## HIGHLIGHTS OF PRESCRIBING INFORMATION

**These highlights do not include all the information needed to use XARELTO® (rivaroxaban) safely and effectively. See full prescribing information for XARELTO.**

**XARELTO (rivaroxaban) tablets, for oral use**
**Initial U.S. Approval: 2011**

**WARNING: (A) PREMATURE DISCONTINUATION OF XARELTO INCREASES THE RISK OF THROMBOTIC EVENTS, and (B) SPINAL/EPIDURAL HEMATOMA**
***See full prescribing information for complete boxed warning***

**PREMATURE DISCONTINUATION OF XARELTO INCREASES THE RISK OF THROMBOTIC EVENTS**

**Premature discontinuation of any oral anticoagulant, including XARELTO, increases the risk of thrombotic events. To reduce this risk, consider coverage with another anticoagulant if XARELTO is discontinued for a reason other than pathological bleeding or completion of a course of therapy (2.2, 2.6, 5.1, 14.1).**

**SPINAL/EPIDURAL HEMATOMA**

**Epidural or spinal hematomas have occurred in patients treated with XARELTO who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis (5.2, 5.3, 6.2).**

**Monitor patients frequently for signs and symptoms of neurological impairment and if observed, treat urgently. Consider the benefits and risks before neuraxial intervention in patients who are or who need to be anticoagulated (5.3).**

### ----------RECENT MAJOR CHANGES----------

| | |
|---|---|
| Boxed Warning | 08/2013 |
| Dosage and Administration (2.8) | 03/2013 |
| Dosage and Administration (2.5) | 01/2014 |
| Warnings and Precautions (5.1, 5.8) | 08/2013 |
| Warnings and Precautions (5.2, 5.6, 5.8, 5.9) | 01/2014 |

### ----------INDICATIONS AND USAGE----------

XARELTO is a factor Xa inhibitor indicated:

- to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation (1.1)
- for the treatment of deep vein thrombosis (DVT), pulmonary embolism (PE), and for the reduction in the risk of recurrence of DVT and of PE (1.2, 1.3, 1.4)
- for the prophylaxis of DVT, which may lead to PE in patients undergoing knee or hip replacement surgery (1.5)

### ----------DOSAGE AND ADMINISTRATION----------

- Take 15 mg and 20 mg tablets with food; take 10 mg tablets with or without food (2.1)
- Nonvalvular Atrial Fibrillation:
  - For patients with CrCl >50 mL/min: 20 mg orally, once daily **with the evening meal** (2.3)
  - For patients with CrCl 15 - 50 mL/min: 15 mg orally, once daily **with the evening meal** (2.3)
- Treatment of DVT, PE, and Reduction in the Risk of Recurrence of DVT and of PE: 15 mg orally twice daily with food for the first 21 days for the initial treatment of acute DVT or PE. After the initial treatment period, 20 mg orally once daily with food for the remaining treatment and the long-term reduction in the risk of recurrence of DVT and of PE. (2.4)
- Prophylaxis of DVT Following Hip or Knee Replacement Surgery: 10 mg orally, once daily with or without food (2.5)

### ----------DOSAGE FORMS AND STRENGTHS----------

Tablets: 10 mg, 15 mg, and 20 mg (3)

### ----------CONTRAINDICATIONS----------

- Active pathological bleeding (4)
- Severe hypersensitivity reaction to XARELTO (4)

### ----------WARNINGS AND PRECAUTIONS----------

- Risk of bleeding: XARELTO can cause serious and fatal bleeding. Promptly evaluate signs and symptoms of blood loss. (5.2)
- Pregnancy-related hemorrhage: Use XARELTO with caution in pregnant women due to the potential for obstetric hemorrhage and/or emergent delivery. Promptly evaluate signs and symptoms of blood loss. (5.7)
- Prosthetic heart valves: XARELTO use not recommended (5.8)

### ----------ADVERSE REACTIONS----------

The most common adverse reaction (>5%) was bleeding. (6.1)

**To report SUSPECTED ADVERSE REACTIONS, contact Janssen Pharmaceuticals, Inc. at 1-800-526-7736 or FDA at 1-800-FDA-1088 or *www.fda.gov/medwatch.***

### ----------DRUG INTERACTIONS----------

- Combined P-gp and strong CYP3A4 inhibitors and inducers: Avoid concomitant use (7.1, 7.2)
- Anticoagulants: Avoid concomitant use (7.3)

### ----------USE IN SPECIFIC POPULATIONS----------

- Nursing mothers: discontinue drug or discontinue nursing (8.3)
- Renal impairment: Avoid or adjust dose based on CrCl (8.7)
- Hepatic impairment: Avoid use in patients with Child-Pugh B and C hepatic impairment or with any degree of hepatic disease associated with coagulopathy (8.8)

**See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.**

**Revised: 02/2014**



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*Sections or subsections omitted from the full prescribing information are not listed.



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## FULL PRESCRIBING INFORMATION

**WARNING: (A) PREMATURE DISCONTINUATION OF XARELTO INCREASES THE RISK OF THROMBOTIC EVENTS,**
**(B) SPINAL/EPIDURAL HEMATOMA**

**A. PREMATURE DISCONTINUATION OF XARELTO INCREASES THE RISK OF THROMBOTIC EVENTS**

**Premature discontinuation of any oral anticoagulant, including XARELTO, increases the risk of thrombotic events. If anticoagulation with XARELTO is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant *[see Dosage and Administration (2.2, 2.6), Warnings and Precautions (5.1), and Clinical Studies (14.1)]*.**

**B. SPINAL/EPIDURAL HEMATOMA**

**Epidural or spinal hematomas have occurred in patients treated with XARELTO who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures. Factors that can increase the risk of developing epidural or spinal hematomas in these patients include:**

- **use of indwelling epidural catheters**
- **concomitant use of other drugs that affect hemostasis, such as non-steroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, other anticoagulants**
- **a history of traumatic or repeated epidural or spinal punctures**
- **a history of spinal deformity or spinal surgery**

***[see Warnings and Precautions (5.2, 5.3) and Adverse Reactions (6.2)]*.**

**Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary *[see Warnings and Precautions (5.3)]*.**

**Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated for thromboprophylaxis *[see Warnings and Precautions (5.3)]*.**

# 1 INDICATIONS AND USAGE

## 1.1 Reduction of Risk of Stroke and Systemic Embolism in Nonvalvular Atrial Fibrillation

XARELTO is indicated to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation.



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There are limited data on the relative effectiveness of XARELTO and warfarin in reducing the risk of stroke and systemic embolism when warfarin therapy is well-controlled *[see Clinical Studies (14.1)]*.

### 1.2 Treatment of Deep Vein Thrombosis

XARELTO is indicated for the treatment of deep vein thrombosis (DVT).

### 1.3 Treatment of Pulmonary Embolism

XARELTO is indicated for the treatment of pulmonary embolism (PE).

### 1.4 Reduction in the Risk of Recurrence of Deep Vein Thrombosis and of Pulmonary Embolism

XARELTO is indicated for the reduction in the risk of recurrence of deep vein thrombosis and of pulmonary embolism following initial 6 months treatment for DVT and/or PE.

### 1.5 Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

XARELTO is indicated for the prophylaxis of DVT, which may lead to PE in patients undergoing knee or hip replacement surgery.

## 2 DOSAGE AND ADMINISTRATION

| Indication | Dosage | |
|---|---|---|
| **Reduction in Risk of Stroke in Nonvalvular Atrial Fibrillation (2.3)** | CrCl >50 mL/min: | 20 mg once daily **with the evening meal** |
| | CrCl 15 to 50 mL/min: | 15 mg once daily **with the evening meal** |
| **Treatment of DVT (2.4)**<br>**Treatment of PE (2.4)** | 15 mg twice daily with food, for first 21 days<br>**▼after 21 days, transition to ▼**<br>20 mg once daily with food, for remaining treatment | |
| **Reduction in the Risk of Recurrence of DVT and of PE (2.4)** | 20 mg once daily with food | |
| **Prophylaxis of DVT Following Hip or Knee Replacement Surgery (2.5)** | Hip replacement: | 10 mg once daily for 35 days |
| | Knee replacement: | 10 mg once daily for 12 days |

### 2.1 Important Food Effect Information

The 15 mg and 20 mg XARELTO tablets should be taken with food, while the 10 mg tablet can be taken with or without food *[see Clinical Pharmacology (12.3)]*.



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In the nonvalvular atrial fibrillation efficacy study XARELTO was taken with the evening meal.

## 2.2 Switching to and from XARELTO

*Switching from Warfarin to XARELTO* - When switching patients from warfarin to XARELTO, discontinue warfarin and start XARELTO as soon as the International Normalized Ratio (INR) is below 3.0 to avoid periods of inadequate anticoagulation.

*Switching from XARELTO to Warfarin* - No clinical trial data are available to guide converting patients from XARELTO to warfarin. XARELTO affects INR, so INR measurements made during coadministration with warfarin may not be useful for determining the appropriate dose of warfarin. One approach is to discontinue XARELTO and begin both a parenteral anticoagulant and warfarin at the time the next dose of XARELTO would have been taken.

*Switching from XARELTO to Anticoagulants other than Warfarin* - For patients currently taking XARELTO and transitioning to an anticoagulant with rapid onset, discontinue XARELTO and give the first dose of the other anticoagulant (oral or parenteral) at the time that the next XARELTO dose would have been taken *[see Drug Interactions (7.3)]*.

*Switching from Anticoagulants other than Warfarin to XARELTO* - For patients currently receiving an anticoagulant other than warfarin, start XARELTO 0 to 2 hours prior to the next scheduled evening administration of the drug (e.g., low molecular weight heparin or non-warfarin oral anticoagulant) and omit administration of the other anticoagulant. For unfractionated heparin being administered by continuous infusion, stop the infusion and start XARELTO at the same time.

## 2.3 Nonvalvular Atrial Fibrillation

For patients with creatinine clearance (CrCl) >50 mL/min, the recommended dose of XARELTO is 20 mg taken orally once daily with the evening meal. For patients with CrCl 15 to 50 mL/min, the recommended dose is 15 mg once daily with the evening meal *[see Use in Specific Populations (8.7)]*.

## 2.4 Treatment of Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and Reduction in the Risk of Recurrence of DVT and of PE

The recommended dose of XARELTO for the initial treatment of acute DVT and/or PE is 15 mg taken orally twice daily with food for the first 21 days. After this initial treatment period, the recommended dose of XARELTO is 20 mg taken orally once daily with food, at approximately the same time each day. The recommended dose of XARELTO for reduction in the risk of recurrence of DVT or PE is 20 mg taken orally once daily with food at approximately the same time each day *[see Clinical Studies (14.2)]*.



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## 2.5 Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

The recommended dose of XARELTO is 10 mg taken orally once daily with or without food. The initial dose should be taken 6 to 10 hours after surgery provided that hemostasis has been established *[see Dosage and Administration (2.6)]*.

- For patients undergoing hip replacement surgery, treatment duration of 35 days is recommended.
- For patients undergoing knee replacement surgery, treatment duration of 12 days is recommended.

## 2.6 Discontinuation for Surgery and other Interventions

If anticoagulation must be discontinued to reduce the risk of bleeding with surgical or other procedures, XARELTO should be stopped at least 24 hours before the procedure to reduce the risk of bleeding *[see Warnings and Precautions (5.2)]*. In deciding whether a procedure should be delayed until 24 hours after the last dose of XARELTO, the increased risk of bleeding should be weighed against the urgency of intervention. XARELTO should be restarted after the surgical or other procedures as soon as adequate hemostasis has been established, noting that the time to onset of therapeutic effect is short *[see Warnings and Precautions (5.1)]*. If oral medication cannot be taken during or after surgical intervention, consider administering a parenteral anticoagulant.

## 2.7 Missed Dose

If a dose of XARELTO is not taken at the scheduled time, administer the dose as soon as possible on the same day as follows:

- For patients receiving 15 mg twice daily: The patient should take XARELTO immediately to ensure intake of 30 mg XARELTO per day. In this particular instance, two 15 mg tablets may be taken at once. The patient should continue with the regular 15 mg twice daily intake as recommended on the following day.
- For patients receiving 20 mg, 15 mg or 10 mg once daily: The patient should take the missed XARELTO dose immediately.

## 2.8 Administration Options

For patients who are unable to swallow whole tablets, 15 mg or 20 mg XARELTO tablets may be crushed and mixed with applesauce immediately prior to use and administered orally. After the administration of a crushed XARELTO 15 mg or 20 mg tablet, the dose should be immediately followed by food *[see Dosage and Administration (2.1, 2.3, 2.4) and Clinical Pharmacology (12.3)]*.



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*Administration via nasogastric (NG) tube or gastric feeding tube:* After confirming gastric placement of the tube, 15 mg or 20 mg XARELTO tablets may be crushed and suspended in 50 mL of water and administered via an NG tube or gastric feeding tube. Since rivaroxaban absorption is dependent on the site of drug release, avoid administration of XARELTO distal to the stomach which can result in reduced absorption and thereby, reduced drug exposure. After the administration of a crushed XARELTO 15 mg or 20 mg tablet, the dose should then be immediately followed by enteral feeding *[see Clinical Pharmacology (12.3)]*.

Crushed 15 mg or 20 mg XARELTO tablets are stable in water and in applesauce for up to 4 hours. An *in vitro* compatibility study indicated that there is no adsorption of rivaroxaban from a water suspension of a crushed XARELTO tablet to PVC or silicone nasogastric (NG) tubing.

## 3 DOSAGE FORMS AND STRENGTHS

- 10 mg tablets: Round, light red, biconvex and film-coated with a triangle pointing down above a “10” marked on one side and “Xa” on the other side
- 15 mg tablets: Round, red, biconvex, and film-coated with a triangle pointing down above a “15” marked on one side and “Xa” on the other side
- 20 mg tablets: Triangle-shaped, dark red, and film-coated with a triangle pointing down above a “20” marked on one side and “Xa” on the other side

## 4 CONTRAINDICATIONS

XARELTO is contraindicated in patients with:

- active pathological bleeding *[see Warnings and Precautions (5.2)]*
- severe hypersensitivity reaction to XARELTO (e.g., anaphylactic reactions) *[see Adverse Reactions (6.2)]*

## 5 WARNINGS AND PRECAUTIONS

### 5.1 Increased Risk of Thrombotic Events after Premature Discontinuation

Premature discontinuation of any oral anticoagulant, including XARELTO, in the absence of adequate alternative anticoagulation increases the risk of thrombotic events. An increased rate of stroke was observed during the transition from XARELTO to warfarin in clinical trials in atrial fibrillation patients. If XARELTO is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant *[see Dosage and Administration (2.2, 2.6) and Clinical Studies (14.1)]*.

### 5.2 Risk of Bleeding

XARELTO increases the risk of bleeding and can cause serious or fatal bleeding. In deciding whether to prescribe XARELTO to patients at increased risk of bleeding, the risk of thrombotic events should be weighed against the risk of bleeding.



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Promptly evaluate any signs or symptoms of blood loss and consider the need for blood replacement. Discontinue XARELTO in patients with active pathological hemorrhage. The terminal elimination half-life of rivaroxaban is 5 to 9 hours in healthy subjects aged 20 to 45 years.

Concomitant use of other drugs that impair hemostasis increases the risk of bleeding. These include aspirin, $P2Y_{12}$ platelet inhibitors, other antithrombotic agents, fibrinolytic therapy, and non-steroidal anti-inflammatory drugs (NSAIDs) *[see Drug Interactions (7.3)]*.

Concomitant use of drugs that are combined P-gp and CYP3A4 inhibitors (e.g., ketoconazole and ritonavir) increases rivaroxaban exposure and may increase bleeding risk *[see Drug Interactions (7.1)]*.

*Reversal of Anticoagulant Effect:*

A specific antidote for rivaroxaban is not available. Because of high plasma protein binding, rivaroxaban is not expected to be dialyzable *[see Clinical Pharmacology (12.3)]*. Protamine sulfate and vitamin K are not expected to affect the anticoagulant activity of rivaroxaban. Partial reversal of prothrombin time prolongation has been seen after administration of prothrombin complex concentrates (PCCs) in healthy volunteers. The use of other procoagulant reversal agents like activated prothrombin complex concentrate (APCC) or recombinant factor VIIa (rFVIIa) has not been evaluated.

## 5.3 Spinal/Epidural Anesthesia or Puncture

When neuraxial anesthesia (spinal/epidural anesthesia) or spinal puncture is employed, patients treated with anticoagulant agents for prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma which can result in long-term or permanent paralysis *[see Boxed Warning]*.

An epidural catheter should not be removed earlier than 18 hours after the last administration of XARELTO. The next XARELTO dose is not to be administered earlier than 6 hours after the removal of the catheter. If traumatic puncture occurs, the administration of XARELTO is to be delayed for 24 hours.

## 5.4 Use in Patients with Renal Impairment

### Nonvalvular Atrial Fibrillation

Avoid the use of XARELTO in patients with CrCl <15 mL/min since drug exposure is increased. Periodically assess renal function as clinically indicated (i.e., more frequently in situations in which renal function may decline) and adjust therapy accordingly. Discontinue XARELTO in



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patients who develop acute renal failure while on XARELTO *[see Use in Specific Populations (8.7)]*.

#### Treatment of Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and Reduction in the Risk of Recurrence of DVT and of PE

Avoid the use of XARELTO in patients with CrCl <30 mL/min due to an expected increase in rivaroxaban exposure and pharmacodynamic effects in this patient population *[see Use in Specific Populations (8.7)]*.

#### Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

Avoid the use of XARELTO in patients with CrCl <30 mL/min due to an expected increase in rivaroxaban exposure and pharmacodynamic effects in this patient population. Observe closely and promptly evaluate any signs or symptoms of blood loss in patients with CrCl 30 to 50 mL/min. Patients who develop acute renal failure while on XARELTO should discontinue the treatment *[see Use in Specific Populations (8.7)]*.

### 5.5 Use in Patients with Hepatic Impairment

No clinical data are available for patients with severe hepatic impairment.

Avoid use of XARELTO in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy since drug exposure and bleeding risk may be increased *[see Use in Specific Populations (8.8)]*.

### 5.6 Use with P-gp and Strong CYP3A4 Inhibitors or Inducers

Avoid concomitant use of XARELTO with combined P-gp and strong CYP3A4 inhibitors (e.g., ketoconazole, itraconazole, lopinavir/ritonavir, ritonavir, indinavir, and conivaptan) *[see Drug Interactions (7.1)]*.

Avoid concomitant use of XARELTO with drugs that are combined P-gp and strong CYP3A4 inducers (e.g., carbamazepine, phenytoin, rifampin, St. John's wort) *[see Drug Interactions (7.2)]*.

### 5.7 Risk of Pregnancy-Related Hemorrhage

In pregnant women, XARELTO should be used only if the potential benefit justifies the potential risk to the mother and fetus. XARELTO dosing in pregnancy has not been studied. The anticoagulant effect of XARELTO cannot be monitored with standard laboratory testing nor readily reversed. Promptly evaluate any signs or symptoms suggesting blood loss (e.g., a drop in hemoglobin and/or hematocrit, hypotension, or fetal distress).



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### 5.8 Patients with Prosthetic Heart Valves

The safety and efficacy of XARELTO have not been studied in patients with prosthetic heart valves. Therefore, use of XARELTO is not recommended in these patients.

### 5.9 Acute PE in Hemodynamically Unstable Patients or Patients Who Require Thrombolysis or Pulmonary Embolectomy

Initiation of XARELTO is not recommended acutely as an alternative to unfractionated heparin in patients with pulmonary embolism who present with hemodynamic instability or who may receive thrombolysis or pulmonary embolectomy.

## 6 ADVERSE REACTIONS

The following adverse reactions are also discussed in other sections of the labeling:

- Increased risk of stroke after discontinuation in nonvalvular atrial fibrillation *[see Boxed Warning* and *Warnings and Precautions (5.1)]*
- Bleeding risk *[see Warnings and Precautions (5.2, 5.4, 5.5, 5.6, 5.7)]*
- Spinal/epidural hematoma *[see Boxed Warning* and *Warnings and Precautions (5.3)]*

### 6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

During clinical development for the approved indications, 16326 patients were exposed to XARELTO. These included 7111 patients who received XARELTO 15 mg or 20 mg orally once daily for a mean of 19 months (5558 for 12 months and 2512 for 24 months) to reduce the risk of stroke and systemic embolism in nonvalvular atrial fibrillation (ROCKET AF); 4728 patients who received either XARELTO 15 mg orally twice daily for three weeks followed by 20 mg orally once daily (EINSTEIN DVT, EINSTEIN PE) or 20 mg orally once daily (EINSTEIN Extension) to treat DVT, PE, and to reduce the risk of recurrence of DVT and of PE; and 4487 patients who received XARELTO 10 mg orally once daily for prophylaxis of DVT following hip or knee replacement surgery (RECORD 1-3).

#### Hemorrhage

The most common adverse reactions with XARELTO were bleeding complications *[see Warnings and Precautions (5.2)]*.

#### *Nonvalvular Atrial Fibrillation*

In the ROCKET AF trial, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 4.3% for XARELTO vs. 3.1% for



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warfarin. The incidence of discontinuations for non-bleeding adverse events was similar in both treatment groups.

Table 1 shows the number of patients experiencing various types of bleeding events in the ROCKET AF trial.

**Table 1: Bleeding Events in ROCKET AF***

| Parameter | XARELTO N = 7111 n (%) | Event Rate (per 100 Pt-yrs) | Warfarin N = 7125 n (%) | Event Rate (per 100 Pt-yrs) |
|---|---|---|---|---|
| Major bleeding† | 395 (5.6) | 3.6 | 386 (5.4) | 3.5 |
| Bleeding into a critical organ‡ | 91 (1.3) | 0.8 | 133 (1.9) | 1.2 |
| Fatal bleeding | 27 (0.4) | 0.2 | 55 (0.8) | 0.5 |
| Bleeding resulting in transfusion of ≥2 units of whole blood or packed red blood cells | 183 (2.6) | 1.7 | 149 (2.1) | 1.3 |
| Gastrointestinal bleeding | 221 (3.1) | 2.0 | 140 (2.0) | 1.2 |

* For all sub-types of major bleeding, single events may be represented in more than one row, and individual patients may have more than one event.

† Defined as clinically overt bleeding associated with a decrease in hemoglobin of ≥2 g/dL, transfusion of ≥2 units of packed red blood cells or whole blood, bleeding at a critical site, or with a fatal outcome. Hemorrhagic strokes are counted as both bleeding and efficacy events. Major bleeding rates excluding strokes are 3.3 per 100 Pt-yrs for XARELTO vs. 2.9 per 100 Pt-yrs for warfarin.

‡ The majority of the events were intracranial, and also included intraspinal, intraocular, pericardial, intra-articular, intramuscular with compartment syndrome, or retroperitoneal.

### *Treatment of Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and to Reduce the Risk of Recurrence of DVT and of PE*

EINSTEIN DVT and EINSTEIN PE Studies

In the pooled analysis of the EINSTEIN DVT and EINSTEIN PE clinical studies, the most frequent adverse reactions leading to permanent drug discontinuation were bleeding events, with XARELTO vs. enoxaparin/Vitamin K antagonist (VKA) incidence rates of 1.7% vs. 1.5%, respectively. The mean duration of treatment was 208 days for XARELTO-treated patients and 204 days for enoxaparin/VKA-treated patients.

Table 2 shows the number of patients experiencing major bleeding events in the pooled analysis of the EINSTEIN DVT and EINSTEIN PE studies.



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**Table 2: Bleeding Events* in the Pooled Analysis of EINSTEIN DVT and EINSTEIN PE Studies**

| Parameter | XARELTO† N = 4130 n (%) | Enoxaparin/ VKA† N = 4116 n (%) |
|---|---|---|
| Major bleeding event | 40 (1.0) | 72 (1.7) |
| Fatal bleeding | 3 (<0.1) | 8 (0.2) |
| Intracranial | 2 (<0.1) | 4 (<0.1) |
| Non-fatal critical organ bleeding | 10 (0.2) | 29 (0.7) |
| Intracranial‡ | 3 (<0.1) | 10 (0.2) |
| Retroperitoneal‡ | 1 (<0.1) | 8 (0.2) |
| Intraocular‡ | 3 (<0.1) | 2 (<0.1) |
| Intra-articular‡ | 0 | 4 (<0.1) |
| Non-fatal non-critical organ bleeding§ | 27 (0.7) | 37 (0.9) |
| Decrease in Hb ≥ 2g/dL | 28 (0.7) | 42 (1.0) |
| Transfusion of ≥2 units of whole blood or packed red blood cells | 18 (0.4) | 25 (0.6) |
| Clinically relevant non-major bleeding | 357 (8.6) | 357 (8.7) |
| Any bleeding | 1169 (28.3) | 1153 (28.0) |

* Bleeding event occurred after randomization and up to 2 days after the last dose of study drug. Although a patient may have had 2 or more events, the patient is counted only once in a category.

† Treatment schedule in EINSTEIN DVT and EINSTEIN PE studies: XARELTO 15 mg twice daily for 3 weeks followed by 20 mg once daily; enoxaparin/VKA [enoxaparin: 1 mg/kg twice daily, VKA: individually titrated doses to achieve a target INR of 2.5 (range: 2.0-3.0)]

‡ Treatment-emergent major bleeding events with at least >2 subjects in any pooled treatment group

§ Major bleeding which is not fatal or in a critical organ, but resulting in a decrease in Hb ≥ 2 g/dL and/or transfusion of ≥2 units of whole blood or packed red blood cells

EINSTEIN Extension Study

In the EINSTEIN Extension clinical study, the most frequent adverse reactions associated with permanent drug discontinuation were bleeding events, with incidence rates of 1.8% for XARELTO vs. 0.2% for placebo treatment groups. The mean duration of treatment was 190 days for both XARELTO and placebo treatment groups.

Table 3 shows the number of patients experiencing bleeding events in the EINSTEIN Extension study.



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**Table 3: Bleeding Events* in EINSTEIN Extension Study**

| Parameter | XARELTO† 20 mg N = 598 n (%) | Placebo† N = 590 n (%) |
|---|---|---|
| Major bleeding event‡ | 4 (0.7) | 0 |
| Decrease in Hb ≥2 g/dL | 4 (0.7) | 0 |
| Transfusion of ≥2 units of whole blood or packed red blood cells | 2 (0.3) | 0 |
| Gastrointestinal | 3 (0.5) | 0 |
| Menorrhagia | 1 (0.2) | 0 |
| Clinically relevant non-major bleeding | 32 (5.4) | 7 (1.2) |
| Any bleeding | 104 (17.4) | 63 (10.7) |

* Bleeding event occurred after the first dose and up to 2 days after the last dose of study drug. Although a patient may have had 2 or more events, the patient is counted only once in a category.

† Treatment schedule: XARELTO 20 mg once daily; matched placebo once daily

‡ There were no fatal or critical organ bleeding events.

### *Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery*

In the RECORD clinical trials, the overall incidence rate of adverse reactions leading to permanent treatment discontinuation was 3.7% with XARELTO.

The rates of major bleeding events and any bleeding events observed in patients in the RECORD clinical trials are shown in Table 4.



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**Table 4: Bleeding Events* in Patients Undergoing Hip or Knee Replacement Surgeries (RECORD 1-3)**

| | XARELTO 10 mg | Enoxaparin† |
|---|---|---|
| **Total treated patients** | **N = 4487**<br>**n (%)** | **N = 4524**<br>**n (%)** |
| Major bleeding event | 14 (0.3) | 9 (0.2) |
| Fatal bleeding | 1 (<0.1) | 0 |
| Bleeding into a critical organ | 2 (<0.1) | 3 (0.1) |
| Bleeding that required re-operation | 7 (0.2) | 5 (0.1) |
| Extra-surgical site bleeding requiring transfusion of >2 units of whole blood or packed cells | 4 (0.1) | 1 (<0.1) |
| Any bleeding event‡ | 261 (5.8) | 251 (5.6) |
| **Hip Surgery Studies** | **N = 3281**<br>**n (%)** | **N = 3298**<br>**n (%)** |
| Major bleeding event | 7 (0.2) | 3 (0.1) |
| Fatal bleeding | 1 (<0.1) | 0 |
| Bleeding into a critical organ | 1 (<0.1) | 1 (<0.1) |
| Bleeding that required re-operation | 2 (0.1) | 1 (<0.1) |
| Extra-surgical site bleeding requiring transfusion of >2 units of whole blood or packed cells | 3 (0.1) | 1 (<0.1) |
| Any bleeding event‡ | 201 (6.1) | 191 (5.8) |
| **Knee Surgery Study** | **N = 1206**<br>**n (%)** | **N = 1226**<br>**n (%)** |
| Major bleeding event | 7 (0.6) | 6 (0.5) |
| Fatal bleeding | 0 | 0 |
| Bleeding into a critical organ | 1 (0.1) | 2 (0.2) |
| Bleeding that required re-operation | 5 (0.4) | 4 (0.3) |
| Extra-surgical site bleeding requiring transfusion of >2 units of whole blood or packed cells | 1 (0.1) | 0 |
| Any bleeding event‡ | 60 (5.0) | 60 (4.9) |

* Bleeding events occurring any time following the first dose of double-blind study medication (which may have been prior to administration of active drug) until two days after the last dose of double-blind study medication. Patients may have more than one event.

† Includes the placebo-controlled period for RECORD 2, enoxaparin dosing was 40 mg once daily (RECORD 1-3)

‡ Includes major bleeding events

Following XARELTO treatment, the majority of major bleeding complications (≥60%) occurred during the first week after surgery.

## Other Adverse Reactions

Non-hemorrhagic adverse reactions reported in ≥1% of XARELTO-treated patients in the EINSTEIN Extension study are shown in Table 5.



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**Table 5: Other Adverse Reactions* Reported by ≥1% of XARELTO-Treated Patients in EINSTEIN Extension Study**

| System Organ Class<br>Preferred Term | XARELTO<br>N = 598<br>n (%) | Placebo<br>N = 590<br>n (%) |
|---|---|---|
| **Gastrointestinal disorders** | | |
| Abdominal pain upper | 10 (1.7) | 1 (0.2) |
| Dyspepsia | 8 (1.3) | 4 (0.7) |
| Toothache | 6 (1.0) | 0 |
| **General disorders and administration site conditions** | | |
| Fatigue | 6 (1.0) | 3 (0.5) |
| **Infections and infestations** | | |
| Sinusitis | 7 (1.2) | 3 (0.5) |
| Urinary tract infection | 7 (1.2) | 3 (0.5) |
| **Musculoskeletal and connective tissue disorders** | | |
| Back pain | 22 (3.7) | 7 (1.2) |
| Osteoarthritis | 10 (1.7) | 5 (0.8) |
| **Respiratory, thoracic and mediastinal disorders** | | |
| Oropharyngeal pain | 6 (1.0) | 2 (0.3) |

* Adverse reaction (with Relative Risk >1.5 for XARELTO versus placebo) occurred after the first dose and up to 2 days after the last dose of study drug. Incidences are based on the number of patients, not the number of events. Although a patient may have had 2 or more clinical adverse reactions, the patient is counted only once in a category. The same patient may appear in different categories.

Non-hemorrhagic adverse reactions reported in ≥1% of XARELTO-treated patients in RECORD 1-3 studies are shown in Table 6.

**Table 6: Other Adverse Drug Reactions* Reported by ≥1% of XARELTO-Treated Patients in RECORD 1-3 Studies**

| System/Organ Class<br>Adverse Reaction | XARELTO<br>10 mg<br>N = 4487<br>n (%) | Enoxaparin†<br><br>N = 4524<br>n (%) |
|---|---|---|
| **Injury, poisoning and procedural complications** | | |
| Wound secretion | 125 (2.8) | 89 (2.0) |
| **Musculoskeletal and connective tissue disorders** | | |
| Pain in extremity | 74 (1.7) | 55 (1.2) |
| Muscle spasm | 52 (1.2) | 32 (0.7) |
| **Nervous system disorders** | | |
| Syncope | 55 (1.2) | 32 (0.7) |
| **Skin and subcutaneous tissue disorders** | | |
| Pruritus | 96 (2.1) | 79 (1.8) |
| Blister | 63 (1.4) | 40 (0.9) |

* Adverse reaction occurring any time following the first dose of double-blind medication, which may have been prior to administration of active drug, until two days after the last dose of double-blind study medication

† Includes the placebo-controlled period of RECORD 2, enoxaparin dosing was 40 mg once daily (RECORD 1-3)



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*Other clinical trial experience:* In an investigational study of acute medically ill patients being treated with XARELTO 10 mg tablets, cases of pulmonary hemorrhage and pulmonary hemorrhage with bronchiectasis were observed.

### 6.2 Postmarketing Experience

The following adverse reactions have been identified during post-approval use of rivaroxaban. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

*Blood and lymphatic system disorders:* agranulocytosis

*Gastrointestinal disorders:* retroperitoneal hemorrhage

*Hepatobiliary disorders:* jaundice, cholestasis, cytolytic hepatitis

*Immune system disorders:* hypersensitivity, anaphylactic reaction, anaphylactic shock, angioedema

*Nervous system disorders:* cerebral hemorrhage, subdural hematoma, epidural hematoma, hemiparesis

*Skin and subcutaneous tissue disorders:* Stevens-Johnson syndrome

## 7 DRUG INTERACTIONS

Rivaroxaban is a substrate of CYP3A4/5, CYP2J2, and the P-gp and ATP-binding cassette G2 (ABCG2) transporters. Inhibitors and inducers of these CYP450 enzymes or transporters (e.g., P-gp) may result in changes in rivaroxaban exposure.

### 7.1 Drugs that Inhibit Cytochrome P450 3A4 Enzymes and Drug Transport Systems

In drug interaction studies evaluating the concomitant use with drugs that are combined P-gp and CYP3A4 inhibitors (ketoconazole, ritonavir, clarithromycin, erythromycin and fluconazole), increases in rivaroxaban exposure and pharmacodynamic effects (i.e., factor Xa inhibition and PT prolongation) were observed. The increases in exposure ranged from 30% to 160%. Significant increases in rivaroxaban exposure may increase bleeding risk *[see Clinical Pharmacology (12.3)]*.

When data suggest a change in exposure is unlikely to affect bleeding risk (e.g., clarithromycin, erythromycin), no precautions are necessary during coadministration with drugs that are combined P-gp and CYP3A4 inhibitors.



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Avoid concomitant administration of XARELTO with combined P-gp and strong CYP3A4 inhibitors *[see Warnings and Precautions (5.6)]*.

### 7.2 Drugs that Induce Cytochrome P450 3A4 Enzymes and Drug Transport Systems

Results from drug interaction studies and population PK analyses from clinical studies indicate coadministration of XARELTO with a combined P-gp and strong CYP3A4 inducer (e.g., rifampicin, phenytoin) decreased rivaroxaban exposure by up to 50%. Similar decreases in pharmacodynamic effects were also observed. These decreases in exposure to rivaroxaban may decrease efficacy *[see Clinical Pharmacology (12.3)]*.

Avoid concomitant use of XARELTO with drugs that are combined P-gp and strong CYP3A4 inducers (e.g., carbamazepine, phenytoin, rifampin, St. John's wort) *[see Warnings and Precautions (5.6)]*.

### 7.3 Anticoagulants and NSAIDs/Aspirin

Single doses of enoxaparin and XARELTO given concomitantly resulted in an additive effect on anti-factor Xa activity. Single doses of warfarin and XARELTO resulted in an additive effect on factor Xa (FXa) inhibition and PT. Concomitant aspirin use has been identified as an independent risk factor for major bleeding in efficacy trials. NSAIDs are known to increase bleeding, and bleeding risk may be increased when NSAIDs are used concomitantly with XARELTO. Coadministration of the platelet aggregation inhibitor clopidogrel and XARELTO resulted in an increase in bleeding time for some subjects *[see Clinical Pharmacology (12.3)]*.

Avoid concurrent use of XARELTO with other anticoagulants due to increased bleeding risk unless benefit outweighs risk. Promptly evaluate any signs or symptoms of blood loss if patients are treated concomitantly with aspirin, other platelet aggregation inhibitors, or NSAIDs *[see Warnings and Precautions (5.2)]*.

### 7.4 Drug-Disease Interactions with Drugs that Inhibit Cytochrome P450 3A4 Enzymes and Drug Transport Systems

Results from a pharmacokinetic trial with erythromycin indicated that patients with renal impairment coadministered XARELTO with drugs classified as combined P-gp and moderate CYP3A4 inhibitors (e.g., diltiazem, verapamil, dronedarone, and erythromycin) have increased exposure compared with patients with normal renal function and no inhibitor use. Significant increases in rivaroxaban exposure may increase bleeding risk.

While increases in rivaroxaban exposure can be expected under such conditions, results from an analysis in the ROCKET AF trial, which allowed concomitant use with combined P-gp and weak



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or moderate CYP3A4 inhibitors (e.g., amiodarone, diltiazem, verapamil, chloramphenicol, cimetidine, and erythromycin), did not show an increase in bleeding in patients with CrCl 30 to <50 mL/min [Hazard Ratio (95% CI): 1.05 (0.77, 1.42)] *[see Use in Specific Populations (8.7)]*.

XARELTO should not be used in patients with CrCl 15 to 80 mL/min who are receiving concomitant combined P-gp and moderate CYP3A4 inhibitors unless the potential benefit justifies the potential risk *[see Clinical Pharmacology (12.3)]*.

# 8 USE IN SPECIFIC POPULATIONS

## 8.1 Pregnancy

Pregnancy Category C

There are no adequate or well-controlled studies of XARELTO in pregnant women, and dosing for pregnant women has not been established. Use XARELTO with caution in pregnant patients because of the potential for pregnancy related hemorrhage and/or emergent delivery with an anticoagulant that is not readily reversible. The anticoagulant effect of XARELTO cannot be reliably monitored with standard laboratory testing. Animal reproduction studies showed no increased risk of structural malformations, but increased post-implantation pregnancy loss occurred in rabbits. XARELTO should be used during pregnancy only if the potential benefit justifies the potential risk to mother and fetus *[see Warnings and Precautions (5.7)]*.

Rivaroxaban crosses the placenta in animals. Animal reproduction studies have shown pronounced maternal hemorrhagic complications in rats and an increased incidence of post-implantation pregnancy loss in rabbits. Rivaroxaban increased fetal toxicity (increased resorptions, decreased number of live fetuses, and decreased fetal body weight) when pregnant rabbits were given oral doses of ≥10 mg/kg rivaroxaban during the period of organogenesis. This dose corresponds to about 4 times the human exposure of unbound drug, based on AUC comparisons at the highest recommended human dose of 20 mg/day. Fetal body weights decreased when pregnant rats were given oral doses of 120 mg/kg. This dose corresponds to about 14 times the human exposure of unbound drug.

## 8.2 Labor and Delivery

Safety and effectiveness of XARELTO during labor and delivery have not been studied in clinical trials. However, in animal studies maternal bleeding and maternal and fetal death occurred at the rivaroxaban dose of 40 mg/kg (about 6 times maximum human exposure of the unbound drug at the human dose of 20 mg/day).



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## 8.3 Nursing Mothers

It is not known if rivaroxaban is excreted in human milk. Rivaroxaban and/or its metabolites were excreted into the milk of rats. Because many drugs are excreted in human milk and because of the potential for serious adverse reactions in nursing infants from rivaroxaban, a decision should be made whether to discontinue nursing or discontinue XARELTO, taking into account the importance of the drug to the mother.

## 8.4 Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

## 8.5 Geriatric Use

Of the total number of patients in the RECORD 1-3 clinical studies evaluating XARELTO, about 54% were 65 years and over, while about 15% were >75 years. In ROCKET AF, approximately 77% were 65 years and over and about 38% were >75 years. In the EINSTEIN DVT, PE and Extension clinical studies approximately 37% were 65 years and over and about 16% were >75 years. In clinical trials the efficacy of XARELTO in the elderly (65 years or older) was similar to that seen in patients younger than 65 years. Both thrombotic and bleeding event rates were higher in these older patients, but the risk-benefit profile was favorable in all age groups *[see Clinical Pharmacology (12.3) and Clinical Studies (14)]*.

## 8.6 Females of Reproductive Potential

Females of reproductive potential requiring anticoagulation should discuss pregnancy planning with their physician.

## 8.7 Renal Impairment

In a pharmacokinetic study, compared to healthy subjects with normal creatinine clearance, rivaroxaban exposure increased by approximately 44 to 64% in subjects with renal impairment. Increases in pharmacodynamic effects were also observed *[see Clinical Pharmacology (12.3)]*.

<u>Nonvalvular Atrial Fibrillation</u>

In the ROCKET AF trial, patients with CrCl 30 to 50 mL/min were administered XARELTO 15 mg once daily resulting in serum concentrations of rivaroxaban and clinical outcomes similar to those in patients with better renal function administered XARELTO 20 mg once daily. Patients with CrCl 15 to 30 mL/min were not studied, but administration of XARELTO 15 mg once daily is also expected to result in serum concentrations of rivaroxaban similar to those in patients with normal renal function *[see Dosage and Administration (2.3)]*.



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Treatment of DVT and/or PE, and Reduction in the Risk of Recurrence of DVT and of PE

In the EINSTEIN trials, patients with CrCl values <30 mL/min at screening were excluded from the studies. Avoid the use of XARELTO in patients with CrCl <30 mL/min.

Prophylaxis of DVT Following Hip or Knee Replacement Surgery

The combined analysis of the RECORD 1-3 clinical efficacy studies did not show an increase in bleeding risk for patients with CrCl 30 to 50 mL/min and reported a possible increase in total venous thromboemboli in this population. Observe closely and promptly evaluate any signs or symptoms of blood loss in patients with CrCl 30 to 50 mL/min. Avoid the use of XARELTO in patients with CrCl <30 mL/min.

### 8.8 Hepatic Impairment

In a pharmacokinetic study, compared to healthy subjects with normal liver function, AUC increases of 127% were observed in subjects with moderate hepatic impairment (Child-Pugh B).

The safety or PK of XARELTO in patients with severe hepatic impairment (Child-Pugh C) has not been evaluated *[see Clinical Pharmacology (12.3)]*.

Avoid the use of XARELTO in patients with moderate (Child-Pugh B) and severe (Child-Pugh C) hepatic impairment or with any hepatic disease associated with coagulopathy.

## 10 OVERDOSAGE

Overdose of XARELTO may lead to hemorrhage. Discontinue XARELTO and initiate appropriate therapy if bleeding complications associated with overdosage occur. A specific antidote for rivaroxaban is not available. Rivaroxaban systemic exposure is not further increased at single doses >50 mg due to limited absorption. The use of activated charcoal to reduce absorption in case of XARELTO overdose may be considered. Due to the high plasma protein binding, rivaroxaban is not expected to be dialyzable *[see Warnings and Precautions (5.2) and Clinical Pharmacology (12.3)]*. Partial reversal of laboratory anticoagulation parameters may be achieved with use of plasma products.

## 11 DESCRIPTION

Rivaroxaban, a FXa inhibitor, is the active ingredient in XARELTO Tablets with the chemical name 5-Chloro-N-({(5S)-2-oxo-3-[4-(3-oxo-4-morpholinyl)phenyl]-1,3-oxazolidin-5-yl}methyl)-2-thiophenecarboxamide. The molecular formula of rivaroxaban is $C_{19}H_{18}ClN_3O_5S$ and the molecular weight is 435.89. The structural formula is:



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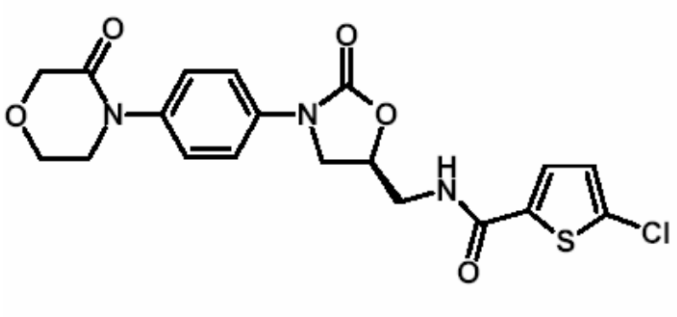

Rivaroxaban is a pure (*S*)-enantiomer. It is an odorless, non-hygroscopic, white to yellowish powder. Rivaroxaban is only slightly soluble in organic solvents (e.g., acetone, polyethylene glycol 400) and is practically insoluble in water and aqueous media.

Each XARELTO tablet contains 10 mg, 15 mg, or 20 mg of rivaroxaban. The inactive ingredients of XARELTO are: croscarmellose sodium, hypromellose, lactose monohydrate, magnesium stearate, microcrystalline cellulose, and sodium lauryl sulfate. Additionally, the proprietary film coating mixture used for XARELTO 10 mg tablets is Opadry® Pink and for XARELTO 15 mg tablets is Opadry® Red, both containing ferric oxide red, hypromellose, polyethylene glycol 3350, and titanium dioxide, and for XARELTO 20 mg tablets is Opadry® II Dark Red, containing ferric oxide red, polyethylene glycol 3350, polyvinyl alcohol (partially hydrolyzed), talc, and titanium dioxide.

# 12 CLINICAL PHARMACOLOGY

## 12.1 Mechanism of Action

XARELTO is a selective inhibitor of FXa. It does not require a cofactor (such as Anti-thrombin III) for activity. Rivaroxaban inhibits free FXa and prothrombinase activity. Rivaroxaban has no direct effect on platelet aggregation, but indirectly inhibits platelet aggregation induced by thrombin. By inhibiting FXa, rivaroxaban decreases thrombin generation.

## 12.2 Pharmacodynamics

Dose-dependent inhibition of FXa activity was observed in humans and the Neoplastin® prothrombin time (PT), activated partial thromboplastin time (aPTT) and HepTest® are prolonged dose-dependently. Anti-factor Xa activity is also influenced by rivaroxaban.

## 12.3 Pharmacokinetics

### Absorption

The absolute bioavailability of rivaroxaban is dose-dependent. For the 10 mg dose, it is estimated to be 80% to 100% and is not affected by food. XARELTO 10 mg tablets can be taken with or without food. For the 20 mg dose in the fasted state, the absolute bioavailability is approximately 66%. Coadministration of XARELTO with food increases the bioavailability of the 20 mg dose



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(mean AUC and $C_{max}$ increasing by 39% and 76% respectively with food). XARELTO 15 mg and 20 mg tablets should be taken with food *[see Dosage and Administration (2.1)]*.

The maximum concentrations ($C_{max}$) of rivaroxaban appear 2 to 4 hours after tablet intake. The pharmacokinetics of rivaroxaban were not affected by drugs altering gastric pH. Coadministration of XARELTO (30 mg single dose) with the $H_2$-receptor antagonist ranitidine (150 mg twice daily), the antacid aluminum hydroxide/magnesium hydroxide (10 mL) or XARELTO (20 mg single dose) with the PPI omeprazole (40 mg once daily) did not show an effect on the bioavailability and exposure of rivaroxaban.

Absorption of rivaroxaban is dependent on the site of drug release in the GI tract. A 29% and 56% decrease in AUC and $C_{max}$ compared to tablet was reported when rivaroxaban granulate is released in the proximal small intestine. Exposure is further reduced when drug is released in the distal small intestine, or ascending colon. Avoid administration of rivaroxaban distal to the stomach which can result in reduced absorption and related drug exposure.

In a study with 44 healthy subjects, both mean AUC and $C_{max}$ values for 20 mg rivaroxaban administered orally as a crushed tablet mixed in applesauce were comparable to that after the whole tablet. However, for the crushed tablet suspended in water and administered via an NG tube followed by a liquid meal, only mean AUC was comparable to that after the whole tablet, and $C_{max}$ was 18% lower.

### Distribution

Plasma protein binding of rivaroxaban in human plasma is approximately 92% to 95%, with albumin being the main binding component. The steady-state volume of distribution in healthy subjects is approximately 50 L.

### Metabolism

Approximately 51% of an orally administered [$^{14}$C]-rivaroxaban dose was recovered as inactive metabolites in urine (30%) and feces (21%). Oxidative degradation catalyzed by CYP3A4/5 and CYP2J2 and hydrolysis are the major sites of biotransformation. Unchanged rivaroxaban was the predominant moiety in plasma with no major or active circulating metabolites.

### Excretion

Following oral administration, approximately one-third of the absorbed dose is excreted unchanged in the urine, with the remaining two-thirds excreted as inactive metabolites in both the urine and feces. In a Phase 1 study, following the administration of a [$^{14}$C]-rivaroxaban dose, 66% of the radioactive dose was recovered in urine (36% as unchanged drug) and 28% was recovered in feces (7% as unchanged drug). Unchanged drug is excreted into urine, mainly via active tubular secretion and to a lesser extent via glomerular filtration (approximate 5:1 ratio).



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Rivaroxaban is a substrate of the efflux transporter proteins P-gp and ABCG2 (also abbreviated Bcrp). Rivaroxaban's affinity for influx transporter proteins is unknown.

Rivaroxaban is a low-clearance drug, with a systemic clearance of approximately 10 L/hr in healthy volunteers following intravenous administration. The terminal elimination half-life of rivaroxaban is 5 to 9 hours in healthy subjects aged 20 to 45 years.

### Specific Populations

#### *Gender*

Gender did not influence the pharmacokinetics or pharmacodynamics of XARELTO.

#### *Race*

Healthy Japanese subjects were found to have 20 to 40% on average higher exposures compared to other ethnicities including Chinese. However, these differences in exposure are reduced when values are corrected for body weight.

#### *Elderly*

In clinical studies, elderly subjects exhibited higher rivaroxaban plasma concentrations than younger subjects with mean AUC values being approximately 50% higher, mainly due to reduced (apparent) total body and renal clearance. Age related changes in renal function may play a role in this age effect. The terminal elimination half-life is 11 to 13 hours in the elderly *[see Use in Specific Populations (8.5)]*.

#### *Body Weight*

Extremes in body weight (<50 kg or >120 kg) did not influence (less than 25%) rivaroxaban exposure.

#### *Renal Impairment*

The safety and pharmacokinetics of single-dose XARELTO (10 mg) were evaluated in a study in healthy subjects [CrCl ≥80 mL/min (n=8)] and in subjects with varying degrees of renal impairment (see Table 7). Compared to healthy subjects with normal creatinine clearance, rivaroxaban exposure increased in subjects with renal impairment. Increases in pharmacodynamic effects were also observed.



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**Table 7: Percent Increase of Rivaroxaban PK and PD Parameters from Normal in Subjects with Renal Insufficiency from a Dedicated Renal Impairment Study**

| Parameter | | CrCl (mL/min) | | |
|---|---|---|---|---|
| | | 50 to 79<br>N = 8 | 30 to 49<br>N = 8 | 15 to 29<br>N = 8 |
| **Exposure** | **AUC** | 44 | 52 | 64 |
| **(% increase relative to normal)** | **$C_{max}$** | 28 | 12 | 26 |
| **FXa Inhibition** | **AUC** | 50 | 86 | 100 |
| **(% increase relative to normal)** | **$E_{max}$** | 9 | 10 | 12 |
| **PT Prolongation** | **AUC** | 33 | 116 | 144 |
| **(% increase relative to normal)** | **$E_{max}$** | 4 | 17 | 20 |

PT = Prothrombin time; FXa = Coagulation factor Xa; AUC = Area under the concentration or effect curve; $C_{max}$ = maximum concentration; $E_{max}$ = maximum effect; and CrCl = creatinine clearance

## Hepatic Impairment

The safety and pharmacokinetics of single-dose XARELTO (10 mg) were evaluated in a study in healthy subjects (n=16) and subjects with varying degrees of hepatic impairment (see Table 8). No patients with severe hepatic impairment (Child-Pugh C) were studied. Compared to healthy subjects with normal liver function, significant increases in rivaroxaban exposure were observed in subjects with moderate hepatic impairment (Child-Pugh B). Increases in pharmacodynamic effects were also observed.

**Table 8: Percent Increase of Rivaroxaban PK and PD Parameters from Normal in Subjects with Hepatic Insufficiency from a Dedicated Hepatic Impairment Study**

| Parameter | | Hepatic Impairment Class (Child-Pugh Class) | |
|---|---|---|---|
| | | Mild<br>(Child-Pugh A)<br>N = 8 | Moderate<br>(Child-Pugh B)<br>N = 8 |
| **Exposure** | **AUC** | 15 | 127 |
| **(% increase relative to normal)** | **$C_{max}$** | 0 | 27 |
| **FXa Inhibition** | **AUC** | 8 | 159 |
| **(% increase relative to normal)** | **$E_{max}$** | 0 | 24 |
| **PT Prolongation** | **AUC** | 6 | 114 |
| **(% increase relative to normal)** | **$E_{max}$** | 2 | 41 |

PT = Prothrombin time; FXa = Coagulation factor Xa; AUC = Area under the concentration or effect curve; $C_{max}$ = maximum concentration; $E_{max}$ = maximum effect

## Drug Interactions

*In vitro* studies indicate that rivaroxaban neither inhibits the major cytochrome P450 enzymes CYP1A2, 2C8, 2C9, 2C19, 2D6, 2J2, and 3A4 nor induces CYP1A2, 2B6, 2C19, or 3A4. *In vitro* data also indicates a low rivaroxaban inhibitory potential for P-gp and ABCG2 transporters.



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### *Drugs that Inhibit Cytochrome P450 3A4 Enzymes and Drug Transport Systems*

In drug interaction studies evaluating the concomitant use with drugs that are combined P-gp and CYP3A4 inhibitors the following increases in rivaroxaban exposure were observed. Similar increases in pharmacodynamic effects (i.e., factor Xa inhibition and PT prolongation) were also observed. Significant increases in rivaroxaban exposure may increase bleeding risk.

- *Ketoconazole (combined P-gp and strong CYP3A4 inhibitor):* Steady-state rivaroxaban AUC and $C_{max}$ increased by 160% and 70%, respectively. Similar increases in pharmacodynamic effects were also observed.

- *Ritonavir (combined P-gp and strong CYP3A4 inhibitor):* Single-dose rivaroxaban AUC and $C_{max}$ increased by 150% and 60%, respectively. Similar increases in pharmacodynamic effects were also observed.

- *Clarithromycin (combined P-gp and strong CYP3A4 inhibitor):* Single-dose rivaroxaban AUC and $C_{max}$ increased by 50% and 40%, respectively. The smaller increases in exposure observed for clarithromycin compared to ketoconazole or ritonavir may be due to the relative difference in P-gp inhibition.

- *Erythromycin (combined P-gp and moderate CYP3A4 inhibitor):* Both the single-dose rivaroxaban AUC and $C_{max}$ increased by 30%.

- *Fluconazole (moderate CYP3A4 inhibitor):* Single-dose rivaroxaban AUC and $C_{max}$ increased by 40% and 30%, respectively.

### *Drugs that Induce Cytochrome P450 3A4 Enzymes and Drug Transport Systems*

In a drug interaction study, coadministration of XARELTO (20 mg single dose with food) with a drug that is a combined P-gp and strong CYP3A4 inducer (rifampicin titrated up to 600 mg once daily) led to an approximate decrease of 50% and 22% in AUC and $C_{max}$, respectively. Similar decreases in pharmacodynamic effects were also observed. These decreases in exposure to rivaroxaban may decrease efficacy.

### *Anticoagulants*

In a drug interaction study, single doses of enoxaparin (40 mg subcutaneous) and XARELTO (10 mg) given concomitantly resulted in an additive effect on anti-factor Xa activity. Enoxaparin did not affect the pharmacokinetics of rivaroxaban. In another study, single doses of warfarin (15 mg) and XARELTO (5 mg) resulted in an additive effect on factor Xa inhibition and PT. Warfarin did not affect the pharmacokinetics of rivaroxaban.



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*NSAIDs/Aspirin*

In ROCKET AF, concomitant aspirin use (almost exclusively at a dose of 100 mg or less) during the double-blind phase was identified as an independent risk factor for major bleeding. NSAIDs are known to increase bleeding, and bleeding risk may be increased when NSAIDs are used concomitantly with XARELTO. In a single-dose drug interaction study there were no pharmacokinetic or pharmacodynamic interactions observed after concomitant administration of naproxen or aspirin (acetylsalicylic acid) with XARELTO.

*Clopidogrel*

In two drug interaction studies where clopidogrel (300 mg loading dose followed by 75 mg daily maintenance dose) and XARELTO (15 mg single dose) were coadministered in healthy subjects, an increase in bleeding time to 45 minutes was observed in approximately 45% and 30% of subjects in these studies, respectively. The change in bleeding time was approximately twice the maximum increase seen with either drug alone. There was no change in the pharmacokinetics of either drug.

*Drug-Disease Interactions with Drugs that Inhibit Cytochrome P450 3A4 Enzymes and Drug Transport Systems*

In a pharmacokinetic trial, XARELTO was administered as a single dose in subjects with mild (CrCl = 50 to 79 mL/min) or moderate renal impairment (CrCl = 30 to 49 mL/min) receiving multiple doses of erythromycin (a combined P-gp and moderate CYP3A4 inhibitor). Compared to XARELTO administered alone in subjects with normal renal function (CrCl >80 mL/min), subjects with mild and moderate renal impairment concomitantly receiving erythromycin reported a 76% and 99% increase in $AUC_{inf}$ and a 56% and 64% increase in $C_{max}$, respectively. Similar trends in pharmacodynamic effects were also observed.

*Drugs that are Substrates of CYP3A4 and/or Drug Transport Systems*

In addition, there were no significant pharmacokinetic interactions observed in studies comparing concomitant rivaroxaban 20 mg and 7.5 mg single dose of midazolam (substrate of CYP3A4), 0.375 mg once-daily dose of digoxin (substrate of P-gp), or 20 mg once daily dose of atorvastatin (substrate of CYP3A4 and P-gp) in healthy volunteers.

## 12.6 QT/QTc Prolongation

In a thorough QT study in healthy men and women aged 50 years and older, no QTc prolonging effects were observed for XARELTO (15 mg and 45 mg, single-dose).



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# 13 NON-CLINICAL TOXICOLOGY

## 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Rivaroxaban was not carcinogenic when administered by oral gavage to mice or rats for up to 2 years. The systemic exposures (AUCs) of unbound rivaroxaban in male and female mice at the highest dose tested (60 mg/kg/day) were 1- and 2-times, respectively, the human exposure of unbound drug at the human dose of 20 mg/day. Systemic exposures of unbound drug in male and female rats at the highest dose tested (60 mg/kg/day) were 2- and 4-times, respectively, the human exposure.

Rivaroxaban was not mutagenic in bacteria (Ames-Test) or clastogenic in V79 Chinese hamster lung cells *in vitro* or in the mouse micronucleus test *in vivo*.

No impairment of fertility was observed in male or female rats when given up to 200 mg/kg/day of rivaroxaban orally. This dose resulted in exposure levels, based on the unbound AUC, at least 13 times the exposure in humans given 20 mg rivaroxaban daily.

# 14 CLINICAL STUDIES

## 14.1 Stroke Prevention in Nonvalvular Atrial Fibrillation

The evidence for the efficacy and safety of XARELTO was derived from ROCKET AF, a multi-national, double-blind study comparing XARELTO (at a dose of 20 mg once daily with the evening meal in patients with CrCl >50 mL/min and 15 mg once daily with the evening meal in patients with CrCl 30 to <50 mL/min) to warfarin (titrated to INR 2.0 to 3.0) to reduce the risk of stroke and non-central nervous system (CNS) systemic embolism in patients with nonvalvular atrial fibrillation (AF). Patients had to have one or more of the following additional risk factors for stroke:

- a prior stroke (ischemic or unknown type), transient ischemic attack (TIA) or non-CNS systemic embolism, or
- 2 or more of the following risk factors:
  - age ≥75 years,
  - hypertension,
  - heart failure or left ventricular ejection fraction ≤35%, or
  - diabetes mellitus

ROCKET AF was a non-inferiority study designed to demonstrate that XARELTO preserved more than 50% of warfarin's effect on stroke and non-CNS systemic embolism as established by previous placebo-controlled studies of warfarin in atrial fibrillation.



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A total of 14264 patients were randomized and followed on study treatment for a median of 590 days. The mean age was 71 years and the mean $CHADS_2$ score was 3.5. The population was 60% male, 83% Caucasian, 13% Asian and 1.3% Black. There was a history of stroke, TIA, or non-CNS systemic embolism in 55% of patients, and 38% of patients had not taken a vitamin K antagonist (VKA) within 6 weeks at time of screening. Concomitant diseases of patients in this study included hypertension 91%, diabetes 40%, congestive heart failure 63%, and prior myocardial infarction 17%. At baseline, 37% of patients were on aspirin (almost exclusively at a dose of 100 mg or less) and few patients were on clopidogrel. Patients were enrolled in Eastern Europe (39%); North America (19%); Asia, Australia, and New Zealand (15%); Western Europe (15%); and Latin America (13%). Patients randomized to warfarin had a mean percentage of time in the INR target range of 2.0 to 3.0 of 55%, lower during the first few months of the study.

In ROCKET AF, XARELTO was demonstrated non-inferior to warfarin for the primary composite endpoint of time to first occurrence of stroke (any type) or non-CNS systemic embolism [HR (95% CI): 0.88 (0.74, 1.03)], but superiority to warfarin was not demonstrated. There is insufficient experience to determine how XARELTO and warfarin compare when warfarin therapy is well-controlled.

Table 9 displays the overall results for the primary composite endpoint and its components.

**Table 9: Primary Composite Endpoint Results in ROCKET AF Study**

| | **XARELTO** | | **Warfarin** | | **XARELTO vs. Warfarin** |
|---|---|---|---|---|---|
| **Event** | **N = 7081 n (%)** | **Event Rate (per 100 Pt-yrs)** | **N = 7090 n (%)** | **Event Rate (per 100 Pt-yrs)** | **Hazard Ratio (95% CI)** |
| Primary Composite Endpoint* | 269 (3.8) | 2.1 | 306 (4.3) | 2.4 | 0.88 (0.74, 1.03) |
| Stroke | 253 (3.6) | 2.0 | 281 (4.0) | 2.2 | |
| Hemorrhagic Stroke | 33 (0.5) | 0.3 | 57 (0.8) | 0.4 | |
| Ischemic Stroke | 206 (2.9) | 1.6 | 208 (2.9) | 1.6 | |
| Unknown Stroke Type | 19 (0.3) | 0.2 | 18 (0.3) | 0.1 | |
| Non-CNS Systemic Embolism | 20 (0.3) | 0.2 | 27 (0.4) | 0.2 | |

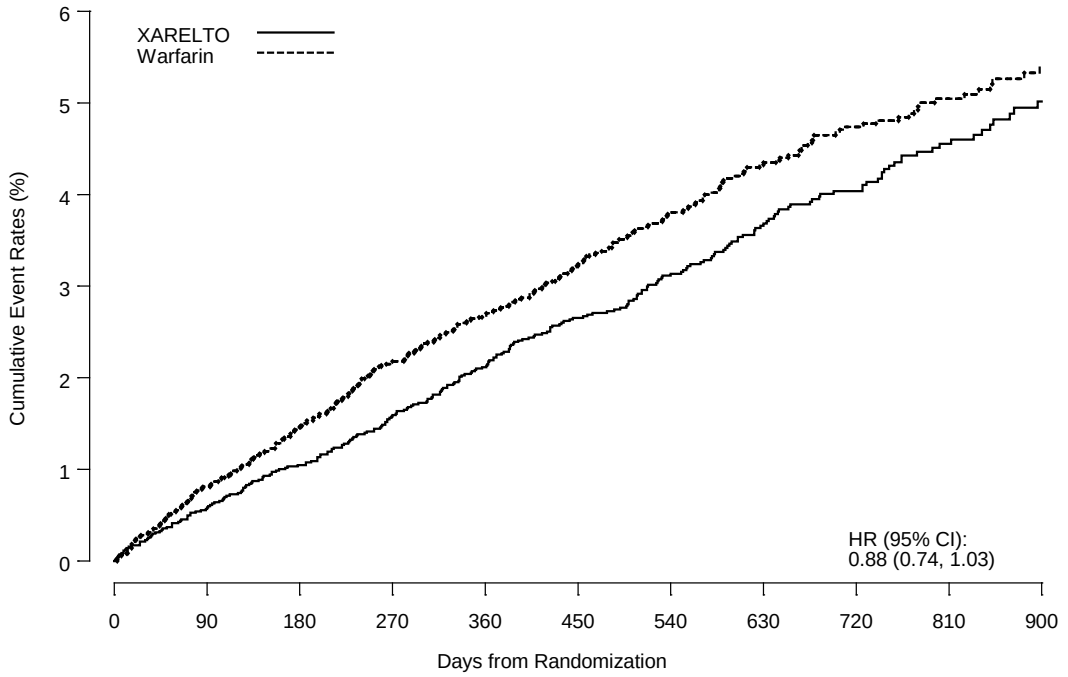
* The primary endpoint was the time to first occurrence of stroke (any type) or non-CNS systemic embolism. Data are shown for all randomized patients followed to site notification that the study would end.

Figure 1 is a plot of the time from randomization to the occurrence of the first primary endpoint event in the two treatment arms.



Reference ID: 3453913

**Figure 1: Time to First Occurrence of Stroke (any type) or Non-CNS Systemic Embolism by Treatment Group**




Number of Subjects at Risk:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| XARELTO | 7081 | 6927 | 6774 | 6620 | 6470 | 5580 | 4779 | 3820 | 2951 | 2058 | 1321 |
| Warfarin | 7090 | 6910 | 6755 | 6590 | 6440 | 5561 | 4756 | 3807 | 2944 | 2069 | 1319 |

The efficacy of XARELTO was generally consistent across major subgroups.

The protocol for ROCKET AF did not stipulate anticoagulation after study drug discontinuation, but warfarin patients who completed the study were generally maintained on warfarin. XARELTO patients were generally switched to warfarin without a period of coadministration of warfarin and XARELTO, so that they were not adequately anticoagulated after stopping XARELTO until attaining a therapeutic INR. During the 28 days following the end of the study, there were 22 strokes in the 4637 patients taking XARELTO vs. 6 in the 4691 patients taking warfarin.

Few patients in ROCKET AF underwent electrical cardioversion for atrial fibrillation. The utility of XARELTO for preventing post-cardioversion stroke and systemic embolism is unknown.



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## 14.2 Treatment of Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and Reduction in the Risk of Recurrence of DVT and of PE

EINSTEIN Deep Vein Thrombosis and EINSTEIN Pulmonary Embolism Studies

XARELTO for the treatment of DVT and/or PE and for the reduction in the risk of recurrence of DVT and of PE was studied in EINSTEIN DVT and EINSTEIN PE, multi-national, open-label, non-inferiority studies comparing XARELTO (at an initial dose of 15 mg twice daily with food for the first three weeks, followed by XARELTO 20 mg once daily with food) to enoxaparin 1 mg/kg twice daily for at least five days with VKA and then continued with VKA only after the target INR (2.0-3.0) was reached. Patients who required thrombectomy, insertion of a caval filter, or use of a fibrinolytic agent and patients with creatinine clearance <30 mL/min, significant liver disease, or active bleeding were excluded from the studies. The intended treatment duration was 3, 6, or 12 months based on investigator's assessment prior to randomization.

A total of 8281 (3449 in EINSTEIN DVT and 4832 in EINSTEIN PE) patients were randomized and followed on study treatment for a mean of 208 days in the XARELTO group and 204 days in the enoxaparin/VKA group. The mean age was approximately 57 years. The population was 55% male, 70% Caucasian, 9% Asian and about 3% Black. About 73% and 92% of XARELTO-treated patients in the EINSTEIN DVT and EINSTEIN PE studies, respectively, received initial parenteral anticoagulant treatment for a median duration of 2 days. Enoxaparin/VKA-treated patients in the EINSTEIN DVT and EINSTEIN PE studies received initial parenteral anticoagulant treatment for a median duration of 8 days. Aspirin was taken as on treatment concomitant antithrombotic medication by approximately 12% of patients in both treatment groups. Patients randomized to VKA had an unadjusted mean percentage of time in the INR target range of 2.0 to 3.0 of 58% in EINSTEIN DVT study and 60% in EINSTEIN PE study, with the lower values occurring during the first month of the study.

In the EINSTEIN DVT and EINSTEIN PE studies, 49% of patients had an idiopathic DVT/PE at baseline. Other risk factors included previous episode of DVT/PE (19%), recent surgery or trauma (18%), immobilization (16%), use of estrogen-containing drug (8%), known thrombophilic conditions (6%), or active cancer (5%).

In the EINSTEIN DVT and EINSTEIN PE studies, XARELTO was demonstrated to be non-inferior to enoxaparin/VKA for the primary composite endpoint of time to first occurrence of recurrent DVT or non-fatal or fatal PE [EINSTEIN DVT HR (95% CI): 0.68 (0.44, 1.04); EINSTEIN PE HR (95% CI): 1.12 (0.75, 1.68)]. In each study the conclusion of non-inferiority was based on the upper limit of the 95% confidence interval for the hazard ratio being less than 2.0.



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Table 10 displays the overall results for the primary composite endpoint and its components for EINSTEIN DVT and EINSTEIN PE studies.

**Table 10: Primary Composite Endpoint Results* in EINSTEIN DVT and EINSTEIN PE Studies – Intent-to-Treat Population**

| Event | XARELTO 20 mg† | Enoxaparin/VKA† | XARELTO vs. Enoxaparin/VKA Hazard Ratio (95% CI) |
|---|---|---|---|
| **EINSTEIN DVT Study** | **N = 1731 n (%)** | **N = 1718 n (%)** | |
| Primary Composite Endpoint | 36 (2.1) | 51 (3.0) | 0.68 (0.44, 1.04) |
| Death (PE) | 1 (<0.1) | 0 | |
| Death (PE cannot be excluded) | 3 (0.2) | 6 (0.3) | |
| Symptomatic PE and DVT | 1 (<0.1) | 0 | |
| Symptomatic recurrent PE only | 20 (1.2) | 18 (1.0) | |
| Symptomatic recurrent DVT only | 14 (0.8) | 28 (1.6) | |
| **EINSTEIN PE Study** | **N = 2419 n (%)** | **N = 2413 n (%)** | |
| Primary Composite Endpoint | 50 (2.1) | 44 (1.8) | 1.12 (0.75, 1.68) |
| Death (PE) | 3 (0.1) | 1 (<0.1) | |
| Death (PE cannot be excluded) | 8 (0.3) | 6 (0.2) | |
| Symptomatic PE and DVT | 0 | 2 (<0.1) | |
| Symptomatic recurrent PE only | 23 (1.0) | 20 (0.8) | |
| Symptomatic recurrent DVT only | 18 (0.7) | 17 (0.7) | |

* For the primary efficacy analysis, all confirmed events were considered from randomization up to the end of intended treatment duration (3, 6 or 12 months) irrespective of the actual treatment duration. If the same patient had several events, the patient may have been counted for several components.

† Treatment schedule in EINSTEIN DVT and EINSTEIN PE studies: XARELTO 15 mg twice daily for 3 weeks followed by 20 mg once daily; enoxaparin/VKA [enoxaparin: 1 mg/kg twice daily, VKA: individually titrated doses to achieve a target INR of 2.5 (range: 2.0-3.0)]

Figures 2 and 3 are plots of the time from randomization to the occurrence of the first primary efficacy endpoint event in the two treatment groups in EINSTEIN DVT and EINSTEIN PE studies, respectively.



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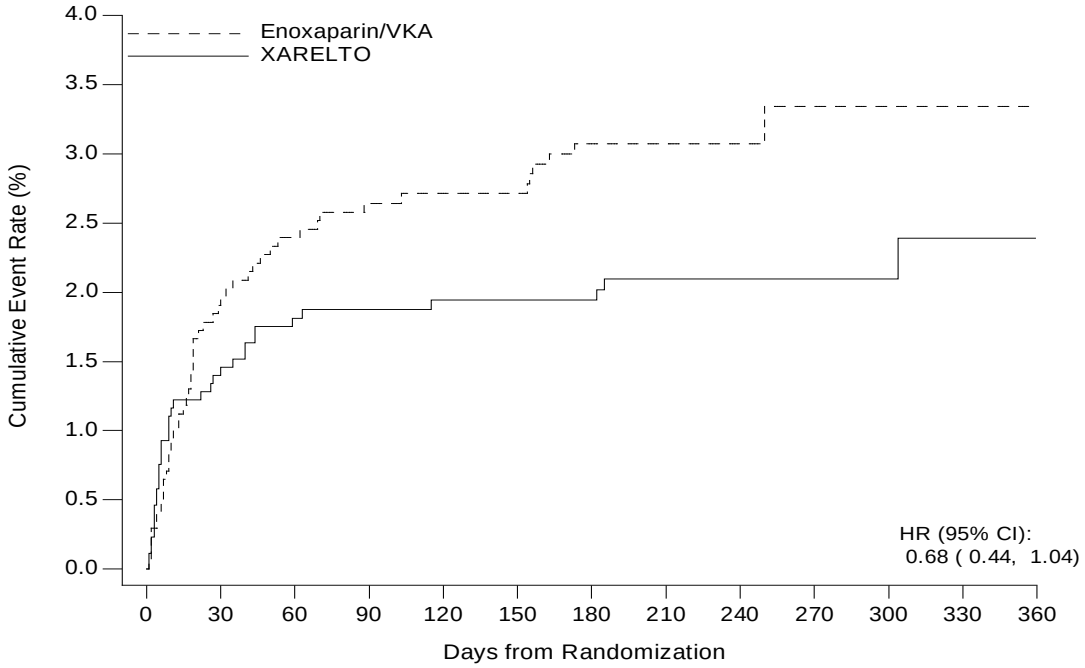
**Figure 2: Time to First Occurrence of the Composite of Recurrent DVT or Non-fatal or Fatal PE by Treatment Group (Intent-to-Treat Population) – EINSTEIN DVT Study**




Number of Patients at Risk

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Enoxaparin/VKA (N= 1718) | 1616 | 1581 | 1565 | 1368 | 1358 | 1301 | 380 | 362 | 342 | 325 | 297 | 264 |
| XARELTO (N= 1731) | 1668 | 1648 | 1635 | 1424 | 1412 | 1369 | 400 | 369 | 364 | 345 | 309 | 266 |



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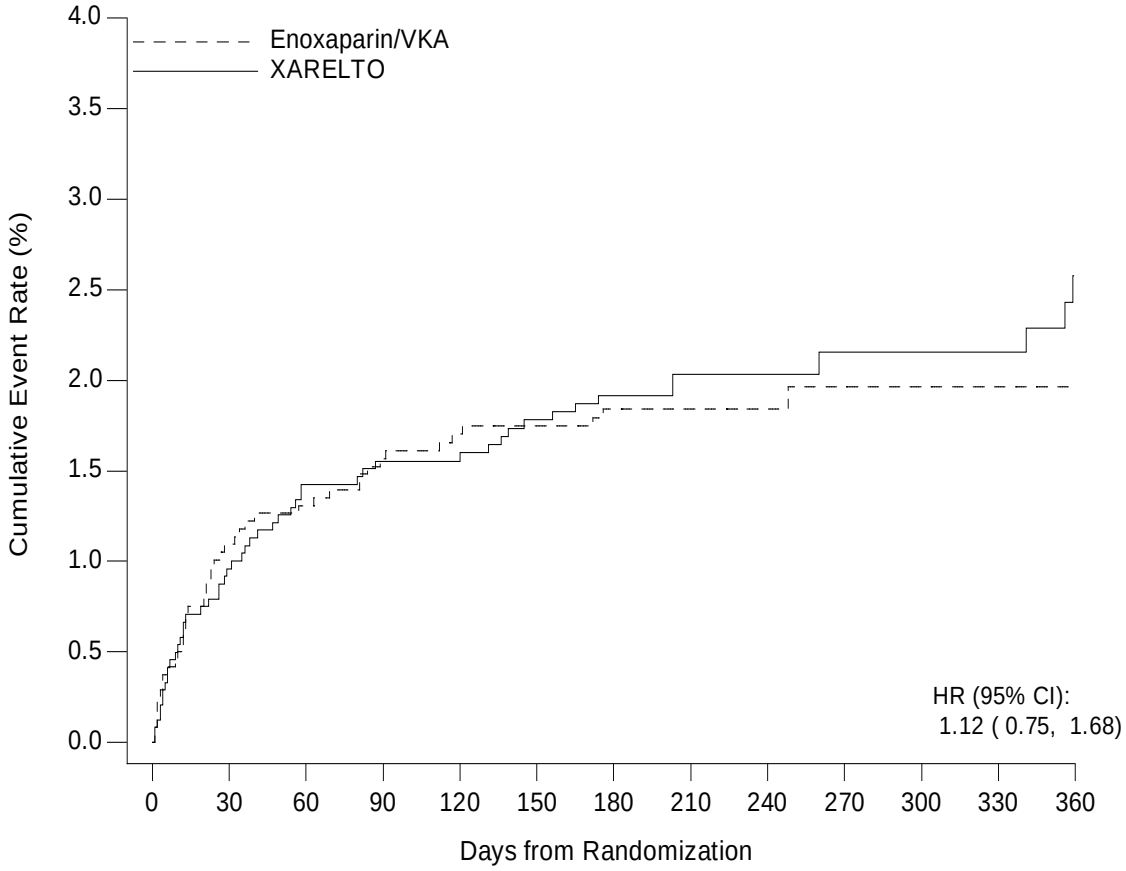
**Figure 3: Time to First Occurrence of the Composite of Recurrent DVT or Non-fatal or Fatal PE by Treatment Group (Intent-to-Treat Population) – EINSTEIN PE Study**




| Number of Patients at Risk | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Enoxaparin/VKA (N= 2413) | 2316 | 2295 | 2280 | 2155 | 2146 | 2113 | 835 | 787 | 773 | 746 | 722 | 675 |
| XARELTO (N= 2419) | 2350 | 2321 | 2311 | 2180 | 2167 | 2133 | 837 | 794 | 785 | 757 | 725 | 672 |

## EINSTEIN Extension Study

XARELTO for reduction in the risk of recurrence of DVT and of PE was studied in the EINSTEIN Extension study, a multi-national, double-blind, superiority study comparing XARELTO (20 mg once daily with food) to placebo in patients who had completed 6 to 14 months of treatment for DVT and/or PE following the acute event. The intended treatment duration was 6 or 12 months based on investigator's assessment prior to randomization.

A total of 1196 patients were randomized and followed on study treatment for a mean of 190 days for both XARELTO and placebo treatment groups. The mean age was approximately 58 years. The population was 58% male, 78% Caucasian, 8% Asian and about 2% Black. Aspirin was taken as on-treatment concomitant antithrombotic medication by approximately 12% of patients in both treatment groups. In the EINSTEIN Extension study about 60% of patients had a



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history of proximal index DVT without PE event and 29% of patients had a PE without symptomatic DVT event. About 59% of patients had an idiopathic DVT/PE. Other risk factors included previous episode of DVT/PE (16%), immobilization (14%), known thrombophilic conditions (8%), or active cancer (5%).

In the EINSTEIN Extension study XARELTO was demonstrated to be superior to placebo for the primary composite endpoint of time to first occurrence of recurrent DVT or non-fatal or fatal PE [HR (95% CI): 0.18 (0.09, 0.39)].

Table 11 displays the overall results for the primary composite endpoint and its components.

**Table 11: Primary Composite Endpoint Results* in EINSTEIN Extension Study – Intent-to-Treat Population**

| **Event** | **XARELTO 20 mg N = 602 n (%)** | **Placebo N = 594 n (%)** | **XARELTO vs. Placebo Hazard Ratio (95% CI)** |
|---|---|---|---|
| Primary Composite Endpoint | 8 (1.3) | 42 (7.1) | 0.18 (0.09, 0.39) p-value=<0.0001 |
| Death (PE) | 0 | 1 (0.2) | |
| Death (PE cannot be excluded) | 1 (0.2) | 0 | |
| Symptomatic recurrent PE | 2 (0.3) | 13 (2.2) | |
| Symptomatic recurrent DVT | 5 (0.8) | 31 (5.2) | |

* For the primary efficacy analysis, all confirmed events were considered from randomization up to the end of intended treatment duration (6 or 12 months) irrespective of the actual treatment duration.

Figure 4 is a plot of the time from randomization to the occurrence of the first primary efficacy endpoint event in the two treatment groups.



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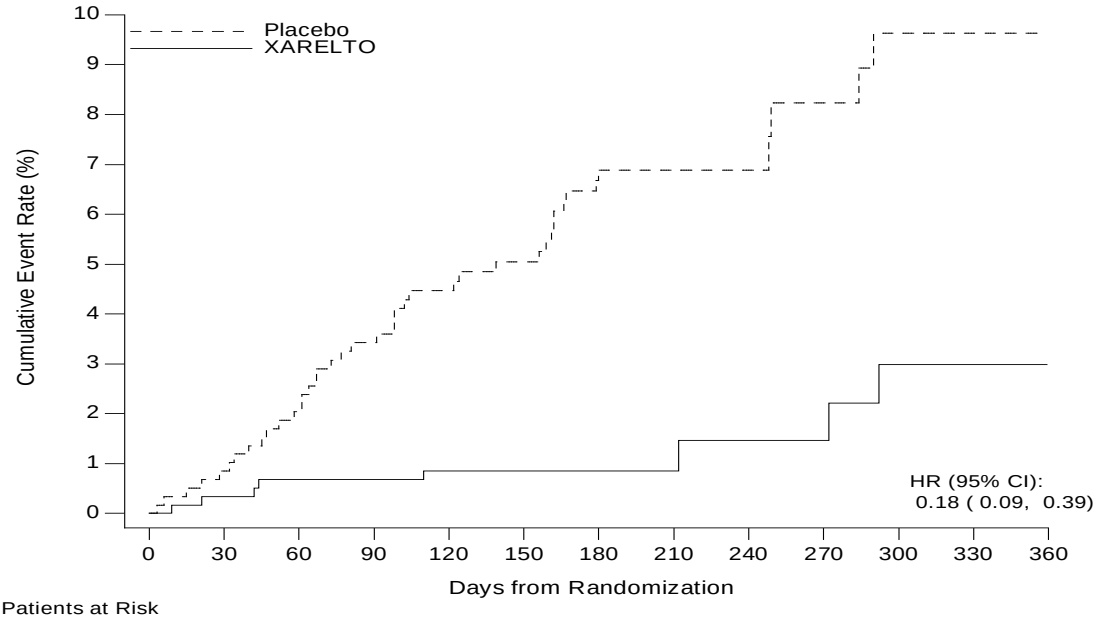
**Figure 4: Time to First Occurrence of the Composite of Recurrent DVT or Non-fatal or Fatal PE by Treatment Group (Intent-to-Treat Population) – EINSTEIN Extension Study**




Number of Patients at Risk

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Placebo (N= 594) | 582 | 570 | 559 | 522 | 468 | 453 | 164 | 138 | 134 | 110 | 93 | 85 |
| XARELTO (N= 602) | 590 | 583 | 577 | 552 | 503 | 491 | 171 | 138 | 133 | 114 | 92 | 81 |

## 14.3 Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

XARELTO was studied in 9011 patients (4487 XARELTO-treated, 4524 enoxaparin-treated patients) in the RECORD 1, 2, and 3 studies.

The two randomized, double-blind, clinical studies (RECORD 1 and 2) in patients undergoing elective total hip replacement surgery compared XARELTO 10 mg once daily starting at least 6 to 8 hours (about 90% of patients dosed 6 to 10 hours) after wound closure versus enoxaparin 40 mg once daily started 12 hours preoperatively. In RECORD 1 and 2, a total of 6727 patients were randomized and 6579 received study drug. The mean age [± standard deviation (SD)] was 63 ± 12.2 (range 18 to 93) years with 49% of patients ≥65 years and 55% of patients were female. More than 82% of patients were White, 7% were Asian, and less than 2% were Black. The studies excluded patients undergoing staged bilateral total hip replacement, patients with severe renal impairment defined as an estimated creatinine clearance <30 mL/min, or patients with significant liver disease (hepatitis or cirrhosis). In RECORD 1, the mean exposure duration (± SD) to active XARELTO and enoxaparin was 33.3 ± 7.0 and 33.6 ± 8.3 days, respectively. In RECORD 2, the mean exposure duration to active XARELTO and enoxaparin was 33.5 ± 6.9 and 12.4 ± 2.9 days, respectively. After Day 13, oral placebo was continued in the enoxaparin



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group for the remainder of the double-blind study duration. The efficacy data for RECORD 1 and 2 are provided in Table 12.

**Table 12: Summary of Key Efficacy Analysis Results for Patients Undergoing Total Hip Replacement Surgery - Modified Intent-to-Treat Population**

| | RECORD 1 | | | RECORD 2 | | |
|---|---|---|---|---|---|---|
| **Treatment Dosage and Duration** | **XARELTO 10 mg once daily** | **Enoxaparin 40 mg once daily** | **RRR*, p-value** | **XARELTO 10 mg once daily** | **Enoxaparin† 40 mg once daily** | **RRR*, p-value** |
| **Number of Patients** | **N = 1513** | **N = 1473** | | **N = 834** | **N = 835** | |
| **Total VTE** | 17 (1.1%) | 57 (3.9%) | 71% (95% CI: 50, 83), p<0.001 | 17 (2.0%) | 70 (8.4%) | 76% (95% CI: 59, 86), p<0.001 |
| **Components of Total VTE** | | | | | | |
| Proximal DVT | 1 (0.1%) | 31 (2.1%) | | 5 (0.6%) | 40 (4.8%) | |
| Distal DVT | 12 (0.8%) | 26 (1.8%) | | 11 (1.3%) | 43 (5.2%) | |
| Non-fatal PE | 3 (0.2%) | 1 (0.1%) | | 1 (0.1%) | 4 (0.5%) | |
| Death (any cause) | 4 (0.3%) | 4 (0.3%) | | 2 (0.2%) | 4 (0.5%) | |
| **Number of Patients** | **N = 1600** | **N = 1587** | | **N = 928** | **N = 929** | |
| **Major VTE‡** | 3 (0.2%) | 33 (2.1%) | 91% (95% CI: 71, 97), p<0.001 | 6 (0.7%) | 45 (4.8%) | 87% (95% CI: 69, 94), p<0.001 |
| **Number of Patients** | **N = 2103** | **N = 2119** | | **N = 1178** | **N = 1179** | |
| **Symptomatic VTE** | 5 (0.2%) | 11 (0.5%) | | 3 (0.3%) | 15 (1.3%) | |

* Relative Risk Reduction; CI=confidence interval
† Includes the placebo-controlled period of RECORD 2
‡ Proximal DVT, nonfatal PE or VTE-related death

One randomized, double-blind, clinical study (RECORD 3) in patients undergoing elective total knee replacement surgery compared XARELTO 10 mg once daily started at least 6 to 8 hours (about 90% of patients dosed 6 to 10 hours) after wound closure versus enoxaparin. In RECORD 3, the enoxaparin regimen was 40 mg once daily started 12 hours preoperatively. The mean age (± SD) of patients in the study was 68 ± 9.0 (range 28 to 91) years with 66% of patients ≥65 years. Sixty-eight percent (68%) of patients were female. Eighty-one percent (81%) of patients were White, less than 7% were Asian, and less than 2% were Black. The study excluded patients with severe renal impairment defined as an estimated creatinine clearance <30 mL/min or patients with significant liver disease (hepatitis or cirrhosis). The mean exposure duration (± SD) to active XARELTO and enoxaparin was 11.9 ± 2.3 and 12.5 ± 3.0 days, respectively. The efficacy data are provided in Table 13.



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**Table 13: Summary of Key Efficacy Analysis Results for Patients Undergoing Total Knee Replacement Surgery - Modified Intent-to-Treat Population**

| | RECORD 3 | | |
|---|---|---|---|
| **Treatment Dosage and Duration** | **XARELTO 10 mg once daily** | **Enoxaparin 40 mg once daily** | **RRR*, p-value** |
| **Number of Patients** | **N = 813** | **N = 871** | |
| **Total VTE** | 79 (9.7%) | 164 (18.8%) | 48% (95% CI: 34, 60), p<0.001 |
| **Components of events contributing to Total VTE** | | | |
| Proximal DVT | 9 (1.1%) | 19 (2.2%) | |
| Distal DVT | 74 (9.1%) | 154 (17.7%) | |
| Non-fatal PE | 0 | 4 (0.5%) | |
| Death (any cause) | 0 | 2 (0.2%) | |
| **Number of Patients** | **N = 895** | **N = 917** | |
| **Major VTE**† | 9 (1.0%) | 23 (2.5%) | 60% (95% CI: 14, 81), p=0.024 |
| **Number of Patients** | **N = 1206** | **N = 1226** | |
| **Symptomatic VTE** | 8 (0.7%) | 24 (2.0%) | |

* Relative Risk Reduction; CI=confidence interval

† Proximal DVT, nonfatal PE or VTE-related death

## 16 HOW SUPPLIED/STORAGE AND HANDLING

XARELTO (rivaroxaban) Tablets are available in the strengths and packages listed below:

- 10 mg tablets are round, light red, biconvex film-coated tablets marked with a triangle pointing down above a “10” on one side, and “Xa” on the other side. The tablets are supplied in the packages listed:

  NDC 50458-580-30 Bottle containing 30 tablets

  NDC 50458-580-10 Blister package containing 100 tablets (10 blister cards containing 10 tablets each)

- 15 mg tablets are round, red, biconvex film-coated tablets with a triangle pointing down above a “15” marked on one side and “Xa” on the other side. The tablets are supplied in the packages listed:

  NDC 50458-578-30 Bottle containing 30 tablets

  NDC 50458-578-90 Bottle containing 90 tablets

  NDC 50458-578-10 Blister package containing 100 tablets (10 blister cards containing 10 tablets each)



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- 20 mg tablets are triangle-shaped, dark red film-coated tablets with a triangle pointing down above a “20” marked on one side and “Xa” on the other side. The tablets are supplied in the packages listed:

| | |
|---|---|
| NDC 50458-579-30 | Bottle containing 30 tablets |
| NDC 50458-579-90 | Bottle containing 90 tablets |
| NDC 50458-579-10 | Blister package containing 100 tablets (10 blister cards containing 10 tablets each) |

Store at 25°C (77°F) or room temperature; excursions permitted to 15°-30°C (59°-86°F) [see USP Controlled Room Temperature].

Keep out of the reach of children.

## 17 PATIENT COUNSELING INFORMATION

*See FDA-approved patient labeling (Medication Guide).*

### 17.1 Instructions for Patient Use

- Advise patients to take XARELTO only as directed.
- Remind patients to not discontinue XARELTO without first talking to their healthcare professional.
- Advise patients with atrial fibrillation to take XARELTO once daily with the evening meal.
- Advise patients with DVT and/or PE to take XARELTO 15 mg or 20 mg tablets with food at approximately the same time every day *[see Dosage and Administration (2.4)]*.
- Advise patients who cannot swallow the tablet whole to crush XARELTO and combine with a small amount of applesauce followed by food *[see Dosage and Administration (2.8)]*.
- For patients requiring an NG tube or gastric feeding tube, instruct the patient or caregiver to crush the XARELTO tablet and mix it with a small amount of water before administering via the tube *[see Dosage and Administration (2.8)]*.
- If a dose is missed, advise the patient to take XARELTO as soon as possible on the same day and continue on the following day with their recommended daily dose regimen.

### 17.2 Bleeding Risks

- Advise patients to report any unusual bleeding or bruising to their physician. Inform patients that it might take them longer than usual to stop bleeding, and that they may bruise and/or bleed more easily when they are treated with XARELTO *[see Warnings and Precautions (5.2)]*.



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- If patients have had neuraxial anesthesia or spinal puncture, and particularly, if they are taking concomitant NSAIDs or platelet inhibitors, advise patients to watch for signs and symptoms of spinal or epidural hematoma, such as tingling, numbness (especially in the lower limbs) and muscular weakness. If any of these symptoms occur, advise the patient to contact his or her physician immediately *[see Boxed Warning]*.

### 17.3 Invasive or Surgical Procedures

Instruct patients to inform their healthcare professional that they are taking XARELTO before any invasive procedure (including dental procedures) is scheduled.

### 17.4 Concomitant Medication and Herbals

Advise patients to inform their physicians and dentists if they are taking, or plan to take, any prescription or over-the-counter drugs or herbals, so their healthcare professionals can evaluate potential interactions *[see Drug Interactions (7)]*.

### 17.5 Pregnancy and Pregnancy-Related Hemorrhage

- Advise patients to inform their physician immediately if they become pregnant or intend to become pregnant during treatment with XARELTO *[see Use in Specific Populations (8.1)]*.

- Advise pregnant women receiving XARELTO to immediately report to their physician any bleeding or symptoms of blood loss *[see Warnings and Precautions (5.7)]*.

### 17.6 Nursing

Advise patients to discuss with their physician if they are nursing or intend to nurse during anticoagulant treatment *[see Use in Specific Populations (8.3)]*.

### 17.7 Females of Reproductive Potential

Advise patients who can become pregnant to discuss pregnancy planning with their physician *[see Use in Specific Populations (8.6)]*.

Active Ingredient Made in Germany

Finished Product Manufactured by:
Janssen Ortho, LLC
Gurabo, PR 00778

Manufactured for:
Janssen Pharmaceuticals, Inc.



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**MEDICATION GUIDE**

**XARELTO® (zah-REL-toe)**

**(rivaroxaban)**

**tablets**

Read this Medication Guide before you start taking XARELTO and each time you get a refill. There may be new information. This Medication Guide does not take the place of talking with your doctor about your medical condition or your treatment.

**What is the most important information I should know about XARELTO?**

- **For people taking XARELTO for atrial fibrillation**:

  People with atrial fibrillation (an irregular heart beat) are at an increased risk of forming a blood clot in the heart, which can travel to the brain, causing a stroke, or to other parts of the body. XARELTO lowers your chance of having a stroke by helping to prevent clots from forming. If you stop taking XARELTO, you may have increased risk of forming a clot in your blood.

  **Do not stop taking XARELTO without talking to the doctor who prescribes it for you. Stopping XARELTO increases your risk of having a stroke.**

  If you have to stop taking XARELTO, your doctor may prescribe another blood thinner medicine to prevent a blood clot from forming.

- **XARELTO can cause bleeding** which can be serious, and rarely may lead to death. This is because XARELTO is a blood thinner medicine that reduces blood clotting. While you take XARELTO you are likely to bruise more easily and it may take longer for bleeding to stop.

  You may have a higher risk of bleeding if you take XARELTO and take other medicines that increase your risk of bleeding, including:

  - aspirin or aspirin containing products
  - non-steroidal anti-inflammatory drugs (NSAIDs)
  - warfarin sodium (Coumadin®, Jantoven®)
  - any medicine that contains heparin
  - clopidogrel (Plavix®)
  - other medicines to prevent or treat blood clots

  Tell your doctor if you take any of these medicines. Ask your doctor or pharmacist if you are not sure if your medicine is one listed above.

  **Call your doctor or get medical help right away if you develop any of these signs or symptoms of bleeding:**

  - unexpected bleeding or bleeding that lasts a long time, such as:
    - nose bleeds that happen often
    - unusual bleeding from the gums
    - menstrual bleeding that is heavier than normal or vaginal bleeding



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- bleeding that is severe or you cannot control
- red, pink or brown urine
- bright red or black stools (looks like tar)
- cough up blood or blood clots
- vomit blood or your vomit looks like “coffee grounds”
- headaches, feeling dizzy or weak
- pain, swelling, or new drainage at wound sites

- **Spinal or epidural blood clots (hematoma).** People who take a blood thinner medicine (anticoagulant) like XARELTO, and have medicine injected into their spinal and epidural area, or have a spinal puncture have a risk of forming a blood clot that can cause long-term or permanent loss of the ability to move (paralysis). Your risk of developing a spinal or epidural blood clot is higher if:
    - a thin tube called an epidural catheter is placed in your back to give you certain medicine.
    - you take NSAIDs or a medicine to prevent blood from clotting
    - you have a history of difficult or repeated epidural or spinal punctures
    - you have a history of problems with your spine or have had surgery on your spine.

If you take XARELTO and receive spinal anesthesia or have a spinal puncture, your doctor should watch you closely for symptoms of spinal or epidural blood clots. Tell your doctor right away if you have tingling, numbness, or muscle weakness, especially in your legs and feet.

- **XARELTO is not for patients with artificial heart valves.**

**See “What are the possible side effects of XARELTO?” for more information about side effects.**

**What is XARELTO?**

- XARELTO is a prescription medicine used to:
    - reduce the risk of stroke and blood clots in people who have a medical condition called atrial fibrillation. With atrial fibrillation, part of the heart does not beat the way it should. This can lead to the formation of blood clots, which can travel to the brain, causing a stroke, or to other parts of the body.
    - treat blood clots in the veins of your legs (deep vein thrombosis) or lungs (pulmonary embolism) and reduce the risk of them occurring again.
    - reduce the risk of forming a blood clot in the legs and lungs of people who have just had hip or knee replacement surgery.

It is not known if XARELTO is safe and effective in children.



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**Who should not take XARELTO?**

**Do not take XARELTO if you:**

- currently have certain types of abnormal bleeding. Talk to your doctor before taking XARELTO if you currently have unusual bleeding.
- are allergic to rivaroxaban or any of the ingredients in XARELTO. See the end of this leaflet for a complete list of ingredients in XARELTO.

**What should I tell my doctor before taking XARELTO?**

Before you take XARELTO, tell your doctor if you:

- have ever had bleeding problems
- have liver or kidney problems
- have any other medical condition
- are pregnant or plan to become pregnant. It is not known if XARELTO will harm your unborn baby. Tell your doctor right away if you become pregnant while taking XARELTO. If you take XARELTO during pregnancy tell your doctor right away if you have any bleeding or symptoms of blood loss.
- are breastfeeding or plan to breastfeed. It is not known if XARELTO passes into your breast milk. You and your doctor should decide if you will take XARELTO or breastfeed.

Tell all of your doctors and dentists that you are taking XARELTO. They should talk to the doctor who prescribed XARELTO for you before you have any surgery, medical or dental procedure.

**Tell your doctor about all the medicines you take, including prescription and nonprescription medicines, vitamins, and herbal supplements.** Some of your other medicines may affect the way XARELTO works. Certain medicines may increase your risk of bleeding. See **"What is the most important information I should know about XARELTO?"**

Especially tell your doctor if you take:

- ketoconazole (Nizoral®)
- itraconazole (Onmel™, Sporanox®)
- ritonavir (Norvir®)
- lopinavir/ritonavir (Kaletra®)
- indinavir (Crixivan®)
- carbamazepine (Carbatrol®, Equetro®, Tegretol®, Tegretol®-XR, Teril™, Epitol®)
- phenytoin (Dilantin-125®, Dilantin®)
- phenobarbital (Solfoton™)
- rifampin (Rifater®, Rifamate®, Rimactane®, Rifadin®)
- St. John's wort (Hypericum perforatum)

Ask your doctor if you are not sure if your medicine is one listed above.



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Know the medicines you take. Keep a list of them to show your doctor and pharmacist when you get a new medicine.

**How should I take XARELTO?**

- Take XARELTO exactly as prescribed by your doctor.
- Do not change your dose or stop taking XARELTO unless your doctor tells you to.
- Your doctor will tell you how much XARELTO to take and when to take it.
- Your doctor may change your dose if needed.
- If you take XARELTO for:
  - **atrial fibrillation:**
    - Take XARELTO 1 time a day with your evening meal.
    - If you miss a dose of XARELTO, take it as soon as you remember on the same day. Take your next dose at your regularly scheduled time.
  - **blood clots in the veins of your legs or lungs:**
    - Take XARELTO once or twice a day as prescribed by your doctor.
    - Take XARELTO with food at the same time each day.
    - If you miss a dose of XARELTO:
      - **and take XARELTO 2 times a day:** Take XARELTO as soon as you remember on the same day. You may take 2 doses at the same time to make up for the missed dose. Take your next dose at your regularly scheduled time.
      - **and take XARELTO 1 time a day:** Take XARELTO as soon as you remember on the same day. Take your next dose at your regularly scheduled time.
  - **hip or knee replacement surgery:**
    - Take XARELTO 1 time a day with or without food.
    - If you miss a dose of XARELTO, take it as soon as you remember on the same day. Take your next dose at your regularly scheduled time.
- If you have difficulty swallowing the tablet whole, talk to your doctor about other ways to take XARELTO.
- Your doctor will decide how long you should take XARELTO. Do not stop taking XARELTO without talking with your doctor first.
- Your doctor may stop XARELTO for a short time before any surgery, medical or dental procedure. Your doctor will tell you when to start taking XARELTO again after your surgery or procedure.



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- Do not run out of XARELTO. Refill your prescription of XARELTO before you run out. When leaving the hospital following a hip or knee replacement, be sure that you will have XARELTO available to avoid missing any doses.
- If you take too much XARELTO, go to the nearest hospital emergency room or call your doctor right away.

**What are the possible side effects of XARELTO?**

- **See "What is the most important information I should know about XARELTO?"**

Tell your doctor if you have any side effect that bothers you or that does not go away.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

**How should I store XARELTO?**

- Store XARELTO at room temperature between 68°F to 77°F (20° to 25° C).

**Keep XARELTO and all medicines out of the reach of children.**

**General information about XARELTO.**

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. Do not use XARELTO for a condition for which it was not prescribed. Do not give XARELTO to other people, even if they have the same condition. It may harm them.

This Medication Guide summarizes the most important information about XARELTO. If you would like more information, talk with your doctor. You can ask your pharmacist or doctor for information about XARELTO that is written for health professionals.

For more information call 1-800-526-7736 or go to www.XARELTO-US.com.

**What are the ingredients in XARELTO?**

Active ingredient: rivaroxaban

Inactive ingredients: croscarmellose sodium, hypromellose, lactose monohydrate, magnesium stearate, microcrystalline cellulose, and sodium lauryl sulfate.

The proprietary film coating mixture for XARELTO 10 mg tablets is Opadry® Pink and contains: ferric oxide red, hypromellose, polyethylene glycol 3350, and titanium dioxide.

The proprietary film coating mixture for XARELTO 15 mg tablets is Opadry® Red and contains: ferric oxide red, hypromellose, polyethylene glycol 3350, and titanium dioxide.



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The proprietary film coating mixture for XARELTO 20 mg tablets is Opadry® II Dark Red and contains: ferric oxide red, polyethylene glycol 3350, polyvinyl alcohol (partially hydrolyzed), talc, and titanium dioxide.

This Medication Guide has been approved by the U.S. Food and Drug Administration.

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Janssen Ortho, LLC
Gurabo, PR 00778

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