

# **CENTER FOR DRUG EVALUATION AND RESEARCH**

*APPLICATION NUMBER:*

**22-307**

**LABELING**

**HIGHLIGHTS OF PRESCRIBING INFORMATION**

These highlights do not include all the information needed to use Effient safely and effectively. See full prescribing information for Effient.

**EFFIENT (prasugrel) tablets**  
Initial U.S. Approval: 2009

**WARNING: BLEEDING RISK**

*See full prescribing information for complete boxed warning*

Effient can cause significant, sometimes fatal, bleeding (5.1, 5.2, and 6.1). Do not use Effient in patients with active pathological bleeding or a history of transient ischemic attack or stroke (4.1 and 4.2).

In patients ≥ 75 years of age, Effient is generally not recommended because of the increased risk of fatal and intracranial bleeding and uncertain benefit, except in high-risk patients (diabetes or prior MI), where its effect appears to be greater and its use may be considered (8.5).

Do not start Effient in patients likely to undergo urgent coronary artery bypass graft surgery (CABG). When possible, discontinue Effient at least 7 days prior to any surgery.

**Additional risk factors for bleeding include:**

- body weight < 60 kg
- propensity to bleed
- concomitant use of medications that increase the risk of bleeding

Suspect bleeding in any patient who is hypotensive and has recently undergone coronary angiography, percutaneous coronary intervention (PCI), CABG, or other surgical procedures in the setting of Effient.

If possible, manage bleeding without discontinuing Effient. Stopping Effient, particularly in the first few weeks after acute coronary syndrome, increases the risk of subsequent cardiovascular events (5.3).

- Patients with unstable angina or, non-ST-elevation myocardial infarction (NSTEMI) (1.1)
- Patients with ST-elevation myocardial infarction (STEMI) when managed with either primary or delayed PCI (1.1).

-----**DOSAGE AND ADMINISTRATION**-----

- Initiate treatment with a single 60 mg oral loading dose (2).
- Continue at 10 mg once daily with or without food. Consider 5 mg once daily for patients < 60 kg (2).
- Patients should also take aspirin (75 mg to 325 mg) daily (2).

-----**DOSAGE FORMS AND STRENGTHS**-----

5 mg and 10 mg tablets (3)

-----**CONTRAINDICATIONS**-----

- Active pathological bleeding (4.1)
- Prior transient ischemic attack or stroke (4.2)

-----**WARNINGS AND PRECAUTIONS**-----

- CABG-related bleeding: Risk increases in patients receiving Effient who undergo CABG (5.2).
- Discontinuation of Effient: Premature discontinuation increases risk of stent thrombosis, MI, and death (5.3).

-----**ADVERSE REACTIONS**-----

Bleeding, including life-threatening and fatal bleeding, is the most commonly reported adverse reaction (6.1).

**To report SUSPECTED ADVERSE REACTIONS, contact Eli Lilly and Company at 1-800-545-5979 or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch)**

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

-----**INDICATIONS AND USAGE**-----

Effient is a P2Y<sub>12</sub> platelet inhibitor indicated for the reduction of thrombotic cardiovascular events (including stent thrombosis) in patients with acute coronary syndrome who are to be managed with PCI as follows:

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## FULL PRESCRIBING INFORMATION

### WARNING: BLEEDING RISK

Effient can cause significant, sometimes fatal, bleeding [see *Warnings and Precautions (5.1 and 5.2) and Adverse Reactions (6.1)*].

Do not use Effient in patients with active pathological bleeding or a history of transient ischemic attack or stroke [see *Contraindications (4.1 and 4.2)*].

In patients  $\geq 75$  years of age, Effient is generally not recommended, because of the increased risk of fatal and intracranial bleeding and uncertain benefit, except in high-risk situations (patients with diabetes or a history of prior MI) where its effect appears to be greater and its use may be considered [see *Use in Specific Populations (8.5)*].

Do not start Effient in patients likely to undergo urgent coronary artery bypass graft surgery (CABG). When possible, discontinue Effient at least 7 days prior to any surgery.

Additional risk factors for bleeding include:

- body weight  $< 60$  kg
- propensity to bleed
- concomitant use of medications that increase the risk of bleeding (e.g., warfarin, heparin, fibrinolytic therapy, chronic use of non-steroidal anti-inflammatory drugs [NSAIDs])

Suspect bleeding in any patient who is hypotensive and has recently undergone coronary angiography, percutaneous coronary intervention (PCI), CABG, or other surgical procedures in the setting of Effient.

If possible, manage bleeding without discontinuing Effient. Discontinuing Effient, particularly in the first few weeks after acute coronary syndrome, increases the risk of subsequent cardiovascular events [see *Warnings and Precautions (5.3)*].

## 1 INDICATIONS AND USAGE

### 1.1 Acute Coronary Syndrome

Effient™ is indicated to reduce the rate of thrombotic cardiovascular (CV) events (including stent thrombosis) in patients with acute coronary syndrome (ACS) who are to be managed with percutaneous coronary intervention (PCI) as follows:

- Patients with unstable angina (UA) or non-ST-elevation myocardial infarction (NSTEMI).
- Patients with ST-elevation myocardial infarction (STEMI) when managed with primary or delayed PCI.

Effient has been shown to reduce the rate of a combined endpoint of cardiovascular death, nonfatal myocardial infarction (MI), or nonfatal stroke compared to clopidogrel. The difference between treatments was driven predominantly by MI, with no difference on strokes and little difference on CV death [see *Clinical Studies (14)*].

It is generally recommended that antiplatelet therapy be administered promptly in the management of ACS because many cardiovascular events occur within hours of initial presentation. In the clinical trial that established the efficacy of Effient, Effient and the control drug were not administered to UA/NSTEMI patients until coronary anatomy was established. For the small fraction of patients that required urgent CABG after treatment with Effient, the risk of significant bleeding was substantial [see *Warnings and Precautions (5.2)*]. Because the large majority of patients are managed without CABG, however, treatment can be considered before determining coronary anatomy if need for CABG is considered unlikely. The advantages of earlier treatment with Effient must then be balanced against the increased rate of bleeding in patients who do need to undergo urgent CABG.

## 2 DOSAGE AND ADMINISTRATION

Initiate Effient treatment as a single 60 mg oral loading dose and then continue at 10 mg orally once daily. Patients taking Effient should also take aspirin (75 mg to 325 mg) daily [see *Drug Interactions (7) and Clinical Pharmacology (12.3)*]. Effient may be administered with or without food [see *Clinical Pharmacology (12.3) and Clinical Studies (14)*].

### Dosing in Low Weight Patients

Compared to patients weighing  $\geq 60$  kg, patients weighing  $< 60$  kg have an increased exposure to the active metabolite of prasugrel and an increased risk of bleeding on a 10 mg once daily maintenance dose. Consider lowering the maintenance dose to 5 mg in patients  $< 60$  kg. The effectiveness and safety of the 5 mg dose have not been prospectively studied.

## 3 DOSAGE FORMS AND STRENGTHS

Effient 5 mg is a yellow, elongated hexagonal, film-coated, non-scored tablet debossed with “5 MG” on one side and “4760” on the other side.

Effient 10 mg is a beige, elongated hexagonal, film-coated, non-scored tablet debossed with “10 MG” on one side and with “4759” on the other side.

## 4 CONTRAINDICATIONS

### 4.1 Active Bleeding

Effient is contraindicated in patients with active pathological bleeding such as peptic ulcer or intracranial hemorrhage [see *Warnings and Precautions (5.1) and Adverse Reactions (6.1)*].

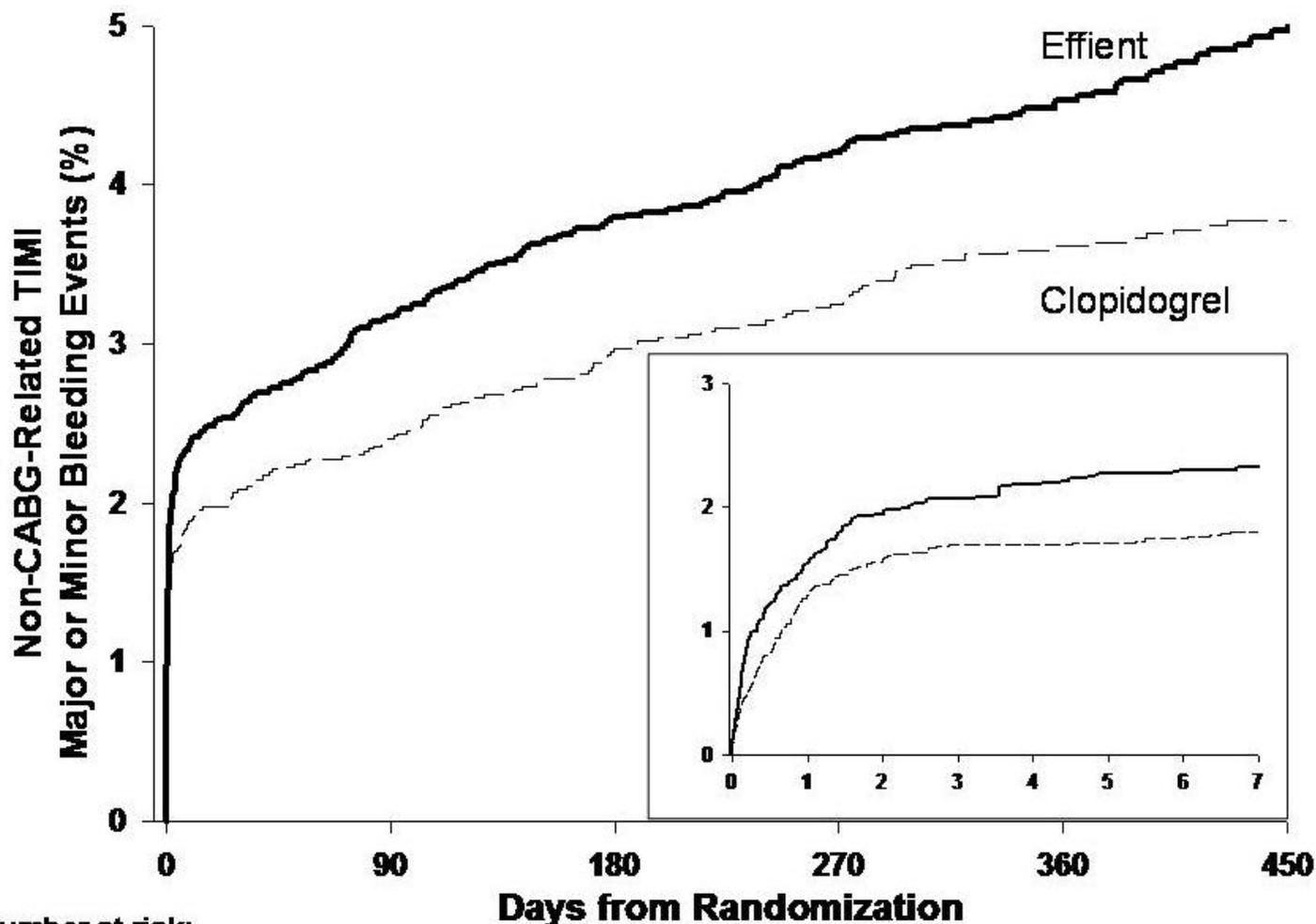
### 4.2 Prior Transient Ischemic Attack or Stroke

Effient is contraindicated in patients with a history of prior transient ischemic attack (TIA) or stroke. In TRITON-TIMI 38 (TRial to Assess Improvement in Therapeutic Outcomes by Optimizing Platelet Inhibition with Prasugrel), patients with a history of TIA or ischemic stroke (> 3 months prior to enrollment) had a higher rate of stroke on Effient (6.5%; of which 4.2% were thrombotic stroke and 2.3% were intracranial hemorrhage [ICH]) than on clopidogrel (1.2%; all thrombotic). In patients without such a history, the incidence of stroke was 0.9% (0.2% ICH) and 1.0% (0.3% ICH) with Effient and clopidogrel, respectively. Patients with a history of ischemic stroke within 3 months of screening and patients with a history of hemorrhagic stroke at any time were excluded from TRITON-TIMI 38. Patients who experience a stroke or TIA while on Effient generally should have therapy discontinued [see Adverse Reactions (6.1) and Clinical Studies (14)].

## 5 WARNINGS AND PRECAUTIONS

### 5.1 General Risk of Bleeding

Thienopyridines, including Effient, increase the risk of bleeding. With the dosing regimens used in TRITON-TIMI 38, TIMI (Thrombolysis in Myocardial Infarction) Major (clinically overt bleeding associated with a fall in hemoglobin  $\geq 5$  g/dL, or intracranial hemorrhage) and TIMI Minor (overt bleeding associated with a fall in hemoglobin of  $\geq 3$  g/dL but  $< 5$  g/dL) bleeding events were more common on Effient than on clopidogrel [see Adverse Reactions (6.1)]. The bleeding risk is highest initially, as shown in Figure 1 (events through 450 days; inset shows events through 7 days).



Number at risk:

Effient	6741	6042	5707	4813	4078	2747
Clopidogrel	6716	6023	5764	4883	4138	2792

Figure 1: Non-CABG-Related TIMI Major or Minor Bleeding Events

Suspect bleeding in any patient who is hypotensive and has recently undergone coronary angiography, PCI, CABG, or other surgical procedures even if the patient does not have overt signs of bleeding.

Do not use Effient in patients with active bleeding, prior TIA or stroke [see Contraindications (4.1 and 4.2)].

Other risk factors for bleeding are:

- Age  $\geq$  75 years. Because of the risk of bleeding (including fatal bleeding) and uncertain effectiveness in patients  $\geq$  75 years of age, use of Effient is generally not recommended in these patients, except in high-risk situations (patients with diabetes or history of myocardial infarction) where its effect appears to be greater and its use may be considered [see *Adverse Reactions (6.1)*, *Use in Specific Populations (8.5)*, *Clinical Pharmacology (12.3)*, and *Clinical Trials (14)*].
- CABG or other surgical procedure [see *Warnings and Precautions (5.2)*].
- Body weight  $<$  60 kg. Consider a lower (5 mg) maintenance dose [see *Dosage and Administration (2)*, *Adverse Reactions (6.1)*, *Use in Specific Populations (8.6)*].
- Propensity to bleed (e.g., recent trauma, recent surgery, recent or recurrent gastrointestinal (GI) bleeding, active peptic ulcer disease, or severe hepatic impairment) [see *Adverse Reactions (6.1)* and *Use in Specific Populations (8.8)*].
- Medications that increase the risk of bleeding (e.g., oral anticoagulants, chronic use of non-steroidal anti-inflammatory drugs [NSAIDs], and fibrinolytic agents). Aspirin and heparin were commonly used in TRITON-TIMI 38 [see *Drug Interactions (7)*, *Clinical Studies (14)*].

Thienopyridines inhibit platelet aggregation for the lifetime of the platelet (7-10 days), so withholding a dose will not be useful in managing a bleeding event or the risk of bleeding associated with an invasive procedure. Because the half-life of prasugrel's active metabolite is short relative to the lifetime of the platelet, it may be possible to restore hemostasis by administering exogenous platelets; however, platelet transfusions within 6 hours of the loading dose or 4 hours of the maintenance dose may be less effective.

### 5.2 Coronary Artery Bypass Graft Surgery-Related Bleeding

The risk of bleeding is increased in patients receiving Effient who undergo CABG. If possible, Effient should be discontinued at least 7 days prior to CABG.

Of the 437 patients who underwent CABG during TRITON-TIMI 38, the rates of CABG-related TIMI Major or Minor bleeding were 14.1% in the Effient group and 4.5% in the clopidogrel group [see *Adverse Reactions (6.1)*]. The higher risk for bleeding events in patients treated with Effient persisted up to 7 days from the most recent dose of study drug. For patients receiving a thienopyridine within 3 days prior to CABG, the frequencies of TIMI Major or Minor bleeding were 26.7% (12 of 45 patients) in the Effient group, compared with 5.0% (3 of 60 patients) in the clopidogrel group. For patients who received their last dose of thienopyridine within 4 to 7 days prior to CABG, the frequencies decreased to 11.3% (9 of 80 patients) in the prasugrel group and 3.4% (3 of 89 patients) in the clopidogrel group.

Do not start Effient in patients likely to undergo urgent CABG. CABG-related bleeding may be treated with transfusion of blood products, including packed red blood cells and platelets; however, platelet transfusions within 6 hours of the loading dose or 4 hours of the maintenance dose may be less effective.

### 5.3 Discontinuation of Effient

Discontinue thienopyridines, including Effient, for active bleeding, elective surgery, stroke, or TIA. The optimal duration of thienopyridine therapy is unknown. In patients who are managed with PCI and stent placement, premature discontinuation of any antiplatelet medication, including thienopyridines, conveys an increased risk of stent thrombosis, myocardial infarction, and death. Patients who require premature discontinuation of a thienopyridine will be at increased risk for cardiac events. Lapses in therapy should be avoided, and if thienopyridines must be temporarily discontinued because of an adverse event(s), they should be restarted as soon as possible [see *Contraindications (4.1 and 4.2)* and *Warnings and Precautions (5.1)*].

### 5.4 Thrombotic Thrombocytopenic Purpura

Thrombotic thrombocytopenic purpura (TTP) has been reported with the use of other thienopyridines, sometimes after a brief exposure ( $<$  2 weeks). TTP is a serious condition that can be fatal and requires urgent treatment, including plasmapheresis (plasma exchange). TTP is characterized by thrombocytopenia, microangiopathic hemolytic anemia (schistocytes [fragment red blood cells] seen on peripheral smear), neurological findings, renal dysfunction, and fever.

## 6 ADVERSE REACTIONS

### 6.1 Clinical Trials Experience

The following serious adverse reactions are also discussed elsewhere in the labeling:

- Bleeding [see *Boxed Warning and Warnings and Precautions (5.1, 5.2)*]
- Thrombotic thrombocytopenic purpura [see *Warnings and Precautions (5.4)*]

Safety in patients with ACS undergoing PCI was evaluated in a clopidogrel-controlled study, TRITON-TIMI 38, in which 6741 patients were treated with Effient (60 mg loading dose and 10 mg once daily) for a median of 14.5 months (5802 patients were treated for over 6 months; 4136 patients were treated for more than 1 year). The population treated with Effient was 27 to 96 years of age, 25% female, and 92% Caucasian. All patients in the TRITON-TIMI 38 study were to receive aspirin. The dose of clopidogrel in this study was a 300 mg loading dose and 75 mg once daily.

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

#### Drug Discontinuation

The rate of study drug discontinuation because of adverse reactions was 7.2% for Effient and 6.3% for clopidogrel. Bleeding was the most common adverse reaction leading to study drug discontinuation for both drugs (2.5% for Effient and 1.4% for clopidogrel).

#### Bleeding

139 *Bleeding Unrelated to CABG Surgery* - In TRITON-TIMI 38, overall rates of TIMI Major or Minor bleeding adverse  
 140 reactions unrelated to coronary artery bypass graft surgery (CABG) were significantly higher on Effient than on clopidogrel, as shown  
 141 in Table 1.  
 142  
 143

**Table 1: Non-CABG-Related Bleeding<sup>a</sup> (TRITON-TIMI 38)**

	Effient (%) (N=6741)	Clopidogrel (%) (N=6716)	p-value
TIMI Major or Minor bleeding	4.5	3.4	p=0.002
TIMI Major bleeding <sup>b</sup>	2.2	1.7	p=0.029
Life-threatening	1.3	0.8	p=0.015
Fatal	0.3	0.1	
Symptomatic intracranial hemorrhage (ICH)	0.3	0.3	
Requiring inotropes	0.3	0.1	
Requiring surgical intervention	0.3	0.3	
Requiring transfusion (≥4 units)	0.7	0.5	
TIMI Minor bleeding <sup>b</sup>	2.4	1.9	p=0.022

144 <sup>a</sup> Patients may be counted in more than one row.

145 <sup>b</sup> See 5.1 for definition.

146  
 147 Figure 1 demonstrates non-CABG related TIMI Major or Minor bleeding. The bleeding rate is highest initially, as shown in  
 148 Figure 1 (inset: Days 0 to 7) [see *Warnings and Precautions (5.1)*].

149 Bleeding rates in patients with the risk factors of age ≥ 75 years and weight < 60 kg are shown in Table 2.  
 150

**Table 2: Bleeding Rates for Non-CABG-Related Bleeding by Weight and Age (TRITON-TIMI 38)**

	Major/Minor		Fatal	
	Effient (%)	Clopidogrel (%)	Effient (%)	Clopidogrel (%)
Weight < 60kg (N=308 Effient, N=356 clopidogrel)	10.1	6.5	0.0	0.3
Weight ≥ 60kg (N=6373 Effient, N=6299 clopidogrel)	4.2	3.3	0.3	0.1
Age < 75 years (N=5850 Effient, N=5822 clopidogrel)	3.8	2.9	0.2	0.1
Age ≥ 75 years (N=891 Effient, N=894 clopidogrel)	9.0	6.9	1.0	0.1

152  
 153 *Bleeding Related to CABG* - In TRITON-TIMI 38, 437 patients who received a thienopyridine underwent CABG during the  
 154 course of the study. The rate of CABG-related TIMI Major or Minor bleeding was 14.1% for the Effient group and 4.5% in the  
 155 clopidogrel group (Table 3). The higher risk for bleeding adverse reactions in patients treated with Effient persisted up to 7 days from  
 156 the most recent dose of study drug.  
 157

**Table 3: CABG-Related Bleeding<sup>a</sup> (TRITON-TIMI 38)**

	Effient (%) (N=213)	Clopidogrel (%) (N=224)
TIMI Major or Minor bleeding	14.1	4.5
TIMI Major bleeding	11.3	3.6
Fatal	0.9	0
Reoperation	3.8	0.5
Transfusion of ≥5 units	6.6	2.2
Intracranial hemorrhage	0	0
TIMI Minor bleeding	2.8	0.9

159 <sup>a</sup> Patients may be counted in more than one row.

160  
 161 *Bleeding Reported as Adverse Reactions* - Hemorrhagic events reported as adverse reactions in TRITON-TIMI 38 were, for  
 162 Effient and clopidogrel, respectively: epistaxis (6.2%, 3.3%), gastrointestinal hemorrhage (1.5%, 1.0%), hemoptysis (0.6%, 0.5%),  
 163 subcutaneous hematoma (0.5%, 0.2%), post-procedural hemorrhage (0.5%, 0.2%), retroperitoneal hemorrhage (0.3%, 0.2%), and  
 164 retinal hemorrhage (0.0%, 0.1%).  
 165 Malignancies

166 During TRITON-TIMI 38, newly diagnosed malignancies were reported in 1.6% and 1.2% of patients treated with prasugrel  
 167 and clopidogrel, respectively. The sites contributing to the differences were primarily colon and lung. It is unclear if these  
 168 observations are causally-related or are random occurrences.

## Other Adverse Events

In TRITON-TIMI 38, common and other important non-hemorrhagic adverse events were, for Effient and clopidogrel, respectively: severe thrombocytopenia (0.06%, 0.04%), anemia (2.2%, 2.0%), abnormal hepatic function (0.22%, 0.27%), allergic reactions (0.36%, 0.36%), and angioedema (0.06%, 0.04%). Table 4 summarizes the adverse events reported by at least 2.5% of patients.

**Table 4: Non-Hemorrhagic Treatment Emergent Adverse Events Reported by at Least 2.5% of Patients in Either Group**

	Effient (%) (N=6741)	Clopidogrel (%) (N=6716)
Hypertension	7.5	7.1
Hypercholesterolemia/Hyperlipidemia	7.0	7.4
Headache	5.5	5.3
Back pain	5.0	4.5
Dyspnea	4.9	4.5
Nausea	4.6	4.3
Dizziness	4.1	4.6
Cough	3.9	4.1
Hypotension	3.9	3.8
Fatigue	3.7	4.8
Non-cardiac chest pain	3.1	3.5
Atrial fibrillation	2.9	3.1
Bradycardia	2.9	2.4
Leukopenia (< 4 x 10 <sup>9</sup> WBC/L)	2.8	3.5
Rash	2.8	2.4
Pyrexia	2.7	2.2
Peripheral edema	2.7	3.0
Pain in extremity	2.6	2.6
Diarrhea	2.3	2.6

## 7 DRUG INTERACTIONS

### 7.1 Warfarin

Coadministration of Effient and warfarin increases the risk of bleeding [see *Warnings and Precautions (5.1) and Clinical Pharmacology (12.3)*].

### 7.2 Non-Steroidal Anti-Inflammatory Drugs

Coadministration of Effient and NSAIDs (used chronically) may increase the risk of bleeding [see *Warnings and Precautions (5.1)*].

### 7.3 Other Concomitant Medications

Effient can be administered with drugs that are inducers or inhibitors of cytochrome P450 enzymes [see *Clinical Pharmacology (12.3)*].

Effient can be administered with aspirin (75 mg to 325 mg per day), heparin, GPIIb/IIIa inhibitors, statins, digoxin, and drugs that elevate gastric pH, including proton pump inhibitors and H<sub>2</sub> blockers [see *Clinical Pharmacology (12.3)*].

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 Pregnancy

**Pregnancy Category B** - There are no adequate and well-controlled studies of Effient use in pregnant women. Reproductive and developmental toxicology studies in rats and rabbits at doses of up to 30 times the recommended therapeutic exposures in humans (based on plasma exposures to the major circulating human metabolite) revealed no evidence of fetal harm; however, animal studies are not always predictive of a human response. Effient should be used during pregnancy only if the potential benefit to the mother justifies the potential risk to the fetus.

In embryo fetal developmental toxicology studies, pregnant rats and rabbits received prasugrel at maternally toxic oral doses equivalent to more than 40 times the human exposure. A slight decrease in pup body weight was observed; but, there were no structural malformations in either species. In prenatal and postnatal rat studies, maternal treatment with prasugrel had no effect on the behavioral or reproductive development of the offspring at doses greater than 150 times the human exposure [see *Nonclinical Toxicology (13.1)*].

### 8.3 Nursing Mothers

It is not known whether Effient is excreted in human milk; however, metabolites of Effient were found in rat milk. Because many drugs are excreted in human milk, prasugrel should be used during nursing only if the potential benefit to the mother justifies the potential risk to the nursing infant.



croscarmellose sodium, microcrystalline cellulose, and vegetable magnesium stearate. The color coatings contain lactose, hypromellose, titanium dioxide, triacetin, iron oxide yellow, and iron oxide red (only in Effient 10 mg tablet).

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Prasugrel is an inhibitor of platelet activation and aggregation through the irreversible binding of its active metabolite to the P2Y<sub>12</sub> class of ADP receptors on platelets.

### 12.2 Pharmacodynamics

Prasugrel produces inhibition of platelet aggregation to 20  $\mu$ M or 5  $\mu$ M ADP, as measured by light transmission aggregometry. Following a 60-mg loading dose of Effient, approximately 90% of patients had at least 50% inhibition of platelet aggregation by 1 hour. Maximum platelet inhibition was about 80% (Figure 2). Mean steady-state inhibition of platelet aggregation was about 70% following 3 to 5 days of dosing at 10 mg daily after a 60-mg loading dose of Effient.

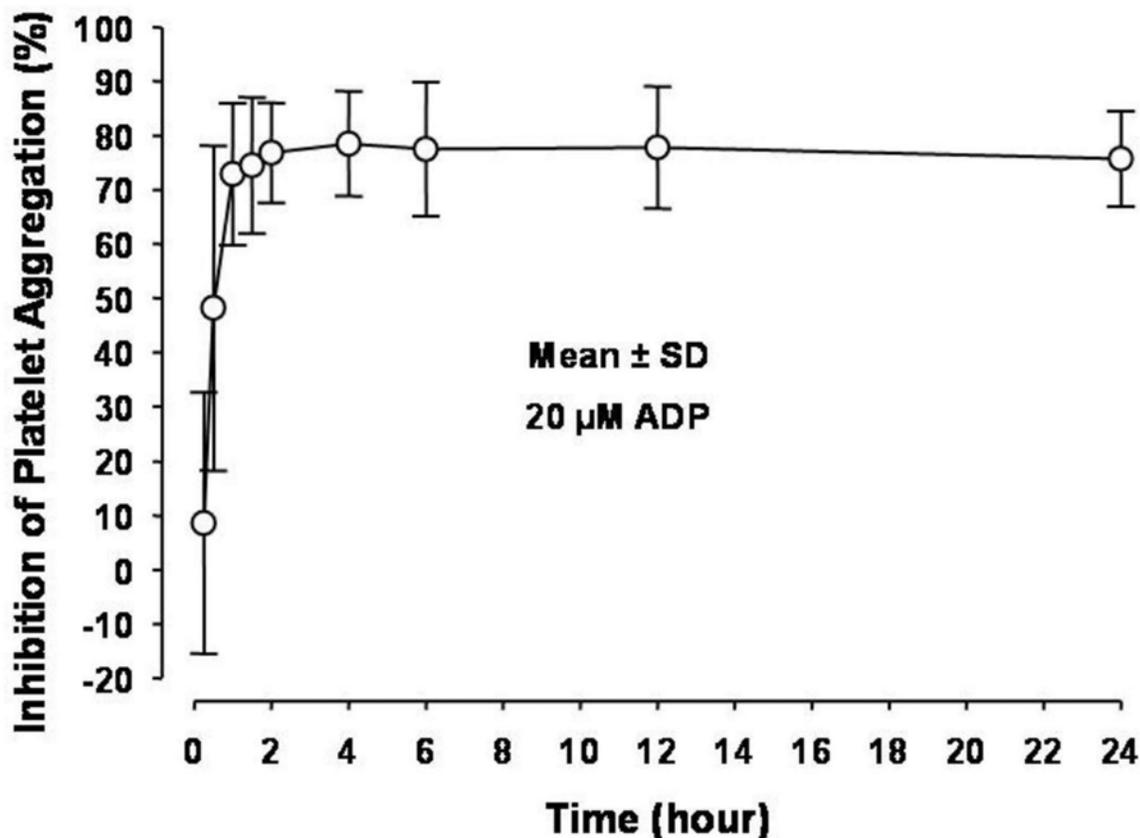


Figure 2: Inhibition (Mean $\pm$ SD) of 20  $\mu$ M ADP-induced Platelet Aggregation (IPA) Measured by Light Transmission Aggregometry after Prasugrel 60 mg

Platelet aggregation gradually returns to baseline values over 5-9 days after discontinuation of prasugrel, this time course being a reflection of new platelet production rather than pharmacokinetics of prasugrel. Discontinuing clopidogrel 75 mg and initiating prasugrel 10 mg with the next dose resulted in increased inhibition of platelet aggregation, but not greater than that typically produced by a 10 mg maintenance dose of prasugrel alone. The relationship between inhibition of platelet aggregation and clinical activity has not been established.

### 12.3 Pharmacokinetics

Prasugrel is a prodrug and is rapidly metabolized to a pharmacologically active metabolite and inactive metabolites. The active metabolite has an elimination half-life of about 7 hours (range 2-15 hours). Healthy subjects, patients with stable atherosclerosis, and patients undergoing PCI show similar pharmacokinetics.

**Absorption and Binding** - Following oral administration,  $\geq$  79% of the dose is absorbed. The absorption and metabolism are rapid, with peak plasma concentrations ( $C_{max}$ ) of the active metabolite occurring approximately 30 minutes after dosing. The active metabolite's exposure (AUC) increases slightly more than proportionally over the dose range of 5 to 60 mg. Repeated daily doses of 10 mg do not lead to accumulation of the active metabolite. In a study of healthy subjects given a single 15 mg dose, the AUC of the

active metabolite was unaffected by a high fat, high calorie meal, but  $C_{\max}$  was decreased by 49% and  $T_{\max}$  was increased from 0.5 to 1.5 hours. Effient can be administered without regard to food. The active metabolite is bound about 98% to human serum albumin.

*Metabolism and Elimination* - Prasugrel is not detected in plasma following oral administration. It is rapidly hydrolyzed in the intestine to a thiolactone, which is then converted to the active metabolite by a single step, primarily by CYP3A4 and CYP2B6 and to a lesser extent by CYP2C9 and CYP2C19. The estimates of apparent volume of distribution of prasugrel's active metabolite ranged from 44 to 68 L and the estimates of apparent clearance ranged from 112 to 166 L/hr in healthy subjects and patients with stable atherosclerosis. The active metabolite is metabolized to two inactive compounds by S-methylation or conjugation with cysteine. The major inactive metabolites are highly bound to human plasma proteins. Approximately 68% of the prasugrel dose is excreted in the urine and 27% in the feces as inactive metabolites.

#### Specific Populations

*Pediatric* - Pharmacokinetics and pharmacodynamics of prasugrel have not been evaluated in a pediatric population [see *Use in Specific Populations* (8.4)].

*Geriatric* - In a study of 32 healthy subjects between the ages of 20 and 80 years, age had no significant effect on pharmacokinetics of prasugrel's active metabolite or its inhibition of platelet aggregation. In TRITON-TIMI 38, the mean exposure (AUC) of the active metabolite was 19% higher in patients  $\geq 75$  years of age than in patients  $< 75$  years of age [see *Warnings and Precautions* (5.1), *Adverse Reactions* (6.1), and *Use in Specific Populations* (8.5)].

*Body Weight* - The mean exposure (AUC) to the active metabolite is approximately 30 to 40% higher in subjects with a body weight of  $< 60$  kg than in those weighing  $\geq 60$  kg [see *Dosage and Administration* (2), *Warnings and Precautions* (5.1), *Adverse Reactions* (6.1), and *Use in Specific Populations* (8.6)].

*Gender* - Pharmacokinetics of prasugrel's active metabolite are similar in men and women.

*Ethnicity* - Exposure in subjects of African and Hispanic descent is similar to that in Caucasians. In clinical pharmacology studies, after adjusting for body weight, the AUC of the active metabolite was approximately 19% higher in Chinese, Japanese, and Korean subjects than in Caucasian subjects.

*Smoking* - Pharmacokinetics of prasugrel's active metabolite are similar in smokers and nonsmokers.

*Renal Impairment* - Pharmacokinetics of prasugrel's active metabolite and its inhibition of platelet aggregation are similar in patients with moderate renal impairment ( $CrCL=30$  to  $50$  mL/min) and healthy subjects. In patients with end stage renal disease, exposure to the active metabolite (both  $C_{\max}$  and  $AUC(0-t_{\text{last}})$ ) was about half that in healthy controls and patients with moderate renal impairment [see *Use in Specific Populations* (8.7)].

*Hepatic Impairment* - Pharmacokinetics of prasugrel's active metabolite and inhibition of platelet aggregation were similar in patients with mild to moderate hepatic impairment compared to healthy subjects. The pharmacokinetics and pharmacodynamics of prasugrel's active metabolite in patients with severe hepatic disease have not been studied [see *Warnings and Precautions* (5.1) and *Use in Specific Populations* (8.8)].

#### Drug Interactions

##### *Potential for Other Drugs to Affect Prasugrel*

*Inhibitors of CYP3A* - Ketoconazole (400 mg daily), a selective and potent inhibitor of CYP3A4 and CYP3A5, did not affect prasugrel-mediated inhibition of platelet aggregation or the active metabolite's AUC and  $T_{\max}$ , but decreased the  $C_{\max}$  by 34% to 46%. Therefore, CYP3A inhibitors such as verapamil, diltiazem, indinavir, ciprofloxacin, clarithromycin, and grapefruit juice are not expected to have a significant effect on the pharmacokinetics of the active metabolite of prasugrel [see *Drug Interactions* (7.3)].

*Inducers of Cytochromes P450* - Rifampicin (600 mg daily), a potent inducer of CYP3A and CYP2B6 and an inducer of CYP2C9, CYP2C19, and CYP2C8, did not significantly change the pharmacokinetics of prasugrel's active metabolite or its inhibition of platelet aggregation. Therefore, known CYP3A inducers such as rifampicin, carbamazepine, and other inducers of cytochromes P450 are not expected to have significant effect on the pharmacokinetics of the active metabolite of prasugrel [see *Drug Interactions* (7.3)].

*Drugs that Elevate Gastric pH* - Daily coadministration of ranitidine (an  $H_2$  blocker) or lansoprazole (a proton pump inhibitor) decreased the  $C_{\max}$  of the prasugrel active metabolite by 14% and 29%, respectively, but did not change the active metabolite's AUC and  $T_{\max}$ . In TRITON-TIMI 38, Effient was administered without regard to coadministration of a proton pump inhibitor or  $H_2$  blocker [see *Drug Interactions* (7.3)].

*Statins* - Atorvastatin (80 mg daily), a drug metabolized by CYP3A4, did not alter the pharmacokinetics of prasugrel's active metabolite or its inhibition of platelet aggregation [see *Drug Interactions* (7.3)].

*Heparin* - A single intravenous dose of unfractionated heparin (100 U/kg) did not significantly alter coagulation or the prasugrel-mediated inhibition of platelet aggregation; however, bleeding time was increased compared with either drug alone [see *Drug Interactions* (7.3)].

*Aspirin* - Aspirin 150 mg daily did not alter prasugrel-mediated inhibition of platelet aggregation; however, bleeding time was increased compared with either drug alone [see *Drug Interactions* (7.3)].

*Warfarin* - A significant prolongation of the bleeding time was observed when prasugrel was coadministered with 15 mg of warfarin [see *Drug Interactions* (7.1)].

##### *Potential for Prasugrel to Affect Other Drugs*

*In vitro* metabolism studies demonstrate that prasugrel's main circulating metabolites are not likely to cause clinically significant inhibition of CYP1A2, CYP2C9, CYP2C19, CYP2D6, or CYP3A, or induction of CYP1A2 or CYP3A.

*Drugs Metabolized by CYP2B6* — Prasugrel is a weak inhibitor of CYP2B6. In healthy subjects, prasugrel decreased exposure to hydroxybupropion, a CYP2B6-mediated metabolite of bupropion, by 23%, an amount not considered clinically

346 significant. Prasugrel is not anticipated to have significant effect on the pharmacokinetics of drugs that are primarily metabolized  
347 by CYP2B6, such as halothane, cyclophosphamide, propofol, and nevirapine.

348 *Effect on Digoxin* - The potential role of prasugrel as a Pgp substrate was not evaluated. Prasugrel is not an inhibitor of Pgp,  
349 as digoxin clearance was not affected by prasugrel coadministration [see *Drug Interactions (7.3)*].

### 350 12.5 Pharmacogenomics

351 There is no relevant effect of genetic variation in CYP2B6, CYP2C9, CYP2C19, or CYP3A5 on the pharmacokinetics of  
352 prasugrel's active metabolite or its inhibition of platelet aggregation.

## 353 13 NONCLINICAL TOXICOLOGY

### 354 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

355 *Carcinogenesis* - No compound-related tumors were observed in a 2-year rat study with prasugrel at oral doses up to 100  
356 mg/kg/day (>100 times the recommended therapeutic exposures in humans (based on plasma exposures to the major circulating  
357 human metabolite). There was an increased incidence of tumors (hepatocellular adenomas) in mice exposed for 2 years to high doses  
358 (>250 times the human metabolite exposure).

359 *Mutagenesis* - Prasugrel was not genotoxic in two *in vitro* tests (Ames bacterial gene mutation test, clastogenicity assay in  
360 Chinese hamster fibroblasts) and in one *in vivo* test (micronucleus test by intraperitoneal route in mice).

361 *Impairment of Fertility* - Prasugrel had no effect on fertility of male and female rats at oral doses up to 300 mg/kg/day (80  
362 times the human major metabolite exposure at daily dose of 10 mg prasugrel).

## 363 14 CLINICAL STUDIES

364 The clinical evidence for the effectiveness of Effient is derived from the TRITON-TIMI 38 (TRial to Assess Improvement in  
365 Therapeutic Outcomes by Optimizing Platelet Inhibition with Prasugrel) study, a 13,608-patient, multicenter, international,  
366 randomized, double-blind, parallel-group study comparing Effient to a regimen of clopidogrel, each added to aspirin and other  
367 standard therapy, in patients with ACS (UA, NSTEMI, or STEMI) who were to be managed with PCI. Randomization was stratified  
368 for UA/NSTEMI and STEMI.

369 Patients with UA/NSTEMI presenting within 72 hours of symptom onset were to be randomized after undergoing coronary  
370 angiography. Patients with STEMI presenting within 12 hours of symptom onset could be randomized prior to coronary angiography.  
371 Patients with STEMI presenting between 12 hours and 14 days of symptom onset were to be randomized after undergoing coronary  
372 angiography. Patients underwent PCI, and for both UA/NSTEMI and STEMI patients, the loading dose was to be administered  
373 anytime between randomization and 1 hour after the patient left the catheterization lab. If patients with STEMI were treated with  
374 thrombolytic therapy, randomization could not occur until at least 24 hours (for tenecteplase, reteplase or alteplase) or 48 hours (for  
375 streptokinase) after the thrombolytic was given.

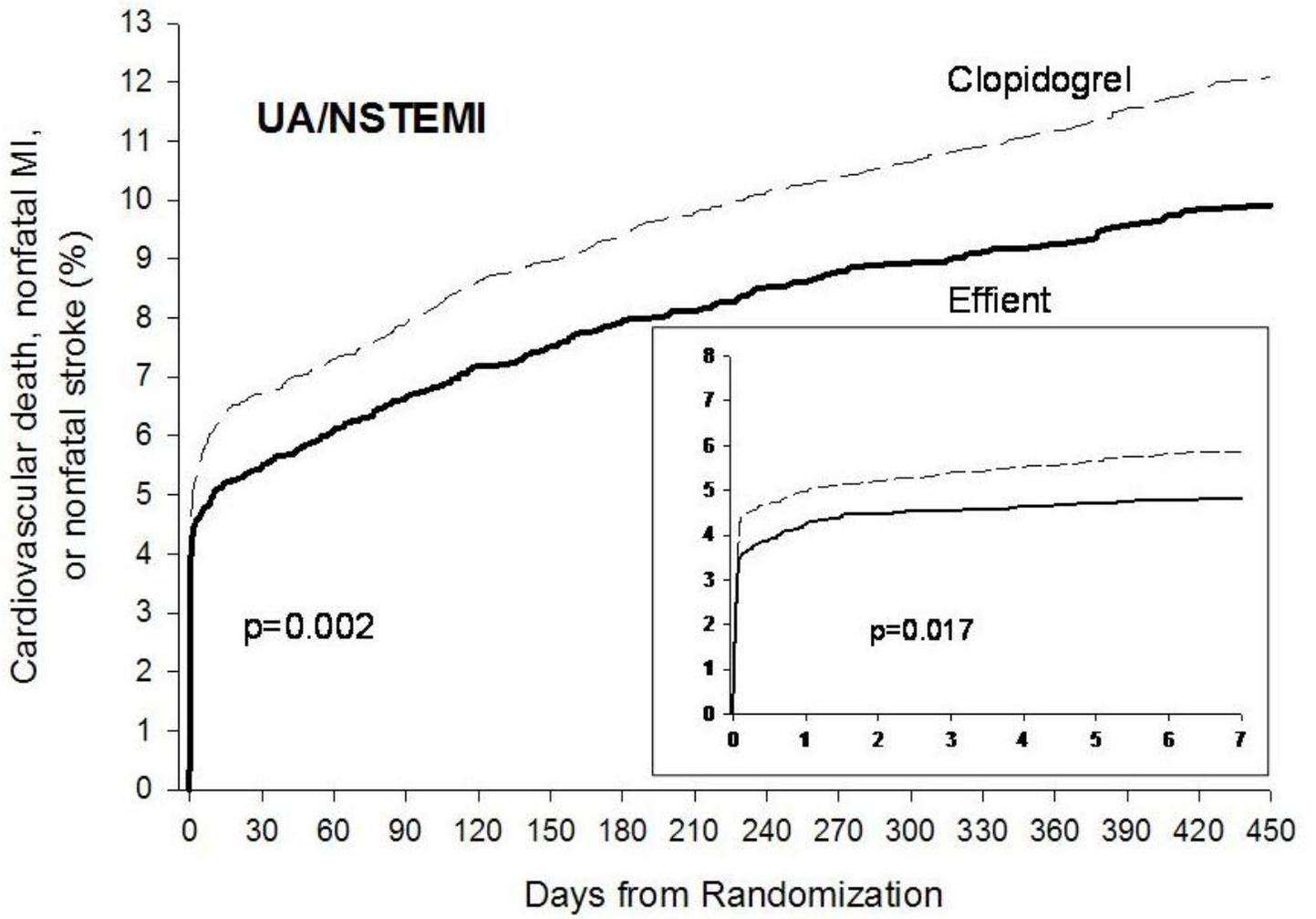
376 Patients were randomized to receive Effient (60 mg loading dose followed by 10 mg once daily) or clopidogrel (300 mg  
377 loading dose followed by 75 mg once daily), with administration and follow-up for a minimum of 6 months (actual median  
378 14.5 months). Patients also received aspirin (75 mg to 325 mg once daily). Other therapies, such as heparin and intravenous  
379 glycoprotein IIb/IIIa (GPIIb/IIIa) inhibitors, were administered at the discretion of the treating physician. Oral anticoagulants, other  
380 platelet inhibitors, and chronic NSAIDs were not allowed.

381 The primary outcome measure was the composite of cardiovascular death, nonfatal MI, or nonfatal stroke in the UA/NSTEMI  
382 population. Success in this group allowed analysis of the same endpoint in the overall ACS and STEMI populations. Nonfatal MIs  
383 included both MIs detected solely through analysis of creatine kinase muscle-brain (CK-MB) changes and clinically apparent  
384 (investigator-reported) MIs.

385 The patient population was 92% Caucasian, 26% female, and 39%  $\geq 65$  years of age. The median time from symptom onset to  
386 study drug administration was 7 hours for patients with STEMI and 30 hours for patients with UA/NSTEMI. Approximately 99% of  
387 patients underwent PCI. The study drug was administered after the first coronary guidewire was placed in approximately 75% of  
388 patients.

389 Effient significantly reduced total endpoint events compared to clopidogrel (see Table 5 and Figure 3). The reduction of total  
390 endpoint events was driven primarily by a decrease in nonfatal MIs, both those occurring early (through 3 days) and later (after 3  
391 days). Approximately 40% of MIs occurred peri-procedurally and were detected solely by changes in CK-MB. Administration of the  
392 clopidogrel loading dose in TRITON-TIMI 38 was delayed relative to the placebo-controlled trials that supported its approval for  
393 ACS. Effient produced higher rates of clinically significant bleeding than clopidogrel in TRITON-TIMI 38 [see *Adverse Reactions*  
394 (6.1)]. Choice of therapy requires balancing these differences in outcome.

395 The treatment effect of Effient was apparent within the first few days, and persisted to the end of the study (Figure 3). The  
396 inset shows results over the first 7 days.



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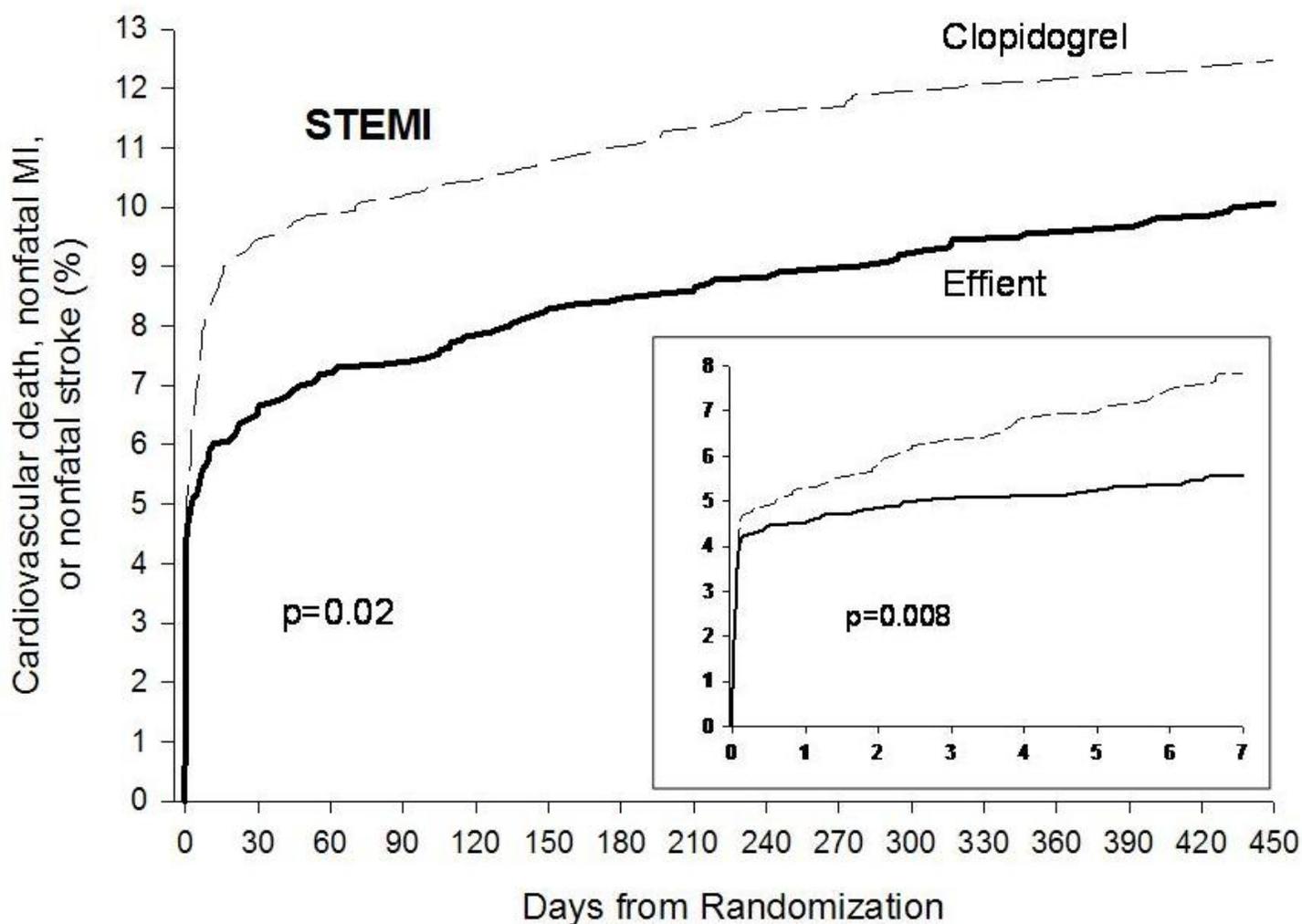


Figure 3: Time to first event of CV death, MI, or stroke (TRITON-TIMI 38)

The Kaplan-Meier curves (Figure 3) show the primary composite endpoint of CV death, nonfatal MI, or nonfatal stroke over time in the UA/NSTEMI and STEMI populations. In both populations, the curves separate within the first few hours. In the UA/NSTEMI population, the curves continue to diverge throughout the 15 month follow-up period. In the STEMI population, the early separation was maintained throughout the 15 month follow-up period, but there was no progressive divergence after the first few weeks.

Effient reduced the occurrence of the primary composite endpoint compared to clopidogrel in both the UA/NSTEMI and STEMI populations (*see* Table 5). In patients who survived an on-study myocardial infarction, the incidence of subsequent events was also lower in the Effient group.

Table 5: Patients with Outcome Events (CV Death, MI, Stroke) in TRITON-TIMI 38

	Patients with events		From Kaplan-Meier analysis	
	Effient (%) N=5044	Clopidogrel (%) N=5030	Relative Risk Reduction (%) <sup>a</sup> (95% CI)	p-value
<b>UA/NSTEMI</b>				
CV death, nonfatal MI, or nonfatal stroke	9.3	11.2	18.0 (7.3, 27.4)	0.002
CV death	1.8	1.8	2.1 (-30.9, 26.8)	0.885
Nonfatal MI	7.1	9.2	23.9 (12.7, 33.7)	<0.001
Nonfatal Stroke	0.8	0.8	2.1 (-51.3, 36.7)	0.922
<b>STEMI</b>				
CV death, nonfatal MI, or nonfatal stroke	9.8	12.2	20.7 (3.2, 35.1)	0.019
CV death	2.4	3.3	26.2 (-9.4, 50.3)	0.129
Nonfatal MI	6.7	8.8	25.4 (5.2, 41.2)	0.016
Nonfatal Stroke	1.2	1.1	-9.7 (-104.0, 41.0)	0.77

<sup>a</sup> RRR = (1-Hazard Ratio) x 100%. Values with a negative relative risk reduction indicate a relative risk increase.

The effect of Effient in various subgroups is shown in Figures 4 and 5. Results are generally consistent across pre-specified subgroups, with the exception of patients with a history of TIA or stroke [see *Contraindications (4.2)*]. The treatment effect was driven primarily by a reduction in nonfatal MI. The effect in patients  $\geq 75$  years of age was also somewhat smaller, and bleeding risk is higher in these individuals [see *Adverse Reactions (6.1)*]. See below for analyses of patients  $\geq 75$  years of age with risk factors.

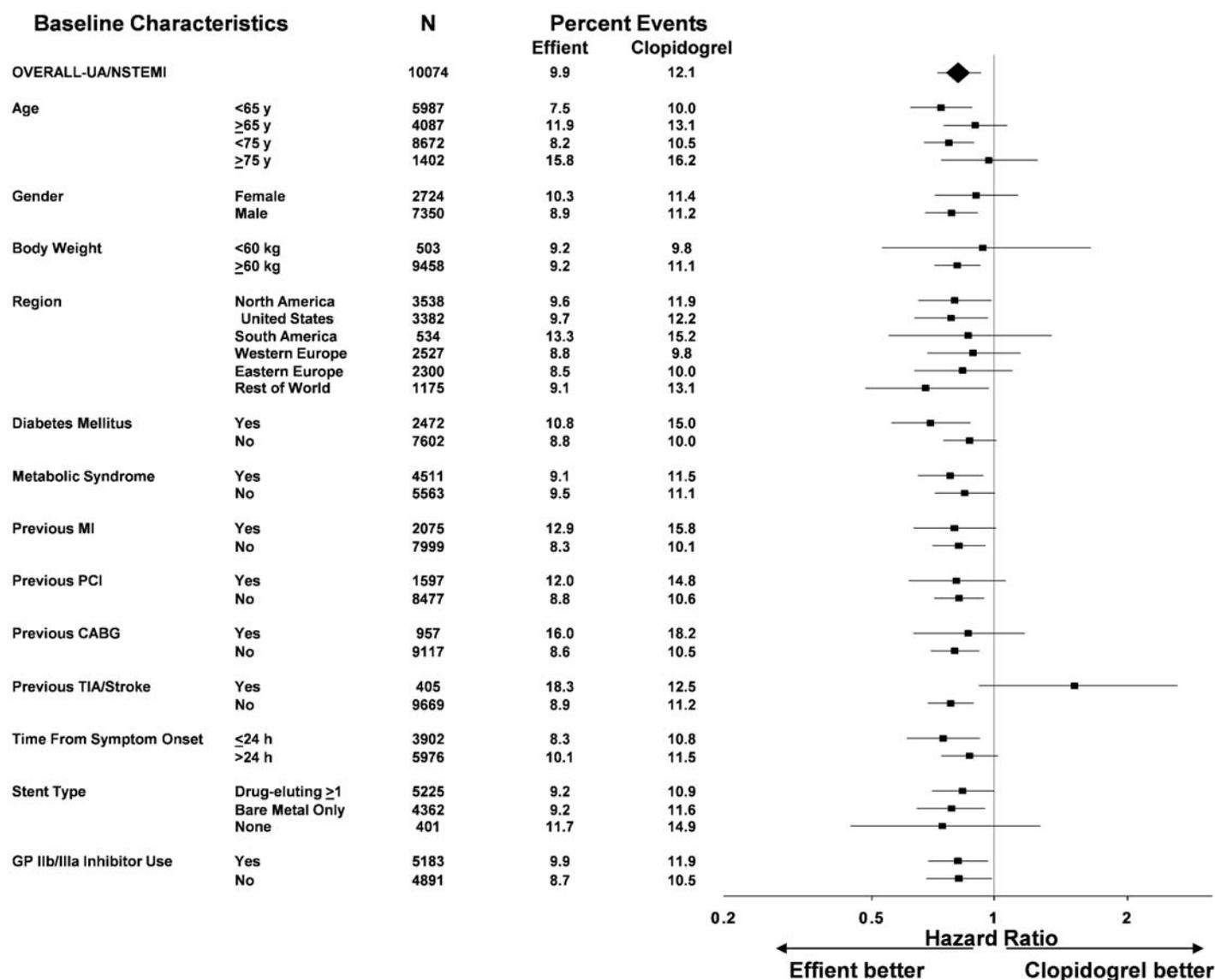


Figure 4: Subgroup analyses for time to first event of CV death, MI, or stroke (HR and 95% CI; TRITON-TIMI 38) – UA/NSTEMI Patients.

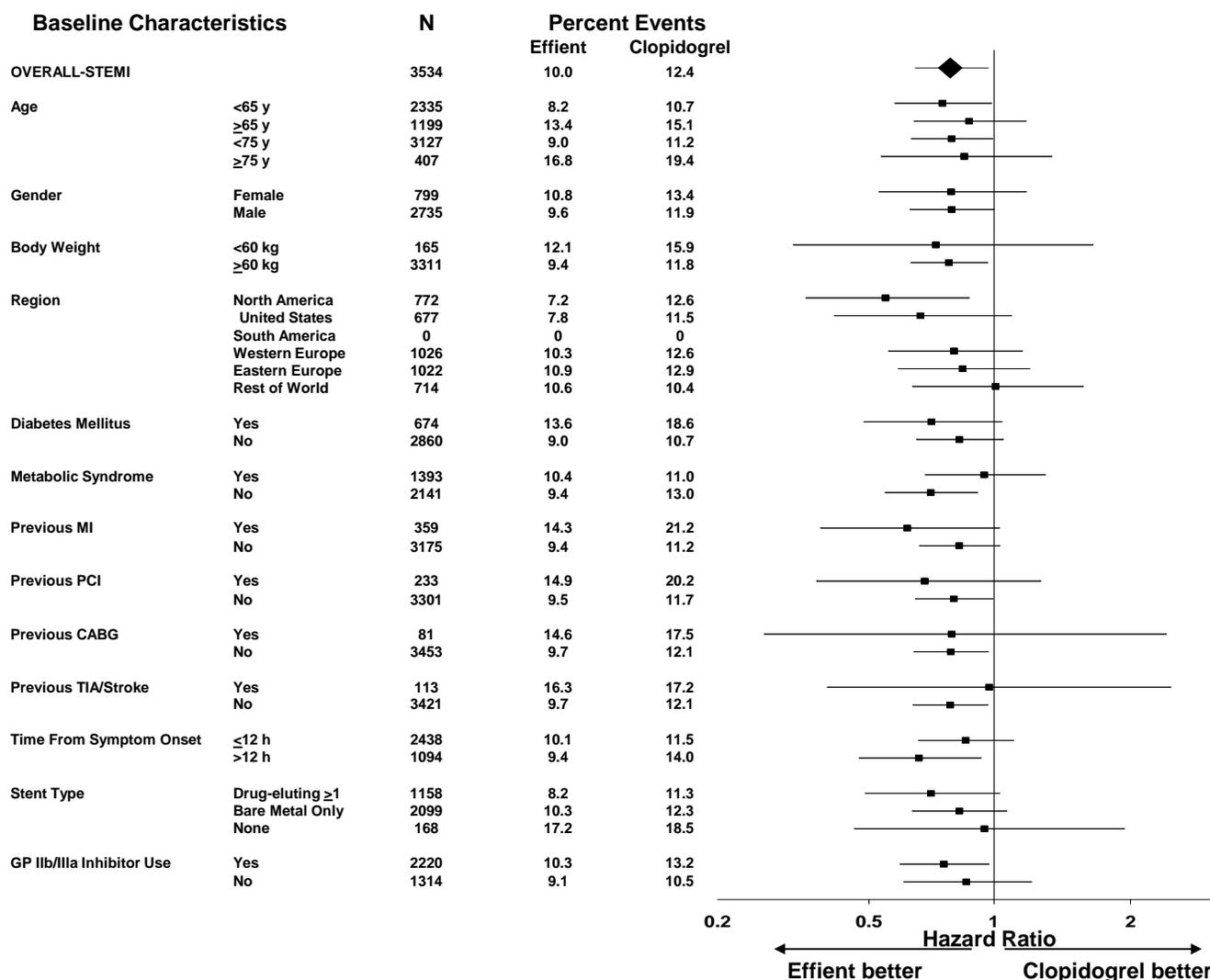


Figure 5: Subgroup analyses for time to first event of CV death, MI, or stroke (HR and 95% CI; TRITON-TIMI 38) – STEMI Patients.

Effient is generally not recommended in patients  $\geq 75$  years of age, except in high-risk situations (diabetes mellitus or prior MI) where its effect appears to be greater and its use may be considered. These recommendations are based on subgroup analyses (Table 6) and must be interpreted with caution, but the data suggest that Effient reduces ischemic events in such patients.

Table 6: Subgroup Analyses for Time to First Event of CV Death, MI, or Stroke: Patients  $<$  or  $\geq 75$  Years of Age,  $\pm$  Diabetes,  $\pm$  Prior History of MI, All ACS Patient Population

	Effient		Clopidogrel		Hazard Ratio (95% CI)	p-value
	N	% with events	N	% with events		
<b>Age <math>\geq 75</math></b>						
Diabetes - yes	249	14.9	234	21.8	0.64 (0.42, 0.97)	0.034
Diabetes - no	652	16.4	674	15.3	1.1 (0.83, 1.43)	NS
<b>Age <math>&lt; 75</math></b>						
Diabetes - yes	1327	10.8	1336	14.8	0.72 (0.58, 0.89)	0.002
Diabetes - no	4585	7.8	4551	9.5	0.82 (0.71, 0.94)	0.004
<b>Age <math>\geq 75</math></b>						
Prior MI - yes	220	17.3	212	22.6	0.72 (0.47, 1.09)	0.12
Prior MI - no	681	15.6	696	15.2	1.05 (0.80, 1.37)	NS
<b>Age <math>&lt; 75</math></b>						

Prior MI - yes	1006	12.2	996	15.4	0.78 (0.62, 0.99)	0.04
Prior MI - no	4906	7.7	4891	9.7	0.78 (0.68, 0.90)	<0.001

There were 50% fewer stent thromboses (95% C.I. 32% - 64%;  $p < 0.001$ ) reported among patients randomized to Effient (0.9%) than among patients randomized to clopidogrel (1.8%). The difference manifested early and was maintained through one year of follow-up. Findings were similar with bare metal and drug-eluting stents.

In TRITON-TIMI 38, prasugrel reduced ischemic events (mainly nonfatal MIs) and increased bleeding events [see *Adverse Reactions (6.1)*] relative to clopidogrel. The findings are consistent with the intended greater inhibition of platelet aggregation by prasugrel at the doses used in the study [see *Clinical Pharmacology (12.2)*]. There is, however, an alternative explanation: both prasugrel and clopidogrel are pro-drugs that must be metabolized to their active moieties. Whereas the pharmacokinetics of prasugrel's active metabolite are not known to be affected by genetic variations in CYP2B6, CYP2C9, CYP2C19, or CYP3A5, the pharmacokinetics of clopidogrel's active metabolite are affected by CYP2C19 genotype, and approximately 30% of Caucasians are reduced-metabolizers. Moreover, certain proton pump inhibitors, widely used in the ACS patient population and used in TRITON-TIMI 38, inhibit CYP2C19, thereby decreasing formation of clopidogrel's active metabolite. Thus, reduced metabolizer status and use of proton pump inhibitors may diminish clopidogrel's activity in a fraction of the population, and may have contributed to prasugrel's greater treatment effect and greater bleeding rate in TRITON-TIMI 38. The extent to which these factors were operational, however, is unknown.

## 16 HOW SUPPLIED/STORAGE AND HANDLING

Effient (prasugrel) 5 mg is supplied as a yellow, elongated hexagonal, film-coated, non-scored tablet debossed with "5 MG" on one side and with "4760" on the other side.

5 mg tablets are supplied as follows:

Bottles of 7 - NDC 0002-4760-76

Bottles of 30 - NDC 0002-4760-30

Effient (prasugrel) 10 mg is supplied as a beige, elongated hexagonal, film-coated, non-scored tablet debossed with "10 MG" on one side and "4759" on the other side.

10 mg tablets are supplied as follows:

Bottles of 30 - NDC 0002-4759-30

Blisters ID 90\* NDC 0002-4759-77

(\*Identi Dose<sup>®</sup>, unit dose medication, Lilly)

Store at 25°C (77°F); excursions permitted to 15° to 30°C (59° to 86°F).

Dispense and keep product in original container. Keep container closed and do not remove desiccant from bottle. Do not break the tablet.

## 17 PATIENT COUNSELING INFORMATION

See Medication Guide

### 17.1 Benefits and Risks

- Summarize the effectiveness features and potential side effects of Effient.
- Tell patients to take Effient exactly as prescribed.
- Remind patients not to discontinue Effient without first discussing it with the physician who prescribed Effient.
- Recommend that patients read the Medication Guide.

### 17.2 Bleeding

Inform patients that they:

- will bruise and bleed more easily.
- will take longer than usual to stop bleeding.
- should report any unanticipated, prolonged, or excessive bleeding, or blood in their stool or urine.

### 17.3 Other Signs and Symptoms Requiring Medical Attention

- Inform patients that TTP is a rare but serious condition that has been reported with medications in this class of drugs.
- Instruct patients to get prompt medical attention if they experience any of the following symptoms that cannot otherwise be explained: fever, weakness, extreme skin paleness, purple skin patches, yellowing of the skin or eyes, or neurological changes.

### 17.4 Invasive Procedures

Instruct patients to:

- inform physicians and dentists that they are taking Effient before any invasive procedure is scheduled.
- tell the doctor performing the invasive procedure to talk to the prescribing health care professional before stopping Effient.

### 17.5 Concomitant Medications

Ask patients to list all prescription medications, over-the-counter medications, or dietary supplements they are taking or plan to take so the physician knows about other treatments that may affect bleeding risk (e.g., warfarin and NSAIDs).

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