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# Factors that Impact Readmission for Medicare and Medicaid HMO Inpatients

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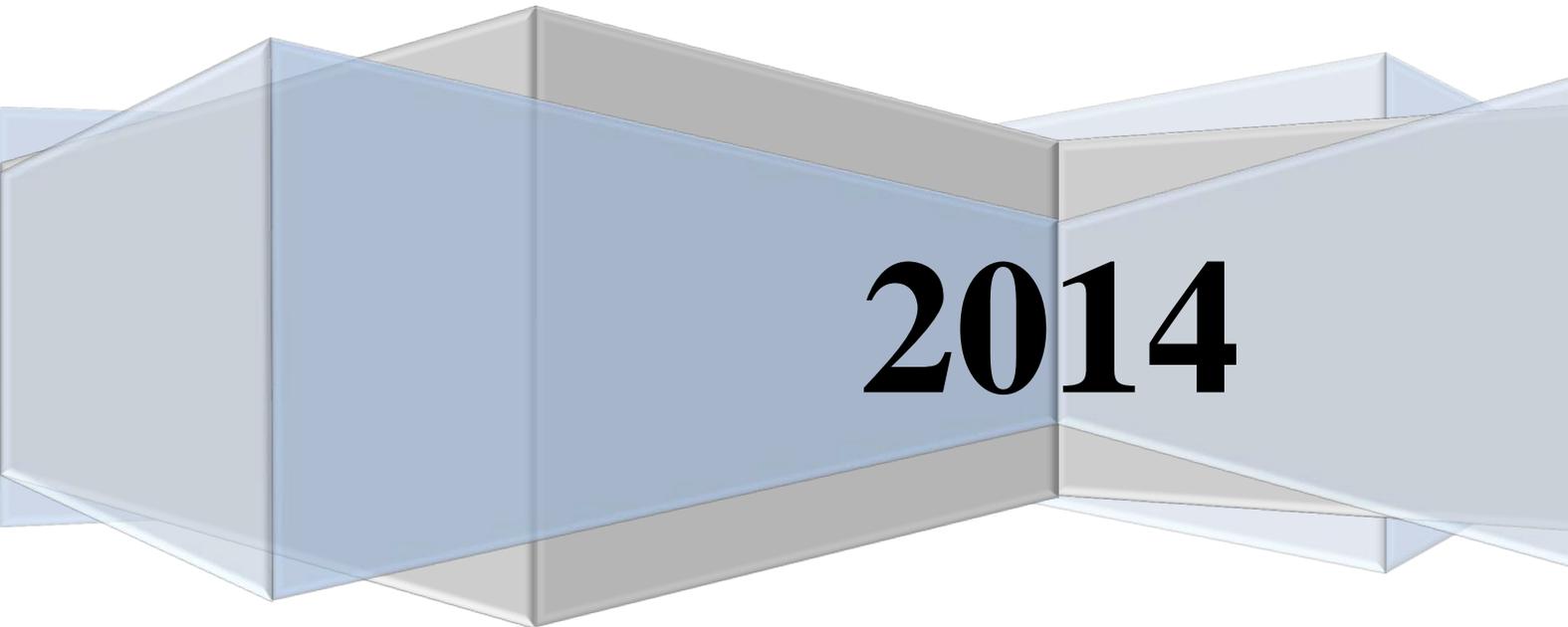
**The College at Brockport**

# Factors that Impact Readmission for Medicare and Medicaid HMO Inpatients

## Senior Thesis Submitted to the Honors College

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**Background:** Hospital readmission is an outcome associated with failure of treatment because readmitted patients are still sick despite recent inpatient treatment. The specific 30-day period is critical because the U.S. Government's Centers for Medicare and Medicaid Services uses a 30-day period for measuring treatment quality and reimbursement for many conditions.

**Objective:** The purpose of this study was to identify demographic factors associated with 30-day readmission for patients initially admitted with any of the following conditions; Congestive Heart Disease (CHF), Pneumonia (PN), and Chronic Obstructive Pulmonary Disease (COPD).

**Methods:** This retrospective study analyzed factors that were associated with readmission. Descriptive statistics and bivariate analysis were used to assess the impact on readmission for the following variables: age, sex, length of stay (LOS), payer, admitting location, initial and secondary diagnosis, and initial discharge location.

**Results:** The results demonstrated that the following variables were statistically associated with readmission were: LOS (p=.008), gender (p=.019), admitting location (p=.002), initial diagnosis (p<.001), secondary diagnosis (p<.001), and discharge location (p<.001). CHF patients were specifically more likely to be readmitted compared to patients without CHF (p<.001).

**Conclusion:** This study suggests that patient demographics, LOS, diagnosis and location may increase readmission risk. CHF patients specifically have higher readmission than other patients. Further research should examine additional factors that may contribute to higher readmission for CHF patients.

## Introduction

Hospitals and healthcare facilities in the United States have been facing increasing pressure to deliver higher quality and lower cost healthcare.[1] The Affordable Care Act is one policy mechanism that is contributing to this pressure, particularly with its introduction of programs such as the hospital readmission reduction program.[2] This program links reimbursement to readmission rates. Readmission has been targeted because it is one area that is very costly for the US healthcare system, contributing $17.5 billion per year in cost[3], and represents a failure in the quality of care provided since patients are returning to the hospital shortly after a recent inpatient admission. Additionally, approximately one in five Medicare patients returning to the hospital within a month of receiving medical treatment. [3] The Centers for Medicare and Medicaid Services (CMS) states that the national average for readmission for the past several years has consistently been 19% even with facilities independently making strides to reduce readmission.[1] In 2012, the product of these efforts was potentially beneficial because this average dropped to 17.8%.[1] However, the ability to have sustained reductions in readmission is dependent upon understanding what patient and healthcare system factors contribute to readmission. The purpose of this study was to examine patient and hospital factors that contribute to readmission for patients who were admitted to a community hospital and who experienced any of the following admitting diagnoses: Congestive Heart Disease (CHF), Pneumonia (PN), and Chronic Obstructive Pulmonary Disease (COPD).

## Background

The Hospital Readmissions Reduction Program became effective on October 1, 2012 in Section 3025 of the Affordable Care Act.[4] This program directly impacts the operations of CMS with regards to readmission measures. The objective of this program is to reduce monetary reimbursements dispersed to eligible hospitals that have excess readmissions.[4] This policy change could in part be attributed to a growing philosophy that facilities with high readmission should not be compensated the same as facilities that properly and successfully care for patient medical needs.[4] Readmission is an outcome associated with failure of treatment because readmitted patients are still sick despite recent inpatient treatment. Readmission is defined by CMS as, "an admission to a subsection (d) hospital within 30 days of a discharge from the same or another subsection(d) hospital."[4] Section 1886 of the Social Security Act defines a subsection(d) hospital by what is excluded rather than included. A facility that fits the inclusion criteria is not a psychiatric or rehabilitation hospital, a facility with a majority of patients less than or equal to 18 years of age, a facility where the average patient length of stay is greater than or equal to 25 days, or a comprehensive or clinical cancer research center as acknowledged by the National Cancer Institute of the National Institutes of Health.[2] This 30-day window was chosen because approximately one in five Medicare patients return to the hospital within a month of receiving medical treatment. [3]

Finalized policies established an algorithm to calculate excess readmission ratios in order to quantify the readmission payment adjustment on a universal scale.[4] The conditions for which they assess readmission are currently Acute Myocardial Infarction (AMI), Heart Failure (HF) also known as Congestive Heart Failure (CHF) and Pneumonia (PN).[4] The range of applicable disorders will be expanding in 2014 to include patients that are admitted for Chronic Obstructive Pulmonary Disease (COPD), elective Total Hip Arthroplasty (THA) and Total Knee Arthroplasty (TKA).[4] The three year period spanning from July 1, 2008 to June 30, 2011 was used to determine the excess readmission ratios for the 2013 US Federal Budget's fiscal year (FY) and similarly 2009 to 2012 was used to determine ratios for FY 2014.[4]

This study assessed factors that impact readmission for CHF, PN, and COPD. In addition to the symptoms experienced with COPD, the American Heart Association defines signs of CHF to include elevated heart rate, edema, nausea or lack of appetite, and disorientation or memory loss. The American Lung Association describes the symptoms of PN as fever, chills, shortness of breath, and a cough that produces green/yellow or possibly bloody mucus. Signs of someone experiencing COPD explained by the American Thoracic Society are shortness of breath, tiredness, and a cough that produces white or pink mucus. These conditions are chronic which is why they were selected for the study. Previous research also demonstrate that CHF, PN, and COPD have higher rates of readmission then other conditions.[1] Thus understanding factors that contribute to readmission for these conditions has the potential to assist hospitals in developing interventions to reduce readmission for these conditions. Readmission reduction is an outcome that is desirable for patients, physicians, and hospitals. Interventions that would reduce readmissions for these conditions could ultimately save time and money for patients and the healthcare system.

**Methods**

*Design and Sample*
This retrospective study used data from Glens Falls Hospital, a community hospital located in Glens Falls, New York (n=7,284). In order to be eligible for the study, patient's information needed to be complete, their hospitalization had to have occurred between July 1, 2009 and June 30, 2012, following the fiscal year of Glens Falls Hospital, and they had to identify as either male or female. If a patient did not survive past discharge during the initial hospitalization, they were omitted from the study because readmission was not possible for a person who died.

*Measures*
The following variables were analyzed in this study 1) age, measured in years, and gender were reported by the patient upon admission for the initial hospitalization, 2) patient's primary payer during hospitalization (Medicare, Medicare-Commercial, Medicare-Medicaid), 3) primary and secondary diagnosis category for initial hospitalization was measured at the discretion of the physician using the ICD-9 code entered by the physician (482.0 heart failure unspecified, 490.6

chronic obstructive pulmonary disease unspecified, 482.9 pneumonia bacterial unspecified), 4) length of hospital stay (LOS) in days recorded by medical staff, 5) type of floor patient was initially admitted to during initial hospitalization, and 6) patient's initial discharge location as recorded by the hospital staff. The original fourteen different documented locations were condensed into three categories: Home, Home with Home Health, and Skilled Nursing Facility/Rehab. Other discharge locations (left against medical advice, acute hospital transfer, psychiatric facility transfer, Veteran's Administration Hospital) that could not be incorporated into those three categories were eliminated from the study because there were not enough patients in those categories to examine them ( all n< 15 per location).

*Procedures and Analysis*

Given the large sample size, cases were eliminated if they had any missing data. The following 9 cases had missing data and were omitted from analysis: 3 cases had no documented year, 2 cases had no floor initially admitted to documented, 1 case had no documented sex, 1 case had no discharge location documented, 1 case had no initial length of stay recorded, and 1 case had no admitting floor, sex, age, or length of stay documented. This left the sample to include 7,284 cases. Data from patient records that fit the inclusion criteria were analyzed using IBM SPSS Statistics for Windows Version 22 and Microsoft Excel 2010. Each variable was evaluated using descriptive statistics. Bivariate analysis including t-tests and chi-square tests were used to examine each variable's association with readmission. The Glens Falls Hospital Institutional Review Board approved the use of this information for this study.

**Results**

The demographic characteristics and descriptive statistics of the study variables are displayed in Table 1. The only variables that were statistically associated with readmission were: LOS (p=.008), gender (p=.019), primary diagnosis (p<.001), secondary diagnosis (p<.001), admitting location (p=.002), and discharge location (p<.001). Patient's age (p=.138) and primary payer (p=.743) were not statistically associated with readmission.

**Table 1**

| Variable | Readmission [N(%), Mean ± SD, Median (25th, 75th)] | | P-value | Strength of Association (r) |
|---|---|---|---|---|
| | No | Yes | | |
| Age | 77 ± 12 | 76 ± 11 | .138 | |
| Length of Stay | 4 (3, 7) | 4 (3, 7) | .008 | |
| Gender Male | 2916 | 454 | .019 | .027 |
| Female | 3458 | 456 | | |
| Payer Medicare | 3241 | 460 | .743 | |
| Medicare-Commercial | 1813 | 252 | | |
| Medicare-Medicaid | 1320 | 198 | | |
| Primary Diagnosis COPD | 1462(85.0%) | 257(15.0%) | <.001 | .104 |
| Pneumonia | 1035(90.9%) | 102(9.1%) | | |
| CHF | 1167(82.1%) | 254(17.9%) | | |
| Other | 2710(90.1%) | 297(9.9%) | | |
| Secondary Diagnosis COPD | 881(91.3%) | 84(8.7%) | <.001 | .068 |
| Pneumonia | 1092(90.2%) | 118(9.8%) | | |
| CHF | 1608(87.3%) | 233(12.7%) | | |
| Other | 2793(85.5%) | 475(14.5%) | | |
| Admitting Location Medical | 6143 | 895 | .002 | .036 |
| Surgical | 231 | 15 | | |
| Discharge Location Home | 3307 | 391 | <.001 | .072 |
| Home w/Home Health | 1613 | 313 | | |
| Skilled Nursing Facility/Rehab | 1454 | 206 | | |
| Any CHF No | 3676 | 436 | <.001 | .065 |
| Yes | 2698 | 474 | | |

The primary and secondary diagnosis category for initial hospitalization demonstrated that CHF patients have higher readmission compared to COPD and PN patients. Further analysis demonstrated that any CHF diagnosis, regardless of position (initial or secondary), was significantly associated with readmission. Patient's that were discharged home with home health

demonstrated the highest readmission when compared to a skilled nursing facility/rehab or directly home. Finally, the primary diagnosis had the strongest association with readmission (r=.104). Discharge location was second strongest with a small strength of association (r=.072).

**Discussion**

This study examined variables that potentially predicted 30-day readmission for CHF, COPD, and PN patients. This analysis demonstrated LOS (p=.008), gender (p=.019), admitting location (p=.002), initial diagnosis (p<.001), secondary diagnosis (p<.001), and discharge location (p<.001) were all statistically associated with readmission for these patients. Patients with longer initial length of stay, who were male, and who were initially admitted to a medical floor were more likely to experience a readmission. Additionally, this study identified that patients with any CHF diagnosis (p<.001) were more likely to experience readmission. These results are consistent with previous research[5] and suggest that targeting these variables for intervention may help hospitals improve their readmission rates.

This study found that patients who had a longer initial LOS were more likely to experience readmission. This finding however has limited clinical relevance because the difference in LOS was 5 hours. Previous research[6] on LOS and readmission suggest that it is a multidimensional factor, being impacted by the things such as the patient's social background, so interventions to reduce readmission by addressing LOS may not necessarily be universally effective. Therefore hospitals should consider LOS while recognizing that it may have a more limited impact on readmission risk.

This study also identified that men were more likely to experience a readmission within 30 days than women. This result has also been observed in previous research.[7] While gender is not a variable that can be manipulated, hospitals may want to consider adopting strategies that consider the unique needs men may have that contribute to readmission.

Further, this study identified that patients that were admitted to a medical floor were more likely to be readmitted than those that were admitted to a surgical floor. Research[8] suggests that differences in readmission by type of floor may be related to the course of patient care in hospital and the extent of follow-up care the patient will receive. Patients who underwent a surgical operation may have had a different experience than those who were admitted to a medical floor. Patients who have a surgical admission might also have a pre-determined discharge plan that is more universal to all patients. Thus, hospitals should consider patient admission location when developing services and care given to patients that aim to reduce readmission.

Finally, this study demonstrated that diagnosis impacts readmission and that the presence of CHF, as either a primary or secondary diagnosis, significantly increased the risk for readmission. This finding is consisted with previous research[7] that has also shown CHF patients have a higher risk of readmission. One study that examined unplanned 28-day readmission in elderly patients

with CHF recommend developing a screening tool to identify those at higher risk upon initial hospitalization suggesting that readmission can be avoided.[6] Hospitals may want to consider adopting this tool or other interventions to address CHF because this condition appeared to have the biggest effect (r=.072) on readmission in this study.

**Conclusion**

This retrospective study evaluated patient and hospital factors that were associated with the 30-day readmission for patients diagnosed with CHF, PN, and COPD.  These results suggest that patients with CHF may need additional resources to reduce the likelihood of readmission. Further research should examine additional factors about CHF patients that may contribute to higher readmission.

**References**

[1] Lavizzo-Mourey, R. (2013, August 13). Treating a Chronic Condition: Efforts to Reduce Avoidable Readmissions at U.S. Hospitals-Institute of Medicine. *Treating a Chronic Condition: Efforts to Reduce Avoidable Readmissions at U.S. Hospitals-Institute of Medicine*. Retrieved May 15, 2014, from http://www.iom.edu/Global/Perspectives/2013/AvoidableReadmissions.aspx

[2] Social Security. (n.d.). Act 1886. Retrieved May 15, 2014, from http://www.ssa.gov/OP_Home/ssact/title18/1886.htm

[3] Rau, J. (2012, August 13). KHN: Kaiser Health News. Medicare To Penalize 2,217 Hospitals for Excess Readmissions. Retrieved May, 15, 2014, from http://www.kaiserhealthnews.org/stories/2012/august/13/medicare-hospitals-readmissions-penalties.aspx

[4] Readmissions Reduction Program. (2013, August 2). –Centers for Medicaid & Medicare Services. Retrieved April 6, 2014 from http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html

[5] Ahmed, N., Taylor, K., McDaniel, Y., & Dyer, C. B. (2012). *The Role of an Acute Care for the Elderly Unit in Achieving Hospital Quality Indicators While Caring for Frail Hospitalized Elders*. Population Health Management, 15(4), 236-240.

[6] Islam, Tasneem, O'Connell, Beverly, and Lakhan, Prabha (2013). *Hospital readmission among older adults with congestive heart failure*. Aust. Health Review 37, 362–368.

[7] Robinson, S., Howie-Esquivel, J., & Vlahov, D. (2012). *Readmission Risk Factors after Hospital Discharge Among the Elderly*. Population Health Management, 15(6), 338-351.[8] McCormack, R., Michels, R., Ramos, N., Hutzler, L., Slover, J. D., & Bosco, J. A. (2013). *Thirty-Day Readmission Rates as a Measure of Quality: Causes of Readmission After Orthopedic Surgeries and Accuracy of Administrative Data*. Journal of Healthcare Management, 58(1), 64-76.