Multrys®

(trace elements injection 4*, USP)

Formulated to Meet Today's Guidelines†

*Each mL contains zinc 1,000 mcg, copper 60 mcg, manganese 3 mcg, and selenium 6 mcg.

†Formulated to more closely align with the 2020 ASPEN Dosing Recommendations.

Actor portrayal

Dosing and administration guide

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An FDA-approved multi-trace elements injection for neonatal and pediatric patients weighing less than 10 kg

Multrys (trace elements injection 4*, USP) is a combination of trace elements (zinc sulfate, cupric sulfate, manganese sulfate, and selenious acid) indicated in neonatal and pediatric patients weighing less than 10 kg as a source of zinc, copper, manganese, and selenium for parenteral nutrition when oral or enteral nutrition is not possible, insufficient, or contraindicated.[1]

Aligns with current treatment guidelines

Multrys has been specifically developed to more closely align with the American Society for Parenteral and Enteral Nutrition (ASPEN) Dosing Recommendations for trace elements supplementation than previously marketed products.[2]

Proven stability

Stability studies support that Multrys can be safely stored for up to 9 days when added to the parenteral nutrition admixture and refrigerated.[1]

Consistent supply

Multrys is proudly manufactured in the US with active pharmaceutical ingredients and components sourced in the US. Our supply chain is short so as a result, American Regent® is positioned to provide you with supply consistency to help ensure critical medications reach patients quickly.

Each single-dose vial of Multrys contains 1 mL. Each mL contains zinc 1,000 mcg, copper 60 mcg, manganese 3 mcg, and selenium 6 mcg.

For pediatric patients weighing 0.4 kg to 0.59 kg

- The recommended dosage of Multrys is 0.2 mL **every other day**
- Daily supplementation of zinc, copper, and selenium will be needed to meet daily requirements (please see Table 2)

SELECT IMPORTANT SAFETY INFORMATION

CONTRAINDICATIONS

Contraindicated in patients with hypersensitivity to zinc or copper.

For pediatric patients weighing 0.6 kg to less than 10 kg

- The recommended dosage of Multrys® is 0.3 mL/kg/day rounded to the nearest 0.1 mL for up to a maximum of 1 mL **per day**
- The recommended volume of Multrys to be added to parenteral nutrition ranges from 0.2 mL per day to 1 mL **per day** based on body weight (please see Table 1)

Table 1: Recommended daily volume of Multrys and corresponding amount of each trace element (mcg)

Body weight	Recommended daily volume	Amount of trace elements provided by the corresponding Multrys volume			
		Zinc (mcg)	Copper (mcg)	Manganese (mcg)	Selenium (mcg)
0.6 kg to 0.8 kg	0.2 mL	200 mcg	12 mcg	0.6 mcg	1.2 mcg
0.9 kg to 1.1 kg	0.3 mL	300 mcg	18 mcg	0.9 mcg	1.8 mcg
1.2 kg to 1.4 kg	0.4 mL	400 mcg	24 mcg	1.2 mcg	2.4 mcg
1.5 kg to 1.7 kg	0.5 mL	500 mcg	30 mcg	1.5 mcg	3 mcg
1.8 kg to 2 kg	0.6 mL	600 mcg	36 mcg	1.8 mcg	3.6 mcg
2.1 kg to 2.3 kg	0.7 mL	700 mcg	42 mcg	2.1 mcg	4.2 mcg
2.4 kg to 2.6 kg	0.8 mL	800 mcg	48 mcg	2.4 mcg	4.8 mcg
2.7 kg to 2.9 kg	0.9 mL	900 mcg	54 mcg	2.7 mcg	5.4 mcg
3 kg to 9.9 kg	1 mL	1,000 mcg	60 mcg	3 mcg	6 mcg

SELECT IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS

Pulmonary Embolism due to Pulmonary Vascular Precipitates: Pulmonary vascular precipitates causing pulmonary vascular emboli and pulmonary distress have been reported in patients receiving parenteral nutrition. If signs of pulmonary distress occur, stop the parenteral nutrition infusion and initiate a medical evaluation.

Vein Damage and Thrombosis: Multrys must be prepared and used as an admixture in parenteral nutrition solution. It is not for direct intravenous infusion. In addition, consider the osmolarity of the final parenteral nutrition solution in determining peripheral versus central administration. Solution with an osmolarity of 900 mOsmol/L or greater must be infused through a central catheter. The infusion of hypertonic nutrient solution into a peripheral vein may result in vein irritation, vein damage, and/or thrombosis.

Additional trace elements supplementation with Multrys® (trace elements injection 4*, USP)

*Each mL contains zinc 1,000 mcg, copper 60 mcg, manganese 3 mcg, and selenium 6 mcg.

Multrys is recommended only for pediatric patients who require supplementation with all 4 of the individual trace elements (ie, zinc, copper, manganese, and selenium).

To determine the additional amount of supplementation needed, compare the calculated daily recommended dosage based on the body weight of the patient to the amount of each trace element provided by Multrys and enteral nutrition sources.

Table 2: Daily requirement for trace elements supplementation for pediatric patients

Trace elements	Patient weight (kg)	Daily requirement†
Zinc	Less than 3 kg	400 mcg/kg/day
	3 kg to 5 kg	250 mcg/kg/day
	5 kg to 10 kg	100 mcg/kg/day
Copper	—	20 mcg/kg/day
Selenium	—	2 mcg/kg/day
Manganese‡	—	1 mcg/kg/day

†Multrys is not recommended for pediatric patients who may require a lower dosage of 1 or more of these individual trace elements.
‡Avoid additional manganese supplementation with Multrys use. Accumulation of manganese in the brain can occur with long-term administration with higher than the recommended dosage of 1 mcg/kg/day. Please see the Important Safety Information on pp.6-7 and accompanying Full Prescribing Information.

For pediatric patients weighing less than 3 kg, Multrys does not provide the recommended daily dosage of zinc

Zinc: For patients weighing less than 3 kg, add zinc sulfate to provide total daily recommended dose of 400 mcg/kg/day using parenteral and/or enteral routes of administration.

For pediatric patients weighing 0.4 kg to 0.59 kg and 4 kg to 9.9 kg, Multrys does not provide the recommended daily dosage of copper or selenium

- Copper: For patients weighing 0.4 to 0.59 kg or 4 kg to 9.9 kg, add cupric chloride to provide total daily recommended dose of 20 mcg/kg/day using parenteral and/or enteral routes of administration
- Selenium: For patients weighing 0.4 to 0.59 kg or 4 kg to 9.9 kg, add selenious acid to provide total daily recommended dose of 2 mcg/kg/day using parenteral and/or enteral routes of administration

Monitoring

Monitor blood zinc, copper, and selenium serum concentrations, whole blood manganese concentrations, fluid and electrolyte status, serum osmolarity, blood glucose, liver and kidney function, blood count, and coagulation parameters. For patients with cholestasis or cirrhosis, monitor hepatic and biliary function during long-term administration of Multrys®.

Multrys is contraindicated in patients with hypersensitivity to zinc or copper. The following adverse reactions were identified in clinical studies or post-marketing reports: Neurologic toxicity with manganese, hepatic accumulation of copper and manganese, and hypersensitivity reactions with zinc and copper.

Administration information

Multrys is supplied as a single-dose vial. Prior to administration, Multrys *must be transferred to a separate parenteral nutrition container*, diluted, and used as an admixture in parenteral nutrition solution.

The final parenteral nutrition solution is for intravenous infusion into a central or peripheral vein. The choice of a central or peripheral venous route should depend on the osmolarity of the final infusate. Solutions with osmolarity of 900 mOsmol/L or greater must be infused through a central catheter.

Table 3: Intrinsic values for automated compounding devices for parenteral nutrition (PN) preparations

Intrinsic value	Multrys
Osmolarity	39 mOsmol/L
Specific gravity	1.004 (g/mL)
pH range	1.5-3.5

For complete information, including dosing and administration, please see the Full Prescribing Information.

SELECT IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS *(continued)*

Neurologic Toxicity with Manganese: Monitor for clinical signs and symptoms of neurotoxicity, whole blood manganese concentrations, and liver function tests. Discontinue Multrys and consider brain magnetic resonance imaging (MRI) if toxicity is suspected. Monitor patients for cholestasis or other biliary liver disease.

Hepatic Accumulation of Copper and Manganese: If a patient develops signs or symptoms of hepatobiliary disease during the use of Multrys, obtain serum concentrations of copper and ceruloplasmin as well as manganese whole blood concentrations; consider using individual trace element products in these patients.

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For intravenous use

INDICATIONS AND USAGE

Multrys is a combination of trace elements (zinc sulfate, cupric sulfate, manganese sulfate, and selenious acid) indicated in neonatal and pediatric patients weighing less than 10 kg as a source of zinc, copper, manganese, and selenium for parenteral nutrition when oral or enteral nutrition is not possible, insufficient, or contraindicated.

IMPORTANT SAFETY INFORMATION

CONTRAINDICATIONS

Contraindicated in patients with hypersensitivity to zinc or copper.

WARNINGS AND PRECAUTIONS

Pulmonary Embolism due to Pulmonary Vascular Precipitates: Pulmonary vascular precipitates causing pulmonary vascular emboli and pulmonary distress have been reported in patients receiving parenteral nutrition. If signs of pulmonary distress occur, stop the parenteral nutrition infusion and initiate a medical evaluation.

Vein Damage and Thrombosis: Multrys must be prepared and used as an admixture in parenteral nutrition solution. It is not for direct intravenous infusion. In addition, consider the osmolarity of the final parenteral nutrition solution in determining peripheral versus central administration. Solution with an osmolarity of 900 mOsmol/L or greater must be infused through a central catheter. The infusion of hypertonic nutrient solution into a peripheral vein may result in vein irritation, vein damage, and/or thrombosis.

Neurologic Toxicity with Manganese: Monitor for clinical signs and symptoms of neurotoxicity, whole blood manganese concentrations, and liver function tests. Discontinue Multrys and consider brain magnetic resonance imaging (MRI) if toxicity is suspected. Monitor patients for cholestasis or other biliary liver disease.

Hepatic Accumulation of Copper and Manganese: If a patient develops signs or symptoms of hepatobiliary disease during the use of Multrys, obtain serum concentrations of copper and ceruloplasmin as well as manganese whole blood concentrations; consider using individual trace element products in these patients.

Aluminum Toxicity: Multrys contains aluminum that may be toxic. Patients with renal impairment and preterm infants, including preterm neonates, are particularly at risk.

Monitoring and Laboratory Tests: Monitor blood zinc, copper, and selenium serum concentrations, whole blood manganese concentration, fluid and electrolyte status, serum osmolarity, blood glucose, liver and kidney function, blood count, and coagulation parameters.

Hypersensitivity Reactions with Zinc and Copper: If hypersensitivity reactions occur, discontinue and initiate appropriate medical treatment.

ADVERSE REACTIONS

The following adverse reactions were identified in clinical studies or post-marketing reports. Given that some of these reactions were reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Adverse reactions with other components of parenteral nutrition solutions:

- Pulmonary embolism due to pulmonary vascular precipitates
- Vein damage and thrombosis
- Aluminum toxicity

Adverse reactions with the use of trace elements administered parenterally or by other routes of administration:

- Neurologic toxicity with manganese
- Hepatic accumulation of copper and manganese
- Hypersensitivity reactions with zinc and copper

USE IN SPECIFIC POPULATIONS

Hepatic Impairment - Hepatic accumulation of copper and manganese have been reported with long-term administration in parenteral nutrition. For patients with cholestasis, biliary dysfunction, or cirrhosis, monitor hepatic and biliary function during long-term administration of Multrys.

OVERDOSAGE

There are reports on overdosage in the literature for the individual trace elements. Management of overdosage is supportive care based on presenting signs and symptoms.

DOSAGE AND ADMINISTRATION

Important Administration Information

Multrys is supplied as a single-dose vial. Prior to administration, Multrys *must be transferred to a separate parenteral nutrition container*, diluted, and used as an admixture in parenteral nutrition solution.

Overview of Dosing

Prior to administration of parenteral nutrition solution containing Multrys, correct severe fluid, electrolyte and acid-base disorders. It is recommended only for patients who require supplementation with all four of the individual trace elements (zinc, copper, manganese, and selenium). Multrys is not recommended for patients who may require a lower dosage of one or more of the individual trace elements. Avoid additional manganese supplementation with Multrys use.

For additional safety information, please see accompanying Full Prescribing Information.

You are encouraged to report adverse drug events to American Regent Inc.® at 1-800-734-9236, or to the FDA by visiting www.fda.gov/medwatch or by calling 1-800-FDA-1088.

REF-1826 6/2021

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T 1.800.734.9236; **E** pv@americanregent.com; **F** 1.610.650.0170

ADEs may also be reported to the FDA:
1.800.FDA.1088 or www.fda.gov/medwatch

Medical information:
T 1.888.354.4855 (9:00 am–5:00 pm Eastern Time, Monday–Friday)
www.americanregent.com/medical-affairs

For medical information outside of normal business hours that cannot wait until the next business day, please call 1.877.845.6371

REFERENCES:

1. American Society for Parenteral and Enteral Nutrition. Appropriate dosing for parenteral nutrition: ASPEN Recommendations. November 17, 2020. Accessed August 14, 2023. http://www.nutritioncare.org/uploadedFiles/Documents/Guidelines_and_Clinical_Resources/PN%20Dosing%201-Sheet-FINAL.pdf
2. Multrys (trace elements injection 4*). Package insert. Shirley, NY: American Regent, Inc.

AMERICAN REGENT®
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