



# Department of Veterans Affairs Office of Inspector General

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## Healthcare Inspection

### Prevention of Venous Thromboembolism in VA Hospitals

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## Executive Summary

The VA Office of Inspector General evaluated the extent to which Veterans Health Administration (VHA) clinicians implement evidence-based recommendations to prevent venous thromboembolism (VTE) in hospitalized patients. VTE includes deep vein thrombosis (DVT), a blood clot in the deep veins of the leg or pelvis, and pulmonary embolism (PE), a blood clot propagated to the lungs.

We evaluated the care provided for two populations of patients at VA hospitals—patients at risk for VTE and patients who developed PE. At-risk patients were older than 75 and had congestive heart failure (CHF). We ascertained whether the CHF patients received any preventive therapy while hospitalized and whether patients who developed PE had received preventive therapy prior to the event.

We estimated that 63 percent of patients at risk for VTE received recommended interventions, a rate similar to published reports from non-VA hospitals. Among patients who had PE while hospitalized, 17 percent received no preventive care before the event, and an additional 28 percent received suboptimal treatment in the absence of contraindications to anticoagulation. In both patient groups, rates of appropriate preventive care were similar at teaching and non-teaching hospitals.

We recommended that VHA develop and implement a plan to ensure that hospitalized patients at risk for VTE receive accepted preventive therapies and that they monitor rates of preventable VTE outcomes.



**DEPARTMENT OF VETERANS AFFAIRS**  
**Office of Inspector General**  
**Washington, DC 20420**

**TO:** Under Secretary for Health

**SUBJECT:** Healthcare Inspection – Prevention of Venous Thromboembolism in VA Hospitals

## **Purpose**

Pulmonary embolism is the most common preventable cause of death in hospitals. The VA Office of Inspector General (OIG), Office of Healthcare Inspections evaluated the extent to which patients hospitalized in Veterans Health Administration (VHA) medical facilities receive recommended preventive therapies.

## **Background**

Blood clots form in the deep veins of many individuals who have been immobile for long periods or have certain medical conditions. Referred to as deep vein thrombosis (DVT), these clots usually develop in the veins of the leg or pelvis. DVT causes disability due to chronic pain, swelling, and ulceration in affected extremities, and clots may dislodge from deep veins and travel to the lungs. Blockage of blood flow in the lungs by a detached blood clot is known as pulmonary embolism (PE), and DVT and PE are thus manifestations of the same disorder, venous thromboembolism (VTE).

VTE is a major concern for all hospitals because approximately 10 per cent of hospital deaths are attributable to PE, and fatal PE usually occurs without warning. Since most hospitalized patients are at risk for VTE and proven preventive measures have long been readily available, this condition has been called “the most common preventable cause of hospital death.”<sup>1</sup> Unfortunately, although explicit standards exist for the prevention of VTE, many patients do not receive this care.<sup>2</sup>

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<sup>1</sup> Geerts WH, et al. Prevention of venous thromboembolism. The seventh ACCP conference on antithrombotic and thrombolytic therapy. Chest. 2004;126:338S–400S.

<sup>2</sup> Amin A, et al. Thromboprophylaxis rates in US medical centers: success or failure? J Thromb Haemost. 2007;5:1610–6.

Recent surgery is a well-recognized risk factor for VTE, and surgeons have prescribed prophylactic therapies more consistently than other specialists. At the same time, prevention of VTE among hospitalized medical patients has been neglected.<sup>3</sup>

The National Quality Forum (NQF) endorses consensus standards for the prevention of VTE in hospitalized patients, including “To evaluate each patient upon admission and regularly thereafter for the risk of developing DVT/VTE. Utilize clinically appropriate methods to prevent DVT/VTE.”<sup>4</sup> Working with the NQF, The Joint Commission is developing a set of standardized inpatient measures for the evaluation of practices related to the management of VTE.<sup>5</sup>

Guidelines for the preventive care of non-surgical inpatients have been developed by several professional associations. The American College of Chest Physicians recommends prophylaxis with the anticoagulant heparin for most acutely ill medical patients. This is a Grade 1A recommendation. When anticoagulation is not possible in individual patients, prevention using mechanical devices is advised.<sup>6</sup>

Within VHA, compliance with preventive measures in surgical patients has been high. During October–December 2007, the national average for administration of VTE prophylaxis within 24 hours of surgery in VA hospitals was 92 percent.<sup>7</sup> A performance measure for VA medical patients has recently been developed following an initial assessment among patients treated in intensive care units.

This review sought to determine the extent to which hospitalized VA medical patients receive VTE preventive care in accordance with evidence-based recommendations. Because quality of care may vary in hospitals based on teaching status,<sup>8</sup> a secondary goal was to ascertain whether teaching and non-teaching facilities differ with respect to the delivery of care for VTE prevention.

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<sup>3</sup> Michota FA. Preventing venous thromboembolism in surgical patients. *Cleve Clin J Med*. 2006;73:S88–S94.

Goldhaber SZ, Turpie AGG. Prevention of venous thromboembolism among hospitalized medical patients. *Circulation*. 2005;111:e1–e3.

<sup>4</sup> <http://www.qualityforum.org/projects/ongoing/vte>. The National Quality Forum is a not-for-profit organization created to develop and implement a national strategy for health care quality measurement and reporting. Accessed June 25, 2008.

<sup>5</sup> <http://www.jointcommission.org/PerformanceMeasurement/PerformanceMeasurement/VTE>. The Joint Commission is an independent, not-for-profit organization that accredits and certifies more than 15,000 health care organizations and programs in the United States. Accessed June 25, 2008.

<sup>6</sup> See footnote 1. Grade 1A indicates a strong recommendation. It is based on expert opinion that benefits of an intervention exceed risks, with supporting evidence from randomized clinical trials. Prevention with mechanical devices is a 1C+ recommendation, indicating “extremely compelling evidence of a treatment benefit without a directly relevant RCT [randomized controlled trial].” See Guyatt G, et al. Applying grades of recommendation for antithrombotic and thrombolytic therapy. *Chest*. 2004;126:179S–187S.

<sup>7</sup> Data from VHA’s Office of Quality and Performance, Performance Data Resource Center.

<sup>8</sup> Landon BE, et al. Quality of care for the treatment of acute medical conditions in US hospitals. *Arch Intern Med*. 2006;166:2511–7.

## Scope and Methodology

We examined compliance with accepted VTE practice guidelines in two patient populations. First, the care of patients at risk for developing VTE was evaluated for evidence of appropriate preventive measures. Second, the care of patients who developed PE while hospitalized was evaluated for evidence of preventive therapy prior to the event.

### Patient Populations

We identified patients discharged from VA acute care hospitals during the period April 1, 2006–March 31, 2007, excluding patients hospitalized less than 48 hours and those in nursing homes, hospices, and domiciliaries. We also excluded patients managed by military or private sector providers at VA facilities.<sup>9</sup> We then defined two distinct populations:

1. Medical patients at increased risk for VTE. These patients were identified by (1) age  $\geq 75$  at the time of admission and (2) hospitalization with a principal discharge diagnosis of heart failure (ICD-9 code 428<sup>10</sup>). Heart failure patients were chosen because medical inpatients have been identified as being neglected in hospital VTE prevention efforts and because VHA currently does not assess this aspect of care.
2. Patients with established PE. These patients had any discharge diagnosis “pulmonary embolism and infarction” (ICD-9 415.1 or 415.19), but those with the diagnosis “personal history of venous thrombosis and embolism” (V12.51) were excluded.

Within each population, the discharge date defined an index hospitalization for evaluation. For patients discharged more than once with a qualifying diagnosis during the study period, we analyzed only the most recent hospitalization.

### Characterization of Facilities

Hospitals were considered teaching hospitals if they were members of the Association of American Medical Colleges’ Council of Teaching Hospitals and Health Systems (COTH).<sup>11</sup> When COTH membership was through a Veterans Integrated Service

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<sup>9</sup> VHA Austin Automation Center, Patient Treatment File.

<sup>10</sup> ICD-9 refers to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM), the official system of assigning codes to diagnoses and procedures associated with hospital utilization.

<sup>11</sup> <http://www.aamc.org/members/coth>. Accessed June 24, 2008.

Network, hospitals were judged to be teaching hospitals if they had one or more close university affiliations and/or management of medical inpatients by housestaff.<sup>12</sup>

### **Patient Selection and Medical Record Review**

In order to ensure optimal representation of teaching and non-teaching hospitals, we stratified patients with increased VTE risk and those with diagnosed PE according to hospital teaching status, thereby creating four groups:

1. Patients at increased risk for VTE – teaching hospitals.
2. Patients at increased risk for VTE – non-teaching hospitals.
3. PE patients – teaching hospitals.
4. PE patients – non-teaching hospitals.

Within each group we assigned a random number to each patient, ordered the patients by random number, and selected patients sequentially until 50 patients were identified or no further eligible patients were available.

For the heart failure patients, we assumed that all were at risk for VTE and required prophylaxis. We examined medical records to ascertain whether any form of preventive care was implemented during the index hospitalization. We also noted the presence of contraindications to prophylactic therapy.<sup>13</sup> Acceptable preventive care measures included anticoagulant medications and, in the case of contraindications to anticoagulation, mechanical compression devices applied to the lower extremity. Prophylaxis with unfractionated heparin was considered adequate only if administered three times daily.<sup>14</sup> Aspirin and other antiplatelet agents were not considered to be anticoagulants.

For the group of patients with established PE, we excluded patients if the diagnosis was made prior to admission or in the first 2 hospital days, if there were no acute signs and symptoms and the diagnosis was chronic PE, or if there were no imaging studies or post-mortem findings in support of the diagnosis. We assessed patients' records for VTE risk factors, for contraindications to preventive therapy, and for whether preventive care

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<sup>12</sup> In these teaching hospitals, medical patients are under the care of resident physicians supervised by attending physicians.

<sup>13</sup> Contraindications are those described in Institute for Clinical Systems Improvement. Health Care Guideline: Venous Thromboembolism Prophylaxis, Fourth Edition, June/2007, pp 13–14. [http://www.icsi.org/guidelines\\_and\\_more/gl\\_os\\_prot/cardiovascular/venous\\_thromboembolism\\_prophylaxis/venous\\_thromboembolism\\_prophylaxis\\_5.html](http://www.icsi.org/guidelines_and_more/gl_os_prot/cardiovascular/venous_thromboembolism_prophylaxis/venous_thromboembolism_prophylaxis_5.html). Accessed July 7, 2008.

<sup>14</sup> Nicolaides AN, Fareed J, Kakkar AK, et al. Prevention and treatment of venous thromboembolism. International Consensus Statement. *Int Angiol* 2006; 25:101–61. This is a Grade A recommendation based on Level 1 evidence from randomized controlled trials with consistent results.

was given. For non-surgical patients, we considered pertinent VTE risk factors to be those included with published recommendations.<sup>15</sup>

In both patient groups, we characterized hospitalizations of at-risk individuals as missed opportunities for prevention if there were no contraindications to treatment and no evidence that adequate prophylactic therapy was provided. In the care of patients with established PE, designation of adequate prophylactic therapy required at least 24 hours of treatment prior to diagnosis.

## Data Analysis

Comparisons between teaching and non-teaching hospitals were analyzed using chi-square tests. Confidence intervals for estimates of overall compliance were calculated using a normal approximation to the binomial distribution.<sup>16</sup>

We conducted the inspection in accordance with *Quality Standards for Inspections* published by the President's Council on Integrity and Efficiency.

## Results

### Medical Patients at Increased Risk for VTE

We identified 4,963 patients age 75 and older discharged after at least 2 days of acute hospitalization for heart failure—3,437 from 73 teaching hospitals and 1,526 from 58 non-teaching hospitals. The 100 patients randomly selected for review ranged in age from 75 to 94 (median, 82) and had hospitalizations of 3–41 days (median, 6). Ninety-eight were male. In this group of patients, we found 63 with evidence of adequate anticoagulation and 37 for which opportunities for prevention were not realized. Of the 63 patients who received anticoagulation, 29 (46 percent) were admitted while taking the oral anticoagulant warfarin for chronic conditions. Teaching and non-teaching hospitals did not differ with respect to missed opportunities for prevention of VTE (37 percent in each group). See Table 1.

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<sup>15</sup> See footnote 1, page 340S.

<sup>16</sup> Fleiss JL, Levin B, Paik MC. *Statistical methods for rates and proportions*, 3<sup>rd</sup> Ed. Hoboken, NJ: Wiley-Interscience; 2003,28,54.



**Table 1. Treatment of Inpatients at Increased Risk for Venous Thromboembolism at Acute Care VA Hospitals, April 1, 2006 – March 31, 2007.\***

	Total (4,963)	Hospital Type	
		Teaching (3,437)	Non-Teaching (1,526)
Randomly selected patients at risk	100	54	46
Received prophylactic anticoagulation †	63	34	29
Missed opportunities for prevention (percent, 95 percent confidence interval)	37 (37, 7–47)	20 (37, 23–51)	17 (37, 22–52)

\* Patients were age  $\geq 75$  with a discharge diagnosis of heart failure and length-of-stay greater than 2 days.

† Types of anticoagulation:

Teaching hospitals – heparin, 11; enoxaparin, 10; warfarin, 13.

Non-teaching hospitals – heparin, 2; enoxaparin 11; warfarin 16.

Six patients had contraindications to pharmacologic prophylaxis, but no patient not receiving anticoagulants had contraindications to mechanical prophylaxis. In addition, six patients received only mechanical prophylaxis even though anticoagulation was not contraindicated, and five received inadequate heparin regimens. See Table 2.

**Table 2. Types of Missed Opportunities for Prevention in Hospitalized Patients at Risk for Venous Thromboembolism.**

	Total (37)	Hospital Type	
		Teaching (20)	Non-Teaching (17)
No contraindications, no prophylaxis	20	9	11
Anticoagulation contraindicated, no mechanical prophylaxis*	6	3	3
No contraindication to anticoagulation; mechanical prophylaxis only	6	4	2
Inadequate heparin regimen; no mechanical prophylaxis†	5	4	1

\* Mechanical prophylaxis entailed the use of sequential compression devices, with or without anti-embolism stockings.

† Heparin prophylaxis was considered inadequate if administered less frequently than three times daily.

### Patients with Established PE

We identified 1,448 acute hospitalizations of at least 2 days duration for patients with PE—1,118 from 72 teaching hospitals and 330 from 51 non-teaching hospitals. We reviewed all 330 non-teaching cases and 449 (40 percent) teaching cases, for a total of 779 cases. In only 8 percent (66) of reviewed cases was the diagnosis of acute PE made after the first 2 hospital days and with accompanying objective evidence of VTE. Ninety percent of reviewed cases (698) were excluded because there was only a remote history of PE or the diagnosis was made prior to admission. Additional cases were excluded because the diagnosis was made during the first 2 hospital days or because there were no imaging studies or post-mortem findings to support the diagnosis. Diagnostic confirmation was by computed tomography and ventilation-perfusion scans, lower extremity ultrasonography in the setting of consistent clinical findings, and autopsy.

The 64 patients with confirmed in-hospital PE ranged in age from 44 to 85 (median, 65) and had hospitalizations of 4–53 days (median, 16). Sixty-three were male. One of these patients had no definite risk factors for VTE and was ambulatory when acute symptoms occurred. Among the 63 patients who had unequivocal VTE risk factors, 34 (54 percent) received appropriate prophylactic treatment, and 29 (46 percent) received inadequate or

no preventive therapy. See Table 3. There was no significant difference between teaching and non-teaching hospitals with respect to provision of prophylactic care (49 percent vs. 35 percent,  $p>0.3$ ).

**Table 3. Patients with a Discharge Diagnosis of Pulmonary Embolism (PE) at Acute Care VA Hospitals, April 1, 2006 – March 31, 2007.\***

	Total (1,448)	Hospital Type	
		Teaching (1,118)	Non-Teaching (330)
Randomly selected patients	779	449	330
Documented in-hospital pulmonary embolism	64	47	17
No definite VRE risk factors	1	0	1
Received prophylactic anticoagulation †	30	20	10
Anticoagulation contraindicated, received mechanical prophylaxis	4	4	0
Missed opportunities for prevention (percent, 95 percent confidence interval)	29 (45, 32–58)	23 (49, 30–68)	6 (35, 12–58)

\* All patients had a length-of-stay greater than 2 days.

† Types of anticoagulation:

Teaching hospitals – heparin, 15; enoxaparin, 4; warfarin, 1.

Non-teaching hospitals – heparin, 3; enoxaparin, 7.

Among the 29 patients whose hospitalizations were characterized as missed opportunities for prevention, 10 did not receive anticoagulation despite having no contraindications. One patient had a contraindication to anticoagulation but received no mechanical prophylaxis. An additional 12 patients received mechanical prophylaxis only despite having no contraindications to anticoagulation. Six patients received inadequate heparin regimens with or without mechanical prophylaxis. See Table 4.

**Table 4. Types of Missed Opportunities for Prevention in Hospitalized Patients with Pulmonary Embolism.**

	Total (29)	Hospital Type	
		Teaching (23)	Non-Teaching (6)
No contraindications, no prophylaxis	10	9	1
Anticoagulation contraindicated, no mechanical prophylaxis*	1	0	1
No contraindication to anticoagulation; mechanical prophylaxis only	12	9	3
Inadequate heparin regimen; † no mechanical prophylaxis	4	3	1
Inadequate heparin regimen; mechanical prophylaxis	2	2	0

\* Mechanical prophylaxis entailed the use of sequential compression devices, with or without anti-embolism stockings.

† Heparin prophylaxis was considered inadequate if administered less frequently than three times daily.

Each of the 10 patients who received no anticoagulation had recognized VTE risk factors. All had recent immobility prior to PE. Nine of the 10 had active malignancies, and 4 of these had undergone recent surgery. None had evidence of hypercoagulable states.<sup>17</sup> Five of the 10 patients died in the year following pulmonary embolism, 3 prior to discharge or within 2 weeks of discharge. See Table 5.

<sup>17</sup> These were defined as specific laboratory test results indicating the presence of conditions known to increase the likelihood of blood clot formation: factor V Leiden, lupus anticoagulant, and anticardiolipin antibodies. See Kucher N, et al. Electronic alerts to prevent venous thromboembolism among hospitalized patients. *N Engl J Med.* 2005;352:969–77.

**Table 5. Patients with Confirmed PE Who had No Anticoagulation.\***

Patient	Age	Hospital Day of PE Diagnosis	VTE Risk Factors			Outcome
			Cancer	Recent Major Surgery	Other	
1	78	14	Bladder	Cystectomy HD† 2	-	Stable 24 months after discharge
2	73	3	Colon	Colectomy 19 days prior to admission	-	Stable 18 months after discharge
3	84	3	Lung	Lobectomy HD 1	-	Stable 20 months after discharge
4	79	8	Renal	Nephrectomy HD 1	-	Stable 22 months after discharge
5	74	11	Prostate	-	-	Died HD 22
6	73	5	Gastric	-	Morbid Obesity	Died 6 months after discharge
7	63	18	Pancreas	-	-	Died HD 19
8	64	18	Pancreas	-	-	Died 7 months after discharge
9	76	4	Melanoma	-	-	Died 13 days after discharge
10	53	4	-	-	Recent sepsis	Stable 24 months after discharge

\* Patient #4 was treated at a non-teaching hospital; all other patients were treated at teaching hospitals. All patients had recent immobility prior to PE.

† HD = hospital day.

## Discussion

Based on a random sample of 4,963 elderly heart failure patients admitted to VA hospitals during a 1-year period, we estimated that 63 percent received recommended interventions aimed at preventing VTE. Although differences in methodology limit comparisons with published reports, this rate is similar to those observed at individual hospitals,<sup>18</sup> in large multicenter registries of patients with DVT or at risk for VTE,<sup>19</sup> and in a recent multinational cross-sectional study.<sup>20</sup> Notably, chronic outpatient anticoagulation that was continued during hospitalization accounted for nearly half of patients receiving preventive care. Compliance did not differ between teaching and non-teaching hospitals.

In a complementary approach to examining the extent of preventive care, we identified 1,448 patients discharged with a diagnosis of PE. Most of these patients were ultimately excluded because they did not have a new event while hospitalized. Eleven (17 percent) of the 64 patients with confirmed in-hospital PE received no preventive care before the event. An additional 18 (28 percent) received suboptimal heparin regimens or mechanical prophylaxis in the absence of contraindications to anticoagulation. As with the patients at risk for VTE, patients with established PE at teaching and non-teaching hospitals received similar rates of preventive care. The observed difference in rates between the types of hospitals favored non-teaching hospitals but did not reach clinical significance.

The population-based approach described in this report permits conclusions about the performance of VA's entire system of acute care hospitals. The results indicate that proven preventive therapies are often neglected at VA hospitals but overall performance is probably comparable to other settings. These findings clarify the extent to which systematic improvement is needed and can serve to inform the design of programs for taking full advantage of opportunities for prevention.

Several additional findings warrant comment. Patients with malignancies accounted for 9 of 10 patients who had PE after receiving no prior anticoagulation. For these cancer patients, recent surgery was also a contributing factor. Although both cancer and surgery

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<sup>18</sup> Goldhaber SZ, Dunn K, MacDougall RC. New onset of venous thromboembolism among hospitalized patients at Brigham and Women's Hospital is caused more often by prophylaxis failure than by withholding treatment. *Chest* 2000;118:1680–84. Peterman CM, Kolansky DM, Spinler SA. Prophylaxis against venous thromboembolism in acutely ill medical patients: an observational study. *Pharmacotherapy*. 2006;26:1086–90. Dorfman M, Chan SB, Maslowski C. Hospital-acquired venous thromboembolism and prophylaxis in an integrated hospital delivery system. *J Clin Pharm Ther*. 2006;31:455–9.

<sup>19</sup> Goldhaber SZ, Tapson VF, and DVT FREE Steering Committee. A prospective study of 5,451 patients with ultrasound-confirmed deep vein thrombosis. *Am J Cardiol*. 2004;15:259–62. Tapson VF, et. Venous thromboembolism prophylaxis in acutely ill hospitalized medical patients: findings from the International Medical Prevention Registry on Venous Thromboembolism. *Chest*. 2007;132:936–45.

<sup>20</sup> Cohen AT, et al. Venous thromboembolism risk and prophylaxis in the acute hospital care setting. *Lancet*. 2008;371:387–94.

are well-known risk VTE factors, the extremely high risk associated with the combination<sup>21</sup> may not be generally recognized by clinicians. Particular effort may be warranted to ensure prophylaxis in this group, and more intensive measures may be necessary.

This report reveals several barriers to the accurate retrospective measurement of preventable inpatient PE. First, the use of discharge diagnoses to monitor the occurrence of inpatient PE is apparently fraught with hazard. In this study, after excluding patients with a discharge diagnostic code indicating a past history of PE, very few patients had an acute or recent event. In addition, many patients were clearly admitted after having the onset of symptoms as outpatients. Further, reliance on discharge diagnoses alone can lead to the inclusion of patients with a presumptive diagnosis made without the advantage of imaging studies or post-mortem examination. Although we overcame these barriers through careful record review and strict diagnostic criteria, our results suggest that efficient performance improvement efforts may require ongoing concurrent review.

A limitation of this study was that its retrospective design did not allow for an accurate determination of whether patients had the risk factor of immobility. Nevertheless, immobility was obvious for the 10 patients with PE who had no prior anticoagulation, all of whom had two or more risk factors.

Despite an acknowledged need for improvements in clinical practice, past efforts have had mixed results. For instance, in one study at a hospital with a well-established electronic medical record, computer alerts led to substantial improvement in the use of preventive measures and in VTE outcomes, but overall compliance remained low.<sup>22</sup> More recently, a multidisciplinary approach has achieved marked reductions in preventable VTE events.<sup>23</sup> Key elements of this approach are a simplified risk assessment tool and concurrent monitoring of patient treatments and outcomes. The Society of Hospital Medicine has developed comprehensive resources for hospitals designing VTE performance improvement programs.<sup>24</sup> Five VA hospitals have planned a pilot intervention for VTE risk assessment, but outcome metrics have yet to be established.<sup>25</sup>

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<sup>21</sup> Spyropoulos AC, et al. Prevention of venous thromboembolism in the cancer surgery patient. *Cleve Clin J Med.* 2008;75 Suppl 3: S17–26. See also Kucher, et al. (footnote 19), in which 80 percent of at-risk patients had cancer.

<sup>22</sup> See footnote 15.

<sup>23</sup> Maynard G, et al. Prevention of hospital-acquired venous thromboembolism: prospective validation of a VTE risk assessment model and protocol. Society of Hospital Medicine 2008 National Meeting. Electronic citation abstract #52, page 29. Accessed June 24, 2008, at

[http://www.hospitalmedicine.org/Paperless2008/PDFs/Additional\\_Info/SHM08\\_Abstracts.pdf](http://www.hospitalmedicine.org/Paperless2008/PDFs/Additional_Info/SHM08_Abstracts.pdf).

<sup>24</sup> [http://www.hospitalmedicine.org/ResourceRoomRedesign/RR\\_VTE/VTE\\_Home.cfm](http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_VTE/VTE_Home.cfm). Accessed June 24, 2008.

Note that the Institute for Clinical Systems Improvement also has extensive resources available. See footnote 13.

<sup>25</sup> VA medical centers involved in VTE pilot activities include Dayton, OH; Iowa City, IA; Omaha, NE; San Diego, CA; and Washington, DC.

## Conclusion

In this population-based study of VA inpatient care, delivery of recommended measures for the prevention of VTE was inconsistent. This quality deficit is similar to that observed in multiple published reports in various hospitals and health care systems.

## Recommendations

1. The Under Secretary for Health should develop and implement a plan to monitor rates of preventable VTE outcomes.
2. The Under Secretary for Health should ensure that hospitalized patients at risk for VTE receive accepted preventive therapies.

## Comments

The Under Secretary for Health concurred with the findings and recommendations in this report and submitted acceptable improvement plans to implement the recommendations. (See Appendix A, pages 14–18, for the full text of these comments.) We will follow up on all corrective actions until the plan has been fully implemented.

After completion of this review, the Agency for Healthcare Research and Quality published a guide for prevention of venous thromboembolism. A key point in the guide is that performance measures should assess “...how well the steps of care delivery come together to prevent hospital-acquired VTE, the main clinical endpoint or outcome.”<sup>26</sup> This point is reflected in Recommendation 1 and in VHA’s action plan.

*(original signed by:)*

JOHN D. DAIGH, JR., M.D.  
Assistant Inspector General for  
Healthcare Inspections

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<sup>26</sup> Maynard G, Stein J. Preventing Hospital-Acquired Venous Thromboembolism: A Guide for Effective Quality Improvement Prepared by the Society of Hospital Medicine. AHRQ Publication No. 08-0075. Rockville, MD: Agency for Healthcare Research and Quality. August 2008.



## Under Secretary for Health Comments

**Department of  
Veterans Affairs**

**Memorandum**

**Date:** September 5, 2008

**From:** Under Secretary for Health (10)

**Subject:** OIG Draft Report: **Healthcare Inspection – Prevention of Venous Thromboembolism in VA Hospitals** (Project No. 2006-02459-HI-0374) (WebCIMS 408817)

**To:** Assistant Inspector General for Health Care Inspections (54)

1. Thank you for the opportunity to review and respond to this report. I concur with your findings and recommendations. The information generated on the 100 study patients you randomly selected for review was helpful, and I understand that our clinical program managers personally followed up on some of the “missed opportunity” cases identified in the report to clarify clinical circumstances that might have impacted the apparent restriction of recommended preventive therapies. VHA’s plan for corrective action in response to your recommendations is attached.

2. I strongly agree with the evidence that prophylaxis for venous thromboembolism (VTE) is effective, and that VTE carries with it significant health care impact. In fact, more than 18 months ago, VHA initiated a significant, ongoing program to monitor drug therapy orders for prevention of VTE in Intensive Care Unit (ICU) patients who were mechanically ventilated or who had one of 12 designated high risk conditions.<sup>1</sup> This program is coordinated through the Inpatient Evaluation Center (IPEC), and was expanded to also encompass patients in acute care wards. Since 2007, VHA has measured VTE prophylaxis for more than 26,000 ICU patients and more than 130,000 medical-surgical (acute care) high risk patients. In addition, appropriate VTE prophylaxis use in the ICU and medical/surgical wards is now incorporated as a transformational

<sup>1</sup> These conditions are cited in the report of the Seventh Conference on Antithrombotic and Thrombolytic Therapy, sponsored by the American College of Chest Physicians, 2004.

measure in VHA's 2009 Performance Contract for Network Directors. I am disappointed that your report only briefly alluded to this important initiative as a "pilot assessment."

3. Your report also concludes that delivery of recommended measures for the prevention of VTE was inconsistent in VHA, but similar to that observed in multiple published reports on various other hospitals and health care systems. I agree that more consistency is needed, but I also believe that VA far surpasses oversight efforts in both the public and private health care sectors in preventing VTE. Based on our findings thus far for ICU patients, clear improvement trends have been validated, and I anticipate similar trends from studies of our acute care patients.

4. Finally, as shown in the attached table, national data generated from 2007 and the first six months of 2008 show substantial improvements in VTE prevention for mechanically ventilated patients. Improvements were also measured for the high risk non-operative patients who were monitored. In addition, all four of the high risk operative patient groups showed improvement in preventive therapy intervention during the time period measured. Because VHA's VTE monitoring program does not currently determine if high risk patients not receiving pharmacologic therapy for VTE prophylaxis are treated with non-drug therapy, the improvements might actually be understated, since a percentage of patients are receiving alternative therapies.

5. In summary, VHA is fully committed to strengthening our ongoing efforts in the prevention of VTE, and I believe that the impressive oversight monitoring program that VHA has already established has provided a strong foundation for continuous improvement in this important clinical area. Thank you again for the opportunity to comment on your report.

*(original signed by:)*

Michael J. Kussman, MD, MS, MACP

Attachments

## Attachment

The table below shows national results for 2007 and the first half of 2008 for the VHA monitor of drug therapy orders for prevention of venous thromboembolism (VTE) in Intensive Care Unit (ICU) patients that are mechanically ventilated or have 1 of 12 high risk medical (Pulmonary Embolism, Congestive Heart Failure, Respiratory Failure, Pneumonia, Stroke, Sepsis, Renal Failure, Hip Fracture) or surgical (GI Inflammation, GI Obstruction, GI resections, Hip Fracture/ Replacement) conditions.

	2007		2008 (6 months)	
	Number	DVT Rx	Number	DVT Rx
Mechanically Ventilated	6,120	78.4%	3,278	82.3%
Non-Operative Diagnoses	7,883	80.8%	4,429	83.4%
Operative Diagnoses	3,208	86.6%	1,665	91.2%

Facility specific VTE prevention information was available to each VAMC in May 2008.

September 22, 2008

VETERANS HEALTH ADMINISTRATION  
 Action Plan Response  
 OIG Draft Report: **Healthcare Inspection – Prevention of  
 Venous Thromboembolism in VA Hospitals**  
 (Project No. 2006-02459-HI-0374)

Recommendations/ Actions	Status	Completion Date
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Recommendation 1. **The Under Secretary for Health should develop and implement a plan to monitor rates of preventable VTE outcomes.**

Concur

As stated in the Under Secretary for Health's response memorandum, VHA initiated the first phase of a new, ongoing national program more than 18 months ago to assess VTE prophylaxis usage (by monitoring drug therapy orders) for at-risk hospitalized patients. Data collection, which is being coordinated by the Inpatient Evaluation Center (IPEC), originally was limited to patients in the Intensive Care Units (ICU), but was later expanded to also include at-risk medical-surgical patients. The monitoring focused on patients who were mechanically ventilated or who had 1 of 12 high risk medical (pulmonary embolism, congestive heart failure, respiratory failure, pneumonia, stroke, sepsis, renal failure, hip fracture) or surgical (gastrointestinal (GI) inflammation, GI obstruction, GI resection, hip fracture/replacement) conditions. The patients monitored included all patients with these diagnoses at any age and in the ICU for any length of time. National monitoring results, including facility-specific information for 2007 and the first half of 2008, were disseminated to the VISNs and VA medical centers in April 2008 for follow-up review and action. VHA has measured VTE prophylaxis for more than 26,000 ICU patients and for more than 130,000 medical-surgical high risk patients. Data trends for VTE prophylaxis for the medical-surgical acute care patients will be available for national distribution in September 2008. As also noted in VHA's response memorandum, published findings support substantial improvements in VTE prevention for all categories of ICU patients, and we anticipate similar trends for the medical-surgical patients.

In Process

September 2008 and Ongoing

VHA also believes that an important component of VHA's VTE monitoring program is to identify patients who developed a pulmonary embolism within their hospital stays and determine if they received appropriate preventive therapy (medications). The planned second phase of VHA's VTE monitoring program is scheduled to begin in September 2009, at which time we will monitor the discharge records of patients with diagnoses of pulmonary embolism. Data trends will be assessed and information will again be made available for national distribution, with appropriate follow-up actions taken as indicated.

Planned                      September 2009 and Ongoing

**Recommendation 2. The Under Secretary for Health should ensure that hospitalized patients at risk for VTE receive accepted preventive therapies.**

Concur

Based on the data generated by the national VTE monitoring program, described above, VHA has incorporated measures for VTE prophylaxis in the ICUs and acute care wards as transformational measures in the 2009 Performance Contract for Network Directors, which further reflects the importance VHA places on ensuring ongoing improvement in this important clinical area.

In addition, VA has been collecting The Joint Commission Surgical Care Improvement Project (SCIP) measures from the ORYX, the Joint Commission's national hospital quality performance measures, including those related to VTE prophylaxis. VHA program managers have been working in close coordination with the VISNs and medical facilities to improve care with demonstrated success. The Office of Quality and Performance, as well as the IPEC, Patient Care Services and the National Center for Patient Safety, will also develop a national educational strategy, using approaches that have been successful with other patient safety training initiatives (i.e., projects involving Central Line Associated Bacteremia (CLAB), Ventilator Associated Pneumonia (VAP), and Acute Myocardial Infarction (AMI). This strategy will employ national conference calls with relevant stakeholders, development of a tool box on the IPEC Website, with definitions, order sets and protocols, and educational modules and tools.

In Process                      March 2009 and Ongoing

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