

Antimicrobial Sodium Content Including Standard Diluent

The purpose is a reference and comparison in cases where limiting sodium is the goal and other considerations such as spectrum of coverage are similar. Anticipated daily sodium load will vary based on volume of parenteral agent used, frequency often related to renal function, and diluent.

Antimicrobial	Dose	Doses/Day	Preferred Diluent***	Approximate Daily Sodium Load	Approximate Daily Sodium Load (mg/day)
Acyclovir	500 mg (Variable dosing regimens)	3	100 mL NS	52.5 mEq (Variable)	1207
Ampicillin	2 g	6	100 mL NS	127.2 mEq	2926
Ampicillin-Sulbactam	3 g	4	100 mL NS	101.6 mEq	2337
Cefazolin	2 g	3	100 mL D5W	12 mEq	276
Cefepime	2g	3	100 mL NS	46.2 mEq	1062
Cefiderocol	2 g	3	100 mL NS	91.8 mEq	2111
Ceftazidime	2 g	3	100 mL NS	60 mEq	1380
Ceftazidime-avibactam	2.5 g	3	100 mL NS	65.4 mEq	1504
Ceftriaxone	2 g	1	100 mL NS	22.6 mEq	520
Daptomycin	500 mg	1	100 mL NS	15.4 mEq	276
Foscarnet	2784 g (~40 mg/kg/dose for 70 kg adult)	3	Straight Drug	83.5 mEq	1921
Ganciclovir	350 mg (5 mg/kg for 70 kg adult)	2	100 mL NS	33.6 mEq	773
Imipenem	500 mg	4	100 mL NS	68 mEq	1564
Imipenem-relebactam	1 g	4	100 mL NS	68 mEq	1564
Linezolid	600 mg	2	300 mL NS	102.4 mEq	2355
Metronidazole	500 mg	3	Straight Drug	42.3 mEq	973
Meropenem	2 g	3	100 mL NS	58 mEq	1334
Meropenem-vaborbactam	4 g	3	100 mL NS	111.6 mEq	2668
Oxacillin	2 g	6	100 mL NS	122.4 mEq – 129.6 mEq	2815 – 2981
Penicillin G sodium	4 million units	6	100 mL NS	140.4 mEq	3229
Piperacillin-tazobactam	3.375 g	3	100 mL NS	70 mEq – 74.4 mEq	1610 – 1711
	4.5 g	3	100 mL NS	77.9 mEq – 83.9 mEq	1792 – 1930
Vancomycin	1 g	2	250 mL NS	77 mEq	1771 (dose dependent)**
Voriconazole	200 mg	2	100 mL NS	49.7 mEq	1143

<1150 mg/day, 1150-2300 mg/day, >2300 mg/day*

*Cutoffs are based on a recommended dietary intake of 2,300 mg sodium/day per the *Dietary Guidelines for Americans*

**Individual doses above 1000 mg require diluents of 500 mL NS

***Additional diluents may be available on a case-by-case basis; please discuss with pharmacy for recommendations

Antimicrobial Sodium Content *Without Diluent* and Other Electrolyte Considerations

Antimicrobial	Sodium	Clinical Effects on Electrolytes
Acyclovir ¹	4.2 mEq/g acyclovir	--
Amphotericin B (liposomal) ²	--	Hyperglycemia (8.2-23%), hypernatremia (4.1%), hypocalcemia (10.6-18.4%), hypokalemia (6.7-42.9%), hypomagnesemia (15.3-29.1%)
Ampicillin ³	2.9 mEq/g ampicillin	--
Ampicillin/Sulbactam ⁴	5 mEq/1.5 grams ampicillin/sulbactam	--
Azithromycin ⁵	--	Hyperkalemia (1-2%), hyponatremia (<1%), hypoglycemia (≤1%) hyperglycemia (≤1%)
Aztreonam ⁶	--	--
Cefazolin ⁷	2 mEq/g cefazolin	--
Ciprofloxacin ⁸	--	Hyperglycemia, hypoglycemia, hyperuricemia, hypercalcemia hypokalemia or hyperkalemia
Cefepime ^{9,10}	--	Hypophosphatemia (2.8%), hyperphosphatemia (>0.1% to <1%), hypercalcemia or hypocalcemia (>0.1% to <1%), hyperkalemia (>0.1% to <1%)
Cefiderocol ^{11,12}	7.6 mEq/g cefiderocol	Hypokalemia (2-11%), hyperkalemia (<4%), hypomagnesemia (5%), hypocalcemia (<4%)
Ceftaroline ¹³	--	Hypokalemia (2%), hyperkalemia (<2%), hyperglycemia (<2%)
Ceftazidime ^{14,15}	2.3 mEq/g ceftazidime (As sodium carbonate)	--
Ceftazidime avibactam ¹⁶	6.4 mEq/2.5g ceftazidime-avibactam	Hypokalemia (<1%)
Ceftriaxone ¹⁷	3.6 mEq/g ceftriaxone	--
Cidofovir ¹⁸	--	Hypercalcemia or hypocalcemia, hyperglycemia or hypoglycemia Hypokalemia or hyperkalemia, hypomagnesemia, hypophosphatemia Metabolic acidosis
Clindamycin ¹⁹	--	--
Daptomycin ⁵³	--	Hypomagnesemia (<1%), increased serum bicarbonate (<1%), hyperphosphatemia
Doxycycline ²⁰	--	Hyperglycemia (1%)
Erythromycin ²¹	--	--
Foscarnet ^{22,23}	0.24 mEq per mL (24 mg Foscarnet)	Hypocalcemia (15-30%)*, hypophosphatemia (8-26%), hyperphosphatemia (6%), hypomagnesemia (15-30%), hypokalemia (16-48%), hyponatremia, SIADH (<1%)
Fluconazole ²⁴	--	Hypokalemia
Ganciclovir ²⁵	2 mEq/500 mg ganciclovir	Metabolic acidosis, hypercalcemia, hyponatremia, SIADH

Antimicrobial	Sodium	Clinical Effects on Electrolytes
Imipenem-cilastatin ²⁶	1.6 mEq per 500 mg imipenem	Hyperkalemia, hyponatremia
Imipenem-cilastatin-relebactam ²⁷	1.6 mEq/g imipenem-cilastatin-relebactam	Hypokalemia (7.9%), hyponatremia (6.4%)
Isavuconazole ²⁸	--	Hypokalemia (14%), hypoglycemia, hyponatremia
Levofloxacin ²⁹	--	Hypoglycemia or hyperglycemia (0.1-1%), hyperkalemia (0.1-1%)
Linezolid ³⁰	5 mEq/300 mL linezolid	Hypoglycemia, hyponatremia, SIADH
Metronidazole ³¹	14 mEq/500 mg metronidazole	--
Meropenem ³²	3.92 mEq/g meropenem	Hypoglycemia (>1%), hypokalemia (>0.1% to ≤1%), hyperglycemia
Meropenem-vaborbactam ³³	10.9 mEq/2g meropenem-vaborbactam	Hypokalemia (1.1%), hyperkalemia (<1%), hyperglycemia or hypoglycemia (<1%)
Micafungin ^{34,35}	<1 mEq/100 mg micafungin	Hyperkalemia (5%) [22-25% in pediatric trials], hypokalemia (<5%), hypernatremia (<5%), hypoglycemia (6%), acidosis [20% pediatric trials], hyperglycemia, hypocalcemia, hypermagnesemia [<15% pediatric trials]
Minocycline ^{36,37}	--	Hypermagnesemia**
Omadacycline ³⁸	--	Hyperphosphatemia (theoretical of tetracycline class)
Oxacillin ³⁹	2.5-3.1 mEq/g oxacillin	--
Penicillin G sodium ⁴⁰	2 mEq sodium per million units of penicillin G activity	Hypernatremia
Penicillin G potassium ⁴¹	0.3 mEq sodium and 1.7 mEq potassium per million units of penicillin G activity	Hyperkalemia
Piperacillin/tazobactam ^{42***}	(EDTA-free formulation) 2.35 mEq sodium/g piperacillin-tazobactam (EDTA-containing formulation) 2.79 mEq sodium/g piperacillin-tazobactam	Hypokalemia (≤1%), hypoglycemia (≤1%) and hyperglycemia, hypernatremia
Polymyxin B ^{43,43}	--	Hyponatremia, hypokalemia, hypocalcemia
Posaconazole ⁴⁴	--	Hypokalemia (22%), hypomagnesemia (10-11%), hyperglycemia (11%), hypocalcemia (9%)
Rifampin ^{45,46}	--	Hyperuricemia
SMX/TMP ⁴⁷	--	Hyperkalemia, hypoglycemia, hyponatremia
Tedizolid ⁴⁸	--	--
Tigecycline ⁴⁹	--	Acidosis, hypophosphatemia, hyponatremia (2%), hypocalcemia (<2%), hypoglycemia (<2%)
Vancomycin ⁵⁰	--	Hypokalemia (13%) [^]
Voriconazole ⁵¹	9.46 mEq/200 mg voriconazole	Hypoglycemia, hypokalemia, hyponatremia

Note: 1 mEq of sodium is ~23 milligrams

*Foscarnet induced hypocalcemia can be minimized by slowing the rate of infusion, **Minocycline contains magnesium sulfate heptahydrate. Magnesium may accumulate in patients with renal

impairment, ***Sodium content minutely variable in formulations between 2.35 mEq-2.84 mEq/gram piperacillin, ^Oral vancomycin preparations in clinical trials
Products containing clinically insignificant amounts of intrinsic sodium per day (i.e., without diluent added) excluded for clarity. Exception: vancomycin.
Example: Letermovir for injection contains 3.1 mg sodium chloride and 1.2 mg sodium hydroxide per mL²³

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