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National and Regional Trends in Deep Vein Thrombosis Hospitalization Rates, Discharge Disposition, and Outcomes for Medicare Beneficiaries

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Abstract

INTRODUCTION: Older adults are at increased risk of developing deep vein thrombosis. Little is known about national trends of deep vein thrombosis hospitalizations in the context of primary and secondary prevention efforts.

METHODS: Medicare standard analytic files were analyzed from 2015–2017 to identify Fee-For-Service patients aged ≥ 65 years who had a principal discharge diagnosis for deep vein thrombosis from 1999 to 2010. We reported the deep vein thrombosis hospitalization rates per 100,000

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person-years as well as 30-day and 1-year mortality rates. We used mixed-effects models to calculate adjusted outcomes.

RESULTS: Overall, there were 726,423 deep vein thrombosis hospitalizations in Medicare Fee-for-Service from 1999 to 2010. Deep vein thrombosis hospitalization rate adjusted for age, sex, and race decreased from 264 per 100,000 person-years in 1999 to 167 per 100,000 person-years in 2010, a relative decline of 36.7% ($P < .0001$). Hospitalizations decreased for all subgroups by age, sex, and race with the exception of black patients (316 to 382 per 100,000 person-years, a relative increase of 20.8%) ($P < .0001$). Hospital length of stay decreased from 6.1 days in 1999 to 5.0 days in 2010, and the proportion of patients discharged to home decreased from 57.2% to 44.1%. Risk-adjusted 30-day, 6-month, and 1-year mortality and 30-day readmission rates remained relatively stable across the study period, but were highest among women in recent years.

CONCLUSIONS: The overall deep vein thrombosis hospitalization rate decreased from 1999 to 2010, except for black patients. Decreases in hospitalizations may reflect changes in clinical practice with increased outpatient rather than inpatient management, and faster transitions to outpatient care for management of deep vein thrombosis.

Keywords

Deep vein thrombosis; Health care disparities; Health care utilization; Hospitalization; Medicare

INTRODUCTION

Deep vein thrombosis is a common medical condition, and is associated with high health care costs and a high rate of recurrence.¹⁻⁴ Older adults are particularly at risk of developing deep vein thrombosis and its complications, including pulmonary embolism and postthrombotic syndrome^{2,4,5} with the risk of deep vein thrombosis estimated to double for each 10-year increase in age after age 50 years.^{2,4,6} Because of its life-threatening consequences, and yet availability of effective preventive measures, deep vein thrombosis has been cited as one of the most treatable diseases and preventable causes of death.^{1,2} In fact, the recognition of the growing public health problem prompted the US Surgeon General to issue a Call to Action to prevent venous thromboembolism, which comprises deep vein thrombosis and pulmonary embolism.⁷

There have been medical advancements in the diagnosis and treatment of deep vein thrombosis since key clinical trials were published in the late 1990s that have the potential to improve patient outcomes.⁸⁻¹¹ For instance, widespread application of diagnostic tests helps identify deep vein thrombosis more quickly and with greater validity.¹² Moreover, findings from randomized trials have made deep vein thrombosis treatment at home or in outpatient settings a possibility for many patients.¹³⁻¹⁵ This may be particularly important for older adults as hospital admission poses a greater risk of adverse event and iatrogenic disease, including psychomotor and social consequences.^{16,17}

Therefore, we aimed to identify the national hospitalization rates of Medicare beneficiaries with a principal discharge diagnosis of deep vein thrombosis, as well as their short- and

long-term outcomes. Further, we determined the rates by age, sex, race and regional subgroups to determine if there are health disparities, as advocated by others.^{7,18}

METHODS

We used Medicare standard analytic files to identify Medicare Fee-for-Service beneficiaries aged 65 years and older. Those who had participated for at least 1 month in Medicare Fee-for-Service and resided and were hospitalized for deep vein thrombosis from January 1, 1999 to December 31, 2010 in the United States were included. We focused on these years of study as this was the era of low-molecular-weight heparin introduction in the United States. Hospitalizations for deep vein thrombosis were defined as discharge from an acute-care hospital with a principal discharge diagnosis of deep vein thrombosis using the International Classification of Diseases, Ninth Revision, Clinical Modification codes: 451.11 or 451.19 or 451.2 or 451.81 or 451.83 or 451.84 or 451.89 or 451.9 or 453.2 or 453.3 or 453.4× or 453.8× or 453.9. The sensitivity and specificity of these codes are high (positive predictive value: 94%–100%).¹⁹ Codes in the secondary position were not used due to low positive predictive value.¹⁹ We used the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines to facilitate reporting of the study. The Yale University Human Investigation Committee approved this study.

The characteristics of patients hospitalized with deep vein thrombosis were examined across years and stratified according to demographic categories of age (65–74, 75–84, and 85 years or older), sex, race (white, black, and other), and state. Clinical comorbidities (Table 1) were selected based on the method used by the Centers for Medicare and Medicaid Services for profiling hospitals for cardiovascular conditions.²⁰ These comorbidities consisted of diagnosis codes in the principal and secondary positions of all hospitalizations for any cause up to 12 months prior to the index deep vein thrombosis hospitalization, as well as those found in the index admission.

To characterize deep vein thrombosis-specific annual hospitalization rates, we calculated a population rate that consisted of the total number of deep vein thrombosis hospitalizations in a given year (numerator), divided by the entire corresponding Medicare Fee-for-Service population in that year (denominator). The Medicare Fee-for-Service population was expressed in person-years to account for new enrollment, disenrollment, or death during an index year.

Outcomes including the all-cause mortality, and all-cause readmission, and length of hospital stay were determined from the corresponding vital status and inpatient Medicare files. Mortality outcomes included in-hospital, 30-day, 6-month and 1-year mortality rates, which were calculated from the date of the index deep vein thrombosis admission. Readmission included rehospitalizations for any cause occurring within 30 days from the date of discharge. Length of hospital stay was based on admission and discharge dates. Outcomes were restricted to unique patients such that if a patient had more than one hospital admission in a given year for deep vein thrombosis, one hospitalization was selected at random as to minimize sample selection bias.

A linear mixed-effects model with a Poisson link function and state-specific random intercepts was fitted to assess the trends in hospitalization rates for deep vein thrombosis, adjusted for age, sex, and race and incorporated year-specific dummy variables representing each year, with 1999 as a reference for each of the subsequent years (2000–2010). Similarly, a linear mixed-effects model with a logit link function and hospital-specific random intercepts was fitted to assess trends in the rate of 30-day, 6-month, and 1-year mortality, adjusted for age, sex, race, comorbidities (Table 1), and year-specific dummy variables. Trends in 30-day readmission across the study period were assessed using a Cox proportional hazards model with postdischarge death as a censoring event, and was also adjusted for age, sex, race, and comorbidities described previously, and the year-specific variables. The proportional hazards assumption was satisfied, validating the adequacy of the Cox regression model.²¹ We then calculated the adjusted rates of hospitalization, mortality, and readmission outcomes for each year, using 1999 as a baseline year, in a similar manner as detailed elsewhere.²² All analyses were performed from years 2015 to 2017. We used SAS, version 9.3 64-bit (SAS Institute, Cary, NC). All statistical tests were 2-sided at a significance level of $P < .05$.

RESULTS

We identified 726,423 beneficiaries aged 65 years of age or older who were hospitalized for deep vein thrombosis between 1999 and 2010 (Table 1).

Hospitalization Rates

In 1999, the hospitalization rate for deep vein thrombosis was 264 per 100,000 person-years, and the overall adjusted hospitalization rate gradually decreased to 167 per 100,000 person-years in 2010, a relative decrease of 36.7% (P for trend $< .001$) (Table 2). There was a slight increase in deep vein thrombosis hospitalizations between 2007 and 2008, but in 2009 the hospitalization rate continued to decline (Figure 1).

Unlike the overall cohort, whites, and other races, black patients had an increase in hospitalization rate, from 316 per 100,000 person-years in 1999 to 382 per 100,000 person-years in 2010, a relative increase of 20.8% over the study period (Figure 1) (P for trend $< .0001$). Of the age-sex subgroups, black women had the greatest relative increase in hospitalization of 23.7% from 1999 to 2010 (335 per 100,000 person-years in 1999 to 414 per 100,000 person-years), whereas white women had the greatest relative decline in hospitalization rate of 43.4% (289 per 100,000 person-years in 1999 to 164 per 100,000 person-years in 2010).

In state-based analyses, all states observed a decrease in the deep vein thrombosis hospitalization rate over the study period, with the exception of Hawaii and Florida (63 to 63 per 100,000 person-years in 1999 to 2010, and 278 to 285 per 100,000 person-years in 1999 to 2010, respectively) (Figure 2). Vermont observed the greatest relative decrease in hospitalization rate from 216 per 100,000 person-years in 1999 to 62 per 100,000 person-years in 2010 (relative decrease of 71.3%).

Length of Stay, Discharge Disposition

The mean (SD) length of stay for deep vein thrombosis hospitalizations consistently decreased from 6.1 (5.2) days in 1999 to 5.0 (3.7) days in 2010. While the length of hospital stay decreased for all race subgroups, black patients continued to have a longer hospital stay than white patients in 1999 (7.4 vs 5.9 days) and in 2010 (5.9 vs 4.9 days). From 1999 to 2010, the proportion of patients discharged to home decreased from 57.2% to 44.1%, with more patients discharged with home health care (14.0% in 1999 to 23.9% in 2010) and to intermediate care facilities/skilled nursing facilities (22.7% to 24.4%) (Table 3).

Mortality

The overall in-hospital mortality rate remained low over the study period (Table 4). The 30-day mortality rate for deep vein thrombosis, adjusted for age, sex, race, and comorbidities was stable over time and ranged between 5.0% (95% confidence interval [CI], 4.8%–5.3%) in 1999 and 5.1% (95% CI, 4.8%–5.4%) in 2010. The adjusted 1-year all-cause mortality rate decreased slightly from 21.5% (95% CI, 20.9%–21.9%) in 1999 to 19.6% (95% CI, 19.2%–20.3%) in 2010.

There were apparent sex and race differences in mortality rates at both 30 days and 1 year following hospitalization. Women had a slight increase in the 30-day and 1-year mortality rates over time, whereas men observed an overall decrease. Whites and other race beneficiaries had an increase in the 30-day and 1-year mortality rates over time, while blacks had the greatest decrease and lowest mortality rates in recent years (30-day mortality: 3.9% black, 5.2% white, and 6.1% other; 1-year mortality: 17.5% black, 19.7% white, 23.0% other) (Table 4) (*P* for trend < .01).

Readmission

The 30-day readmission rates, adjusted for age, sex, race, and comorbidities increased over time from 13.4% (95% CI, 13.3%–14.3%) in 1999 to 15.1% (95% CI, 14.7%–15.7%) in 2010 (*P* for trend = 0.11), a relative increase of 12.7%, with peaks in 2004 and 2007 (Table 3). Trends in risk-adjusted 30-day readmission rates were not different for age and sex subgroups; however, there were significant and substantial (more than an absolute 2%) disparities by race subgroup, with black patients having a higher readmission rate than white patients in 1999 (17.6% vs 12.9%) and in 2010 (17.1% vs 14.6%).

DISCUSSION

This study encompasses the largest to date to examine trends in deep vein thrombosis hospitalization rates and outcomes among older adults in the United States. Overall, the hospitalization rate decreased from 1999 to 2010 for all populations except black patients who had a precipitous increase during the study period. The overall decrease in hospitalization rate was accompanied by an overall temporal decrease in length of hospital stay and slight increase in 30-day readmission rates. Mortality outcomes, including in-hospital, 30-day, and 1-year mortality rates remained largely unchanged during the study period. Among the key clinical subgroups, the hospitalization rates were consistently higher

among black patients, and outcomes were consistently worse among women during recent years of the study period.

The adjusted deep vein thrombosis hospitalization rate decreased by nearly 37% during the course of the study period, from 264 to 167 per 100,000 person-years. There are several hypotheses to account for this decrease. First, changes in clinical practice patterns during the study period advocated for outpatient rather than inpatient management of deep vein thrombosis,^{15,23,24} including full outpatient management or earlier hospital discharge. This explanation may be bolstered by our finding that the length of hospital stay for deep vein thrombosis decreased from 1999 to 2010, and the proportion of patients discharged to home decreased with more patients discharged to skilled nursing facilities. Second, prevention efforts specific to deep vein thrombosis during the study period could have contributed to a decrease in new deep vein thrombosis events and thereby the deep vein thrombosis hospitalization rate over time. For instance, health promotion education efforts may have informed older adults about the signs and symptoms of deep vein thrombosis, thus encouraging patients to avoid prolonged sedentary periods.^{25,26} Further, increased utilization of pharmacological prophylaxis, coincident with the widespread use of electronic medical records that encompass frequent venous thromboembolism prophylaxis alerts,²⁷ may have contributed to lower rates of deep vein thrombosis during other hospitalizations or post discharge, and thereby lowering the rates of subsequent hospitalizations for deep vein thrombosis. Although we are unable to identify the exact cause of the observed trends, a combination of these factors has likely played a role.

Despite the overall decrease in deep vein thrombosis hospitalization rates, in our study of older adults, the hospitalization rates for black patients remains the highest of all racial subgroups, and the rate steadily increased during the study period by 21%, compared with a decrease of 42% for white patients from 1999 to 2010. This finding coincides with studies in other age groups that showed a higher risk of deep vein thrombosis among blacks,⁷ as well as higher incidence of pulmonary embolism hospitalizations²⁸ compared with white patients. Potential explanations for an increase in deep vein thrombosis hospitalization rates among black patients could include a higher propensity for clinicians to admit black patients due to concern for clinical or social risk factors.²⁹ Relatedly, black patients may also have a higher burden of comorbidities, such as obesity, diabetes, and cardiovascular disease, experience more severe deep vein thromboses, or have other biological or genotype differences relative to other racial subgroups.^{7,30,31} Additionally, prior research has shown that blacks experience health disparities and may have limited access to quality medical care that could delay treatment for deep vein thrombosis, including poor discharge planning, lack of health awareness, fear, and medical mistrust.^{32–34} The decrease in mortality rates among black patients, albeit surprising, could be in part due to the differences in unmeasured clinical characteristics of patients of different races. For instance, if blacks did not seek medical care during a deep vein thrombosis event, and if black patients with more severe deep vein thromboses died prior to admission, the proportion of hospitalized black patients with less severe deep vein thromboses would be greater than that of hospitalized white patients.³⁵

The results of our study also showed a slight increase in hospital 30-day all-cause readmission rates for deep vein thrombosis from 13% in 1999 to 15% in 2010, although this finding was not statistically significant. Potential explanations for this observation include deep vein thrombosis patients experiencing more complications at home, such as bleeding, suboptimal anticoagulation, and even recurrent venous thromboembolism, which may be due to home care or early hospital discharge. With regard to our observed decreases in deep vein thrombosis hospitalization rates and increases in readmissions, although there are several hypotheses, the dominant one may be related to the newer recommendations for home treatment of deep vein thrombosis, therefore contributing to fewer hospitalizations in more recent years, but at the cost of more readmissions.

We extend the prior literature in several ways. We are the first to identify contemporary trends in deep vein thrombosis hospitalization rates and outcomes among older adults in the United States. Indeed, one prior US-based investigation used data from the National Hospital Discharge Survey and found the incidence of deep vein thrombosis among hospitalized patients increased from 0.8% in 1979 to 1.3% in 1999; however, these data comprised hospitalized patients, whereas our sample was all Medicare Fee-for-Service beneficiaries.³⁶ Another cohort study of 1369 patients admitted to 12 hospitals in Worcester, Massachusetts found decreases in the proportion of people admitted to hospital with acute deep vein thrombosis from 1999 to 2009, as well as a significant decrease in the length of hospital stay (from 5.6 to 4.8 days), which is similar to our observation. Yet, that study noted a decrease in 30-day all-cause mortality (6.0% to 3.5%),²³ whereas our mortality findings were stable over time (5.0% in 1999 to 5.1% in 2010). Two other studies examined deep vein thrombosis trends, but they were conducted using international samples. One study in Singapore reported the primary and secondary deep vein thrombosis prevalence among hospitalized patients and found a rate of 0.5% in 1997.³⁷ Most recently, the RIETE registry, a prospective multinational multi-center registry of patients with objectively confirmed venous thromboembolism, found a decreased length of hospital stay from 2001 to 2014, along with an overall decrease in risk-adjusted rates of 30-day all-cause mortality (from 3.9% in 2001 to 2005 to 2.7% in 2010 to 2014, $P < .01$).³⁸ The directionality of our findings corresponds with those of the length of hospital stay in RIETE, although the 30-day mortality rate in our sample remained stable across the study period. Contrary to RIETE, our study sample was exclusively related to older adults. Further, we were able to explore the trends and disparities across the major demographic subgroups and regions.

This study has several limitations. First, patients enrolled in Medicare managed care programs as well as those younger than 65 years of age were excluded. Nevertheless, our sample comprised 100% of Medicare Fee-for-Service beneficiaries, and the majority of patients admitted to the hospital with deep vein thrombosis are older adults.⁷ Second, administrative codes were used to define the cohort instead of medical record review. However, medical chart abstraction for such a large study is not feasible, and the diagnostic codes in the principal position that we used for identification of deep vein thrombosis have very high sensitivity and specificity.¹⁹ Third, we were unable to classify some specific markers of disease severity, including the location of the deep vein thrombosis or iliac extension, due to the nature of the data available to us. However, there are no existing data or a priori hypotheses to indicate that these findings have had a major proportional change over

time. As such, it is unlikely that they would impact our conclusions related to the observed trends for hospitalizations or outcomes.

In conclusion, hospitalizations for deep vein thrombosis have decreased markedly for Medicare Fee-for-Service beneficiaries, as has the length of stay among hospitalized patients from 1999 to 2010. Thirty-day readmissions rates have shown a slight increase, while the short and longer-term mortality rates have remained relatively stable. The racial and sex disparities for deep vein thrombosis identified in our study indicate unmet needs for preventive measures among these populations.

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CLINICAL SIGNIFICANCE

- The overall adjusted rate of hospitalizations for deep vein thrombosis decreased substantially from 1999 to 2010.
- Among black patients, hospitalizations for deep vein thrombosis increased markedly over the study period and rates were the highest among black patients.
- Short- and long-term mortality and readmission outcomes remained relatively stable across the study period, but women had higher rates than men.
- This information can be used to document deep vein thrombosis surveillance over time, with a greater focus on disparities.

Figure 1.
Rates of adjusted hospitalization for deep vein thrombosis by overall and race subgroup, 1999 to 2010.

Figure 2. Hospitalization rates per 100,000 person-years for deep vein thrombosis by US State, 1999 (top) and 2010 (bottom).

Table 1

Characteristics of Patients Hospitalized for Deep Vein Thrombosis, 1999 to 2010

	1999–2000	2001–2002	2003–2004	2005–2006	2007–2008	2009–2010
No. of patients	128,921	130,985	123,856	117,823	112,918	111,920
Age, mean (SD) (years)	78.5 (7.7)	78.6 (7.7)	78.8 (7.9)	79.0 (8.0)	79.3 (8.1)	79.4 (8.3)
Women	64.9%	64.4%	63.0%	62.6%	62.0%	61.1%
White	87.5%	86.5%	85.0%	84.1%	83.8%	83.2%
Black	9.4%	10.3%	11.4%	12.3%	12.5%	13.0%
Other race	3.1%	3.2%	3.5%	3.7%	3.7%	3.8%
Hypertension	53.4%	58.9%	63.1%	65.4%	70.4%	72.0%
Atherosclerosis	26.3%	27.3%	29.0%	29.1%	29.2%	28.2%
COPD	19.3%	19.7%	21.2%	22.0%	21.0%	19.2%
Cancer	23.5%	23.5%	23.0%	22.4%	21.3%	20.2%
Diabetes mellitus	20.2%	21.5%	23.6%	25.1%	26.0%	26.9%
Heart failure	14.1%	14.5%	15.7%	16.4%	15.6%	14.6%
Peripheral vascular disease	13.3%	13.8%	14.5%	15.1%	15.1%	13.6%
Cerebrovascular disease other than stroke	6.0%	5.9%	5.8%	5.3%	5.2%	5.1%
Unstable angina	2.8%	2.6%	2.3%	1.9%	1.6%	1.5%
Stroke	4.0%	3.9%	3.7%	3.7%	3.6%	3.4%
Prior myocardial infarction	2.6%	2.7%	2.8%	2.8%	2.8%	2.8%
Trauma in past year	11.6%	12.1%	13.2%	13.5%	13.4%	12.6%
Dementia	16.6%	17.6%	18.7%	19.2%	20.3%	20.9%
Malnutrition	4.8%	4.8%	5.5%	6.0%	7.3%	8.7%
Functional disability	4.7%	4.5%	4.5%	4.2%	4.4%	4.7%
Pneumonia	10.9%	11.1%	11.8%	12.4%	12.8%	12.6%
Depression	8.2%	9.5%	10.7%	10.8%	11.1%	10.6%
Respiratory failure	3.6%	3.7%	4.2%	5.1%	6.6%	6.7%
Renal failure	4.9%	6.2%	8.4%	12.0%	15.8%	17.7%
Major psychiatric disorder	3.3%	3.4%	3.4%	3.4%	3.5%	3.8%
Liver disease	0.8%	0.9%	0.9%	1.0%	1.0%	1.1%

COPD = chronic obstructive pulmonary disease.

Table 2
Hospitalization Rates for Deep Vein Thrombosis in Medicare Fee-for-Service Beneficiaries, 1999 to 2010

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Relative Difference (%) [*]
Person-years	26,479,079	26,768,087	27,553,904	28,345,999	28,821,487	29,109,293	29,157,293	28,452,501	27,899,732	27,675,586	27,343,436	27,696,576	
Rates per 100 000 person-years													
Adjusted overall [†]	264	245	243	230	204	187	182	177	170	182	175	167	-36.7
Age (years)													
65–74	196	175	170	159	130	119	108	102	97	101	95	92	-52.8
75–84	311	287	293	279	256	229	231	224	218	238	228	217	-30.3
85	425	415	407	410	385	375	366	374	366	396	394	376	-11.5
Sex													
Men	231	206	206	198	183	167	163	157	155	163	161	154	-33.3
Women	286	271	269	257	221	205	196	192	184	198	187	179	-37.6
Race													
White	267	242	239	224	193	175	166	162	157	168	162	154	-42.2
Black	316	321	335	355	336	348	366	378	380	411	425	382	20.8
Other	146	124	123	120	123	112	117	105	105	109	102	105	-28.1

^{*} Relative difference from 1999 to 2010.

[†] Adjusted for age, sex, and race.

Table 3

Length of Stay, Discharge Disposition, and Readmission Rates of Deep Vein Thrombosis in Medicare Fee-for-Service Beneficiaries, 1999 to 2010

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Relative Difference (%) [*]
Length-of-stay (SD) (days)	6.1 (5.2)	5.9 (4.4)	5.8 (4.4)	5.8 (4.5)	5.7 (4.4)	5.6 (4.2)	5.5 (4.2)	5.5 (4.2)	5.4 (4.5)	5.3 (4.4)	5.1 (4.0)	5.0 (3.7)	-18.0
Discharge disposition, %													
Home	57.2	57.4	57.3	55.7	53.0	49.0	48.5	46.9	46.1	45.8	45.3	44.1	-22.9
Home health care	14.0	14.0	14.0	14.9	16.8	20.0	20.1	21.2	22.1	22.3	23.2	23.9	70.7
ICF/SNF	22.7	22.3	22.4	22	22.4	23.5	23.9	24.2	24.4	24.5	24.1	24.4	7.5
Hospice	0.1	0.2	0.3	0.5	0.9	1.2	1.5	1.8	1.8	2.0	2.2	2.1	2000.0
Transferred out	1.0	1.1	1.0	1.1	1.0	0.9	0.9	0.8	0.9	0.9	0.8	0.9	-10.0
Other [†]	4.5	4.7	4.8	5.6	5.9	5.3	4.8	4.4	4.3	4.5	4.4	4.3	-4.4
30-day readmission rate, %													
Adjusted overall [‡]	13.4	13.9	14.5	14.9	16.0	16.8	16.2	16.6	17.3	15.3	14.8	15.1	12.7
Age (years)													
65-74	13.4	13.6	13.6	14.2	15.5	16.7	14.8	16.2	16.5	14.4	13.4	14.7	9.3
75-84	13.2	13.6	14.4	15.2	15.8	16.1	16.4	16.4	16.9	15.8	15.2	14.9	13.1
85	13.7	14.6	16.6	15.5	16.8	18.7	17.5	18.1	19.1	16.5	16.3	16.3	18.7
Sex													
Men	13.7	14.4	14.1	14.7	14.8	16.2	15.7	15.7	15.9	14.4	13.6	14.1	2.7
Women	13.2	13.4	14.7	14.9	16.5	17.3	16.4	17.4	18.3	16.2	15.9	15.9	20.5
Race													
White	12.9	13.1	14.0	14.4	15.2	16.4	15.3	16.0	16.6	15.2	14.2	14.6	13.3
Black	17.6	18.0	17.5	18.1	19.5	19.8	19.6	19.4	19.8	16.6	17.9	17.1	-2.8
Other	14.7	20.5	16.9	16.4	21.1	18.4	19.9	22.4	20.2	17.9	16.9	18.0	22.3

ICF/SNF = Intermediate care facility/skilled nursing facility.

^{*} Relative difference from 1999 to 2010.[†] including discharge against medical advice.[‡] Adjusted for age, sex, race, and clinical comorbidities.

Mortality Outcomes for Deep Vein Thrombosis in Medicare Fee-for-Service Beneficiaries, 1999 to 2010

Table 4

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Relative Difference (%) [*]
In-hospital mortality rate													
Unadjusted Overall	1.6	1.6	1.6	1.5	1.6	1.5	1.5	1.4	1.3	1.2	1.1	1.1	-31.3
30-day mortality rates													
Adjusted overall [†]	5.0	5.0	5.3	5.2	5.8	5.7	5.8	5.8	5.8	5.9	5.4	5.1	1.2
Age (years)													
65–74	4.1	4.2	4.5	3.9	4.5	4.5	4.7	4.5	4.2	4.7	3.9	3.9	-4.0
75–84	4.5	5.0	5.2	4.9	5.3	5.3	5.2	5.4	5.5	5.7	4.8	4.9	7.8
85	7.2	6.3	6.8	7.5	8.5	7.5	8.3	7.9	8.0	7.2	7.7	6.3	-12.8
Sex													
Men	5.3	5.2	5.4	5.3	5.9	5.6	5.6	5.6	5.2	5.6	5.0	4.4	-17.0
Women	4.8	4.9	5.3	5.2	5.8	5.7	5.9	5.9	6.2	6.0	5.6	5.5	14.8
Race													
White	5.0	5.0	5.3	5.3	5.8	5.7	6.0	6.1	6.0	6.1	5.5	5.2	3.9
Black	5.2	5.4	5.3	4.6	6.0	5.2	4.5	4.6	4.5	4.6	4.6	3.9	-25.0
Other	4.4	5.8	5.8	5.2	5.3	5.3	5.5	4.2	5.7	4.9	6.9	6.1	38.7
1-year mortality rates													
Adjusted overall [†]	21.5	21.5	23.1	22.1	23.2	22.8	21.0	21.4	21.8	20.4	19.7	19.6	-8.7
Age (years)													
65–74	18.4	19.1	18.8	17.0	18.8	19.9	18.0	18.1	17.1	16.2	14.6	14.7	-20.1
75–84	20.1	20.4	22.3	21.6	21.7	20.5	19.1	19.6	20.5	19.4	18.5	18.0	-10.4
85	28.8	26.3	31.5	30.7	32.0	30.9	27.6	28.4	29.2	26.0	26.5	27.4	-5.0
Sex													
Men	22.5	22.5	22.9	22.3	21.7	21.7	20.0	19.5	20.1	18.2	17.5	17.2	-23.5
Women	21.0	21.0	23.3	22.2	24.2	23.7	21.6	22.7	22.9	21.5	20.9	21.2	0.9
Race													
White	21.3	21.4	22.9	22.2	23.4	23.1	21.2	21.6	22.4	20.3	19.6	19.7	-7.3
Black	23.8	23.5	24.5	22.9	22.5	21.4	18.5	20.6	19.0	20.4	18.8	17.5	-26.4

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Relative Difference (%) [*]
Other	20.0	20.2	25.0	21.3	23.1	23.0	19.3	18.9	21.1	18.6	20.6	23.0	14.8

%

^{*} Relative difference from 1999 to 2010.

[†] Adjusted for age, sex, race, and clinical comorbidities.

[‡] Including discharge against medical advice.