comorbidities affecting a majority of the population included hypertension (83%) and tobacco abuse (53%). The comorbidities that were more evenly distributed included diabetes (46%), COPD (40%), and ischemic heart disease (43%). The comorbidities of peripheral vascular disease, anemia, depression, anxiety, stroke, and substance abuse were infrequent.

Table 3 provides further information regarding the 175 HF patients. Admission to the Emergency Department for the 175 admitted HF patients was evenly distributed between those having and not having an emergency room visit within 1 year prior to admission (n = 64 and 63 respectively). Only 2 patients left against medical advice (AMA). Data analysis demonstrated this variable was insignificant in predicting the likelihood of patient admission/readmission.

Analysis of laboratory data for the 175 HF patients as displayed in table 3 discloses a significant association (p = 0.0160) between a creatinine outside of the reference range (n = 47) resulting in increased overall admissions.

The highest number of admissions experienced by a single patient was eight. It was noted that 41% of those who had 3 admissions were readmitted again within 30 days of discharge.

Figure 1. Number of admissions experienced at individual patient level (n = 175)

	1	2	3	4	5	6	7	8
Number of patients	99	26	29	12	6	2	1	1

Patients with a s single admission (n = 92) compared to those patients with >1 admission (n = 76) excluding those patients who expired during their first admission (n = 7)

Analysis of patient data to determine if differences existed between HF patients admitted a single time between January 1, 2013 through June 30, 2013 and those admitted more than once during this time period excluded those patients who expired (n = 168). The two subgroups consisted of patients with a single admission (n = 92) and those patients with more than one admission (n = 76).

History of ischemic heart disease was a common but not significant factor in association with having more than one admission. The variables of sex, discharge status, anemia, Brain natriuretic peptide (BNP) and creatinine demonstrated a significant association with multiple admissions rather than a single admission during the study period as demonstrated in the figure below.

Figure 2. Variables with significant association to >1 admission (n = 168)

	Patients who experienced >1 admission (%)	P value
Sex		0.0596
Male	37	
Female	52	
Discharge destination		0.0484
Transfer to outside facility	16	
Skilled nursing facility	58	
Home with home health	50	
Home	44	
Hospice	50	
Anemia (n = 23)	65	0.0383
Brain Natriuretic Peptide		0.0001
101-2400 (ref.) (n = 117)	34	
≤100 (n = 31)	81	
>2400 (n = 20)	45	
Creatinine		0.0201
>2	60	

Data was not only analyzed to determine the characteristics of patients who had more than one admission, but it was also analyzed to determine if some patient characteristics were more common in those patients admitted within 30 days of discharge from the acute care setting.

All admissions independent of patient of level (n =301)

The data was analyzed to look at all 301 admissions as a group (Table 4 and Table 5). A single patient's characteristics were included as many times as the patient experienced an admission during the study time period. Patients who expired were not included. This allowed for analysis of association by the admission rather than the individual patient level. Significant patient characteristics of the patients readmitted within 30 days post discharge included discharge status, diabetes, COPD, anemia, ischemic heart disease, BNP, and creatinine.

Figure 3. Variables with significant association to 30 day readmission post discharge in all admissions independent of patient level (n = 301)

	Patients who experienced a readmission within 30 days (%)	P value
Discharge destination		0.0458
Transfer to outside facility	12	
Skilled nursing facility	32	
Home with home health	32	
Home	28	
Hospice	43	
Diabetes (n = 145)	33	0.0385
COPD (n = 140)	34	0.0151
Anemia (n = 53)	43	0.0045
Ischemic heart disease (n = 140)	34	0.0299
Brain Natriuretic Peptide		0.0151
101-2400 (ref.) (n = 205)	22	
≤100 (n = 17)	41	
>2400 (n = 36)	42	
Creatinine		0.0371
≤2 (ref.)	24	
>2	36	

Tobacco abuse was almost significant (p = 0.0639) with 32% of those patients with a history of tobacco abuse being readmitted within 30 days if discharge.

HF patients with a 30 day readmission after 1st visit (Table 2 & Table 3)

A total of 175 total HF patient admissions comprised of 99 females and 76 males was analyzed to determine significant patient characteristics predictive of readmission within 30 days post-discharge from an acute care setting. The 7 patients who expired during their first admission were removed from the data for analysis of 30 day readmissions since they would not have had the opportunity for readmission. This left a group (n = 168) of 95 females and 73 males for evaluation of 30 day readmissions .Of the HF patients discharged alive, 27 females and 14 males were readmitted within 30 days of discharge after their first admission, meaning that 28% of the 68 total females were readmitted versus 19% of the 59 total females. However this association was not significant. Patients admitted within 30 days after their first discharge had a significantly higher mean age (74 versus 79) than those who did not (p = 0.04).

History of anemia was statistically significant (p = <.01) with 52% of patients being readmitted within 30 days after their first admission. A history of anemia was significantly associated with a patient having hemoglobin out of reference range (p = 0.0027). But hemoglobin by itself was not significantly associated with 30 day readmission. Ischemic heart disease was also significant for the readmitted HF patient population.

Figure 4. Variables with significant association to 30 day readmission post discharge after first patient admission exuding those patients who expired during their first admission (n = 168)

	Patients who experienced a readmission within 30 days (%)	P value
Anemia (n = 23)	52	0.0008
Ischemic heart disease (n = 72)	32	0.0488

Discussion

This investigation served to define the characteristics of HF population within this specific regional acute care facility in Central Kentucky, and provide a starting point for the development of an electronic predictive instrument for the facility. Understanding the HF population being served allows a facility to have population specific standardized interventions in place to be implemented with each HF admission. Consistent implementation of the population specific interventions could result in appropriate care management in the outpatient setting and reduce future hospitalizations.

In this investigation, the HF population had an average patient age of 75 years with the youngest patient being 41 and the oldest patient being 100 years old. The HF population was predominantly Caucasian with Medicare as the insurer. There were 76 male (43%) and 99 female (56%) patients with 103 (59%) of those patients being single and 72 (41%) married. These characteristics could serve as indicators within the electronic predictive instrument to initiate inclusion of standardized interventions designed to aid a majority of the population such as assessment of the need for mobility aids, provision of aids to assist in reading or hearing, and provision of support systems for the single patients to assist in compliance with the plan of care post discharge.

Patient characteristics found to have a significant relationship with 30 day readmissions included a history of COPD, anemia, ischemic heart disease, diabetes, and creatinine and BNP laboratory values outside of the normal reference range. While history of diabetes was significantly associated with a readmission within 30 days post discharge, actual glucose reading were not associated. Having a history of anemia was related to readmissions, but a hemoglobin level outside of reference range was not related readmissions. Patients with a history of anemia or a hemoglobin level outside of reference range were more likely to have a creatinine level greater than two.

Using existing knowledge, significant laboratory values and patient characteristics (such as comorbidities) identified in the population can also serve as triggers. Concurrent diagnoses of HF and

COPD place patients at higher risk for readmissions, necessitating that care pathways are routinely established to ensure close collaboration between a pulmonologist and cardiologist (Hawkins, Petrie, Juhnd, et al., 2009). Those patients with a BNP out of reference range could benefit from serial testing to evaluate their response to treatment (Wright, Struthers, 2006). It is known that there is an increased prevalence of chronic kidney disease and anemia in the HF population, and that these comorbidities are associated with adverse outcomes (McClellan, Flanders, Langston et al., 2002; Luthi, Flanders, Burnier et al., 2006). This presents the opportunity to quickly identify a these HF patients, guaranteeing that appropriate steps are followed such as collaboration with a nephrologists and finding the source of the anemia.

Patients discharged to a skilled nursing facility (SNF) experienced a higher rate of 30 day readmissions. This relationship has been investigated with high readmission rates being attributed to poor staffing, and lack of staff education (The Commonwealth Fund, 2014). While the facility in this investigation discharges patients to several SNFs, there are a few which are commonly used. A potential solution could be partnering with these SNF's to provide their staff with HF education.

HF patient characteristics which were not linked to higher readmission rates could also trigger individualized plans of care if assessments are communicated routinely through an electronic predictive instrument at the time of admission. For example, even though ejection fraction does not demonstrate a significant relationship with 30 day readmissions, the information can be used to alert providers to ensure that appropriate steps are being taken to support the work of the heart. Those patients with a reduced left ventricular ejection fraction can be properly identified and optimal medication management initiated (Heart Failure Society of America, 2010). Tobacco abuse was also not directly linked as a significant factor in increasing 30 day readmissions, but it is known that tobacco abuse is directly related to ischemic heart disease and COPD which were significantly related to 30 day readmissions. Providers could target patients with a history of tobacco abuse and provide smoking

cessation education and prescriptions for quit aids or community programs made available (Lightwood, Fleischmann, & Glantz, 2001).

It was interesting that social variables such as marriage status, tobacco use, alcohol abuse, and history of drug and illicit drug abuse were not found to significantly affect 30 day readmission rates. However, a very small percentage of the population was noted to have a recorded history illicit drug or alcohol use. History of an emergency department visit within the last year was also insignificant.

Depression was not found to be a significant predictor of 30 day readmissions within this HF population, with only 15 percent (n= 27) having a documented diagnosis of depression. Despite these findings, other investigations have shown that depression is common in the HF population, but is often not properly diagnosed (Artinian, Artinian & Saunders, 2004). Depression in HF patients is associated with increased readmission rates (Rozzini, Sabatini, Frisoni, & Trabucchi, 2002). It is also linked to higher death rates, increased healthcare use, and higher rates of emergency room use (Rutledge, Reis, Linke, Greenber, & Mills, 2006). As a possible solution, the facility in this investigation could screen all HF admissions for depression with an easy to use depression screening instrument such as the Patient Health Questionnaire-2 (Elderon, Smolderen, Na, & Whooley, 2011). This instrument could be integrated within the EMR in the initial nursing history and physical assessment. Inclusion of this instrument would lead to appropriate identification of those HF patients with depression, therefore effectively identifying an additional strata of HF patients at increased risk for readmissions so that their plan of care could be appropriately individualized.

This investigation will provide a valuable resource to the facility as it develops an electronic predictive instrument. The electronic instrument will be designed to reflect the characteristics of the HF population served as well as identify those individuals at risk for readmission within 30 days post-discharge. In addition to triggering a standardized plan of care with interventions targeting the facility's HF population, early identification of those variables significant for risk of readmission within 30 days

will allow the multidisciplinary team to develop individualized plans of care at the time of admission including interventions designed to maintain the patient in the community and avoid further readmissions. Identification of HF patients at high risk for 30 day readmissions at the time of admission allows for implementation of individualized interventions such as education, special attention to medication administration, collaboration with outside support services such as home health, and development of a shared plan of care with a SNF.

Strengths of the facility in this investigation that will foster success in the design and implementation of an electronic predictive instrument used to identify patients at high risk for readmission within 30 days include presence of an established electronic medical record, IT&S support for development of reports, presence of a strategic plan including a goal for reduction of readmissions, and the availability of a multidisciplinary team required to establish a plan of care meeting high risk for readmission patients' needs. In addition, the facility has many resources needed for transition of the patient into community at the time of discharge including an extensive education material and processes ready for patients in areas such as diabetes.

Limitations

The major limitation for this study is a data deficit for some of the variables. This was secondary absence of patient information including complete omission of a variable (for example a laboratory test). Comorbidities were obtained from the history and physical, which is predominantly reliant on the patient and family being accurate historians.

Some individuals experienced multiple admissions (n = 76). Not all of these readmissions were categorized as a readmission within 30 days post discharge. The data groups after one and two admissions were too small for meaningful analysis. Therefore, the data was analyzed in various ways to get a clear picture of the population and variables associated with 30 day readmission.

Conclusion

This investigation is a stepping stone to creating an electronic tool designed to reflect the characteristics of HF population admitted to a single facility and predict risk of HF readmissions within 30 days at the time of admission. Implementation of a plan of care designed to meet the needs of this HF population as well as identify those patients at high risk for will allow for provision of a comprehensive and timely individualized plan of care to reduce the incidence of 30 day readmissions.

Table 1. Demographic data from chart review (n = 175).

	All Patients (n = 175)
Age	
Average (SD)	75
Gender	
Male	76 (43%)
Female	99 (56%)
Race	
White	165 (94%)
Black	7 (4%)
Other	3 (2%)
Marital Status	
Married	72 (41%)
Single	103 (59%)
Insurance	
Medicare	154 (88%)
Medicaid	7 (4%)
Commercial	11 (6%)
Self Pay	3 (2%)
Hypertension	
Yes	146 (83%)
No	29 (17%)
Diabetes	
Yes	81 (46%)
No	94 (54%)
*PVD	
Yes	21 (12%)
No	154 (88%)

	All Patients (n = 175)
*COPD	
Yes	70 (40%)
No	105 (60%)
Anemia	
Yes	24 (14%)
No	151 (86%)
*Is. Heart Dis.	
Yes	76 (43%)
No	99 (57%)
Depression	
Yes	27 (15%)
No	148 (85%)
Anxiety	
Yes	11 (6%)
No	164 (94%)
Stroke	
Yes	23 (13%)
No	152 (87%)
*ETOH	
Yes	8 (5%)
No	167 (95%)
*Drug Abuse	
Yes	3 (2%)
No	172 (98%)
Tob. Abuse	
Yes	92 (53%)
No	83 (47%)

*PVD = Peripheral vascular disease, *COPD = Chronic obstructive pulmonary disease, Is. Heart Dis. = Ischemic Heart Disease, *ETOH = History of abuse, *Tobacco abuse = History of abuse,*Drug abuse = History of abuse, *Tob. Abuse = Tobacco Abuse

Table 2. Demographic data *all data excluding those patients who expired on their first admission (n = 7)

	Patients with a single admission (n = 92)	Patients with >1 admission (n = 76)	Patients with ≥1 admissions not admitted within 30 days post discharge after 1st admission (n = 127)	Patients with an admission within 30 days post discharge (n = 41) After first admission
Age				
Average (SD)			74	79
Gender				
Male	46 (50%)	27 (35%)	59 (46%)	14 (34%)
Female	46 (50%)	49 (65%)	68 (54%)	27 (66%)
Race				
White	86 (94%)	72 (94%)	118 (93%)	40 (98%)
Black	5 (5%)	2 (3%)	6 (5%)	1 (2%)
Other	1 (1%)	2 (3%)	3 (2%)	0
Marital Status				
Married	36 (39%)	31 (41%)	49 (39%)	18 (44%)
Single	56 (61%)	45 (59%)	78 (61%)	23 (56%)
Insurance				
Medicare	78 (85%)	70 (92%)	108 (85%)	40 (98%)

	Patients with a single admission (n = 92)	Patients with >1 admission (n = 76)	Patients with ≥1 admissions not admitted within 30 days post discharge after 1st admission (n = 127)	Patients with an admission within 30 days post discharge (n = 41) After first admission
*COPD				
Yes	32 (35%)	36 (47%)	50 (39%)	18 (44%)
No	60 (65%)	40 (53%)	77 (61%)	23 (56%)
Anemia				
Yes	8 (9%)	15 (20%)	11 (9%)	12 (29%)
No	84 (91%)	61 (80%)	116 (91%)	29 (71%)
*Is. Heart Dis.				
Yes	34 (37%)	38 (50%)	49 (39%)	23 (56%)
No	58 (63%)	38 (50%)	78 (61%)	18 (44%)
Depression				
Yes	14 (15%)	11 (14%)	20 (16%)	5 (12%)
No	78 (85%)	65 (86%)	107 (84%)	36 (88%)
Anxiety				
Yes	5 (5%)	6 (8%)	9 (7%)	2 (5%)

Medicaid	3 (3%)	4 (6%)	6 (5%)	1 (2%)
Commercial	9 (10%)	0	10 (8%)	0
Self Pay	2 (2%)	1 (1%)	3 (2%)	0
Hypertension				
Yes	76 (83%)	64 (84%)	104 (82%)	36 (88%)
No	16 (17%)	12 (16%)	23 (18%)	5 (12%)
Diabetes				
Yes	42 (46%)	35 (46%)	58 (46%)	19 (46%)
No	50 (54%)	41 (54%)	69 (54%)	22 (54%)
*PVD				
Yes	8 (9%)	11 (14%)	15 (12%)	4 (10%)
No	84 (91%)	65 (86%)	112 (88%)	37 (90%)

No	87 (95%)	70 (92%)	118 (93%)	39 (95%)
Stroke				
Yes	10 (11%)	11 (14%)	16 (13%)	5 (12%)
No	82 (89%)	65 (85%)	111 (87%)	36 (88%)
*ETOH				
Yes	5 (5%)	2 (3%)	5 (4%)	2 (5%)
No	87 (95%)	74 (97%)	122 (96%)	39 (95%)
*Drug Abuse				
Yes	3 (3%)	0	3 (2%)	0
No	89 (97%)	76 (100%)	124 (98%)	41 (100%)
Tob. Abuse				
Yes	47 (51%)	42 (55%)	67 (53%)	22 (54%)
No	45 (49%)	34 (45%)	60 (47%)	19 (46%)

*PVD = Peripheral vascular disease, *COPD = Chronic obstructive pulmonary disease, Is. Heart Dis. = Ischemic Heart Disease, *ETOH = History of abuse, *Tobacco abuse = History of abuse,*Drug abuse = History of abuse, *Tob. Abuse = Tobacco Abuse

Table 3. Characteristics of patients

	Patients with a single admission (n = 92)	Patients with >1 admission (n = 76)	Patients with a single admission (n = 127) *excluding those who expired on first admission	Patients with an admission within 30 days post discharge (n = 41)		Patients with a single admission (n = 92)	Patients with >1 admission (n = 76)	Patients with a single admission (n = 127) *excluding those who expired on first admission	Patients with an admission within 30 days post discharge (n = 41)
Discharge Destination					Creatine Kinase MB				
Transfer to outside facility	16 (17%)	3 (4%)	18 (14%)	1 (2%)	≤9 (ref.)	87 (95%)	74 (97%)	121 (95%)	38 (93%)
Skilled nursing facility	15 (16%)	20 (26%)	23 (18%)	13 (32%)	>9	5 (5%)	2 (3%)	6 (5%)	3 (7%)
Home with home health	19 (21%)	22 (29%)	27 (21%)	11 (27%)					
Home	41 (45%)	21 (27%)	57 (45%)	16 (39%)	Glucose				
Expired	-	5 (7%)	-	-	>70 (ref.)	91 (99%)	74 (97%)	126 (99%)	40 (98%)
Hospice	1 (1%)	5 (7%)	2 (2%)	0	≤70	1 (1%)	2 (3%)	1 (1%)	1 (2%)
ED visit in last year					Troponin				
Yes	42 (46%)	38 (50%)	64 (50%)	16 (39%)	≤1 (ref.)	89 (97%)	75 (99%)	123 (97%)	41 (100%)
No	50 (54%)	38 (50%)	63 (50%)	25 (61%)	>1	3 (3%)	1 (1%)	4 (3%)	0
AMA in last year					White Blood Cell				
Yes	2 (2%)	76 (100%)	2 (2%)	0	≤10.9 (ref.)	64 (70%)	59 (78%)	84 (66%)	32 (78%)
No	90 (98%)	0	125 (98%)	41 (100%)	>10.9	28 (30%)	17 (22%)	43 (34%)	9 (22%)
Level of Care at									

admission									
Intensive Care Unit	21 (23%)	19 (25%)	26 (20%)	10 (24%)	Blood Urea Nitrogen				
Progressive Care Unit	32 (35%)	26 (34%)	40 (32%)	10 (24%)	<35 (ref.)	63 (68%)	49 (64%)	86 (68%)	28 (70%)
Floor bed	39 (42%)	31 (41%)	61 (48%)	21 (51%)	35-50	19 (21%)	11 (14%)	25 (20%)	8 (20%)
					51-70	8 (9%)	8 (11%)	10 (8%)	1 (3%)
Systolic Blood Pressure					>70	2 (2%)	8 (11%)	5 (4%)	3 (7%)
>100 (ref.)	88 (96%)	71 (93%)	119 (94%)	40 (98%)					
81-100	3 (3%)	3 (4%)	6 (5%)	1 (2%)	Sodium				
80 or less	1 (1%)	2 (3%)	2 (2%)	0	135-145 (ref.)	66 (72%)	55 (72%)	87 (69%)	28 (68%)
					130-134 or > 145	20 (22%)	16 (21%)	30 (24%)	10 (24%)
Diastolic Blood Pressure					≤129	6 (6%)	5 (7%)	10 (7%)	3 (7%)
>62 (ref.)	75 (82%)	57 (75%)	100 (79%)	31 (76%)					
54-62	13 (14%)	10 (13%)	20 (16%)	8 (20%)	Creatinine				
≤53	4 (4%)	9 (12%)	7 (6%)	2 (4%)	≤2 (ref.)	74 (80%)	52 (68%)	93 (73%)	30 (73%)
					>2	18 (20%)	24 (32%)	34 (27%)	11 (27%)
Pulse									
<99 (ref.)	63 (69%)	52 (68%)	86 (68%)	31 (76%)	Total Creatine Kinase				
≥99	29 (31%)	24 (32%)	41 (32%)	10 (24%)	36-300 (ref.)	64 (76%)	38 (61%)	79 (72%)	28 (76%)
					≤35 or >300	20 (24%)	24(39%)	30 (28%)	9 (24%)
Temperature (C˚)									
35-37.7 (ref.)	86 (95%)	69 (93%)	116 (92%)	38 (95%)	Bilirubin				
<34.9 or >37.7	5 (5%)	5 (7%)	10 (8%)	2 (5%)	≤1.4 (ref.)	87 (95%)	70 (92%)	121 (95%)	39 (95%)
					>1.4	5 (5%)	6 (8%)	6 (5%)	2 (5%)
Body Mass Index									
18.5-24.9 (ref.)	23 (25%)	21 (28%)	34 (27%)	14 (35%)	Hemoglobin				
<18.5	6 (6%)	5 (6%)	8 (6%)	2 (5%)	≥12 (ref.)	45 (49%)	22 (29%)	62 (49%)	17 (41%)
25.0-29.9	18 (20%)	21 (28%)	25 (20%)	9 (23%)	<8	2 (2%)	7 (9%)	3 (2%)	3 (7%)
≥35	45 (49%)	29 (38%)	60 (47%)	15 (37%)	8-11.9	45 (49%)	47 (62%)	62 (49%)	21(51%)

Ejection Fraction					Brain Natriuretic Peptide				
>50 (ref.)	44 (48%)	44 (58%)	65 (51%)	24 (58%)	101-2400 (ref.)	75 (82%)	42 (55%)	93 (73%)	24 (59%)
36-50	20 (22%)	15 (20%)	26 (20%)	6 (15%)	≤100	6 (6%)	25 (33%)	21 (17%)	10 (24%)
≤35	28 (30%)	17 (22%)	36 (28%)	11 (27%)	>2400	11 (12%)	9 (12%)	13 (10%)	7 (17%)
PT/INR									
<1.25 (ref.)	49 (71%)	31 (56%)	67 (72%)	20 (67%)					
≥1.25	20 (29%)	24 (44%)	26 (28%)	10 (33%)					

Table 4. Demographics of all admissions independent of patient level (n = 301)

	No readmission within 30 days of discharge (n = 218)	Readmission within 30 days of discharge (n = 83)
Age		
Average (SD)	75	74
Gender		
Male	94 (43%)	25 (30%)
Female	124 (87%)	58 (70%)
Race		
White	203 (93%)	80 (96%)
Black	10 (5%)	2 (2%)
Other	5 (2%)	1 (1%)
Marital Status		
Married	86 (39%)	36 (43%)
Single	132 (60%)	47 (57%)
Insurance		
Medicare	192 (88%)	78 (94%)
Medicaid	10 (5%)	2 (2%)
Commercial	12 (5%)	0
Self Pay	4 (2%)	3 (4%)
Hypertension		
Yes	179 (82%)	66 (80%)
No	39 (18%)	17 (20%)
Diabetes		
Yes	97 (44%)	48 (58%)
No	121 (56%)	35 (42%)
*PVD		
Yes	29 (13%)	6 (7%)
No	189 (87%)	77 (93%)

	No readmission within 30 days of discharge (n = 218)	Readmission within 30 days of discharge (n = 83)
*COPD		
Yes	92 (42%)	48 (58%)
No	126 (58%)	35 (42%)
Anemia		
Yes	30 (14%)	23 (28%)
No	188 (86%)	60 (72%)
*Is. Heart Dis.		
Yes	93 (43%)	47 (57%)
No	125 (57%)	36 (43%)
Depression		
Yes	37 (17%)	11 (13%)
No	181 (83%)	72 (87%)
Anxiety		
Yes	16 (7%)	3 (4%)
No	202 (93%)	80 (96%)
Stroke		
Yes	30 (14%	11 (13%)
No	188 (86%)	72 (87%)
*ETOH		
Yes	7 (3%)	5 (6%)
No	211 (97%)	78 (94%)
*Drug Abuse		
Yes	3 (1%)	0
No	215 (99%)	83 (100%)

Tob. Abuse		
Yes	116 (53%)	54 (65%)
No	102 (47%)	29 (35%)

*PVD = Peripheral vascular disease, *COPD = Chronic obstructive pulmonary disease, Is. Heart Dis. = Ischemic Heart Disease, *ETOH = History of abuse, *Tobacco abuse = History of abuse,*Drug abuse = History of abuse, *Tob. Abuse = Tobacco Abuse

Table 5. Characteristics of all admissions independent of patient level (n = 301)

	No admission 30 days after discharge (n = 218)	Admission within 30 days post-discharge (n = 83)
Discharge Destination		
Transfer to outside facility	23 (10%)	3 (4%)
Skilled nursing facility	47 (22%)	22 (26%)
Home with home health	51 (23%)	24 (29%)
Home	78 (36%)	31 (37%
Expired	15 (7%)	0
Hospice	4 (2%)	3 (4%)
ED visit in last year		
Yes	121 (56%)	45 (54%)
No	97 (44%)	38 (46%)
AMA in last year		
Yes	2 (1%)	83 (100%)
No	216 (99%)	0
Level of Care at admission		
Intensive Care Unit	54 (25%)	20 (24%)
Progressive Care Unit	70 (32%)	29 (35%)
Floor bed	94 (43%)	34 (41%)
Systolic Blood Pressure		
>100 (ref.)	206 (94%)	77 (93%)
81-100	8 (4%)	6 (7%)
80 or less	4 (2%)	0

	No admission 30 days after discharge (n = 218)	Admission within 30 days post-discharge (n = 83)
Creatine Kinase MB		
≤9 (ref.)	169 (94%0	72 (97%)
>9	11 (6%)	2 (3%)
Glucose		
>70 (ref.)	215 (99%)	82 (99%)
≤70	3 (1%)	1 (1%)
Troponin		
≤1 (ref.)	177 (97%(	75 (100%)
>1	6 (3%)	0
White Blood Cell		
≤10.9 (ref.)	150 (69%)	64 (77%)
>10.9	67 (31%)	19 (23%)
Blood Urea Nitrogen		
<35 (ref.)	148 (69%)	49 (60%)
35-50	40 (18%)	18 (22%)
51-70	15 (7%)	7 (8%)
>70	13 (6%)	8 (10%)
Sodium		
135-145 (ref.)	152 (70%)	55 (66%)

Diastolic Blood Pressure		
>62 (ref.)	165 (76%)	67 (81%)
54-62	38 (17%)	9 (11%)
≤53	15 (7%)	7 (8%)
Pulse		
<99 (ref.)	151 (69%)	63 (76%)
≥99	67 (31%)	20 (24%)
Temperature (C˚)		
35-37.7 (ref.)	198 (92%)	80 (98%)
<34.9 or >37.7	17 (8%)	2 (2%)
Body Mass Index		
18.5-24.9 (ref.)	61 (28%)	30 (37%)
<18.5	14 (6%)	3 (4%)
25.0-29.9	48 (22%)	16 (19%)
≥30	94 (43%)	33 (40%)
Ejection Fraction		
>50 (ref.)	118 (58%)	52 (64%)
36-50	39 (19%)	13 (16%)
≤35	45 (22%)	16 (20%)
PT/INR		
<1.25 (ref.)	103 (66%)	42 (66%)
≥1.25	54 (34%)	22 (34%)

130-134 or >145	50(23%)	19 (23%)
≤129	15 (7%)	9 (11%)
Creatinine		
≤2 (ref.)	160 (74%)	51 (61%)
>2	57 (26%)	32 (39%)
Total Creatine Kinase		
36-300 (ref.)	125 (68%)	46 (62%)
≤35 or >300	57 (31%)	28 (38%)
Bilirubin		
≤1.4 (ref.)	187 (94%)	77 (95%)
>1.4	13 (6%)	4 (5%)
Hemoglobin		
≥12 (ref.)	87 (40%)	27 (33%)
<8	11 (5%)	6 (7%)
8-11.9	119 (55%)	50 (60%)
Brain Natriuretic Peptide		
101-2400 (ref.)	160 (84%)	45 (67%)
≤100	10 (5%)	7 (10%)
>2400	21 (11%)	15 (22%)

Appendix A

	*DM	*HTN	*PVD	Chronic Pulmonary Disease	Anemia	Ischemic Heart Disease	Depression	Anxiety	*ETOH	Stroke	*Drug abuse (illicit)	*Tobacco Abuse	*Level of Care at Admission
Patient 1													
Patient 2													

*DM = Diabetes
Binary Quality of 1 if yes, 0 if no
*HTN = Hypertension
Binary Quality of 1 if yes, 0 if no
*PVD = Peripheral vascular disease
Binary Quality of 1 if yes, 0 if no
Chronic Pulmonary Disease = Asthma, Chronic Obstructive Pulmonary Disease (COPD)
Binary Quality of 1 if yes, 0 if no
Anemia = Binary Quality of 1 if yes, 0 if no
Ischemic Heart Disease = Binary Quality of 1 if yes, 0 if no
Depression = Binary Quality of 1 if yes, 0 if no
Anxiety = Binary Quality of 1 if yes, 0 if no
*ETOH = History of abuse, Never abused
Binary Quality of 1 if yes, 0 if no
Stroke = Binary Quality of 1 if yes, 0 if no
*Drug abuse = History of abuse, Never abused
Binary Quality of 1 if yes, 0 if no
*Tobacco abuse = History of abuse, Never abused
Binary Quality of 1 if yes, 0 if no
*Level of Care at Admission = Regular floor bled, Step Down Unit (SDU), Intensive Care Unit (ICU)
Quality of 2 for floor bed, 1 for SDU, 0 for ICU

Appendix B

	Age (years)	*Gender (male or female)	*Race	*Insurance	*Discharge Destination	Readmission in 30 days	*Marital Status	*ED Visits	*AMA
Patient 1									
Patient 2									

*Gender = Male or Female
1 for Male, 0 for Female
*Race = Caucasian, African American, Other
2 for Caucasian, 1 for African American, 0 for Other
*Insurance = Commercial, Medicare, Medicaid, or No insurance(self pay)
3 for Commercial, 2 for Medicare, 1 for Medicaid, 0 for No insurance
*Discharge Destination = Home, Home with Home Health Care (HHC), Skilled Nursing Facility (SNF), Transfer to outside Facility
3 for Home, 2 for HHC, 1 for SNF, 0 transfer to outside facility
*Marital Status = Single(widowed, divorced), Married
1 for Married, 0 for Single
*ED = Emergency department visit to facility in 1 year prior to last admission
1 for yes, 0 for no
*AMA = History if leaving against medical advice within the 1 year from index admission
1 for yes, 0 for no

Appendix C

	Systolic BP >100 (ref.) 81-100 ≤80	Diastolic BP >62 (ref.) 54-62 ≤53	Pulse <99 (ref.) ≥99	Temperature 95-100 (ref.) ≤95 or >100	BNP ≤100 100-2400 (ref.) >2400	PT-INR <1.25 (ref.) ≥1.25	Glucose >70 (ref.) ≤70	*BMI	*EF >50% (ref) 35-50% ≤35%	*CK-MB ≤9 (ref.) >9
Patient 1										
Patient 2										

	Troponin ≤1 (ref.) >1	*WBC ≤10.9 (ref.) >10.9	*BUN <35 (ref.) 35-50 50-70 >70	Sodium 135-145 (ref.) 130-135 or > 145 ≤130	Creatinine ≤2 (ref.) >2	*CK 35-300 (ref.) ≤35 or >300	Bilirubin ≤1.4 (ref.) >1.4	Hemoglobin A1C <4. 0 4-5.6 (ref) >5.6
Patient 1								
Patient 2								

(Amarasingham, Moore, Tabak, Drazner, Clark, Zhang, et al., 2010, p 983)

*BMI = Body Mass Index
*EF = Ejection fraction
*CK-MB = Creatinine Kinase-MB
*WBC = White blood cell
*BUN = Blood urea nitrogen

Values expressed as percentages

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Palliative Care Law: Integration of Palliative

Services in the Acute Care Setting for Non-traditional

Patients with Chronic Illness Including the Heart Failure Population

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Palliative Care Law: Integration of Palliative Services in the Acute Care Setting for Non-traditional Patients with Chronic Illness Including the Heart Failure Population

Legislators are beginning to recognize the medical, humanitarian, and economic value of helping terminally ill patients and their families become educated regarding potential treatment options during their end of life journeys (Brody, 2010). Traditionally, palliative care has targeted individuals with an oncology diagnosis or pain management issues. This service could benefit other patient populations experiencing life limiting diseases also.

Heart failure (HF) is a chronic, long term, disabling illness which results in death as the patient condition progressively worsens. Palliative care services can provide individualized support and symptom management from the time of diagnosis through end stage or death rather than as an intervention solely designed to ease a terminal process (Hupcey, Penrod, & Fogg 2009). This paper will utilize the HF population to demonstrate the benefit of integrating palliative care services into the acute care setting for patient populations not customarily considered for these interventions. Kingdon's multiple streams model will be used as a framework for analyzing the potential of adopting a Palliative Care Information Act nation-wide.

Palliative care offers patients facing life-threatening illnesses such as HF options which can enhance quality of life through: a) provision of relief from pain, b) affirmation of life and consideration of dying as a normal process, c) neither hastening or postponing death, d) integration of the psychological and spiritual aspects of care, e) offering a support system to help the family cope during the patient illness and in their bereavement process, f) use of a team approach to address patient and family needs, (Supelveda, Marlin, Yoshida, & Ullrich, 2002; Shah, Morrissey, Bharadwaj, et al., 2013).

Palliative care and hospice care are often confused. Palliative care's purpose is to address and manage symptoms causing distress such as pain, difficulty breathing or nausea, but receipt of palliative care does not mean the individual is in the act of dying. The aim of palliative care is to allow persons to

live their lives in comfort while receiving treatment for their medical condition and management of symptoms (National Institute of Nursing Research, 2009). Hospice and palliative care programs do have similarities. Both have goals driven towards symptom relief and pain management. They are different in that palliative care services have fewer restrictions, and therefore are appropriate for a much larger patient population. Patients will qualify for palliative care services if they have a serious, complex, or chronic illness (including patients who are expected to recover). In order to qualify for Medicare Hospice Benefit, two physicians must first certify that a patient is expected to have less than six months to live (Get Palliative Care, 2013; Centers for Medicare and Medicaid (CMS), 2012).

Background

Currently, palliative care guidelines and services are greatly lacking or non-existent. Patients with chronic illnesses such as HF are not being consistently offered the services due to issues such as lack of provider-patient communication, and unavailability of palliative care services. Exclusion of these services leaves gaps in patient care and provider-patient communication. The SUPPORT study investigators conducted a controlled trial to understand the prognoses and preferences for outcomes and risks of treatment among dying patients with many different diagnoses (Knaus, Connors, Dawson, Desbiens, Fulkerson, Goldman, et al. , 1995). This study highlighted that chronically ill and dying patients were often not asked about their desire for aggressive treatment, nor are they informed about the characteristics of hospital death. Additionally, providers are often unaware of their patients' wishes regarding do-not-resuscitate and “allow natural death” orders. This gap in care led to almost 40% of patients who died spending at least 10 days in an intensive care unit, and among 50% of the conscious patients who died while hospitalized, family members reported the patient experienced moderate to severe pain at least half of the time (Knaus, WA 1995).

Some investigations have shown that palliative care services are excluded in over 55% of facilities statewide. Large, nonprofit hospitals belonging to a health system were most likely to have palliative

care programs in an investigation which examined palliative cares services in California. These same hospitals had conducted training programs related to palliative care more frequently. The most common type of palliative care program was inpatient consultation of a team. The programs were primarily funded by the hospitals, and the goals of the service were determined by the hospital or health system (Pantilat, Kerr, Billings, Bruno, & O'Riordan, 2012).

A barrier for facilities to offer palliative care services is the lack of palliative medicine providers. Currently, there is only one palliative medicine provider for every 1,200 persons with a chronic or terminal illness, compared to one cardiologist for every 71 persons who has a heart attack (Center to Advance Palliative Care, 2013). Advance practice nurses would be invaluable to bridging this gap in care both in the inpatient and outpatient setting.

Palliative care is focused on symptom management and comfort of the patient. Initiation of palliative care services for HF patients throughout the course of the disease process allows for evidence based interventions to help control the symptoms common to HF patients such as dyspnea, fatigue, pain and cognitive impairment (Goodlin, 2009; Jaarsma, Beattie, Ryder et al., 2009; Lorenz, Lynn, Shugarman, et al., 2008). In much the same way, palliative care can provide benefit in the treatment of advanced HF even if it is not implemented early on in the disease process (Ward, C., 2002; Hemani, Letizia, 2008). Although few persons diagnosed with end-stage HF receive the benefit of palliative care consultation, individuals receiving end of life interventions are positively impacted by those interventions. Positive impact has been demonstrated through extended life, patient/family and provider collaboration to establish preferred and appropriate plan of care, and substantial cost savings (Adler, Goldfinger, Park, & Meier, 2009; Morrison, Penrod, Cassel, Caust-Ellenbogen, Litke, Spragens et al., 2008). A primary source of cost savings secondary to initiation of palliative care is decrease in unnecessary intensive care unit use (Eti, O'Mahony, McHugh et al., 2013).

In 2013, five states introduced formally enacted laws related to provision of palliative care services including Maryland, Connecticut, Rhode Island, New Hampshire, and Massachusetts. Generally the bills include the following: "a) the establishment of a palliative care advisory council to aide in state palliative care initiatives, b) the establishment of educational web resources, c) the requirement that all licensed facilities facilitate access to palliative care or provide information about palliative care services, or d) the creation of palliative care pilot programs for data collection" (Waner, 2013).

In 2009, California adopted the Right to Know End-of Life Options act. It states when a health care provider makes a diagnosis that a patient has a terminal illness, the health care provider shall, upon the patient's request provide the patient with comprehensive information and counseling regarding legal end-of-life options (O'Reilly, 2008). In addition, the patient should be referred to another health care provider if that provider does not wish to comply with the patient's request for end-of-life information. A healthcare provider is defined as an attending physician or surgeon but also extends to nurse practitioners and physician assistants.

As a result of the passage of this law, hospitals in California began assessing the ability to comply with the law. Most California hospitals did not have palliative care programs to assist providers in complying with this act. The California Healthcare Foundation launched an initiative called Spreading Palliative Care in Public Hospitals (SPCPH) to: a) develop new, sustainable inpatient palliative care programs in California hospitals, b) provide models for culturally sensitive palliative care services, c) support expansion and enhancement of existing public hospital palliative care programs, and d) create a uniform data collection tool. During phase 1, grants were awarded to 12 facilities to assist in implementing palliative care consult services where none existed and expand existing programs. In phase II, which spans April 2011 to December 2013, five additional facilities have received grants. The California Healthcare Foundation has declared the project a success. The percentage of California hospitals with a palliative care program increased 10 percent from 2008 to 2011 (43 and 53 percent

respectively), and from 22 percent to 100 percent in public hospitals from 2007 to 2012. It has stimulated formation of new palliative care programs in 13 facilities and expanded them in four others (Parrish, 2013).

In New York, on February 9, 2011 The Palliative Care Information Act was passed. It amended the Public Health Law by adding section 2927-c which requires physicians and nurse practitioners to offer terminally ill patients information and counseling concerning palliative care and end-of-life options. This information by law must include: a) prognosis, b) the range of treatment options available to the patient, c) the risks and benefits of each of the options for treatment, and d) referral to another care provider willing to provide the information and counseling if the practitioner caring for the patient is not able to offer these services. Design, passage, and implementation of this law generated strong public statements from the medical community. The passage of the law triggered responses throughout the healthcare community both positive and negative.

Analysis of Problem

Routine integration of palliative care services into practice may require more forceful and proactive measures. Kingdon's multiple streams model provides an excellent framework for analyzing the potential of adopting a Palliative Care Information Act nation-wide. The three streams of problems, policies and politics will be beneficial in analyzing the potential for enacting palliative care law (Kingdon, 1997). Would establishment of a Palliative Care Law nationally provide the HF population with interventions that meet their needs in establishing plans of care that support quality of life and end of life care decision making processes?

Problem

Palliative care services are not routinely available to patients who could benefit from them. Patient populations suffering from chronic or debilitating disease states, including the HF population would benefit from consistent access to palliative care programs. HF has become epidemic in

developed counties and incidence of HF is becoming more prevalent world-wide. Over 5 million individuals in the United States have HF, with an estimated annual incidence of > 500,000. The number of deaths due to HF in 2004 was 284,365 which exceeded the total mortalities in that same year for lung cancer, breast cancer, prostate cancer, and HIV/AIDS combined. The yearly cost for care of the patients was roughly $30 billion in 2006, and the cost of care for these patients is greater than the cost of care for all other diagnoses (Adler, Goldfinger, Park, Meier, 2009).

Approximately 5% of patients with HF have end stage disease that is not responsive to medical therapy. These patients rely upon symptom management as they live out the rest of their lives (Adler, Goldfinger, Park, Meier, 2009). Palliative care services would be valuable to HF patients resulting in increased quality of life, appropriate symptom management, and cost containment (Eti, O'Mahony, McHugh et al., 2013; Jaarsma, Beattie, Ryder et al., 2009). When referred appropriately, palliative care services have been shown to reduce patients' cost per admission by $7000.00 compared to Medicaid patients who did not receive palliative care referrals (Andrews, 2011).

Much of the public and some providers have misjudged palliative care as pre-death care. This perception omits the primary goals of symptom management and comfort, leaving patients with unmet needs including symptom management and lack of ability to perform activities of daily living. The challenge in providing palliative care to the HF population lies in redirecting the focus upon end-of-life care to one of providing palliative care measures inclusive of symptom management prior to meeting end of life issues. Passage of a palliative care law could ensure provider and patient education, and that appropriate patient populations such as HF are offered the benefit of the services (Hupcey, Penrod, & Fogg 2009).

The healthcare community has validated the value of palliative care services and it is beginning to explore methods for hardwiring the provision of these services into the care setting such as policy change (Waner, 2013; O'Reilly, 2008; Parrish, 2013). One potential solution is to adopt laws mandating

palliative care services be offered to patients in the acute care setting. Many actors have been involved in the discussion of the potential for adopting palliative care information law adoption. Nationally, the rights of each patient to receive individualized end of life care has been addressed by the Joint Commission and The Center for Medicaid and Medicare Services (CMS). The standards of these accrediting agencies have targeted patient rights to receive information regarding advance directives and to have care individualized if a terminal illness has been diagnosed. The Joint Commission and CMS have not standardized the process for meeting the requirements, but they have allowed each hospital to determine the process for providing the information to the patients it serves. Palliative care would be one of many options organizations could adopt in meeting these standard requirements.

Policies

One potential solution that would ensure palliative care services were available for appropriate patients in the acute setting is the passage of palliative care legislation at the national level. Palliative Care Law has been enacted at the state level. The state templates could provide the foundation for creating a national law mandating palliative care services be offered to all patients with diagnoses of diseases or conditions that would ultimately result in death. The key benefits of a national Palliative Care Law would include: a) disclosure of diagnoses improving an individual's ability to consider various treatment options and choose an option that meets his/her needs, b) improved quality of life, c) increased ability to perform activities of daily living, d) reduced likelihood patients will spend their last days in hospitals or in intensive care units, e) increased longevity due to symptom management, and f) increased likelihood of timely hospice referrals.

There would be significant barriers to enactment of palliative care legislation at the national level. Some of these challenges would include: a) provision of consistent, adequate, timely services, b) monitoring compliance of the law, c) determination of quality indicators to measure the effectiveness of the various palliative care programs, d) determination of what terminal illness is, e) provision of trained

services from a multidisciplinary team, and f) presence of mentoring for care providers new to the palliative care role (Milch, 2011). Due to these significant barriers, adoption of a national Palliative Care Law seems to be an unrealistic goal.

A second option for integrating palliative care services into the acute care setting is to continue pursuing legislation mandating provision of palliative care services state by state. The laws established in California and New York could serve as models for future state legislation. Optimally, representatives from various states would collaborate to develop laws that would cross boundaries. The challenges listed for adoption of palliative care law at the national level would also be present at the state level, but perhaps states could foster resolution of these issues and standardize practices as the solutions became incorporated into the law. For instance, future state laws could determine when after a life limiting diagnosis was determined palliative care should be initiated, indicators for monitoring to determine the effectiveness of palliative care programs, and competency requirements for practitioners supporting palliative care programs.

Advantages to adopting state laws requiring palliative care services include: a) guaranteed provision of treatment options to patients allowing them to control their disease manifestations and end of life care, b) increased patient quality of life, c) opportunity to individualize palliative care programs to the populations comprising the state population, d) increased public awareness of end of life options and decisions, and e) identification of evidence based practices for patients with life limiting illnesses. Issues regarding state legislation requiring palliative care programs in acute care settings include: a.) lack of competent care providers to offer the palliative care services, b) lack of standardization regarding composition of the palliative care team, c) difficulty in monitoring compliance with the law, d) potential lack of funds necessary to provide educational materials and competent staff, and e) lack of the ability to define life limiting illness consistently from state to state.

Another potential solution for integrating palliative care into the treatment plans for patients diagnosed with a disease or condition that will eventually result in death is mandating national healthcare provider education regarding palliative care, hospice care, end of life services, and communication with patients. The education would raise awareness of the role palliative care plays in treating patients, and as a result, increased adoption of palliative care services would occur. Over time, palliative care would become an accepted standard of care within acute care settings as organizations and patients communicate the benefits with the services.

The education could be developed by a multidisciplinary team comprised of experts in palliative care under the direction of the National Advisory Board Company. The goal of this National Advisory Board Company is to offer expertise in translating changes in healthcare, explaining policy, and integrating policy into practice. This multidisciplinary team could utilize the Clinical Practice Guidelines for Quality Palliative Care released in 2013 as a framework for developing the educational program. Completion of the education would be mandated by state licensure boards prior to professional licensure for all healthcare providers. The benefit of this approach would be: a) physician buy in due to reassurance that the patient/provider relationship would not be threatened, b) presence of standardized, evidence based patient education across the care continuum, and c) local oversight for provision of appropriate services, eliminating the need for monitoring of compliance by an external agency. Concerns related to the approach include: a) failure of practitioners to integrate the palliative education into their practice patterns. b) inconsistent identification of appropriate patient populations due to absence of inclusion criteria for palliative care services, and c) lack of a formal process to monitor the effectiveness of the education upon adoption of palliative care programs and resulting patient outcomes.

Integration of care services into the acute healthcare environment requires two actions. First, the national accrediting bodies approved by the United States Senate and House of Representatives

must be mandated by law to revise end of life standards to include provision of palliative care services within the healthcare organizations they accredit. Sub-standards within the overall requirement for integration of palliative care services into appropriate treatment plans would demand: a) identification of patient populations specific to each organization that were appropriate for palliative care services, b) provision of a structured competency program related to palliative care for all personnel specific to the role of each care provider, c) formation of policies describing the palliative care program at the organization, d) provision of patient education regarding the right to palliative care services, and e) submission of data related to outcomes of the palliative care program to a national repository.

Second, Medicare and Medicaid reimbursement laws would be revised to include appropriate reimbursement for hospital stays coded with V66.7 (palliative care). This increase in reimbursement would support any increased cost hospitals incur due to the implementation of palliative care services or units. Costs could include payment for services by certified physicians, clergy and nurses on the palliative care teams or the expense of constructing the palliative care units. The appropriateness of the use of these codes could be monitored during the coding review process currently utilized by the CMS.

Palliative care law can financially reward hospitals through timely identification and accurate documentation of comfort care for appropriate patients. CMS has linked severity adjusted patient mortality rates with payment through the Value Based Purchasing legislation. For some patient populations, hospital connected deaths, such as those of the HF population, are unavoidable and predictable. Palliative care services can assist care providers in focusing treatment plans upon maximizing patient comfort and quality of life efforts. Proper palliative care documentation will prevent inflation of hospital mortality rates and the perception that complications and deaths are occurring in health patient populations through assignment of code V66.7. This code can be used as a secondary diagnosis if comfort care, comfort measure, comfort care and pain control, end of life care, or hospice

care terminology is included in physician documentation. Deaths of patients with this terminology will be classified as expected and will not count against organizations when comparing hospital mortality rates nationally.

Politics

The HF Association of the European Society of Cardiology organized a workshop to raise the awareness of the need for palliative care for HF patients. This workshop determined the barriers to HF patients receiving palliative care services were the unpredictability of the condition, difficulties in anticipating the terminal phase, and a high prevalence of sudden death. The workshop targeted the common morbidities including depression suffered by the HF population and through data analysis determined the morbidities that would benefit from symptom management. In addition, suggestions for possible interventions at key points throughout the disease process were suggested (Jaarsma, Beattie, Rutten, McDonagh, Mohacsi, Murray, et al., 2009).

The American Cancer Society's Cancer Action Network (ACS-CAN) is a strong advocate for palliative care, and is very active in assisting legislation. Other networks such as the National Council for Palliative Care (NCPC), American Academy of Hospice and Palliative Medicine (AAHPM), American Geriatrics Society (AGS), American Hospital Association (AHA), American Society of Clinical Oncology (ASCO) , Association of Professional Chaplains, HealthCare Chaplaincy, Hospice and Palliative Nurses Association (HPNA), Institute for Health Care Improvement (IHI), National Hospice and Palliative Care Organization (NHPCO) , and Social Work in Hospice and Palliative Care Network are also strong advocated for palliative care legislation. The Center to Advocate Palliative care acts as an umbrella and organizer of palliative care efforts. It also offers statistics and information to the general population on how your state ranks in comparison to the nation on palliative care services.

Potential or Unintended Consequences of Recommended Policy

Many positive outcomes could result from inclusion of palliative care standards in the accreditation process for healthcare facilities. First, there might be decrease in the amount of expensive, futile care provided today including futile intensive care unit treatments (Nueberg, 2009). Palliative care services can also assist in documentation of advance directives, consultation prior to transfer to an intensive care unit, and consultation of ethics committees if disputes arise (Nueberg, 2009). This helps to relieve some of the decision making stress for families, and ensure that patient's wishes are executed.

Another potential outcome would be an increase in the number of palliative care units existing throughout the United States. These units could provide assistance in managing life threatening illnesses throughout the course of the illness rather than delaying this support until the patient required hospice care. As a result, a potential to increase quality of life and decrease hospital admissions and readmissions could be realized by the individuals served. Research studying the effectiveness of the palliative care units would be critical to hardwiring evidence based practices within these settings. With the initiation of palliative care services throughout the healthcare environment, all populations appropriate for the services would be identified. Opportunity the perform diagnosis specific research studies determining the most effective cares for patients at the various stages during illnesses eventually resulting in death would increase the value of the services through provision of standardized, evidence based interventions, and result in optimal patient outcomes.

Unintended outcomes of integrating palliative care into regulatory standards could occur. First, miscommunication related to patient wishes might be offered if care decisions were made in a time of crisis. Research is required to determine if patient condition can render an individual incapable of making the same end of life decisions while acutely ill as when he or she was not suffering from the discomforts and physical conditions present during hospitalization. Second, providers may be reluctant

or unwilling to embrace the standards due to a belief that care discussions should be timed at the discretion of the physician and not necessarily upon diagnosis of a life limiting disease. This reluctance was communicated when the New York Palliative Care Law was enacted.

Palliative care standards could create a media frenzy. Journalists who are not educated regarding the goals of palliative care or who publish sensationalist stories may try to equate the mandate for palliative care with the implementation of death teams in the health care setting.

Integration of palliative care services into the acute care delivery systems would be of great benefit for patients with a HF diagnosis. In the future, it is essential the healthcare community embrace and support actions that result in provision of palliative care services to appropriate patient populations.

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Capstone Report Conclusion

The three manuscripts provide a description of the importance of providing HF patients with individualized care designed to provide them with quality of life in the community. Due to the high volume of individuals diagnosed with HF, the high cost of care and the financial impact of caring for this patient population, it is critical that acute care facilities reduce the 30 day readmission rates. Development and implementation of a facility specific electronic instruments designed to predict the patients at high risk for readmission offers an effective, timely way to decrease HF 30 day readmission rates through the implementation of an individualized plan of care at the time admission. This concept requires further development, but could be a solution to the question of how to improve HF patient outcomes and readmission rates.

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