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## 1 PRODUCT NAME

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EZETIMIBE SANDOZ 10 mg tablet

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## 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

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Each tablet contains 10mg ezetimibe.

Contains Lactose

For the full list of excipients, see section 6.1.

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## 3 PHARMACEUTICAL FORM

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Ezetimibe Sandoz 10 mg is a white to almost white, oval tablet (7.4 mm x 4.1 mm) with debossing “10” on one side and “EZT” on the other side.

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## 4 CLINICAL PARTICULARS

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### 4.1 Therapeutic indications

#### Primary Hypercholesterolaemia

Ezetimibe Sandoz, administered with an HMG-CoA reductase inhibitor (statin) or alone, is indicated as adjunctive therapy to diet for the reduction of elevated total cholesterol (total-C), low-density lipoprotein cholesterol (LDL-C), apolipoprotein B (Apo B), and triglycerides (TG) and to increase high-density lipoprotein cholesterol (HDL-C) in adult and adolescent (10 to 17 years of age) patients with primary (heterozygous familial and non-familial) hypercholesterolaemia.

#### Homozygous Familial Hypercholesterolaemia (HoFH)

Ezetimibe Sandoz, administered with a statin, is indicated for the reduction of elevated total-C and LDL-C levels in adult and adolescent (10 to 17 years of age) patients with HoFH. Patients may also receive adjunctive treatments (e.g., LDL apheresis).

### 4.2 Dose and method of administration

The patient should be on an appropriate lipid-lowering diet and should continue on this diet during treatment with Ezetimibe Sandoz.

The recommended dose of Ezetimibe Sandoz is 10 mg once daily, used alone or with a statin. Ezetimibe Sandoz can be administered at any time of the day, with or without food.

#### Use in Renal Impairment/Chronic kidney Disease

##### Monotherapy

In patients with renal impairment, no dosage adjustment of Ezetimibe Sandoz is necessary (see Section 5.2, *Characteristics in Patients [Special Populations]*).

##### Combination Therapy with Simvastatin

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In patients with mild renal impairment (estimated GFR  $\geq 60$  mL/min/1.73 m<sup>2</sup>), no dosage adjustment of Ezetimibe Sandoz or simvastatin is necessary. In patients with chronic kidney disease and estimated glomerular filtration rate  $< 60$  mL/min/1.73 m<sup>2</sup>, the dose of Ezetimibe Sandoz is 10 mg and the dose of simvastatin is 20 mg once a day in the evening. In such patients, the use of higher doses of simvastatin should be closely monitored. (See Section 4.4, and Section 5.2, *Characteristics in Patients [Special Populations]*) and Clinical Trials, Prevention of Major Vascular Events in Chronic Kidney Disease (CKD)).

### **Use in the Elderly**

No dosage adjustment is required for elderly patients (see Section 5.2, *Characteristics in Patients [Special Populations]*).

### **Use in Paediatric Patients**

Children and adolescents  $\geq 10$  years: No dosage adjustment is required (see Section 5.2, *Characteristics in Patients [Special Populations]*).

Children  $< 10$  years: Treatment with Ezetimibe Sandoz is not recommended.

### **Use in Hepatic Impairment**

No dosage adjustment is required in patients with mild hepatic insufficiency (Child Pugh score 5 to 6). Treatment with ezetimibe is not recommended in patients with moderate (Child Pugh score 7 to 9) or severe (Child Pugh score  $> 9$ ) liver dysfunction. (See Section 4.4 and Section 5.2, *Characteristics in Patients [Special Populations]*.)

### **Co-administration with bile acid sequestrants**

Dosing of Ezetimibe Sandoz should occur either  $\geq 2$  hours before or  $\geq 4$  hours after administration of a bile acid sequestrant.

### **4.3 Contraindications**

Hypersensitivity to any component of this medication.

When Ezetimibe Sandoz is to be administered with a statin, please refer to the data sheet for that particular statin.

### **4.4 Special warnings and precautions for use**

When Ezetimibe Sandoz is to be administered with a statin, please refer to the data sheet for that particular statin.

### **Liver Enzymes**

In controlled co-administration trials in patients receiving ezetimibe with a statin, consecutive transaminase elevations ( $\geq 3$  X the upper limit of normal [ULN]) have been observed (See Section 4.8). When ezetimibe is co-administered with a statin, liver function tests should be performed at initiation of therapy and according to the recommendations of the statin, and periodically thereafter. If an increase in ALT or AST  $\geq 3$  X the ULN persists the statin dose should be reduced or the statin withdrawn.

In a controlled clinical study in which over 9000 patients with chronic kidney disease were randomised to receive ezetimibe 10 mg combined with simvastatin 20 mg daily (n=4650) or placebo (n=4620) (median follow-up period of 4.9 years), the incidence of consecutive elevations of transaminases ( $> 3$  X ULN) was 0.7% for ezetimibe combined with simvastatin and 0.6% for placebo (See Section 4.8).

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### **Skeletal Muscle**

In clinical trials, there was no excess of myopathy or rhabdomyolysis associated with ezetimibe compared with the relevant control arm (placebo or statin alone). However, myopathy and rhabdomyolysis are known adverse reactions to statins and other lipid-lowering medicines. In clinical trials, the incidence of CPK >10 X ULN was 0.2% for ezetimibe vs 0.1% for placebo, and 0.1% for ezetimibe co-administered with a statin vs 0.4% for statins alone.

In post-marketing experience with ezetimibe, cases of myopathy and rhabdomyolysis have been reported regardless of causality. Most patients who developed rhabdomyolysis were taking a statin prior to initiating ezetimibe. However, rhabdomyolysis has been reported very rarely with ezetimibe monotherapy and very rarely with the addition of ezetimibe to agents known to be associated with increased risk of rhabdomyolysis. All patients starting therapy with Ezetimibe Sandoz should be advised of the risk of myopathy and told to report promptly any unexplained muscle pain, tenderness or weakness. Ezetimibe Sandoz and any statin that the patient is taking concomitantly should be immediately discontinued if myopathy is diagnosed or suspected. The presence of these symptoms and a creatine phosphokinase (CPK) level >10 times the ULN indicates myopathy.

In a clinical trial in which over 9000 patients with chronic kidney disease were randomised to receive ezetimibe 10 mg combined with simvastatin 20 mg daily (n=4650) or placebo (n=4620) (median follow-up 4.9 years), the incidence of myopathy/rhabdomyolysis was 0.2% for ezetimibe combined with simvastatin and 0.1% for placebo (See Section 4.8).

### **Hepatic Insufficiency**

Due to the unknown effects of the increased exposure to ezetimibe in patients with moderate or severe hepatic insufficiency, Ezetimibe Sandoz is not recommended in these patients (see Section 5.2, *Characteristics in Patients [Special Populations]*).

### **Paediatric Use**

Safety and effectiveness of ezetimibe co-administered with simvastatin in patients 10 to 17 years of age with heterozygous familial hypercholesterolaemia have been evaluated in a controlled clinical trial in adolescent boys and in girls who were at least one year post-menarche. Adolescent patients treated with ezetimibe and up to 40 mg/day simvastatin had an adverse experience profile similar to that of adult patients treated with ezetimibe and simvastatin. However, elevations of CPK ( $\geq 10$  X ULN) occurred in two patients (2%) treated with ezetimibe co-administered with simvastatin and in zero patients treated with simvastatin alone. No cases of myopathy were reported. In this controlled study, there was no detectable effect on growth or sexual maturation in the adolescent boys or girls, or any effect on menstrual cycle length in girls. (See Section 4.2 and 4.8.) Ezetimibe has not been studied in patients younger than 10 years of age or in pre-menarchal girls.

### **Fibrates**

The safety and efficacy of ezetimibe administered with fibrates have not been established; therefore, co-administration of Ezetimibe Sandoz and fibrates is not recommended (see Section 4.5).

### **Cyclosporine**

Caution should be exercised when initiating ezetimibe in the setting of cyclosporine. Cyclosporine concentrations should be monitored in patients receiving Ezetimibe Sandoz and cyclosporine (see Section 4.5).

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### **Anticoagulants**

If Ezetimibe Sandoz is added to warfarin, another coumarin anticoagulant, or fluindione, the International Normalised Ratio (INR) should be appropriately monitored (see Section 4.5).

### **Excipient**

Ezetimibe Sandoz contains lactose. Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucosegalactose malabsorption should not take this medicine.

### **4.5 Interaction with other medicines and other forms of interaction**

In preclinical studies, it has been shown that ezetimibe does not induce cytochrome P450 medicine metabolising enzymes. No clinically significant pharmacokinetic interactions have been observed between ezetimibe and medicines known to be metabolised by cytochromes P450 1A2, 2D6, 2C8, 2C9, and 3A4, or N-acetyltransferase.

Ezetimibe had no effect on the pharmacokinetics of dapsone, dextromethorphan, digoxin, oral contraceptives (ethinyl estradiol and levonorgestrel), glipizide, tolbutamide, or midazolam during co-administration. Cimetidine, co-administered with ezetimibe, had no effect on the bioavailability of ezetimibe.

**Antacids:** Concomitant antacid administration decreased the rate of absorption of ezetimibe but had no effect on the bioavailability of ezetimibe. This decreased rate of absorption is not considered clinically significant.

**Cholestyramine:** Concomitant cholestyramine administration decreased the mean AUC of total ezetimibe (ezetimibe + ezetimibe glucuronide) approximately 55 %. The incremental LDL-C reduction due to adding ezetimibe to cholestyramine may be lessened by this interaction.

**Cyclosporine:** In a study of eight post-renal transplant patients with creatinine clearance of >50 mL/min on a stable dose of cyclosporine, a single 10 mg dose of ezetimibe resulted in a 3.4-fold (range 2.3- to 7.9-fold) increase in the mean AUC for total ezetimibe compared to a healthy control population from another study (n=17). In a different study, a renal transplant patient with severe renal insufficiency (creatinine clearance of 13.2 mL/min/1.73 m<sup>2</sup>) who was receiving multiple medications, including cyclosporine, demonstrated a 12-fold greater exposure to total ezetimibe compared to concurrent controls. In a two-period crossover study in twelve healthy subjects, daily administration of 20 mg ezetimibe for 8 days with a single 100 mg dose of cyclosporine on Day 7 resulted in a mean 15% increase in cyclosporine AUC (range 10% decrease to 51% increase) compared to a single 100 mg dose of cyclosporine alone (see Section 4.4).

**Fibrates:** Concomitant fenofibrate or gemfibrozil administration increased total ezetimibe concentrations approximately 1.5- and 1.7-fold respectively, however these increases are not considered clinically significant. The safety and effectiveness of ezetimibe administered with fibrates have not been established. Fibrates may increase cholesterol excretion into the bile, leading to cholelithiasis. In a preclinical study in dogs, ezetimibe increased cholesterol in the gallbladder bile (see Section 5.3, Animal Pharmacology). Although the relevance of this preclinical finding to humans is unknown, coadministration of Ezetimibe Sandoz with fibrates is not recommended until use in patients is studied.

**Statins:** No clinically significant pharmacokinetic interactions were seen when ezetimibe was co-administered with atorvastatin, simvastatin, pravastatin, lovastatin, fluvastatin, or rosuvastatin.

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**Anticoagulants:** Concomitant administration of ezetimibe (10 mg once daily) had no significant effect on bioavailability of warfarin and prothrombin time in a study of twelve healthy adult males. There have been post-marketing reports of increased International Normalised Ratio in patients who had ezetimibe added to warfarin or fluindione. Most of these patients were also on other medications (See Section 4.4).

### 4.6 Fertility, pregnancy and lactation

#### Use in pregnancy

No clinical data on exposed pregnancies are available. Animal studies of ezetimibe administered alone do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal/foetal development, parturition or postnatal development (see Section 5.3, Development). However, caution should be exercised when prescribing to pregnant women.

When ezetimibe was given with lovastatin, simvastatin, pravastatin or atorvastatin, no teratogenic effects were observed in embryo-foetal development studies in pregnant rats. In pregnant rabbits, a low incidence of skeletal malformations was observed (see Section 5.3, Development).

When ezetimibe is to be administered with a statin, please refer to the data sheet for that particular statin.

#### Use in lactation

Studies in rats have shown that ezetimibe is excreted in milk. It is not known whether ezetimibe is excreted into human breast milk, therefore, Ezetimibe Sandoz should not be used in nursing mothers unless the potential benefit justifies the potential risk to the infant.

### 4.7 Effects on ability to drive and use machines

No studies of the effects on the ability to drive and use of machines have been performed. However, certain side effects that have been reported with Ezetimibe Sandoz may affect some patients' ability to drive or operate machinery. Individual responses to Ezetimibe Sandoz may vary. (See Section 4.8).

### 4.8 Undesirable effects

Clinical studies of up to 112 weeks duration in which ezetimibe 10 mg daily was administered alone (n=2396), or with a statin (n=11,308), patients demonstrated: Ezetimibe was generally well tolerated, adverse reactions were usually mild and transient, the overall incidence of side effects reported with ezetimibe was similar to that reported with placebo, and the discontinuation rate due to adverse experiences was comparable between ezetimibe and placebo.

The following common ( $\geq 1/100$ ,  $< 1/10$ ) or uncommon ( $\geq 1/1,000$ ,  $< 1/100$ ); medicine-related adverse experiences were reported in patients taking ezetimibe alone (n = 2396) and at a greater incidence than placebo (n=1159), or in patients taking ezetimibe co-administered with a statin (n = 11,308) and at a greater incidence than statin administered alone (n=9361):

#### **Ezetimibe administered alone:**

Investigations:

*Uncommon:* ALT and/or AST increased; blood CPK increased; gamma-glutamyltransferase increased; liver function test abnormal

Respiratory, Thoracic and Mediastinal Disorders:

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*Uncommon:* cough

### Gastrointestinal Disorders:

*Common:* abdominal pain; diarrhoea; flatulence

*Uncommon:* dyspepsia; gastroesophageal reflux disease; nausea

### Musculoskeletal and Connective Tissue Disorders

*Uncommon:* arthralgia; muscle spasms; neck pain

### Metabolism and Nutrition Disorders:

*Uncommon:* decreased appetite

### Vascular Disorders:

*Uncommon:* hot flush; hypertension

### General Disorders and Administration Site Condition:

*Common:* fatigue

*Uncommon:* chest pain; pain

### **Ezetimibe co-administered with a statin:**

#### Investigations:

*Common:* ALT and/or AST increased

#### Nervous System Disorders: *Common:* headache

*Uncommon:* paresthesia

#### Gastrointestinal Disorders:

*Uncommon:* dry mouth; gastritis

#### Skin and Subcutaneous Tissue Disorders:

*Uncommon:* pruritus; rash; urticaria

#### Musculoskeletal and Connective Tissue Disorders:

*Common:* myalgia

*Uncommon:* back pain; muscular weakness; pain in extremity

#### General Disorders and Administration Site Condition:

*Uncommon:* asthenia; oedema peripheral

### **Patients with Chronic Kidney Disease**

In the Study of Heart and Renal Protection (SHARP) (see Section 5.1, Clinical Trials, Prevention of Major Vascular Events in Chronic Kidney Disease (CKD)), involving over 9000 patients treated with a fixed dose combination of ezetimibe 10 mg with simvastatin 20 mg daily (n=4650) or placebo (n=4620), the safety profiles were comparable during a median follow-up period of 4.9 years. In this trial, only serious adverse events and discontinuations due to any adverse events were recorded. Discontinuation rates due to adverse events were comparable (10.4% in patients treated with ezetimibe combined with simvastatin, 9.8% in patients treated with placebo). The incidence of myopathy/rhabdomyolysis was 0.2% in patients treated with ezetimibe combined with simvastatin and 0.1% in patients treated with placebo. Consecutive elevations of transaminases (> 3X ULN) occurred in 0.7% of patients treated with ezetimibe combined with simvastatin compared with 0.6% of patients treated with placebo. In this trial, there were no statistically significant increases in the incidence of

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pre-specified adverse events, including cancer (9.4% for ezetimibe combined with simvastatin, 9.5% for placebo), hepatitis, cholecystectomy or complications of gallstones or pancreatitis.

In a study involving adolescent (10 to 17 years of age) patients with heterozygous familial hypercholesterolaemia (n = 248), the safety and tolerability profile of the group co-administered ezetimibe and simvastatin was similar to that of adult patients co-administered ezetimibe and simvastatin (see Section 4.4, *Paediatric Use*).

### Laboratory Test Findings

In controlled clinical monotherapy trials, the incidence of clinically important elevations in serum transaminases (ALT and/or AST  $\geq 3$  X ULN, consecutive) was similar between ezetimibe (0.5 %) and placebo (0.3 %). In co-administration trials, the incidence was 1.3% for patients treated with ezetimibe co-administered with a statin and 0.4% for patients treated with a statin alone. These elevations were generally asymptomatic, not associated with cholestasis, and returned to baseline after discontinuation of therapy or with continued treatment (See Section 4.4).

Clinically important elevations of CPK ( $\geq 10$  X ULN) in patients treated with ezetimibe administered alone or co-administered with a statin were similar to elevations seen with placebo or statin administered alone, respectively.

In a study involving adolescent (10 to 17 years of age) patients with heterozygous familial hypercholesterolaemia (n = 248), elevations of CPK ( $\geq 10$  X ULN) occurred in two patients (2%) treated with ezetimibe plus simvastatin and in zero patients treated with simvastatin alone. No cases of myopathy were reported.

### Post-Marketing Experience

The following adverse reactions have been reported in post-marketing experience, regardless of causality assessment:

*Blood and lymphatic system disorders:* thrombocytopenia

*Nervous system disorders:* dizziness; paraesthesia

*Gastrointestinal disorders:* pancreatitis; constipation

*Skin and subcutaneous tissue disorders:* erythema multiforme

*Musculoskeletal and connective tissue disorders:* myalgia; myopathy/rhabdomyolysis (See Section 4.4)

*General disorders and administration site conditions:* asthenia

*Immune system disorders:* Hypersensitivity reactions, including anaphylaxis, angioedema, rash, and urticaria

*Hepatobiliary disorders:* hepatitis; cholelithiasis; cholecystitis

*Psychiatric disorders:* depression

#### Reporting of suspected adverse reactions

Reporting suspected adverse reaction after authorisation of the medicine is important. It allows continued monitoring of the benefit/risk balance of the medicine. Healthcare professionals are asked to report any suspected adverse reactions <https://nzphvc.otago.ac.nz/reporting/>

## 4.9 Overdose

In clinical studies, administration of ezetimibe, 50 mg/day to 15 healthy subjects for up to 14 days, 40 mg/day to 18 patients with primary hypercholesterolaemia for up to 56 days, and 40 mg/day to 27 patients with homozygous sitosterolaemia for 26 weeks, was generally well tolerated.

A few cases of over dosage with ezetimibe have been reported; most have not been associated with adverse experiences. Reported adverse experiences have not been serious. In the event of an overdose, symptomatic and supportive measures should be employed.

Contact the Poisons Information Centre on (telephone 0800 POISON or 0800 764766) for advice on management of overdose.

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## 5 PHARMACOLOGICAL PROPERTIES

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### 5.1 Pharmacodynamic properties

#### *Pharmacotherapeutic group*

Ezetimibe Sandoz (ezetimibe) is in a new class of lipid-lowering compounds that selectively inhibit the intestinal absorption of cholesterol and related plant sterols.

Lipid modifying agents, Other lipid modifying agents, ATC code: C10A X09

Ezetimibe Sandoz is orally active and potent, with a unique mechanism of action that differs from other classes of cholesterol-reducing compounds (e.g., statins, bile acid sequestrants [resins], fibric acid derivatives, and plant stanols). The molecular target of ezetimibe is the sterol transporter, Niemann-Pick C1-Like 1 (NPC1L1), which is responsible for the intestinal uptake of cholesterol and phytosterols.

Ezetimibe localises at the brush border of the small intestine and inhibits the absorption of cholesterol, leading to a decrease in the delivery of intestinal cholesterol to the liver. This causes a reduction of hepatic cholesterol stores and an increase in clearance of cholesterol from the blood. Ezetimibe does not increase bile acid excretion (like bile acid sequestrants) and does not inhibit cholesterol synthesis in the liver (like statins).

In a 2-week clinical study in 18 hypercholesterolaemic patients, ezetimibe inhibited intestinal cholesterol absorption by 54 %, compared with placebo. By inhibiting the absorption of intestinal cholesterol, ezetimibe reduces the delivery of cholesterol to the liver. Statins reduce cholesterol synthesis in the liver. Together these distinct mechanisms provide complementary cholesterol reduction. Ezetimibe, administered with a statin, reduces total-C, LDL-C, Apo B, and TG and increases HDL C in patients with hypercholesterolaemia, beyond either treatment alone.

Clinical studies demonstrate that elevated levels of total-C, LDL-C and Apo B, the major protein constituent of LDL, promote human atherosclerosis. In addition, decreased levels of HDL-C are associated with the development of atherosclerosis. Epidemiologic studies have established that cardiovascular morbidity and mortality vary directly with the level of total-C and LDL-C and inversely with the level of HDL-C. Like LDL, cholesterol-enriched triglyceride-rich lipoproteins, including very-low-density lipoproteins (VLDL), intermediate-density lipoproteins (IDL), and remnants, can also promote atherosclerosis.

A series of preclinical studies was performed to determine the selectivity of ezetimibe for inhibiting cholesterol absorption. Ezetimibe inhibited the absorption of [<sup>14</sup>C]-cholesterol with



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no effect on the absorption of triglycerides, fatty acids, bile acids, progesterone, ethinyl estradiol, or the fat soluble vitamins A and D.

### CLINICAL TRIALS

#### *Prevention of Major Vascular Events in Chronic Kidney Disease (CKD)*

The Study of Heart and Renal Protection (SHARP) was a multinational, randomised, placebo-controlled, double-blind study conducted in 9,438 patients with chronic kidney disease, a third of whom were on dialysis at baseline. Patients with a definite history of myocardial infarction (MI) or coronary revascularisation procedure, existing or planned renal transplant, recent acute uraemic emergency, evidence of active inflammatory muscle disease or creatine kinase (CK) >3xULN were excluded. For the first year, patients were randomised in a ratio of 4:4:1, respectively, to a fixed dose combination of ezetimibe 10 mg with simvastatin 20 mg, placebo, or simvastatin 20 mg daily. The 1-year simvastatin arm was included to enable the comparison of ezetimibe combined with simvastatin to simvastatin alone with regard to safety and lipids. At 1 year the simvastatin-only arm was re-randomised 1:1 to a fixed dose combination of ezetimibe 10 mg with simvastatin 20 mg or placebo. A total of 4,650 patients were allocated to ezetimibe 10 mg combined with simvastatin 20 mg and 4,620 to placebo, and followed for a median of 4.9 years. Patients had a mean age of 62 (ranging in age from 39 to 94.5 years old); 63% were male, 72% were Caucasian and 23% were diabetic; and, for those not on dialysis, the median serum creatinine was 0.22 mmol/L and the mean estimated glomerular filtration rate (eGFR) was 26.5 mL/min/1.73 m<sup>2</sup>, with 94% of patients having an eGFR < 45 mL/min/1.73 m<sup>2</sup>. There were no lipid entry criteria. Mean LDL-C at baseline was 2.8 mmol/L. As of the 1-year measurement, LDL-C was reduced 26% relative to placebo by simvastatin 20 mg alone and 38% for ezetimibe 10 mg combined with simvastatin 20 mg. At the midpoint of the study (2.5 years) mean LDL-C reduction in all randomised patients for ezetimibe combined with simvastatin relative to placebo was 32%. All lipid measurements included patients no longer taking study medication.

The SHARP protocol-specified primary comparison was an intention-to-treat analysis of "major vascular events" (MVE; defined as nonfatal MI or cardiac death, stroke, or any revascularisation procedure) in only those patients initially randomised to the ezetimibe combined with simvastatin (n=4,193) or placebo (n=4,191) groups. Secondary analyses included the same composite analysed for the full cohort randomised (at study baseline or at year 1) to ezetimibe combined with simvastatin (n=4,650) or placebo (n=4,620) as well as the components of this composite.

The primary endpoint analysis showed that ezetimibe combined with simvastatin significantly reduced the risk of MVE (749 patients with events in the placebo group vs. 639 in the ezetimibe combined with simvastatin group) with an absolute risk reduction of 2.3% (number needed to treat, 43) and a relative risk reduction of 16% (p=0.001) (see Figure 1). An analysis of major atherosclerotic events (MAE, a subset of the MVE composite that excluded non-coronary cardiac deaths and haemorrhagic stroke) showed that Ezetimibe combined with simvastatin significantly reduced the risk of MAE (526 (11.3%) of 4650 patients ever allocated to ezetimibe combined with simvastatin and 619 (13.4%) of 4620 patients ever allocated to placebo), corresponding to an absolute risk reduction of 2.1% (number needed to treat, 48) and a relative risk reduction of 17% (p=0.002).

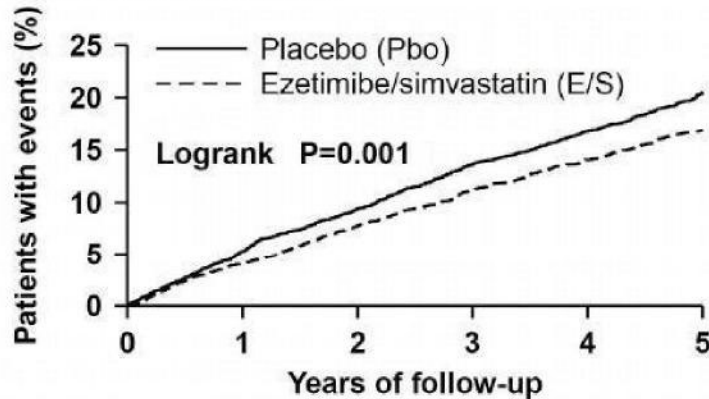
The risk reduction for the MVE composite was directionally consistent (i.e., Ezetimibe combined with simvastatin numerically superior to placebo) with that of the entire cohort of patients for the following key baseline predefined subgroups: age, gender, dialysis vs. non-dialysis, eGFR, diabetes, pre-existing atherosclerotic disease, blood pressure, or tertiles of baseline LDL-C.

Compliance rates with placebo and study medication declined over the course of the study. For example, at 20-25 months of follow-up, 68% of patients allocated to ezetimibe/simvastatin and 67% of patients allocated to placebo were taking 80% or more of the study medication, while at 44-49 months, compliance had fallen to 60% and 56%, respectively.

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**Figure 1: Effect of ezetimibe Combined with Simvastatin on the Primary Endpoint of Risk of Major Vascular Events**

### Major Vascular Events



The individual components of MVE in all randomised patients are presented in Table 6. ezetimibe combined with simvastatin significantly reduced the risk of stroke and any revascularisation, with non-significant numerical differences favouring ezetimibe combined with simvastatin for nonfatal MI and cardiac death.

**Table 6: Major Vascular Events by Treatment Group in All Randomised Patients in SHARP<sup>a</sup>**

Outcome	Ezetimibe 10 mg combined with simvastatin 20 mg (N=4,650)	Placebo (N=4,620)	Risk Ratio (95% CI)	P-value
Major Vascular Events	701 (15.1%)	814 (17.6%)	0.85 (0.77-0.94)	0.001
Nonfatal MI	134 (2.9%)	159 (3.4%)	0.84 (0.66-1.05)	0.12
Cardiac Death	253 (5.4%)	272 (5.9%)	0.93 (0.78-1.10)	0.38
Any Stroke	171 (3.7%)	210 (4.5%)	0.81 (0.66-0.99)	0.038
Non-haemorrhagic Stroke	131 (2.8%)	174 (3.8%)	0.75 (0.60-0.94)	0.011
Haemorrhagic Stroke	45 (1.0%)	37 (0.8%)	1.21 (0.78-1.86)	0.40
Any Revascularisation	284 (6.1%)	352 (7.6%)	0.79 (0.68-0.93)	0.004
Major Atherosclerotic Events (MAE) <sup>b</sup>	526(11.3%)	619(13.4%)	0.83 (0.74-0.94)	0.002

<sup>a</sup> Intention-to-treat analysis on all SHARP patients randomised to ezetimibe combined with simvastatin or placebo either at baseline or year 1.

<sup>b</sup> MAE defined as the composite of nonfatal myocardial infarction, coronary death, non-haemorrhagic stroke, or any revascularisation.

No significant treatment effect of ezetimibe combined with simvastatin on MVE was found in the subgroup of patients on dialysis at baseline compared with those not on dialysis at baseline. Among 3023

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patients on dialysis at baseline, ezetimibe combined with simvastatin reduced the risk of MVE by 6% (RR 0.94: 95% CI 0.80-1.09) compared with 22% (RR 0.78: 95% CI 0.69-0.89) among 6247 patients not on dialysis at baseline (interaction P=0.08).

Among patients not on dialysis at baseline, ezetimibe combined with simvastatin did not reduce the risk of progressing to end-stage renal disease compared with placebo.

There were no significant differences between the Ezetimibe Sandoz combined with simvastatin and placebo groups on all cause mortality, or on any specific cause of death.

The study design precluded drawing conclusions regarding the independent contribution of either ezetimibe or simvastatin to the observed effect, and was not able to provide evidence of efficacy for the combination of ezetimibe 10 mg with simvastatin 20 mg compared to either the lower dose combination (i.e. Ezetimibe 10 mg with simvastatin 10 mg) or to treatment with statin alone (i.e. simvastatin 20 mg).

The effect of ezetimibe taken in combination with other statins in patients with CKD has not been studied.

### 5.2 Pharmacokinetic properties

Ezetimibe Sandoz, ezetimibe is described chemically as 1-(4-fluorophenyl)-3(R)-[3-(4-fluorophenyl)-3(S)-hydroxypropyl]-4(S)-(4-hydroxyphenyl)-2-azetidinone. The empirical formula is C<sub>24</sub>H<sub>21</sub>F<sub>2</sub>NO<sub>3</sub>. Its molecular weight is 409.4

Ezetimibe is a white, crystalline powder that is freely to very soluble in ethanol, methanol, and acetone and practically insoluble in water. Ezetimibe has a melting point of about 163°C and is stable at ambient temperature.

#### Pharmacokinetics

##### Absorption

After oral administration, ezetimibe is rapidly absorbed and extensively conjugated to a pharmacologically active phenolic glucuronide (ezetimibe-glucuronide). Mean maximum plasma concentrations (C<sub>max</sub>) occur within 1 to 2 hours for ezetimibe-glucuronide and 4 to 12 hours for ezetimibe. The absolute bioavailability of ezetimibe cannot be determined as the compound is virtually insoluble in aqueous media suitable for injection.

Concomitant food administration (high fat or non-fat meals) had no effect on the oral bioavailability of ezetimibe when administered as ezetimibe 10 mg tablets. Ezetimibe Sandoz can be administered with or without food.

##### Distribution

Ezetimibe and ezetimibe-glucuronide are bound 99.7% and 88 to 92% to human plasma proteins, respectively.

##### Metabolism

Ezetimibe is metabolised primarily in the small intestine and liver via glucuronide conjugation (a phase II reaction) with subsequent biliary excretion. Minimal oxidative metabolism (a phase I reaction) has been observed in all species evaluated. Ezetimibe and ezetimibe-glucuronide are the major medicine-derived compounds detected in plasma, constituting approximately 10 to 20 % and 80 to 90 % of the total medicine in plasma, respectively. Both ezetimibe and ezetimibe-glucuronide are slowly eliminated from plasma with evidence of significant enterohepatic recycling. The half-life for ezetimibe and ezetimibe-glucuronide is approximately 22 hours.

##### Elimination

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Following oral administration of  $^{14}\text{C}$ -ezetimibe (20 mg) to human subjects, total ezetimibe accounted for approximately 93 % of the total radioactivity in plasma. Approximately 78 % and 11 % of the administered radioactivity were recovered in the faeces and urine, respectively, over a 10-day collection period. After 48 hours, there were no detectable levels of radioactivity in the plasma.

### Special patient considerations

#### **Characteristics in Patients (Special Populations)**

##### Paediatric Patients

The absorption and metabolism of ezetimibe are similar between children and adolescents (10 to 18 years) and adults. Based on total ezetimibe, there are no pharmacokinetic differences between adolescents and adults. Pharmacokinetic data in the paediatric population <10 years of age are not available.

##### Geriatric Patients

Plasma concentrations for total ezetimibe are about 2-fold higher in the elderly ( $\geq 65$  years) than in the young (18 to 45 years). LDLC reduction and safety profile are comparable between elderly and young subjects treated with Ezetimibe Sandoz. Therefore, no dosage adjustment is necessary in the elderly.

##### Hepatic Insufficiency

After a single 10 mg dose of ezetimibe, the mean area under the curve (AUC) for total ezetimibe was increased approximately 1.7-fold in patients with mild hepatic insufficiency (Child Pugh score 5 or 6), compared to healthy subjects. In a 14-day, multiple-dose study (10 mg daily) in patients with moderate hepatic insufficiency (Child Pugh score 7 to 9), the mean AUC for total ezetimibe was increased approximately 4-fold on Day 1 and Day 14 compared to healthy subjects. No dosage adjustment is necessary for patients with mild hepatic insufficiency. Due to the unknown effects of the increased exposure to ezetimibe in patients with moderate or severe (Child Pugh score  $>9$ ) hepatic insufficiency, ezetimibe is not recommended in these patients (see Section 4.4).

##### Renal Insufficiency

After a single 10 mg dose of ezetimibe in patients with severe renal disease ( $n=8$ ; mean  $\text{CrCl} \leq 30 \text{ mL/min/1.73m}^2$ ), the mean AUC for total ezetimibe was increased approximately 1.5-fold, compared to healthy subjects ( $n=9$ ). This result is not considered clinically significant. No dosage adjustment is necessary for renally impaired patients.

An additional patient in this study (post-renal transplant and receiving multiple medications, including cyclosporine) had a 12-fold greater exposure to total ezetimibe.

##### Gender

Plasma concentrations for total ezetimibe are slightly higher (<20 %) in women than in men. LDL-C reduction and safety profile are comparable between men and women treated with ezetimibe. Therefore, no dosage adjustment is necessary on the basis of gender.

##### Race

Based on a meta-analysis of pharmacokinetic studies, there were no pharmacokinetic differences between Blacks and Caucasians.

### **5.3 Preclinical safety data**

#### **Animal Pharmacology**

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The hypocholesterolaemic effect of ezetimibe was evaluated in Rhesus monkeys, a model for the human metabolism of cholesterol, as well as in dogs. Rhesus monkeys were fed a cholesterol-containing diet that mimics a human Western diet. Ezetimibe was found to have an  $ED_{50}$  of 0.0005 mg/kg/day for inhibiting the rise in plasma cholesterol levels ( $ED_{100}$  = 0.003 Lmg/kg/day). The  $ED_{50}$  in dogs was found to be 0.007 mg/kg/day. These results are consistent with ezetimibe being an extremely potent cholesterol absorption inhibitor.

In dogs given ezetimibe ( $\geq 0.03$  mg/kg/day), the concentration of cholesterol in gallbladder bile increased ~2- to 3-fold. However, a dose of 300 mg/kg/day administered to dogs for one year did not result in gallstone formation or any other adverse hepatobiliary effects. In mice given ezetimibe (0.3 to 5 mg/kg/day) and fed a normal or cholesterol rich diet, the concentration of cholesterol in gallbladder bile was either unaffected or reduced to normal levels, respectively. The relevance of these preclinical findings to humans is unknown.

### **Animal Toxicology**

#### Acute Toxicity

In animals, no toxicity was observed after single oral doses of 5000 mg/kg of ezetimibe in rats and mice and 3000 mg/kg in dogs.

#### Chronic Toxicity

Ezetimibe was well tolerated by mice, rats and dogs. No target organs of toxicity were identified in chronic studies at daily doses up to 1500 (males) and 500 mg/kg (females) in rats, up to 500 mg/kg in mice, or up to 300 mg/kg in dogs.

The safety of concomitant administration of ezetimibe and statins was assessed in rats and dogs. When ezetimibe was co-administered with atorvastatin, simvastatin, pravastatin or lovastatin, for three months, toxicologic findings were consistent with those seen with statins administered alone.

#### Carcinogenicity

In two-year studies conducted in mice and rats, ezetimibe was not carcinogenic.

#### Mutagenesis

Ezetimibe was not genotoxic in a series of *in vivo* and *in vitro* tests.

Combinations of ezetimibe with atorvastatin, simvastatin, pravastatin, or lovastatin were not genotoxic in a series of *in vitro* and *in vivo* assays.

#### Reproduction

Ezetimibe did not affect the fertility of male or female rats.

#### Development

Ezetimibe was not teratogenic in rats or rabbits and had no effect on prenatal or postnatal development.

Concomitant administration of ezetimibe and statins was not teratogenic in rats. In pregnant rabbits, a low incidence of skeletal malformations (fused sternbrae, fused caudal vertebrae, reduced number of caudal vertebrae) was observed when ezetimibe (1000 mg/kg;  $\geq 146$  times the human exposure at 10 mg daily based on  $AUC_{0-24hr}$  for total ezetimibe) was administered with lovastatin (2.5 and 25 mg/kg), simvastatin (5 and 10 mg/kg), pravastatin (25 and 50 mg/kg), or atorvastatin (5, 25, and 50 mg/kg). Exposure to the pharmacologically active form of the statin ranged from 1.4 (atorvastatin) to 547 (lovastatin) times the human exposure at 10

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mg daily (simvastatin or atorvastatin) or 20 mg daily (lovastatin and pravastatin) based on AUC<sub>0-24hr</sub>.

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### 6 PHARMACEUTICAL PARTICULARS

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#### 6.1 List of excipients

Each 10 mg tablet contains:

- lactose monohydrate
- hypromellose
- croscarmellose sodium
- microcrystalline cellulose
- sodium lauryl sulfate
- magnesium stearate.

#### 6.2 Incompatibilities

None known.

#### 6.3 Shelf life

3 years

#### 6.4 Special precautions for storage

Store below 30°C. Protect from moisture. Store in the original package.

#### 6.5 Nature and contents of container

Ezetimibe Sandoz 10 mg, tablets are available in packs of 30 tablets.

#### 6.6 Special precautions for handling, reconstitution and disposal

Any unused medicine should be disposed of in accordance with local requirements.

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### 7 MEDICINE SCHEDULE

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Prescription Medicine.

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### 8 SPONSOR

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Sandoz New Zealand Limited  
12 Madden Street  
Auckland 1010  
New Zealand

Telephone: 0800 726 369

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### 9 DATE OF FIRST APPROVAL

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18 June 2015

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## 10 DATE OF REVISION OF THE TEXT

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20 March 2023

### SUMMARY TABLE OF CHANGES

Section changed	Summary of new information
8	Change in sponsor details