**Title Page**

Predictors of readmission or death among patients with a first diagnosis of heart failure in a statewide database.

**Introduction**

Heart failure (HF) is the most common reason for hospital admission in the elderly and is associated with impaired quality of life, high mortality, financial burden and frequently repeated readmissions1. Thirty percent of patients with HF are readmitted and approximately 15% die within 30-60 days after discharge. American Heart Association statistics indicate that US health care expenditures reached $30.7 billion between 2011-20142 and this number is projected to increase nearly 127% to $70 billion on HF by 20303. Previous studies have addressed the issues of the incidence, outcomes and time-trends of HF readmissions. These reports were based on data from specific programs addressing these questions, single-center intervention trials or were review papers and meta-analyses. These publications included varying number of participants, various time intervals and different methodologies. However, most of these papers did not include follow-up for more than 30days and did not examine secular changes with regards to readmission and outcomes4-15.

The purpose of this study is to report the incidence, outcomes and time-trends of HF readmissions on an all-inclusive population-based cohort of more than 89000 HF patients who were discharged alive in New Jersey hospitals from year 2000 to 2014 using the Myocardial Infarction Data Acquisition System (MIDAS)16-18.

**Methods**

**Data sources**

Data were obtained from the Myocardial Infarction Data Acquisition System (MIDAS) database that includes all admissions to acute care non-federal hospitals in New Jersey from 2000 to 2014 for cardiovascular disease with longitudinal follow-up. Patients discharged with a principal diagnosis HF were identified using the International Classification of Diseases, Ninth Revision, Clinical Modification, (ICD-9-CM). MIDAS includes the dates of admission and discharge, demographic characteristics, insurance status (commercial, HMO, Medicare, Medicaid, self-pay), reason for admission, and comorbidities including anemia (280.0; 280.1; 280.8; 280.9; 281.0; 281.1; 281.2; 281.3; 281.4; 281.8; 281.9; 285.21; 285.29; 285.8; 285.9), chronic kidney disease (585.1, 585.2, 585.3, 585.4, 585.6, 585.9), chronic obstructive pulmonary disease (490; 491.0; 491.1; 491.20; 491.21; 491.22; 491.8; 491.9; 492.0; 492.8; 493.00; 493.01; 493.02; 493.10; 493.11; 493.12; 493.20; 493.21; 493.22; 493.81; 493.82; 493.90; 493.91; 493.92; 494.0; 494.1; 495.0; 495.1; 495.2; 495.3; 495.4; 495.5; 495.6; 495.7; 495.8; 495.9; 496), stroke (433.01; 433.11; 433.21; 433.31; 433.81; 433.91; 434.01; 434.11; 434.91), hypertension (401.0 to 405.99), diabetes (250.00 to 250.93), atrial fibrillation 427.31 and atrial flutter 427.32, hyperlipidemia (272 to 272.9), AMI (410.00 to 410.92), obstructive sleep apnea code 327.23, Parkinson’s disease code 332*,* and Transient Ischemic Attack (TIA) (434.01; 434.11; 434.91).Patients with cancer and HIV were excluded (n=xxxx). Hospital characteristics included hospital location (inner city, urban, rural, suburban), teaching status (teaching vs non-teaching) and availability of invasive and/or interventional procedures. The cause and date of death were obtained from New Jersey Death Registration files. We used “The Link King”19,a public automated record linkage and consolidation softwarethat in a report of 500 000 linked records chosen at random and referred for blinded clerical review had a positive predictive value of 96.1% and a sensitivity of 96.7%20.

Study participants were hospitalized for HF with ICD‐9‐CM primary discharge diagnosis code 428 (n=89738). The cause of death was recorded using the ICD‐10‐CM codes between I21.0 and I23.8 for AMI as a cause of death (n=xxxx), ICD‐10‐CM codes between I60.0 and I64.9 (n=yyyy) for stroke while for death due to CV events ICD‐10‐CM codes between I00.0 and I99.9 (n=zzzz).

The precision of MIDAS has been formerly audited. Using a stratified random sample of charts,it was found that the diagnoses of ischemic or hemorrhagic stroke and MI were accurate in 89% and 91% of cases20-21. In addition, hospital discharge records are matched with the information given on the death certificates. (Reasons for exclusions and numbers)

*Altogether 89,738 patients ages xx years or older who were discharged alive from New Jersey non-federal hospitals with a first diagnosis of HF between 2000 and 2014 were included in the present report. HF patients admitted to federal hospitals and nursing homes (accountable for xxxx % of the patients) were excluded. Patients with HF listed as a secondary diagnosis were also excluded (xxxx). The New Jersey State Institutional Review Board ? and the Rutgers Robert Wood Johnson Medical School of New Jersey Institutional Review Board approved the study.*

**Study variables**

Covariates included comorbidities, patient demographics, hospital characteristics (inner city vs rural) and facility with capacity of cardiac catheterization lab or PCI, index hospitalization length of stay, insurance type. The various types of HF at discharge ware coded as follows: (428.0; 428.1; 428.20; 428.21; 428.22; 428.23; 428.30; 428.31; 428.32; 428.33; 428.40; 428.41; 428.42; 428.43; 428.9 ) OR 428.0 congestive HF-unspecified, 428.1 left HF, 428.2, 428.20, 428.21, 428.22, 428.23 as systolic HF and systolic HF unspecified, acute, chronic and acute on chronic respectively, 428.3 as diastolic HF, 428.30, 428.31, 428.32, 428.33 as diastolic HF-unspecified, acute, chronic and acute on chronic diastolic HF respectively. Finally, code 428.4 identified combined systolic and diastolic HF, 428.40 combined systolic and diastolic HF, code 428.41 acute combined systolic and diastolic HF-unspecified, 428.42 chronic combined systolic and diastolic HF, 428.43 acute on chronic combined systolic and diastolic HF and 428.9 HF-unspecified.

**Outcomes**

The temporal trends in the rate of HF specific readmission and all-cause readmission at 30-days, 90-days, 180-days and 1-year were examined using multivariable logistic regression models. Along the same line CV death and all-cause death, at the same time intervals, were investigated using segmented regression models.

**Statistical Analysis** Davit will write the analysis

**Results**

Baseline patient demographics and hospital characteristics are shown in Table.2. Altogether, 89,738 patients, 52.8% females were included in our analysis. We had to exclude 3344 patients due to incorrect or missing information on the medical records. The mean age was 73.1 +/-15 years (min 18 years - max 109 years), median 76 years, third quarter 85.0 (IQR). Caucasian race covered 68594 individuals (73.7%) and 14714 were black (15.8%), while other ethnicities comprised 9774 patients (10.5%). Non-Hispanic ethnicity depicted (n=76714) 82.4% of the study population and (n=7769) 8.3% defined themselves as Hispanics. Most of study patients were Medicare beneficiaries (n=59805) accounting for 64.2% of the total whereas (n=26435) 28.4% participants used commercial insurance. With regards to hospital characteristics 48.1% were teaching and similarly 48.3% were non-teaching hospitals. Most of these hospitals had no potential of cardiac catheterization or PCI whereas 44.1% were able of doing it. Inner city located hospitals, urban area, suburb located, and rural area hospital accounted for 17.7%, 24.2%, 42% and 12.5% respectively.

Rates of all-cause and HF readmissions at 30-day, 90-day, 180-day and 1-year follow-up are presented in Tables 3a and Table 3b, respectively. The unadjusted 30-day all-cause readmission rate increased from 15.98% in the year 2000 to 20.29% in 2014. At the same time HF readmissions for the same time frame marginally rose from 5.63% to 6.5%. Notably there is three to four-fold increase for every type of readmission from 30-days to 1-year follow-up. A noteworthy observation is that there was a categorical upturn on the all-cause rates for every 5 years of follow-up. Indeed 30-day all-cause readmissions rose from 16.17% for the period 2000-2004 to 20.39% for the years 2010-2014. Likewise, 90-day all-cause rates increased from 29.57% to 35.27% for the same time frames. More staggering numbers are those for 180-day and 1-year follow-up showing that readmissions for any-cause among HF patients increased from 39.26% to 46.07% (again for the periods 2000-2004 and 2010-2014), reaching 50.59% to 56.83% at 1-year follow-up. At one-year all-cause readmission follow-up, one for every two patients was re-hospitalized as shown in Table 3a.

The rates of readmission pertaining for all HF specific hospitalizations are presented in Table 3b. The 30-day rates rose from 5.7% (2000-2004) to 6.69% (2005-2009) and remained relatively stable 6.68% for the years 2010-2014. Similarly between 2000-2004 and 2005-2009 there was a slight increase in the rates of readmission for all follow-up phases (90-day, 180-day, 1-year) and a downtrend for the period between 2010 and 2014 to 11.52%, 15.3% and 19.75% accordingly, an observation that could possibly reflect the implementation of the Hospital Readmission Reduction Program (HRRP) that was enforced since October 2012. Indeed, all rates of readmission were mounting, up until 2011 while there was a study decline in those numbers from 2012 and on. The goal of this program was to penalize hospitals showing higher than expected risk-standardized 30-day readmission rates for AMI, pneumonia and HF.

The 30-day and 90-day unadjusted all-cause mortality rates marginally increased from 3.74% in 2000 to 3.94% in 2014 and from 7.86% to 8.05%, correspondingly (Table 3c). Interestingly the unadjusted all-cause mortality rates demonstrate a downtrend from 12.05% to 11.95% for the 180-day and from 18.81% to 17.32% for the 1-year follow-up periods. Cardiovascular mortality illustrated in Table 3d manifested a sturdy increase for all four follow-up time frames between the years 2000 and 2009, whereas for the period 2010 to 2014 there was a notable reduction for all four segments of the follow-up period. At 1-year of follow-up death from CV causes declined from 8.5% to 7.9% amongst HF patients.

Causes of readmission…… Among the etiologies of readmission, cardiac causes (xxxx) were most common (HF being most common followed by ischemic heart disease and arrhythmias), whereas pulmonary causes were responsible for yyyy and renal causes for zzzz of the readmissions.

The temporal trends in the rate of HF specific and all-cause readmission as well as CV and all-cause mortality at 30-days, 90-days, 180-days and 1-year were examined using multivariable logistic regression models. Adjusted predictors of any-cause readmission among patients with HF are shown in table 2A. Predictors of increased all-cause readmissions were length of stay (odds ratio [OR] 1.008, 95% confidence interval [CI] 1.005 to 1.001, p<0.001), anemia (OR 1.204, 95% CI 1.155 to 1.204, p<0.001), CKD (OR 1.336, 95% CI 1.25 to 1.428, p<0.001), COPD (OR 1.291, 95% CI 1.24 to 1.343, p<0.001), diabetes (OR 1.299, 95% CI 1.253 to 1.346, p<0.001), hypertension (OR 1.443, 95% CI 1.394 to 1.494, p<0.001) and admission to a non-teaching hospital (OR 1.094, 95% CI 1.055 to 1.135, p<0.001) at 1-year period of follow-up. Logistic regression analysis identified male gender (OR 1.078, 95% CI 1.042 to 1.116, p<0.001), black race (OR 1.316, 95% CI 1.253 to 1.383, p<0.001), Medicare/Medicaid beneficiaries (OR 1.158, 95% CI 1.08 to 1.242, p<0.001), history of AMI (OR 1.123, 95% CI 1.058 to 1.191, p<0.001), COPD (OR 1.096, 95% CI 1.047 to 1.148, p<0.001), diabetes (OR 1.22, 95% CI 1.169 to 1.273, p<0.001), hypertension (OR 1.116, 95% CI 1.068 to 1.165, p<0.001), stroke (OR 1.437, 95% CI 1.132 to 1.825, p=0.003), admission to non-teaching hospitals (OR 1.1, 95% CI 1.051 to 1.151, p<0.001), as important predictors of HF readmission as shown in table 2B.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Index LOS | Age group | Total patients No | All-cause readmission, No. (%) | HF readmission, No. (%) |
|  | 1. <65 |  |  |  |
| <4days | 1. 65-74 |  |  |  |
|  | 1. 75-84 |  |  |  |
|  | 1. >85 |  |  |  |
|  | 1. <65 |  |  |  |
| >4days | 1. 65-74 |  |  |  |
|  | 1. 75-84 |  |  |  |
|  | 1. >85 |  |  |  |

Interactions testing revealed ……. interactions by race/ethnicity, teaching hospital status for risk-adjusted 30-day all-cause or HF-specific readmissions. However, there was a significant interaction by

DISCUSSION

Need to compare table 3 of Canadian/US data to MIDAS. However, these authors they only have categorical definition of HF readmission at 30-days. We have up to 1-year where the time to readmission is a continued variable.

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was 308,976 for both sexes and HF was the underlying cause in 68,626 of those events2. Moreover, hospitalizations for HF embrace mortality and readmission rates of 15% and 30%, respectively, within 30–60 days post‐discharge3.. readmissions are common and associated with a considerable impact on US morbidity and mortality, affecting approximately 6.5 million Americans, while 960,000 new HF cases are documented annually. These figures constitute a deleterious combination from a clinical and a financial standpoint, vindicating those describing HF as a developing pandemic of the 21st century.

Many reports have addressed the incidence, time-trends and outcomes of HF readmissions in different settings. Some of them originate from registries, other from OPTIMIZE-HF (Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients With Heart Failure) was one of those registries that reported in the follow-up cohort (nearly 10% of the registry) mortality rating between 5.4%-14.0% built on admission systolic blood pressureand readmission frequency close to 30% within 2 to 3 months post-discharge6. Likewise, in the ESC-HF (European Society of Cardiology – Heart Failure) registry comprised from 12 European countries, 1-year readmission and mortality rates were stated 31.9% and 17.4% respectively7. Hospital-based registries8-12 have incompletely provided real-world understanding on HF, since most of the feedback we receive is based on specific populations i.e. patients admitted in designated HF units, thus the accurate prevalence and predictors of readmissions and death related to HF are yet to be explored.

Furthermore, multiple comorbidities are often seen in HF patients that are perplexing short and long-term management and unfavorably affect outcome. Non-cardiac causes of readmission mark a noteworthy contribution to adverse clinical outcomes in these patients, correspondingly to the burden of cardiac causes. In these lines a cross-sectional analysis of U.S. Medicare beneficiaries age ≥65 years reported noncardiac comorbidities are highly prevalent and clearly complicate with HF patients13.

Thus far, data on predictors accountable for readmission or death affecting HF patients in population-based models is controversial. The objective of the present study was to provide insight on predictors of readmission or death among patients discharged alive with a first diagnosis of HF within a specific geographic area with the use of a statewide database14-16.

and for Medicare beneficiaries the disorder with the largest number of 30-day all-cause readmissions is congestive heart failure with 134,500 readmissions1. Approximately one every 8 deaths declare HF on the National Center for Death Statistics, while in 2014

[Eur J Heart Fail.](https://www.ncbi.nlm.nih.gov/pubmed/29791084) 2018 Aug;20(8):1169-1174. doi: 10.1002/ejhf.1212. Epub 2018 May 23.

# The Hospital Readmissions Reduction Program-learning from failure of a healthcare policy.

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### Abstract

Heart failure is the leading cause of readmissions in patients aged ≥65 years with high associated societal and economic costs. The utilization metric of 30-day risk standardized readmission rates (RSRRs) has therefore become a target to reduce healthcare costs. In this review, we discuss in detail the implementation, effectiveness, and unintended consequences of the Hospital Readmissions Reduction Program (HRRP)-the major healthcare policy approach in the U.S. to reduce readmissions by financially penalizing hospitals with higher than average 30-day RSRRs. The HRRP was enacted by the Patient Protection and Affordable Care Act of 2010 (popularly known as 'Obamacare'). The public reporting of RSRRs began in June 2009 and the HRRP readmission penalties went into effect starting fiscal year 2013. The policy had limited success in achieving its primary objective of reducing readmissions as the achieved reduction in heart failure readmissions was much smaller (∼9%) than anticipated (∼25%) with some of the reduction in RSRRs attributable to the artifact of administrative upcoding post-HRRP rather than an actual decline in readmissions. From the time of passage of this law, there have been significant concerns regarding gaming of the system such as increase in observation stays, delaying readmissions beyond discharge day 30, and inappropriate triage strategies in emergency departments in order to achieve lower readmission rates to avoid penalties. A series of independent reports have now suggested that implementation of the HRRP was associated with an increase in 30-day, 90-day, and 1-year risk-adjusted heart failure mortality in the U.S. with reversal in decade long trend of declining heart failure mortality. We review the evidence behind effect of the HRRP on readmissions and mortality outcomes as well as discuss various lessons to be learned from the design, implementation, and consequences of this policy.

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**Disease management interventions for heart failure.**

[Takeda A](https://www.ncbi.nlm.nih.gov/pubmed/?term=Takeda%20A%5BAuthor%5D&cauthor=true&cauthor_uid=30620776)1, [Martin N](https://www.ncbi.nlm.nih.gov/pubmed/?term=Martin%20N%5BAuthor%5D&cauthor=true&cauthor_uid=30620776), [Taylor RS](https://www.ncbi.nlm.nih.gov/pubmed/?term=Taylor%20RS%5BAuthor%5D&cauthor=true&cauthor_uid=30620776), [Taylor SJ](https://www.ncbi.nlm.nih.gov/pubmed/?term=Taylor%20SJ%5BAuthor%5D&cauthor=true&cauthor_uid=30620776).

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**Abstract**

**BACKGROUND:**

Despite advances in treatment, the increasing and ageing population makes heart failure an important cause of morbidity and death worldwide. It is associated with high healthcare costs, partly driven by frequent hospital readmissions. Disease management interventions may help to manage people with heart failure in a more proactive, preventative way than drug therapy alone. This is the second update of a review published in 2005 and updated in 2012.

**OBJECTIVES:**

To compare the effects of different disease management interventions for heart failure (which are not purely educational in focus), with usual care, in terms of death, hospital readmissions, quality of life and cost-related outcomes.

**SEARCH METHODS:**

We searched CENTRAL, MEDLINE, Embase and CINAHL for this review update on 9 January 2018 and two clinical trials registries on 4 July 2018. We applied no language restrictions.

**SELECTION CRITERIA:**

We included randomised controlled trials (RCTs) with at least six months' follow-up, comparing disease management interventions to usual care for adults who had been admitted to hospital at least once with a diagnosis of heart failure. There were three main types of intervention: case management; clinic-based interventions; multidisciplinary interventions.

**DATA COLLECTION AND ANALYSIS:**

We used standard methodological procedures expected by Cochrane. Outcomes of interest were mortality due to heart failure, mortality due to any cause, hospital readmission for heart failure, hospital readmission for any cause, adverse effects, quality of life, costs and cost-effectiveness.

**MAIN RESULTS:**

We found 22 new RCTs, so now include 47 RCTs (10,869 participants). Twenty-eight were case management interventions, seven were clinic-based models, nine were multidisciplinary interventions, and three could not be categorised as any of these. The included studies were predominantly in an older population, with most studies reporting a mean age of between 67 and 80 years. Seven RCTs were in upper-middle-income countries, the rest were in high-income countries.Only two multidisciplinary-intervention RCTs reported mortality due to heart failure. Pooled analysis gave a risk ratio (RR) of 0.46 (95% confidence interval (CI) 0.23 to 0.95), but the very low-quality evidence means we are uncertain of the effect on mortality due to heart failure. Based on this limited evidence, the number needed to treat for an additional beneficial outcome (NNTB) is 12 (95% CI 9 to 126).Twenty-six case management RCTs reported all-cause mortality, with low-quality evidence indicating that these may reduce all-cause mortality (RR 0.78, 95% CI 0.68 to 0.90; NNTB 25, 95% CI 17 to 54). We pooled all seven clinic-based studies, with low-quality evidence suggesting they may make little to no difference to all-cause mortality. Pooled analysis of eight multidisciplinary studies gave moderate-quality evidence that these probably reduce all-cause mortality (RR 0.67, 95% CI 0.54 to 0.83; NNTB 17, 95% CI 12 to 32).We pooled data on heart failure readmissions from 12 case management studies. Moderate-quality evidence suggests that they probably reduce heart failure readmissions (RR 0.64, 95% CI 0.53 to 0.78; NNTB 8, 95% CI 6 to 13). We were able to pool only two clinic-based studies, and the moderate-quality evidence suggested that there is probably little or no difference in heart failure readmissions between clinic-based interventions and usual care (RR 1.01, 95% CI 0.87 to 1.18). Pooled analysis of five multidisciplinary interventions gave low-quality evidence that these may reduce the risk of heart failure readmissions (RR 0.68, 95% CI 0.50 to 0.92; NNTB 11, 95% CI 7 to 44).Meta-analysis of 14 RCTs gave moderate-quality evidence that case management probably slightly reduces all-cause readmissions (RR 0.92, 95% CI 0.83 to 1.01); a decrease from 491 to 451 in 1000 people (95% CI 407 to 495). Pooling four clinic-based RCTs gave low-quality and somewhat heterogeneous evidence that these may result in little or no difference in all-cause readmissions (RR 0.90, 95% CI 0.72 to 1.12). Low-quality evidence from five RCTs indicated that multidisciplinary interventions may slightly reduce all-cause readmissions (RR 0.85, 95% CI 0.71 to 1.01); a decrease from 450 to 383 in 1000 people (95% CI 320 to 455).Neither case management nor clinic-based intervention RCTs reported adverse effects. Two multidisciplinary interventions reported that no adverse events occurred. GRADE assessment of moderate quality suggested that there may be little or no difference in adverse effects between multidisciplinary interventions and usual care.Quality of life was generally poorly reported, with high attrition. Low-quality evidence means we are uncertain about the effect of case management and multidisciplinary interventions on quality of life. Four clinic-based studies reported quality of life but we could not pool them due to differences in reporting. Low-quality evidence indicates that clinic-based interventions may result in little or no difference in quality of life.Four case management programmes had cost-effectiveness analyses, and seven reported cost data. Low-quality evidence indicates that these may reduce costs and may be cost-effective. Two clinic-based studies reported cost savings. Low-quality evidence indicates that clinic-based interventions may reduce costs slightly. Low-quality data from one multidisciplinary intervention suggested this may be cost-effective from a societal perspective but less so from a health-services perspective.

**AUTHORS' CONCLUSIONS:**

We found limited evidence for the effect of disease management programmes on mortality due to heart failure, with few studies reporting this outcome. Case management may reduce all-cause mortality, and multidisciplinary interventions probably also reduce all-cause mortality, but clinic-based interventions had little or no effect on all-cause mortality. Readmissions due to heart failure or any cause were probably reduced by case-management interventions. Clinic-based interventions probably make little or no difference to heart failure readmissions and may result in little or no difference in readmissions for any cause. Multidisciplinary interventions may reduce the risk of readmission for heart failure or for any cause. There was a lack of evidence for adverse effects, and conclusions on quality of life remain uncertain due to poor-quality data. Variations in study location and time of occurrence hamper attempts to review costs and cost-effectiveness.The potential to improve quality of life is an important consideration but remains poorly reported. Improved reporting in future trials would strengthen the evidence for this patient-relevant outcome.

[Circ Cardiovasc Qual Outcomes.](https://www.ncbi.nlm.nih.gov/pubmed/23386663) 2013 Mar 1;6(2):171-7. doi: 10.1161/CIRCOUTCOMES.112.967356. Epub 2013 Feb 5.

# Patient-identified factors related to heart failure readmissions.

[Retrum JH](https://www.ncbi.nlm.nih.gov/pubmed/?term=Retrum%20JH%5BAuthor%5D&cauthor=true&cauthor_uid=23386663)1, [Boggs J](https://www.ncbi.nlm.nih.gov/pubmed/?term=Boggs%20J%5BAuthor%5D&cauthor=true&cauthor_uid=23386663), [Hersh A](https://www.ncbi.nlm.nih.gov/pubmed/?term=Hersh%20A%5BAuthor%5D&cauthor=true&cauthor_uid=23386663), [Wright L](https://www.ncbi.nlm.nih.gov/pubmed/?term=Wright%20L%5BAuthor%5D&cauthor=true&cauthor_uid=23386663), [Main DS](https://www.ncbi.nlm.nih.gov/pubmed/?term=Main%20DS%5BAuthor%5D&cauthor=true&cauthor_uid=23386663), [Magid DJ](https://www.ncbi.nlm.nih.gov/pubmed/?term=Magid%20DJ%5BAuthor%5D&cauthor=true&cauthor_uid=23386663), [Allen LA](https://www.ncbi.nlm.nih.gov/pubmed/?term=Allen%20LA%5BAuthor%5D&cauthor=true&cauthor_uid=23386663).

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### Abstracth

#### BACKGROUND:

Although readmission after hospitalization for heart failure has received increasing attention, little is known about its root causes. Prior investigations have relied on administrative databases, chart review, and single-question surveys.

#### METHODS AND RESULTS:

We performed semistructured 30- to 60-minute interviews of patients (n=28) readmitted within 6 months of index heart failure admission. Established qualitative approaches were used to analyze and to interpret data. Interview findings were the primary focus of the study, but patient information and provider comments from chart data were also consulted. Patient median age was 61 years; 29% were nonwhite; 50% were married; 32% had preserved ejection fraction; and median time from discharge to readmission was 31 days. Reasons for readmission were multifactorial and not easily categorized into mutually exclusive reasons. Five themes emerged as reasons cited for hospital readmission: distressing symptoms, unavoidable progression of illness, influence of psychosocial factors, good but imperfect self-care adherence, and health system failures.

#### CONCLUSIONS:

Our study provides the first systematic qualitative assessment of patient perspectives concerning heart failure readmission. Contrary to prior literature and distinct from what we found documented in the medical record, patient experiences were highly heterogeneous, not easily categorized as preventable or not preventable, and not easily attributed to a single cause. These findings suggest that future interventions designed to reduce heart failure readmissions should be multifaceted, should be systemic in nature, and should integrate patient input.

 This study included 89738 individuals (52.81% females) admitted to hospitals of New Jersey for a primary diagnosis of HF between 2000-2014 and were discharged alive after an acute care hospitalization for HF. (NEED PERCENTAGES) The vast majority of the patients included in our analysis were white (73.69%), the mean age was 73.14 years (min 18 years max 109 years – need SD), median 76 years, third quarter 85.0 (IQR) and 64.25 % were Medicare beneficiaries. We appreciate a 26.1% decline in new incidence cases of hospitalized patients with HF between 2000-2014.

Approximately three out of four patients (75.14%) were readmitted at least once during the follow up period.

IDEAS FOR THE RESULTS

1. PARKINSONS DISEASE
2. ED VISITS
3. SCC STATUS
4. CHRONIC INFLAMMATORY STATES
5. USUAL SUSPECTS ADJUST
6. 3 TYPES OF READMISSIONS: HF, CVD OR NON-CVD
7. ALL-CAUSE DEATH AND CV-DEATH
8. TIME – TRENDS
9. HOSPITAL CHARACTERISTICS (TEACHING, # OF ADMISSIONS, # OF HF ADMOSSIONS, ABLE TO PERFORM BY-PASS, PCI, SAME HOSPITAL OR ANY HOSPITAL

RESULTS

1. ~~JAMA PAPER ONLY DISCUSSES 30-DAY POST DISCHARGE~~
2. CHECK THE RATIO OF HF READMISSIONS DEVIDED BY ALL-CAUSE READMISSIONS
3. MAKE TABLE OF ALL FINDINGS AT 30-DAYS IN THE JAMA TABLE vs OURS AT 30-DAYS AND EXPLAIN THE DIFFERENCES p.93 JAMA Table. 2 first 8 parameters.
4. MAKE TABLE COMPARING 8 VARIABLES IN US PATIENTS AND MIDAS PATIENTS AND POTENTIALLY ADD ADDITIONAL VARIABLES IF DATA AVAILABLE IN US POPULATION OF THE JAMA PAPER.
5. 30 DAY READMISSIONS IN THE JAMA PAPER WAS CONSIDERED A CATEGORICAL VARIABLE (YES/NO). IN MIDAS WE CAN PRODUCE SURVIVAL CURVES FOR THE 4 OUTCOMES IN ADDITION TO THE ANALYSIS AT 30-DAYS, 90-DAYS, 180-DAYS AND 1-YEAR.
6. post.hf.dx1 IF THEY HAD AN MI POST DISCHARGE, DIFFERENT OUTCOME? OR IS MI A PREDICTOR OF FREADMISSION
7. FOR THE OUTCOMES WE ASSUME THEY PERTAIN TO THOSE DISCHARGED ALIVE
8. ~~MEANING OF DECADE?~~
9. ~~ADD TEACHING vs NON-TEACHING HOSPITAL IN THE LOGISTIC~~
10. FIND LITERATURE OR PHYSIOLOGICAL EXPLANATIONS IN THE ODDS RATIO FIGURES
11. ~~NEED Los WITH REGARDS TO READMISSIONS~~
12. NEED LENGTH OF STAY BY YEAR
13. INTRODUCTION SHOULD INCLUDE THE FINDINGS FROM THE CANADA vs USA PAPER
14. ADD RATIO OF HF/ALL CAUSE READMISSIONS BY YEAR

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **P** |
| **NJ PATIENTS** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Discharged alive, no | 7760 | 7345 | 7271 | 7205 | 6462 | 6202 | 5770 | 5444 | 5836 | 5659 | 5941 | 5875 | 5375 | 5513 | 5588 | NA |
| Acute LOS, mean (SD), d |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| All-cause readmission within 30 days | 124  (15.98) | 116  (15.75) | 119  (16.39) | 119  (16.52) | 105  (16.20) | 106  (17.03) | 97  (16.88) | 99  (18.26) | 124  (21.18) | 121  (21.39) | 116  (19.56) | 128  (21.84) | 108  (20.11) | 111  (20.13) | 113  (20.29) |  |
| Total hospital days within 30d of index admission, mean (SD) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| HF readmission within 30d of discharge | 44  (5.63) | 42  (5.75) | 40  (5.46) | 42  (5.84) | 38  (5.83) | 39  (6.24) | 38  (6.62) | 35  (6.48) | 41  (7.09) | 40  (7.02) | 37  (6.21) | 43  (7.40) | 37  (6.83) | 36  (6.44) | 36  (6.50) |  |
| CV readmissions within 30d of discharge |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Non-CV readmission within 30d of discharge |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Index hospitalization mortality, No./Total No. | 3.74 | 3.89 | 3.60 | 4.36 | 3.54 | 4.18 | 4.49 | 3.97 | 4.46 | 4.52 | 3.84 | 4.89 | 4.00 | 4.24 | 3.94 |  |
| **US PATIENTS** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Discharged alive, no |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Acute LOS, mean (SD), d |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| All-cause readmission within 30 days |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Total hospital days within 30d of index admission, mean (SD) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| HF readmission within 30d of discharge |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CV readmissions within 30d of discharge |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Non CV readmission within 30d of discharge |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Index hospitalization mortality, No./Total No. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |