

Oral Penicillin Desensitization Guidelines
GENESIS HEALTH SYSTEM OR MEDICAL CENTER

[] GMC - Aledo, IL [X] GMC – Davenport, IA [] GMC – DeWitt, IA [] GMC – Silvis, IL

Population:

Patients 18 years of age or older who have a documented history of allergy to penicillin

Inclusion Criteria:

- Adults with a history of IgE-mediated penicillin allergy who have been evaluated by an allergist or infectious disease physician and judged to benefit from penicillin desensitization

Exclusion Criteria:

- Patients less than 18 years old
- Patients who are likely to have interrupted therapy (**penicillin desensitization lasts only as long as the therapy is uninterrupted and if therapy is interrupted for >24-48 hours, it is highly recommended to repeat desensitization procedure**)
- Patients who have a history of blistering reactions like severe cutaneous eruptions, Stevens-Johnsons Syndrome, exfoliative dermatitis, erythroderma, or toxic epidermal necrolysis
- Patients who have a history of hemolytic anemia or interstitial nephritis because these are mediated by IgG rather than IgE antibodies and cannot be desensitized by this method

Skill Level:

- Infectious Disease Physician
- Registered Nurse
- Registered Pharmacist

Definitions:

Desensitization: process of altering immune response to drug for patient to temporarily tolerate a drug

General Considerations:

Note that penicillin desensitization lasts only as long as the therapy is uninterrupted and if therapy is interrupted for >24-48 hours, it is highly recommended to repeat desensitization procedure.

- There are 14 steps to the desensitization process and each step should be administered at 15 minute intervals
- Protocol completion is estimated to take 6 hours and requires near-constant supervision so 1:1 nursing ratio recommended
- An ICU setting is recommended for desensitization but if ICU setting unavailable, recommend having adequate nursing staff and notifying the ICU and Rapid Response Team that a penicillin desensitization case is in the hospital
- Before starting desensitization, discontinue all beta blockers if possible
- Have an IV line, epinephrine, continuous cardiac monitor, and pulse oximeter available

Preparation and Administration of Oral Penicillin VK for Desensitization

1. Obtain oral penicillin VK 250 mg/5 mL solution (will need 17 mL for the dilutions)
2. Reconstitute oral penicillin VK 250 mg/5 mg solution
3. **For Steps 1-7**, draw 1 mL of the oral penicillin VK 250 mg/5 mL (50 mg) and add to **99 mL of SWFI** to get concentration of 50 mg/100 mL, or **0.5 mg/mL**
4. **For Steps 8-10**, draw 1 mL of the oral penicillin VK 250 mg/5 mL (50 mg) and add to **9 mL of SWFI** to get concentration of 50 mg/10 mL, or **5 mg/mL**
5. **For Steps 11-14**, use standard concentration of oral penicillin VK 250 mg/5 mL, or **50 mg/mL**
6. Draw up the 14 Step syringes according to the chart below and clearly label each syringe with the Step, the concentration, and the volume
7. Administer each dose at 15 minute intervals in 30 mL water or flavored beverage
8. After Step 14 is completed, observe patient for 30 minutes and then administer full therapeutic dose by route of choice

Step	Drug Dilution (mg/mL)	mL Administered	Drug Dose per Step		Cumulative Dose Administered	
			mg	units	mg	units
1	0.5	0.1	0.05	80	0.05	80
2	0.5	0.2	0.1	160	0.15	240
3	0.5	0.4	0.2	320	0.35	560
4	0.5	0.8	0.4	640	0.75	1,200
5	0.5	1.6	0.8	1,280	1.55	2,480
6	0.5	3.2	1.6	2,560	3.15	5,040
7	0.5	6.4	3.2	5,120	6.35	10,160
8	5	1.2	6	9,600	12.35	19,760
9	5	2.4	12	19,200	24.35	38,960
10	5	4.8	24	38,400	48.35	77,360
11	50	1	50	80,000	98.35	157,360
12	50	2	100	160,000	198.35	317,360
13	50	3	200	320,000	398.35	637,360
14	50	4	400	640,000	798.35	1,277,360

*Dilution guide from The Sanford Guide to Antimicrobial Therapy

Orders:

- Step 1 – Penicillin VK concentration 0.5 mg/mL: Dose 0.05 mg (80 units)/0.1 mL
- Step 2 – Penicillin VK concentration 0.5 mg/mL: Dose 0.1 mg (160 units)/0.2 mL

- Step 3 – Penicillin VK concentration 0.5 mg/mL: Dose 0.2 mg (320 units)/0.4 mL
- Step 4 – Penicillin VK concentration 0.5 mg/mL: Dose 0.4 mg (640 units)/0.8 mL
- Step 5 – Penicillin VK concentration 0.5 mg/mL: Dose 0.8 mg (1,280 units)/1.6 mL
- Step 6 – Penicillin VK concentration 0.5 mg/mL: Dose 1.6 mg (2,560 units)/3.2 mL
- Step 7 – Penicillin VK concentration 0.5 mg/mL: Dose 3.2 mg (5,120 units)/6.4 mL
- Step 8 – Penicillin VK concentration 5 mg/mL: Dose 6 mg (9,600 units)/1.2 mL
- Step 9 – Penicillin VK concentration 5 mg/mL: Dose 12 mg (19,200 units)/2.4 mL
- Step 10 – Penicillin VK concentration 5 mg/mL: Dose 24 mg (38,400 units)/4.8 mL
- Step 11 – Penicillin VK concentration 50 mg/mL: Dose 50 mg (80,000 units)/1 mL
- Step 12 – Penicillin VK concentration 50 mg/mL: Dose 100 mg (160,000 units)/2 mL
- Step 13 – Penicillin VK concentration 50 mg/mL: Dose 200 mg (320,000 units)/4 mL
- Step 14 – Penicillin VK concentration 50 mg/mL: Dose 400 mg (640,000 units)/8 mL

Sources:

- Robinson JL, Hameed T, Carr S. Practical aspects of choosing an antibiotic for patients with a reported allergy to an antibiotic. *Clin Infect Dis*. 2002 Jul 1;35(1):26-31. doi: 10.1086/340740. Epub 2002 Jun 5. PMID: 12060871.
- Yates AB. Management of patients with a history of allergy to beta-lactam antibiotics. *Am J Med*. 2008 Jul;121(7):572-6. doi: 10.1016/j.amjmed.2007.12.005. PMID: 18589051.
- Oral Penicillin Desensitization. *The Sanford Guide to Antimicrobial Therapy*. Dallas, TX :Antimicrobial Therapy, Inc., 1995.