GUIDELINES FOR TEACHING INHALATION TECHNIQUE TO CHILDREN

In-Check Dial™

- Set the resistance for the appropriate device
- Install the one-way filter (arrow pointing toward the patient) [Clement-Clarke is blue]
- Set up the simulation; "Imagine that you are at home getting ready to breathe your medication into your lungs. Show me exactly what you do when you breathe your [medicine name] into your lungs.
- Hand the In-Check Dial™ to the student saying "Seal your lips around the end of the mouthpiece. Lift your chin to open your airway, aiming the In Check Dial up towards the top of the facing wall. Suck air through it in the same way you would breathe in to suck medicine out of your [name of medicine device]. (**Reminder** – You might need to say. "This is NOT your peak flow meter. Don't blow into this tube. Think of this like a big straw. You are going to suck air through this tube in the same way that you would breathe your medicine into your lungs at home.)
- Watch for the following patient behaviors:
    1) exhales fully to empty the lungs (increases the volume of air that can be inhaled, this increases the amount of drug deposited into peripheral airways)
    2) inhales at a steady inspiratory flow rate (IFR) at or near the recommended rate of 30 LPM for MDIs and 60 LPM for DPIs (EPR3); the **red** marker marks only the peak inspiratory flow rate, so observe the **white** marker for variability in IFR; the white disks marks instantaneous IFR and allows an estimation of the inspiratory time (IFT)
    3) holds breath for 5-10 seconds (time is limited by patient comfort and capacity)
- Coach the patient to improve their effort for each step above (1-3)
- **Provide a "target time" to guide the person's effort at breathing in at the correct speed. Target time for MDIs is 2 times the FEV1. Target time for DPIs in seconds equals FEV1 in liters. (If FEV1=2 L and the person is using an MDI, say "it should take you 4 seconds to fill your lungs with your medication".)**
- Repeat until the IFR and IFT are optimal and reproducible
- Document initial effort (eg. 120 LPM for one second) and final attained flow and time (30-35 LPM for 4 seconds), document that this effort was or was not reproducible
- Recheck at each opportunity (work toward the EPR3 recommendation of 30 LPM for MDIs (p. 250) and 60 LPM for DPIs (p. 249).

MDI [metered dose inhaler]

- Use a spacer (good idea for bronchodilators, essential for inhaled corticosteroids)
- Insert MDI into the VHC and shake the medication gently several times if indicated [see package instructions]
- Common error is excessive IFR with very brief inspiratory time (results in oropharyngeal deposition with minimal lung deposition)

Valved holding chamber [VHC]

- Might require coating in diluted dish detergent once a month to block static build-up
- Might have a flow signal that sounds off if IFR exceeds 60 LPM – twice the recommended IFR (**Reminder** – ask the patient "If you hear a whistle, what does that mean?" Answer is "slow down. Keep breathing, but slow down.") Remind the person of their target time and encourage to watch a clock with a second hand or count "0ne 1000, two 1000..."

- An In-Check Dial™ looks a little like a spacer, so this is a natural simulation for most patients. Say "Imagine that you are at home getting ready to take your [medicine name]. You hook up your MDI to your spacer. Now show me how you breathe your medication into your lungs."
- Promotes slower, deeper inhalation with improved drug delivery to small airways
- When more than one type of inhaler is used, start with quick relief medicines.

VHC with Mask

- Infants are going to be passive participants. The goal is to have the parent observe the exhalation valve (nose valve), if this is a device feature, to be sure that the infant takes six breaths after each actuation of the MDI. Otherwise the rise and fall of the chest/abdomen will be the indicator for breaths. Toddlers are more likely to tolerate the mask if the parent counts out loud for the required 6 breaths (One, Two, Three, Four, Five, Six – clap and applaud NOW). This works! Really!
- Preschool children will usually respond to the following instructions after the mask is in place. "OK. Blow out ALL your air, like you blow out the candles on a cake [or similar instructions]." Next, actuate the MDI and say, "Breathe in, breathe in, breathe in… Now hold it, hold it, hold it. Good work!" If the effort is not great just keep the mask in place and repeat this sequence one or more times to clear the drug from the chamber. By three or four years of age most young children can learn to intentionally empty their lungs, take a slow breath to fill their lungs with medication and then hold their breath a few seconds.
- Recommend "rinse and spit, then brush your teeth" after inhaled corticosteroids (ICS). For infants, toddlers and others unable to perform good oral care, wipe face with moist cloth and provide food or beverage after ICS doses to remove drug from face and throat.

DPI [Dry Powder Inhaler]

- Common errors – either insufficient IFR (leading to settling of the drug in the mouth and upper airway) or excessive IFR with short IFT leading to over-acceleration of drug, keeping it from making the many turns required to arrive in the lower airways)
- DPIs need a stronger, faster inhalation and are not used with spacers. It takes greater effort to breathe in a DPI than an MDI, especially when someone is having trouble with asthma. Most asthma medicines are available in both DPI and MDI.
- Coach for 60 LPM using a target inspiratory time equal to their FEV1 (or 2-3 seconds), **use correct resistance setting on the In-Check Dial.** (For Twisthaler™ and Flexhaler™ resistance is very close to the Turbuhaler™ setting.)
- Some patients don't like the feel of the lactose that ends up on the back of their throat. Recommend that they take a sip of water first to moisten the throat.
- Recommend "rinse and spit, then brush your teeth" after inhaled corticosteroids (ICS). If unable, eating or drinking will help remove drug from throat.

Nebulizer with Mask for Infants, Toddlers and Preschoolers

- Without a mask most of the intended dose will be lost; blow-by technique not effective for infants and young children; USE A MASK!!! (EPR3, p. 251)
- **Reminder** – Ask the parent – "Will your child leave the mask in place for the treatments?" Also ask – "Is the time and effort required for these treatments doable for your household?" "Can you afford this medication?" If not consider MDI by VHC with mask. This approach cuts drug administration time from 10 minutes several times a day to one minute and eliminates the need for a machine. This might make the family more portable and adherent to the ICS dosing plan.