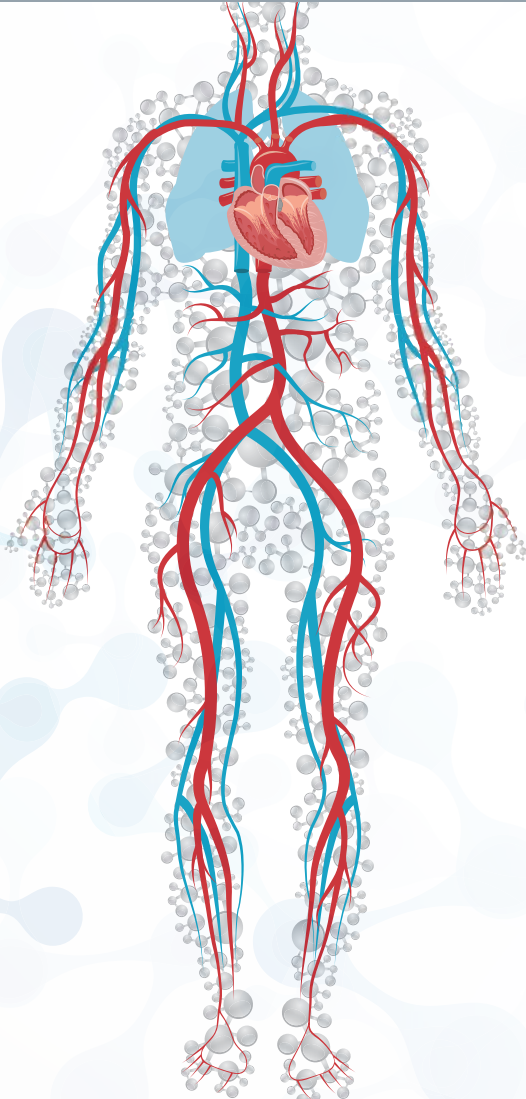


A Patient's Guide To

LIVING with Venous Thromboembolism (VTE)

CAUSES • RISK FACTORS • SYMPTOMS • DIAGNOSIS • TREATMENTS



VTE includes deep vein thrombosis (DVT) and pulmonary embolism (PE)

The background of the page is a complex, abstract molecular structure. It consists of numerous interconnected nodes and lines, resembling a network or a cluster of atoms. The nodes are represented by circles of varying sizes and shades of blue, from light sky blue to deep navy blue. The lines connecting them are thin and also in shades of blue. The overall effect is a sense of dynamic, interconnectedness, typical of a molecular model or a data network visualization.

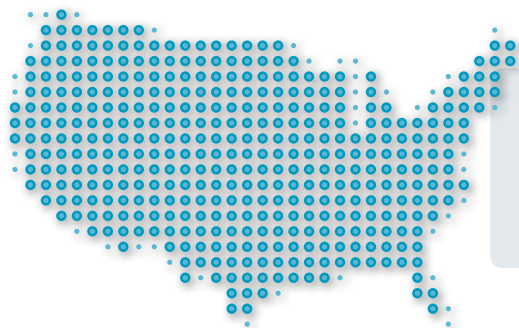
INSIDE

Defining VTE.....	2
Why Do Clots Form?.....	3
Who Is At Risk?.....	4
What Are the Symptoms?	5
How Is It Diagnosed?	6
How Is It Treated?	6
Potential Complications	8
Life After a VTE.....	8
Additional Resources	9
References	9

LIVING with Venous Thromboembolism (VTE)

Venous thromboembolism, or VTE, is a term that includes deep vein thrombosis and pulmonary embolism. It is common—affecting as many as 600,000 Americans¹. While approximately half of all cases are related to hospitalization², there are numerous causes and risk factors that may cause VTE in non-hospitalized individuals.

VTE recurs (or happens again) frequently and can cause long-term complications and even death. However, recognizing symptoms, seeking prompt medical attention, and getting proper treatment can significantly reduce complications and save your life.



VTE affects as many as
600,000
AMERICANS¹

MOST COMMON TYPES OF CARDIOVASCULAR ILLNESS IN THE U.S.³



Acute Coronary Syndrome



Stroke



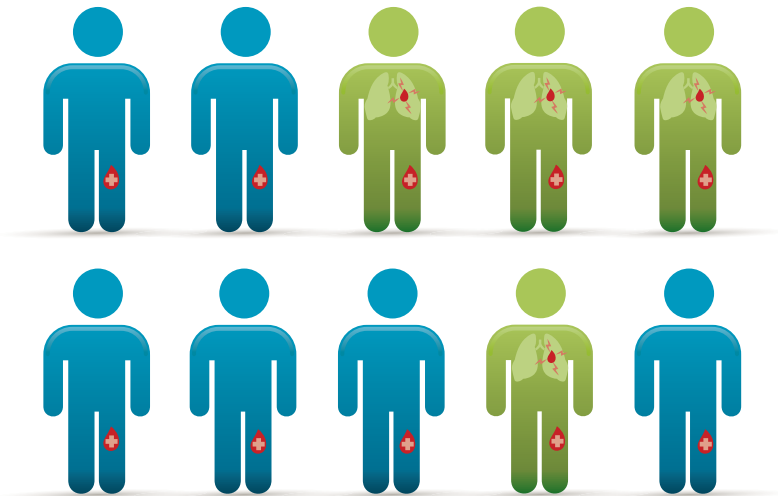
VTE

Defining VTE

Venous thromboembolism (VTE) is a term that includes deep vein thrombosis and pulmonary embolism.

Deep vein thrombosis (DVT) is a blood clot that develops in a deep vein in the body—usually within muscles. (The opposite of a deep vein is a superficial vein—one that is close to the skin, or the surface). The most common place for a DVT to develop is in the veins of the legs or pelvis, but they can also develop in the arms, brain, or intestines.

Pulmonary embolism (PE) occurs when blood clots in the deep veins (DVT) break free, travel through the circulatory system to the lungs, and lodge in a main artery or arteries, blocking blood flow. This blockage can cause high blood pressure in the lungs. As a result, the heart pumps harder than usual, and may enlarge and eventually fail from being overworked.



4 in 10 DVTs

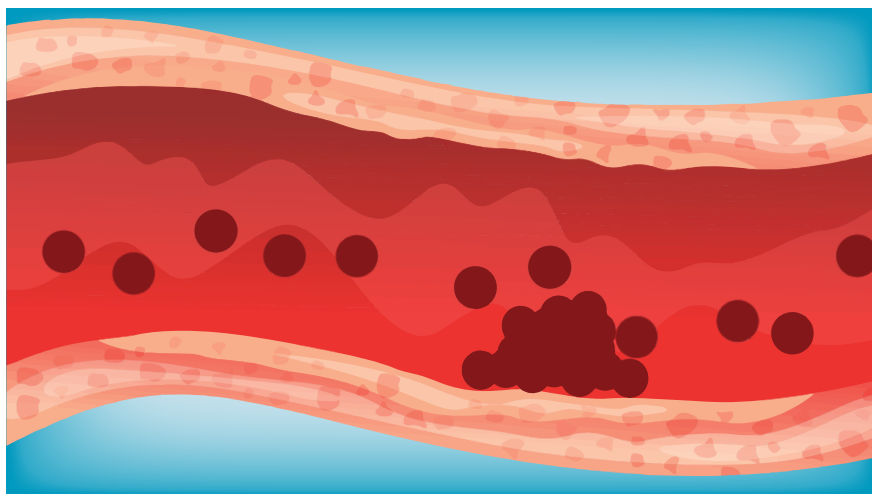
WILL DEVELOP INTO A **PE**

Why Do Clots Form?

Blood clotting, or coagulation, is a complex process where cells and proteins in the blood collect and form a “plug” of sorts at the site of an injury. This prevents excessive bleeding and usually the clots are dissolved by the body when the injury has healed.

However, clotting can happen even when there isn't an injury that needs it, and they aren't always dissolved naturally. These clots can form in the veins or arteries of the circulatory system, although with DVT, the clots form in deep veins. This can be very dangerous for a number of reasons.

The clot can block vital blood flow and cause pain, swelling, and tissue damage. Even more dangerous is when a clot breaks free and becomes an embolism—a clot traveling in the blood stream. An embolism from a deep vein can travel to the arteries of the lung, lodge, and cause severe complications and even death.



Who Is At Risk?

Blood clots in the veins can form anywhere that the blood doesn't circulate, or move, properly. This can happen because of damage to the veins—such as with surgery, because of impaired circulation—such as with extended lack of movement, and because of clotting disorders that make the blood thicker and more likely to clot.

Many factors can make a person more likely to develop blood clots and DVT or PE, including:

- Surgery, serious injury, inflammation and inflammatory disorders, cancer, and use of a central venous catheter
- Lack of motion from hospitalization, extended bed rest, or a leg cast
- Older age



1 in 2 CASES OF VTE occur during or soon after being **DISCHARGED FROM THE HOSPITAL**²

AGES 85+ 15x MORE LIKELY TO HAVE A VTE EVENT than people ages 45–54 years old.⁴



- Pregnancy, and the four months after delivery
- Use of certain medications like birth control and hormone replacement therapy
- Inherited or acquired clotting disorders
- Family history of clots
- Overweight or obesity
- Smoking

The risk of travel-related VTE in the general population is very low. However, VTE risk while traveling increases with the length of travel time (greater than 6 hours) and the addition of pre-existing risk factors, such as a previous DVT. All long-distance air passengers should stay hydrated and perform stretching exercises once an hour while in flight to prevent VTE.



What Are the Symptoms?

Deep Vein Thrombosis (DVT)

When there is a blood clot in a deep vein (DVT), blood flow is restricted and can lead to a variety of symptoms including:

- Swelling
- Pain or tenderness
- Warmth in the swollen area
- Red or discolored skin

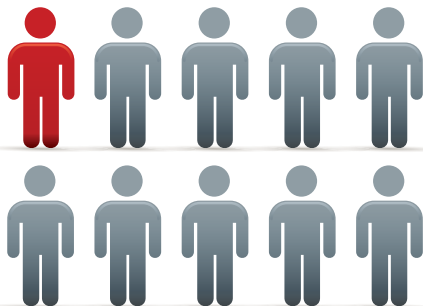
If you have any of these symptoms, be sure to discuss them with your health care professional right away. However, keep in mind that a DVT can occur without any symptoms.

Pulmonary Embolism (PE)

The biggest risk with DVT is that the clot breaks free and leads to a pulmonary embolism. Not all DVTs break free but if they do, and develop into a PE, it is a life-threatening emergency. If a PE goes untreated, it can quickly lead to death, so early recognition is key. Seek immediate medical attention if you experience any of the following symptoms of PE:

- Unexplained shortness of breath
- Pain in your chest, back, or side that is made worse with deep breathing or coughing
- Rapid breathing
- Coughing up blood
- Rapid heartbeat

1 in 10
people with
UNTREATED PE
WILL DIE WITHIN 30 DAYS.⁵



How Is It Diagnosed?

Recognizing and reporting symptoms to your health care professional is an important first step in getting a diagnosis. Your health care professional will not only want to hear about your symptoms and medical history, but will likely use some of the following tools to confirm your diagnosis:

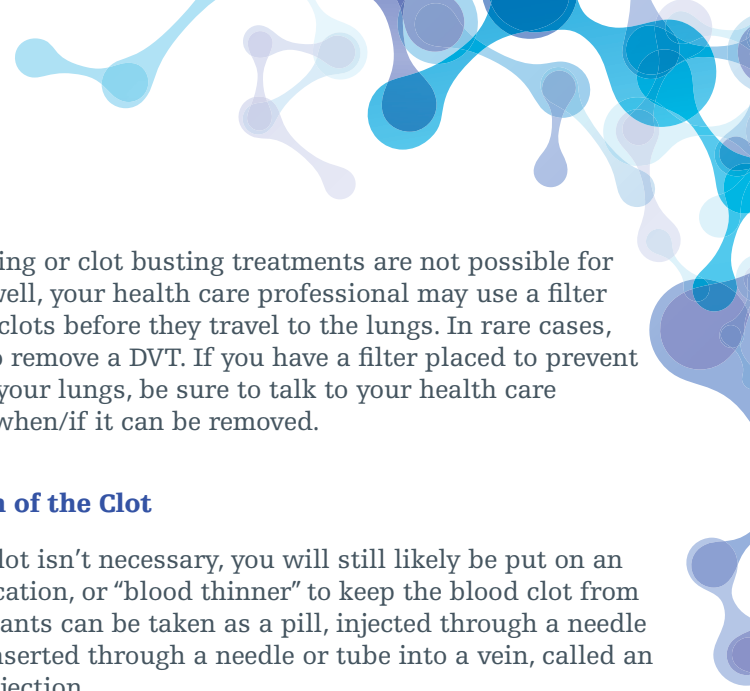
- **Clinical decision scores**—different scoring tools evaluate your symptoms, risk factors, and medical history to better estimate your risk and determine if you need additional testing.
- **Compression ultrasonography (sometimes called a “Doppler” or “Duplex” study)**—this is the most commonly used tool and is a noninvasive procedure that uses imaging to look for clots in veins.
- **Computed tomography (CT) venography**—radioactive dye is injected in the vein and allows an x-ray to be taken of your veins.
- **Magnetic resonance imaging (MRI)**—this machine produces detailed images of the inside of your body using magnetic imaging. This gives informative images of the body and can find DVTs.

How Is It Treated?

Breaking Up the Clot

In some cases a pulmonary embolism is immediately life threatening and your healthcare professional may give you a “clot busting” medicine—also referred to as thrombolytic therapy, to quickly dissolve your blood clots. The medication has a small risk of causing major bleeding so is only used in patients with extreme symptoms.

In some cases, a procedure is necessary to break up the clot and increase blood flow around it. This is called catheter-directed thrombolysis. A catheter is inserted in a vein in the leg and guided to the clot. The health care professional may then inject a clot-busting drug directly into the vein near the clot. They may also choose to insert and inflate a small balloon—balloon angioplasty, or place a wire stent, to widen the vein and prevent future blockages.



If these blood thinning or clot busting treatments are not possible for you, or don't work well, your health care professional may use a filter in the vein to catch clots before they travel to the lungs. In rare cases, surgery is needed to remove a DVT. If you have a filter placed to prevent clots from going to your lungs, be sure to talk to your health care professional about when/if it can be removed.

Preventing Growth of the Clot

If breaking up the clot isn't necessary, you will still likely be put on an anticoagulant medication, or "blood thinner" to keep the blood clot from growing. Anticoagulants can be taken as a pill, injected through a needle under the skin, or inserted through a needle or tube into a vein, called an intravenous or IV injection.

Preventing Recurrence

Once the blood clot is treated, the next treatment goal is to keep clots from happening again, or recurring. If you experience a VTE, the risk of it happening again is highest in the following three months, so your health care professional will likely keep you on an oral anticoagulant during that time to prevent new clots from forming.

After that time, if your clot was caused by a temporary risk factor—like hospitalization—your health care professional may decide to take you off of the anticoagulant. However, if it's unclear what caused your VTE, or if it was caused by a risk factor that you still have—like a genetic clotting disorder—your health care professional may want to continue your treatment for a longer period of time.

Anticoagulants can cause bleeding so you should be sure to discuss the benefits and risks with your health care professional. If you are prescribed an anticoagulant, be sure to take it as directed since missing a dose or taking it too late will leave you at a higher risk of new clots.

Potential Complications

The most serious complication from a VTE is death. Patients who develop a pulmonary embolism have around a 15% chance of dying from it.⁶ The mortality rate of PE rises significantly if not treated properly and promptly.

There are also long-term complications including post-thrombotic syndrome (PTS), which occurs when a clot damages the valves in the veins that control the direction of blood flow. Symptoms include pain, swelling, darkened skin color, skin ulcers, varicose veins, and recurrence of DVT and PE. This can cause long-term suffering and disability.

Life After a VTE

If you have been diagnosed with a VTE, there are some steps that you can take to lower your chances of developing another clot:

- Take all medications as directed
- Follow the instructions of your health care professional if you are hospitalized or need extended bed rest
- Lose weight if needed
- See your health care professional regularly
- Know the symptoms and risk factors for DVT and PE and seek immediate medical attention if you experience any
- Seek medical attention if you have symptoms of bleeding from your anticoagulant including unexplained severe headache and black or bloody bowel movements



For more information on VTE, watch the “Living with VTE and Preventing Deadly Blood Clots” film available on the Alliance for Aging Research YouTube Channel.

Additional Resources

Learn More about Venous Thromboembolism (VTE)

- The National Heart, Lung, and Blood Institute at www.nhlbi.nih.gov has important information about the prevention, causes, risks, diagnosis, and treatments of deep vein thrombosis (DVT) and pulmonary embolism (PE).
- The Cleveland Clinic shares more basics on DVT and PE at <http://my.clevelandclinic.org>.
- The National Blood Clot Alliance: Stop the Clot shares videos and more resources on how blood clots and treatment may affect diet, travel, children, women, and cancer patients at www.StopTheClot.org.

Find a Vascular Surgeon

- Find your nearest top vascular specialist by using The US News: Health List at <http://health.usnews.com/doctors/location-index/vascular-surgeons>
- The Society for Vascular Medicine has a database of more than 600 vascular surgeons at www.vascularmed.org/clinical_archive/find_physician.cfm

References

- ¹ Beckman, MG, WC Hooper, SE Critchley, and TL Ortel. 2010. Venous Thromboembolism: A public health concern. *Am J Prev Med* 38(4 Suppl):S495-501.
- ² Heit, JA, MD Silverstein, DN Mohr, et al. 2001. The Epidemiology of Venous Thromboembolism in the Community. *Thromb Haemost* 86:452-63. AND Spencer, FA, C Emery, SW Joffe, et al. 2009. Incidence Rates, Clinical Profile, and Outcomes of Patients with Venous Thromboembolism: The Worcester VTE study. *J Thromb Thrombolysis* 28:401-9.
- ³ Goldhaber, SZ. 1992. Pulmonary Embolism Thrombolysis: A clarion call for international collaboration. *J Am Coll Cardiol* 19(2):246-7.
- ⁴ Tsai, AW, M Cushman, WD Rosamond, SR Heckbert, JF Polak, and AR Folsom. 2002. Cardiovascular Risk Factors and Venous Thromboembolism Incidence: The longitudinal investigation of thromboembolism etiology. *Arch Intern Med* 161:1182-9.
- ⁵ Smith, JB, JM Maguire, et al. 2010. Early Anticoagulation Is Associated With Reduced Mortality for Acute Pulmonary Embolism. *Chest* 137(6): 1382—90.
- ⁶ Goldhaber, SZ, L Visani, and M DeRosa. 1999. Acute Pulmonary Embolism: Clinical outcomes in the International Cooperative Pulmonary Embolism Registry (ICOPER). *Lancet* 353(9162):1386-9.



Advancing Science. Enhancing Lives.

1700 K Street, NW
Suite 740
Washington, DC 20006
202.293.2856

www.agingresearch.org

 Alliance for Aging Research

 @Aging_Research

The **Alliance for Aging Research** is the leading non-profit organization dedicated to accelerating the pace of scientific discoveries and their application in order to vastly improve the universal human experience of aging and health.

© 2014 Alliance for Aging Research

With support from



Daiichi-Sankyo

*The Alliance for Aging Research
maintained all editorial control
over the content of this brochure*

Many thanks to our expert reviewers:

David Garcia, MD

Professor of Medicine/Hematology
University of Washington School of Medicine

Geno J. Merli, MD, MACP, FHM, FSVM

Professor of Medicine & Surgery, Co-Director, Jefferson Vascular Center
Sidney Kimmel Medical College at Thomas Jefferson University
Thomas Jefferson University Hospitals

Stephan Moll, MD

Professor of Medicine in the Division of Hematology-Oncology
University of North Carolina in Chapel Hill
Co-founder of the Clot Connect information program, on the web at clotconnect.org