



INHALER AND NEBULIZER DEVICES

COMMON THEMES FOR INHALERS

Metered-dose Inhalers

- Generally, should be used with a valved holding chamber
- Require priming
- Must always be held upright and shaken for at least 5 seconds
- Require a slow, deep breath
- Breathe-hold for up to 10 seconds or as long as able
- Wait 30-60 seconds between doses
- *Redihaler is only breath-actuated MDI & should NEVER be shaken*

Slow Mist Inhaler

- Requires priming
- May be used with a valved holding chamber
- Requires a slow, deep breath
- Breathe-hold for up to 10 seconds or as long as able
- Wait 30-60 seconds between doses

Dry Powder Inhalers

- All DPIs should be kept dry - without moisture
- MUST inhale with a forceful, fast, and deep breath for each dose with adequate inspiratory force to deliver the powder deep into the lungs
- Breath-hold for 3-4 seconds or up to 10 seconds
- NEVER - ever - ever shake a DPI device (powder will spill out)
- Do not prime a DPI
- Do not breathe into the device or open it before you are ready to use it (moisture in breath or the air will clump and gum up the powder)
- Avoid covering the air vents with lips or fingers
- NEVER use a valved holding chamber with any DPI
- *Flexhaler - Only prime ONCE. Package insert does not specify a breath-hold.*

Nebulizers: Main Types - Jet & Electronic

Standard Jet Nebulizers

Three general types of jet nebulizers:

- (1) Standard (basic) jet
- (2) Breath-enhanced jet
- (3) Breath-actuated jet



- Require compressor or power pack
- Generally, require 2-10 L/min of pressurized gas
- Treatment times vary from 15-25 minutes
- Generally larger, but lower in cost than the vibrating mesh nebulizers
- Standard (basic) jet nebulizers only deliver about 20% of aerosol to lungs
- Breath-enhanced jet and breath-actuated jet nebulizers deliver > 80% of aerosol to lungs
- **CLEAN HANDS & CLEAN NEBULIZER are key!!**

Electronic Nebulizers

There are two main types of electronic nebulizers, but only the mesh nebulizers are used in clinical practice for nebulizing medications:

- (1) Ultrasonic (used currently for sputum induction)
- (2) Vibrating mesh (e.g., InnoSpire Go, Omron, Lamira)



- Small, portable, quiet, and deliver medications quickly and efficiently
- Wafer thin, metal alloy mesh about 5-10 mm in diameter with 1,000-7,000 laser-drilled tapered, funnel-shaped holes: easily clogged
- **CLEAN HANDS & CLEAN NEBULIZER are key!!**

DRY POWDER INHALERS (SINGLE-DOSE)

HandiHaler®

- Keep capsules in blister pack until just before use (moisture causes powder to clump)
- Open the dust cap and the white mouthpiece
- Place capsule in the well
- Press and release the green piercing button once
- Exhale away from the device
- Seal lips around mouthpiece (do not block air vents)
- Breathe in forcefully and deeply - you should hear a rattling noise
- Hold your breath for up to 10 seconds or as long as possible
- Exhale away from the device
- Then inhale a second time (repeating steps above with the same capsule - do not pierce the capsule again)
- Discard the capsule in the trash without touching it



Podhaler®

- Keep capsules in blister pack until just before use (moisture causes powder to clump) - remove only one at a time
- Remove the Podhaler lid (dust cover) and remove the mouthpiece
- Peel back foil on the blister pack to expose one capsule
- Place the capsule in the capsule chamber (NOT in the mouthpiece)
- Replace the mouthpiece (being careful not to over-tighten)
- Remove the Podhaler from the base and hold upside down
- Press the blue button completely to pierce the capsule, then release
- Exhale away from the device
- Seal lips around mouthpiece and breathe in rapidly, but steadily
- Hold breath for about 5 seconds, then exhale away from the device
- Repeat inhalation steps (total of two inhalations per capsule and usual dose requires four capsules)



Neohaler®

- Keep capsules in blister pack until just before use (moisture causes powder to clump)
- Remove the dust cap and open the white mouthpiece
- Place capsule in the well
- Press the two piercing buttons on the sides once, then release
- Exhale away from the device
- Hold the device with buttons on the sides (not up and down)
- Seal lips around mouthpiece (do not block air vents)
- Breathe in rapidly, but steadily and deeply, and you should hear a whirling noise
- Hold your breath for up to 10 seconds or as long as possible
- Exhale away from the device
- Open the mouthpiece and, if there is still medicine in the capsule, then inhale a second time (repeating steps above with the same capsule - do not pierce the capsule again)



DRY POWDER INHALERS (MULTI-DOSE)

Diskus®

- Hold the Diskus parallel to the floor
- Use the thumb grip to slide the cover to expose the mouthpiece
- Slide the lever away from you to load the medicine
- Holding the Diskus with both hands (like a hamburger) but away from your mouth, breathe out gently, but completely
- Seal lips around mouthpiece and breathe in quickly and deeply through your mouth until you take a full, deep breath
- Move the device away from your mouth
- Hold your breath for up to 10 seconds or as long as possible
- Then breathe out slowly
- Slide the cover back over the mouthpiece to close the device



Inhub™

- Hold the Inhub upright
- Use the thumb grip to slide the cover to expose the mouthpiece
- Slide the yellow lever down to load the medicine
- Holding the Inhub upright and away from your mouth, breathe out gently, but completely
- Seal lips around mouthpiece and breathe in quickly and deeply through your mouth until you take a full, deep breath
- Move the device away from your mouth
- Hold your breath for up to 10 seconds or as long as possible
- Then breathe out slowly
- Slide the cover back over the mouthpiece to close the device



Ellipta®

- Hold the Ellipta upright and slide the cover down to expose the mouthpiece and air vents and to load the medicine
- Holding the Ellipta with both hands (like a hamburger) but away from your mouth, breathe out gently, but completely
- Then seal lips around mouthpiece, but do not block air vents
- Breathe in one full, long steady breath through your mouth
- Move the device away from your mouth
- Hold your breath at least 3-4 seconds or as long as possible
- Then breathe out slowly
- Slide the cover back over the mouthpiece to close the device
- Do not open and close the device over and over, the medicine will be lost



Pressair®

- Hold the Pressair upright and remove the dust cap
- Control window indicator should be red
- Press the button all the way down and release completely
- Make sure the indicator in the control window turns green
- Holding the device upright and away from your mouth, breathe out gently, but completely
- Seal lips around mouthpiece and take a strong, deep breath through your mouth and you may hear a click
- Move the device away from your mouth
- Hold your breath for up to 10 seconds or as long as possible
- Then breathe out slowly and be sure the indicator is red
- Replace the dust cover



Flexhaler®

- Prime the device ONCE before first use
- Hold upright and remove the cap to expose the mouthpiece
- Turn the base all the way in one direction and then in the opposite direction until you hear a click to load the medicine
- Holding away from your mouth, breathe out gently, but completely
- Then seal lips around mouthpiece, but do not block the air vents
- Take a forceful, full, and deep breath through your mouth
- Move the device away from your mouth and breathe out slowly
- If a second dose is needed, turn the base in both directions as above to load the next dose and then repeat the breathing steps



Respiclick®

- Hold the Respiclick upright and open the cap to load the dose
- Holding away from your mouth, breathe out gently, but completely
- Seal lips around mouthpiece and breathe in quickly and deeply through your mouth until you take a full, deep breath
- Move the device away from your mouth
- Hold your breath for up to 10 seconds or as long as possible
- Then breathe out slowly
- Slide the cover back over the mouthpiece to close the device
- Do not open and close the device over and over, the medicine will be lost



Twisthaler®

- Hold upright, remove the cap to expose mouthpiece and load the dose
- Holding away from your mouth, breathe out gently, but completely
- Then seal lips around mouthpiece, but do not block the air vents
- Take a fast, deep breath through your mouth
- Move the device away from your mouth
- Hold your breath for up to 10 seconds
- Breathe out slowly and replace the lid
- If a second dose is needed, remove the cap again and repeat the breathing steps
- Do not open and close the device over and over, the medicine will be lost



AEROSOL DEVICES

Metered-dose Inhaler (MDI)

- Most effective when used with a valved holding chamber
- Open the cap
- Inspect (ensure no foreign objects)
- Shake for at least 5 seconds
- Breathe out slowly away from device
- Seal lips around mouthpiece
- Start inhaling (through mouth) and actuate dose of medication while continuing to breathe in slowly and deeply
- Hold breath for up to 10 seconds
- Breathe out away from device
- Wait 30-60 seconds
- Repeat steps for next dose (if needed)



Redihaler™ (Breath-Actuated MDI)

- Open the cap
- Do NOT shake (medicine may spill out)
- Breathe out slowly away from device
- Seal lips around mouthpiece
- Inhale deeply through the mouth
- Hold breath for up to 10 seconds
- Breathe out away from device
- Close the cap until it clicks
- Wait 30-60 seconds
- Repeat steps for next dose



Respimat® (Slow Mist Inhaler)

- Load the cartridge by pressing down on a firm surface
- Point the device away from your face/eyes before opening the cap
- Prime the device before the first dose
- Remember the steps: "TOP"
- Turn the clear base (in the direction of the arrow)
- Open the cap, breathe out away from the device and close your lips around the mouthpiece
- Press the dose-release button and inhale slowly
- Do not block the side air vents
- Hold breath for up to 10 seconds
- Breathe out away from device
- Wait 30-60 seconds
- Repeat steps for next dose
- Can be used with Valve Holding Chamber



MDI With Valved Holding Chamber (VHC)

- Perform the same steps as above, but after shaking MDI, attach to VHC
- Also requires a slow, deep breath
- If VHC whistles or makes any noise, you are breathing in too quickly