Does Insurance Source Make a Difference In Meeting Rehabilitation Goals in Skilled Nursing Facilities?

BY

Samson Barasa

Bachelor of Medicine and Surgery (M.B.Ch.B)

Moi University Eldoret, Kenya, 2002.

THESIS

Submitted as partial fulfillment of the requirements
for the degree of Master of Science in Clinical and Translational Sciences
in the Graduate College of the
University of Illinois at Chicago, 2015.

Chicago, Illinois

Defense Committee:

Jack Zwanziger, Chair and Advisor
Donald Jurivich, Internal Medicine Department, Section of Geriatrics
Naoko Muramastu, Associate Professor of Community of Health Sciences

TABLE OF CONTENTS

TABLE   **LIST OF TABLES**

FIGURE   **LIST OF FIGURES**

Summary

Introduction

Patients who develop significant functional decline during hospitalization often get admitted to Skilled Nursing Facilities. Services offered during SNF care include physical and occupational therapy, intravenous antibiotics and wound care. Medicare, Commercial insurance and County Care Contracts are the main payers of SNF care. Medicare and County Care Contracts pay for 100 and 30 days of Skilled Nursing Facility (SNF) care respectively. On the other hand, Commercial insurance renews SNF care cover weekly till discharge from SNF, if a patient shows positive progress in attaining SNF care goals. The objective of this study was to estimate a possible association between the SNF payer source and attainment of the SNF care goals.

Method

A retrospective study of 234 patients admitted in three SNFs examined whether they achieved their physical therapy, wound care and intravenous (IV) antibiotics goals. Primary data analysis focused on "all or none" attainment of goals, using the Poisson logistic regression adjusting for age, gender, diabetes mellitus, infections and the baseline functional status represented by grooming ability at SNF admission.

Results

Medicare patients were significantly older than Commercial insurance and the County Care Contract patients. The median length of SNF care was significantly longer for Medicare patients, compared with that of Commercial insurance and County Care Contract patients. Contrary to the null hypothesis that no differences existed between insurance sources in terms of attaining SNF goals at SNF discharge, a significant difference was found. Commercial insurance patients were more likely to achieve their physical therapy goals compared to Medicare patients. Our analysis of County Care Contract versus Medicare patients showed that differences in attaining physical therapy goals were due to age, the baseline functional status and gender, but not the insurance source. Differences in attaining wound care goals among the SNF payer sources were due to diabetes mellitus and infections. Patients without diabetes mellitus and infections had a higher chance of achieving their wound care goals compared to patients with diabetes mellitus and infections. There were no differences in attaining IV antibiotics goals across the 3 SNF payer sources.

Conclusion

Commercial insurance patients are more likely to attain their SNF care goals compared Medicare patients. The differences in attaining physical therapy goals between Medicare and County Care Contract patients are as a result of age, gender and the baseline functional status. Similarly, differences in attaining wound care goals among the SNF payer sources are due to presence of diabetes mellitus and infections rather than the type of insurance.

1. INTRODUCTION

During hospitalization some patients functionally decline making it difficult for them to return to their pre-hospitalization residency. Patients who develop functional decline beyond a critical threshold often get admitted to Skilled Nursing Facilities (SNF) for short term skilled nursing care. [1, 2] Most often SNF services include physical and occupational therapy,[3] intravenous antibiotics and wound care.[4,5]

Each patient's SNF goals are determined by the physical therapy and the wound care teams during SNF admission. SNF goals are decided based on a patient's baseline functional status, wound condition, medical comorbidities and their pre-hospitalization functional status. Attainment of SNF goals is supposed to ensure patients recovers a functional status that enable them return safely to their pre-hospitalization residency.[6] In addition, SNF goals are used to monitor response to therapy.

In Cook County Chicago Illinois, USA, Medicare, Commercial insurance and County Care contracts are the main payers of SNF care. Their SNF care payment plans vary by the number of SNF care days they cover.[7,8,9,10,11,12] Medicare pays the full cost of SNF care for the first 20 days and a co-pay is charged on the subsequent 80 days. While the Cook County Care contracts cover the full costs of SNF care for 30 days after hospitalization, only for US citizens residing in Cook County, aged 18 to 64 years who don't have any medical insurance and earn less than 1 340 dollars per month. In contrast, the Commercial insurance SNF care cover is renewed every week if a patient records a positive progress in attaining SNF care goals. The physical therapy hours per day and the number of days per week are equal for each patient across the three SNF payer sources.

A library search found that no studies have been conducted to determine whether there is an association between attainment of SNF care goals and the type of SNF payment source. We sought to determine whether there is an association between the SNF payment plans and attainment of SNF goals in 3 nursing facilities in Chicago, Illinois. Knowing whether there is an association between the SNF payer source and attainment of SNF goals can shape future SNF payment plans, besides being used by the SNF facilities to improve care

.

2. METHODS

2.1 Study population and setting

The study sample consists of patients who were admitted for skilled nursing facility (SNF) care between January 2013 and December 2013, in three SNFs in Chicago, Illinois. All SNFs affiliated to one of the Geriatrics teaching and research program were invited to this study. However, one of the SNFs was dropped because of bureaucracy in obtaining their research participation consent. The eligible participants were more than 18 years old. In addition, the study participants were neither planning for a transition to custodial care at SNF admission, nor were they on custodial care before hospitalization. The local institutional review board approved our study protocol and waived the consent requirement for the study participants.

2.2 Identification of the participants

We identified patients from the SNF medical records, who were admitted for SNF care and had either Medicare, Commercial insurance or County Care contracts as their SNF payer source. We omitted patients who had incomplete medical records from the study.

2.3 Data collection

We retrieved the patients' information from their Skilled Nursing Facility medical records. "Study data was collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at UIC.[13] REDCap is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources."

2.4 Risk Factors and Covariates

We examined the type of skilled nursing facility (SNF) payment source (Medicare, Commercial insurance and County Care contract) as the primary risk factor for attaining SNF goals. In addition, we gathered data of other risk factors that could potentially influence the relationship between attaining SNF goals and the SNF payment source. These factors included age, gender, the primary reason for SNF admission and the medical comorbidities.

Furthermore, we collected data on the patients' baseline functional status at SNF admission in the following dimensions: bed mobility, ability to stand and bear weight, ability to walk in the room, dressing, bathing, toileting, eating and grooming. The ability to perform these activities had been classified as follows: independent, supervision, limited assistance, extensive assistance and total assistance. Besides that, we retrieved information on the level of support needed to perform the aforementioned activities of daily living (ADLs) as follows: no set-up, set-up help only, one person physical assist and two or more person physical assist.

2.5 Outcomes

2.5.1 Physical therapy goals

The physical therapy goals included the patients' baseline functional status at SNF admission, the planned goals (functional status) and the goals (functional) status at SNF discharge. The physical therapy goals information had been recorded in the medical records according to the functional independence measure (FIM) scoring system. A minority of patients who were not only admitted for muscle strengthening, but also for gait and balance training, their physical therapy goals had been recorded as Good, Good minus, Fair plus, Fair, Fair minus, Poor and Poor minus. A patient received a score ranging from 1 (lowest) to 7 (highest) for each physical therapy goal (functional status).

We determined attainment of physical therapy goals using 3 approaches as follows:

2.5.1.1 Approach 1 (All or none)

We compared the patient's functional status at SNF discharge and the planned physical therapy goals to determine whether they had achieved their goals.

2.5.1.2 Approach 2

We computed the percentage goals achieved based on the planned SNF goals, using the FIM scores for each goal as follows; [(Goals status score at SNF Discharge – Goals status score during SNF admission) ÷ (Planned goals score – Goals status score during SNF admission)].

2.5.1.3 Approach 3

We grouped the percentage goals achieved in approach 2 into 4 categories as follows; achieved more than 20%, 40%, 60% and 80% of their planned goals.

2.5.2 Wound care goals

Wound care goals had been recorded in the medical records as follows; to heal the wound, reduce the size of the wound, to ensure the wound can be dressed once daily or 3 times a week. We compared the planned wound care goals at SNF admission with the wound status at discharge to determine whether the wound care goals had been achieved. Attainment of wound care goals was classified as achieved or not achieved.

2.5.3 Intravenous (IV) antibiotics goals

We decided whether patients attained their IV antibiotics goals by comparing the recommended stop date for their antibiotics at skilled nursing facility (SNF) admission and their discharge date. We classified patients as having achieved their goals, if their antibiotics stop date occurred prior to, or on their discharge date. If the intravenous antibiotics stops date occurred after the date of discharge, we did a further review of the patient's medical records to find out whether their physician had reduced the duration of their antibiotics treatment. We categorized patients as having not achieved

their IV antibiotics goals, if their discharge date occurred before their antibiotics stop date and their physician had not shortened the duration of their antibiotics treatment to a date within their SNF care stay.

2.5.4 Overall SNF goals

We combined the physical therapy, wound care and IV antibiotics goals into one variable known as the overall SNF goals. We coded patients as having attained their overall SNF goals if they attained all their goals in all categories (physical therapy, wound care and IV antibiotics) that they were receiving SNF care. On the other hand, we grouped patients as having not attained their goals if they failed to attain one goal in any category that they were receiving SNF care.

2.6 Missing Data

We omitted patients who had incomplete medical records from the study.

2.7 Statistical analysis

We compared the baseline characteristics of Medicare patients and those who were on Commercial insurance and County Care contracts using the independent t-test to determine whether they were homogeneous.

We performed a correlation analysis of the baseline functional status variables. We considered variables with a Pearson's correlation co-efficient of more than 0.25 as being correlated. All the baseline functional status variables were highly correlated. We decided to use grooming as our baseline functional status variable in our data analysis because it is a predictor of functional recovery as an independent activity of daily living.[14] We combined patients who needed extensive and total assistance in the grooming category because the patients who needed total assistance were few.

To determine whether patients on Medicare were more likely to attain their overall skilled nursing facility (SNF) goals, physical therapy, wound care and intravenous (IV) antibiotics goals compared to those on Commercial and County Care contracts, we conducted a generalized linear model for Poisson regression analysis. Our analysis adjusted for age, gender and the functional status at SNF admission except for wound care and IV antibiotics goals. We controlled for

diabetes mellitus, anemia, infection and age during the analysis of the wound care goals. On the other hand, the analysis of the IV antibiotics goals adjusted for age only.

We conducted a logistic regression of the average percent physical therapy goals achieved and the SNF payer source, to determine whether there was a difference in attaining the average percent goals, among patients on Commercial insurance and County Care contracts compared to Medicare patients. We adjusted for age, gender and the functional status at SNF admission because they were the only known confounders and effect modifiers available in the medical records.

The statistical analysis was performed using the SPSS version 22 and Stata version 13.

3. RESULTS

3.1 Characteristics of the participants

The baseline characteristics of the 234 patients who were enrolled in the study are shown in Table I and II on the next 2 pages. 55, 182 and 41 patients were admitted for intravenous antibiotics, physical therapy and wound care respectively. The age range of the study participants was 22 to 102 years. The mean age and length of SNF care for the study participants was 66 years and 44 days respectively. County Care Contract patients had the lowest mean age and Median length of SNF care compared Medicare and Commercial insurance patients.

TABLE I: BASELINE CHARACTERISTSICS OF THE STUDY POPULATION. [a]

	Medicare (N=132)	Commercial (N = 51)	County Care (N = 51)
Mean Age in years ±SD	73 ±14.8	66±15.4*	47±11.6*
SNF - no. (%)			
SNF facility 1	33(25)	21(41.2)*	10(19.6)*
SNF facility 2	79(59.8)	16(31.4)*	20(39.2)*
SNF facility 3	20((15.2)	14(27.4)	21(41.2)*
Male sex – no. (%)	71(53.8)	27(52.9)	40(78.4)*
Marital Status – no. (%)			
Married	16(12.1)	16(31.4)*	9(17.6)
widowed	30(22.7)	8(15.7)	1(2)*
Divorced	20(15.2)	2(3.9)*	5(9.8)
Never married	36(27.3)	13(25.5)	22(43.1)
Race -- no. (%) ¶			
Black not of hispanic	101(76.5)	31(60.8)	22(43.1)*
White not of hispanic	19(14.4)	10(19.6)	6(11.8)
Hispanics	8(6.1)	9(17.6)	18(35.3)*
Reason for SNF admission – no. (%)			
IV antibiotics	10(7.6)	8(15.7)	37(72.5)*
PT/OT	125(94.7)	42(82.3)	14(27.5)*
Wound care	16(12.1)	12(23.5)	13(25.5)
Medical Comorbidities – no. (%)			
Chronic Obstructive Pulmonary Disease	19(14.4)	3(5.9)	0(0)*
Dementia	26(19.7)	7(13.7)	0(0)*
Depression	17(12.9)	7(13.7)	4(7.8)
stroke	14(10.6)	3(5.9)	0(0)*
Diabetes Mellitus	53(40.5)	16(31.4)	17(33.3)
Anemia	34(25.8)	9(17.6)	6(11.8)*
Infections	15(11.4)	11(21.6)	34(66.7)*
Renal insufficiency	33(25)	9(17.6)	3(5.9)*
Bowel incontinence	39(29.5)	11(21.6)	2(3.9)*
Urinary incontinence	45(34.1)	14(27.5)*	3(5.9)*
Pressure ulcer	4(3)	1(2)	1(2)
Fractures	13(9.8)	6(11.8)	4(7.8)
Amputations	9(6.8)	4(7.8)	2(3.9)
Knee replacements	0(0)	2(3.9)	0(0)
Hip replacements	3(2.2)	1(2)	0(0)
Congestive Heart Failure	20(15.2)	9(17.6)	0(0)*
Non-pressure ulcers	13(9.8)	13(25.5)*	13(25.5)*
Median length of SNF care	52	37*	32*

[a] N=number of patients;
PT/OT = Physical and occupational therapy;
IV antibiotics = intravenous antibiotics;
SNF = Skilled Nursing Facility;
The asterisk indicates that the P value is less than 0.05 in the commercial and County Care columns in comparison with Medicare; Values in the Commercial insurance and County Care Contract columns without an asterisk have p values ≥0.05; P values were calculated using the independent t-test.
¶ Race was determined according to medical records.

Medicare and Commercial insurance patients had a similar baseline functional status, whereas County Care Contract patients had a significantly better baseline functional status compared to Medicare patients as shown in Table II. Please see tables XVI and XVII, Appendix E for all the categories of the baseline functional status.

TABLE II: BASELINE FUNCTIONAL STATUS AT SNF ADMISSION[a]

Baseline Functional at SNF admission			
	Medicare (n=132)	Commercial (n=51)	County Care (n=51)
Individual Performance – no. (%)			
Bed mobility Independent	21(15.9)	10(19.6)	25(49)*
Bed mobility extensive assist	94 (71.2)	33(64.7)	12(23.5)*
Stand and bear weight independent	13(9.8)	10(19.6)	21(41.2)*
Stand and bear weight extensive assist	92 (69.7)	29(56.9)	13(25.5)*
Walk in the room independent	14(10.6)	10(19.6)	21(41.2)*
Walk in the room extensive assist	24(18.2)	6(11.8)	4(7.8)*
Dressing independent	13(9.8)	9(17.6)	22(43.1)*
Dressing extensive assist	97(73.5)	31(60.7)	9(17.6)*
Grooming independent	15(11.4)	9(11.8)	24(47.1)*
Grooming extensive assist	92(69.7)	28(54.9)	6(11.8)*
Bathing independent	1(0.8)	1(2)	6(11.8)*
Bathing extensive assist	97(73.5)	34(66.7)	18(35.3)*
Toileting independent	17(12.9)	10(19.6)	23(45.1)*
Toileting extensive assist	98(74.2)	33(64.7)	15(29.4)*
Eating independent	92(69.7)	31(60.8)	31(60.8)
Eating extensive assist	7(5.3)	4(7.8)	0(0)*
Support needed – no. (%)			
Bed mobility no set-up	24(18.2)	11(21.6)	31(60.8)*
Bed mobility 1 person assist	54(40.9)	22(43.1)	6(11.8)*
Stand and bear weight no set-up	16(12.1)	11(21.6)	29(56.9)*
Stand and bear weight 1 person assist	73(55.3)	23(45.1)	9(17.6)*
Walk in the room no set-up	20(15.2)	13(25.5)	28(54.9)*
Walk in the room 1 person assist	35(26.5)	8(15.7)	4(31.4)*
Dressing no set-up	4(3)	3(5.9)	12(23.5)*
Dressing 1 person assist	108(81.8)	34(66.7)*	16(31.4)*
Grooming no set-up	5(3.8)	19(2)	10(19.6)*
Grooming 1 person assist	104(78.8)	30(58.8)*	13(25.5)*
Bathing no set-up	2(1.5)	0(0)	5(9.8)
Bathing 1 person assist	100(75.8)	34(66.7)	13(25.5)*
Toileting no set up	17(12.9)	13(25.5)	24(47.5)*
Toileting 1 person assist	74(56)	22(43.1)	12(23.5)*

[a] N= number of patients;
SNF = Skilled Nursing Facility;
The asterisk indicates that P value is less than 0.05 in the commercial and County Care columns in comparison with Medicare;
Values in the Commercial insurance and County Care Contract columns without an asterisk have p values ≥0.05; P values were calculated using the independent t-test.

The age distribution of Medicare patients was more negatively skewed as compared to that of County Care Contract patients as shown in figure 1 below.
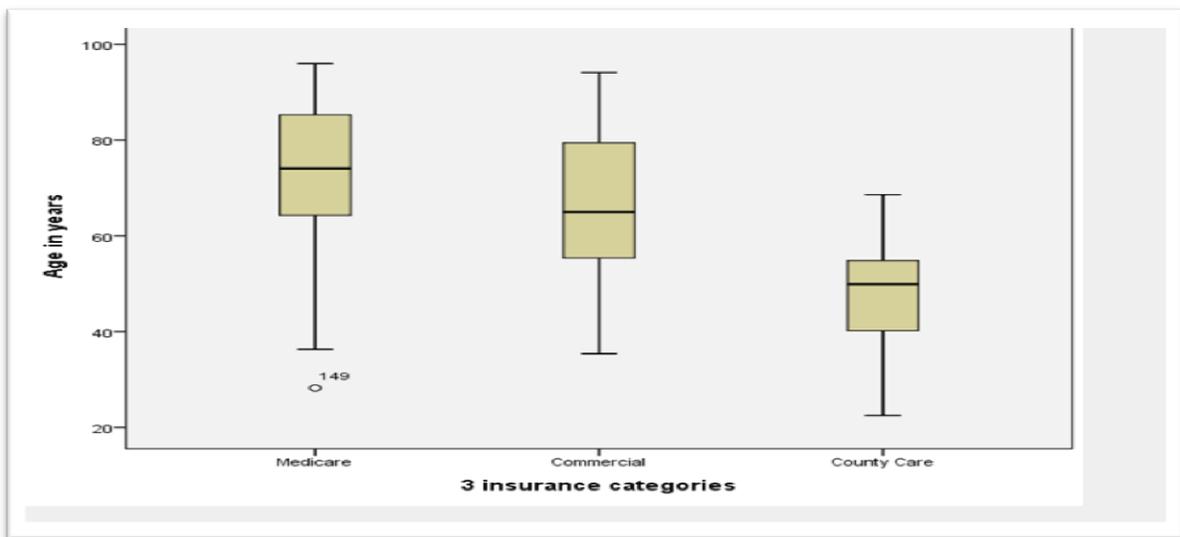
Figure 1: Age distribution among the SNF payer sources.

Shown is the distribution of patients among the 3 SNF payer sources.

Medicare insurance had the highest percentage of patients who required extensive and total assistance with grooming, whereas County Care Contract had none who required total assistance with grooming as shown in figure 2 below.
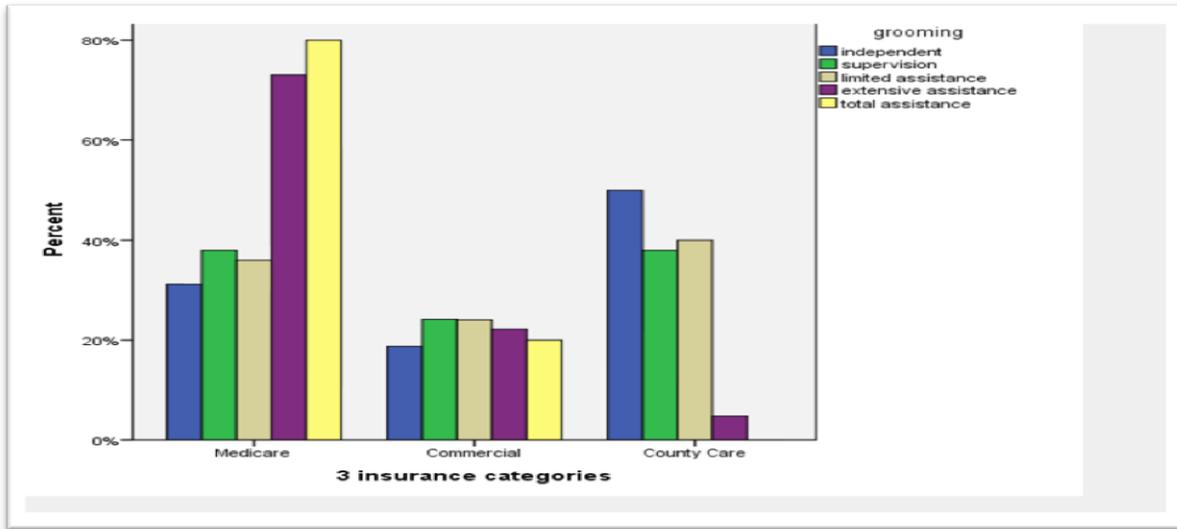
Figure 2: **Baseline grooming functional status at SNF admission.**

Shown are the percentages of patients in each category of grooming for the 3 SNF payer sources.

3.2 Overall SNF goals

During the median SNF care period of 35 days, 26, 20 and 40 patients on Medicare, Commercial insurance and County Care contracts respectively achieved their overall skilled nursing facility (SNF) goals. Patients on Commercial insurance [RR 1.68 (1.05 – 2.70)] and County Care contracts [RR 1.94 (1.24 – 3.04)] were more likely to achieve their Overall

SNF goals compared to patients on Medicare after controlling for age and the baseline functional status at SNF admission as shown in table V, Appendix A in detail.

In our multivariate analysis, patients who were more than 80 years old, had a higher risk of not attaining their Overall SNF goals compared to those who were less than 50 years old [RR 0.40 (0.20 – 0.82)]. Similarly the combined number of patients who required extensive and total assistance with grooming were less likely to attain their Overall SNF goals compared to those who were independent [RR 0.63 (0.41 – 0.97)].

3.3 Physical Therapy Goals

3.3.1 Approach 1 (All or none): Attained vs not attained

Out of the 154 patients who were admitted for physical therapy, 13, 10 and 4 patients on Medicare, Commercial insurance and County Care contracts respectively attained all of their physical therapy goals at SNF discharge. Commercial insurance patients were more likely to attain all of their physical therapy goals [RR 2.51 (1.33 – 4.73)] compared to Medicare patients. Our analysis of County Care Contract patients versus Medicare patients showed that their differences in attaining physical therapy goals were due to age, baseline functional status and gender, but not the insurance source. Patients who were less than 50 years old had a higher chance of achieving their physical therapy goals compared to patients who were more than 80 years old (p = 0.02). Moreover, patients who were independent with grooming were more likely to achieve their physical therapy goals compared to those who needed extensive and total assistance with grooming combined (p=0.03). Lastly, females had a lower chance of attaining their physical therapy goals compared to males (p=0.02). A detailed analysis of the physical therapy goals is shown in table VI, Appendix B.

3.3.2 Approach 2: Average percent goals attained

We evaluated the average percent goals achieved at the end of rehabilitation as a continuous variable comparing the 3 insurance sources. The table III below shows the average percent goals gained based on planned goals at different percentiles.

TABLE III: THE AVERAGE PERCENT GOALS GAINED [a]

Percentiles	Average percent goals gained based on planned goals		
	Medicare (n=104)	Commercial (n=34)	Cook county (n=11)
25th percentile	0.25	0.16	0.55
50th percentile	0.44	0.51	0.91
75th percentile	0.76	1.0	1.0

[a] N= number of participants

Patients on Commercial insurance and County Care contracts had the highest average percent goals gained at the 50th and 75th percentiles compared to Medicare patients. A similar trend was observed in our sub-analysis of patients who required only extensive assistance with grooming at skilled nursing facility (SNF) admission across the 3 SNF payers as shown in table VII, Appendix B.

Our study didn't find an association between the average percent goals attained based on planned goals among Commercial insurance [OR 0.66 (0.21 – 2.14)] and County Care Contract (OR 1) patients, compared to Medicare patients (table VIII, Appendix B). In the sub-analysis of patients who required only extensive assistance with grooming, we didn't find a difference in the average percent goals attained based on planned goals, among the Commercial insurance [OR 0.60 (0.16 – 2.29)] and County Care Contract (OR 1) patients, compared to Medicare patients (table IX, Appendix B).

3.3.3 Approach 3: Percentage of Goals attained

Table IV below shows the association between attainment of physical therapy goals among patients on

Commercial insurance and County Care contracts compared to Medicare patients.

TABLE IV: SNF PAYER SOURCE AND PERCENTAGE GOALS COMPARED TO MEDICARE[a]

	Percentage Goals	Commercial Insurance RR (C.I)	County Care Contract RR (C.I)
Goals attained based on Planned PT/OT goals	More than 20%	0.93 (0.74 – 1.16)	1.32 (1.08 – 1.60)
	More than 40%	1.15 (0.84 – 1.59)	1.81 (1.37 – 2.38)
	More than 60 %	1.10 (0.70 – 1.74)	1.76 (1.05 – 2.93)
	More than 80 %	1.46 (0.83 – 2.59)	2.41 (1.25 – 4.65)

[a] PT/OT = physical and occupational therapy; RR = relative risk; C.I = 95% confidence interval

Patients on County Care contracts were twice as likely to attain more than 80% of their goals compared to Medicare

patients. Similarly, patients on County Care contracts had a higher chance of achieving more than 20%, 40% and 60% of

their physical therapy goals compared to Medicare patients. On the contrary, there were no significant associations in

attaining more than 20%, 40%, 60% and 80% of the physical therapy goals among Commercial insurance patients compared

to Medicare patients. Please see details of this analysis in tables X to XIII, Appendix B.

3.4 Wound Care Goals

Out of the 16, 12 and 13 patients on Medicare, Commercial insurance and County Care contracts admitted for

wound care, 56%, 58% and 69% respectively attained their wound care skilled nursing facility (SNF) goals. We found

differences in chances of attaining wound care goals among Commercial and County Care Contract patients against

Medicare patients. These differences were due to diabetes mellitus, infections and history of anemia. Patients without

diabetes mellitus [RR 40.24 (1.39 – 1162.43) were more likely to attain their wound care goals compared to patients with diabetes mellitus. On the other hand, Infections negatively impacted attainment of wound care goals, with non-infected patients having a 23 times better chance of meeting their wound care goals compared to infected patients [RR 23.04 (1.39 – 382.88)]. Curiously, patients with history of anemia had a higher chance of attaining their wound care goals compared to patients without history of anemia [RR 25.60 (3.00 – 218.73)]. For more details on this analysis please see table XI, Appendix C.

3.5 Intravenous Antibiotics Goals

All the 9, 9 and 36 patients on Medicare, Commercial insurance and County Care contracts respectively admitted for intravenous antibiotics therapy, completed their doses of antibiotics during their SNF care stay, except for 1 patient on Medicare. As a result there were no associations between attaining intravenous antibiotics goals, among Commercial insurance [RR 1.12 (0.90 – 1.41)] and County Care Contract [RR 1.17 (0.87 – 1.56)] patients, compared to Medicare patients even with age adjustment (table XVI, Appendix D).

4. DISCUSSION

Medicare patients receive a full SNF care cover for the first 20 days and are then charged a Co-pay up to 80 days thereafter.[15] The Commercial insurance SNF care cover is renewed weekly depending on whether a patient shows positive progress in attaining therapy goals. On the other hand, County Care Contract patients are given renewable SNF care contracts for 30 days. We hypothesized that Medicare patients were more likely to achieve their goals because they received more SNF care days than patients on Commercial insurance and County Care contracts.

In this multisite cohort study we found that attainment of SNF goals was associated with the SNF payment source. Contrary to our expectations, our study found that patients on Commercial insurance and County Care contracts were more likely to achieve their overall SNF care goals compared to Medicare patients. This association was statistically significant even after adjusting for age, gender and the SNF admission baseline functional status. These findings are consistent with findings from other studies which have shown that patients on Commercial insurance are more likely to be discharged home from SNF care compared to patients on Medicare.[16] With the assumption that being discharged home is an indicator of functional recovery.

In the multivariate analysis, age and the baseline functional status at skilled nursing facility (SNF) admission influenced attainment of SNF care goals. Age and the functional status at SNF care admission have been shown to determine functional recovery and a successful home transition after SNF care.[17,18,19, 20,21,22]

Medicare patients were significantly older compared to patients on Commercial insurance and County Care contracts. Although the functional status of Medicare patients was not statistically significantly different from that of Commercial insurance patients, it was significantly different from that of County Care Contract patients. These observations can be explained by the fact that a patient's SNF payer source is determined by factors such as age, disability and the level of income.[23,24,12]

Commercial insurance patients were more likely to attain their physical therapy goals compared to the Medicare patients, even though Medicare patients had used more SNF care days. These findings are similar to findings from other studies which have shown that an increase in physical and occupational therapy visits among nursing home patients is not associated with discharge from the SNF facilities.[25] If we assume that those discharged from the SNF facilities would have recovered their functional status.

The Commercial insurance SNF care cover is renewed weekly if a patient shows positive progress in attaining therapy goals. We found that Commercial insurance patients were more likely to achieve their goals. Whether the threat of Commercial insurance termination was a mitigating factor is not clear. Our findings suggest that the threat of insurance termination for patients on Commercial insurance every week can influence attainment of SNF goals. The threat of insurance termination can have a motivation effect on patients and, or the physical therapy teams in ensuring they achieve their therapy goals.[26,27]

The more number of hours per day a patient spends on actual physical and occupational therapy, the higher the chances of functional recovery.[28,29,30,31,32] The threat of insurance termination can motivate patients to spend more hours on actual therapy in order to avoid termination of their SNF care cover. This threat can also provoke empathy among the physical and occupational therapists at the thought of their patients losing their SNF care cover. Consequently, the empathic therapist may come up with innovative ways that can spur their patients to attain their weekly goals, hence avoiding the SNF care cover termination.[26] These innovative ways include shorter but more therapy sessions in a day[32] and positive feedbacks,[26] just to name but a few.

Besides that, the prevalence of osteoarthritis is high among the older patients.[33] Medicare patients are significantly older and therefore more likely to have osteoarthritis. Patients with osteoarthritis are less likely to utilize all their scheduled time and sessions of physical and occupational therapy per day on actual therapy because of osteoarthritic pain.

Moreover, elderly patients have a lower tolerance to exercise compared to younger patients.[34,35,36,37,38,39] Given that Medicare patients are significantly older than patients on Commercial insurance and County Care contracts, they are more likely to tolerate shorter hours and fewer sessions of therapy per day. This reduces the chances of attaining skilled nursing facility (SNF) goals among Medicare patients.

The type of insurance can also influence a patient's adherence to therapy,[40] and determine whether they receive physical and occupational therapy.[41,42] Therefore these results could also suggest that Commercial insurance patients are more likely to adhere to therapy because of the factors discussed above.

Based on the categorical analysis County Care Contract patients were more likely to attain more than 20%, 40%, 60% and 80% of their physical therapy goals compared to Medicare patients. These can be explained by the fact that patients on County Care contracts are significantly younger and have a higher functional status at SNF admission compared to Medicare patients. This explanation is consistent with findings in our analysis of physical therapy goals in approach 1, comparing Medicare and County Care patients (table VI). These findings showed that patients with a lower functional status at SNF admission, older and females were less likely to achieve their physical therapy goals. Other studies too have shown that younger patients[43,44] and those with a higher functional status have a greater potential of recovering their baseline function during rehabilitation.[22,45] Apart from that, younger patients have a higher tolerance to physical therapy than older patients, hence recovering their functional status.[34,35,36,37,38,39] The percentage of males among the County Care Contract patients was significantly higher compared to Medicare patients. Females are more prone to functional decline post-hospitalization compared to males.[43,46,47,44] Hence gender differences can also explain why County Care Contractpatients have greater chance of achieving their SNF goals compared to Medicare patients.

All patients admitted for intravenous antibiotics completed their intravenous antibiotics doses within their SNF care period. The 100% antibiotics completion implies that all patients regardless of the insurance source had met their goals of infection resolution.

With regard to attainment of wound care goals several observations were made. For instance diabetic and infected patients had a higher risk of not achieving wound care goals, compared to those without diabetes mellitus and infections respectively. These findings resonate with conclusions from other studies.[48,49,50,51] On the other hand, we found that patients who had history of anemia, had a higher chance of attaining their wound care goals. It is known that anemia is associated with non-healing wounds.[52,53,54] Therefore, these findings are in contrast to the published information on the relationship between anemia and wound healing. We can explain this observation by the fact that, our study collected data on the history of anemia rather than active anemia. Hence, anemia could have resolved among some of the patients on SNF care, who had history of anemia.

4.1 Limitations:

Based on our study findings, the differences in attaining SNF goals cannot be explained entirely by the number of days covered by the SNF payer source, age, gender and the baseline functional status. We need to explore other factors that can influence attainment of SNF goals which were not analyzed by our study, because they were not available in the patients' medical records. These factors include adherence to therapy and motivation to participate in therapy. Our study didn't have access to the hours and sessions of therapy each patient received in a day. We need to find out whether patients on Commercial insurance and County Care contracts participate in more sessions and spend more hours on actual physical and occupational therapy per day compared to Medicare patients.

Active depression is associated with a poor functional recovery.[55] Poor functional recovery results in not achieving SNF goals. Our study didn't find a statistically significant difference in the history of depression between Medicare patients and among patients on Commercial insurance and County Care contracts. Information on whether patients had active depression during their SNF care period wasn't available. There could have been differences in active depression[16] among patients admitted for SNF care, thereby influencing attainment of SNF goals.

The patients' nutritional status,[21,43,56] and how soon they started receiving physical therapy while hospitalized or at SNF admission[21,57,31,58] wasn't available either. These factors can also influence functional recovery hence attainment of SNF goals.

5. CONCLUSION

Commercial insurance and County Care Contract patients are more likely to attain their Skilled Nursing Facility (SNF) care goals compared to the Medicare patients who have more SNF care days covered and a longer median SNF care stay. This study also suggests that factors such as age, gender, diabetes mellitus, anemia, the baseline functional status and the weekly threat of SNF care termination among Commercial insurance patients can influence attainment of SNF care goals. We need to conduct further studies to determine whether this weekly threat of SNF care cover termination, motivates participation in therapy. Indeed, this is an area that needs further exploration. We should not use the findings of this study to prematurely conclude that elderly (Medicare) patients don't need more days for therapy. Elderly patients can only tolerate few hours of therapy per day.[34,35,36,37,38,39] Therefore, Medicare (elderly) patients may still need more SNF care days than younger (Commercial and County Care) patients to achieve an optimum functional recovery status during their SNF care period.

CITED LITERATURE

1. Mallinson TR, Bateman J, Tseng HY, et al. A comparison of discharge functional status after rehabilitation in skilled nursing, home health, and medical rehabilitation settings for patients after lower-extremity joint replacement surgery. Archives of physical medicine and rehabilitation. 2011;92(5):712-720.

2. Greenhall AM. House bat management. Jamestown, ND: Northern Prairie Wildlife Research Center Online 1982.

3. Munin MC, Putman K, Hsieh CH, et al. Analysis of rehabilitation activities within skilled nursing and inpatient rehabilitation facilities after hip replacement for acute hip fracture. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists. 2010;89(7):530-540.

4. James R, Gines D, Menlove A, et al. Nutrition support (tube feeding) as a rehabilitation intervention. Archives of physical medicine and rehabilitation. 2005;86(12 Suppl 2):S82-S92.

5. Leibovitz A, Plotnikov G, Habot B, et al. Pathogenic colonization of oral flora in frail elderly patients fed by nasogastric tube or percutaneous enterogastric tube. The journals of gerontology Series A, Biological sciences and medical sciences. 2003;58(1):52-55.

6. Toles M, Barroso J, Colon-Emeric C, et al. Staff interaction strategies that optimize delivery of transitional care in a skilled nursing facility: a multiple case study. Family & community health. 2012;35(4):334-344.

7. Buntin MB, Colla CH, Deb P, et al. Medicare spending and outcomes after postacute care for stroke and hip fracture. Medical care. 2010;48(9):776-784.

8. Aragon K, Covinsky K, Miao Y, et al. Use of the Medicare posthospitalization skilled nursing benefit in the last 6 months of life. Archives of internal medicine. 2012;172(20):1573-1579.

9. Hurt B. How does a skilled nursing facility get reimbursed by Medicare? Interview by Kathleen D. Schaum. Advances in skin & wound care. 2011;24(9):394-402.

10. Grabowski DC, Afendulis CC, McGuire TG. Medicare prospective payment and the volume and intensity of skilled nursing facility services. Journal of health economics. 2011;30(4):675-684 .

11. Centers for M, Medicaid Services HHS. Medicare program; prospective payment system and consolidated billing for skilled nursing facilities for FY 2012. Final rule. Federal register. 2011;76(152):48486-48562 .

12. Nordqvist C. How To Find Private Health Insurance Available: http://www.medicalnewstoday.com/info/health-insurance/find-private-health-insurance. Accessed Nov 1st, 2013, 2013.

13. Paul A. Harris RT, Robert Thielke, Jonathon Payne, Nathaniel Gonzalez, Jose G. Conde. Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009;42(2):377-381.

14.   Gialanella B, Santoro R, Ferlucci C. Predicting outcome after stroke: the role of basic activities of daily living predicting outcome after stroke. European journal of physical and rehabilitation medicine. 2013;49(5):629-637.

15.   Services CfMM. Your Medicare Coverage Available: http://www.medicare.gov/coverage/skilled-nursing-facility-care.html, 2014.

16.   Thomas KE, Gassoumis ZD, Wilber KH. Conversion diversion: participation in a social HMO reduces the likelihood of converting from short-stay to long-stay nursing facility placement. Journal of the American Medical Directors Association. 2010;11(5):333-337
.

17.   M. LJR. Correlates of post-hospital physical function at 1 year in skilled nursing facility residents. Journal of Advanced Nursing. 2008; 62(4):479-486.

18.   Spruit-van Eijk M, Zuidema SU, Buijck BI, et al. Determinants of rehabilitation outcome in geriatric patients admitted to skilled nursing facilities after stroke: a Dutch multi-centre cohort study. Age and ageing. 2012;41(6):746-752.

19.   Siebens HC, Sharkey P, Aronow HU, et al. Outcomes and weight-bearing status during rehabilitation after arthroplasty for hip fractures. PM & R : the journal of injury, function, and rehabilitation. 2012;4(8):548-555.

20.   Conner D, Barnes C, Harrison-Felix C, et al. Rehabilitation outcomes in a population of nonagenarians and younger seniors with hip fracture, heart failure, or cerebral vascular accident. Archives of physical medicine and rehabilitation. 2010;91(10):1505-1510
.

21.   Lee J, Higgins PA. Predicting posthospital recovery of physical function among older adults after lower extremity surgery in a short-stay skilled nursing facility. Rehabilitation nursing : the official journal of the Association of Rehabilitation Nurses. 2008;33(4):170-177.

22.   Palleschi L, De Alfieri W, Salani B, et al. Functional recovery of elderly patients hospitalized in geriatric and general medicine units. The PROgetto DImissioni in GEriatria Study. Journal of the American Geriatrics Society. 2011;59(2):193-199.

23.   administration Uss. How to qualify for Medicare Available: http://ssa-custhelp.ssa.gov/app/answers/detail/a_id/400/~/how-to-qualify-for-medicare. Accessed Nov 1st, 2013, 2013.

24.   Eligibility Available: http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Eligibility/Eligibility.html. Accessed Nov 1st, 2013, 2013.

25.   Hutt E, Ecord M, Eilertsen TB, et al. Prospective payment for nursing homes increased therapy provision without improving community discharge rates. Journal of the American Geriatrics Society. 2001;49(8):1071-1079.

26.   Lenze EJ, Host HH, Hildebrand MW, et al. Enhanced medical rehabilitation increases therapy intensity and engagement and improves functional outcomes in postacute rehabilitation of older adults: a randomized-controlled trial. Journal of the American Medical Directors Association. 2012;13(8):708-712.

27. ZuWallack RL. The roles of bronchodilators, supplemental oxygen, and ventilatory assistance in the pulmonary rehabilitation of patients with chronic obstructive pulmonary disease. Respiratory care. 2008;53(9):1190-1195.

28. Roach KE, Ally D, Finnerty B, et al. The relationship between duration of physical therapy services in the acute care setting and change in functional status in patients with lower-extremity orthopedic problems. Physical therapy. 1998;78(1):19-24.

29. Jette DU, Warren RL, Wirtalla C. The relation between therapy intensity and outcomes of rehabilitation in skilled nursing facilities. Archives of physical medicine and rehabilitation. 2005;86(3):373-379.

30. Jette DU, Warren RL, Wirtalla C. Rehabilitation in skilled nursing facilities: effect of nursing staff level and therapy intensity on outcomes. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists. 2004;83(9):704-712.

31. Horn SD, DeJong G, Smout RJ, et al. Stroke rehabilitation patients, practice, and outcomes: is earlier and more aggressive therapy better? Archives of physical medicine and rehabilitation. 2005;86(12 Suppl 2):S101-S114.

32. Stockton KA, Mengersen KA. Effect of multiple physiotherapy sessions on functional outcomes in the initial postoperative period after primary total hip replacement: a randomized controlled trial. Archives of physical medicine and rehabilitation. 2009;90(10):1652-1657.

33. Zhang JF, Song LH, Wei JN, et al. Prevalence of and risk factors for the occurrence of symptomatic osteoarthritis in rural regions of Shanxi Province, China. International journal of rheumatic diseases. 2014.

34. Arstila M, Impivaara O, Maki J. New ergometric reference values for clinical exercise tests. Scandinavian journal of clinical and laboratory investigation. 1990;50(7):747-755.

35. Shechtman O, Mann WC, Justiss MD, et al. Grip strength in the frail elderly. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists. 2004;83(11):819-826.

36. Desrosiers J, Bravo G, Hebert R, et al. Normative data for grip strength of elderly men and women. The American journal of occupational therapy : official publication of the American Occupational Therapy Association. 1995;49(7):637-644.

37. Poh H, Eastwood PR, Cecins NM, et al. Six-minute walk distance in healthy Singaporean adults cannot be predicted using reference equations derived from Caucasian populations. Respirology. 2006;11(2):211-216.

38. Rao NA, Irfan M, Haque AS, et al. Six-minute walk test performance in healthy adult Pakistani volunteers. Journal of the College of Physicians and Surgeons--Pakistan : JCPSP. 2013;23(10):720-725.

39. Biswas D, Dey A, Chakraborty M, et al. Habitual physical activity score as a predictor of the 6-min walk test distance in healthy adults. Respiratory investigation. 2013;51(4):250-256.

40.   Grispino F, Messner P. Adherence to scheduled therapy sessions: the influence of payer source. Journal of hand therapy : official journal of the American Society of Hand Therapists. 2008;21(3):286-290; quiz 291

.
41.   Wodchis WP, Fries BE, Pollack H. Payer incentives and physical rehabilitation therapy for nonelderly institutional long-term care residents: evidence from Michigan and Ontario. Archives of physical medicine and rehabilitation. 2004;85(2):210-217.

42.   Elrod CS, DeJong G. Determinants of utilization of physical rehabilitation services for persons with chronic and disabling conditions: an exploratory study. Archives of physical medicine and rehabilitation. 2008;89(1):114-120.

43.   Chen CC, Wang C, Huang GH. Functional trajectory 6 months posthospitalization: a cohort study of older hospitalized patients in Taiwan. Nursing research. 2008;57(2):93-100.

44.   Barnes DE, Mehta KM, Boscardin WJ, et al. Prediction of recovery, dependence or death in elders who become disabled during hospitalization. Journal of general internal medicine. 2013;28(2):261-268.

45.   Latham NK, Jette DU, Warren RL, et al. Pattern of functional change during rehabilitation of patients with hip fracture. Archives of physical medicine and rehabilitation. 2006;87(1):111-116.

46.   Dai YT, Huang GS, Yang RS, et al. Functional recovery after hip fracture: six months' follow-up of patients in a multidisciplinary rehabilitation program. Journal of the Formosan Medical Association = Taiwan yi zhi. 2002;101(12):846-853.

47.   Boyd CM, Ricks M, Fried LP, et al. Functional decline and recovery of activities of daily living in hospitalized, disabled older women: the Women's Health and Aging Study I. Journal of the American Geriatrics Society. 2009;57(10):1757-1766.

48.   Kim BK, Lee YK, Park KY, et al. Analysis of multiple risk factors affecting the result of free flap transfer for necrotising soft tissue defects of the lower extremities in patients with type 2 diabetes mellitus. Journal of plastic, reconstructive & aesthetic surgery : JPRAS. 2014;67(5):624-628.

49.   Mendes JJ, Leandro C, Mottola C, et al. In vitro design of a novel lytic bacteriophage cocktail with therapeutic potential against organisms causing diabetic foot infections. Journal of medical microbiology. 2014;63(Pt 8):1055-1065.

50.   Dash SN, Dash NR, Guru B, et al. Towards reaching the target: clinical application of mesenchymal stem cells for diabetic foot ulcers. Rejuvenation research. 2014;17(1):40-53.

51.   Downe A. Use of Urgotul SSD to reduce bacteria and promote healing in chronic wounds. British journal of community nursing. 2013;Suppl:S32, S34-38.

52.   Suda AJ, Winkler KA, Grutzner PA, et al. High complication rate after septic orthopaedic implant removal of the lower leg. Archives of orthopaedic and trauma surgery. 2014.

53.   Raffoul W, Far MS, Cayeux MC, et al. Nutritional status and food intake in nine patients with chronic low-limb ulcers and pressure ulcers: importance of oral supplements. Nutrition. 2006;22(1):82-88.

54.   Dudek NL, Buenger UR, Trudel G. Bilateral anterior superior iliac spine pressure ulcers: a case report. Archives of physical medicine and rehabilitation. 2002;83(10):1459-1461.

55.   Barry LC, Murphy TE, Gill TM. Depression and functional recovery after a disabling hospitalization in older persons. Journal of the American Geriatrics Society. 2011;59(7):1320-1325.

56.   Dennis RA, Johnson LE, Roberson PK, et al. Changes in activities of daily living, nutrient intake, and systemic inflammation in elderly adults receiving recuperative care. Journal of the American Geriatrics Society. 2012;60(12):2246-2253.

57.   Hu MH, Hsu SS, Yip PK, et al. Early and intensive rehabilitation predicts good functional outcomes in patients admitted to the stroke intensive care unit. Disability and rehabilitation. 2010;32(15):1251-1259.

58.   Kunik CL, Flowers L, Kazanjian T. Time to rehabilitation admission and associated outcomes for patients with traumatic brain injury. Archives of physical medicine and rehabilitation. 2006;87(12):1590-1596.

APPENDICES

7.1 APPENDIX A

Overall SNF Goals

TABLE V
OVERALL SNF GOALS ANALYSIS[a]

Overall SNF Goals	Poisson Model	P-Value	RR (confidence Interval)
SNF Payers	Medicare (Reference)		1
	Commercial insurance	0.032	1.68(1.05 – 2.70)
	County Care	0.004	1.94 (1.24 – 3.04)
Age Categories	< 50 years (Reference)		1
	50 to 60 years	0.101	0.59 (0.31 – 1.05)
	60 to 70 years	0.063	0.57 (0.31 – 1.03)
	70 to 80 years	0.042	0.49 (0.24 – 0.98)
	More than 80 years	0.012	0.40 (0.20 – 0.82)
Groom Functional Status Categories	Independent (Reference)		1
	Supervision	0.636	0.91 (0.60 – 1.36)
	Limited assistance	0.838	0.96 (0.68 – 1.37)
	Extensive assistance + Total assistance	0.036	0.63 (0.41 – 0.97)

[a] A table showing attainment of Overall SNF goals among Commercial insurance and County Care Contractpatients compared to Medicare patients.

Age is a confounder statistically and in literature, while Grooming is an effect modifier in literature but not statistically for both County Care Contract and Commercial insurance analysis.

7.2 APPENDIX B

Physical Therapy Goals

TABLE VI
PHYSICAL THERAPY GOALS ANALYSIS[a]

Physical Therapy Goals	Poisson Model	P-value	RR (confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.005	2.51 (1.33 – 4.73)
	County Care	0.069	2.22 (0.94 – 5.26)
Age Categories	> 80 years (Reference)		1
	Less than 50 years	0.016	1268713 (13.78 – 1.17e+11)
	50 to 60 years	0.023	35735.87(4.32 - 2.96e+08)
	60 to 70 years	0.028	927.08 (2.07- 415012.4)
	70 to 80 years	0.023	69.23 (2.07 – 415012.4)
Grooming Functional Status Categories	Independent (Reference)		1
	Supervision	0.024	1213.14 (2.56 – 574984.7)
	Limited assistance	0.110	36.32 (0.45 – 2958.23)
	Extensive assistance + Total assistance	0.038	12.48 (1.15 – 135.81)
Females	Males (Reference)		1
	Females	0.016	0.0007 (1.74e-06 – 0.25)
Interactions	Gender x Groom	0.022	6.84 (1.33 – 35.30)
	Age x Groom	0.042	2.29 (1.03 – 5.09)
	Age X Gender	0.014	14.87 (1.73 – 127.95)
	Age X Gender X Groom	0.018	0.49 (0.27 – 0.88)

[a] A table showing attainment of physical therapy goals among Commercial insurance and County Care Contract patients compared to Medicare patients.

Age, groom and Gender are effect modifiers statistically and in literature, in the association of County Care and attaining physical therapy goals compared Medicare. Gender and Groom are effect modifiers in literature but not statistically in the Commercial insurance versus Medicare physical therapy goals analysis, whereas age is a confounder in literature and but not statistically.

TABLE VII

THE AVERAGE PERCENT GOALS GAINED AT DIFFERENT PERCENTILES AMONG PATIENTS REQUIRING EXTENSIVE ASSISTANCE WITH GROOMING

Percentile of Goals gained	Average percent goals gained based on planned goals		
	Medicare (n=104)	Commercial (n=34)	County Care (n=11)
25th percentile	0.22	0.07	0.83
50th percentile	0.40	0.28	0.87
75th percentile	0.75	0.75	0.91

TABLE VIII

AN ANALYSIS OF THE AVERAGE PERCENT GOALS GAINED BASED ON PLANNED GOALS[a]

% of Goals Attained	Logistic Model	P- value	OR (Confidence Interval)
SNF Payers	Medicare (Reference)		1
	Commercial insurance	0.496	0.66 (0.21 – 2.14)
	County Care		1
Age	Age	0.100	1.38 (0.94 – 2.14)

[a] A table showing an analysis of the average percentage goals attained among County Care Contract and Commercial insurance patients compared to Medicare patients.

Age is confounder in literature but not statistically in the analysis of the attained percent goals for both County Care and Commercial insurance patients compared to Medicare patients.

TABLE IX

AN ANALYSIS OF THE AVERAGE PERECENT GOALS GAINED BASED ON PLANNED GOALS AMONG PATIENTS REQUIRING EXTENSIVE ASSISTANCE WITH GROOMING[a]

% of Goals Attained	Logistic Model	p- value	OR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.486	0.63 (0.17 – 2.34)
	County Care		1
Age Categories	Age	0.101	0.10 (0.93 – 2.30)

[a] A table showing attainment of the average percentage goals among County Care Contract and Commercial insurance patients compared to Medicare patients for patient who needed only extensive assistance with grooming.

Age is confounder in literature but not statistically in the analysis of the attained percent goals for both County Care and Commercial insurance patients compared to Medicare patients.

TABLE X
AN ANALYSIS OF ATTAINING MORE THAN 80% OF THE PLANNED PHYSICAL THERAPY GOALS[a]

>80% Goals	Poisson model	P-Value	RR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.189	1.46 (0.83 – 2.59)
	County Care	0.009	2.41 (1.25 – 4.65)
Age categories	< 50 years (Reference)		1
	50 to 60 years	0.819	1.09 (0.52 – 2.30)
	60 to 70 years	0.521	0.75 (0.31 – 1.82)
	70 to 80 years	0.777	0.89 (0.39 – 2.03)
	More than 80 years	0.212	0.56 (0.22 – 1.39)

[a] A table showing attainment of more than 80% of the physical therapy goals among the County Care Contract and Commercial insurance patients compared to Medicare patients for patients.

Age is confounder in literature but not statistically in the analysis of the attained percent goals for both County Care and Commercial insurance patients compared to Medicare patients.

TABLE XI
AN ANALYSIS OF ATTAINING MORE THAN 60% OF THE PLANNED PHYSICAL THERAPY GOALS[a]

>60% Goals	Poisson model	P-Value	RR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.672	1.10 (0.70 – 1.74)
	County Care	0.030	1.76 (1.05 – 2.93)
Age Categories	< 50 years (Reference)		1
	50 to 60 years	0.720	0.90 (0.52 – 1.58)
	60 to 70 years	0.203	0.64 (0.33 – 1.27)
	70 to 80 years	0.336	0.74 (0.40 – 1.36)
	More than 80 years	0.281	0.72 (0.40 – 1.31)

[a] A table showing attainment of more than 60% of the physical therapy goals among County Care Contract and Commercial insurance patients compared to Medicare patients.

Age is confounder in literature but not statistically in the analysis of the attained percent goals for both County Care and Commercial insurance patients compared to Medicare patients.

TABLE XII
AN ANALYSIS OF ATTAINING MORE THAN 40% OF THE PLANNED PHYSICAL THERAPY GOALS[a]

>40% Goals	Poisson model	P-Value	RR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.376	1.15 (0.84 – 1.59)
	County Care	0.000	1.81 (1.37 – 2.38)
Age Categories	< 50 years (Reference)		1
	50 to 60 years	0.446	0.86 (0.58 – 1.27)
	60 to 70 years	0.282	0.78 (0.51 – 1.22)
	70 to 80 years	0.468	0.86 (0.57 – 1.30)
	More than 80 years	0.298	0.80 (0.53 – 1.22)

[a] A table showing attainment of more than 40% of the physical therapy goals among County Care Contract and Commercial insurance patients compared to Medicare patients.

Age is confounder in literature but not statistically in the analysis of the attained percent goals for both County Care and Commercial insurance patients compared to Medicare patients.

TABLE XIII
AN ANALYSIS OF ATTAINING MOR THAN 20% OF THE PLANNED PHYSICAL THERAPY GOALS [a]

>20% Goals	Poisson model	P-Value	RR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.502	0.93 (0.74 – 1.16)
	County Care	0.005	1.32 (1.08 – 1.60)
Age categories	< 50 years (Reference)		1
	50 to 60 years	0.324	1.19 (0.84 – 1.67)
	60 to 70 years	0.692	1.11 (0.66 – 1.84)
	70 to 80 years	0.227	1.46 (0.79 – 2.74)
	More than 80 years	0.142	1.77 (0.83 – 3.80)
Gender	Females (Reference)		1
	Males	0.032	1.50 (1.04 – 2.17)
Interactions	Age x Gender	0.074	0.91 (0.82 – 1.01)

[a] A table showing attainment of more than 20% of the physical therapy goals among County Care Contract and Commercial insurance patients compared to Medicare patients.

Age is a confounder in literature but not statistically in the analysis of both County Care and Commercial insurance. Gender is an effect modifier in literature but not statistically (it didn't change the results compared to the crude results).

7.3 APPENDIX C

Wound Care Goals

TABLE XIV
WOUND CARE GOALS ANALYSIS [a]

Wound Care Goals	Poisson model	P-Value	RR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.013	43.78 (2.25 – 851.82)
	County Care	0.005	1681.81 (9.15 – 309007.8)
Age	Age	0.947	0.99 (0.81 – 1.22)
Diabetes Mellitus (DM) Status	Diabetes Mellitus (Reference)		1
	No Diabetes Mellitus	0.031	40.24 (1.39 – 1162.43)
Infection Status	Infection (Reference)		1
	No Infection	0.029	23.04 (1.39 – 382.88)
History of anemia	No anemia history(Reference)		1
	History of anemia	0.003	25.60 (3.00 – 218.73)
Interactions	DM X infection	0.031	0.25 (0.71 – 0.89)
	Anemia x infection	0.023	3.78 (1.21 – 11.82)
	Infection x SNF payer	0.010	0.23 (0.07 – 0.70)
	DM x SNF payer	0.121	0.54 (0.25 – 1.18)

[a] A table showing attainment of Wound Care goals among patients on County Care Contract and Commercial insurance patients compared to Medicare patients.

Diabetes mellitus, infection and anemia are effect modifiers in literature and statistically in the analysis of the Commercial insurance and County Care Contract patients versus Medicare patients. Age is a confounder in literature but not statistically in the analysis of both Commercial and County Care Contract patients versus Medicare.

7.4 APPENDIX D

Intravenous Antibiotics Goals

TABLE XV
INTRAVENOUS ANTIBIOTICS GOALS ANALYS [a]

IV antibiotics Goals	Poisson model	P-Value	RR (Confidence Interval)
SNF payers	Medicare (Reference)		1
	Commercial insurance	0.307	1.12 (0.90 – 1.41)
	County Care	0.293	1.17 (0.87 – 1.56)
Age Categories	< 50 years (Reference)		1
	50 to 60 years	0.288	1.05 (0.96 – 1.14)
	60 to 70 years	0.297	1.11 (0.91 – 1.33)
	70 to 80 years	0.312	1.12 (0.90 – 1.40)
	More than 80 years	0.299	1.06 (0.95 – 1.18)

[a] A table showing attainment of Intravenous antibiotics goals among County Care Contract and Commercial insurance patients compared to Medicare patients.

Age is confounder in literature but not statistically in the analysis of both the commercial and County Care contracts patients versus Medicare patients.

7.5 APPENDIX E

TABLE XVI
BASELINE FUNCTIONAL STATUS AT SNF ADMISSION FOR INDIVIDUAL PERFORMANCE [a]

Baseline Functional at SNF admission

	Medicare (n=132)	Commercial (n=51)	County Care (n=51)
Individual Performance – no. (%)			
Bed mobility Independent	21(16)	10(20)	25(49)*
Bed mobility supervision	5(3.8)	1(2)	9(17.6)
Bed mobility limited assistance	7(5.3)	5(10)	4(7.8)
Bed mobility extensive assist	94 (71.8)	33(66)	12(23.5)*
Bed mobility total assistance	4(3.1)	1(1)	1(2)
Stand and bear weight independent	13(9.8)	10(19.6)	21(41.2)*
Stand and bear weight supervision	6(4.6)	2(3.9)	11(21.6)
Stand and bear weight limited assistance	12(9.2)	7(13.7)	2(3.9)
Stand and bear weight extensive assist	92 (70.2)	29(56.9)	13(25.5)*
Stand and bear weight total assistance	7(5.3)	3(5.9)	4(7.8)
Walk in the room independent	14(10.6)	10(19.6)	21(41.2)*
Walk in the room supervision	10(7.6)	5(9.8)	11(21.6)
Walk in the room limited assistance	13(9.9)	4(7.8)	1(2)
Walk in the room extensive assist	24(18.3)	6(11.8)	4(7.8)*
Walk in the room total assistance	0(0)	2(3.9)	0(0)
Dressing independent	13(9.8)	9(17.6)	22(43.1)*
Dressing supervision	8(6.1)	4(7.8)	10(19.6)
Dressing limited assistance	10(7.6)	4(7.8)	9(17.6)
Dressing extensive assist	97(73.5)	31(60.8)	9(17.6)*
Dressing total assistance	3(2.3)	3(5.9)	1(2)
Grooming independent	15(11)	9(17.6)	24(47.1)*
Grooming supervision	11(8.4)	7(13.7)	11(21.6)
Grooming limited assistance	9(6.9)	6(11.8)	10(19.6)
Grooming extensive assist	92(70.2)	28(54.9)	6(11.8)*
Grooming total assistance	4(3.1)	1(2)	0(0)
Bathing independent	1(0.8)	1(2)	6(11.8)*
Bathing supervision	20(15.3)	10(19.6)	23(45.1)
Bathing limited assistance	2(1.5)	2(3.9)	3(5.9)
Bathing extensive assist	97(74)	34(66.7)	18(35.3)*
Bathing total assistance	9(6.9)	4(7.8)	1(2)
Toileting independent	17(13.1)	10(20)	23(45.1)*
Toileting supervision	5(3.8)	4(8)	9(17.6)
Toileting limited assistance	6(4.6)	2(4)	3(5.9)
Toileting extensive assist	98(75.4)	33(66)	15(29.4)*
Toileting total assistance	3(2.3)	1(2)	1(2)
Eating independent	82(64.6)	31(60.8)	31(60.8)
Eating supervision	19(15)	8(17.4)	17(33.3)
Eating limited assistance	13(10.2)	3(6.5)	1(2)
Eating extensive assist	7(5.3)	4(8.7)	0(0)*
Eating total assistance	6(4.7)	0(0)	1(2)

[a] N= number of patients;
SNF = Skilled Nursing Facility;
The asterisk indicates that P value is less than 0.05 in the commercial and County Care columns in comparison with Medicare; Values in the Commercial insurance and County Care Contract columns without an asterisk have p values ≥0.05; P values were calculated using the independent t-test.

TABLE XVII
BASELINE FUNCTIONAL STATUS AT SNF ADMISSION FOR SUPPORT NEEDED [a]

Baseline Functional at SNF admission			
Support needed – no. (%)			
Bed mobility no set-up	24(18.3)	11(21.6)	31(67.4)*
Bed mobility set-up only	2(1.5)	1(2)	1(2.2)
Bed mobility 1 person assist	54(41.2)	22(43.1)	6(13)*
Bed mobility 2 plus person assist	51(38.9)	17(33.3)	8(17.4)
Stand and bear weight no set-up	16(12.4)	11(21.6)	29(63)*
Stand and bear weight set-up only	2(1.6)	1(2)	1(2.2)
Stand and bear weight 1 person assist	73(56.6)	23(45.1)	9(17.6)*
Stand and bear weight 2 plus person assist	37(28.7)	16(31.4)	7(15.2)
Walk in the room no set-up	20(15.6)	13(25.5)	28(62.2)*
Walk in the room set-up only	2(1.6)	2(3.9)	2(4.4)
Walk in the room 1 person assist	35(27.3)	8(15.7)	4(8.9)*
Walk in the room 2 plus person assist	1(0.8)	4(7.8)	1(2.2)
Dressing no set-up	4(3.1)	3(5.9)	12(26.1)*
Dressing set-up only	15(11.5)	10(19.6)	18(39.1)
Dressing 1 person assist	108(82.4)	34(66.7)*	16(34.8)*
Dressing 2 plus person assist	4(3.1)	3(5.9)	0(0)
Grooming no set-up	5(3.8)	1(2)	10(21.7)*
Grooming set-up only	19(14.5)	16(32.7)	23(50)
Grooming 1 person assist	104(79.4)	30(61.2)*	13(28.3)*
Grooming 2 plus person assist	3(2.3)	2(4.1)	0(0)
Bathing no set-up	2(1.5)	0(0)	5(11.1)
Bathing set-up only	20(15.3)	11(21.6)	22(48.9)
Bathing 1 person assist	100(76.3)	34(66.7)	13(28.9)*
Bathing 2 plus person assist	7(5.3)	6(11.8)	5(11.1)
Toileting no set up	17(13.2)	13(26.5)	24(53.3)*
Toileting set-up only	3(2.3)	3(6.1)	5(11.1)
Toileting 1 person assist	74(57.4)	22(44.9)	12(26.7)*
Toileting 2 plus person assist	34(26.4)	11(22.4)	4(8.9)

[a] N= number of patients;
SNF = Skilled Nursing Facility;
The asterisk indicates that P value is less than 0.05 in the commercial and County Care columns in comparison with Medicare;
Values in the Commercial insurance and County Care Contract columns without an asterisk have p values ≥0.05; P values were calculated using the independent t-test.

<div align="center">

VITA

Samson Wafula Barasa

Graduate work

</div>

UNIVERSITY OF ILLINOIS AT CHICAGO, Chicago, Illinois.   **July 2012 – June 2014**

Geriatrics Fellow

- Geriatrics Board Certified 2013

UNION HOSPITAL Terre Haute, Indiana.   **July 2009 – June 2012**

Family Practice Resident

- Family Practice Board Certified

<div align="center">

Education

</div>

UNIVERSITY OF ILLINOIS AT CHICAGO, Chicago, Illinois.   **July 2012 – Todate**

Master of Science in Clinical and Translational Research Student

- Awarded a certificate in clinical research methods 2013
- Currently pursuing a Master of Science in Clinical and Translational Research

MOI UNIVERSITY,SCHOOL OF HEALTH SCIENCE, Eldoret, Kenya.   **October 1996– August 2002**

- Awarded Bachelor of medicine and surgery (M.B.Ch.B) Degree 2002

<div align="center">

Work experience

</div>

RIVERBEND HOSPITAL, Eugene Oregon.   **July 2014 – Todate**

Hospitalist

UNIVERSITY OF NAIROBI / UNIVERSITY OF MANITOBA COLLABORATIVE PROJECT Nairobi, Kenya. April 2005 – June 2009

Project Physician.

 LUGULU MISSION HOSPITAL, Bungoma Kenya.   **February 2004 – March 2005**

Medical officer

worked as a Medical officer (general practitioner) in medicine, pediatrics, Obstetrics, Gynecology,surgical and out-patient departments.

KAKAMEGA PROVINCIAL HOSPITAL, Kakamega Kenya   **November 2002– January 2004**

Medical intern.

- Did Internship in medicine, pediatrics, surgical, Obstetrics and gynecology ward

Publications

- Chege, D., Chai, Y., Huibner, S., Kain, T., Wachihi, C., Kimani, M., Barasa, S., McKinnon, L., Muriuki, F., Kariri, A., Jaoko, W., Anzala, O., Kimani, J., Ball, T., Plummer, F., Kaul, R. (2012). Blunted IL17/IL22 and pro-inflammatory cytokine responses in the genital tract and blood of HIV-exposed, seronegative female sex workers in Kenya. *PLoS One, 7*(8), e43670. doi: 10.1371/journal.pone.0043670

- Lester, R. T., Mills, E. J., Kariri, A., Ritvo, P., Chung, M., Jack, W., Habyarimana, J., Karanja, S., Barasa, S., Nguti,   R., Estambale, B., Ngugi, E., Ball, T. B., Thabane, L., Kimani, J., Gelmon, L., Ackers, M., Plummer, F. A. (2009). The HAART cell phone adherence trial (WelTel Kenya1): a randomized controlled trial protocol. *Trials, 10*, 87. doi: 10.1186/1745-6215-10-87

Abstracts

- Authored an original research abstract titled   *"Does the insurance source make a difference in meeting rehabilitation goals in skilled nursing facilities"* Nominated for the presidential award competition at the AMERICAN GERIATRICS SOCIETY meeting, May 2015, Washington DC.

- Authored an original research abstract titled *"What is the impact of the Aggressive Comprehensive Team Approach (ACTA) on the 30 day re-hospitalization rate? A pre and post intervention study at a skilled nursing facility"* Nominated for poster presentation at the AMERICAN GERIATRICS SOCIETY meeting, May 2014, Orlando, FL.

- Authored an original research abstract titled *"Reinstitution of Vitamin D Supplementation as Evidence Based Fall Prevention Strategy in a Teaching Long-term Care Setting"* Nominated for poster presentation at the AMERICAN GERIATRICS SOCIETY meeting, May 2014, Orlando, FL.

- Authored an original research abstract titled *"Just how do second hand smokers influence smoking cessation among pregnant women?"*. Nominated for oral presentation at the INDIANA ACADEMY OF FAMILY PHYSICIANS, 2012 RESIDENTS' DAY/RESEARCH FORUM, 17 May 2012.; INDIANAPOLIS, Indiana.

- Authored an original research abstract titled *"Did you know how weather seasons affect the no show rates at your clinic?"*. Nominated for oral presentation at the INDIANA ACADEMY OF FAMILY PHYSICIANS, 2010 RESIDENTS' DAY/RESEARCH FORUM, 19 March 2010.; INDIANAPOLIS, Indiana.

- Was one of the aurthors in an oral presentation aurthored by: Gakii G , Kusimba J, Barasa S, Kamunyo G, Akolo M, Onyango R, Kimani J, L Gelmon (2008, December). ***Group therapy for HIV and ART adherence***. Presented at the 15th International Conference on AIDS and STIs in Africa, 8-11 December 2008,; Dakar, Senegal.

- Was one of the aurthors in a poster presentation aurthored by: Gakii G, Barasa S, Kusimba J, Kamunyo G, Akolo M,Onyango R, Kariri T, Kimani J,. (2008,August). ***Does disclosure of HIV status to close friends and family influence ART adherence? Don't tell but swallow the pill: High levels of ARV adherence in the undisclosed.*** Poster presented at : AIDS 2008 XVII INTERNATIONAL CONFERENCE MEXICO CITY, 3-8 August.; MEXICO CITY, Mexico.

- Authored an original research abstract titled "***Factors influencing time between testing positive and presenting for HIV care***" Nominated for poster presentation at the AIDS 2008 XVII INTERNATIONATIONAL AIDS CONFERENCE MEXICO CITY , 3-8 August.; MEXICO CITY, Mexico.

Awards and honors

- Received the 2012 Union Hospital Foundation research award for being the outstanding resident in research.
- Awarded a merit award for being ranked the best fifth year Medical Student in M.B.Ch.B programme during 2000/2001 academic year.

Professional Memberships

- A member of American Academy of Family Physicians
- A member of American Geriatrics Society
- A member of American Congress of Obstetricians and Gynecologists