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Risks for Hospitalization and the
Role of Occupational Therapy in
Home Health

Traci Kruse

A doctoral project submitted in partial fulfillment of the requirements for the degree of
Doctor of Occupational Therapy,
St. Catherine University, St. Paul, Minnesota

May 19, 2017

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Risk Factors for Hospitalization and the Role of Occupational Therapy in Home Health

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Abstract

This cross-sectional descriptive study examined risk factors for hospitalization and the role of occupational therapy in the home health population of a large Midwest health system. The aim of the study was to determine if there was a difference in characteristics related to ADL/IADL performance with home health patients who were hospitalized and those who were not and in hospitalization for those who received occupational therapy and those who did not. Participants included a convenience sample ($n=9045$) of community-dwelling adults, age 18-104, who received home health services from January 2016 through December 2016. Descriptive statistics were obtained for demographics and thirteen OASIS ADL/IADL measures. Participants were mostly female (62.3%) with a mean age of 72.9 years ($SD=14.7$). The percentage of participants who were hospitalized ($n=1440$, 15.9%) was similar to the national average. For both the total group and the hospitalized group most individuals had ADL/IADL deficits. Over 75% of the total group had a diagnosis listed as *other*. There was lower occupational therapy involvement with participants having no or few deficits and greater involvement when patients had more deficits. Patients with 6-10 identified deficits had the highest rate of hospitalization ($n=1041$, 26.2%). Unexpected findings in the characteristics of groups who did and did not receive occupational therapy suggest further study is needed to understand the role of home health occupational therapy in reducing hospitalization.

Keywords: home health, occupational therapy, hospitalization, ADL, IADL

Introduction

The goal of having older adults remain in their homes has been a driving force in government policy for years (Elkan et al., 2001). Health care services for older adults change over time to meet the current demands. With a recent trend in the use of community-based alternatives to hospital care, it is important to understand the implications for health outcomes. Home health services are one option that provides nursing and skilled therapy to older adults in their residences.

Individuals who are discharged to their home may be at risk for hospitalization. With approximately 3.3 million adults readmitted within 30-days of discharge, the estimated financial burden of hospitalization in the United States for 2011 was \$41.3 billion (Hines, Barrett, Jiang, & Steiner, 2014). Understanding the role of home health in reducing hospitalization may help improve overall patient well-being, decrease medical costs, and improve patient outcomes. In a changing health care system, it is important to find innovative and cost-effective ways to provide care.

Measurement of functional outcomes is important in home health programs. The Centers for Medicare and Medicaid Services (CMS) collects data on 41 outcome and assessment information sets (OASIS) (Centers for Medicare and Medicaid Services [CMS], 2017). These outcome measures include functional ability, physiological changes, emotional/behavioral, cognitive ability, and health care utilization, such as hospitalization (Shaughnessy, Crisler, Hittle & Schlenker, 2002). Functional outcomes are an important measure of home health because of the emphasis on an individual's ability to remain safe and independent in their homes and avoid long-term care (Shaughnessy et al., 2002). By improving physical function home health

providers may be able to decrease hospitalization rates (Gilbertson, Langhorne, Walker, Allen, & Murray, 2000; Wilkins, Jung, Wishart, Edwards, & Norton, 2003).

Home health staff are uniquely situated to identify and address risk factors for hospitalization since home health practitioners make frequent visits to homebound adults. Analyzing the characteristics of these homebound adults may lead to increased awareness of risk factors for hospitalization and strategies to address them. Identification of activities of daily living and instrumental activities of daily living (ADL/IADL) tasks that may be factors in hospitalization may help improve functional outcomes in home health by addressing these factors early in the episode.

The ability to analyze secondary data, summarize the findings, and make recommendations to focus care that addresses the needs of homebound adults to reduce hospitalization and improve ADL/IADL outcomes is now possible. The primary goal of this study was to analyze the characteristics of home health services, and occupational therapy (OT) for individuals who were and were not hospitalized, with a secondary goal of identifying gaps in service and presenting possible solutions to improve overall outcome measures. Secondary data from a major Midwest health system were used to examine the personal and environmental characteristics of people who are hospitalized after receiving home health services. Analyzing these features may lead to increased awareness of risk factors for hospitalization and strategies to address them. If home health care providers can reduce risk factors, then older adults may have improved health and participation outcomes and reduced overall medical costs.

Data on home health participants based on OASIS responses and patient surveys have been routinely used to guide program development and best practice policies. These retrospective data may also be used to examine patients who were hospitalized during their home

health episode. The data available included levels of assistance needed in activities of daily living and instrumental activities of daily living (ADL/IADL) such as dressing, medication management, transfers, and toileting categories. There are very few studies that look at home health services in improving outcomes unique to the particular CMS measures. Since Medicare is the largest payer for home health services, understanding the characteristics that are associated with increased risk of hospitalization may be helpful in improving the services that address those risks (National Association of Home Care & Hospice, 2010).

Having insight into the overall outcomes of home health services and their impact on hospitalization is imperative. To do this we analyzed secondary data to identify outcomes, risks for adverse outcomes, and gaps in services. We then determined possible solutions to address these deficiencies.

Review of Literature

Health care is changing to meet the needs of a growing older population. Services are often provided in the individual's home with a focus on positive outcomes and preventing hospitalization. Home health services have guidelines that are summarized by the Centers for Medicare and Medicaid Services (CMS, 2017). These guidelines indicate qualifications for services and the types of services to address the needs of the home health population. The Centers for Medicare and Medicaid Services (CMS) also provide measurement tools to assess patient outcomes, determine payment of services, and provide publically reported results on health programs. This review of the literature will summarize current knowledge on hospitalization and re-hospitalization, home health, and OASIS measures related to rehabilitation and hospitalization

Hospitalization and Re-hospitalization

The Centers for Medicare and Medicaid Services defines readmission or re-hospitalization as being admitted to a hospital within 30-days of being discharged from the same or a different hospital (CMS, 2012). Hospital readmission rates are used as a measure of cost reduction and quality improvement (CMS, 2015). Re-hospitalization has been shown to contribute to poor patient outcomes, increased risk of future hospitalizations, exacerbation of medical conditions, and reduced safety in the home, thus increasing burdens on caregivers and the healthcare system (Courtney et al., 2009). In a randomized controlled trial by Courtney et al. (2012), of the older adults ($n = 128$) who had been admitted to the hospital and had at least one indicator of re-admission, those who received nursing and physiotherapy had a significant improvement in quality of life indicators ($p = 0.001$) and reduction in hospitalizations ($p = 0.007$).

The Centers for Medicare and Medicaid Services have focused on reducing hospitalizations and improving patient outcomes (CMS, 2013). Since Medicare is the largest payer for home health services, understanding the characteristics that are associated with increased risk of hospitalization is needed to improve the services that address those risks (National Association of Home Care & Hospice, 2010). Some studies have examined the role of home health in hospitalization related to specific diagnoses such as congestive heart failure or depression, but few have looked specifically at CMS outcome measures including hospitalization. One study by Jiang et al. (2001) looked at congestive heart failure and depression along with hospitalization. This study noted that Beck Depression Inventory scores of ten or higher or diagnoses of Major Depressive Disorder were risk factors for hospitalization at three months ($p = 0.004$) and one year ($p = 0.005$). This study used logic regression to adjust for clinical risk factors but it did not address CMS outcome measures.

Other studies have examined the characteristics of older adults who are at greater risk of hospital admission. These factors include an age of 80-years or older, five or more comorbidities, cognitive impairment, impaired function in daily tasks, advanced stage illness, or multiple prior acute admissions (Albrecht et al., 2014; Scott, Shohag, & Ahmed, 2014). Having services, such as palliative care, in the home or a nursing facility was associated with significantly lower risk of hospital admission in a retrospective cohort study ($n = 408$) (Enguidanos, Vesper, & Lorenz, 2012). Studies have also been done on the impact of home nursing visits on hospitalization but few have examined the impact of therapy in the home on decreasing hospitalization (O'Connor, Hanlon, Naylor, & Bowles, 2015).

Although there are limited studies on the role of therapy in home health outcomes, there is an increase in understanding of the risk factors for hospitalization. A recent systematic

literature review investigated 25 research studies published from 2002 to 2011. These studies were organized into two themes, risk factors for acute care hospitalization and approaches to reduce hospitalization (O'Connor, 2012). Primary risk factors were categorized into sociodemographic characteristics, clinical background, and functional status. Functional status risk factors include ADL/IADL performance, an area within the scope of occupational therapy. OASIS provides a functional status score that is derived by assessing the level of assistance with ADL/IADL tasks and functional ability is a key indicator of a person's ability to remain in their home (Scharpf & Madigan, 2010). Individuals who required assistance with ADL/IADL tasks but had inadequate social or caregiver support were vulnerable to hospitalization (O'Connor, 2012). Similar findings on the impact of environmental and socioeconomic characteristics on hospitalization have been reported in other primary research studies (Arbaje et al., 2008). Clinical conditions that increased the risk for hospitalization were having four or more medical conditions, such as pressure ulcers, incontinence, medication management, and depression (Courtney et al., 2009; Roberts & Robinson, 2014). Some studies have found specific medical diagnoses are risk factors for hospitalization, including diabetes, cardiovascular disease (Raval et al., 2015) and congestive heart failure (CHF) (Rich et al., 1993; Rich et al., 1995). A study by Raval et al. (2015) used a retrospective, longitudinal cohort design to assess hospitalization rates and risk-factors for Medicare beneficiaries with diabetes. This study found diabetes and cardiovascular disease as statistically significant risk factors for hospitalization ($p < 0.001$). Rich et al. (1993) performed a prospective, randomized clinical trial ($n=98$) which identified CHF as the most frequent indication for hospitalization accounting for a 29% to 47% rate of hospitalization within three to six months of discharge. A follow up study by Rich et al. (1995) used a prospective, randomized trial to assess hospitalization in high-risk CHF patients ($n=282$)

who received a multidisciplinary intervention approach. The intervention group received intensive education on CHF, medication management, dietary guidance, discharge planning, and individualized home health services. There was a statistically significant reduction in hospitalizations for CHF the intervention group ($p=0.04$) indicating that a comprehensive multidisciplinary approach resulted in more favorable outcomes. Inadequate chronic disease management is considered a risk factor for hospitalization.

Home Health

Providing care to adults in their homes allows practitioners to observe, identify, and assess risk factors. Home health services may include skilled nursing, physical therapy, occupational therapy, speech language pathology, home health aide, and medical social work services (CMS, 2014). Home health services are provided to individuals after a qualifying event. These qualifying events may include persons who have either been discharged from a recent hospital stay, discharged from a transitional care setting (nursing home or rehabilitation facility), or had a referral from their physician in the clinic (CMS, 2014). Persons admitted to home health must be considered homebound. According to the CMS, homebound is defined as:

The patient is considered homebound if the following two criteria are met: 1. The patient, because of illness or injury, needs the aid of supportive devices such as crutches, canes, wheelchairs, and walkers; requires the use of special transportation; or the assistance of another person in order to leave their place of residence; OR have a condition such that leaving his/her home is medically contraindicated, AND 2. There must exist a normal inability to leave the home, AND if the patient does leave the home, it requires a considerable and taxing effort. If the patient does in fact leave the home, the patient may nevertheless be considered homebound if the absences from the home are infrequent or

for periods of relatively short duration, or are attributable to the need to receive health care treatment (CMS, 2014, p. 5).

Home health services are provided in 60-day increments and at the end of the first 60-day certification period providers are required to recertify individuals who have a continued need for home health services (CMS, 2017). Re-certification is completed every 60-days for the duration of time home health services are provided.

Interventions used in home health are not unique to this setting; rather, an array of rehabilitation interventions that are commonly used in hospitals and transitional care units (TCU) are adapted for the home environment (Courtney et al., 2012; Courtney et al., 2009; Rowland, Maitra, Richardson, Hudson & Woodhouse, 1990). Home health occupational therapy uses daily occupation and activity based interventions to improve physical function and independent living in community-dwelling adults (American Occupational Therapy Association [AOTA], 2016). Improving physical function and independence has been shown to decrease hospitalization rates (Corr & Bayer, 1995; Gilbertson et al., 2000; Wilkins et al., 2003). One study by Gitlin et al. (2006) looked at multicomponent home interventions to improve functional performance in older adults ($n = 319$). This study had an intervention group who received physical and occupational therapy in the home with goals focused directly on areas of concern identified by the individuals and based on self-reports of the levels of deficiency. The intervention group had a statistically significant improvement in ADL ($p = 0.03$) and IADL ($p = 0.04$) performance. A randomized controlled trial of 138 patients used occupational therapy to improve functional performance with ADLs (Gilbertson et al., 2000). The Nottingham Extended Activities of Daily Living Scale and Barthel Activities of Daily Living Index were used to measure outcomes at eight weeks and six months. The intervention group had a statistically significant improvement in activities of

daily living at both eight weeks ($p = 0.03$) and six months ($p = 0.04$). Another study by Corr & Bayer (1995) ($n = 110$) identified a decrease in hospitalization in their intervention group which received a significantly greater number of aids to daily living ($p = 0.05$). The intervention group received regular occupational therapy interventions in addition to their regular programs such as hospital programs and community physical therapy programs. The occupational therapists addressed functional independence with activities of daily living through education and task modifications such as toilet aids and stair-rails. Although their research could not directly connect the use of occupational therapy to the functional improvements one year post stroke, they did identify a significant reduction in hospitalization in the intervention group ($p = 0.03$).

Measures Used in Home Health

Home health agencies collect data on patients at critical points during their home health episode. These key time points are at the admission to home health services, transfer to another provider of care (e.g. hospital), resumption of care following a hospital stay, recertification (after the initial 60-day episode of care), discharge, and death (CMS, 2017). The CMS collects data on 41 outcome measures using the Outcome Assessment and Information Set (OASIS) (CMS, 2017). OASIS measures include functional ability, physiological changes, emotional/behavioral, cognitive ability, and health care utilization, such as hospitalization (Shaughnessy et al., 2002). Any data collected by the CMS are used for payment of services, public reporting of selected outcomes, and for survey and certification purposes for the Medicare and Medicaid programs (CMS, 2017).

Multiple studies have looked at the psychometric characteristics of OASIS measures. A systematic literature review found the reliability and validity of OASIS measures vary from low to moderate depending on the response item (O'Connor & Davitt, 2012). These studies were

limited in that the methods, statistical analyses, and items tested and measured were inconsistent. There have also been multiple changes in the OASIS measure since initially implemented in 2002 which makes comparing questions and answers over longer time frames difficult (CMS, 2014).

OASIS Measures Related to Rehabilitation and Hospitalization

OASIS measures on functional status are directly related to occupational and physical therapy domains of practice such as level of independence with bathing, dressing, toileting, hygiene/grooming, medication administration, and ambulation/locomotion. Currently, there is limited knowledge on whether these functional tasks put patients at a higher risk of hospitalization. Multiple studies have used a general ADL/IADL deficit group in readmission analysis, or functional impairment as risk factors for readmission (Anpalahan & Gibson, 2006; Arbaje et al., 2008; Preyde & Brassard, 2011). These studies only looked at the ADL/IADL group as a whole and did not look at individual ADL/IADL deficits.

Objective

The aims of this study were to analyze risk factors for hospitalization in home health, identify the role of home health in reducing hospitalizations, and identify potential gaps in service to present potential interventions to improve outcomes. To do this we wanted to answer two questions;

- 1) Is there a difference in characteristics related to ADL/IADL performance of home health individuals who were hospitalized and those who were not?
- 2) Is there a difference in hospitalization for individuals who received home health occupational therapy and those who do not?

Methods

This study used a cross-sectional descriptive approach examining the home health population served by a large Midwest health system. The primary long-term objective was to provide insight into risk factors for hospitalization and the role of occupational therapy as it related to those risk factors. The study protocol was approved by the Institutional Review Board at the Midwest health system and St. Catherine University. A waiver of consent for the secondary data was also requested and granted. Subjects signed a release of information form at the time home health services were started. Patients have the right to not disclose their data for research purposes. Only subjects who signed a release of information for research had their data included in this study.

Participants

This study examined a convenience sample of home health patients who were hospitalized and those who were not. Eligible participants were community-dwelling adults of any age who were provided home health services. All home health patients who were discharged by home health within the past twelve months were included. This study excluded any home health patients who were still open to home health services after December of 2016 and those who had their episodes deleted.

Process

Structured query language and pivot tables in Excel enabled a multivariable and multilayer analysis to compare thirteen OASIS ADL/IADL items that were gathered during the initial encounter for home health and demographic information. The use of structured query language and pivot tables have been commonly used for data analysis at the participating Midwest health system. To identify the term *need for assistance*, they needed to look at the

thirteen OASIS items and determined what scores would indicate a need for assistance. Having more than a necessity for the set-up of a task was defined to indicate a need for assistance for OASIS ADL/IADL items. For psychosocial measures individuals were identified as having a deficit or not having a deficit. (See Appendix B.1)

This study included all home health patients in a nine-county metro area who had a discharge from home health between January 2016 and December 2016. Although this study did not identify the referral source for the participants involved, such as a hospital, transitional care unit (TCU), or clinic, it was important to understand what The Centers for Medicare and Medicaid Services calls re-hospitalization in home health. Hospitalization was defined as a person who was hospitalized during their episode for any urgent or unplanned hospitalization. Any scheduled admissions for procedures or surgery were excluded from the hospitalization group. Descriptive statistics were obtained for demographics (e.g. sex, age, and diagnosis) and OASIS measures of dressing, medication management, toileting, grooming, bathing, and transfers/ambulation. Descriptive statistics were compared for patients who were hospitalized and those who were not and those who received occupational therapy services and those who did not.

Results

Participants

The initial dataset included participants who had their home health services end between January 2016 and December 2016 which yielded 10,159 individuals. Since there was a new version of OASIS, OASIS-C1 that started October of 2015, the participants were further limited to those who had services begin in January 2016. This ensured all individuals had the same OASIS-C1 questions used during their home health event. This sample was then limited to people who only had one 60-day episode which then limited participants to 9,045. Participants were limited to one 60-day episode to eliminate outliers from patients who have a long-term need for home health services.

Participant characteristics are described in Table 1. Most participants were female ($n = 5639$, 62.3%) and between the ages of 68-87 ($n = 4657$, 51.5%). The mean age in the study was 72.9 years old, with a total age range of 18-104. Of the sample, the mental health issues identified were: cognitive deficit ($n = 1282$, 14.2%), anxiety ($n = 1883$, 20.8%), and depression ($n = 511$, 5.7%). The number of participants that were hospitalized out of this sample ($n = 1440$, 15.9%) was similar to the national average of 16.5% (CMS, 2015).

Deficits in ADL/IADL areas for the total and hospitalized subgroup are described in Table 2. For the total group ($n = 9045$) the following deficits were noted during the initial OASIS assessment: dressing ($n = 7291$, 80.6%), grooming ($n = 3931$, 43.5%), bathing ($n = 8066$, 89.2%), toileting ($n = 5773$, 63.8%), locomotion ($n = 8066$, 89.2%), phone ($n = 480$, 5.3%), eating ($n = 8672$, 95.9%), and medication ($n = 8565$, 94.7%). The ADL/IADL groups for the hospitalized group ($n = 1440$) with the largest percent of identified deficits were dressing ($n =$

1184, 82.2%), bathing ($n = 1300$, 90.3%), toileting ($n = 951$, 66.0%), locomotion ($n = 1299$, 90.2%), eating ($n = 1396$, 96.9%), and medication ($n = 1375$, 95.5%).

Table 1

Sample Characteristics (N=9045)

Characteristic	N (%)
Age	
18-27	66 (0.7)
28-37	166 (1.8)
38-47	287 (3.2)
48-57	864 (9.6)
58-67	1563 (17.3)
68-77	2096 (23.2)
78-87	2561 (28.3)
88-97	1394 (15.4)
>97	48 (0.5)
Gender	
Male	3406 (37.7)
Female	5639 (62.3)
Cognitive Deficit	
Yes	1282 (14.2)
No	7763 (85.8)
Anxiety	
Yes	1883 (20.8)
No	7162 (79.2)
Depression	
Yes	511 (5.7)
No	8534 (94.4)
Hospitalized	
No	7605 (84.1)
Yes	1440 (15.9)

For both the total group and the hospitalized group most individuals had ADL/IADL deficits. The group of hospitalized individuals with two deficits in dressing and locomotion had a higher hospitalization percentage than individuals with one deficit or no deficit. The group of hospitalized individuals with one deficit in medications, eating, and toileting had a higher hospitalization percentage than individuals with no deficit or two deficits. For both the total group and hospitalized group most individuals did not identify mental health deficits of

depression, anxiety, or cognitive deficits. Of those individuals who did identify mental health deficits, the group with anxiety ($n = 348$) had the highest hospitalization percentage.

The Centers for Medicare and Medicaid Services identified certain diagnoses as having a high-risk for hospitalization (CMS, 2012). The CMS publications currently report hospitalization rates for those high-risk diagnoses of congestive heart failure, heart attack, pneumonia, COPD, and cardiac bypass or graft surgery (CMS, 2012). The major Midwest health system in this study collects data on certain diagnoses. However, the majority of the population surveyed had their diagnosis listed as *other* ($n = 6810$). Table 3 identifies high-risk diagnoses and their hospitalization rate. This table also summarizes the involvement of occupational therapy and the hospitalization rate. The diagnoses with the highest rates of hospitalization in the total group were septicemia ($n = 21$, 28.4%), pneumonia ($n = 16$, 26.2%), COPD ($n = 89$, 26.9%), cardiac dysrhythmias ($n = 27$, 23.1%), urinary tract infection ($n = 22$, 19.0%), renal failure ($n = 5$, 31.3%), and heart disease ($n = 162$, 23.0%). The diagnoses that had a lower hospitalization percentage when occupational therapy was involved were septicemia, cardiac dysrhythmias, and acute renal failure. Over 75% of the total group had *other* listed as their primary diagnosis.

Table 4 examines the relationship between involvement in occupational therapy with patients who were hospitalized and their identified ADL/IADL deficits. Of the hospitalized patients with no deficits, there was a lower percentage of occupational therapy involvement. In general, there was greater occupational therapy involvement for individuals with one or two ADL/IADL deficits. For hospitalized patients with cognitive deficits, there was a greater occupational therapy involvement than for those with no cognitive deficits. There was little difference in occupational therapy involvement for patients on the anxiety and depression measures.

Table 2

ADL/IADL Characteristics (Total, N=9045) (Hospitalization, N=1440)

Characteristic	Total N (%)	Hospitalization N (%)
Dressing		
No Deficit	1754 (19.4)	256 (17.8)
One Deficit (upper body or lower body)	2816 (31.1)	403 (28.0)
Two Deficits (upper body and lower body)	4475 (49.5)	781 (54.2)
Grooming		
No Deficit	5114 (56.5)	761 (52.8)
Deficit	3931 (43.5)	679 (47.2)
Bathing		
No Deficit	979 (10.8)	140 (9.7)
Deficit	8066 (89.2)	1300 (90.3)
Toileting		
No Deficit	3272 (36.2)	489 (34.0)
One Deficit (transfer or hygiene)	5145 (56.9)	822 (57.1)
Two Deficits (transfer and hygiene)	628 (6.9)	129 (9.0)
Locomotion		
No Deficit	979 (10.8)	141 (9.8)
One Deficit (transfer or walk/wheelchair)	2011 (22.2)	319 (22.2)
Two Deficits (transfer and walk/wheelchair)	6055 (66.9)	980 (68.1)
Eating		
No Deficit	373 (4.1)	44 (3.1)
One Deficit (prepare or eat)	8343 (92.2)	1323 (91.9)
Two Deficits (prepare and eat)	329 (3.6)	73 (5.1)
Phone		
No Deficit	8565 (94.7)	1349 (93.7)
Deficit	480 (5.3)	91 (6.3)
Medication		
No Deficit	480 (5.3)	65 (4.5)
One Deficit (oral or injectable)	6914 (76.4)	1049 (72.8)
Two Deficits (oral and injectable)	1651 (18.3)	326 (22.6)
Cognitive Deficit		
No	7763 (85.8)	1237 (85.9)
Yes	1282 (14.2)	203 (14.1)
Anxiety		
No	7162 (79.2)	1092 (75.8)
Yes	1883 (20.8)	348 (24.2)
Depression		
No	8534 (94.4)	1329 (92.3)
Yes	511 (5.7)	111 (7.7)

Table 3

High-Risk Diagnoses and Hospitalization (N=9045)

Diagnosis	Total N (%)	OT Involved N (%)	No OT Involved N (%)
Congestive Heart Failure	12 (0.1)		
Not Hospitalized	11 (91.7)	5 (45.5)	6 (54.5)
Hospitalized	1 (8.3)		1 (100.0)
Septicemia	74 (0.8)		
Not Hospitalized	53 (71.6)	24 (45.3)	29 (54.7)
Hospitalized	21 (28.4)	10 (47.6)	11 (52.4)
Pneumonia	61 (0.7)		
Not Hospitalized	45 (73.8)	19 (42.2)	26 (57.8)
Hospitalized	16 (26.2)	10 (62.5)	6 (37.5)
COPD	331 (3.7)		
Not Hospitalized	242 (73.1)	137 (56.6)	105 (43.4)
Hospitalized	89 (26.9)	45 (50.6)	44 (49.4)
Cardiac Dysrhythmias – Atrial Fibrillation	117 (1.3)		
Not Hospitalized	90 (76.9)	50 (55.6)	40 (44.4)
Hospitalized	27 (23.1)	10 (37.0)	17 (63.0)
Urinary Tract Infections	116 (1.3)		
Not Hospitalized	94 (81.0)	53 (56.4)	41 (43.6)
Hospitalized	22 (19.0)	11 (50.0)	11 (50.0)
Acute Unspecified Renal Failure	16 (0.2)		
Not Hospitalized	11 (68.8)	8 (72.7)	3 (27.3)
Hospitalized	5 (31.3)	2 (40.0)	3 (60.0)
Heart Disease	704 (7.8)		
Not Hospitalized	542 (77.0)	213 (39.3)	329 (60.7)
Hospitalized	162 (23.0)	92 (56.8)	70 (43.2)
Acute Cerebral Vascular Disease - stroke	2 (2.0)		
Not Hospitalized	2 (100.0)	2 (100.0)	-
Hospitalized	-	-	-
Other	6810 (75.3)		
Not Hospitalized	5901 (86.7)	2762 (46.8)	3139 (53.2)
Hospitalized	909 (13.3)	444 (48.8)	465 (51.2)

Table 4

OT Involvement for Hospitalized Patients by ADL/IADL Category (N=1440)

Characteristics of Hospitalized Patients	Total N (%)	OT Involved N (%)	No OT Involved N (%)
Dressing			
No Deficit	256 (17.8)	85 (33.2)	171 (66.8)
One Deficit (upper body or lower body)	403 (28.0)	176 (43.7)	227 (56.3)
Two Deficits (upper body and lower body)	781 (54.2)	438 (56.1)	343 (43.9)
Grooming			
No Deficit	761 (52.8)	307 (40.3)	454 (59.7)
Deficit	679 (47.2)	392 (57.7)	287 (42.3)
Bathing			
No Deficit	140 (9.7)	39 (27.9)	101 (72.1)
Deficit	1300 (90.3)	660 (50.8)	640 (49.2)
Toileting			
No Deficit	489 (34.0)	192 (39.3)	297 (60.7)
One Deficit (transfer or hygiene)	822 (57.1)	429 (52.2)	393 (47.8)
Two Deficits (transfer and hygiene)	129 (9.0)	78 (60.5)	51 (39.5)
Locomotion			
No Deficit	141 (9.8)	34 (24.1)	107 (75.9)
One Deficit (transfer or walk/wheelchair)	319 (22.2)	131 (41.1)	188 (58.9)
Two Deficits (transfer and walk/wheelchair)	980 (68.1)	534 (54.5)	446 (45.5)
Eating			
No Deficit	44 (3.1)	14 (31.8)	30 (68.2)
One Deficit (prepare or eat)	1323 (91.9)	652 (49.3)	671 (50.7)
Two Deficits (prepare and eat)	73 (5.1)	33 (45.2)	40 (54.8)
Phone			
No Deficit	1349 (93.7)	648 (48.0)	701 (52.0)
Deficit	91 (6.3)	51 (56.0)	40 (44.0)
Medication			
No Deficit	65 (4.5)	17 (26.2)	48 (73.8)
One Deficit (oral or injectable)	1049 (72.8)	527 (50.2)	522 (49.8)
Two Deficits (oral and injectable)	326 (22.6)	155 (47.5)	171 (52.5)
Cognitive Deficit			
No	1237 (85.9)	568 (45.9)	669 (54.1)
Yes	203 (14.1)	131 (64.5)	72 (35.5)
Anxiety			
No	1092 (75.8)	532 (48.7)	560 (51.3)
Yes	348 (24.2)	167 (48.0)	181 (52.0)
Depression			
No	1329 (92.3)	647 (48.7)	682 (51.3)
Yes	111 (7.7)	52 (46.8)	59 (53.2)

Table 5 includes data for the total number of ADL/IADL deficits and hospitalization, it also compares changes when OT is involved. When ADL/IADL deficits are looked at in groups of deficiencies related to hospitalizations, individuals who have 6-10 identified ADL/IADL deficits have the largest hospitalization rate ($n = 1041$, 26.2%) and those with no deficit the smallest group ($n = 8$, 8.3%). Those who identified more than ten deficits during the OASIS assessment comprised the second largest group who were hospitalized ($n = 79$, 22.4%). The group with 1-5 identified ADL/IADL deficits had the least amount of hospitalization for participants with identified deficits ($n = 312$, 14.4%). The hospitalized groups with no deficit ($n = 1$, 12.5%) and with 1-5 ADL/IADL deficits ($n = 96$, 15.8%) had the lowest hospitalization when OT was involved. Approximately 84% of hospitalized patients with 1-5 deficits and about 46% of those with six or more identified deficiencies in ADL/IADL performance had no occupational therapy involvement.

Table 5

Total Number of ADL/IADL Deficits and Hospitalization (N=9045)

Total Number of ADL/IADL Deficits	Total N (%)	OT Involved N (%)	No OT Involved N (%)
No Deficit	103(1.1)		
Not Hospitalized	95 (91.7)	8 (8.4)	87 (91.6)
Hospitalized	8 (8.3)	1 (12.5)	7 (87.5)
1-5 Deficits	2169 (24.0)		
Not Hospitalized	1857 (85.6)	628 (33.8)	1229 (66.2)
Hospitalized	312 (14.4)	96 (30.8)	216 (69.2)
6-10 Deficits	6420 (71.0)		
Not Hospitalized	5379 (83.8)	2903 (54.0)	2476 (46.0)
Hospitalized	1041 (16.2)	559 (53.7)	482 (46.3)
>10 Deficits	353 (3.9)		
Not Hospitalized	274 (77.6)	147 (53.6)	127 (46.4)
Hospitalized	79 (22.4)	43 (54.4)	36 (45.6)

Discussion and Conclusions

This study examined the characteristics of ADL/IADL deficits as related to the home health population who were hospitalized and received occupational therapy services. For both the total group and the hospitalized group critical ADL/IADL problems were identified. Both the hospitalized group and total group had multiple ADL/IADL deficits identified. Although occupational therapists are skilled in addressing deficits in ADL/IADL tasks this study failed to find a connection between occupational therapy and decreased hospitalization.

Home Health Individuals with ADL/IADL Deficits

There were a large number of individuals who had ADL/IADL deficits. The majority of participants (74.9%) had over six deficiencies in ADL/ADL areas. Having such a large number of deficits may indicate more complex needs. If this sample was more acute or complex than the general home health population, it would be beneficial to compare other samples and the relationship between occupational therapy intervention and hospitalization. Since approximately 46% of this population was hospitalized, further examination of the factors that influence performance may be helpful. For the hospitalized sample, the ADL/IADL areas that had the largest percentage of deficits were dressing (82.2%), bathing (90.3%), toileting (66.0%), locomotion (90.2%), eating (96.9%), and medication (95.5%). Analysis of the physical and cognitive requirements to complete these daily activities may be helpful in understanding their relationships to hospitalization.

For example, the OASIS questions related to feeding address a person's ability to feed themselves and ability to prepare, plan, or reheat a delivered meal. The physical task of feeding yourself includes eating, chewing, and swallowing. These functions may be impaired by motor skills, vision, physical strength, and mobility. They may also be impaired due to oral issues such

as muscle strength, oral motor control, or even denture/teeth concerns. Difficulty in preparing meals may be attributed to issues similar to feeding or entirely different problems. To make a meal, you need to be able to ambulate and navigate the kitchen, manage the appliance to reheat the item, and have the strength and mobility to complete the task. Since studies show that malnutrition is co-morbidity risk-factor for hospitalization, this may be one area of focus to reduce hospitalization (Silverstein, Qin, Mercer, Fong, & Haydar, 2008). Occupational therapists can address these concerns and work with speech therapy to address chewing and swallowing. This particular data set only looked at occupational therapy involvement and it may also be beneficial to look at multidisciplinary involvement with this population.

The second largest hospitalization group was individuals who had deficits in medication management. Inability to manage medications places patients at risk for hospitalization (DeCoster, Ehlman, & Conners, 2013; Sanders & Van Oss, 2013). Medication management may be difficult due to cognitive deficits, fine motor, and other physical limitations. Occupational therapists are specifically trained to assess and understand cognitive deficits. They can simplify medication education and develop programs to assist patients in being more successful with medication management. Specific interventions were not available in this data set. It may be beneficial to examine ADL/IADL deficits and the interventions that were addressed in the home.

A high percentage of bathing, locomotion, dressing, and toileting deficits were noted in individuals who were hospitalized. Performance of these tasks may be difficult for multiple reasons, including cognitive deficits, physical dysfunction, and environmental limitations. Targeting occupational therapy interventions to specific impairments may help improve performance in these activities. Occupational therapy as a profession, places emphasis on a

holistic approach to function, participation, and builds on skills to engage in activities and increase safety and independence with daily tasks.

Persons who reported having anxiety ($n = 348$, 18.5%) or depression ($n = 111$, 21.7%) also had a higher rate of hospitalization. Occupational therapists are educated to address both physical and psychosocial impairments that affect performance. Through the use of a recovery model, occupational therapists can work with a client to build a partnership, foster relationships, develop coping strategies and healthy habits, and daily routines to empower individuals for personal change. Occupational therapists are educated and understand neurophysiology, psychosocial development, activity and environmental analysis, which is why they are skilled in addressing the needs of the home health population. However, it may be possible that the occupational therapy interventions used with this sample were not addressing the specific needs of this group to reduce their hospitalization risk.

Occupational Therapy Roles in Preventing Hospitalization

Occupational therapists are uniquely positioned to address the person and environment factors that support performance of ADL/IADL tasks. In this large sample of hospitalized individuals who had deficits in ADLs/IADLs, approximately 46% of them had no occupational therapy services. Occupational therapy plays an important role in early identification of deficits and engagement of individuals in addressing problems that make them vulnerable for hospitalization (Roberts & Robertson, 2014).

Occupational therapy addresses multiple factors that support health and quality of life. This broad scope of practice includes physical function and mobility, cognitive assessment and retraining, engaging in meaningful activities, understanding changes across the lifespan, and understanding remediation and compensation for tasks. Occupational therapy addresses the

multiple needs of the home care population, including physical disabilities, cognitive deficits, environmental limitations, and mental health concerns. The ability to address multiple risk factors is important to reduce hospitalizations.

Contributions of Other Factors to Hospitalization

Diagnoses are another contributing factor to hospitalization. The CMS identifies certain diagnoses as being high-risk for hospitalization. These diagnoses include congestive heart failure (CHF), septicemia, pneumonia, chronic obstructive pulmonary disease (COPD), cardiac dysrhythmias, urinary tract infections, acute renal failure, heart disease, and acute cerebral vascular disease (CMS, 2012). In this data set, the vast majority of diagnoses were recorded as *other* (75.3%). Some individuals who had a diagnosis of *other* may have had one of the priority diagnoses or other medical diagnoses. The study was limited to diagnoses that were reported for coding in the OASIS data set. If high-risk diagnoses were not recorded in the OASIS data set, the accuracy of the analyses for diagnoses may be questionable. To develop interventions that address all risk factors for hospitalization, diagnoses that may place individuals in a high risk category need to be noted.

The availability of formal or informal caregivers and an individual's living environment are also considered a risk factor for hospitalization (Arbaje et al., 2008; Greysen et al., 2014). In this data set, information on the physical and social environment was not available. Since support systems are critical for monitoring and managing ADL/IADL performance and ADL/IADL performance is a risk factor for hospitalization, this information would be beneficial in the development of practice guidelines. Occupational therapists are trained in understanding how the individual's physical and social environment may be a support or a barrier to performance of ADL/IADL tasks. Without information on the environment, developing recommendations for

practice guidelines may be challenging. Understanding the impact the environment and social support have on ADL/IADL performance supports the use of occupational therapy in the home to identify and address risk factors.

Most occupational therapists are using exercise and activity codes rather than ADL codes (Lamb, 2017). Since occupational therapists are skilled in addressing functional performance in ADL/IADL tasks, understanding what is being addressed during a home health visit may be valuable in developing practice guidelines. If exercise and activity interventions are used more than ADL/IADL interventions in home health occupational therapy, this may explain some of the problems identified in ADLs and IADLs. Individual case studies that focus on home health occupational therapy interventions may provide additional insight.

Implications for Home Health and Occupational Therapy Practice

This doctoral project suggests that ADL/IADL deficits are important indicators for hospitalization in the home health population. Occupational therapists are uniquely skilled in addressing functional performance in ADL/IADL tasks. With an increased awareness of ADL/IADL performance on hospitalization, having deficits in these areas should trigger a referral to occupational therapy. Deficits in specific ADL/IADL tasks puts people at risk for hospitalization. Focusing on these specific tasks may be an important strategy for preventing hospitalization in the home health population.

Individuals are complex and understanding all of the characteristics that may impact their health is important in reducing hospitalizations. Having accurate coding of diagnoses and collection of other personal characteristics is valuable when assessing risk for hospitalization. This also supports understanding and screening for mental health and cognitive deficits, since mental health and cognitive deficits are also shown to impact hospitalization. Recently this Midwest health system implemented a cognitive deficit screening tool in addition to the depression screening tool. The depression screen was imbedded in the OASIS questions. Thus, it may be helpful to have the cognitive screening tool imbedded in the OASIS as well.

Implications for Future Research

Future knowledge advancement and research should pursue the collection and examination of data on the other contributing variables to hospitalization. In order to fully understand hospitalization in the home health population all contributing factors need to be identified and analyzed to predict outcomes. Multivariate analyses may be helpful in predicting hospitalization outcomes from a combination of demographic and OASIS variables which may be beneficial in improving performance outcomes.

Study Limitations

This study had several limitations. First, it was limited to a one-year convenience sample of home health patients in a limited area. This study was also limited in knowledge of socio-economic status, social support, and living environment. Having an understanding of these demographic variables would be beneficial for developing protocols to address hospitalization in home health. Studies show that socio-economic status, social support, and living environment may impact hospitalization (Arbaje et al., 2008; Greysen et al., 2014). Information on co-morbidities, case-mix score, and additional information regarding patient diagnoses was also missing in the data. Having this information may be beneficial in making comparisons to other populations. In order to develop a plan to address hospitalization, having similar population groups and understanding the complex medical needs of patients would be beneficial. Future studies may benefit from looking at case studies of hospitalized patients to analyze the differences in people of similar complexity and acuity, similar and different living situations, socio-economic status, and social support.

This study also limited analyses to occupational therapy. Future studies may benefit from looking at the total number of occupational therapy visits, the timing of occupational therapy involvement (before or after hospitalization), and the specific interventions that were being addressed in the home. They may also benefit from using a logistic regression model to predict occupational therapy involvement and hospitalization. There was also no analysis completed on other allied health professions or skilled nursing involvement. It may be beneficial to further investigate a multidisciplinary approach to hospitalization since studies show that the utilization of a multidisciplinary approach is the most efficient in reducing hospitalizations in adults (Rich et al., 1993; Rich et al., 1995; Ryan, Aloe, & Mason-Johnson, 2009).

Appendix A: Review of Literature

Appendix A.1 Hospitalization and Home Health

Re-hospitalization is a term used when an individual returns to the hospital, after being discharged, within a specified period of time. For home health providers that specified period of time is within 30-days of being discharged from the same or different hospital (Centers for Medicare and Medicaid Services [CMS], 2012). Cost of hospitalization is a tremendous burden on society. The cost of hospitalizations for Medicare beneficiaries was \$120 billion in 2012 and of that amount it is estimated that the cost of preventable hospitalizations could be as high as \$12 billion (O'Connor et al., 2015). Understanding the risk factors of hospitalization may help reduce the number of preventable hospitalizations.

Risk factors for hospitalization have been studied on multiple levels. One study of Ohio Medicare certified home care agencies ($n = 922$) found that individuals who were admitted to hospitals for exacerbations of their chronic disease were more likely to have functional disability, skin problems, and questionable rehabilitation prognosis (Fortinsky, Madigan, Sheehan, Tullai-McGuinness, & Fenster, 2006). Other studies examined risk factors for specific medical diagnoses and reported comparable findings that are relevant to occupational therapy, including diabetes (Raval et al., 2015) and congestive heart failure (CHF) (Rich et al., 1993; Rich et al., 1995). Regardless of specific medical conditions, occupational therapy provides strategies to improve functional performance with ADLs/IADLs while reducing functional decline and risk of injury (AOTA, 2016).

There is also growing evidence on interventions that may be helpful in reducing hospitalization such as home health services. The cost of home health has increased by 89% from

2002 to 2012 and it is estimated that over 12,311 agencies provided home health services to approximately 3.4 million Medicare beneficiaries (O'Connor et al., 2015).

Appendix A.2 Home Health and Occupational Therapy

Occupational therapists provide interventions in the home to improve outcomes in areas such as medication management, dressing, toileting, bathing, and daily management of chronic conditions (Siebert & Vance, 2013). Occupational therapists are experts at using meaningful activities of daily life to collaborate with patients and caregivers, which is an approach that works well with people managing chronic diseases (AOTA, 2015). The American Occupational Therapy Association (AOTA) identifies occupational therapy practitioners as having an effective role in improving efficiency and optimizing patient outcomes (AOTA, 2016). Therapists find the unique balance between functional ability, meaningful activities, and environmental needs so patients can be safe and as independent as possible in their home (AOTA, 2016). Although occupational therapy cannot establish initial eligibility for home health under Medicare, occupational therapists can extend eligibility under Medicare since the need for occupational therapy qualifies patients for continuation of a patient's home health benefit (AOTA, 2016). Occupational therapists have a unique way of addressing a patient's social and functional needs which can be risk factors for hospitalization if not addressed (Rogers, Bai, Lavin, & Anderson, 2016).

Occupational therapists are also uniquely skilled at identifying the role cognition plays in the management of ADL/IADL tasks. Occupational therapists have the skills and training to assess cognitive function, determine how it impacts functional performance, and design an intervention plan to increase independence (Cheney & Rivera-Finnen, 2011). Occupational therapists can also help other staff understand the most effective techniques to address patient needs, how to correctly assess performance on OASIS questions, and provide additional guidance based on their unique training which focuses on functional performance (AOTA,

2016). Occupational therapists are also skilled in prevention, lifestyle modifications, and physical and psychosocial needs which is particularly effective when managing chronic illness (AOTA, 2015). Occupational therapy practitioners can address performance deficits in ADL and IADL tasks, teach individualized strategies to manage fatigue and cope with the physical demands of daily tasks, teach and incorporate health management tasks into daily habits and routine, and develop additional strategies and adaptations to support a person's physical and psychosocial wellbeing (AOTA, 2015).

Appendix A.3 The Centers for Medicare and Medicaid Services and OASIS Measurements

Home health is a short-term, medically necessary service covered through Medicare Part-A that includes skilled nursing, physical, occupational, and speech therapy. Services must be ordered through a physician and individuals must be considered homebound. A patient is considered homebound if because of illness or injury they need the aid of an assistive device or another person to leave home, or they have a condition such that leaving their home is medically contraindicated. Leaving home must also require a considerable and taxing effort, be infrequent, and of short duration (CMS, 2014).

Since 1999, The Centers for Medicare and Medicaid Services (CMS) has required home health agencies to collect and report performance data, this is known as the Outcome and Assessment Information Set or OASIS. These data are used for multiple purposes such as calculating different quality reports which are provided to home health agencies to help guide quality and performance improvement efforts. The CMS started publically reporting some of these outcomes in 2007 in a program called *Home Health Compare* (CMS, n.d.). *Home Health Compare* focuses on effectiveness of achieving outcomes, efficiency in delivering services and using resources, equity in providing care to persons who may differ in personal needs or clinical conditions, focus on patient needs and preferences, providing timely care, and maintaining patient safety. These publicly-reported outcome and process measures indicate how well home health agencies assist their patients in regaining or maintaining their ability to function (CMS, n.d.).

Appendix B. Methods

Appendix B.1 OASIS C1 Questions

For this study, having more than a need for set-up of the task was determined to indicate a need for assistance. For the OASIS items M1800-1850, 1870, 1890, M2020 and 2030 a score of two or higher was used to indicate the need for assistance. OASIS item 1860 a score of three or greater was used to identify a need for assistance. And for OASIS item 1880 a rating of one or greater was used to identify a need for help. Persons who scored a two or higher on OASIS item M1700 (Cognition) were identified as having a cognitive deficit. Individuals with a score of 4 or more on the PHQ2 screen were identified as having depression. Finally, M1720 for Anxiety, a score of 2 or greater indicated a patient has anxiety.

NEURO/EMOTIONAL/BEHAVIORAL STATUS

(M1700) Cognitive Functioning: Patient's current (day of assessment) level of alertness, orientation, comprehension, concentration, and immediate memory for simple commands.

- 0 - Alert/oriented, able to focus and shift attention, comprehends and recalls task directions independently.
- 1 - Requires prompting (cuing, repetition, reminders) only under stressful or unfamiliar conditions.
- 2 - Requires assistance and some direction in specific situations (for example, on all tasks involving shifting of attention) or consistently requires low stimulus environment due to distractibility.
- 3 - Requires considerable assistance in routine situations. Is not alert and oriented or is unable to shift attention and recall directions more than half the time.
- 4 - Totally dependent due to disturbances such as constant disorientation, coma, persistent vegetative state, or delirium.

(M1720) When Anxious (Reported or Observed Within the Last 14 Days):

- 0 - None of the time
- 1 - Less often than daily
- 2 - Daily, but not constantly
- 3 - All of the time
- NA - Patient nonresponsive

(M1730) Depression Screening: Has the patient been screened for depression, using a standardized, validated depression screening tool?

- 0 - No

- 1 - Yes, patient was screened using the PHQ-2©* scale. Instructions for this two-question tool: Ask patient: “Over the last two weeks, how often have you been bothered by any of the following problems?”

PHQ-2©*	Not at all 0 - 1 day	Several days 2 - 6 days	More than half of the days 7 - 11 days	Nearly every day 12 - 14 days	NA Unable to respond
a) Little interest or pleasure in doing things	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> NA
b) Feeling down, depressed, or hopeless?	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> NA

- 2 - Yes, patient was screened with a different standardized, validated assessment and the patient meets criteria for further evaluation for depression.
- 3 - Yes, patient was screened with a different standardized, validated assessment and the patient does not meet criteria for further evaluation for depression.

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ADL/IADLs

(M1800) Grooming: Current ability to tend safely to personal hygiene needs (specifically: washing face and hands, hair care, shaving or make up, teeth or denture care, or fingernail care).

- 0 - Able to groom self unaided, with or without the use of assistive devices or adapted methods.
- 1 - Grooming utensils must be placed within reach before able to complete grooming activities.
- 2 - Someone must assist the patient to groom self.
- 3 - Patient depends entirely upon someone else for grooming needs.

(M1810) Current Ability to Dress Upper Body safely (with or without dressing aids) including undergarments, pullovers, front-opening shirts and blouses, managing zippers, buttons, and snaps:

- 0 - Able to get clothes out of closets and drawers, put them on and remove them from the upper body without assistance.
- 1 - Able to dress upper body without assistance if clothing is laid out or handed to the patient.
- 2 - Someone must help the patient put on upper body clothing.
- 3 - Patient depends entirely upon another person to dress the upper body.

(M1820) Current Ability to Dress Lower Body safely (with or without dressing aids) including undergarments, slacks, socks or nylons, shoes:

- 0 - Able to obtain, put on, and remove clothing and shoes without assistance.

- 1 - Able to dress lower body without assistance if clothing and shoes are laid out or handed to the patient.
- 2 - Someone must help the patient put on undergarments, slacks, socks or nylons, and shoes.
- 3 - Patient depends entirely upon another person to dress lower body.

(M1830) Bathing: Current ability to wash entire body safely. **Excludes grooming (washing face, washing hands, and shampooing hair).**

- 0 - Able to bathe self in shower or tub independently, including getting in and out of tub/shower.
- 1 - With the use of devices, is able to bathe self in shower or tub independently, including getting in and out of the tub/shower.
- 2 - Able to bathe in shower or tub with the intermittent assistance of another person:
 - (a) for intermittent supervision or encouragement or reminders, OR
 - (b) to get in and out of the shower or tub, OR
 - (c) for washing difficult to reach areas.
- 3 - Able to participate in bathing self in shower or tub, but requires presence of another person throughout the bath for assistance or supervision.
- 4 - Unable to use the shower or tub, but able to bathe self independently with or without the use of devices at the sink, in chair, or on commode.
- 5 - Unable to use the shower or tub, but able to participate in bathing self in bed, at the sink, in bedside chair, or on commode, with the assistance or supervision of another person.
- 6 - Unable to participate effectively in bathing and is bathed totally by another person.

(M1840) Toilet Transferring: Current ability to get to and from the toilet or bedside commode safely and transfer on and off toilet/commode.

- 0 - Able to get to and from the toilet and transfer independently with or without a device.
- 1 - When reminded, assisted, or supervised by another person, able to get to and from the toilet and transfer.
- 2 - Unable to get to and from the toilet but is able to use a bedside commode (with or without assistance).
- 3 - Unable to get to and from the toilet or bedside commode but is able to use a bedpan/urinal independently.
- 4 - Is totally dependent in toileting.

(M1845) Toileting Hygiene: Current ability to maintain perineal hygiene safely, adjust clothes and/or incontinence pads before and after using toilet, commode, bedpan, urinal. If managing ostomy, includes cleaning area around stoma, but not managing equipment.

- 0 - Able to manage toileting hygiene and clothing management without assistance.
- 1 - Able to manage toileting hygiene and clothing management without assistance if supplies/implements are laid out for the patient.
- 2 - Someone must help the patient to maintain toileting hygiene and/or adjust clothing.
- 3 - Patient depends entirely upon another person to maintain toileting hygiene.

(M1850) Transferring: Current ability to move safely from bed to chair, or ability to turn and position self in bed if patient is bedfast.

- 0 - Able to independently transfer.
- 1 - Able to transfer with minimal human assistance or with use of an assistive device.

- 2 - Able to bear weight and pivot during the transfer process but unable to transfer self.
- 3 - Unable to transfer self and is unable to bear weight or pivot when transferred by another person.
- 4 - Bedfast, unable to transfer but is able to turn and position self in bed.
- 5 - Bedfast, unable to transfer and is unable to turn and position self.

(M1860) Ambulation/Locomotion: Current ability to walk safely, once in a standing position, or use a wheelchair, once in a seated position, on a variety of surfaces.

- 0 - Able to independently walk on even and uneven surfaces and negotiate stairs with or without railings (specifically: needs no human assistance or assistive device).
- 1 - With the use of a one-handed device (for example, cane, single crutch, hemi-walker), able to independently walk on even and uneven surfaces and negotiate stairs with or without railings.
- 2 - Requires use of a two-handed device (for example, walker or crutches) to walk alone on a level surface and/or requires human supervision or assistance to negotiate stairs or steps or uneven surfaces.
- 3 - Able to walk only with the supervision or assistance of another person at all times.
- 4 - Chairfast, unable to ambulate but is able to wheel self independently.
- 5 - Chairfast, unable to ambulate and is unable to wheel self.
- 6 - Bedfast, unable to ambulate or be up in a chair.

(M1870) Feeding or Eating: Current ability to feed self meals and snacks safely. Note: This refers only to the process of eating, chewing, and swallowing, not preparing the food to be eaten.

- 0 - Able to independently feed self.
- 1 - Able to feed self independently but requires:
 - (a) meal set-up; OR
 - (b) intermittent assistance or supervision from another person; OR
 - (c) a liquid, pureed or ground meat diet.
- 2 - Unable to feed self and must be assisted or supervised throughout the meal/snack.
- 3 - Able to take in nutrients orally and receives supplemental nutrients through a nasogastric tube or gastrostomy.
- 4 - Unable to take in nutrients orally and is fed nutrients through a nasogastric tube or gastrostomy.
- 5 - Unable to take in nutrients orally or by tube feeding.

(M1880) Current Ability to Plan and Prepare Light Meals (for example, cereal, sandwich) or reheat delivered meals safely:

- 0 - (a) Able to independently plan and prepare all light meals for self or reheat delivered meals; OR
 - (b) Is physically, cognitively, and mentally able to prepare light meals on a regular basis but has not routinely performed light meal preparation in the past (specifically: prior to this home care admission).
- 1 - Unable to prepare light meals on a regular basis due to physical, cognitive, or mental limitations.
- 2 - Unable to prepare any light meals or reheat any delivered meals.

(M1890) Ability to Use Telephone: Current ability to answer the phone safely, including dialing numbers, and effectively using the telephone to communicate.

- 0 - Able to dial numbers and answer calls appropriately and as desired.
- 1 - Able to use a specially adapted telephone (for example, large numbers on the dial, teletype phone for the deaf) and call essential numbers.
- 2 - Able to answer the telephone and carry on a normal conversation but has difficulty with placing calls.
- 3 - Able to answer the telephone only some of the time or is able to carry on only a limited conversation.
- 4 - Unable to answer the telephone at all but can listen if assisted with equipment.
- 5 - Totally unable to use the telephone.
- NA - Patient does not have a telephone.

MEDICATIONS

(M2020) Management of Oral Medications: Patient's current ability to prepare and take all oral medications reliably and safely, including administration of the correct dosage at the appropriate times/intervals. **Excludes injectable and IV medications. (NOTE: This refers to ability, not compliance or willingness.)**

- 0 - Able to independently take the correct oral medication(s) and proper dosage(s) at the correct times.
- 1 - Able to take medication(s) at the correct times if:
 - (a) individual dosages are prepared in advance by another person; OR
 - (b) another person develops a drug diary or chart.
- 2 - Able to take medication(s) at the correct times if given reminders by another person at the appropriate times
- 3 - Unable to take medication unless administered by another person.
- NA - No oral medications prescribed.

(M2030) Management of Injectable Medications: Patient's current ability to prepare and take all prescribed injectable medications reliably and safely, including administration of correct dosage at the appropriate times/intervals. **Excludes IV medications.**

- 0 - Able to independently take the correct medication(s) and proper dosage(s) at the correct times.
- 1 - Able to take injectable medication(s) at the correct times if:
 - (a) individual syringes are prepared in advance by another person; OR
 - (b) another person develops a drug diary or chart.
- 2 - Able to take medication(s) at the correct times if given reminders by another person based on the frequency of the injection
- 3 - Unable to take injectable medication unless administered by another person.
- NA - No injectable medications prescribed.

Appendix B.2 High Risk Diagnoses and Hospitalization Expanded Table

Table 6

High Risk Diagnoses and Hospitalization (N=9045)

Diagnosis	Total N (%)	OT Involved N (%)	No OT Involved N (%)
Congestive Heart Failure	12 (0.1)		
Not Hospitalized	11 (91.7)	5 (45.5)	6 (54.5)
Hospitalized	1 (8.3)		1 (100.0)
Septicemia	74 (0.8)		
Not Hospitalized	53 (71.6)	24 (45.3)	29 (54.7)
Hospitalized	21 (28.4)	10 (47.6)	11 (52.4)
Pneumonia	61 (0.7)		
Not Hospitalized	45 (73.8)	19 (42.2)	26 (57.8)
Hospitalized	16 (26.2)	10 (62.5)	6 (37.5)
COPD	331 (3.7)		
Not Hospitalized	242 (73.1)	137 (56.6)	105 (43.4)
Hospitalized	89 (26.9)	45 (50.6)	44 (49.4)
Cardiac Dysrhythmias – Atrial Fibrillation	117 (1.3)		
Not Hospitalized	90 (76.9)	50 (55.6)	40 (44.4)
Hospitalized	27 (23.1)	10 (37.0)	17 (63.0)
Urinary Tract Infections	116 (1.3)		
Not Hospitalized	94 (81.0)	53 (56.4)	41 (43.6)
Hospitalized	22 (19.0)	11 (50.0)	11 (50.0)
Acute Unspecified Renal Failure	16 (0.2)		
Not Hospitalized	11 (68.8)	8 (72.7)	3 (27.3)
Hospitalized	5 (31.3)	2 (40.0)	3 (60.0)
Heart Disease	704 (7.8)		
Not Hospitalized	542 (77.0)	213 (39.3)	329 (60.7)
Hospitalized	162 (23.0)	92 (56.8)	70 (43.2)
Acute Cerebral Vascular Disease - stroke	2 (2.0)		
Not Hospitalized	2 (100.0)	2 (100.0)	-
Hospitalized	-	-	-
Asthma, Other Emphysema, Chronic Airway Obstruction	12 (0.1)		
Not Hospitalized	10 (83.3)	3 (30.0)	7 (70.0)
Hospitalized	2 (16.7)	1 (50.0)	1 (50.0)
Cancer	271 (3.0)		
Not Hospitalized	175 (64.6)	79 (45.1)	96 (54.9)
Hospitalized	96 (35.4)	38 (39.6)	58 (60.4)
Cellulitis	158 (1.8)		
Not Hospitalized	125 (79.1)	40 (32.0)	85 (68.0)
Hospitalized	33 (20.9)	13 (43.3)	20 (66.7)

Diagnosis	Total N (%)	OT Involved N (%)	No OT Involved N (%)
Delirium	55 (0.6)		
Not Hospitalized	50 (90.9)	39 (78.0)	11 (32.0)
Hospitalized	5 (9.1)	2 (40.0)	3 (60.0)
Dementia, Other Senile Psychosis	11 (0.1)		
Not Hospitalized	8 (72.7)	4 (50.0)	4 (50.0)
Hospitalized	3 (27.3)	2 (66.7)	1 (33.3)
Diabetes	184 (2.0)		
Not Hospitalized	149 (81.0)	75 (50.3)	74 (49.7)
Hospitalized	35 (19.0)	11 (31.4)	24 (68.6)
Edema, Chest Pain, Shortness of Breath	46 (0.5)		
Not Hospitalized	39 (84.8)	22 (56.4)	17 (43.6)
Hospitalized	7 (15.2)	5 (71.4)	2 (28.6)
Fracture	24 (0.3)		
Not Hospitalized	24 (100.0)	14 (58.3)	10 (41.7)
Hospitalized	-	-	-
Protein-calorie Malnutrition	10 (0.1)		
Not Hospitalized	5 (50.0)	3 (60.0)	2 (40.0)
Hospitalized	5 (50.0)	2 (40.0)	3 (60.0)
Syncope	30 (0.3)		
Not Hospitalized	28 (93.3)	17 (60.7)	11 (39.3)
Hospitalized	2 (6.7)	1 (50.0)	1 (50.0)
Other	6810 (75.3)		
Not Hospitalized	5901 (86.7)	2762 (46.8)	3139 (53.2)
Hospitalized	909 (13.3)	444 (48.8)	465 (51.2)

Appendix C IRB Approval St. Catherine University*St. Catherine University IRB**Protocol Exemption Notification*

To: Traci Kruse

From: John Schmitt, IRB Chair

Subject: Protocol #827

Date: 02/19/2017

Thank you for submitting your research proposal to the St. Catherine University Institutional Review Board (IRB). The primary purpose of the IRB is to safeguard and respect the rights and welfare of human subjects in scientific research. In addition, IRB review serves to promote quality research and to protect the researcher, the advisor, and the university.

On behalf of the IRB, I am responding to your request for Exempt level approval to use human subjects in your research. The application # **827: Risk Factors for Re-hospitalization and the Use of Occupational Therapy in Home Health** has been verified by the St. Catherine University Institutional Review Board as Exempt according to 45CFR46.101(b)(4): Existing Data & Specimens - No Identifiers on 02/19/2017. The project was approved as submitted. You may begin your research at any time.

Please note that changes to your protocol may affect its exempt status. You must request approval for any changes that will affect the risk to your subjects using the Amendment Request Form. You should not initiate these changes until you receive written IRB approval. Also, you should report any adverse events to the IRB using the Adverse Event Form. These documents are available at the Mentor IRB system homepage, which can be accessed through the St. Catherine University IRB homepage. When the project is complete, please submit a project completion form.

If you have any questions, feel free to contact me or email via the Mentor messaging system. We appreciate your attention to the appropriate treatment of research subjects. Thank you for working cooperatively with the IRB; best wishes in your research!

Sincerely,

John Schmitt, PhD

Chair, Institutional Review Board

jsschmitt@stkate.edu

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