



Electrolyte Review

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Objectives

- Review electrolyte use in pediatrics and discuss the dosing



Sodium

sodium chloride tab

Reference Links: 1. [Micromedex](#)

⚠ Dose: g

Route:

Frequency:

For:

Starting:

Sodium Chloride (IV)

- ✓ 0.9% NaCl – 154 meq/L
- ✓ 0.45% NaCl -77 meq/L
- ✓ 0.2% NaCl – 34 meq/L

HIGH ALERT: Hypertonic Saline
3% NaCl- 513 meq/L

- Sodium chloride (PO)
 - Dose in milliequivalents
 - Two available oral forms
 - Sodium chloride 1 gram = 17 meq Na
- Sodium bicarbonate (PO)
 - Dose is milligrams
 - Sodium Bicarbonate 650 mg tab = 7.7 meq of Sodium and 7.7 meq of bicarbonate

sodium chloride 4 mEq/mL soln

Reference Links: 1. [Micromedex](#)

⚠ Dose:

Route:

⚠ Frequency:

For:

Starting:

First Dose:

First Dose: **Today 1108**

ⓘ There are no scheduled times based on the current order parameters.



Sodium

Potassium

Calcium

Magnesium

Phosphate

Urinary Alkalinizers

Orders

citric acid-potassium citrate 1100-334 mg/5 mL soln 10 mEq

Reference 1. Micromedex

Links:

Report: Lab Test Results

citric acid-sodium citrate 334-500 mg/5 mL soln

✓ Accept ✗ Cancel

Component

Potassium

Order Inst.:

Each 1 mL contains 1 mEq of Na. Thus 2 mL/kg/day provides 2 mEq/kg/day of Na, and 3 mL/kg/day provides 3 mEq/kg/day of Na.

Orders

tricitrates 550-500-334 mg/5 mL soln

Dose

Reference 1. Micromedex

Links:

Dose: 1 mL 5 mL 15 mL 30 mL

Route

Route:

Oral

Oral

Frequency

Frequency:

3 times daily with meals & at bedtime

TID AC & QHS

For:

30

Doses

Hours

Days

Starting:

6/30/2021

Today

Tomorrow

First Dose:

⌚

Include Now

As Scheduled

Show Additional Options

First Dose: **Today 1200** Last Dose: **Fri 7/30 0800** Number of doses: **120**

Scheduled Times

Adjust Schedule



Urinary Alkalinizers

Citric Acid Potassium Citrate/ Cytra-K	Each milliliter (ml) contains 2 meq of potassium and 2 meq of bicarbonate	EPIC order dosed in Milliequivalents Dilution required
Citric Acid Sodium Citrate/ Bicitra	Each milliliter (ml) contains 1 meq of sodium 1 meq of bicarbonate	EPIC order dose in milliliters Dilution required
Tricitrates/ Citric Acid Sodium Citrate Potassium Citrate	Each milliliter contains (ml) 1 meq of sodium 1 meq of potassium 2 meq of bicarbonate	EPIC order dose in milliliters Dilution required



Potassium

! Peds Electrolyte Replacement Protocol (Non-ICU) ⌵

🔑 [Manage User Versions](#)

▼ Medications

▼ Potassium Replacement

GOAL: KCl 0.5-1 mEq/kg/dose over 2 hours (*max 10mEq IV dose*) (**Use starting dose of 0.5 mEq/kg/dose if renal or cardiac disease [can be increased if inadequate response]**)

Trended Labs

	06/28/21 0917	06/25/21 0945
K	3.2*	3.2*

☒ Patient weight <10 kg

☐ Potassium Chloride (peripheral)

☒ ! Potassium Chloride (central)

☐ potassium chloride 0.4 mEq/mL syringe (\$\$)

0.5 mEq/kg, Intravenous, Once, Cardiac monitor recommended during infusion for potassium infusion rate 0.5 mEq/kg/hr from all sources (e.g. TPN, maintenance fluids) and for patients with significant cardiac or renal disease. Please do not change administration time to run less than 2 hours.

☐ potassium chloride 0.4 mEq/mL syringe (\$\$)

1 mEq/kg, Intravenous, Once, Cardiac monitor recommended during infusion for potassium infusion rate 0.5 mEq/kg/hr from all sources (e.g. TPN, maintenance fluids) and for patients with significant cardiac or renal disease. Please do not change administration time to run less than 2 hours.

IV Potassium Chloride

Dosing:

- ✓ See ordering panel
- ✓ MAX rate: 0.5 meq/kg/HOUR
- ✓ Max rate from all sources (TPN, fluids, etc.)??

Concentration

- ✓ 0.1 meq/ml (peripheral)
- ✓ 0.4 meq/ml (central)

Serum potassium level should be rechecked before any further administration of potassium to prevent inadvertent hyperkalemia



Potassium

PO Potassium Chloride

Dosing

✓ 1 -2 meq/kg/DAY

Dosage Forms

✓ 10meq, 8meq, 20 MEQ tab

✓ 20meq/ 15ml liquid

Enteral treatment is preferred because of the much lower incidence of complications

Lower doses of potassium (0.5 meq/kg) given more frequently (every 4-6 hours) are more effective than larger doses given less frequently since the kidney excretes the excess potassium and the hypokalemia remains uncorrected

Should be taken with meals and full glass of water/liquid to minimize GI irritation; no more than 20 MEQ as a single dose, usually in divided doses

potassium chloride 20 mEq/15 mL soln 17.1067 mEq

Reference 1. [Micromedex](#)

Links:

Report: Lab Test Results

Component	Time Elapsed	Value	Range
Potassium	2 days (06/28/21 0917)	3.2 (L)	3.6 - 5.3 mmol/L
	5 days (06/25/21 0945)	3.2 (L)	3.6 - 5.3 mmol/L
	7 days (06/22/21 2346)	3.9	3.6 - 5.3 mmol/L

Dose:

1 mEq/kg 1 mEq/kg 2 mEq/kg

Weight Type: Recorded Ideal Adjusted **Dosing** Order-Specific

Weight: 16.8 kg 12.7 kg 14.3 kg 17.1 kg

Dosing weight: 17.1 kg (recorded 16 hours ago)

Administer Dose: 17.1067 mEq ⬆

1 mEq/kg × 17.1 kg (Dosing weight as of Tue Jun 29, 2021 1949)
 = 17.1 mEq × 15 mL/20 mEq
 = 12.83 mL × 20 mEq/15 mL (rounded to the nearest 0.01 mL from 12.825 mL)
 = 17.1067 mEq

Administer Amount: 12.83 mL ⬇

Route:

Oral 🔍



Calcium

▼ Calcium Replacement

PREFERRED GOAL: Calcium gluconate 10% 50 mg/kg IV (max single dose 2g), preferred over calcium chloride because less tissue necrosis if extravasation.

Trended Labs

	06/28/21 0917	06/25/21 0945
CALCIUM	9.1*	9.3

☐ calcium gluconate 20 mg/mL (peripheral) (\$\$)

50 mg/kg, Intravenous, Once, Infuse IV no faster than 100 mg/min via peripheral-line. Monitor for bradycardia during the infusion. Incompatible with fluids containing phosphate or sodium bicarbonate. Concomitant administration of ceftriaxone and calcium containing products has been associated with fatal outcomes in neonates <28 days of age and is contraindicated. In patients >28 days old, ceftriaxone and calcium containing products may be administered sequentially if the infusion lines are flushed thoroughly between infusions, but should not be administered simultaneously via a Y-site.

☐ calcium gluconate 50 mg/mL (central) (\$\$\$)

50 mg/kg, Intravenous, Once, Infuse IV no faster than 100 mg/min via peripheral-line. Monitor for bradycardia during the infusion. Incompatible with fluids containing phosphate or sodium bicarbonate. Concomitant administration of ceftriaxone and calcium containing products has been associated with fatal outcomes in neonates <28 days of age and is contraindicated. In patients >28 days old, ceftriaxone and calcium containing products may be administered sequentially if the infusion lines are flushed thoroughly between infusions, but should not be administered simultaneously via a Y-site.

▶ Phosphate Replacement (Phos 3 mmol to 4.4 mEq)

[Click for more](#)

IV Calcium Gluconate

- ✓ Dosing:
See ordering panel

IV Calcium Chloride

- ✓ Not part of order set
- ✓ 10- 20 mg/kg, Max 2 grams
- ✓ Central Line only
- ✓ 1 gram of calcium chloride = 273 mg of elemental calcium = 13.6 meq of calcium

1 gram of Calcium Gluconate = 93 mg of elemental calcium = 4.65 meq calcium



Calcium

PO Calcium

Dosing

- ✓ Not in elemental calcium
- ✓ In calcium carbonate
- ✓ Lexicomp/ Uptodate
 - ✓ *Watch dose expressions*

✓ Calcium Carbonate Suspension:

✓ *2.5 mg of calcium carbonate =
1 mg of elemental calcium*
OR

✓ *100 mg elemental calcium = 1 ml*

calcium carbonate chew tab 500 mg

Order Inst.: 500 mg of Calcium Carbonate = 200 mg of elemental Calcium.

Reference Links: 1. Micromedex

Dose: 500 mg 500

Administer Dose:

Administer Amount:

Route: Oral Oral

calcium carbonate 1250 mg/5 mL susp 712.5 mg

Order Inst.: 1250 mg of Calcium Carbonate = 500 mg elemental Calcium.

Reference Links: 1. Micromedex

Reference Links:

Dose:

125 mg/kg/day 125 mg/kg/day 250 mg/kg/day 375 mg/kg/day

Weight Type: Recorded Ideal Adjusted Dosing Order-Specific

Weight: 16.8 kg 12.7 kg 14.3 kg 17.1 kg

Dosing weight: 17.1 kg (recorded 14 hours ago)

Administer Dose: 712.5 mg

125 mg/kg/day × 17.1 kg (Dosing weight as of Tue Jun 29, 2021 1949)
= 2,137.5 mg/day over 3 administrations per day
= 712.5 mg × 5 mL/1,250 mg
= 2.85 mL × 1,250 mg/5 mL
= 712.5 mg

Administer Amount: 2.85 mL

Route: Oral Oral



Sodium

Potassium

Calcium

Magnesium

Phosphate

Magnesium

○ Patient weight < 10 kg

▼ Magnesium Replacement

GOAL: Magnesium sulfate 25-50 mg/kg/dose q4-6hr x3 doses (max single dose 2g)

No results for input(s): MG in the last 168 hours.

- ☐ magnesium sulfate IV (\$\$)
50 mg/kg, Intravenous, Every 6 hours provider specified for 3 doses

IV Magnesium Sulfate

Dosing:
see panel

Generally repleted every 6 hours x 3 doses



Magnesium

Oral Magnesium Repletion		
Magnesium Oxide 800 mg	480 mg elemental mag	40 meq of elemental mag
Magnesium Sulfate Soln 1000 mg	100 mg of elemental mag	8 meq of elemental mag
Magnesium Protein Complex 133 mg	133 mg of elemental mag	11 meq of elemental mag

PO Magnesium

Dosing:

- ✓ 25- 50 mg/kg
- ✓ Expressed in magnesium sulfate
- ✓ (2.5 -5 mg/kg of elemental mag)**



Phosphate

▼ Phosphate Replacement (Phos 3 mmol to K 4.4 mEq)

STANDARD DOSING: NaPhos or KPhos 0.16-0.32 mmol/kg/dose over 4 to 6 hours.

Please consider last K level before ordering, 1 mmol of phosphate = 1.5 mEq of potassium.

Trended Labs

	06/28/21 0917	06/25/21 0945
NA	136	136
K	3.2*	3.2*

☐ sodium phosphate

☒ potassium phosphate

If ordering more than 0.32 mmol/kg, please run o

☐ potassium phosphate in dextrose 5% syringe (periph
Intravenous, Once

☐ potassium phosphate in dextrose 5% syringe (central
Intravenous, Once

potassium phosphate 5.4715 mmol in dextrose 5% 47.42 mL syringe

✓ Accept ✗

Dose:

0.32

mmol/kg

0.16 mmol/kg

0.32 mmol/kg

Weight Type:

Recorded

Ideal

Adjusted

Dosing

Order-Specific

Weight:

16.8 kg

12.7 kg

14.3 kg

17.1 kg

Dosing weight: 17.1 kg (recorded 14 hours ago)

Administer Dose: 5.4715 mmol

Administer Amount: 47.42 mL

Route:

Intravenous

Intravenous

Priority:

Routine

Frequency:

Once

Once

Starting: 6/30/2021

Today

Tomorrow

At: 1045

First Dose: Today 1045 Number of doses: 1

Scheduled Times

06/30/21 1045

Rate:

7.9

mL/hr

47.42 mL / 6 hr

= 7.9 mL/hr (rounded to the nearest 0.01 mL/hr from 7.9033 mL/hr)

Administer

6

Hours

6 Hours



Phosphate

▼ Phosphate Replacement (Phos 3 mmol to K 4.4 mEq)

STANDARD DOSING: NaPhos or KPhos 0.16-0.32 mmol/kg/dose over 6 hours sodium phosphates 2.76 mmol in dextrose 5% 23 mL syringe

Please consider last K level before ordering, 1 mmol of phosphate = 1.3 mEq

Trended Labs

	06/28/21 0917	06/25/21 0945
NA	136	136
K	3.2*	3.2*

☒ sodium phosphate

If ordering more than 0.32 mmol/kg, please run over 10 hours, otherwise

☐ sodium phosphate in dextrose 5% syringe (peripheral) (\$\$)
Intravenous, Once

☒ sodium phosphates 2.76 mmol in dextrose 5% 23 mL syringe (\$\$\$)
2.76 mmol (rounded from 2.736 mmol = 0.16 mmol/kg × 17.1 kg Dosing weight)
Administer over 6 Hours
Infuse IV via central line. Refrigerate.
Do not infuse in the same IV line with calcium-containing IV fluids.

☐ potassium phosphate

Dose:

0.16

mmol/kg

0.16 mmol/kg

0.32 mmol/kg

Weight Type:

Recorded

Ideal

Adjusted

Dosing

Order-Specific

Weight:

16.8 kg

12.7 kg

14.3 kg

17.1 kg

Dosing weight: 17.1 kg (recorded 14 hours ago)

Administer Dose: 2.76 mmol

Administer Amount: 23 mL

Route:

Intravenous

Intravenous

Priority:

Routine

Frequency:

Once

Once

Starting: 6/30/2021

Today

Tomorrow

At: 1045

First Dose: Today 1045 Number of doses: 1

Scheduled Times

06/30/21 1045

Rate:

mL/hr

Administer
Over:

6

Hours

6 Hours

Base (Selection Required)

☒ dextrose 5%

22.08

mL

☐ sodium chloride 0.9%



Phosphate

potassium & sodium phosphates 280-160-250 mg pwd pkt 1 packet ✓ Accept ✗ Cancel

Order Inst.: Mg dosing is based on phosphorus component. Each packet contains approximately 250 mg of phosphorus (8 mmol), 160 mg of sodium (6.9 mEq) and 280 mg of potassium (7.1 mEq).

potassium & sodium phosphate tab 250 mg ✓ Accept ✗ Cancel

Order Inst.: Each tablet yields approximately 250 mg of phosphorus, 298 mg of sodium (13.0 mEq) and 45 mg of potassium (1.1 mEq).

Reference Links: 1. Micromedex

Dose: 1 packet 1 packet

Administer Dose: 1 packet

Administer Amount: 1 packet

Route: Oral Oral

Frequency: 3 times daily with meals & at bedtime TID AC & HS

Reference Links: 1. Micromedex

Lab Test Results

Component	Time Elapsed	Value	Range	Status
Potassium	2 days (06/28/21 0917)	3.2 (L)	3.6 - 5.3 mmol/L	Final result
		3.2 (L)	3.6 - 5.3 mmol/L	Final result
		3.9	3.6 - 5.3 mmol/L	Final result
		5.2	4.0 - 5.6 mg/dL	Final result
diatric reference ranges were derived from the CALIPER website using UCLA instrumentation. tps://app3.ccb.sickkids.ca/caliper/caliperlogin				
		4.9	4.0 - 5.6 mg/dL	Final result
diatric reference ranges were derived from the CALIPER website using UCLA instrumentation. tps://app3.ccb.sickkids.ca/caliper/caliperlogin				
		5.3	4.0 - 5.6 mg/dL	Final result
diatric reference ranges were derived from the CALIPER website using UCLA instrumentation. tps://app3.ccb.sickkids.ca/caliper/caliperlogin				

250 mg 500 mg

4.6 mg/kg) ∨

Route: Oral Oral

	K and Na Phos Packet	K and Na Phos Tab
	ONE packet	250 mg Tab
Phosphate	8 mmol	8 mmol
Sodium	7 meq	13 meq
Potassium	7 meq	1.1 meq

References

- Hall, J. E., & Guyton, A. C. (2011). Guyton and Hall textbook of medical physiology. Philadelphia, PA: Saunders Elsevier. Chicago (Author-Date, 15th ed.).
- Stockwell, J.A., Preissig, C.M., Comprehensive Critical Care: Pediatric. Society of Critical Care Medicine, 2012
- Lexi-Comp, Inc., & American Pharmacists Association. (2012). *Pediatric & neonatal dosage handbook*. Hudson, Ohio: LexiComp.

