

## New Zealand Data Sheet

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### 1 PEDIPPI

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PediPPI 2 mg/mL powder for oral suspension  
PediPPI 4 mg/mL powder for oral suspension

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### 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

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PediPPI 2 mg/mL powder for oral suspension: After reconstitution, each 1 mL of suspension contains 2 mg of omeprazole.

PediPPI 4 mg/mL powder for oral suspension: After reconstitution, each 1 mL of suspension contains 4 mg of omeprazole.

**Excipient(s) with known effect:** Each 1 mL of suspension contains sodium methyl parahydroxybenzoate 2.3 mg, maltitol 272 mg, sodium benzoate 5 mg, sodium 17.2 mg and potassium 54.3 mg.

For the full list of excipients, see Section 6.1.

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### 3 PHARMACEUTICAL FORM

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Powder for oral suspension.

Powder in Cap: White / off-white / slightly yellow powder.

Powder in Bottle: White / off-white / slightly yellow powder. May contain dark specks due to sweetener.

When reconstituted, it will be a white / off-white / brownish suspension. It may contain dark specks due to the sweetener.

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### 4 CLINICAL PARTICULARS

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#### 4.1 Therapeutic indications

PediPPI is indicated for the treatment of:

- reflux oesophagitis
- duodenal ulcer

- gastric ulcer
- NSAID-associated gastric and duodenal ulcers or erosions
- symptoms of acid related dyspepsia
- Zollinger-Ellison syndrome.

In the treatment of peptic ulceration, the eradication of *H. pylori*, as the causative organism, must be a high priority. Accordingly, PediPPI should be used as part of combination therapy for the eradication of *H. pylori*.

### **Maintenance**

PediPPI is indicated for maintenance treatment of:

- reflux oesophagitis
- duodenal ulcer
- gastric ulcer
- Zollinger-Ellison syndrome.

### **Children over 1 month of age**

- Treatment of reflux oesophagitis
- Symptomatic treatment of heartburn and acid regurgitation in gastro-oesophageal reflux disease.

## **4.2 Dose and method of administration**

PediPPI is recommended to be given in the morning.

**PediPPI 2 mg/mL oral suspension is suitable for doses of  $\leq 15$  mg. For doses of 20 mg or greater, PediPPI 4 mg/mL oral suspension is suitable.**

### **Reflux oesophagitis**

The recommended dosage is omeprazole 20 mg once daily. Symptom resolution is rapid and in most patients healing occurs within 4 weeks. For those patients who may not be fully healed after the initial course, healing usually occurs during a further 4-week treatment period.

In patients with severe reflux oesophagitis, omeprazole 40 mg once daily is recommended and healing is usually achieved within 8 weeks.

For the long-term management of patients with healed reflux oesophagitis, the recommended dose is omeprazole 10 mg once daily. If needed, the dose can be increased to omeprazole 20-40 mg once daily.

### **Severe reflux oesophagitis in children from one year and older**

The management of severe reflux oesophagitis should be diagnosed or recommended by a specialist paediatrician or gastroenterologist.

The recommended dosage regime for healing is:

Weight	Dosage
10 - 20 kg	PediPPI 10 mg daily
> 20 kg	PediPPI 20 mg daily

If needed, dosage may be increased to 20 mg and 40 mg respectively.

#### Children over 1 month of age

Age	Dosage*
1 month to 1 year of age	1 mg/kg once daily. Doses above 1.5 mg/kg/day have not been studied.

\* Individual dose measurements  $\leq 2$  mL of the 2 mg/mL presentation are not indicated.

The 2 mg/mL and 4 mg/mL strengths are equivalent with respect to buffering capacity (same amount of buffer on a mL basis).

For doses of  $\leq 15$ mg, the 2 mg/mL strength is recommended. The 2 mg/mL strength is indicated for age 1 month to 1 year for administering up to 15 mg and  $\geq 1$  year of age for administering 10 mg, to provide sufficient buffering capacity and absorption. For doses of 20 mg or 40 mg, the 4 mg/mL strength is suitable. The 4 mg/mL strength is indicated for administration of 20 mg or 40 mg so that a maximum of 2 doses are required.

*Reflux oesophagitis:* The treatment time is 4-8 weeks.

*Symptomatic treatment of heartburn and acid regurgitation in gastro-oesophageal reflux disease:* The treatment time is 2-4 weeks. If symptom control has not been achieved after 2-4 weeks the patient should be investigated further.

#### ***Helicobacter pylori* (Hp) eradication regimens in peptic ulcer disease**

##### Triple therapy regimens

Omeprazole 20 mg, amoxicillin 1 g and clarithromycin 500 mg, all twice a day for one week

or

Omeprazole 20 mg, clarithromycin 250 mg and metronidazole 400 mg (or tinidazole 500 mg), all twice a day for one week

or

Omeprazole 40 mg once daily with amoxicillin 500 mg and metronidazole 400 mg both three times a day for one week.

To ensure healing in patients with active peptic ulcer disease, see further dosage recommendations for duodenal and gastric ulcer.

In each regimen if the patient is still *Helicobacter pylori* positive, therapy may be repeated.

**Duodenal ulcer**

The recommended dosage in patients with an active duodenal ulcer is omeprazole 20 mg once daily. Symptom resolution is rapid and in most patients healing occurs within 2 weeks. For those patients who may not be fully healed after the initial course, healing usually occurs during a further 2-week treatment period.

In patients with poorly responsive duodenal ulcer omeprazole 40 mg once daily is recommended and healing is usually achieved within 4 weeks.

For the prevention of relapse in patients with duodenal ulcer disease the recommended dose is omeprazole 10 mg once daily. If needed, the dose can be increased to omeprazole 20-40 mg once daily.

For NSAID-associated duodenal ulcers, see “NSAID-associated gastroduodenal lesions”.

**Gastric ulcer**

The recommended dosage is omeprazole 20 mg once daily. Symptom resolution is rapid and in most patients healing occurs within 4 weeks. For those patients who may not be fully healed after the initial course, healing usually occurs during a further 4 weeks’ treatment period.

In patients with poorly responsive gastric ulcer, omeprazole 40 mg once daily is recommended and healing is usually achieved within 8 weeks.

For the prevention of relapse in patients with poorly responsive gastric ulcer, the recommended dose is omeprazole 20 mg once daily. If needed, the dose can be increased to omeprazole 40 mg once daily.

For NSAID-associated gastric ulcers, see “NSAID-associated gastroduodenal lesions”.

**NSAID-associated gastroduodenal lesions**

For NSAID-associated gastric ulcers, duodenal ulcers or gastroduodenal erosions in patients with or without continued NSAID treatment, the recommended dosage of omeprazole is 20 mg once daily. Symptom resolution is rapid and in most patients healing occurs within 4 weeks.

For those patients who may not be fully healed after the initial course, healing usually occurs during a further 4 weeks treatment period.

For the prevention of NSAID-associated gastric ulcers, duodenal ulcers, gastroduodenal erosions and dyspeptic symptoms the recommended dosage of omeprazole is 20 mg once daily.

**Symptoms of acid-related dyspepsia**

For the 24-hour relief, and prevention of symptoms in patients with epigastric pain/discomfort with or without heartburn and indigestion, 20 mg omeprazole once daily in the morning for 14 –28 days\*. If symptom control has not been achieved after 4 weeks treatment with omeprazole 20 mg daily, further investigation is recommended.

*\*Patients may respond adequately to 10 mg daily and this dose could be considered as a starting dose.*

### **Zollinger-Ellison syndrome**

In patients with Zollinger-Ellison syndrome, the dosage should be individually adjusted and treatment continued as long as is clinically indicated. The recommended initial dosage is omeprazole 60 mg daily. All patients with severe disease and inadequate response to other therapies have been effectively controlled and more than 90% of the patients maintained on doses of omeprazole 20-120 mg daily. When doses exceed omeprazole 80 mg daily, the dose should be divided and given twice daily.

### **Impaired renal function**

Dose adjustment is not needed in patients with impaired renal function.

### **Impaired hepatic function**

As bioavailability and plasma half-life of omeprazole are increased in patients with impaired hepatic function a daily dose of 10 - 20 mg may be sufficient.

### **Elderly**

Dose adjustment is not needed in the elderly.

### **Method of administration**

Omeprazole oral suspension should be taken on an empty stomach, at least 30 minutes before a meal.

#### *Precautions to be taken before handling or administering the medicinal product*

Omeprazole powder for oral suspension requires reconstitution prior to oral administration. For instructions on reconstitution of the medicinal product before administration, see Section 6.6 Special precautions for disposal and other handling.

For instructions for administration via nasogastric (NG) or percutaneous endoscopic gastrostomy (PEG) tubes, see Section 6.6 Special precautions for disposal and other handling.

## **4.3 Contraindications**

Known hypersensitivity to omeprazole, substituted benzimidazoles or any other constituent of the formulation.

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

In the presence of any alarm symptom (e.g. significant unintentional weight loss, recurrent vomiting, dysphagia, haematemesis or melaena) and when gastric ulcer is suspected or present, the possibility of malignancy should be excluded as treatment may alleviate symptoms and delay diagnosis.

Concomitant administration of omeprazole and medicines such as atazanavir and nelfinavir is not recommended (see Section 4.5 Interaction with other medicines and other forms of interaction).

Concomitant use of omeprazole and clopidogrel should be avoided see Section 4.5 Interaction with other medicines and other forms of interaction).

Some published studies have shown that withdrawal of long-term proton pump inhibitor (PPI) therapy can lead to aggravation of acid-related symptoms and may result in rebound acid hypersecretion. The causal relationship with omeprazole has not been fully established.

#### **Risk of osteoporosis related fractures**

Some published observational studies suggest that proton pump inhibitor (PPI) therapy may be associated with a small increased risk for osteoporosis related fractures. However, in other similar observational studies no such increased risk was found.

In randomized, double-blind and controlled clinical studies on omeprazole and esomeprazole (including two open long-term studies of up to more than 12 years) there are no indications that PPIs are associated with osteoporotic fractures.

Although a causal relationship between omeprazole/esomeprazole and osteoporotic fractures has not been established, patients at risk for developing osteoporosis or osteoporotic fractures are advised to have appropriate clinical monitoring in accordance with current clinical guidelines for these conditions.

#### **Hypomagnesaemia**

Symptomatic hypomagnesaemia has been reported rarely in patients treated with long-term PPI medication. In some severe cases hypocalcaemia was also reported. Severe hypomagnesaemia may result in serious adverse events such as tetany, seizures and potentially also arrhythmias. In some patients, treatment of hypomagnesaemia with magnesium replacement was not sufficient to correct the magnesium imbalance and discontinuation of the PPI was required. In patients later retreated with the same or different PPI, hypomagnesaemia returned within a shorter time period. For patients expected to be on prolonged treatment or who take PPIs with other medicines such as digoxin or medicines that may cause hypomagnesaemia, consideration should be given to monitoring magnesium levels prior to initiation and periodically thereafter.

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

#### **EFFECTS OF OMEPRAZOLE ON THE PHARMACOKINETICS OF OTHER MEDICINES**

The decreased intragastric acidity during treatment with omeprazole might increase or decrease the absorption of active substances with a gastric pH dependent absorption.

#### **Nelfinavir, atazanavir**

Omeprazole has been reported to interact with some antiretroviral medicines. The clinical importance and the mechanisms behind these interactions are not always known. Increased gastric pH during omeprazole treatment may change the absorption of the antiretroviral medicine. Other possible interaction mechanisms are via CYP2C19. For some antiretroviral medicines, such as atazanavir and nelfinavir,

decreased serum levels have been reported when given together with omeprazole. Concomitant administration with omeprazole and medicines such as atazanavir and nelfinavir is therefore not recommended.

### **Citalopram / Escitalopram**

Co-administration of omeprazole (20 mg) with citalopram (20 mg single dose) doubles the AUC of the S-isomer of citalopram, but the R-isomer of citalopram is not affected. A reduction in the dose of citalopram may be necessary based on clinical judgement. For patients taking omeprazole, the citalopram dose should not exceed the maximum dose of 20 mg/day.

Co-administration of omeprazole (30 mg) with escitalopram (20 mg single dose) increased the plasma levels (approximately 50%) and terminal half-life (31%) of escitalopram. A reduction in the dose of escitalopram may be necessary based on clinical judgement.

### **Digoxin**

Concomitant treatment with omeprazole (20 mg daily) and digoxin in healthy subjects increased the bioavailability of digoxin by 10% (up to 30% in two out of ten subjects).

### **Clopidogrel**

Results from studies in healthy subjects have shown a pharmacokinetic /pharmacodynamic interaction between clopidogrel (300 mg loading dose/75 mg daily maintenance dose) and omeprazole (80 mg p.o. daily, i.e. four times the recommended dose) resulting in decreased exposure to the active metabolite of clopidogrel by an average of 46%, and resulting in decreased maximum inhibition of (ADP induced) platelet aggregation by an average of 16%.

It is, however, uncertain to what extent this interaction is clinically important. One prospective, randomised (but incomplete) study (in over 3760 patients comparing placebo with omeprazole 20 mg in patients treated with clopidogrel and ASA) and non-randomised, post-hoc analyses of data from large, prospective, randomised clinical outcome studies (in over 47000 patients) did not show any evidence of an increased risk for adverse cardiovascular outcome when clopidogrel and PPIs, including omeprazole, were given concomitantly.

Results from a number of observational studies are inconsistent with regard to increased risk or no increased risk for CV thromboembolic events when clopidogrel is given together with a PPI.

When clopidogrel was given together with a fixed dose combination of esomeprazole 20 mg + ASA 81 mg compared to clopidogrel alone in a study in healthy subjects there was a decreased exposure by almost 40% of the active metabolite of clopidogrel. However, the maximum levels of inhibition of (ADP induced) platelet aggregation in these subjects were the same in the clopidogrel and the clopidogrel + the combined (esomeprazole + ASA) product groups, likely due to the concomitant administration of low dose ASA.



### Other active substances

The absorption of erlotinib, ketoconazole and itraconazole is significantly reduced and thus clinical efficacy may be impaired. For posaconazole and erlotinib concomitant use should be avoided.

### ACTIVE SUBSTANCES METABOLISED BY CYP2C19

Omeprazole inhibits CYP2C19, the major omeprazole metabolising enzyme. Thus, the metabolism of concomitant medicines also metabolised by CYP2C19, such as **diazepam, phenytoin, warfarin (R-warfarin)** or other **vitamin K antagonists** and **cilostazol**, may be delayed.

#### Phenytoin

Monitoring of patients receiving phenytoin is recommended and a reduction of the phenytoin dose may be necessary. However, concomitant treatment with omeprazole 20 mg daily did not change the blood concentration of phenytoin in patients on continuous treatment with this medicine.

#### Warfarin or other Vitamin K antagonists

In patients receiving warfarin or other vitamin K antagonists, monitoring of INR is recommended and a reduction of the warfarin (or other vitamin K antagonist) dose may be necessary. Concomitant treatment with omeprazole 20 mg daily did, however, not change coagulation time in patients on continuous treatment with warfarin.

#### Cilostazol

Omeprazole, given in doses of 40 mg to healthy subjects in a cross-over study, increased C<sub>max</sub> and AUC for cilostazol by 18% and 26% respectively, and one of its active metabolites by 29% and 69% respectively.

#### Other

Omeprazole is partly metabolised also by CYP3A4, but omeprazole does not inhibit this enzyme. Thus, omeprazole does not affect the metabolism of medicines metabolised by CYP3A4, such as **cyclosporin, lignocaine, quinidine, oestradiol, erythromycin** and **budesonide**.

Results from a range of interaction studies with omeprazole versus other medicines demonstrate that omeprazole, 20-40 mg daily, has no significant influence on any other CYP enzymes relevant for medicine metabolism, as shown by the lack of metabolic interaction with substrates for CYP1A2 (such as **caffeine, theophylline**), CYP2C9 (such as **S-warfarin, piroxicam, diclofenac, naproxen**), CYP2D6 (such as **metoprolol, propranolol**), CYP2E1 (such as **ethanol**).

### UNKNOWN MECHANISM

#### Tacrolimus

Concomitant administration of omeprazole has been reported to increase the serum levels of tacrolimus.



### **Methotrexate**

When given together with proton pump inhibitors, methotrexate levels have been reported to increase in some patients. In high-dose methotrexate administration a temporary withdrawal of omeprazole may need to be considered.

### **Saquinavir**

For other antiretroviral medicines, such as saquinavir, elevated serum levels have been reported. There are also some antiretroviral medicines of which unchanged serum levels have been reported when given with omeprazole.

## **EFFECTS OF OTHER MEDICINES ON THE PHARMACOKINETICS OF OMEPRAZOLE**

### **Inhibitors CYP2C19 and/or CYP3A4**

Since omeprazole is metabolised by CYP2C19 and CYP3A4, medicines known to inhibit CYP 2C19 or CYP 3A4 or both (such as clarithromycin and voriconazole) may lead to increased omeprazole serum levels by decreasing the rate of omeprazole's metabolism.

Concomitant voriconazole treatment resulted in more than doubling of the omeprazole exposure. Since high doses of omeprazole have been well-tolerated, adjustment of the omeprazole dose is not required during temporary concomitant use.

### **Inducers of CYP2C19 and/or CYP3A4**

Medicines known to induce CYP 2C19 or CYP 3A4 or both (such as **rifampicin** and **St John's wort**) may lead to decreased omeprazole serum levels by increasing omeprazole's rate of metabolism.

## **4.6 Fertility, pregnancy and lactation**

### **Pregnancy**

Results from three prospective epidemiological studies indicate no adverse effects of omeprazole on pregnancy or on the health of the foetus/newborn child. Omeprazole can be used during pregnancy.

### **Breast-feeding**

Omeprazole is excreted in breast milk but is not likely to influence the child when therapeutic doses are used.

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

PediPPI is not likely to affect the ability to drive or use machines.

## **4.8 Undesirable effects**

The following adverse reactions have been identified or suspected in the clinical trials programme for omeprazole and post-marketing. None was found to be dose-related. The reactions are classified according to frequency (common >1/100, <1/10; uncommon >1/1000, <1/100; rare >1/10000, <1/1000; very rare <1/10000).

**Blood and lymphatic system disorders**

Rare: Leukopenia, thrombocytopenia, agranulocytosis, pancytopenia

**Immune system disorders**

Rare: Hypersensitivity reactions e.g. fever, angioedema and anaphylactic reaction/shock

**Metabolism and nutrition disorders**

Rare: Hyponatraemia

Very rare: Hypomagnesaemia, severe hypomagnesaemia may result in hypocalcaemia. Hypomagnesaemia may also result in hypokalaemia.

**Psychiatric disorders**

Uncommon: Insomnia

Rare: Agitation, aggression, confusion, depression, hallucinations

**Nervous system disorders**

Common: Headache

Uncommon: Dizziness, paraesthesia, somnolence

Rare: Taste disturbance

**Eye disorders**

Rare: Blurred vision

**Ear and labyrinth disorders**

Uncommon: Vertigo

**Respiratory, thoracic and mediastinal disorders**

Rare: Bronchospasm

**Gastrointestinal disorders**

Common: Abdominal pain, constipation, diarrhoea, flatulence, nausea/vomiting

Rare: Dry mouth, stomatitis, gastrointestinal candidiasis, microscopic colitis

**Hepatobiliary disorders**

Uncommon: Increased liver enzymes

Rare: Hepatitis with or without jaundice, hepatic failure, encephalopathy in patients with pre-existing liver disease

**Skin and subcutaneous tissue disorders**

Uncommon: Dermatitis, pruritus, rash, urticaria

Rare: Alopecia, photosensitivity, erythema multiforme, Stevens-Johnson syndrome, toxic epidermal necrolysis (TEN), acute generalized exanthematous pustulosis (AGEP), drug rash with eosinophilia and systemic symptoms (DRESS)

**Musculoskeletal, connective tissue and bone disorders**

Rare: Arthralgia, myalgia, muscular weakness

**Renal and urinary disorders**

Rare: Interstitial nephritis

**Reproductive system and breast disorders**

Rare: Gynaecomastia

**General disorders and administration site conditions**

Uncommon: Malaise

Rare: Increased sweating, peripheral oedema

**Paediatric population**

The safety of omeprazole has been assessed in a total of 310 children aged 0 to 16 years with acid-related disease. There are limited long term safety data from 46 children who received maintenance therapy of omeprazole during a clinical study for severe erosive oesophagitis for up to 749 days. The adverse event profile was generally the same as for adults in short-term as well as in long-term treatment. There are no long term data regarding the effects of omeprazole treatment on puberty and growth.

**Reporting of suspected adverse reactions**

Reporting suspected adverse reactions 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**

Rare reports have been received of overdosage with omeprazole. In the literature doses of up to 560 mg have been described and occasional reports have been received when single oral doses have reached up to 2,400 mg omeprazole (120 times the usual recommended clinical dose). Nausea, vomiting, dizziness, abdominal pain, diarrhoea and headache have been reported from overdosage with omeprazole. Also apathy, depression and confusion have been described in single cases.

The symptoms described in connection to omeprazole overdosage have been transient, and no serious outcome due to omeprazole has been reported. The rate of elimination was unchanged (first order kinetics) with increased doses and no specific treatment has been needed.

For advice on the management of overdose please contact the National Poisons Centre on 0800 POISON (0800 764766).

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**5 PHARMACOLOGICAL PROPERTIES**

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**5.1 Pharmacodynamic properties**

Omeprazole, a racemic mixture of two active enantiomers, reduces gastric acid secretion through a highly targeted mechanism of action. It is a specific inhibitor of the acid pump in the parietal cell. It is rapid acting and provides control through reversible inhibition of gastric acid secretion with once daily dosing.

### Site and mechanism of action

Omeprazole is a weak base and is concentrated and converted to the active form in the highly acidic environment of the intracellular canaliculi within the parietal cell, where it inhibits the enzyme H<sup>+</sup>,K<sup>+</sup>-ATPase, the acid pump. This effect on the final step of the gastric acid formation process is dose-dependent and provides for highly effective inhibition of both basal acid secretion and stimulated acid secretion, irrespective of the stimulus.

All pharmacodynamic effects observed can be explained by the effect of omeprazole on acid secretion.

### Effect on gastric acid secretion

Oral dosing with omeprazole once daily provides for rapid and effective inhibition of daytime and night-time gastric acid secretion with maximum effect being achieved within 4 days of treatment. With omeprazole 20 mg, a mean decrease of at least 80% in 24-hour intragastric acidity is then maintained in duodenal ulcer patients, with the mean decrease in peak acid output after pentagastrin stimulation being about 70% twenty-four hours after dosing.

Oral dosing with omeprazole 20 mg maintains an intragastric pH of  $\geq 3$  for a mean time of 17 hours of the 24 hour period in duodenal ulcer patients.

As a consequence of reduced acid secretion and intragastric acidity, omeprazole dose-dependently reduces/normalises acid exposure of the oesophagus in patients with gastro-oesophageal reflux disease.

The inhibition of acid secretion is related to the area under the plasma concentration-time curve (AUC) of omeprazole and not to the actual plasma concentration at a given time.

No tachyphylaxis has been observed during treatment with omeprazole.

### Effect on *Helicobacter pylori*

*Helicobacter pylori* is associated with acid peptic disease, including duodenal and gastric ulcer disease. *H. pylori* is a major factor in the development of gastritis. *H. pylori* together with gastric acid are major factors in the development of peptic ulcer disease. *H. pylori* has been found to play a causal role in the development of gastric carcinoma.

Omeprazole has a bactericidal effect on *H. pylori in vitro*.

Eradication of *H. pylori* with omeprazole and antimicrobials is associated with rapid symptom relief, high rates of healing of any mucosal lesions, and long-term remission of peptic ulcer disease thus reducing complications such as gastrointestinal bleeding as well as the need for prolonged anti-secretory treatment.

### Other effects related to acid inhibition

During treatment with antisecretory medicines, serum gastrin increases in response to the decreased acid secretion. Also chromogranin A (CgA) increases due to decreased gastric acidity. The increased CgA level may interfere with investigations for

neuroendocrine tumours. Literature reports indicate that proton pump inhibitor treatment should be stopped 5 to 14 days before CgA measurements. Measurements should be repeated if levels have not normalised by this time.

An increased number of ECL cells possibly related to the increased serum gastrin levels, have been observed in both children and adults during long term treatment with omeprazole. The findings are considered to be of no clinical significance.

During long-term treatment gastric glandular cysts have been reported in a somewhat increased frequency. These changes are a physiological consequence of pronounced inhibition of acid secretion, are benign and appear to be reversible.

Decreased gastric acidity due to any means including proton pump inhibitors, increases gastric counts of bacteria normally present in the gastrointestinal tract. Treatment with acid-reducing medicines may lead to slightly increased risk of gastrointestinal infections such as *Salmonella* and *Campylobacter* and, in hospitalised patients, possibly also *Clostridium difficile*.

### **Paediatric population**

In a non-controlled study in children (1 to 16 years of age) with severe reflux oesophagitis, omeprazole at doses of 0.7 to 1.4 mg/kg improved oesophagitis level in 90% of the cases and significantly reduced reflux symptoms. In a single-blind study, children aged 0–24 months with clinically diagnosed gastro-oesophageal reflux disease were treated with 0.5, 1.0 or 1.5 mg omeprazole/kg. The frequency of vomiting/regurgitation episodes decreased by 50% after 8 weeks of treatment irrespective of the dose.

## **5.2 Pharmacokinetic properties**

### **Absorption and Distribution**

Omeprazole is acid labile and is therefore administered in omeprazole oral suspension as a buffered suspension. The buffer protects omeprazole from acid degradation, facilitating absorption.

Absorption of omeprazole is rapid, with peak plasma levels occurring approximately 30 minutes after dose. Absorption of omeprazole takes place in the small intestine and is usually completed within 3–6 hours. In a bioavailability study the administration with food (milk) reduced the extent of absorption by approximately 20%. The systemic availability (bioavailability) from a single oral dose of omeprazole is approximately 40%. After repeated once-daily administration, the bioavailability increases to about 60%.

The apparent volume of distribution in healthy subjects is approximately 0.3 L/kg body weight. Omeprazole is 97% plasma protein bound.

### **Metabolism and Excretion**

Omeprazole is completely metabolised by the cytochrome P450 system (CYP). The major part of its metabolism is dependent on the polymorphically expressed, specific isoform CYP2C19, responsible for the formation of hydroxyomeprazole, the major metabolite in plasma. The remaining part is dependent on another specific isoform,

CYP3A4, responsible for the formation of omeprazole sulphone. As a consequence of high affinity of omeprazole to CYP2C19, there is a potential for competitive inhibition and metabolic drug-drug interactions with other substrates for CYP2C19. However, due to low affinity to CYP3A4, omeprazole has no potential to inhibit the metabolism of other CYP3A4 substrates.

The parameters below reflect mainly the pharmacokinetics in individuals with a functional CYP2C19 enzyme, extensive metabolisers.

Total plasma clearance is about 30-40 L/h after a single dose. The plasma elimination half-life of omeprazole is usually shorter than one hour both after single and repeated oral once daily dosing. The AUC of omeprazole increases with repeated administration. This increase is dose-dependent and results in a non-linear dose-AUC relationship after repeated administration. This time- and dose-dependency is due to a decrease of first pass metabolism and systemic clearance probably caused by an inhibition of the CYP2C19 enzyme by omeprazole and/or its metabolites (e.g. the sulphone). Omeprazole is completely eliminated from plasma between doses with no tendency for accumulation during once daily administration.

No metabolite has been found to have any effect on gastric acid secretion. Almost 80% of an orally given dose is excreted as metabolites in the urine, and the remainder is found in the faeces, primarily originating from bile secretion.

**Poor metabolisers:** Approximately 3% of the Caucasian population and 15-20% of Asian populations lack a functional CYP2C19 enzyme and are called poor metabolisers. In such individuals the metabolism of omeprazole is probably mainly catalysed by CYP3A4. After repeated once-daily administration of 20 mg omeprazole, the mean AUC was 5 to 10 times higher in poor metabolisers than in subjects having a functional CYP2C19 enzyme (extensive metabolisers). Mean peak plasma concentrations were also higher, by 3 to 5 times. These findings have no implications for the posology of omeprazole.

### Special patient populations

**Impaired hepatic function:** The metabolism of omeprazole in patients with liver dysfunction is impaired, resulting in an increased AUC. Omeprazole has not shown any tendency to accumulate with once daily dosing.

**Impaired renal function:** The pharmacokinetics of omeprazole, including systemic bioavailability and elimination rate, are unchanged in patients with reduced renal function.

**Elderly:** The metabolism rate of omeprazole is somewhat reduced in elderly subjects (75-79 years of age).

**Children:** Available data from children (1 year and older) suggests that the pharmacokinetics, within the recommended dosages (see Section 4.2 Dose and method of administration), is similar to those reported in adults.

In children younger than 6 months, clearance of omeprazole is low due to low capacity to metabolise omeprazole.

### 5.3 Preclinical safety data

Gastric ECL-cell hyperplasia and carcinoids, have been observed in life-long studies in rats treated with omeprazole. These changes are the result of sustained hypergastrinaemia secondary to acid inhibition. Similar findings have been made after treatment with H<sub>2</sub>-receptor antagonists, proton pump inhibitors and after partial fundectomy. Thus, these changes are not from a direct effect of any individual drug.

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## 6 PHARMACEUTICAL PARTICULARS

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### 6.1 List of excipients

Sodium hydrogen carbonate  
Potassium hydrogen carbonate  
Sodium alginate  
Maltitol  
Mannitol  
Sucralose  
Xanthan gum  
Vanilla Flavour (for omeprazole 2 mg only)  
Menthol Flavour  
Titanium dioxide  
Sodium benzoate  
Sodium methyl parahydroxybenzoate

### 6.2 Incompatibilities

None known when instructions in Section 4.2 Dosage and method of administration are followed.

### 6.3 Shelf life

Dry powder: 24 months.  
Reconstituted suspension: 28 days.

### 6.4 Special precautions for storage

#### **Dry powder:**

Store below 25°C. Store in the original foil pouch to protect from light and moisture.

#### **Reconstituted suspension:**

The reconstituted suspension should be stored in a refrigerator (2°C - 8°C).  
Store in the original container to protect from light. Keep the bottle tightly closed.  
It may be stored below 25°C for up to 2 days.



## 6.5 Nature and contents of container

Amber plastic (PET) bottle with powder fitted with a red polypropylene (PP) closure cap containing powder, all enclosed in an aluminium foil pouch.

Each bottle contains 47 g of powder for oral suspension. Once reconstituted the bottle contains 90 mL of oral suspension, of which 75 mL is intended for dosing and administration.

Each pack also contains an opaque PP oral dosing syringe (5 mL, graduated at each 1 mL and intermediate marks every 0.1 mL) with white HDPE plunger, colourless, transparent LDPE bottle adaptor and grey PP replacement cap.

## 6.6 Special precautions for disposal and other handling

It is recommended that a pharmacist reconstitutes PediPPI oral suspension prior to its dispensing to the patient.

### **Preparing and taking the suspension**

The container is a two compartment system containing powder both in the cap and in the bottle. The two powders first need to be combined and are then to be reconstituted in water. A red mixing disk will drop into the medicine to help mix the powders and also mix the reconstituted suspension after addition of the water. It should remain in the bottle. The red cap is replaced by a grey cap after reconstitution.

### Instructions for initial reconstitution

#### *Combination of powder in cap and bottle*

- Shake the bottle for 10 seconds to loosen the powder.
- Twist the red cap anti-clockwise (see arrow on cap) until the seal is broken to release the powder in the red cap into the bottle.
- Twist the red cap back to the original position, securely fastening the red cap onto the bottle.

#### *Reconstitution of the powder*

- Shake the bottle vigorously for 10 seconds to mix the powders.
- Tap the base of the bottle three times on a hard-horizontal surface to make sure all powder is in the bottle and not in the cap.
- Remove the red cap from the bottle.
- Add 64 mL of water by using a suitable measuring device up to the line on the label.
- Securely fasten the red cap onto the bottle and shake vigorously for 30 seconds.

#### *Placement of syringe adaptor*

- Remove the red cap and red ring and throw away.
- Insert the colourless, transparent bottle adaptor and replace the red cap with the grey plastic screw-cap.
- Leave for 15 minutes for product to reach final consistency.

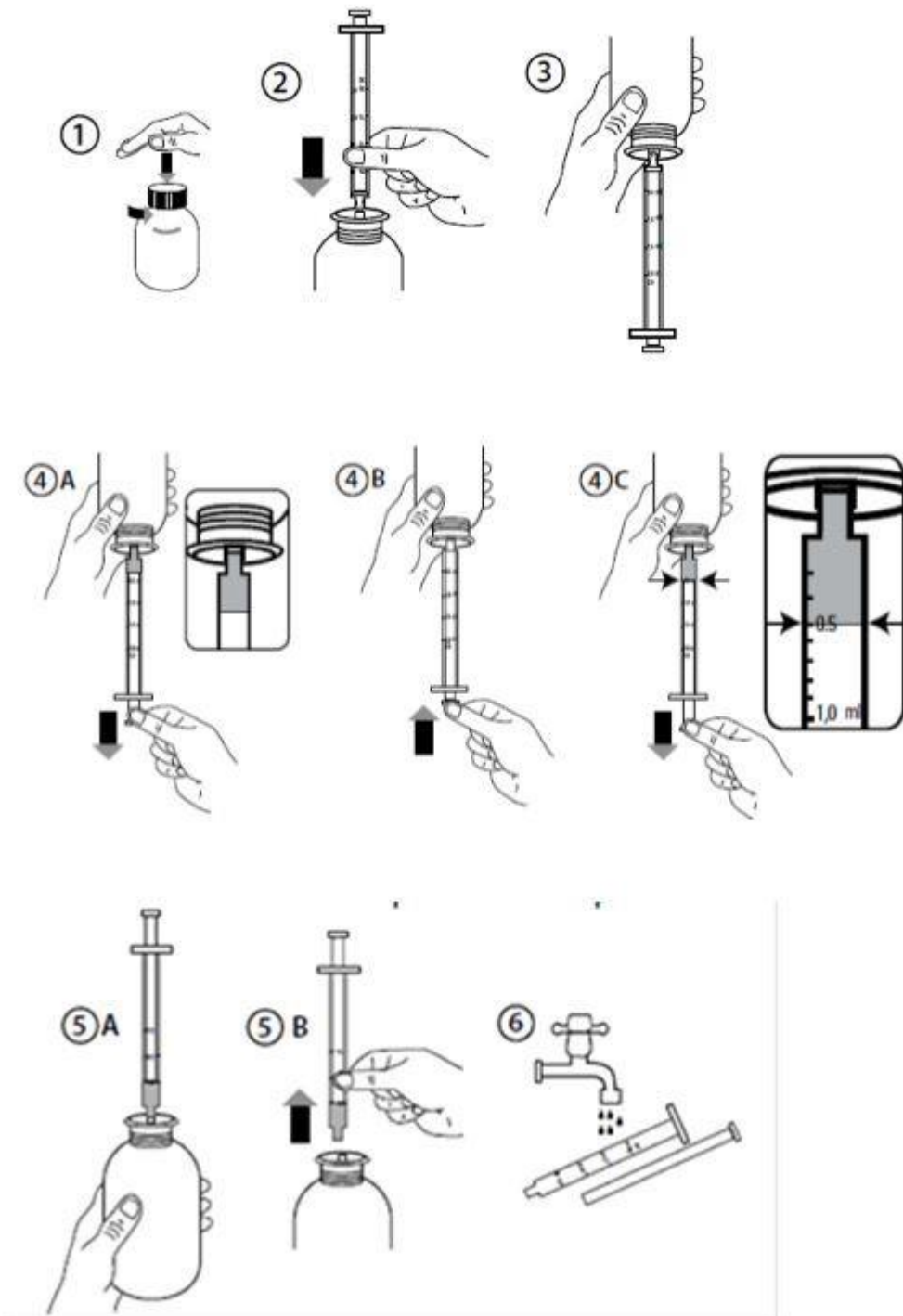
The reconstituted suspension will be a white / off-white / brownish suspension. It may contain dark specks due to the sweetener.

### Measuring the dose

#### *Instructions for use of the syringe*

1. Shake for 20 seconds immediately prior to each use.
2. To open the bottle, press the grey cap down and turn it anti-clockwise (Figure 1). Do not remove the white cap portion.
3. Take the syringe and put it into the adaptor opening (Figure 2).
4. Turn the bottle upside down (Figure 3).
5. Fill the syringe with a small amount of suspension by pulling the plunger down (Figure 4A).  
Then push the plunger upward in order to remove any possible bubbles (Figure 4B).  
Finally, pull the plunger down to the graduation mark corresponding to the quantity in millilitres (mL) prescribed.  
The top flat edge of the piston should be in line with the graduation mark you are measuring to (Figure 4C).
6. Turn the bottle the right way up (Figure 5A).
7. Remove the syringe from the adaptor (Figure 5B).
8. Put the end of the syringe into the mouth of the patient and push the plunger slowly back in to take the medicine. The suspension will be released slowly while the last portion will be released faster due to reduced resistance in the tip of the syringe.
9. Wash the syringe with water and let it dry before you use it again (Figure 6).
10. Close the bottle with the grey plastic screw cap - leave the bottle adaptor in the bottle.

Note: It is normal to have the red plastic disc in the suspension during use; do not attempt to remove it.



Instruction for administration via nasogastric (NG) or percutaneous endoscopic gastrostomy (PEG) tubes

Ensure that the enteral feeding tube is free from obstruction before administration.

1. Flush the enteral tube with 5 mL of water.
2. Administer the required dose of omeprazole oral suspension with a suitable measuring device.
3. Flush the enteral tube with 5 mL of water.

This product is compatible for use with polyurethane and PVC nasogastric (NG) and percutaneous endoscopic gastrostomy (PEG) tubes of size 6 Fr to 16 Fr. For the smallest diameter tubes (6 Fr) a smaller flush volume of 2 mL may be used to support the use in very young children where fluid intake restriction may be of relevance.

Any unused medicinal product or waste material 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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## **9 DATE OF FIRST APPROVAL**

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12 May 2022

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## **10 DATE OF REVISION OF TEXT**

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12 May 2022