

# AUSTRALIAN PRODUCT INFORMATION – NOUMED LANSOPRAZOLE (lansoprazole) Capsules

## 1. NAME OF THE MEDICINE

Lansoprazole

## 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each NOUMED LANSOPRAZOLE capsule contains enteric-coated delayed release pellets with 30 mg of lansoprazole.

Contains excipients with known effects: sucrose.

For the full list of excipients, see *section 6.1 List of excipients*.

## 3. PHARMACEUTICAL FORM

NOUMED LANSOPRAZOLE 30 mg capsules - Purple cap/lavender body, self-locked hard gelatin capsules of size '1' imprinted with 'L 30' on both cap and body, containing white to off-white pellets.

## 4. CLINICAL PARTICULARS

### 4.1 THERAPEUTIC INDICATIONS

#### Adults

NOUMED LANSOPRAZOLE capsules are indicated for

- Healing and long-term management of reflux oesophagitis.
- Healing and long-term management for patients with duodenal ulcer.
- Healing of benign gastric ulcer. Patients whose gastric or duodenal ulcer is not associated with ingestion of non-steroidal anti-inflammatory drugs require treatment with antimicrobial agents in addition to antisecretory drugs whether on first presentation or on recurrence.
- Patients with benign peptic lesions that do not respond to H<sub>2</sub>-receptor antagonists.
- Eradication of *H. pylori* from the upper gastrointestinal tract in patients with peptic ulcer or chronic gastritis when used in combination with appropriate antibiotics.
- Relief of reflux-like and/or ulcer-like symptoms associated with acid-related dyspepsia.

#### Paediatric and adolescent patients 1 to 17 years of age

NOUMED LANSOPRAZOLE capsules are indicated for

- Treatment of gastro-oesophageal reflux disease, including all grades of oesophagitis.
- Healing of erosive oesophagitis.

### 4.2 DOSE AND METHOD OF ADMINISTRATION

NOUMED LANSOPRAZOLE capsules contain 30 mg of lansoprazole as enteric-coated delayed release capsules.

To achieve the optimal acid inhibitory effect, and hence most rapid healing and symptom relief, NOUMED LANSOPRAZOLE capsules should be taken in the morning before food.

The capsules should be swallowed whole. Do not crush or chew.

## Adults

### *Reflux oesophagitis:*

30 mg lansoprazole once daily for 4 weeks. The majority of patients will be healed after the first course. For patients who have not fully healed within this time, a further 4 weeks' treatment using the same dosage regimen is indicated. For long-term management, a maintenance dose of 15 mg or 30 mg once daily can be used dependent upon patient response.

### *Duodenal ulcer:*

30 mg lansoprazole once daily for 4 weeks. For the prevention of relapse, the recommended maintenance dose is 15 mg once daily.

### *Gastric ulcer:*

30 mg lansoprazole once daily for 8 weeks.

### *Acid-related dyspepsia:*

Lansoprazole 15 mg or 30 mg once daily for 2-4 weeks, depending on the severity and persistence of symptoms. Patients who do not respond after 4 weeks, or who relapse shortly afterwards, should be investigated.

### *Eradication of H. pylori:*

The following combinations have been shown to be effective when used for 7 days:

Lansoprazole 30 mg twice daily plus **two** of the following antibiotics: amoxicillin 1 g twice daily, metronidazole 400 mg twice daily and clarithromycin 250 mg twice daily.

## Paediatrics/adolescents

Short-term treatment (8-12 weeks). In patients aged 1-17 years with gastro-oesophageal reflux disease, including all grades of oesophagitis, the recommended initial dosage is:

Body weight	Recommended Dose
≤ 30 Kg	15 mg lansoprazole once daily
> 30 Kg	30 mg lansoprazole once daily

After 2 weeks, an increase in dose up to 60 mg lansoprazole daily may be beneficial for patients who are not responding satisfactorily.

## Instructions for patients who are unable to swallow capsules

For other patients who have difficulty swallowing lansoprazole capsules, the capsule can be opened and administered as follows:

- Open the capsule.
- Sprinkle intact granules on one tablespoon of apple sauce, strained pears, cottage cheese or yoghurt.
- Swallow immediately.

The capsules may also be emptied into a small volume of either apple juice, orange juice or tomato juice and administered as follows:

- Open the capsule.
- Sprinkle intact granules into a small volume of apple juice, orange juice or tomato juice. Mix briefly and swallow immediately.
- To ensure complete delivery of the dose, the glass should be rinsed with two or more volumes of juice and the contents swallowed immediately.

Use in other foods or liquids has not been studied clinically and is, therefore, not recommended.

### Nasogastric tube administration

For patients with a nasogastric tube in place, NOUMED LANSOPRAZOLE capsules can be administered as follows:

- Open the capsule
- Mix the intact granules into 40 mL of apple juice (Do not use any other liquids)
- Inject through the nasogastric tube into the stomach
- Flush with additional apple juice to clear the tube

### 4.3 CONTRAINDICATIONS

- Hypersensitivity to lansoprazole, other proton pump inhibitors or any of the ingredients (see *section 6.1 List of excipients*).
- Severe hepatic impairment.
- Lansoprazole should not be co-administered with atazanavir due to a significant reduction in atazanavir exposure.

### 4.4 SPECIAL WARNINGS AND PRECAUTIONS FOR USE

As with other anti-ulcer therapies, the possibilities of malignancy should be excluded when a gastric ulcer is suspected, since treatment with lansoprazole may alleviate the symptoms of a malignancy and possibly delay its diagnosis.

Similarly, the possibility of serious underlying disease such as malignancy should be excluded before treatment for dyspepsia commences, particularly in patients of middle age or older who have new or recently changed dyspeptic symptoms.

#### Use with caution in the following circumstances:

Agents that elevate gastric pH may increase the already-present risk of nosocomial pneumonia in intubated ICU patients receiving mechanical ventilation.

When using lansoprazole with antibiotics to eradicate *H. pylori*, it is recommended that prescribers refer to the approved product information for the antibiotics selected.

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 drugs may lead to a slightly increased risk of gastrointestinal infections such as *Salmonella* and *Campylobacter*. Proton pump inhibitor therapy may be associated with an increased risk of *Clostridium difficile* infection.

Daily treatment with any acid-suppressing medications over a long period of time (e.g. longer than 3 years) may lead to malabsorption of cyanocobalamin (vitamin B12) caused by hypo- or achlorhydria. Cyanocobalamin deficiency should be considered in patients with Zollinger-Ellison syndrome and other pathological hypersecretory conditions requiring long-term treatment, individuals with reduced body stores or risk factors for reduced vitamin B12 absorption (such as the elderly) on long-term therapy or if relevant clinical symptoms are observed.

PPIs, especially if used in high doses and over long durations (> 1 year), may modestly increase the risk of hip, wrist and spine fracture, predominantly in the elderly or in presence of other recognised risk factors. Observational studies suggest that PPIs may increase the overall risk of fracture. Some of this increase may be due to other risk factors. Patients at risk of osteoporosis should receive clinical guidelines and they should have an adequate intake of vitamin D and calcium.

#### Enterochromaffin-like (ECL) cell effects

Safety concerns of long-term treatment relate to hypergastrinaemia and possible ECL effects. ECL cell hyperplasia and gastric carcinoid tumour were observed in animal studies.

Human gastric biopsy specimens from patients treated with proton pump inhibitors have not detected ECL cell effects similar to those seen in rats. Gastric biopsies taken in all the long-term maintenance studies have revealed:

- a slight increase in mean endocrine cell count during 12 months maintenance treatment with lansoprazole 15 or 30 mg, observed in 3 of 4 studies. Cell density averages were slightly higher under 30 mg lansoprazole

than under 15 mg lansoprazole once daily. These observations were reversible approximately 3 months after maintenance therapy stopped in two of the studies.

- single cases of changes from normal to simple hyperplasia which persisted in one patient 3 months after discontinuation of treatment.
- for antral biopsies a greater mean gastrin-positive cell density and mean serotonin-positive cell density was found for lansoprazole 30 mg compared to lansoprazole 15 mg once daily.
- no evidence of carcinoid tumours or visible endocrine cell proliferation was seen in any patient for either fundus or antral biopsies.

(There are currently biopsy data on over 400 patients treated between 9 months and one year and over 230 patients treated for more than one year).

### **Retinal atrophy**

In animal studies, retinal atrophy was observed in Sprague Dawley rats dosed orally with lansoprazole. Retinal atrophy has not been found in mice, dogs, monkeys or humans. Mechanistic studies have indicated that the effect is specific to species dependent on hepatic synthesis of the amino acid taurine, which has a protective effect on the retina. Lansoprazole inhibits hepatic synthesis of taurine; however, humans obtain their taurine requirements from the diet.

### **Acute Interstitial Nephritis**

Acute interstitial nephritis has been observed in patients taking PPIs including lansoprazole. Acute interstitial nephritis may occur at any point during PPI therapy and is generally attributed to an idiopathic hypersensitivity reaction. Discontinue lansoprazole if acute interstitial nephritis develops.

### **Hypomagnesaemia**

Hypomagnesaemia, symptomatic and asymptomatic, has been reported rarely in patients treated with PPIs for at least three months, in most cases after a year of therapy. Serious adverse events include tetany, arrhythmias, and seizures. In most patients, treatment of hypomagnesaemia required magnesium replacement and discontinuation of the PPI.

For patients expected to be on prolonged treatment or who take PPIs with medications such as digoxin or drugs that may cause hypomagnesaemia (e.g. diuretics), health care professionals may consider monitoring magnesium levels prior to initiation of PPI treatment and periodically during PPI treatment.

### **Subacute Cutaneous Lupus Erythematosus (SCLE)**

Proton pump inhibitors are associated in rare cases with the occurrence of subacute cutaneous lupus erythematosus (SCLE). If lesions occur, especially in sun exposed areas of the skin, and if accompanied by arthralgia, the patient should seek medical help promptly and the healthcare professional should consider stopping the product.

### **Use in hepatic impairment**

Lansoprazole is metabolized substantially by the liver. The results of clinical trials in adult patients with liver disease indicate that the metabolism of lansoprazole is prolonged in patients with severe hepatic impairment.

See *section 4.3 Contraindications*.

### **Use in renal impairment**

There is no need to alter the dosage in adult patients with impaired renal function.

### **Use in the elderly**

Dosage adjustment is not required in the elderly.

## Paediatric use

There is insufficient experience to recommend the use of lansoprazole in paediatric patients with hepatic or renal impairment.

See also *section 4.2 Dose and method of administration*, *section 5.1 Pharmacodynamic properties – Clinical Trials* and *section 5.2 Pharmacokinetic properties*.

## Effects on laboratory tests

Increased Chromogranin A (CgA) level may interfere with investigations for neuroendocrine tumours. To avoid this interference, proton pump inhibitor treatment should be stopped 14 days before CgA measurements.

## 4.5 INTERACTIONS WITH OTHER MEDICINES AND OTHER FORMS OF INTERACTIONS

Lansoprazole is metabolised in the liver and is a weak inducer of cytochrome P450. Therefore, there is the possibility of interaction with other drugs metabolised via this system, e.g. theophylline, phenytoin, carbamazepine and warfarin. Patients receiving such drugs concomitantly with lansoprazole should be monitored to determine if any dosage adjustment is necessary.

There have been isolated cases of a suspected drug interaction with warfarin, but a definitive relationship to lansoprazole therapy has not been established.

No clinically significant effects on plasma levels of non-steroidal anti-inflammatory drugs phenytoin (single IV doses only) and diazepam have been found.

Concomitant administration of lansoprazole and tacrolimus may increase whole blood levels of tacrolimus, especially in transplant patients who are intermediate or poor metabolisers of CYP2C19. Inhibitors of CYP2C19 such as fluvoxamine would likely increase the systemic exposure to lansoprazole. Inducers of CYP2C19 would likely decrease the systemic exposure to lansoprazole.

The possibility of interaction between lansoprazole and low-dose oral contraceptives cannot be excluded.

Coadministration of lansoprazole with sucralfate delayed absorption and reduced lansoprazole bioavailability by approximately 30%. Similarly, antacids may also reduce the bioavailability of lansoprazole. Therefore, lansoprazole should be taken at least an hour prior to sucralfate or antacid administration.

Lansoprazole causes a profound and long-lasting inhibition of gastric acid secretion; therefore, it is theoretically possible that lansoprazole may interfere with the absorption of drugs where gastric pH is an important determinant of bioavailability (e.g. ketoconazole, ampicillin esters, iron salts, digoxin).

Coadministration of PPIs in healthy subjects and in transplant patients receiving mycophenolate mofetil has been reported to reduce exposure to the active metabolite, mycophenolic acid. This is possibly due to a decrease in mycophenolate mofetil solubility at an increased gastric pH. The clinical relevance of reduced mycophenolic acid exposure on organ rejection has not been established in transplant patients receiving PPIs and mycophenolate mofetil. Use lansoprazole with caution in transplant patients receiving mycophenolate mofetil.

Concomitant use with methotrexate (primarily at high dose), may elevate and prolong serum levels of methotrexate and/or its metabolite, possible leading to methotrexate toxicities. A temporary withdrawal of the PPI may be considered in some patients receiving treatments with high dose methotrexate.

Lansoprazole, and other PPIs, should not be co-administered with HIV protease inhibitors for which absorption is dependent on acidic intragastric pH (e.g. atazanavir and nelfinavir), due to significant reduction in their bioavailability. The decreased systemic concentration of the HIV protease inhibitor may result in a loss of therapeutic effect and the development of HIV resistance.

Patients with rare hereditary problems of fructose intolerance, glucose-galactose malabsorption or sucrase-isomaltase insufficiency should not take this medicine.

## 4.6 FERTILITY, PREGNANCY AND LACTATION

### Effects on fertility

The effects of lansoprazole on human male fertility have not been evaluated.

### Use in pregnancy

#### Category B3

Reproductive studies conducted in pregnant rats and rabbits at oral doses up to 300 and 30 mg/kg/day, respectively, did not disclose any evidence of a teratogenic effect. A significant increase in foetal mortality was observed in the rabbit study at doses above 10 mg/kg/day. In rats a slight reduction in litter survival and weights was noted at doses above 100 mg/kg/day.

There are insufficient data to recommend the administration of lansoprazole during pregnancy. Lansoprazole should not be used during pregnancy, unless the benefit clearly outweighs the potential risk to the fetus.

### Use in lactation

Animal studies indicate that lansoprazole is secreted into breast milk. There is no information on the secretion of lansoprazole into breast milk in humans. The use of lansoprazole during breast-feeding should be avoided.

## 4.7 EFFECTS ON ABILITY TO DRIVE AND USE MACHINES

The effects of this medicine on a person's ability to drive and use machines were not assessed as part of its registration.

## 4.8 ADVERSE EFFECTS (UNDESIRABLE EFFECTS)

Lansoprazole is well tolerated, with adverse events generally being mild and transient.

### *Nervous system disorders*

Headache, dizziness.

Rarely, paraesthesia and taste disturbances.

### *Psychiatric disorders*

Depression, confusion and hallucinations.

### *Gastrointestinal disorders*

Diarrhoea, constipation, abdominal pain, dyspepsia, nausea, vomiting, flatulence and dry or sore mouth or throat.

Rarely, cases of colitis (macroscopic and microscopic) have been reported. In severe and/or protracted cases of diarrhoea, discontinuation of therapy should be considered. In the majority of cases symptoms resolve on discontinuation of therapy.

Frequency not known: Withdrawal of long-term PPI therapy can lead to aggravation of acid-related symptoms and may result in rebound acid hypersecretion.

### *Infections and infestations*

Upper respiratory tract infections, urinary tract infections.

As with any broad-spectrum antibiotic treatment, the risk of pseudomembranous colitis should be considered in patients using triple therapy for the eradication of *H. pylori*.

### *Hepatobiliary disorders*

Alterations in liver function test values, elevation of aspartate aminotransferase (AST), alanine transaminase (ALT), alkaline phosphatase, lactate dehydrogenase (LDH) and gamma-glutamyl transpeptidase ( $\gamma$ -GTP).

Rarely, jaundice or hepatitis, have been reported. However, routine monitoring of liver function tests is not required.

***Skin and subcutaneous tissue disorders***

Skin rashes, urticaria and pruritus. These generally resolve on discontinuation of drug therapy. Serious dermatological reactions are rare but there have been occasional reports of Stevens-Johnson Syndrome, toxic epidermal necrolysis and erythematous or bullous rashes including erythema multiforme. Cases of hair thinning and photosensitivity have also been reported.

***Immune system disorders***

Angioedema, wheezing, and very rarely, anaphylaxis.

***Renal and urinary disorders***

Cases of interstitial nephritis have been reported which have sometimes resulted in renal failure.

***Metabolism and nutrition disorders***

Hypomagnesaemia has been reported rarely.

There have been isolated reports of hyponatraemia, but a definitive relationship to lansoprazole therapy has not been established.

***Blood and lymphatic system disorders***

Haematological effects (thrombocytopenia, agranulocytosis, eosinophilia, leucopenia, neutropenia and pancytopenia) have occurred rarely. Bruising, purpura and petechiae have also been reported.

***Musculoskeletal and connective tissue disorders***

Arthralgia, myalgia.

***Eye disorders***

Blurred vision

***Ear and labyrinth disorders***

Vertigo

***Respiratory, thoracic and mediastinal disorders***

There have been isolated reports of interstitial pneumonia and hyponatraemia, but a definitive relationship to lansoprazole therapy has not been established.

***Reproductive system and breast disorders***

Gynaecomastia and erectile dysfunction have been reported rarely.

***Injury, poisoning and procedural complications***

Fracture of the hip, wrist or spine has been reported.

***General disorders and administration site conditions***

Fatigue, malaise, peripheral oedema

**Reporting suspected adverse effects**

Reporting suspected adverse reactions after registration of the medicinal product is important. It allows continued monitoring of the benefit-risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions at [www.tga.gov.au/reporting-problems](http://www.tga.gov.au/reporting-problems).

**4.9 OVERDOSE**

There is no information on the effect of acute overdosage. In a case of overdose, supportive and symptomatic therapy should be initiated. Doses of up to 180 mg/day for more than a year have been used to treat Zollinger Ellison syndrome with no serious adverse effects.

For information on the management of overdose, contact the Poison Information Centre on 131126 (Australia).

## 5. PHARMACOLOGICAL PROPERTIES

### 5.1 PHARMACODYNAMIC PROPERTIES

#### Mechanism of action

Lansoprazole reduces gastric acid secretions by inhibiting the H<sup>+</sup>/K<sup>+</sup>-ATPase (proton pump) of the parietal cells in the gastric mucosa, the terminal phase of acid secretion. The drug is effective in the treatment of acid-related disorders of the upper gastrointestinal tract.

A single dose of 30 mg lansoprazole inhibits stimulated acid secretion by approximately 80%. Basal acid secretion and basal and stimulated secretion volumes are affected to a lesser degree.

After repeated dosing (for 7 days) 90% inhibition of stimulated acid secretion is achieved. Despite its short elimination half-life, lansoprazole has a prolonged pharmacological action, providing effective suppression of gastric acid secretion over 24 hours.

When used in combination with the recommended antibiotics, lansoprazole is associated with *H. pylori* eradication rates of up to 90%.

#### Clinical trials

##### *Helicobacter Pylori*

In clinical trials, the recommended dosage regimens were associated with *H. Pylori* eradication rates of up to 90%. The best eradication rates were obtained with regimens which included clarithromycin. Trials which used lansoprazole in combination with only one antibiotic resulted in significantly lower eradication rates. Therefore, such regimens are not recommended.

##### *Reflux oesophagitis*

##### Paediatric and adolescent patients

In an open-label, U.S. multicentre study, 66 children, 1 to 11 years of age, with GORD were assigned to receive an initial dose of either lansoprazole 15 mg once daily, if the body weight was ≤30 kg, or lansoprazole 30 mg once daily, if the body weight was >30 kg, administered for 8 to 12 weeks. The lansoprazole dose was increased up to 60 mg daily in some children after 2 weeks of treatment.

Erosive and Non Erosive GORD	Final Visit <sup>a</sup> % (n/N)
Erosive GORD healing rate	100% (27/27)
Improvement in overall GORD symptoms	76% (47/62 <sup>b</sup> )
<sup>a</sup> At week 8 or 12.	
<sup>b</sup> No data were available for 4 children	

Treatment with lansoprazole also demonstrated significant reduction in frequency and severity of GORD symptoms ( $p < 0.001$ ).

In a double-blind, U.S. multicentre study, 63 patients 12 to 17 years of age with proven GORD were randomised to receive either lansoprazole 15 mg once daily or 30 mg once daily for five days. Subjects in both groups demonstrated improvement in symptoms of reflux disease. A reduction in heartburn severity was shown to be statistically significant for patients treated with either 15 mg or 30 mg lansoprazole. The majority of patients (69% for lansoprazole 15 mg once daily and 74% for lansoprazole 30 mg once daily) reported that their reflux symptoms were better after treatment.

##### Adults

In two double-blind, placebo-controlled multicentre studies (of 336 patients) examining the efficacy of lansoprazole 15 mg and 30 mg tablets in maintaining healed erosive reflux oesophagitis, lansoprazole was significantly superior to placebo in maintaining endoscopic and symptomatic freedom from disease. The time to median recurrence of

either symptoms or endoscopic evidence of disease was less than 1 month for the placebo and greater than 12 months for 15 mg and 30 mg lansoprazole ( $p \leq 0.001$ ). There was a slight trend for a better outcome with 30 mg lansoprazole, although this was not statistically significant.

A study in 266 patients, comparing lansoprazole 15 mg and 30 mg daily with ranitidine 300 mg twice daily, found both lansoprazole 15 mg and 30 mg increased the time to relapse and probability of no relapse in comparison to ranitidine. The percentage of patients who relapsed endoscopically during the 12-month maintenance period was 31% in the lansoprazole 15-mg group, 20% in the lansoprazole 30-mg group and 68% in the ranitidine group. The difference between the lansoprazole groups and the ranitidine was apparent from the earliest time point in the study and maintained throughout the 12-month period. Comparison of treatment groups with regard to symptom control showed similar superiority of lansoprazole over ranitidine ( $p < 0.001$  for each comparison).

A study in 882 patients comparing lansoprazole 15 mg and 30 mg daily with omeprazole 20 mg daily showed endoscopic remission rates (after 12 months) of 75% with lansoprazole 15 mg daily, 88% with lansoprazole 30 mg daily and 89% with omeprazole 20 mg daily. The results demonstrate that lansoprazole 30 mg daily achieved significantly better remission rates compared to lansoprazole 15 mg daily and is of equal efficacy to omeprazole 20 mg daily.

The results of the 4 pivotal studies examining the use of lansoprazole in the long-term management of reflux oesophagitis are tabulated below.

Endoscopically Proven Relapse Rates at 12 Months					
Study	Lansoprazole 15 mg once daily	Lansoprazole 30 mg once daily	Ranitidine 300 mg once daily	Omeprazole 20 mg once daily	Placebo
1 (n=163)	37%	39%	-	-	92%*
2 (n=184)	13%	11%	-	-	-
3 (n=569)	31%	20%	68%*	-	-
4 (n=882)	25#	12%	-	11%	-
- not included in the study; * ( $p < 0.001$ ) versus lansoprazole 15 mg and 30 mg, # ( $p < 0.001$ ) versus omeprazole 20 mg and lansoprazole 30 mg					

### Duodenal ulcer

In a study comparing lansoprazole 15 mg daily with placebo in 180 patients with endoscopically documented duodenal ulcer, the percentage of patients who remained healed after twelve months was significantly higher with lansoprazole than with placebo. Lansoprazole 15 mg was significantly superior to placebo in preventing endoscopic and symptomatic relapses of disease.

Treatment	Interval (months)					
	0-1	1-2	2-3	3-6	6-9	9-12
Placebo	20%	36%	52%	60%	60%	62%
Lansoprazole 15mg	2%*	8%*	10%*	14%*	15%*	17%*
*( $p \leq 0.001$ ) versus placebo						

The maintenance studies discussed, using lansoprazole 15 mg and 30 mg, did not extend beyond 12 months.

### Acid-related dyspepsia

The efficacy of lansoprazole 15-30 mg daily has been examined in a total of 531 patients, compared with ranitidine (n=171), omeprazole (n=281) and placebo (n=138).

The efficacy of lansoprazole (30 mg mane) was compared to ranitidine (150 mg bd) for the treatment of acid-related dyspepsia in a double-blind, parallel, 4-week study. The results are presented in the following table.

Number of Patients with No Symptoms						
	Lansoprazole	Week 2 Ranitidine	P value	Lansoprazole	Week 4 Ranitidine	P value
No Symptoms	95/171 (55%)	56/171 (33%)	0.001	95/137 (69%)	63/145 (44%)	0.001
No. DT.H	91/138 (66%)	68/139 (49%)	0.006	89/111 (80%)	66/120 (55%)	0.001
No NT.H	89/128 (69%)	64/124 (52%)	0.005	86/103 (83%)	68/106 (64%)	0.003
No DT.EP	78/127 (61%)	62/140 (45%)	0.007	75/100 (72%)	71/120 (60%)	0.06
No NT.EP	79/115 (68%)	59/120 (50%)	0.004	74/91 (81%)	67/104 (65%)	0.01

DT = Day time H = Heartburn NT = Night-time EP = Epigastric Pain

There was also a significant difference in the usage of "rescue" antacid treatment in the two groups, with 67% of the lansoprazole group taking antacids in the first two weeks of treatment compared with 83% of the ranitidine group (p=0.001).

In patients with symptoms of ulcer-like and reflux-like dyspepsia, lansoprazole 15 mg mane was compared to omeprazole 10 mg mane for a 4-week period in a double-blind, parallel study. In the primary efficacy analyses in the intent to treat population, the study revealed that more patients were free of overall primary symptoms of dyspepsia in the lansoprazole-treated group compared to the omeprazole-treated group (p=0.007 and 0.078 respectively).

	Treatment	Symptom-Free Lansoprazole	Patients n (%) Omeprazole	P value
Overall Primary Symptoms	2 weeks	150 (53%)	115 (41%)	0.007
	4 weeks	167 (59%)	143 (51%)	0.078
Relief of Day-time Heartburn	2 weeks	164 (70%)	131 (58%)	0.011
	4 weeks	163 (70%)	145 (64%)	0.28
Relief of Night-time Heartburn	2 weeks	140 (69%)	132 (63%)	0.23
	4 weeks	146 (72%)	144 (68%)	0.53
Relief of Day-time Epigastric Pain	2 weeks	129 (63%)	88 (46%)	0.001
	4 weeks	137 (67%)	114 (60%)	0.17
Relief of Night-time Epigastric Pain	2 weeks	108 (61%)	91 (52%)	0.11
	4 weeks	113 (64%)	104 (60%)	0.46

### ***Non-ulcer dyspepsia***

In a randomised, double-blind parallel study, 15 mg lansoprazole mane was compared to placebo in 269 patients suffering from non-ulcer dyspepsia. In the intent-to-treat population the healing rate was 81/131 (61.8%) in the lansoprazole group after 2-3 weeks treatment, compared to 61/138 (44.2%) in the placebo group (p=0.005). In the 3-month follow-up period, the recurrence of non-ulcer dyspepsia symptoms was reported by 32/86 (37.2%) patients in the lansoprazole group and by 29/79 (36.7%) in the placebo group (p=1.0). Healing was defined as the percentage of patients with no heartburn or acid regurgitation, as well as no nausea and vomiting and a reduction in the Visual Analogue Scale value of  $\leq 20\%$  during the last 5 days of treatment.

## **5.2 PHARMACOKINETIC PROPERTIES**

### **Adults**

Lansoprazole is well absorbed and exhibits high bioavailability (80-90%) following an oral dose. The bioavailability has been shown to be affected by the presence of food; however, acid inhibition (which is an endpoint for efficacy), as measured from sampling of gastric juice in healthy volunteers, is not significantly affected by food. It was shown in one study that a.m. dosing produced higher mean gastric pH values than p.m. dosing. Plasma protein binding

is high (98%) and is gender and concentration independent. Binding does not change as a result of multiple dosing. The plasma elimination half-life in healthy subjects ranges from 1 to 2 hours following a single dose or multiple doses. Peak plasma levels occur within 1.5 to 2.0 hours after dosing in these subjects. After IV administration, the volume of distribution is  $29 \pm 4$  L, total clearance is  $31 \pm 8$  L/h and elimination half-life is  $0.9 \pm 0.44$  h.

Following absorption, lansoprazole is extensively metabolised and the metabolites are excreted by both the renal and biliary route. A study with  $^{14}\text{C}$ -labelled lansoprazole showed that up to 50% of the label was excreted in the urine, although unchanged drug does not appear to be excreted by this route; unchanged drug is eliminated, however, by biliary excretion.

## Children and adolescents

### 1 to 11 years of age

The pharmacokinetics of lansoprazole were studied in pediatric patients with gastro-oesophageal reflux disease (GORD) aged 1 to 11 years, with lansoprazole doses of 15 mg once daily for subjects weighing <30 kg and 30 mg once daily for subjects weighing >30 kg. Lansoprazole pharmacokinetics in these paediatric patients were similar to those previously observed in healthy adult subjects. The mean  $C_{\text{max}}$  and AUC values were similar between the two dose groups and were not affected by weight or age within each weight-adjusted dose group used in this study.

### 12 to 17 years of age

In a study of patients aged 12 to 17 years with GORD, the pharmacokinetics of lansoprazole were shown to be similar to those previously observed in healthy adult subjects. No statistically significant differences were observed between doses for  $T_{\text{max}}$ ,  $t_{1/2}$  or natural logarithms of dose-normalised  $C_{\text{max}}$  and  $\text{AUC}_{0-24}$ . None of the selected covariates (body weight, age and gender) had any statistically significant effect on lansoprazole  $T_{\text{max}}$  or the natural logarithms of dose normalized  $C_{\text{max}}$  and  $\text{AUC}_{0-24}$ .

## 5.3 PRECLINICAL SAFETY DATA

### Genotoxicity

Negative results were obtained in gene mutation assays and in an *in vivo* assay of chromosomal damage. *In vitro* assays of chromosomal damage showed evidence of chromosomal aberrations, though this may reflect cytotoxicity rather than genotoxic activity.

### Carcinogenicity

In a 2-year carcinogenicity study in rats, oral doses of 5, 15 or 50 mg/kg/day, 5 days per week, produced gastric ECL cell hyperplasia and carcinoid tumours in a dose-related manner in both male and female rats. The incidence of these effects was markedly higher in female rats. A "no effect" dose was not established for female rats. An increased incidence of benign Leydig cell tumours and testicular hyperplasia was also reported at dose levels of 15 mg/kg/day. Two repeat 2-year carcinogenicity studies in rats using doses ranging from 5-150 mg/kg/day, 7 days per week confirmed these findings.

In mice, a 78-week carcinogenicity study was performed at doses of 1.5, 5, 15 and 50 mg/kg/day, 5 days per week. No gastric ECL cell carcinoids were seen. In a repeat carcinogenicity study, mice were dosed with 15, 75, 150 or 300 mg/kg/day, 7 days a week. Terminal studies showed ECL cell hyperplasia, mucosal hyperplasia/hypertrophy and glandular dilatation and vacuolation at all dosages. Carcinoids were found in occasional animals receiving 15, 150 or 300 mg/kg/day.

Hypergastrinaemia secondary to prolonged hypochlorhydria has been postulated to be the mechanism by which ECL cell hyperplasia and gastric carcinoid tumours develop.

## 6. PHARMACEUTICAL PARTICULARS

### 6.1 LIST OF EXCIPIENTS

The pellets also contain the inactive ingredients sugar spheres (sucrose, maize starch), hypromellose, purified talc, titanium dioxide, macrogol 300, colloidal anhydrous silica, methacrylic acid-ethyl acrylate copolymer (1:1) dispersion 30%, OPACODE monogramming ink S-1-277002 black (proprietary ingredient no. 107581). The

capsule shells contain gelatin and titanium dioxide, and the colourants indigo carmine CI73015 and carmoisine CI14720 (30 mg capsule). The capsules are imprinted with OPACODE S-1-277002 black (PI 107581).

## 6.2 INCOMPATIBILITIES

Incompatibilities were either not assessed or not identified as part of the registration of this medicine.

## 6.3 SHELF LIFE

In Australia, information on the shelf life can be found on the public summary of the Australian Register of Therapeutic Goods (ARTG). The expiry date can be found on the packaging.

## 6.4 SPECIAL PRECAUTIONS FOR STORAGE

Store below 25°C.

## 6.5 NATURE AND CONTENTS OF CONTAINER

The capsules are supplied in cold form blister and strip pack containing 28 of 30 mg strength.

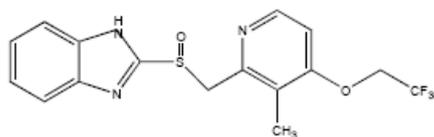
## 6.6 SPECIAL PRECAUTIONS FOR DISPOSAL

In Australia, any unused medicine or waste material should be disposed of by taking to your local pharmacy.

## 6.7 PHYSICOCHEMICAL PROPERTIES

NOUMED LANSOPRAZOLE delayed release capsules contain lansoprazole, which is a substituted benzimidazole. Lansoprazole is a white to slightly brownish crystalline, acid-labile powder, slightly soluble in ethanol and almost insoluble in water (0.033 mg/mL), but more soluble at higher pH.

Chemical structure:



Molecular formula: C<sub>16</sub>H<sub>14</sub>F<sub>3</sub>N<sub>3</sub>O<sub>2</sub>S

Chemical name: 2 [[[3-methyl-4-(2,2,2-trifluoroethoxy)-2-pyridyl]methyl] sulphonyl]-1 H-benzimidazole

Molecular weight: 369.36

CAS number:

103577-45-3

## 7. MEDICINE SCHEDULE (POISON STANDARD)

S4 – Prescription Only Medicine

## 8. SPONSOR

Avallon Pharmaceuticals Pty Ltd

Level 5, 7 Eden Park Drive,

Macquarie Park NSW 2113

Australia

Tel 1800 930 999

## 9. DATE OF FIRST APPROVAL

18 December 2019

## 10. DATE OF REVISION

24 January 2020

### Summary table of changes

Section changed	Summary of new information
4.3	Add contraindication
4.4	Strengthen precautions relating to proton pump inhibitor therapy; Add precaution relating to acute intestinal nephritis; hypomagnesaemia; and subacute cutaneous lupus erythematosus (SCLE).
4.5	Add interactions with tacrolimus; mycophenolate; methotrexate; and HIV protease inhibitors.
4.6	Strengthen warning relating to use in pregnancy
4.8	Reorganised adverse effects under the appropriate System Organ Class; add adverse effects.
6.1	Update to excipient name in accordance with the Australian Approved Name for therapeutic substances.
8	Sponsor details updated to Avallon Pharmaceuticals Pty Ltd