

# AUSTRALIAN PRODUCT INFORMATION – BICILLIN<sup>®</sup> L-A (BENZATHINE BENZYL PENICILLIN TETRAHYDRATE) SUSPENSION FOR INJECTION

## 1. NAME OF THE MEDICINE

Benzathine benzylpenicillin tetrahydrate

## 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

BICILLIN L-A contains benzathine benzylpenicillin (the benzathine salt of benzylpenicillin) in aqueous suspension:

600,000 Units/1.17 mL pre-filled syringe, containing benzathine benzylpenicillin tetrahydrate 517 mg/1.17 mL.

1,200,000 Units/2.3 mL pre-filled syringe, containing benzathine benzylpenicillin tetrahydrate 1016.6 mg/2.3 mL.

### Excipient(s) with known effect

- Methyl hydroxybenzoate
- Propyl hydroxybenzoate.

For the full list of excipients, see Section 6.1 List of excipients.

## 3. PHARMACEUTICAL FORM

Suspension for injection.

## 4. CLINICAL PARTICULARS

### 4.1 Therapeutic indications

Intramuscular benzathine benzylpenicillin is indicated in the treatment of infections due to penicillin-sensitive micro-organisms that are susceptible to the low and very prolonged serum levels common to this particular dosage form. Therapy should be guided by bacteriological studies (including sensitivity tests) and by clinical response.

The following infections will usually respond to adequate dosage of intramuscular benzathine benzylpenicillin:

Streptococcal infections (Group A - without bacteraemia). Mild-to-moderate infections of the upper respiratory tract (e.g., pharyngitis).

Venereal infections - Syphilis, yaws, bejel and pinta.

Medical conditions in which benzathine benzylpenicillin therapy is indicated as prophylaxis:

Rheumatic fever and/or chorea - Prophylaxis with benzathine benzylpenicillin has proven effective in preventing recurrence of these conditions. It has also been used as follow-up prophylactic therapy for rheumatic heart disease and acute glomerulonephritis.

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

### **Dosage**

Use a concentration of 442 mg/mL when measuring part doses. The quantity of benzathine benzylpenicillin is based on 1,200 Units/mg potency.

#### ***Streptococcal (Group A) upper respiratory infections (for example, pharyngitis)***

A single injection of 1,200,000 Units for adults.

A single injection of 900,000 Units for older children.

A single injection of 300,000 to 600,000 Units for infants and for children under 27 kg.

#### ***Venereal infections***

Syphilis - Primary, secondary and latent - 2,400,000 Units (1-dose). Late (tertiary including neurosyphilis) - 2,400,000 units at 7-day intervals for three doses.

Congenital (with normal CSF) - under 2 years of age: 50,000 Units/kg body weight; ages 2-12 years; adjust dosage based on adult dosage schedule.

Yaws, bejel and pinta - 1,200,000 Units (single injection).

#### ***Prophylaxis - for rheumatic fever and glomerulonephritis***

Following an acute attack, benzathine benzylpenicillin (parenteral) may be given in doses of 1,200,000 Units once a month or 600,000 Units every 2 weeks.

### **Method of Administration**

Because of the high concentration of suspended material in this product, the needle may be blocked if the injection is not made at a slow, steady rate.

Administer by DEEP, INTRAMUSCULAR INJECTION in the upper, outer quadrant of the buttock. In infants and small children, the midlateral aspect of the thigh may be preferable. Administration in the anterolateral thigh is not recommended due to the adverse effects observed (see Section 4.4 Special warnings and precautions for use), and vascularity of this region. When doses are repeated, vary the injection site.

Method of administration is the same as with conventional syringe. Remove needle cover by grasping it securely; twist and pull. Introduce needle into patient, aspirate by pulling back slightly on the plunger, and inject.

Discard any unused portion.

### **4.3 Contraindications**

Previous hypersensitivity reaction to any of the penicillins.

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

#### **Allergic Reactions**

Serious and occasionally fatal hypersensitivity (anaphylactoid) reactions have been reported in patients on penicillin therapy. Although anaphylaxis is more frequent following parenteral therapy, it has occurred in patients on oral penicillins. These reactions are more apt to occur in individuals with a history of sensitivity to multiple allergens. There have been well-documented reports of individuals with a history of penicillin hypersensitivity reactions who have experienced severe hypersensitivity reactions when treated with a cephalosporin. Before therapy with a penicillin, careful inquiry should be made concerning previous hypersensitivity reactions to penicillins, cephalosporins and other allergens. If an allergic reaction occurs, the drug should be discontinued and the patient treated with the usual agents, e.g., pressor amines, antihistamines and corticosteroids. Severe anaphylactoid reactions require emergency treatment with adrenaline. Oxygen and intravenous corticosteroids and airway management, including intubation, should also be administered as indicated.

Penicillin should be used with caution in individuals with histories of significant allergies and/or asthma.

Whenever allergic reactions occur, penicillin should be withdrawn unless, in the opinion of the physician, the condition being treated is life-threatening and amenable only to penicillin therapy.

#### **Severe Cutaneous Adverse Reactions**

Severe cutaneous adverse reactions (SCAR), such as Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), drug reaction with eosinophilia and systemic symptoms (DRESS), and acute generalised exanthematous pustulosis (AGEP) have been reported in patients taking beta-lactam antibiotics. When SCAR is suspected, BICILLIN L-A should be discontinued immediately and an alternative treatment should be considered.

#### **Administration Precautions**

***Do not inject intravenously or admix with other intravenous solutions.*** There have been reports of inadvertent intravenous administration of benzathine which has been associated with cardiorespiratory arrest and death.

Inadvertent intravascular administration, including inadvertent direct intra-arterial injection or injection immediately adjacent to arteries, of BICILLIN L-A and other penicillin preparations has resulted in severe neurovascular damage, including transverse myelitis with permanent paralysis, gangrene requiring amputation of digits and more proximal portions of extremities, and necrosis and sloughing at and surrounding the injection site consistent with the diagnosis of Nicolau syndrome (also known as livedoid dermatitis or embolia cutis

medicamentosa). Such severe effects have been reported following injections into the buttock, thigh and deltoid areas. Other serious complications of suspected intravascular administration which have been reported include immediate pallor, mottling or cyanosis of the extremity, both distal and proximal to the injection site, followed by bleb formation; severe oedema requiring anterior and/or posterior compartment fasciotomy in the lower extremity.

Severe effects and complications following accidental intravascular administration have most often occurred in infants and small children. Prompt consultation with an appropriate specialist is indicated if any evidence of compromise of the blood supply occurs at, proximal to, or distal to the site of injection.

***Do not inject into or near a nerve.*** Injection into or near a nerve may result in permanent neurological damage.

Quadriceps femoris fibrosis and atrophy have been reported following repeated intramuscular injections of penicillin preparations into the anterolateral thigh. Because of these adverse effects and the vascularity of this region, administration in the anterolateral thigh is not recommended.

### **Antibiotic-associated Pseudomembranous Colitis**

Antibiotic-associated pseudomembranous colitis has been reported with many antibiotics including penicillin. Treatment with antibacterial agents alters the normal flora of the colon leading to overgrowth of *Clostridioides difficile*.

*C. difficile* produces toxins A and B which contribute to the development of *Clostridioides difficile* associated-diarrhoea (CDAD). Hypertoxin producing strains of *C. difficile* cause increased morbidity and mortality, as these infections can be refractory to antimicrobial therapy and may require colectomy. CDAD must be considered in all patients who present with diarrhoea following antibacterial use. Careful medical history is necessary since CDAD has been reported to occur over two months after the administration of antibacterial agents.

The severity of the colitis may range from mild to life-threatening. It is important to consider this diagnosis in patients who develop diarrhoea or colitis in association with antibiotic use (this may occur up to several weeks after cessation of antibiotic therapy). Mild cases usually respond to drug discontinuation alone. However, in moderate to severe cases, appropriate therapy with a suitable oral antibacterial agent effective against *C. difficile* should be considered. Fluids, electrolytes and protein replacement should be provided when indicated. Drugs which delay peristalsis, e.g. opiates and diphenoxylate with atropine (Lomotil) may prolong and/or worsen the condition and should not be used.

### **Non-susceptible Organisms and Superinfections**

Prolonged use of antibiotics may promote the overgrowth of non-susceptible organisms, including fungi. Should superinfection occur, appropriate measures should be taken.

### **Streptococcal Infections**

In streptococcal infections, therapy must be sufficient to eliminate the organism otherwise the sequelae of streptococcal disease may occur. Cultures should be taken following completion of treatment to determine whether streptococci have been eradicated.

## **Blood and Kidney Function Tests**

In prolonged therapy with penicillin and particularly with high-dosage schedules, periodic evaluation of the renal and haematopoietic systems is recommended.

Fluids, electrolytes and protein replacement therapy should be provided when indicated.

## **Use in the Elderly**

BICILLIN L-A is known to be mainly excreted by the kidney, the risk of toxic reactions to this drug may be greater in patients with impaired renal function (see Section 5.2 Pharmacokinetic properties). It may be useful to monitor renal function in elderly patients.

## **Paediatric Use**

(see Sections 4.1 Therapeutic indications and 4.2 Dose and method of administration.)

## **Effects on Laboratory Tests**

Penicillins can interfere with the copper sulfate reagent method of testing for glycosuria, resulting in falsely elevated or falsely decreased readings. Such interference does not occur with the glucose oxidase method.

## **Other**

BICILLIN L-A contains approximately 0.11 mEq of sodium per 600,000 units of benzylpenicillin (approximately 2.59 mg of sodium per 600,000 units of benzylpenicillin) and approximately 0.22 mEq of sodium per 1,200,000 units of benzylpenicillin (approximately 5.17 mg of sodium per 1,200,000 units of benzylpenicillin).

## **4.5 Interactions with other medicines and other forms of interactions**

Tetracyclines may antagonise the bactericidal effect of penicillin and concurrent use of these drugs should be avoided.

The rate of excretion of the penicillins is decreased by concomitant administration of probenecid which prolongs, as well as increases, blood levels of the penicillins.

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

### **Effects on Fertility**

No data available.

### **Use in Pregnancy – Category A**

*Category A - Drugs which have been taken by a large number of pregnant women and women of child-bearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the fetus having been observed.*

Although generally considered to be safe, BICILLIN L-A should be used during pregnancy only if clearly needed.

### **Use in Lactation**

Soluble benzylpenicillin (the hydrolysate of benzathine benzylpenicillin) is excreted in breast milk. The effect on the infant, if any, is not known. Caution should be used when BICILLIN L-A is administered to a nursing woman.

## **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)**

As with other penicillins, untoward reactions of the sensitivity phenomena are likely to occur, particularly in individuals who have previously demonstrated hypersensitivity to penicillins or in those with a history of allergy, asthma, hay fever, or urticaria.

*The following adverse reactions have been reported with BICILLIN L-A during post-marketing experience:*

Skin and Other Subcutaneous Tissue Disorders: Stevens-Johnson syndrome (SJS) and drug reaction with eosinophilia and systemic symptoms (DRESS) (see Section 4.4 Special warnings and precautions for use).

*The following adverse reactions have been reported with parenteral benzylpenicillin (the active moiety in BICILLIN L-A):*

General: Hypersensitivity reactions including the following: skin eruptions (maculopapular to exfoliative dermatitis), urticaria, laryngeal oedema, fever, eosinophilia; other serum sickness-like reactions (including chills, fever, oedema, arthralgia and prostration), and anaphylactic/anaphylactoid reaction (including shock and death); severe cutaneous adverse reactions (SCAR), such as toxic epidermal necrolysis (TEN) and acute generalised exanthematous pustulosis (AGEP) (see section 4.4 Special warnings and precautions for use).

Fever and eosinophilia may frequently be the only reaction observed.

Gastrointestinal: Pseudomembranous colitis. Onset of pseudomembranous colitis symptoms may occur during or after antibacterial treatment (see Section 4.4 Special warnings and precautions for use).

Haematologic: Haemolytic anaemia, leucopenia, thrombocytopenia

Neurologic: Neuropathy

Urogenital: Nephropathy, acute interstitial nephritis

As with other treatments for syphilis, the Jarisch-Herxheimer reaction has been reported.

*The following adverse events have been temporally associated with parenteral administration of benzathine benzylpenicillin (the active moiety of BICILLIN L-A):*

Body as a Whole: Hypersensitivity reactions (including allergic vasculitis, pruritus, fatigue, asthenia, and pain), aggravation of existing disorder, headache, Nicolau syndrome (also known as livedoid dermatitis or embolia cutis medicamentosa) (see Section 4.4 Special warnings and precautions for use – Administration Precautions).

Cardiovascular: Cardiac arrest, hypotension, tachycardia, palpitations, pulmonary hypertension, pulmonary embolism, vasodilation, vasovagal reaction, cerebrovascular accident, syncope.

Gastrointestinal: Nausea, vomiting, blood in stool, intestinal necrosis.

Haematological: Lymphadenopathy.

Injection Site: Injection site reactions (including pain, inflammation, lump, abscess, necrosis, oedema, haemorrhage, cellulitis, hypersensitivity, atrophy, ecchymosis, and skin ulcer), neurovascular reactions (including warmth, vasospasm, pallor, mottling, gangrene, numbness of the extremities, cyanosis of the extremities, and neurovascular damage).

Metabolic: Elevated BUN, creatinine, and SGOT.

Musculoskeletal: Joint disorder, periostitis, exacerbation of arthritis, myoglobinuria, rhabdomyolysis.

Nervous System: Nervousness, tremors, dizziness, somnolence, confusion, anxiety, euphoria, transverse myelitis, seizures, coma.

A syndrome manifested by a variety of CNS symptoms such as severe agitation with confusion, visual and auditory hallucinations, and a fear of impending death (Hoigne's syndrome), has been reported after administration of benzylpenicillin procaine and, less commonly, after injection of the combination of benzylpenicillin benzathine and benzylpenicillin procaine. Other symptoms associated with this syndrome, such as psychosis, seizures, dizziness, tinnitus, cyanosis, palpitations, tachycardia, and/or abnormal perception in taste, also may occur.

Respiratory: Hypoxia, apnoea, dyspnoea.

Skin and Other Subcutaneous Tissue Disorders: Diaphoresis.

Special Senses: Blurred vision, blindness.

Urogenital: Neurogenic bladder, haematuria, proteinuria, renal failure, impotence, priapism.

### **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 have been no reported overdoses with BICILLIN L-A. Penicillin in overdosage has the potential to cause neuromuscular hyperirritability and convulsive seizures. This is particularly so if the penicillin is given intravenously or to patients with renal failure.

For information on the management of overdose, contact the Poisons Information Centre on 13 11 26 (Australia).

## 5. PHARMACOLOGICAL PROPERTIES

### 5.1 Pharmacodynamic properties

#### Mechanism of Action

Benzylpenicillin exerts a bactericidal action against penicillin-sensitive micro-organisms during the stage of active multiplication. It acts through the inhibition of biosynthesis of cell-wall peptidoglycan, rendering the cell wall osmotically unstable. It is not active against the penicillinase-producing bacteria or against organisms resistant to beta-lactams because of alterations in the penicillin-binding proteins.

The following *in-vitro* data are available but the clinical significance is unknown. Benzylpenicillin exerts high *in vitro* activity against Staphylococci (except penicillinase-producing strains), Streptococci (Groups A, C, G, H, L and M) and Pneumococci. Other organisms sensitive to benzylpenicillin are: *Neisseria gonorrhoea*, *Corynebacterium diphtheria*, *Bacillus anthracis*, Clostridia spp, *Actinomyces bovis*, *Streptobacillus moniliformis*, *Listeria monocytogenes* and *Leptospira* spp. *Treponema pallidum* is extremely sensitive to the bactericidal action of benzylpenicillin.

#### Clinical Trials

No data available.

### 5.2 Pharmacokinetic properties

#### Absorption

Intramuscular benzathine benzylpenicillin is absorbed very slowly into the bloodstream from the intramuscular site and converted by hydrolysis to benzylpenicillin. This combination of hydrolysis and slow absorption results in blood serum levels much lower but much more prolonged than other parenteral penicillins.

Intramuscular administration of 225 mg of benzathine benzylpenicillin in adults results in blood levels of 22.5 to 37.5 nanogram per mL, which are maintained for 4 to 5 days. Similar blood levels may persist for 10 days following administration of 450 mg and for 14 days following administration of 900 mg. Blood concentrations of 2.25 nanogram per mL may still be detectable 4 weeks following administration of 900 mg.

## **Distribution**

Approximately 60% of benzylpenicillin is bound to serum protein. The drug is distributed throughout the body tissues in widely varying amounts. Highest levels are found in the kidneys with lesser amounts in the liver, skin and intestines. Benzylpenicillin penetrates into all other tissues and the spinal fluid to a lesser degree.

## **Excretion**

With normal kidney function, the drug is excreted rapidly by tubular excretion.

In neonates and young infants and in individuals with impaired kidney function, excretion is considerably delayed.

## **5.3 Preclinical safety data**

### **Genotoxicity**

No data available.

### **Carcinogenicity**

No data available.

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Sodium citrate  
Water for injections  
Lecithin  
Carmellose sodium  
Povidone  
Methyl hydroxybenzoate  
Propyl hydroxybenzoate.

### **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 at 2 to 8°C. Refrigerate, do not freeze.

BICILLIN L-A may be stored below 30°C, for a single period of up to 2 months, prior to expiry. The date the product is placed outside of refrigerated storage and stored below 30°C should be written in the space provided on the carton. After storage outside of refrigeration, the product should be discarded and cannot be returned to refrigerated storage.

## 6.5 Nature and contents of container

BICILLIN L-A is supplied as follows:

1.17 mL pre-filled glass syringe, containing 600,000 Units benzathine benzylpenicillin tetrahydrate, equivalent to 517 mg; \*packs of 5 and 10 syringes.

2.3 mL pre-filled glass syringe, containing 1,200,000 Units benzathine benzylpenicillin tetrahydrate, equivalent to 1016.6 mg; \*packs of 5 and 10 syringes.

\*Not all pack sizes available.

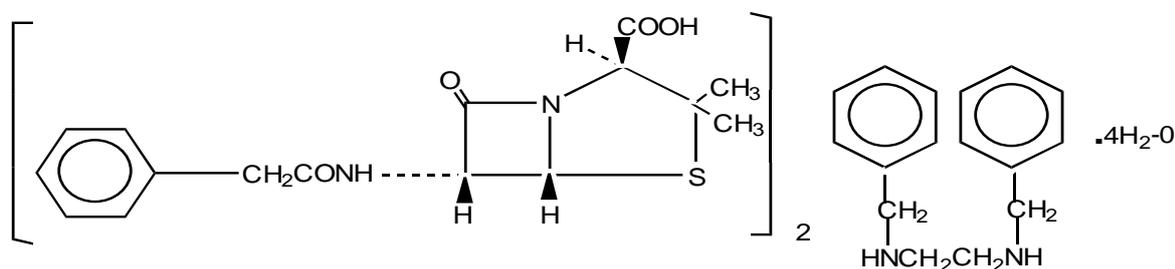
## 6.6 Special precautions for disposal

In Australia, any unused medicine or waste material should be disposed of in accordance with local requirements.

## 6.7 Physicochemical properties

Benzathine benzylpenicillin occurs as a white or almost white powder. It is very slightly soluble in water, freely soluble in dimethylformamide and in formamide, slightly soluble in ethanol (96 per cent).

### Chemical Structure



BICILLIN L-A (sterile benzathine benzylpenicillin suspension) is chemically designated as (2S,5R,6R)-3,3-dimethyl-7-oxo-6-(2-phenylacetamido)-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid compound with *N,N'*-dibenzylethylenediamine (2:1), tetrahydrate.

Chemical Formula:  $(C_{16}H_{18}N_2O_4S)_2 \cdot C_{16}H_{20}N_2 \cdot 4H_2O$

Molecular Weight: 981.18

**CAS Number**

41372-02-5

**7. MEDICINE SCHEDULE (POISONS STANDARD)**

Schedule 4 - Prescription Only Medicine

**8. SPONSOR**

Pfizer Australia Pty Ltd  
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Sydney NSW 2000

Toll Free Number: 1800 675 229

[www.pfizer.com.au](http://www.pfizer.com.au)**9. DATE OF FIRST APPROVAL**

BICILLIN L-A 600,000 Units / 1.17 mL: 19 September 2018

BICILLIN L-A 1,200,000 Units / 2.3 mL: 3 January 2008

**10. DATE OF REVISION**

15 March 2022

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**SUMMARY TABLE OF CHANGES**

<b>Section changed</b>	<b>Summary of new information</b>
4.4	Update to the sodium content.
4.6	Update to the Nursing Mothers to add clarification point on benzylpenicillin release from insoluble salts.