



Venous Thromboembolism in Adult Hospitalizations—United States, 2007–2009

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1 table omitted.

DEEP VEIN THROMBOSIS (DVT) IS A BLOOD clot that occurs in a deep vein of the body; pulmonary embolism (PE) occurs when a clot breaks free and enters the arteries of the lungs. DVT and PE comprise venous thromboembolism (VTE), an important and growing public health concern.^{1,2} Hospitalization is a major risk factor for VTE, and many VTE events that occur among hospitalized patients can be prevented.^{2,3} A new program of the U.S. Department of Health and Human Services (Partnership for Patients: Better Care, Lower Costs) aims to reduce the number of preventable VTE cases in hospitals.⁴ To estimate the number of hospitalizations with VTE each year in the United States, CDC analyzed 2007–2009 data from the National Hospital Discharge Survey (NHDS). The results of that analysis determined that an estimated average of 547,596 hospitalizations with VTE occurred each year among those aged ≥ 18 years in the United States. DVT was diagnosed in an estimated annual average of 348,558 hospitalizations, and PE was diagnosed in 277,549; both DVT and PE were diagnosed in 78,511 hospitalizations. Estimates of the rates of hospitalizations with VTE were substantially higher among adults aged ≥ 60 years compared with those aged 18–59 years. These findings underscore the need to promote implementation of evidence-based prevention strategies to reduce the number of preventable cases of VTE among hospitalized patients.

NHDS uses a stratified multistage probability design to obtain a sample of discharges from nonfederal short-stay (average: <30 days) hospitals in the 50 states and District of Columbia.⁵ Medical and demographic information, up to seven listed discharge diagnoses, and disposition (including patient death) are collected for a sample of discharges from each hospital. Data including restricted design variables were accessed through the Research Data Center of CDC's National Center for Health Statistics. For this report, *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) codes were used to identify hospitalizations of persons aged ≥ 18 years with discharge diagnoses of DVT or PE. A DVT diagnosis was defined as the presence of any of the ICD-9-CM codes 451.1x, 451.81, 451.83, 453.2, 453.4x, 671.3x, and 671.4x. A PE diagnosis was defined as the presence of any of the ICD-9-CM codes 415.1x and 673.2x. Hospitalizations with codes for either DVT or PE also were counted as having a VTE diagnosis. Whether DVT or PE were present on admission or acquired during the hospital stay could not be determined. Data from 2007–2009 were used in this analysis. Weighted estimates of the average annual number of hospitalizations with a discharge diagnosis of DVT or PE were divided by the 2008 mid-year U.S. population estimates to derive rates of hospitalizations with a diagnosis of VTE per 100,000 population overall among adults aged ≥ 18 years, by sex and selected age groups.

During 2007–2009, an estimated annual average of 547,596 hospitalizations had a diagnosis of VTE for adults aged ≥ 18 years. Estimates for DVT and PE diagnoses were not mutually exclusive. An estimated annual average of 348,558 adult hospitalizations had a diagnosis of DVT, and 277,549 adult hospitalizations had a diagnosis of PE. An estimated annual average of 78,511 adult hospitalizations

What is already known on this topic?

Hospitalized patients are at increased risk for venous thromboembolism (VTE), which consists of deep vein thrombosis (DVT) and pulmonary embolism (PE). Many of the VTEs acquired by hospitalized patients are preventable.

What is added by this report?

During 2007–2009, an estimated annual average of 547,596 adult hospitalizations occurred for which a discharge diagnosis of VTE was recorded; 348,558 of these hospitalizations had a discharge diagnosis of DVT, and 277,549 had a discharge diagnosis of PE. A total of 78,511 had both discharge diagnoses.

What are the implications for public health practice?

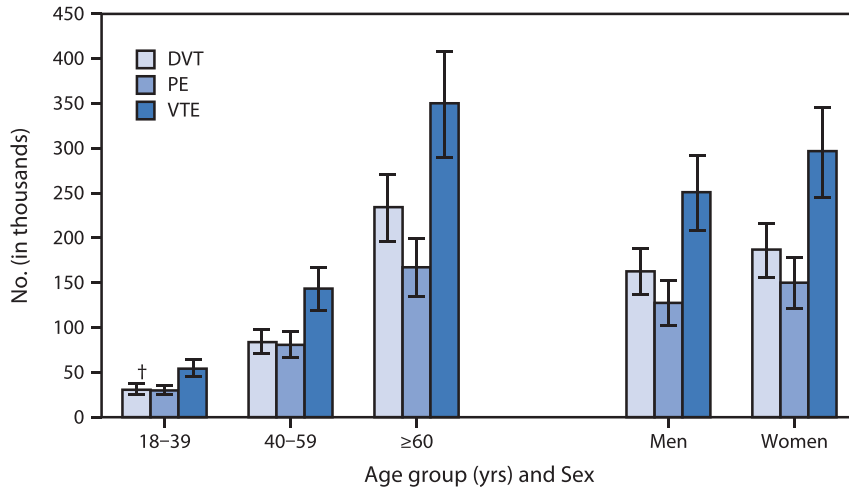
VTE is an important public health concern. Greater efforts are needed to identify, develop, and implement VTE prevention strategies and to improve surveillance for VTE cases to reduce morbidity and mortality from VTE.

(14% of overall VTE hospitalizations) had diagnoses of both DVT and PE.

The estimated average annual number of hospitalizations with VTE was successively greater among older age groups: 54,034 for persons aged 18–39 years; 143,354 for persons aged 40–59 years; and 350,208 for persons aged ≥ 60 years. The estimated average annual number of hospitalizations with VTE was comparable for men (250,973) and women (296,623).

The average annual rates of hospitalizations with a discharge diagnosis of DVT, PE, or VTE among adults were 152, 121, and 239 per 100,000 population, respectively. For VTE, the average annual rates were 60 per 100,000 population aged 18–39 years, 143 for persons aged 40–49 years, 200 for persons aged 50–59 years, 391 for per-

FIGURE. Estimated average annual number of hospitalizations with a diagnosis of deep vein thrombosis (DVT), pulmonary embolism (PE), or venous thromboembolism (VTE), by patient sex and age group — National Hospital Discharge Survey, United States, 2007–2009*



* Diagnoses of DVT and PE are not mutually exclusive; an estimated 78,511 patients received diagnoses of both DVT and PE. VTE estimates include patients with diagnoses of either DVT or PE.
 † 95% confidence interval.

sons aged 60–69 years, 727 for persons aged 70–79 years, and 1,134 for persons aged ≥80 years. The rates of hospitalization were similar for men and women, and the point estimates increased for both sexes by age.

On average, 28,726 hospitalized adults with a VTE diagnosis died each year. Of these patients, an average of 13,164 had a DVT diagnosis and 19,297 had a PE diagnosis; 3,735 had both DVT and PE diagnoses.

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Editorial Note: The results of this analysis underscore the importance of VTE as a public health concern. Many of the VTE diagnoses reported via NHDS might have occurred during hospitalization, when the risk for VTE is known to be elevated (e.g., because of major surgery, immobility, or comorbid conditions) (1–3). Because VTE cases that occur in hospitals often are preventable, an opportunity exists to reduce

disease burden through implementation of evidence-based prevention strategies in hospital settings.^{1,2,6}

The incidence of DVT and PE is known to be much higher among older adults compared with younger persons.⁷ In this analysis, the estimates of hospitalization rates with a discharge diagnosis of DVT, PE, or VTE were successively higher among older age groups. Although DVT and PE affect older hospitalized patients the most, a substantial number of hospitalizations with a diagnosis of VTE occurred among younger patients. Previous research has not clearly demonstrated a consistent difference between the rates of VTE in men and women.⁸ The findings in this report indicate that hospitalization rates with a diagnosis of DVT, PE, or VTE were comparable between men and women.

Many DVT and PE events can be prevented through appropriate administration of prophylaxis, which might include pharmacologic agents (e.g., antithrombotic agents) or mechanical devices. Current use of prophylaxis in hospitalized patients might be subop-

timal.^{1,9} CDC is collaborating with partners to promote implementation of evidence-based guidelines for prevention of DVT and PE in hospitalized patients. CDC also is developing a VTE module within the National Healthcare Safety Network, a web-based surveillance system for hospitals and health-care facilities.*

The findings in this report are subject to at least four limitations. First, whether DVT or PE was present on admission or onset occurred during the hospital stay cannot be determined. Second, DVT and PE diagnoses were identified using ICD-9-CM codes available in NHDS data rather than through medical record abstraction. Research suggests that most of the DVT and PE ICD-9-CM codes recorded in discharge records and used in this study on average have positive predictive values ranging from 75% to 95%.¹⁰ Third, the unit of analysis in this report was hospitalization and not the number of persons with diagnoses of DVT or PE. Patients hospitalized multiple times for these conditions in a given year would be counted more than once in NHDS data. Finally, NHDS surveys a sample of hospitalizations in the United States; therefore, the findings are subject to sampling variability.

Patients should discuss VTE prevention with their health-care providers before and during hospitalization and adhere to prescribed therapies, as appropriate. Comprehensive public health efforts also are needed to prevent VTE among hospitalized patients. Development and implementation of evidence-based prevention strategies are important to achieving this goal.

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*Additional information available at <http://www.cdc.gov/nhsn>.

Adult Awareness of Tobacco Advertising, Promotion, and Sponsorship—14 Countries

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2 tables omitted

ACCORDING TO THE 2012 REPORT OF THE U.S. Surgeon General, exposure to tobacco advertising, promotion, and sponsorship (TAPS) is associated with the initiation and continuation of smoking among young persons.¹ The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) requires countries to prohibit all forms of TAPS²; the United States signed the agreement in 2004, but the action has not yet been ratified. Many countries have adopted partial bans covering direct advertising in traditional media channels; however, few countries have adopted comprehensive bans on all types of direct and indirect marketing. To assess progress to-

ward elimination of TAPS and the level of awareness of TAPS among persons aged ≥ 15 years, CDC used data from the Global Adult Tobacco Survey (GATS) collected in 14 countries during 2008–2010. Awareness of any TAPS ranged from 12.4% in Turkey to 70.4% in the Philippines. In the four countries where awareness of TAPS was $\leq 15\%$, three of the countries had comprehensive bans covering all nine channels assessed by GATS, and the fourth country banned seven of the nine channels. In 12 countries, more persons were aware of advertising in stores than advertising via any other channel. Reducing exposure to TAPS is important to prevent initiation of tobacco use by youths and young adults and to help smokers quit.¹

GATS is an ongoing, nationally representative, in-person household survey of noninstitutionalized adults aged ≥ 15 years.* Fourteen countries completed GATS during 2008–2010. Countries conducting GATS used a standardized core questionnaire, sample design, data collection method, and analysis protocol to enhance comparability across countries. A multistage cluster sample design was used in each country, and data were weighted in analysis to account for the complex sample design.³ Survey questions regarding direct tobacco marketing asked whether participants noticed cigarette advertising in five marketing channels during the previous 30 days: 1) television or radio, 2) newspapers or magazines, 3) billboards or public walls, 4) Internet, and 5) point-of-sale in stores. Questions were asked regarding four channels of indirect tobacco marketing: 1) sponsorship of sports or sporting events, 2) free samples of cigarettes, 3) sales or coupons for cigarettes, and 4) clothing or other items featuring a brand name or logo.

During 2008–2010, all 14 countries banned at least one form of tobacco marketing. Three countries (Egypt, Thailand, and Vietnam) banned all nine channels of tobacco marketing that were assessed. Eight other countries (Bangladesh, Brazil, India, Mexico, Philip-

pines, Poland, Turkey, and Uruguay) banned five to eight channels. Three countries (China, Russia, and Ukraine) banned four or fewer channels. All 14 countries banned advertising on television or radio, and all but Russia and Mexico banned advertising in newspapers or magazines. Russia and China were the only countries that did not ban advertising on billboards or public walls; China had no bans on any types of indirect marketing.

Participants were aware of tobacco marketing in all countries, including the three countries that banned all nine TAPS channels: Egypt (13.0%), Thailand (15.0%), and Vietnam (14.7%). In general, awareness of TAPS was higher in those countries with the fewest bans. An exception was the Philippines, where participants had the highest awareness of TAPS (70.4%) despite bans on five TAPS channels. The next highest levels of awareness were in Russia (65.3%), which banned one channel, and Mexico (52.8%), which banned five. In China, which banned two channels, the government owns and operates the tobacco company. TAPS awareness in this country (16.9%) was lower than in other countries with partial bans.

In seven countries, awareness of point-of-sale advertising in stores was $>20\%$ and, with the exception of China and Turkey, awareness of point-of-sale advertising in stores was higher than awareness of any other TAPS channel. Awareness of tobacco advertising in newspapers or magazines was highest in Mexico (17.4%) and Russia (33.3%), the only two countries that do not ban tobacco advertising in print publications. Among the indirect marketing channels, awareness was $<10\%$ in most countries, with the exception of free samples (13.0% in Russia) and clothing or items with brand names or logos (11.0% in Mexico, 18.3% in the Philippines, and 20.9% in Russia).

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