Use of Antithrombotic Medications among Elderly Ischemic Stroke Patients

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Abstract

Background—The use of antithrombotic medications after ischemic stroke is recommended for deep vein thrombosis (DVT) prophylaxis and secondary stroke prevention. We assessed the rate of receipt of these therapies among eligible ischemic stroke patients aged ≥65 years and determined the effects of age and other patient characteristics on treatment.

Methods and Results—The analysis included Medicare fee-for-service beneficiaries discharged with ischemic stroke (ICD-9 433, 434, 436) randomly selected for inclusion in the Medicare Health Care Quality Improvement Program's National Stroke Project 1998–1999, 2000–2001. Patients discharged from non-acute facilities, transferred, or terminally ill were excluded. Receipt of in-hospital pharmacological DVT prophylaxis, antiplatelet medication, anticoagulants for atrial fibrillation, and antithrombotic medications at discharge were assessed in eligible patients, stratified by age (65–74, 75–84, 85+ yrs). Descriptive models identified characteristics associated with treatment. Among 31,554 patients, 14.9% of those eligible received pharmacologic DVT prophylaxis, 83.9% antiplatelet drugs, 82.8% anticoagulants for atrial fibrillation, and 74.2% were discharged on an antithrombotic medication. Rates of treatment decreased with age, and were lowest for patients aged 85 years or older. Admission from a skilled nursing facility and functional dependence were associated with lower treatment rates.

Conclusions—There was substantial underuse of antithrombotic therapies among elderly ischemic stroke patients, particularly among the very elderly, those admitted from skilled nursing facilities, and patients with functional dependence. The reasons for low use of antithrombotic therapies, including the apparent underuse of DVT prophylaxis in otherwise eligible patients, require further investigation.

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Keywords

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Introduction

Stroke is an important public health problem in the elderly, with 75% of all strokes occurring in persons age 65 years and older.[1] Stroke is the third most common cause of death and a leading cause of disability among Americans in this age group.[2,3] The absolute number of elderly individuals with stroke will increase in the coming decades because of the stable or increasing incidence of stroke[4–7] coupled with a growing elderly population.[8,9] Patients who survive an acute ischemic stroke are at increased risk for recurrence, with the highest rates occurring within the first few weeks and reaching 10% after the first year.[10,11]

Treatment guidelines recommend the use of aspirin for patients with acute ischemic stroke, pharmacological and non-pharmacological prophylaxis for deep vein thrombosis (DVT), anticoagulation for atrial fibrillation, and a variety of antithrombotic drugs for secondary prevention.[12] Despite their effectiveness,[11,13–19] there is widespread underutilization of antithrombotic drugs among elderly stroke patients,[20–27] suggesting that older patients may be receiving suboptimal care. There are relatively little age specific data regarding the utilization of antithrombotics among the very elderly, particularly for stroke patients 85 years of age or older in the United States. This represents an important gap because the proportion of the population over 85 years of age will increase fivefold by 2050.[8] Given the increasing longevity of the U.S. population and the greater survivorship of stroke patients, it is important to determine whether proven secondary preventive therapies are appropriately utilized among the very elderly. Older age is associated with an increased risk of poststroke in-hospital mortality in Medicare beneficiaries, independent of sex, cognitive status, concomitant cardiac disease or stroke severity.[28] The results of studies conducted in other countries assessing age-related differences in the receipt of secondary preventive interventions are inconsistent.[29,30] Variation in the use of these therapies may exist within the elderly population due to factors such as the prevalence of comorbid illness, impaired functional status, and perceived feasibility of treating patients of advanced age with medications such as warfarin.[22,31,32] We sought to determine whether there were age-specific differences in the receipt of pharmacologic DVT prophylaxis and antithrombotic drugs using a large, random sample of elderly patients hospitalized for acute ischemic stroke in the United States. A secondary aim was to determine whether there were patient characteristics that were associated with a greater likelihood of treatment within age groups.

Methods

Study participants were part of the Medicare Health Care Quality Improvement Program's National Stroke Project.[23,33] In brief, the National Stroke Project was authorized by the Health Care Financing Administration (now the Centers for Medicare & Medicaid Services) to improve the quality of care for patients with stroke or transient ischemic attack (TIA). A systematic random sample of up to 750 hospitalized, fee-for-service Medicare beneficiaries with a primary discharge diagnosis of stroke was identified from each of the 50 states, the District of Columbia, and Puerto Rico during two periods of data collection (1998–1999 and 2000–2001). These patients were drawn from 3,876 hospitals. Patients were included in the present study if they had a primary diagnosis of ischemic stroke (ICD-9-CM codes 433.x1, 434.x1, and 436) and had confirmatory physician documentation of a new event. Patients were excluded if they were younger than 65 years of age (n=4211), missing data on age or sex (n=15), transferred to or from another acute care facility (n=3868), discharged within

one day (n=605), had left the hospital against medical advice (n=131), or had terminal cancer or an illness with a life expectancy of less than 6 months (n=1519); these exclusions are not mutually exclusive. Patients discharged alive within 1 day were excluded because they likely had conditions that were miscoded or misdiagnosed as ischemic stroke (e.g., syncope, migraine, or hypoglycemia). Transfers were excluded because care at the other acute care facility was not captured in the medical record.

Data were obtained from medical record review by two clinical data abstraction centers using computerized abstraction tools. Patient sex, age, race-ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, or other), skilled nursing facility residence prior to admission, comorbid conditions, medical history, and discharge disposition (home, skilled nursing facility, or other) were recorded. The patients' pre-stroke and discharge functional statuses were assessed using categories that reflect the modified Rankin scale (Figure 1), and were categorized as either independent, needing assistance, or dependant. We also assessed the change in scores from admission to discharge among patients discharged alive (patients who died in-hospital were not assigned a modified Rankin score).

Outcome measures included the rates of pharmacological DVT prophylaxis by the end of day 2 among non-ambulatory patients not receiving mechanical DVT prophylaxis, antiplatelet medication during the hospitalization, anticoagulants (either warfarin, intravenous, subcutaneous, or low-molecular weight heparin) during the hospitalization among those with atrial fibrillation, and the prescription of or plan for an antithrombotic drug at discharge among patients eligible for these therapies. Table 1 gives the inclusion and exclusion criteria for each of the quality indicators. These conservative criteria were used to determine the frequency of treatment in a group of patients who generally should be given antithrombotic therapy.

Treatment rates were stratified by patient age (65–74, 75–84, and ≥85 years), as well as by admission from a skilled nursing facility and functional status at discharge. Hierarchical regression models were used to both identify patient characteristics associated with the receipt of therapies among eligible candidates and to account for patient clustering within hospitals. Model covariates included age, sex, race-ethnicity, comorbid conditions (diabetes, hypertension, prior stroke/TIA, history of atrial fibrillation, congestive heart failure, and myocardial infarction), admission from a skilled nursing facility, functional status at discharge, and change in functional score from admission to discharge. Discharge to a skilled nursing facility was included only in the model for antithrombotic treatment at discharge.

Based on bivariate results, we tested for an age interaction with admission location and modified Rankin score at discharge in each of the models. We used standard rounding procedures to the hundredth place for the odds ratios and 95% confidence intervals presented. Due to missing modified Rankin scores (ranging from 1.6% to 21.1% across treatment categories), we created a variable for the missing data that was included in secondary analyses. Analyses were conducted using SAS version 9.1.3 (SAS Institute Inc., Cary, North Carolina). Hierarchical models were estimated using the GLIMMIX procedure in SAS. The authors had full access to the data and take responsibility for its integrity. All authors have read and agreed to the manuscript as written.

Results

Characteristics of the 31,554 patients who met initial study criteria are presented in Table 2. Patients aged 75 years and older were more likely to have had a prior stroke, a history of atrial fibrillation, congestive heart failure, and angina but were less likely to have

hypertension or diabetes than patients aged 65–74. Older patients were more likely to have been admitted from a skilled nursing facility, more likely to be functionally dependent at admission and discharge, and less likely to be discharged home as compared with younger patients (p<0.001 for each comparison).

The proportion of eligible patients who received antithrombotic therapies decreased with advancing age except in the case of pharmacological DVT prophylaxis, which was slightly higher among patients aged 75–84 years as compared with those 65–74 years old (Figure 2). Overall rates of pharmacological DVT prophylaxis were particularly low, ranging from 11.4%–17.0% of eligible patients across age groups. In secondary analyses, we included patients who received non-pharmacologic DVT prophylaxis, but results were essentially unchanged. Treatment rates ranged from 78.3%–87.5% across age groups for antiplatelet drugs, 76.3%–88.7% for anticoagulants among those with atrial fibrillation, and 70.3%–76.7% for antithrombotic drugs at discharge. Treatment rates were lower for patients who were admitted from a skilled nursing facility (Figure 3) and those who were functionally dependent (Figure 4) within each age group.

In risk-adjusted analyses (Table 3), the receipt of DVT prophylaxis as well as the use of antiplatelet drugs during the hospitalization did not differ between patients aged 65–74 years and 75–84 years, although the receipt of DVT prophylaxis was lower for those over age 85 years. Receipt of in hospital anticoagulants for atrial fibrillation decreased with advancing age and was lowest for patients 85 years or older. The likelihood of receiving antithrombotic drugs at discharge did not differ between patients aged 65–74 and 75–84 years; however, those 85 years of age or older were less likely to receive these drugs.

Patients who were admitted from a skilled nursing facility were less likely to receive DVT prophylaxis (p=0.0003 for ineraction between age and SNF admission) antiplatelet drugs in the hospital, anticoagulants for atrial fibrillation (p <0.0001 for interaction between age and SNF admission), and antithrombotics at discharge. Increasing levels of functional dependence were associated with progressively lower rates of utilization of each of these therapies (needs assistance and dependent vs. functional independence), with a significant interaction between age and functional status at discharge for the receipt of DVT (p<0.0001) and anticoagulants for atrial fibrillation (p<0.0001). In secondary analysis, the inclusion of patients with missing Rankin scores did not appreciably alter the results. Elderly black patients were less likely to receive DVT prophylaxis in hospital and antithrombotics at discharge than white patients, but there were no differences for antiplatelet drugs or anticoagulants during the hospitalization. Hispanic patients and those belonging to other race-ethnic groups were less likely to receive inhospital anticoagulants as compared to non-Hispanic Whites. The relationship of these covariates with receipt of antithrombotic drugs remained unchanged when age was treated as a continuous variable in the analysis.

Discussion

Although national guidelines recommending the use of antithrombotic drugs for DVT prophylaxis and secondary stroke prevention have been in place for many years,[16,34,35] we found an overall underutilization of these therapies in eligible elderly patients hospitalized with ischemic stroke, particularly among the oldest patients. Among eligible ischemic stroke patients 85+ years of age, only 11% received pharmacological DVT prophylaxis, 78% received antiplatelet medications, 76% received anticoagulants for atrial fibrillation, and 70% received antithrombotics at discharge. Because we assessed treatment rates among eligible patients, these relatively low utilization rates cannot be attributed to differences in contraindications by age. Decreased mobility and admission from a skilled nursing facility were also associated with lower receipt of each therapy. Race-ethnicity was associated with

the rates of DVT prophylaxis, anticoagulant use for atrial fibrillation, and antithrombotic use at discharge, but these associations were inconsistent across race-ethnic groups and treatments. The overall low use of DVT prophylaxis and the reasons for these differences in otherwise eligible patients requires further investigation.

Prior analyses using the National Stroke Project data show that antithrombotics prescribed at discharge for patients with acute stroke or transient ischemic attack and warfarin for patients with atrial fibrillation are underutilized in patients age 65 years or older.[23,33] Our analyses extend this prior work, stratifying the receipt of treatment by age groups for the subset of patients with a new ischemic stroke. We found that the underutilization of therapies is even more pronounced for the very elderly, and differs by other patient characteristics including admission location and level of functional dependence. The receipt rate of therapy for atrial fibrillation in our study was higher than that reported by Jencks et al. This is likely due to their consideration of all Medicare patients with a principal discharge diagnosis of atrial fibrillation whether or not they had an ischemic stroke. In contrast, we determined the receipt of therapy among ischemic stroke patients with documented evidence of atrial fibrillation during the hospitalization. Our lower rate of antithrombotic use at discharge as compared with Jencks et al likely reflects differences in inclusion and exclusion criteria.

DVT prophylaxis in immobilized stroke patients can reduce the risk of death due to pulmonary embolism by 56% to 82%.[36] Although we found the level of utilization to be consistent with the reported rate of 13.8% among eligible Medicare patients in Michigan,[37] they were lower than those reported from the California Acute Stroke Pilot Registry (CASPR, 64% in 2003 and 43% in 2004) and Get-With-The-Guidelines (GWTG)-Stroke (74% in 2003) databases.[38–40] Rates may be higher in GWTG-Stroke and CASPR hospitals as they have a particular interest in stroke and both are designed as quality improvement programs. Variation in rates between studies may also reflect differences in the age distributions of included patients, differing criteria for appropriate prophylaxis, as well as the accuracy of assessment and documentation for the level of patient activity by day 2 of the hospitalization. There may also be increased DVT prophylactic use over time, as evidenced by the increase from 13.8–17.9% found in Medicare beneficiaries from 1998–2002,[41] and a 15.8% increase in GWTG-Stroke hospitals from 2003 through 2007.[38]

More than three-quarters of patients who were eligible to receive antiplatelet drugs during the hospitalization received them, with the proportion declining in successively older age groups. These observations are consistent with another study that found unadjusted utilization rates of 73.7% among stroke patients age 65–75 years of age, and 71.9% among those >75 years old; however, risk adjusted analyses combined the older groups and compared them with patients younger than 65 years of age.[42] Hierarchical models revealed no difference in the receipt of antiplatelet drugs across age groups during the acute hospitalization.

Direct comparisons with prior research reporting utilization rates of warfarin for in-hospital atrial fibrillation with our study are limited because these other studies either included patients <65 years of age[43,44] or those without a diagnosis of acute ischemic stroke.[21,23,32,33] A recent study of ischemic stroke patients treated at designated stroke centers in Ontario reported similar rates of treatment as our study, with a non-significant decrease in the receipt of warfarin at discharge (87.2% for <59 years, 81.5% for 60–69 years, 82.7% for 70–79 years, and 76.8% for 80+ years of age).[29] Older patients with atrial fibrillation are known to benefit from anticoagulant treatment;[45–48] however, we found lower receipt rates in the older age groups. This suggests that patient age may influence physicians' decisions to prescribe warfarin independent of other demographic and clinical factors, a finding consistent with other reports in older populations.[21,43] One explanation for this age

difference may be physicians' desire to avoid hemorrhagic stroke, the risk for which increases with age.[22] Although the risk of major anticoagulant-associated bleeding is higher in the very elderly,[48] the risks do not offset the benefits for most high risk patients with atrial fibrillation if anticoagulants are carefully administered.[45–48]

We found that one-fourth of eligible patients did not receive antithrombotic medications at discharge, a rate that is somewhat higher than the 16%-17% reported in two studies of Medicare patients in Michigan during the same time period.[24,41] It is possible that our observed rate differs because of local variations in stroke care that are not evident within a single geographic location. Furthermore, the Michigan studies included cases with transient arterial occlusion (ICD-9 code 362.34), restricted stroke cases to white or black race, and excluded cases in which there was physician documentation that at least one antithrombotic therapy was considered but not prescribed.

Volpato et al found no difference in the prescription of antithrombotic therapy at discharge among elderly stroke patients in Italian clinical centers, but did find lower utilization rates with decreased functional independence.[27] A Canadian study reported similar rates of antithrombotics at discharge across all elderly age groups (<59, 60–69, 70–79, and 80+), but only included patients admitted to designated stroke centers in Ontario which may represent a higher level of care than in non-stroke center facilities.[29] Our findings differ from data reported from CASPR, which found no age difference (80+ vs. <80) in optimal utilization of antithrombotic therapy.[49] Optimal therapy was defined as receipt at discharge of at least one medication from the class (i.e., an antiplatelet drug or an anticoagulant) or a valid contraindication to treatment. There was wide variation in the rates of actual and optimal treatment across the 11 CASPR hospitals. The differences in reported results between this study and ours may reflect greater variation in our sample, which was drawn from hospitals across the United States, and/or may represent selection bias (and as noted above CASPR hospitals were selected based on their interest in stroke care and experience in using registries). Higher compliance rates would also be expected among committed hospitals that were aware they were being monitored for these therapies, including those participating in quality improvement programs such as the GWTG-Stroke program.[40]

Our study has several limitations. First, we may have underestimated the proportion of patients prescribed antithrombotics prior to admission or at discharge due to lack of documentation, particularly for non-prescription medications such as aspirin. We used a conservative approach, excluding patients with a range of potential contraindications for the use of antiplatelet drugs, yet still found a large proportion of untreated patients. Additional clinical contraindications for acute anticoagulation may not have been documented and information on stroke size, which might affect the use of these drugs, was not available. Determining patient immobility from chart review had moderate reliability, and may have influenced the observed rates. The data reflect treatment patterns at the time of the study. Although care may have improved over time, practice recommendations for the use of antithrombotic therapies have not appreciably changed.[16,34,35] We did not have information on reasons that physicians may not have prescribed these medications; however, a review of published articles assessing practice patterns and barriers to warfarin use in the setting of atrial fibrillation indicates that advanced patient age is consistently identified as a factor influencing decision making.[22] Finally, our findings may not be generalizable to patients who are transferred to or from other facilities as they were excluded from the analysis.

Our findings suggest that antithrombotic medication use is not optimal, and that treatment rates may be affected by patient age as well as other patient characteristics, including admission from a skilled nursing facility and functional status. These differences were present regardless of patient demographics and comorbidities. Further research is needed to

replicate these results in other data resources and understand the reasons for these differences. The underutilization of antithrombotic drugs among elderly stroke patients, particularly the very elderly, suggests that there may be an opportunity to improve their post-stroke DVT prophylaxis and secondary preventive care. Future work will need to determine the effectiveness of performance improvement activities such as primary stroke center certification,[50] the Get-With-The-Guidelines-Stroke program,[40] and other similar efforts in the elderly population.

Acknowledgments

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Figure 1.
The Comparison between the Modified Rankin Scale and the National Stroke Project
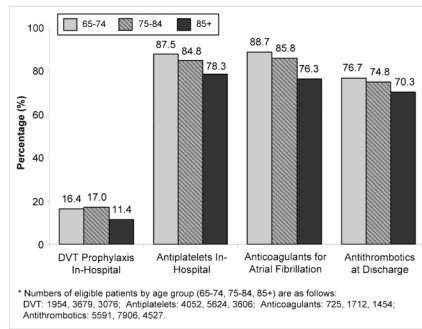Mobility Variables

Figure 2.
Receipt of Therapies by Age Group
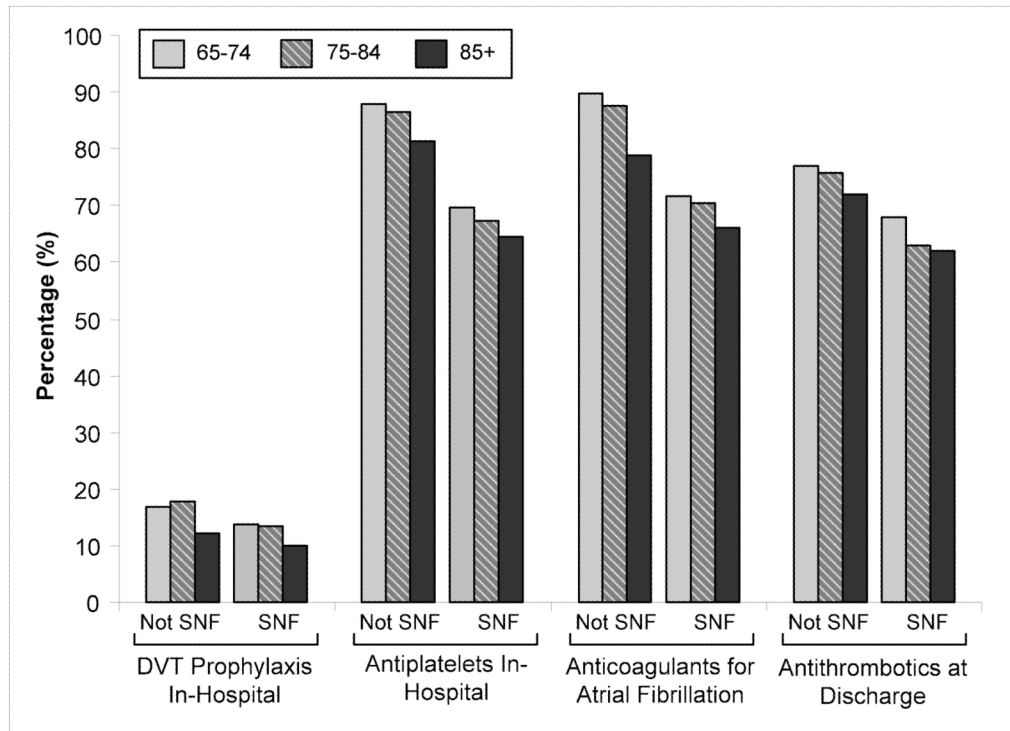
Figure 3.
Receipt of Therapies by Admission Source (SNF vs. Not SNF) Stratified by Age
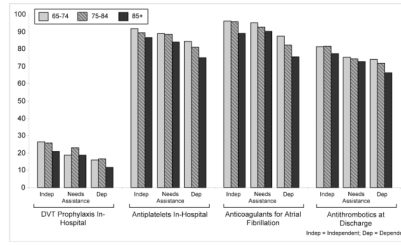
Figure 4.
Receipt of Therapies by Discharge Modified Rankin Score (Independent, Needs Assistance or Dependent) Stratified by Age

Table 1

Stroke Treatment and Eligibility Criteria*

	Treatment Definition	Eligibility Exclusion Criteria†	Number Treated	Number Eligible	Percent Treated
DVT Prophylaxis	• Received anticoagulant including warfarin/coumadin or heparin by the end of day 2	• (N=22,845 excluded) • Ambulatory by the end of day 2 (N=22,525) • Used intermittent pneumatic compression device (IPC) by the 2nd hospital day (N=669)	1,295	8,709	14.9%
Antiplatelet Drugs	• Received aspirin, aspirin + sustained-release dipyridamole, Clopidogrel, or Ticlidopine during hospitalization	• (N=18,272 excluded) • Documented history of adverse reaction, allergy or sensitivity to the medications; documented contraindication for antithrombotic medication including arthritis requiring NSAIDs or ASA, history/current bleeding, high risk for bleeding, high risk for falls, liver disease, or impaired consciousness; or patient refusal (N=13,059) • Intravenous heparin or coumadin during the hospitalization (N=8,334)	11,137	13,282	83.9%
Anticoagulants for Atrial Fibrillation	• Prescribed warfarin or heparin during hospitalization	• (N=27,663 excluded) • No atrial fibrillation during hospitalization (N=24,143) • Documented history of adverse reaction, allergy or sensitivity to warfarin and heparin (N=12) • Documented contraindication for antithrombotic medication including arthritis requiring NSAIDs or ASA, history/current bleeding, high risk for bleeding, high risk for falls, liver disease, or impaired consciousness (N=9,919) • Patient refused heparin and warfarin (N=9,754) • History of any type of hemorrhage (N=3,668)	3,221	3,891	82.8%
Antithrombotics at Discharge	• Physician prescribed or planned at discharge:	• (N=13,530 excluded) • Died in hospital (N=2,805)	13,380	18,024	74.2%

Treatment Definition	Number Treated	Eligibility Exclusion Criteria[†]	Number Eligible	Percent Treated
– Warfarin – Aspirin – Aspirin + sustained-release dipyridamole – Clopidogrel – Ticlidopine		• Documented history of adverse reaction, allergy, or sensitivity to the antithrombotic medications, bleeding, peptic ulcer disease, history of hemorrhage, new/evolving hemorrhage during hospitalization, surgery, unrepaired aneurysm, or aortic dissection; patient refusal (N=13,059)		

*
Additional clinical contraindications for acute anticoagulation may not be reflected in these analyses; Information on size of stroke was not available.

†
Subcategories of eligibility exclusion criteria are not mutually exclusive

DVT: deep vein thrombosis; NSAIDs: nonsteroidal antiinflammatory drugs; ASA: aspirin

Table 2

Demographic and Clinical Characteristics

	Total		Age (yrs)			P-value
			65–74 (N=9054)	75–84 (N=13929)	85+ (N=8571)	
	N	%	%	%	%	
Gender						<0.001
Male	12,462	39.5	49.7	39.9	28.2	
Female	19,092	60.5	50.3	60.1	71.8	
Age, mean ± SD	79.4 ± 7.7		70.1 ± 2.8	79.6 ± 2.8	89.0 ± 3.5	
Race						
Non-Hispanic White	24,816	78.7	73.7	80.3	81.1	<0.001
Non-Hispanic Black	2,993	9.5	13.5	8.3	7.2	
Hispanic	633	2.0	2.9	1.8	1.4	
Other	3,112	9.9	9.9	9.6	10.3	
Comorbidity and Medical History						
Prior Stroke	17,090	54.2	53.0	55.3	53.6	0.002
Prior TIA	885	2.8	2.8	3.0	2.5	0.071
Atrial Fibrillation	6,667	21.1	13.3	21.6	28.7	<0.001
Congestive Heart Failure	6,151	19.5	13.1	18.8	27.4	<0.001
Hypertension	25,128	79.6	81.5	80.3	76.5	<0.001
Diabetes Mellitus	9,742	30.9	40.3	30.8	21.0	<0.001
IHD/Angina	16,445	52.1	49.7	53.4	52.6	<0.001
Prior Myocardial Infarction	10,229	32.6	31.7	33.1	32.9	0.083
Admitted from Skilled Nursing Facility	3,118	10.1	4.2	8.8	18.4	<0.001
Functional Status at Admission						<0.001
Independent	18,900	60.3	72.3	61.3	45.8	
Needs Assistance	9,955	31.7	22.5	31.3	42.3	
Dependent	2,505	8.0	5.2	7.4	12.0	
Functional Status at Discharge						<0.001
Independent	5,518	19.0	30.0	18.0	8.2	

	Total		Age (yrs)			
			65–74 (N=9054)	75–84 (N=13929)	85+ (N=8571)	P-value
	N	%	%	%	%	
Needs Assistance	12,182	41.9	40.2	43.3	41.3	
Dependent	11,402	39.2	29.8	38.7	50.5	
Discharge Disposition						<0. 001
Home	11,143	35.3	49.1	34.8	21.6	
Skilled Nursing Facility	9,667	30.6	17.4	29.9	45.8	
Rehabilitation Hospitals	6,216	19.7	23.2	21.2	13.6	
Other	2,443	7.7	5.9	7.7	9.7	

TIA = transient ischemic attack; IHD = ischemic heart disease

Table 3

Risk-Adjusted Analysis of Quality Indicators[*]

Characteristics	DVT Prophylaxis in Hospital N=6864		Antiplatelet Drugs in Hospital N=28942		Anticoagulants for AF in Hospital N=3372		Antithrombotics at Discharge N=17742	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Demographics								
Age 75–84 (vs. 65–74)	0.95	(0.81–1.11)	1.01	(0.95–1.08)	0.72	(0.53–0.97)	0.96	(0.88–1.04)
Age 85+ (vs. 65–74)	0.58	(0.48–0.70)	0.98	(0.91–1.06)	0.48	(0.35–0.65)	0.84	(0.76–0.93)
Male (vs. Female)	1.12	(0.98–1.28)	1.02	(0.97–1.08)	1.13	(0.91–1.39)	1.08	(1.01–1.16)
Black Race (vs. White)	0.75	(0.61–0.93)	1.06	(0.96–1.17)	0.95	(0.61–1.46)	0.88	(0.78–0.99)
Other/Hispanic Race (vs. White)	0.81	(0.65–1.01)	0.97	(0.89–1.06)	0.52	(0.38–0.71)	1.10	(0.98–1.23)
Medical History								
Diabetes	1.19	(1.04–1.36)	1.09	(1.02–1.15)	1.12	(0.89–1.41)	0.89	(0.83–0.96)
Hypertension	0.97	(0.83–1.14)	1.31	(1.23–1.40)	1.26	(1.01–1.57)	1.18	(1.09–1.29)
Prior Stroke	1.37	(1.20–1.57)	1.02	(0.97–1.08)	1.01	(0.83–1.23)	1.13	(1.05–1.21)
Atrial Fibrillation	4.23	(3.69–4.85)	0.36	(0.34–0.39)	1.82	(1.48–2.23)	1.80	(1.63–1.99)
Prior MI	1.10	(0.97–1.26)	1.09	(1.02–1.15)	1.08	(0.88–1.32)	1.14	(1.05–1.23)
CHF	1.34	(1.16–1.55)	0.80	(0.75–0.86)	0.88	(0.72–1.09)	0.91	(0.83–1.00)
Admitted from SNF (vs. not SNF)	0.83	(0.70–0.99)	0.58	(0.53–0.63)	0.38	(0.30–0.50)	0.80	(0.71–0.91)
Functional Score at Discharge								
Needs Assistance (vs. Independent)	0.72	(0.55–0.93)	0.93	(0.86–1.00)	0.75	(0.52–1.07)	0.75	(0.68–0.82)
Dependent (vs. Independent)	0.43	(0.34–0.55)	0.66	(0.61–0.72)	0.19	(0.14–0.27)	0.68	(0.61–0.76)
Discharged to SNF (vs. not SNF)	-	-	-	-	-	-	0.68	(0.62–0.74)

[*] Adjusted for all the variables listed in the table, as well as change in functional status. SNF = Skilled Nursing Facility