

# Deep Vein Thrombosis and Pulmonary Embolism

There are few public health problems as serious as deep vein thrombosis (DVT) and pulmonary embolism (PE), yet these conditions receive little attention. DVT/PE is an underdiagnosed, serious, preventable medical condition that occurs when a blood clot forms in a deep vein. These clots usually develop in the lower leg, thigh, or pelvis, but they can also occur in the arm. In more than one-third of people affected by DVT, clots can travel to the lungs and cause PE, a potentially fatal condition.

The precise number of people affected by DVT/PE is unknown, but estimates range from 300,000 to 600,000 annually in the United States. DVT/PE is associated with substantial morbidity and mortality: One-third of people with DVT/PE will have a recurrence within 10 years and one-third of people die within one month of diagnosis. Among people who have had a DVT, one-third will have long-term complications (post-thrombotic syndrome) such as swelling, pain, discoloration, and scaling in the affected limb. In some cases, the symptoms can be so severe that a person can become disabled. More troubling, sudden death is the first symptom in about one-quarter of people who have a PE.

Much of the morbidity and mortality associated with DVT/PE could be prevented with early and accurate diagnosis and management; however, the major challenges for preventing DVT/PE are effectively predicting which individuals are at greatest risk and ensuring access to appropriate care. DVT/PE affects people of all races and ages. Many of the acquired risks such as obesity, advanced age, air travel, chronic diseases, cancer, and hospitalization are increasing in the United States, and we can expect to see increasing numbers of people affected by DVT/PE.

## A Public Health Approach

### Surveillance, Epidemiology, Research

Despite the large number of people affected, there is currently no national surveillance of DVT/PE, and current prevalence and incidence estimates likely underestimate the impact of this condition. To strengthen our understanding of this condition and its impact, we need better data on DVT/PE incidence, morbidity, and mortality using surveillance that is geographically, racially, and ethnically representative of the U.S. population. In addition, data from such surveillance can also help to:

- Determine if differences in risks and outcomes exist among minority populations including whether DVT/PE contributes to health disparities.
- Define the risk factors in selected patient groups, such as women who are pregnant or individuals who have had surgical procedures.
- Evaluate the use of evidence-based preventive measures in clinical practice.
- Detect changes in DVT/PE occurrence over time.
- Identify areas for future research to reduce the disease burden.

The Centers for Disease Control and Prevention (CDC) is engaged in research to identify genetic and acquired risk factors of DVT/PE by providing support for the Genetic Attributes of Thrombosis Epidemiology (GATE) Study, a cooperative agreement with Emory University's Rollins School of Public Health. Researchers are using data from this study of more than 1,200 cases of DVT/PE in both African-Americans and whites to evaluate the effect of genetic variations on the risk of DVT/PE.



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CDC also supports the Thrombosis and Hemostasis Centers Research and Prevention Network to foster collaborative epidemiologic research designed to identify risks among the U.S. population and ultimately to improve diagnosis and treatment of these conditions. Funded centers have collected data on more than 5,000 patients of all ages and races while providing services to patients with DVT/PE and other thrombotic conditions. In addition to maintaining the patient registry, centers are initiating a biologic repository and new research protocols to further study the causes of and adverse outcomes for DVT/PE.



## Health Education and Health Literacy

DVT/PE is preventable. It is important for people to be able to recognize the signs and symptoms, know when to seek care, and know what treatment is available. Individuals, families, and their support communities can reduce their risk by understanding DVT/PE and its risk factors. Health care professionals have a critical role to play in preventing and reducing the burden of DVT/PE, as well. Although much is known about effective prevention and treatment, this evidence is not applied systematically in many health care settings. There is a need for greater awareness and education among health care professionals about the prevention, recognition, and treatment of DVT/PE.

CDC supports education and outreach activities at both the community and national levels to provide health promotion and wellness programs for people at risk for or affected by clotting disorders. Working with the National Alliance for Thrombosis and Thrombophilia (NATT), CDC has funded a health promotion and wellness initiative called “Stop the Clot” that develops and disseminates health information for people who have been affected by DVT/PE. The program conducts community education forums on clotting, sponsors a website with resources and information for the public, and has established support groups for people who have experienced DVT/PE. Additionally, CDC and NATT have developed an online training program on the basics of DVT/PE for non-physician health care professionals.

CDC is also working with the Vascular Disease Foundation to increase awareness among hospitalized women about their risk for DVT/PE.

## Laboratory Support and Capacity

CDC is enhancing laboratory research capacity by providing collaborating investigators with services such as subject matter expertise, technical support, and laboratory analysis. In the study of DVT/PE, CDC scientists use state-of-the-art laboratory methods such as gene sequencing and whole-genome scans to identify new genes that may be specifically associated with clotting, or genes associated with the risk factors (e.g., the role of inflammation, or other medical conditions) for clotting.

CDC’s DVT/PE research activities include the following:

- Conducting basic science and clinical research to define, determine the causes and complications of, diagnose, and prevent the complications of DVT/PE.
- Conducting studies to evaluate, improve, and standardize methods and procedures for classifying DVT/PE.
- Providing diagnostic support for research studies on emerging diseases or conditions associated with DVT/PE.
- Maintaining the national reference laboratory for coagulation disorders.

For more information, please visit our website at [www.cdc.gov/blooddisorders](http://www.cdc.gov/blooddisorders).



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