



# About Venous Thromboembolism (VTE)

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## What is Venous Thromboembolism (VTE)?

Venous thromboembolism (VTE) is the third most common cardiovascular disease worldwide, after ischaemic heart disease and stroke<sup>1</sup> and is the most common, avoidable cause of hospital death<sup>2</sup>. VTE encompasses two serious conditions:

**Deep vein thrombosis (DVT)** is a blood clot in a vein, usually in the leg that partially or totally blocks the flow of blood<sup>3</sup>. If all or part of a DVT breaks off and is carried to another vessel which delivers blood to an organ, the consequences can be devastating. If it occurs in a vessel supplying blood to the lungs, it is known as a pulmonary embolism (PE), which can be rapidly fatal. (see below)

- ◆ Symptoms of DVT include pain, swelling, redness of the area, and dilation of the surface veins. The skin may also be warm to the touch

**Pulmonary embolism (PE)** is a blood clot blocking one or more vessels in the lungs. Once in the lung, the blood clot may block the circulation, causing sudden death or long-term damage to the lungs and other vital organs. About a third (34%) of VTE deaths are from sudden fatal PE<sup>4</sup>

- ◆ Symptoms of PE include acute shortness of breath, chest pain, and rapid heart rate; some people also cough blood
- ◆ About 1 in 10 deaths that occur in the hospital is caused by pulmonary emboli<sup>5</sup>

## Who is at Risk of VTE?

- ◆ Patients undergoing major orthopaedic surgery for hip or knee replacement or major surgery for cancer
  - The risk of symptomatic VTE after major orthopaedic surgery is higher than in the general population for at least two months after surgery<sup>2</sup>
  - Without preventative treatment, the absolute DVT risk after hip or knee surgery is between 40% and 60%<sup>2</sup>
- ◆ Patient-related, predisposing risk factors include inherited thrombophilia, advanced age, obesity, prior VTE and varicose veins<sup>2</sup>
- ◆ Patients admitted to hospital for an acute medical condition

VTE can be difficult to diagnose, as up to half of patients have no specific symptoms. Consequently, avoiding venous blood clots by preventative measures is the most economical and effective approach in current clinical practice.



## How Common is VTE?

### The worldwide incidence of VTE is 1 per 1000<sup>6</sup>

- ◆ The estimated incidence of DVT every year is approximately 700,000 in EU<sup>9</sup> and up to 2 million in the U.S.<sup>7</sup>
- ◆ The estimated incidence of acute PE every year 400,000 in EU<sup>9</sup> and approximately 60-70 per 100,000 patients in the U.S.<sup>8</sup>

## What is the Disease Burden of VTE?

### Mortality and morbidity

Globally, VTE kills one person every 37 seconds, which is more than 843,000 deaths every year<sup>4,10</sup>. This includes over 540,000 deaths in Europe alone<sup>11</sup>. In the EU, more than twice as many people die from VTE than from breast cancer, prostate cancer, AIDS and traffic accidents combined<sup>4</sup>.

- ◆ 10–25% of PEs are rapidly fatal<sup>12,13</sup>, usually within 2 hours of the onset of symptoms<sup>14</sup>. PE can reoccur, and if it does, it is usually fatal<sup>15</sup>
- ◆ Even in the absence of a PE, DVT alone can have burdensome and costly consequences such as post-thrombotic syndrome<sup>13</sup> and a significant risk of reoccurrence

### Economic burden

The complications associated with VTE, and its treatment, are frequent and costly. The main drivers of these VTE costs are initial and recurrent events requiring hospitalisation.

- ◆ The total estimated cost for VTE associated care in Europe is €3.1bn per year<sup>16</sup>
- ◆ In Europe, the annual cost of managing all-cause VTE has been estimated at approximately €4,000 per patient<sup>17</sup>
- ◆ With hospital readmission for DVT at 19%, the rate of VTE recurrence remains high<sup>18</sup>

## How is VTE Prevented and Treated?

Anticoagulants are the cornerstone of therapy for prevention of potentially deadly blood clots, but widely used traditional therapies are associated with significant drawbacks that challenge optimal patient treatment.

- ◆ The traditional standard therapy for **prevention of VTE** associated with orthopaedic surgery is a class of anticoagulant drugs known as heparins. Heparins require administration by injection, which can cause inconvenience and discomfort. In addition, some patients taking heparin experience a severe reaction known as HIT (heparin-induced thrombocytopenia), which can lead to new or worsening thrombosis





- ◆ The current standard of care for **treatment of VTE** is the complex dual drug approach of heparin followed by a vitamin K antagonist (VKA), such as warfarin. As well as the difficulties associated with heparins mentioned above, managing patients on VKAs such as warfarin can also be challenging. VKAs have a narrow therapeutic window (meaning there is a small gap between the dose that provides effective anticoagulation and a dose that increases bleeding events or can increase the rate of blood clots) and therefore can require frequent dose adjustments, as well as a need for routine coagulation monitoring. Furthermore, VKAs have a slow onset of action, as well as many food and drug interactions<sup>19,20</sup>

Limitations of current VTE therapies may contribute to their under-utilisation<sup>21</sup>, creating challenges for patients and leaving them at risk.

**Novel oral anticoagulants** hold the promise of overcoming the limitations of traditional anticoagulants to prevent and or treat more venous and arterial thromboembolic (VAT) conditions. Benefits of novel oral anticoagulants include predictable anticoagulation without the need for routine coagulation monitoring or frequent dose adjustment, low risk of drug-drug interactions and no dietary restrictions.

Xarelto<sup>®</sup> (rivaroxaban) protects patients from blood clots across more VAT conditions than any other novel oral anticoagulant. For VTE patients, 'Xarelto' is a single drug solution providing uninterrupted patient management from hospital to home as well as working fast for rapid protection. 'Xarelto' also has a similar low rate of major bleeding compared with the dual-drug approach of low molecular weight heparin (LMWH) and VKA.

Over the last four years, across all indications, more than two and a half million patients worldwide have received 'Xarelto' in daily clinical practice.

#### **VTE Prevention in Adult Patients Following Elective Hip or Knee Replacement Surgery**

- ◆ 'Xarelto' has been available since 2008 for VTE prevention in adult patients following elective hip or knee replacement surgery, and it is the only oral anticoagulant that has consistently demonstrated superior efficacy over enoxaparin in this indication. 'Xarelto' is approved in more than 120 countries worldwide and is marketed outside the U.S. by Bayer HealthCare in this indication



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- ◆ In the U.S., where 'Xarelto' has been available since July 2011 for VTE prevention in adult patients following elective hip or knee replacement surgery, Janssen Pharmaceuticals, Inc. (a Johnson & Johnson Company) holds marketing rights

### **DVT Treatment and Prevention**

- ◆ In December 2011 'Xarelto' also received EU marketing approval for the treatment of deep vein thrombosis (DVT) and the prevention of recurrent DVT and PE following an acute DVT in adult patients
  - In July 2012, the UK's National Institute for Health and Clinical Excellence (NICE) issued Final Guidance recommending 'Xarelto' for National Health Service (NHS) use for the treatment of DVT and the prevention of recurrent DVT and PE following an acute DVT in adults. The positive NICE appraisal was based on detailed analysis of the clinical and cost-effectiveness benefits of 'Xarelto'
- ◆ In November 2012, 'Xarelto' received U.S. approval as a single-drug solution for the treatment of DVT and to reduce the risk of recurrent DVT and PE

### **PE Treatment and Prevention**

- ◆ In October 2012, 'Xarelto' was recommended for approval by the European Committee for Medicinal Products for Human Use (CHMP) for the treatment of PE and the prevention of recurrent DVT and PE in adults. The decision of the European Commission on the approval in these indications is expected before the year-end
- ◆ In November 2012, 'Xarelto' also received U.S. approval as a single-drug solution for the treatment of PE and to reduce the risk of recurrent DVT and PE





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**RIVAROXABAN**



## About Xarelto® (Rivaroxaban)

Rivaroxaban is the most broadly indicated novel oral anticoagulant and is marketed under the brand name Xarelto®. To date, Xarelto has been approved for use in the following venous arterial thromboembolic (VAT) indications:

- The prevention of stroke and systemic embolism in adult patients with non-valvular atrial fibrillation (AF) with one or more risk factors in more than 70 countries worldwide
- The treatment of deep vein thrombosis (DVT) and prevention of recurrent DVT and pulmonary embolism (PE) in adults in more than 70 countries worldwide
- The prevention of venous thromboembolism (VTE) in adult patients undergoing elective hip or knee replacement surgery in more than 120 countries worldwide

Since the first approval of Xarelto in 2008 in the orthopaedic setting, more than two and a half million patients worldwide have received Xarelto in daily clinical practice in this indication alone.

Rivaroxaban was discovered by Bayer HealthCare, and is being jointly developed with Janssen Research & Development, LLC. Xarelto is marketed outside the U.S. by Bayer HealthCare and in the U.S. by Janssen Pharmaceuticals, Inc. (a Johnson & Johnson Company).

Anticoagulant medicines are potent therapies used to prevent or treat serious illnesses and potentially life threatening conditions. Before initiating therapy with anticoagulant medicines, physicians should carefully assess the benefit and risk for the individual patient.

Responsible use of Xarelto is a high priority for Bayer, and the company has developed a [Prescribers Guide](#) for physicians and a [Xarelto Patient Card](#) for patients to support best practices. To learn more, please visit: <https://prescribe.xarelto.com>.

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**To learn more about VAT, please visit [www.VATspace.com](http://www.VATspace.com)**  
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