

Benzyl Penicillin:

Class: Antibiotic

Indications: Treatment of infections (including sepsis, pneumonia, pericarditis, endocarditis, meningitis, anthrax) caused by susceptible organisms; active against some gram-positive organisms, generally not *Staphylococcus aureus*; some gram-negative organisms such as *Neisseria gonorrhoeae*, and some anaerobes and spirochetes.

Available dosage form in the hospital: BENZYL PENICILLIN 300000 IU

Trade Names:

Dosage:

- Actinomyces* species: I.V.: 10-20 million units/day divided every 4-6 hours for 4-6 weeks
- Clostridium perfringens*: I.V.: 24 million units/day divided every 4-6 hours with clindamycin
- Corynebacterium diphtheriae*: I.V.: 2-3 million units/day in divided doses every 4-6 hours for 10-12 days
- Erysipelas: I.V.: 1-2 million units every 4-6 hours
- Erysipelothrix*: I.V.: 2-4 million units every 4 hours
- Fascial space infections: I.V.: 2-4 million units every 4-6 hours with metronidazole
- Leptospirosis: I.V.: 1.5 million units every 6 hours for 7 days
- Listeria*: I.V.: 15-20 million units/day in divided doses every 4-6 hours for 2 weeks (meningitis) or 4 weeks (endocarditis)
- Lyme disease (meningitis): I.V.: 20 million units/day in divided doses
- Neurosyphilis: I.V.: 18-24 million units/day in divided doses every 4 hours (or by continuous infusion) for 10-14 days (CDC, 2006; CDC, 2009; CDC, 2010)
- Prosthetic joint infection: I.V.:
 - Enterococcus spp (penicillin-susceptible), streptococci (beta-hemolytic)*: 20-24 million units daily continuous infusion every 24 hours or in divided doses every 4 hours for 4-6 weeks (Osmon, 2013); **Note:** For penicillin-susceptible *Enterococcus spp*, consider addition of aminoglycoside.
 - Propionibacterium acnes*: 20 million units daily continuous infusion every 24 hours or in divided doses every 4 hours for 4-6 weeks (Osmon, 2013)
- Streptococcus:
 - Brain abscess*: I.V.: 18-24 million units/day in divided doses every 4 hours with metronidazole
 - Endocarditis or osteomyelitis*: I.V.: 3-4 million units every 4 hours for at least 4 weeks

- Group B streptococcus (neonatal prophylaxis)*: I.V.: 5 million units x 1 dose, then 2.5-3.0 million units every 4 hours until delivery (CDC, 2010)
- Skin and soft tissue*: I.V.: 3-4 million units every 4 hours for 10 days
- Toxic shock*: I.V.: 24 million units/day in divided doses with clindamycin
- Streptococcal pneumonia: I.V.: 2-3 million units every 4 hours
- Whipple's disease: I.V.: 2 million units every 4 hours for 2 weeks, followed by oral trimethoprim/sulfamethoxazole or doxycycline for 1 year . Relapse or CNS involvement: 4 million units every 4 hours for 4 weeks

Renal Impairment:

-Manufacturer's recommendation:

- Uremic patients with $Cl_{cr} > 10$ mL/minute/1.73 m²: Administer a normal dose followed by 50% of the normal dose every 4-5 hours
- $Cl_{cr} < 10$ mL/minute/1.73 m²: Administer a normal dose followed by 50% of the normal dose every 8-10 hours

Alternate recommendation:

- GFR >50 mL/minute: No dosage adjustments are necessary (Aronoff, 2007).
- GFR 10-50 mL/minute: Administer 75% of the normal dose (Aronoff, 2007).
- GFR <10 mL/minute: Administer 20% to 50% of the normal dose (Aronoff, 2007).
- Intermittent hemodialysis (IHD) (administer after hemodialysis on dialysis days) (Heintz, 2009): Administer a normal dose followed by either 25% to 50% of normal dose every 4-6 hours **or** 50% to 100% of normal dose every 8-12 hours.
 - For *mild-to-moderate* infections, administer 0.5-1 million units every 4-6 hours **or** 1-2 million units every 8-12 hours.
 - For *neurosyphilis, endocarditis, or serious infections*, administer up to 2 million units every 4-6 hours; administer after dialysis on dialysis days **or** supplement with 500,000 units after dialysis.
- Note:** Dosing dependent on the assumption of 3 times weekly, complete IHD sessions.

-Continuous renal replacement therapy (CRRT) (Heintz, 2009; Trotman, 2005): Drug clearance is highly dependent on the method of renal replacement, filter type, and flow rate. Appropriate dosing requires close monitoring of pharmacologic response, signs of adverse reactions due to drug accumulation, as well as drug concentrations in relation to target trough (if appropriate). The following are general recommendations only (based on dialysate flow/ultrafiltration rates of 1-2 L/hour and minimal residual renal function) and should not supersede clinical judgment:

- CVVH: Loading dose of 4 million units, followed by 2 million units every 4-6 hours
- CVVHD: Loading dose of 4 million units, followed by 2-3 million units every 4-6 hours
- CVVHDF: Loading dose of 4 million units, followed by 2-4 million units every 4-6 hours

Common side effect: Contact dermatitis, rash, Pseudomembranous colitis, Neutropenia,

Pregnancy Risk Factor: B