

## DEEP VEIN THROMBOPHLEBITIS AND PULMONARY EMBOLISM

### Background

This case definition was developed by the Armed Forces Health Surveillance Center (AFHSC) for the purpose of epidemiological surveillance of three related conditions important to military-associated populations. AFHSC designated deep vein thrombophlebitis and pulmonary embolism conditions of “special surveillance interest” due to their association with severe injury and prolonged travel in confined spaces during medical evacuations. Because of the frequent association between thrombophlebitis, deep vein thrombosis, and pulmonary embolism, this surveillance case definition applies to all three conditions.

### Clinical Description

Deep vein thrombosis (DVT) is the formation of a blood clot in a deep vein. Although it often occurs in a lower extremity, it may also occur in the upper extremity or in the large veins in the chest and abdomen. The most serious complication of DVT is the life threatening condition pulmonary embolism (PE). Pulmonary embolism occurs when all or part of a blood clot in a deep vein breaks loose, travels to the right side of the heart, and embeds in one or more pulmonary blood vessels. Deep vein thrombosis and pulmonary embolism collectively are often referred to as venous thromboembolism (VTE).<sup>1</sup> Thrombophlebitis refers to inflammation of a vein in association with a clot in that vein.

### Case Definition and Incidence Rules

For surveillance purposes, a case of deep vein thrombosis or pulmonary embolism is defined as:

- *One hospitalization* with any of the defining diagnoses of deep vein thrombosis or pulmonary embolism in *any* diagnostic position (see ICD9 code list below); or
- *Two or more outpatient medical encounters*, occurring at least *7 days apart*, with a diagnosis of deep vein thrombosis or pulmonary embolism in *any* diagnostic position.
- *If analysis requires deployment-associated incident case counts*, the initial defining encounter must have occurred while the individual was deployed to, or within 90 days of returning from, a theater of operations of interest and the deployment must have been for 30 days or longer.

#### **Incidence rules:**

For individuals who meet the case definition:

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes a diagnosis of deep vein thrombosis or pulmonary embolism.

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<sup>1</sup> Armed Forces Health Surveillance Center. Deep Vein Thromboembolism Among Members of Active and Reserve Components, U.S. Armed Forces, 1999-2008. *Medical Surveillance Monthly Report (MSMR)*, 2009 August; Vol.16(8): 12-17.



**Case Definition and Incidence Rules** *(continued)*

- An individual is considered an incident case only once.

**Exclusions:**

- None

**Codes**

The following ICD9 codes are included in the case definition:

Condition	ICD-9-CM codes	CPT Codes
Deep Vein Thrombophlebitis / Pulmonary Embolism	415.1x (pulmonary embolism and infarction) <ul style="list-style-type: none"> <li>- 415.11 (iatrogenic pulmonary embolism and infarction)</li> <li>- 415.12 (septic pulmonary embolism)</li> <li>- 415.19 (other pulmonary embolism and infarction)</li> </ul> 451.1x (phlebitis and thrombophlebitis of deep vessels of lower extremities) <ul style="list-style-type: none"> <li>- 451.11 (femoral vein, deep, superficial)</li> <li>- 451.19 (other; femoropopliteal vein, popliteal vein, tibial vein)</li> </ul> 451.81 (phlebitis and thrombophlebitis, iliac vein)           451.83 (phlebitis and thrombophlebitis, of deep veins of upper extremities; brachial vein, radial vein, ulnar vein)           451.89 (phlebitis and thrombophlebitis, of other sites; axillary vein, jugular vein, subclavian vein)           453.2 (embolism and thrombosis of inferior vena cava)           453.40 – 453.42 (venous embolism and thrombosis of deep vessels of proximal lower extremity and distal lower extremity)           453.8x (acute venous embolism and thrombosis of other specified veins)* <ul style="list-style-type: none"> <li>- 453.81 (superficial veins of upper extremity)</li> <li>- 453.82 – 453.89 (acute venous embolism and thrombosis of: deep veins of upper extremities; upper extremities, unspecified; axillary veins; subclavian veins; internal jugular veins; other thoracic veins; and other specified veins)</li> </ul>	NA



## Development and Revisions

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- This case definition was developed by the Medical Surveillance Monthly Report (MSMR) staff for surveillance of deep vein thromboembolism.<sup>1</sup> The definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses.

### *Case Definition and Incidence Rule Rationale*

- In order to increase the specificity and positive predictive value of the case definition, the time interval between the two outpatient encounters with a diagnosis of deep vein thrombophlebitis or pulmonary embolism was changed to “occurring at least 7 days apart.” A 2009 MSMR article used an interval of “not more than 90 days apart” between the two outpatient encounters.<sup>1</sup>
- For deployment-associated incident case counts, AFHSC includes Department of Defense defined operations associated with deployment in its analyses, (e.g., Operations Enduring Freedom (OEF), Iraqi Freedom (OIF), and Operation New Dawn (OND)). The specification of “within 90 days of returning” represents the best judgment of a reasonable time frame to allow for post-deployment medical evaluations and follow-up to detect incident cases of deployment-associated NIHI. When estimating such cases, it should be noted that a causal association for DVT due to an event that occurred during a deployment or direct combat cannot be proven using data available to AFHSC.

### *Code Set Determination and Rationale*

- Code lists used in the following peer review journals were considered in the development of this definition: New England Journal of Medicine, Chest, Thrombosis Research,<sup>2</sup> and Clinical Therapeutics.
- A 2009 MSMR article on DVT includes ICD9 code 415 (acute core pulmonale).<sup>1</sup>
- Code lists used by the Veteran’s Administration and the Agency for Health Research and Quality (AHRQ) were considered in the development of this definition.

### *Deployment-Associated Incident Cases of DVT and PE*

If an analysis requires “deployment-associated” incident case counts, AFHSC includes the restriction described above under *Case Definition and Incidence Rules*. As of November 2010, AFHSC includes the following operations as associated with deployment in their DVT analyses: Enduring Freedom (OEF), Iraqi Freedom (OIF), and New Dawn (OND).

The specification of “within 90-days of returning” represents the best judgment of a reasonable time frame to allow for post-deployment screening to prompt medical evaluations that result in the diagnosis of DVT and PE. When estimating “deployment-associated” incident cases, it should be noted that a causal association for DVT and PE due to an event that occurred during a deployment or direct combat cannot be determined using data available to AFHSC.

## Reports

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AFHSC reports on deep vein thrombophlebitis and pulmonary embolism in the following reports:

- Monthly: Armed Forces Health Surveillance Center. “*Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service.*” Medical Surveillance Monthly Report (MSMR); Available on the AFHSC website at: <http://www.afhsc.mil/msmr>.

<sup>2</sup> Isenbarger DW, Atwood JE, Scott PT, et al. Venous thromboembolism among United States soldiers deployed to Southwest Asia. *Thromb Res.* 2006; 117(4): 379-83.



**Review**

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Feb 2011	Case definition review and adopted by AFHSC Surveillance Methods and Standards (SMS) working group.
Sept 2007	Case definition developed and reviewed by MSMR staff.

**Comments**

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None

