

## Nebulized Vancomycin

Vancomycin is an antibiotic used to treat upper and lower respiratory infections caused by several types of bacteria such as Staphylococcal (Staph) or Streptococcal (Strep). Antibiotic medicines kill the bacteria by preventing its growth.

### Dose

250 mg vancomycin (2.5 mL from diluted vancomycin vials) twice daily by nebulization.

### Supplies Needed for One Month of Treatment (250 mg twice daily for one month)

Product Name	Quantity
Vancomycin 500 mg vials	60 vials
Sterile water for injection 10 mL vials	600 mL (60 vials x 10 mL)
Sodium chloride inhalation solution 0.9% 3 mL	180 mL (60 vials x 3 mL)
10 mL Syringe with needle	60 syringes
Alcohol wipes	1 box (100/box)

### Preparation:

Vancomycin comes as a powder in 500 mg vials and must be diluted before using. Dilute a new vial of vancomycin twice daily, no more than 1 hour before each inhalation. Use a new syringe to dilute the vancomycin and draw up each dose.

### How to Prepare:

1. Prepare a clean area for mixing vancomycin for nebulization.
2. Wash your hands.
3. Uncap the plastic covers from the sterile water and the vancomycin vial.
4. Wipe off the top of the sterile water and the vancomycin vial with alcohol wipes. Use a separate alcohol wipe for each vial. Discard the used alcohol wipes.

### How to mix Vancomycin:

1. Open the package for one 10 mL syringe with attached needle. Pick up the syringe by the barrel. Do not touch the tip of the syringe.
2. Carefully remove the cap from the needle.
3. Pull 5 mL of air into the syringe by holding the barrel of the syringe with one hand and pulling on the flat end of the plunger with the other hand. Do not touch the sides of the plunger.
4. Insert the needle into the sterile water vial and push the needle into the rubber stopper until the tip is visible in the vial.
5. Push the air into the vial, then turn the water vial upside down to allow water to cover the tip of the needle.
6. While holding the vial with one hand and the flat end of the syringe plunger with the other hand, slowly withdraw 5 ml of water into the syringe being careful not to touch the sides of the syringe plunger (only touch the flat end of the plunger).
7. Remove the needle/syringe from the vial. Insert the needle into the vancomycin vial and push down on

the plunger to add the 5 mL of sterile water into vial. Swirl gently to mix. **Do not** shake the vial as this will make the medicine foam.

8. **The sterile water vial must be discarded after each use. It cannot be saved for reuse even if there is water left in the vial since it has no preservative to prevent bacterial growth.**

### **Measuring the Correct Dose:**

1. Each vial of reconstituted (mixed) vancomycin contains 500 mg of drug in a 5 mL volume.
2. Using the same syringe with attached needle, draw up 5 mL of air into the syringe and push the needle into the vial. Push air from the syringe into the vial and then pull back on the plunger of the syringe to draw up the correct dose. **A 250 mg dose is 2.5 mL of solution**
3. Draw up 2.5 mL of the prepared vancomycin (250 mg) mixture. Withdraw the needle/syringe from the vial and slowly push the vancomycin solution from the syringe into the nebulizer cup.
4. Discard the syringe.

This vancomycin mixture needs to be further diluted before nebulizing. Sodium chloride inhalation solution 0.9% is used for this purpose.

### **Diluting the Vancomycin with Sodium Chloride Inhalation Solution 0.9% in the Nebulizer Cup:**

- Add 1 mL or about 1/3 of sodium chloride inhalation solution 0.9% to the nebulizer cup containing the vancomycin mixture. Swirl to mix. Adding sodium chloride solution 0.9% to the vancomycin in the nebulizer cup makes it easier to

nebulize vancomycin without coughing.

- If you add more of the sodium chloride solution 0.9% to the cup, this will not affect the vancomycin treatment. Adding more will only increase the length of time needed to nebulize the medication.
- Use a separate sodium chloride 0.9% vial for each nebulized treatment. The vial is designed for single use only and must be discarded after a single use.

### **How to Nebulize the Vancomycin**

1. Before inhaling vancomycin, 1<sup>st</sup> inhale a medication to open your lungs as directed by your healthcare provider (for example, could inhale 2 puffs from an albuterol inhaler).
2. Attach one end of the smooth tubing to the air compressor and the opposite end to the nebulizer. Turn the air compressor on. A fine mist should be visible. If not, make sure the compressor is working by disconnecting the smooth tubing.
3. Feel for air coming from the compressor. If the compressor isn't working properly, check all connections. If the nebulizer is still not misting, use a different nebulizer kit.
4. Place the mouthpiece in your mouth. Small children may use a mask over the mouth and nose rather than a mouthpiece.
5. Take slow, deep, even breaths through your mouth. Make sure the medicine cup is kept upright.
6. Continue the treatment until the medicine is finished (no mist comes out). Remember to hold the cup upright so that the medicine does not spill. If the medicine sticks to the side of the cup, gently tap the sides of the cup.

7. Foam may develop in the medicine cup during nebulization. This is a normal reaction of the drug.
8. After the treatment is over, it is very important to take the medicine cup apart, rinse with hot water, and allow it to air dry on paper towel.

### **Storage**

Store the sterile water and undiluted vancomycin vials (powder) at room temperature until use. Once vancomycin is prepared, it must be used within 1 hour of mixing. The remaining medication in the vial must be thrown away and CANNOT be used 1 hour after mixing.

### **Treatments**

Treatments are generally scheduled twice daily. If you use a bronchodilator inhaler, use it before you do the therapy. Your symptoms should improve or remain stable as you continue the therapy. If your infection does not improve or if it gets worse, call your doctor.

### **Side Effects**

When inhaled, vancomycin may lead to difficulty in breathing, wheezing, coughing, and shortness of breath. If these occur, please tell your doctor or respiratory therapist right away. Call your doctor right away if you notice any symptoms of an allergic reaction including itching or hives, swelling in your face or hands, swelling or tingling in your mouth or throat, chest tightness, and/or trouble breathing.

### **How to Clean and Disinfect the Small Volume Nebulizer by Heat**

Note: Use the following heat methods only for sturdy, hard plastic nebulizer cups. Heat cleaning may melt lighter, clear plastic nebulizers.

All your nebulizer parts can be cleaned and disinfected in your dishwasher or microwave twice a week except for the blue reservoir tubing. The blue tubing cannot be placed in the dishwasher. This piece needs to be cleaned according to the “by hand” instructions below.

### **Dishwasher:**

1. Take the nebulizer apart.
2. Place the pieces in a dishwasher basket on the top rack of the dishwasher.
3. After the dishwasher cycle is done, remove the pieces and shake out the extra water.
4. Air-dry the nebulizer pieces on a dry paper towel.

### **Microwave:**

1. Take the nebulizer apart. Wash the pieces in warm soapy water.
2. Rinse with hot water.
3. Place the nebulizer pieces in a bowl. Add enough water to completely cover the pieces.
4. Microwave for 3-5 minutes; shorter time in high power microwaves to keep the nebulizer from melting.
5. Place the nebulizer pieces on a paper towel to dry.

### **How to Clean and Disinfect the Small Volume Nebulizer by Hand**

If you would prefer not to clean and disinfect your nebulizer using the dishwasher, follow the steps below. To clean and disinfect by hand, you can use either the vinegar and water method or rubbing alcohol method. **If you have Cystic Fibrosis (CF) do not use the vinegar and water method.**

**Vinegar and Water Method:**

1. Take the nebulizer apart. Wash the pieces in warm soapy water.
2. Rinse with hot tap water.
3. Place the nebulizer pieces in a bowl and add enough vinegar and water solutions to completely cover the equipment. To make the vinegar and water solution, mix 1 part white vinegar (5% solution from your grocery store) to 2 parts water (1 cup vinegar to 2 cups water).
4. Soak the nebulizer for 30 minutes to 2 hours.
5. Rinse all other parts of the nebulizer with sterile water. **Do not** use water from the faucet, bottled or distilled water; it could be contaminated. You can make water sterile by boiling it for 5 minutes. Use this water once, and then throw it out.
6. Place the pieces on a paper towel to dry.

**Rubbing Alcohol Method:**

1. Take the nebulizer apart. Wash the pieces in warm soapy water.
2. Rinse with hot tap water.
3. Place the nebulizer pieces in a bowl and add enough rubbing alcohol (isopropyl alcohol) to completely cover the nebulizer pieces.
4. Soak the nebulizer pieces for 5 minutes.
5. Rinse the nebulizer pieces with sterile water. Do NOT use water from the faucet, bottled, or distilled water. You can make water sterile by boiling it for 5 minutes. Use this water once, and then throw it out.
6. Place the nebulizer pieces on a paper towel to dry.

**Equipment**

If you have questions about your nebulizer, contact UW Health Care Direct at (608) 203-2273.

If you have questions about your vancomycin or need more supplies, contact the pharmacy.

Your health care team may have given you this information as part of your care. If so, please use it and call if you have any questions. If this information was not given to you as part of your care, please check with your doctor. This is not medical advice. This is not to be used for diagnosis or treatment of any medical condition. Because each person's health needs are different, you should talk with your doctor or others on your health care team when using this information. If you have an emergency, please call 911. Copyright © 8/2023 University of Wisconsin Hospitals and Clinics Authority. All rights reserved. Produced by the Department of Nursing HF#7930.