

Thiamine

Newborn Use only

2026

Key points	Risk of serious anaphylactic reactions with parenteral administration. Resuscitation facilities should be available.
Indication	Suspected or confirmed neonatal thiamine deficiency. Thiamine responsive metabolic disease.
Action	Vitamin B1. Water-soluble vitamin. Thiamine pyrophosphate (ThDP) is the main metabolically active form of thiamine. ThDP is an essential cofactor in multiple enzyme complexes involved in the metabolism of carbohydrates and amino acids. ¹
Contraindications	History of anaphylaxis/hypersensitivity to thiamine or its other ingredients. ²
Precautions	Due to the potential for serious anaphylactic reactions, parenteral administration of thiamine is only indicated when oral administration is not acceptable or possible. The resuscitation facilities should be available when administered parenterally.
Dose	Thiamine-responsive maple syrup urine disease (MSUD): 5-10 mg/kg/day ORAL. Discuss with paediatric metabolic specialist. ³ Pyruvate dehydrogenase complex (PDHC) deficiency/Mitochondrial Complex I deficiency: 50–200 mg/day ORAL or IV, once daily or in 2–3 divided doses. ³
Route	ORAL IV
Presentation	ORAL 100 mg tablets (Betavit, Betamin) IV Thiamine Sterop Solution for injection – 100 mg in 2 mL injection. ² Note: There are other brands that contain benzyl alcohol. They are not suitable for infants.
Preparation	ORAL: Crush tablet and mix with a small amount of water. If a part dose is required, can halve or quarter tablet accordingly before crushing. IV: Draw up 2 mL (100 mg of thiamine) and dilute with sodium chloride 0.9% to make a final volume of 10 mL with a final concentration of 10 mg/mL. ^{4,5} NOTE: Use the smallest volume syringe available/suitable for drawing up the drug for the preparation. (e.g. for <1 mL draw up – use 1 mL syringe). For 10 mL syringe - Recommend using syringe that has markings at 0.2mL increments.
IV Compatibility	Fluids: ⁶ Glucose 5%, glucose 10%, sodium chloride 0.9%. Amino acids at Y site: Yes Lipid emulsion at Y site: Yes Y-site: Alfentanil, amikacin, ampicillin, ascorbic acid, atracurium, atropine, aztreonam, calcium chloride, calcium gluconate, cefamandole, cefazolin, cefotaxime, cefotetan, cefoxitin, ceftriaxone, cefuroxime, clindamycin, dexamethasone sodium phosphate, dexmedetomidine, digoxin, dobutamine, dopamine, doxycycline, enalaprilat, epinephrine, erythromycin lactobionate, esmolol, fentanyl, gentamicin sulfate, glycopyrrolate, heparin sodium, insulin regular, labetalol, lidocaine, magnesium sulfate, metoprolol, morphine sulfate, multivitamin, naloxone, netilmicin, nitroglycerin, norepinephrine, oxacillin, papaverine, penicillin G potassium and sodium, piperacillin, potassium chloride, propranolol, pyridoxine, ranitidine, sodium nitroprusside, succinylcholine, theophylline, ticarcillin, ticarcillin/clavulanate, tobramycin, tolazoline, urokinase, vancomycin, vasopressin, and verapamil.
IV Incompatibility	Y-site: Aminophylline, amphotericin B, azathioprine, cefoperazone, ceftazidime, ceftizoxime, diazepam, diazoxide, folic acid, furosemide, ganciclovir, hydrocortisone sodium succinate, imipenem/cilastatin, indomethacin, methylprednisolone sodium succinate, phenobarbital, phenytoin, sodium bicarbonate, and sulfamethoxazole/trimethoprim. Variable: Ampicillin, hydralazine
Administration	IV: Slow IV infusion over 30–60 minutes ^{4,5,7} Oral: Best taken with food, so can also mix with expressed breast milk. ²
Monitoring	Serious hypersensitivity reactions following parenteral administration. See adverse reactions section ²
Drug Interactions	Fluorouracil, and patiomer ¹⁰
Adverse Reactions	Feeling of warmth, pain, urticaria, erythema, scaling of the facial skin, severe rash, weakness, sweating, nausea, vomiting, restlessness, tightness of the throat, angioedema, respiratory distress, cyanosis,

	pulmonary oedema, dyspnoea, respiratory failure, gastrointestinal bleeding, abdominal pain, precordial pain, palpitations, tachycardia, transient vasodilation and hypotension, shock, vascular collapse, semi-comatose state, and death have occurred. ²
Overdose	No overdose effects have been reported in paediatric population. In cases of overdose, withdraw thiamine and give supportive treatment for symptoms and respiratory and cardiac function. ² AUSTRALIA: Contact the Poisons Information Centre on 13 11 26 for management of overdose. NEW ZEALAND: Contact the National Poisons Centre on 0800 764 766 for management of overdose.
Stability	Use immediately. Discard unused portion of both IV and oral mixture.
Storage	Ampoules for IV: Store below 25°C. Protect from light. ² Oral tablets: Store below 30°C
Excipients	sodium hydroxide and water for injection ²
Evidence	<p>Overview</p> <p>Thiamine, also called vitamin B1, is an essential micronutrient. Humans cannot synthesise thiamine and depend on dietary intake. Thiamine has a short half-life (1–12 h) and body stores are limited. Thus, a regular dietary supply is required to maintain tissue thiamine levels.¹ ThDP, also called thiamine pyrophosphate, is the metabolically active form, constituting some 80% of total body thiamine. ThDP is an essential cofactor in multiple enzyme complexes involved in the metabolism of carbohydrates and amino acids.</p> <p>In aerobic metabolism, pyruvate enters the mitochondria and is oxidized by the pyruvate dehydrogenase (PDH) complex into acetyl-CoA. Acetyl-CoA is used in the Krebs cycle to generate adenosine triphosphate (ATP). Thiamine deficiency leads to lactic acidosis because thiamine is a cofactor of the PDH complex that helps convert pyruvate to acetyl-CoA. If thiamine is deficient and pyruvate cannot be used for the Krebs cycle, it is converted to lactate by the enzyme lactate dehydrogenase in anaerobic metabolism, leading to lactic acidosis.⁷</p> <p>Paediatric thiamine deficiency (PTD)</p> <p>PTD in high income countries is reported in association with inborn errors of metabolism or acquired conditions, such as parenteral nutrition without adequate vitamin supplements.^{8–13} High carbohydrate or glucose infusions increase thiamine requirements. Classical nutritional beriberi is rarely seen in high income countries. The clinical presentation can be broad: severe or refractory hyperlactatemia with acidosis, neurological features (sensorimotor signs, altered consciousness, ocular signs, seizure), and cardiovascular instability (heart failure and shock). Pulmonary arterial hypertension is also known and is reversed by thiamine supplementation.¹³</p> <p>Thiamine recommended intakes</p> <p>Thiamine is a water-soluble vitamin that is relatively safe with limited adverse effects.⁷ The recommended nutrient intake in infancy is 0.2 mg/day (0–6 months), 0.3 mg/day (7–12 months), 0.5 mg/day (1–3 years), 0.6 mg/day (4–6 years), and 0.9 mg/day (7–9 years) and after the age of 10 years, it is the same as adults (1.1–1.2 mg/day). There are no known adverse effects of high thiamine intakes; and there is no upper intake level for thiamine.^{1,7}</p> <p>Treatment of thiamine deficiency</p> <p>There are no specific recommendations established on the dosing and duration of IV thiamine, but case reports document a range of thiamine IV given as a single dose, or multiple daily doses for several days.⁷ ANMF expert consensus is to start with 100 mg thiamine daily, followed by regular assessment for any dose adjustment.</p>
References	<ol style="list-style-type: none"> Whitfield KC, Bourassa MW, Adamolekun B, Bergeron G, Bettendorff L, Brown KH, et al. Thiamine deficiency disorders: diagnosis, prevalence, and a roadmap for global control programs. <i>Annals of the New York Academy of Sciences</i>. 2018;1430(1):3–43. Thiamin Sterop solution for injection. Product info. Accessed via eMIMS on 4 August 2026. Agedal KJ, Steidl KE, Burgess JL. An overview of type B lactic acidosis due to thiamine (B1) deficiency. <i>The Journal of Pediatric Pharmacology and Therapeutics</i>. 2023;28(5):397–408. British Inherited Metabolic Diseases Group (BIMDG). https://bimdg.org.uk/emergency/paediatric-guidelines/. Accessed on 11 August 2026. Sastry UM, M J, Kumar RK, Ghosh S, AP B, Subramanian A, et al. Thiamine-responsive acute severe pulmonary hypertension in exclusively breastfeeding infants: a prospective observational study. <i>Archives of Disease in Childhood</i>. 2021;106(3):241–6.

	<ol style="list-style-type: none"> 6. Panigrahy N, Chirla DK, Shetty R, Shaikh FAR, Kumar PP, Madappa R, et al. Thiamine-Responsive Acute Pulmonary Hypertension of Early Infancy (TRAPHEI)-A Case Series and Clinical Review. <i>Children (Basel)</i>. 2020;7(11). 7. MerativeTM Micromedex® Complete IV Compatibility (electronic version). Merative, Ann Arbor, Michigan, USA. Available at: https://www.micromedexsolutions.com/ (cited: Aug/02/2026). 8. Friel JK, Bessie JC, Belkhole SL, Edgecombe C, Steele-Rodway M, Downton G, et al. Thiamine, riboflavin, pyridoxine, and vitamin C status in premature infants receiving parenteral and enteral nutrition. <i>Journal of pediatric gastroenterology and nutrition</i>. 2001;33(1):64–9. 9. Wu Y, Xu H, Du L, Li Z. Case Report: A complicated case of neonatal refeeding syndrome following intrauterine growth restriction corrected by high dose thiamine supplementation. <i>Frontiers in Pediatrics</i>. 2025;13:1594715. 10. Hasan SA, Shajira ES. Lactic acidosis due to thiamine deficiency in a preterm infant associated with inadequate parenteral nutrition. <i>The American Journal of Case Reports</i>. 2023;24:e939008–1. 11. Ozdemir H, Bilgen H, Alp Unkar Z, Kiykim E, Memisoglu A, Ozek E. Severe lactic acidosis in an extremely low birth weight infant due to thiamine deficiency. <i>Journal of Pediatric Endocrinology and Metabolism</i>. 2018;31(6):693–5. 12. Bradley C, Hansen A, Levy P, Hashim E. Recognizing neonatal refeeding syndrome and thiamin supplementation: A case report. <i>Journal of Parenteral and Enteral Nutrition</i>. 2023;47(3):437–41. 13. Rakotoambinina B, Hiffler L, Gomes F. Pediatric thiamine deficiency disorders in high-income countries between 2000 and 2020: a clinical reappraisal. <i>Annals of the New York Academy of Sciences</i>. 2021;1498(1):57–76.
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VERSION/NUMBER	DATE
Original 1.0	29/10/2026
REVIEW	29/10/2031

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Citation

Australasian Neonatal Medicines Formulary (ANMF). Thiamine. Version number: 1. Date of publication 29/10/2026. <https://www.anmfonline.org/>