ECHO IDAHO

Small Device, Big Impact:
The Power of Proper Inhaler Use

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School of Health and Medical Professions

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Learning Objectives

- Review types of inhaled respiratory medication delivery devices
- List requirements for effective medication delivery
- Identify proper techniques for using different types of inhaled medication delivery devices
- Explain how to properly use various delivery devices for patients
- Share resources for navigating insurance and access issues

Disclosures

- I do not receive any financial benefit from the products I mention
- Medication images ≠ Camille's recommendation
- The In-Check Dial is the only available tool that I am aware of at this time

THANK YOU!

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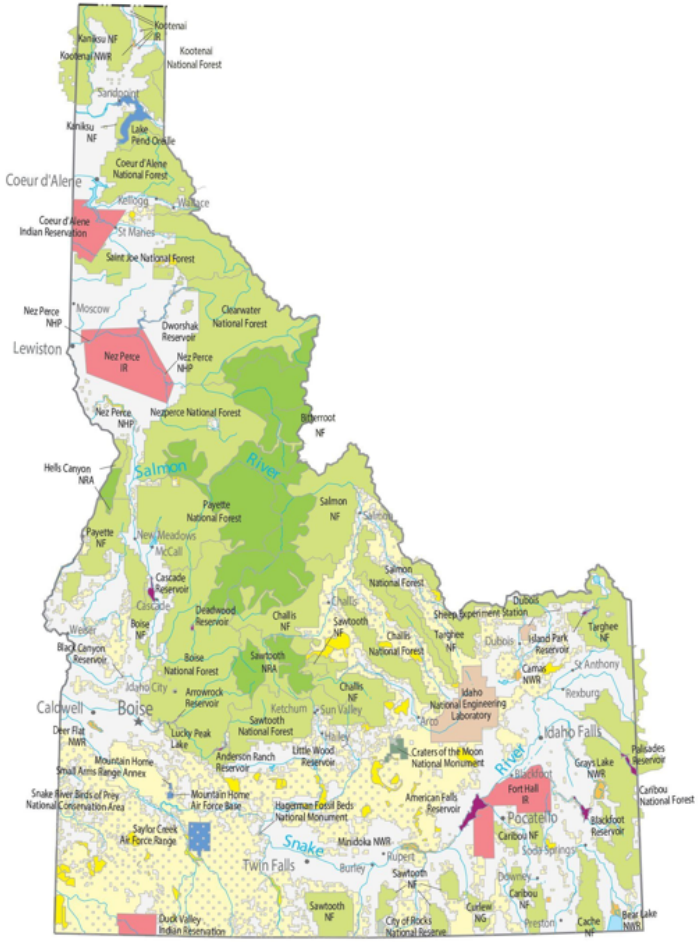
Why are we here?

6.2% of Idahoans have COPD [1]

10.5% of Idahoans have Asthma [1]

Idaho has the fewest PCPs in the US[2]



1. America's Health Rankings
2. American Medical Association Physician Masterfile

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Inhaled Medications

- Topical medications used to treat a variety of respiratory diseases
- Fine particles enter the airways
- Fall out of suspension and deposit on airways

2025 Respiratory Treatments

Allergy & Asthma Network

800.878.4403 • AllergyAsthmaNetwork.org

Allergy & Asthma Network is a national nonprofit organization dedicated to ending needless death and suffering due to asthma, allergies and related conditions through outreach, education, advocacy and research.

American College of Allergy, Asthma & Immunology

VIATRIS

Theravance Biopharma

G = GENERIC AVAILABLE
N = NEBULIZER VIAL

DISEASE STATES:
A = ASTHMA
C = COPD

SHORT-ACTING BETA$_2$-AGONIST (SABA) BRONCHODILATORS
relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

- **Albuterol Sulfate Inhalation Solution** — 0.63, 1.25 mg, 2.5mg; 3 mL — albuterol sulfate inhalation solution — A G N
- **ProAir RespiClick®** — 90 mcg — albuterol sulfate inhalation powder — A
- **Proventil® HFA** — 90 mcg — albuterol sulfate — A G
- **Ventolin® HFA** — 90 mcg — albuterol sulfate — A G
- **Xopenex®** — 0.31, 0.63, 1.25 mg; 3 mL — levalbuterol hydrochloride inhalation solution — A G N
- **Xopenex HFA®** — 45 mcg — levalbuterol tartrate — A G

SABA and ICS
contains SABA to relax airway muscles and offer quick relief of symptoms, and inhaled corticosteroid (ICS) to reduce inflamed airways

- **AIRSUPRA®** — 90/80 mcg — albuterol and budesonide — A

INHALED CORTICOSTEROIDS (ICS)
reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

- **Alvesco® HFA** — 80, 160 mcg — ciclesonide — A
- **Arnuity® Ellipta®** — 50, 100, 200 mcg — fluticasone furoate inhalation powder — A
- **Asmanex® HFA** — 50, 100, 200 mcg — mometasone furoate — A
- **Asmanex® Twisthaler®** — 110, 220 mcg — mometasone furoate inhalation powder — A
- **Fluticasone Propionate Diskus Inhalation Powder** — 50, 100, 250 mcg — authorized generic of Flovent Diskus — A
- **Fluticasone Propionate HFA** — 44, 110, 220 mcg — authorized generic of Flovent HFA — A
- **Pulmicort Flexhaler®** — 90, 180 mcg — budesonide inhalation powder — A
- **Pulmicort Respules®** — 0.25, 0.50, 1.0 mg; 2 mL — budesonide inhalation suspension — A G N
- **QVAR Redihaler®** — 40, 80 mcg — beclomethasone dipropionate — A

LONG-ACTING BETA$_2$-AGONIST (LABA) BRONCHODILATORS
relax tight muscles in airways and offer lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours

- **Brovana®** — 15 mcg; 2 mL — arformoterol tartrate inhalation solution — C N
- **Perforomist®** — 20 mcg; 2 mL — formoterol fumarate inhalation solution — C N
- **Serevent® Diskus®** — 50 mcg — salmeterol xinafoate inhalation powder — A C
- **Striverdi® Respimat®** — 2.5 mcg — olodaterol hydrochloride — C

MUSCARINIC ANTAGONISTS (ANTICHOLINERGICS)
relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

SHORT-ACTING

- **Atrovent® HFA** — 17 mcg — ipratropium bromide — C

LONG-ACTING

- **Incruse® Ellipta®** — 62.5 mcg — umeclidinium inhalation powder — C
- **Ipratropium Bromide Inhalation Solution** — 0.5/3 mg; 3 mL — C G N
- **Spiriva® HandiHaler®** — 18 mcg — tiotropium bromide inhalation powder — C
- **Spiriva® Respimat®** — 1.25, 2.5 mcg — tiotropium bromide — A C
- **Tudorza® Pressair®** — 400 mcg — aclidinium bromide inhalation powder — C
- **Yupelri®** — 175 mcg; 3 mL — revefenacin inhalation solution — C N

COMBINATION MEDICATIONS
contain ICS and LABA

- **Advair Diskus®** — 100/50, 250/50, 500/50 mcg — fluticasone propionate and salmeterol inhalation powder — A C G
- **Advair® HFA** — 45/21, 115/21, 230/21 mcg — fluticasone propionate and salmeterol xinafoate — A G
- **AirDuo® RespiClick®** — 55/14, 113/14, 232/14 mcg — fluticasone propionate and salmeterol inhalation powder — A G
- **Breo® Ellipta®** — 50/25, 100/25, 200/25 mcg — fluticasone furoate and vilanterol inhalation powder — A C G
- **Breyna®** — 80/4.5, 160/4.5 mcg — budesonide and formoterol fumarate dihydrate (approved generic of Symbicort) — A C
- **Dulera®** — 50/5, 100/5, 200/5 mcg — mometasone furoate and formoterol fumarate dihydrate — A
- **Symbicort®** — 80/4.5, 160/4.5 mcg — budesonide and formoterol fumarate dihydrate — A C G
- **Wixela Inhub®** — 100/50, 250/50, 500/50 mcg — fluticasone propionate and salmeterol xinafoate (approved generic of Advair Diskus) — A C

contain LABA and long-acting muscarinic antagonist (LAMA)

- **Anoro® Ellipta®** — 62.5/25 mcg — umeclidinium and vilanterol inhalation powder — C
- **Bevespi Aerosphere®** — 9/4.8 mcg — glycopyrrolate and formoterol fumarate — C
- **Duaklir® Pressair®** — 400/12 mcg — aclidinium bromide and formoterol fumarate — C
- **Stiolto® Respimat®** — 2.5/2.5 mcg — tiotropium bromide and olodaterol — C

contain ICS, LABA and LAMA

- **Trelegy® Ellipta®** — 200/62.5/25 mcg, 100/62.5/25 mcg — fluticasone furoate, umeclidinium and vilanterol inhalation powder — A C
- **Breztri Aerosphere®** — 160/9/4.8 mcg — budesonide, glycopyrrolate and formoterol fumarate — C

contain SABA and short-acting muscarinic antagonist (SAMA)

- **Combivent® Respimat®** — 20/100 mcg — ipratropium bromide and albuterol — C
- **Ipratropium Bromide and Albuterol Sulfate Inhalation Solution** — 0.5mg/2.5mg; 3mL — C G

BIOLOGICS
target cells and pathways that cause airway inflammation; delivered by injection or IV

- **Cinqair®** — 62.5/25 ml — reslizumab — A
- **Dupixent®** — 100, 200, 300 mg — dupilumab — A C
- **Fasenra®** — 30 mg — benralizumab — A
- **Nucala®** — 100 mg — mepolizumab — A
- **Tezspire®** — 210 mg — tezepelumab-ekko — A
- **Xolair®** — 75 to 375 mg — omalizumab — A

PDE3/4 INHIBITORS
control inflammation and reduce flare-ups

- **Ohtuvayre™** — 3 mg; 2.5 mL — ensifentrine inhalation suspension — C N

PDE4 INHIBITORS
control inflammation and reduce flare-ups

- **Daliresp®** — 250, 500 mcg — roflumilast — C

LEUKOTRIENE MODIFIERS
block chemicals called leukotrienes that cause airway inflammation; available as tablet or granules

- **Singulair®** — 4, 5, 10 mg — montelukast — A
- **Zafirlukast** — 10, 20 mg — A
- **Zileuton** — 600 mg — A

Reviewed by Dennis Williams, PharmD

Generic versions of some brand name inhalers are not included on this poster. Generic inhalers may be a different color than brand name versions.

Devices and Medications

Allergy & Asthma NETWORK

University of Idaho School of Health and Medical Professions

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Devices

pMDI

DPI

SoftMist

Nebulizer

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pMDI

- Medication aerosolized by use of propellant
  - Currently HFA

pMDI

Pros

- Portable
- Quick to use
- No minimum peak inspiratory flow rate required
- Aerosolized by propellant
- Spacer

Cons

- Coordination required
- Deposition depends on technique
- Can be bulky if used with a spacer

Spacer

- Plastic holding chamber
- Multiple breaths
- Minimize coordination required
- Used with pMDI

Spacer

Pro

- Minimal coordination required
- Improved medication delivery
- Decreased particle size due to Brownian Motion

Cons

- Bulky
- Not all spacers are made the same
  - Per manufacturers' research
- Require cleaning

DPI

- Medication disaggregated and aerosolized by patient inspiratory effort
- Generally need > 30 – 60 LPM of patient generated inspiratory flow

DPI

Pros

- Small and portable
- Minimal coordination required
- No propellant needed

Cons

- Requires patient effort
- Requires patient to generate **significant** inspiratory flow
- Drug delivery depends on technique
- Not always feasible when SOB

SoftMist

- Aerosolization occurs due to the energy of a compressed spring
- Low velocity drug delivery
- Less coordination needed than pMDI
- Does not require high inspiratory flows
- Smaller particles
- Increase lung deposition
- Decrease oropharyngeal deposition

SoftMist

Pro

- Portable and compact
- Multidose
- Lower dependency on inspiratory effort
- High fine-particle fraction
- High lung deposition
- Low mouth and oropharynx deposition
- No propellant

Cons

- Coordination needed for actuation
- Not breath actuated
- Requires hand dexterity

Nebulizer

- Aerosol is generated by pressurized gas source or electricity
- Requires nebulizer machine or compressed gas source
- Takes 3–8 minutes depending on the medication(s) and flow

Nebulizer

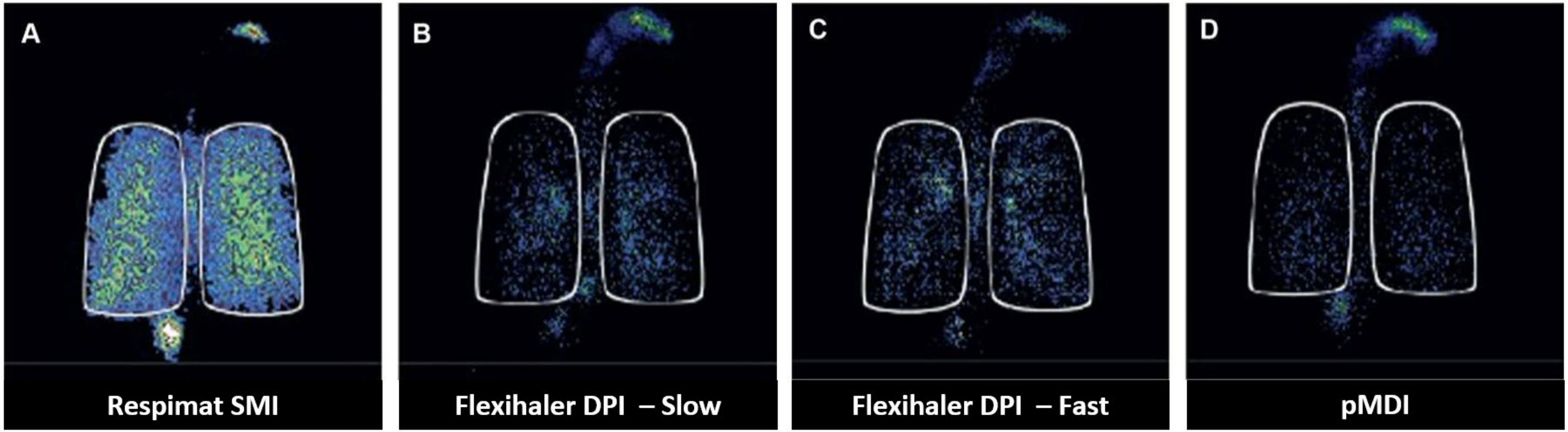
Pros

- No patient coordination required
- Better insurance coverage
- Med delivery not dependent on technique

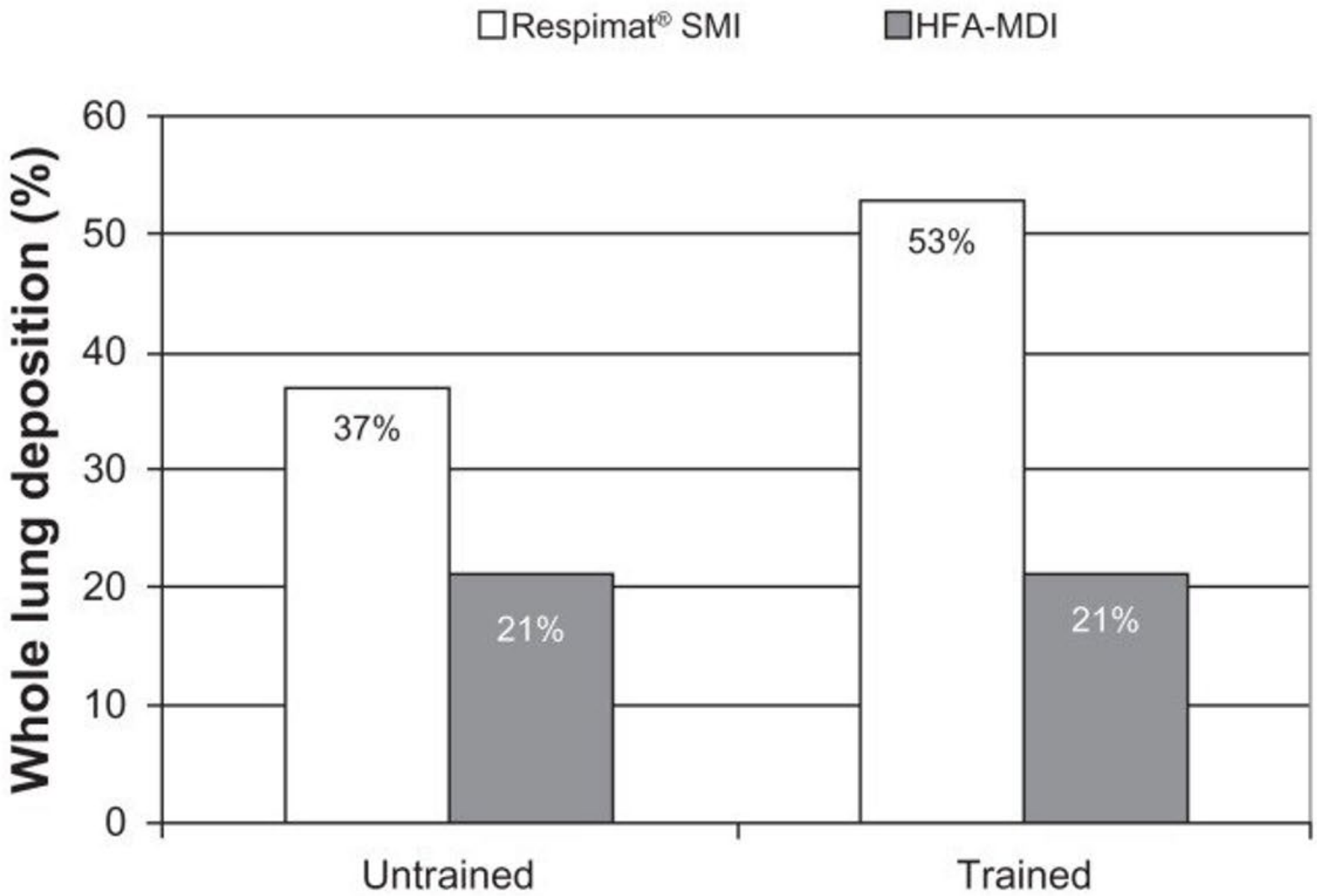
Cons

- TAKES time
- Not portable
- Requires outside energy source

Inhaler Imaging



Pitcairn, G. et al., 2005



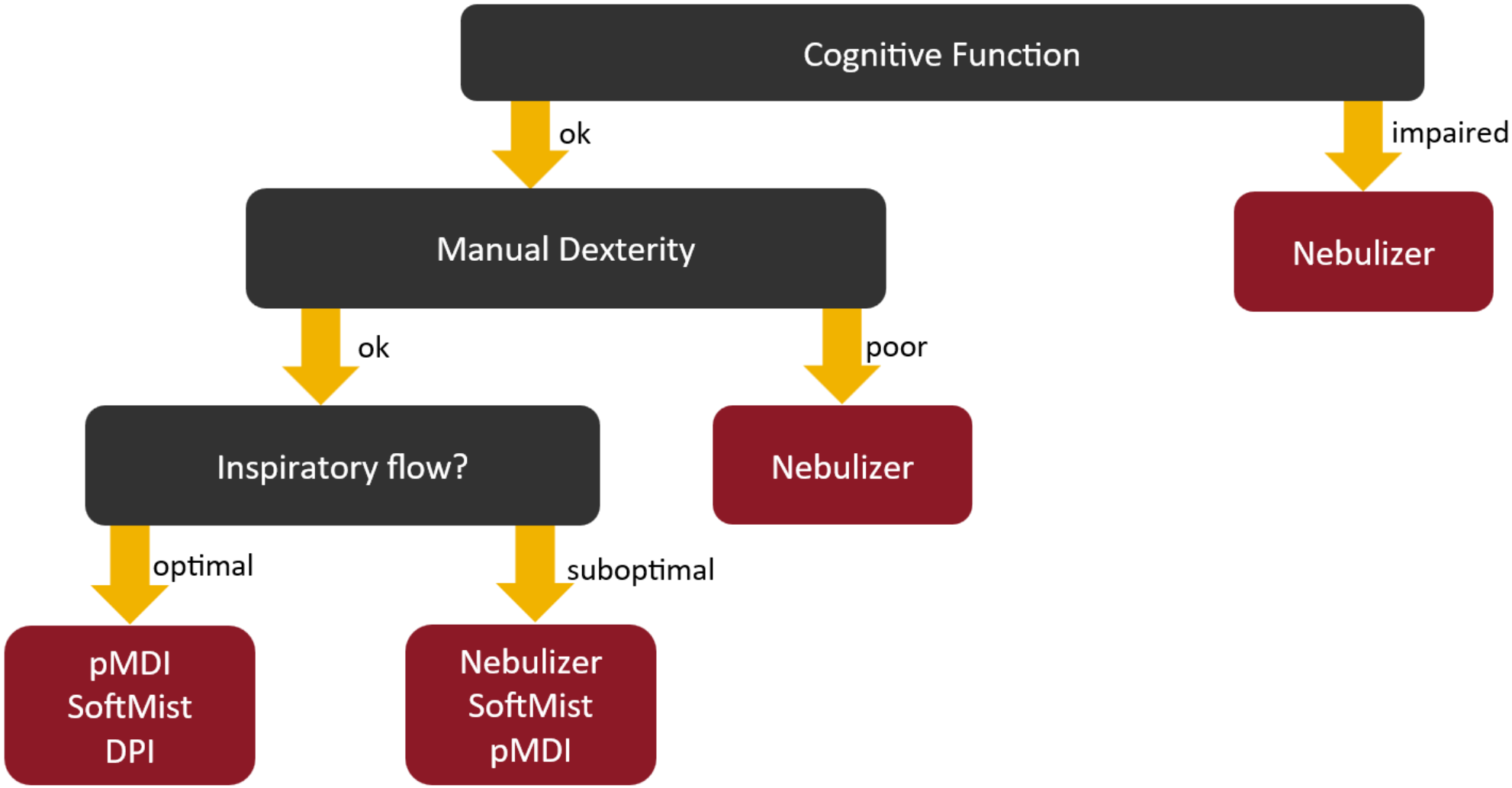
Determining Delivery Device

Questions to ask:

1. Is a deep, quick voluntary inhalation possible?
2. Can sufficient inspiratory flow be obtained?
3. Does the patient have sufficient hand–lung coordination?
4. What other inhaled medications is this patient taking? What devices are they already using?

Cataldo et al., 2022

Respiratory Device Decision Tree



Mahler, D. A., 2020

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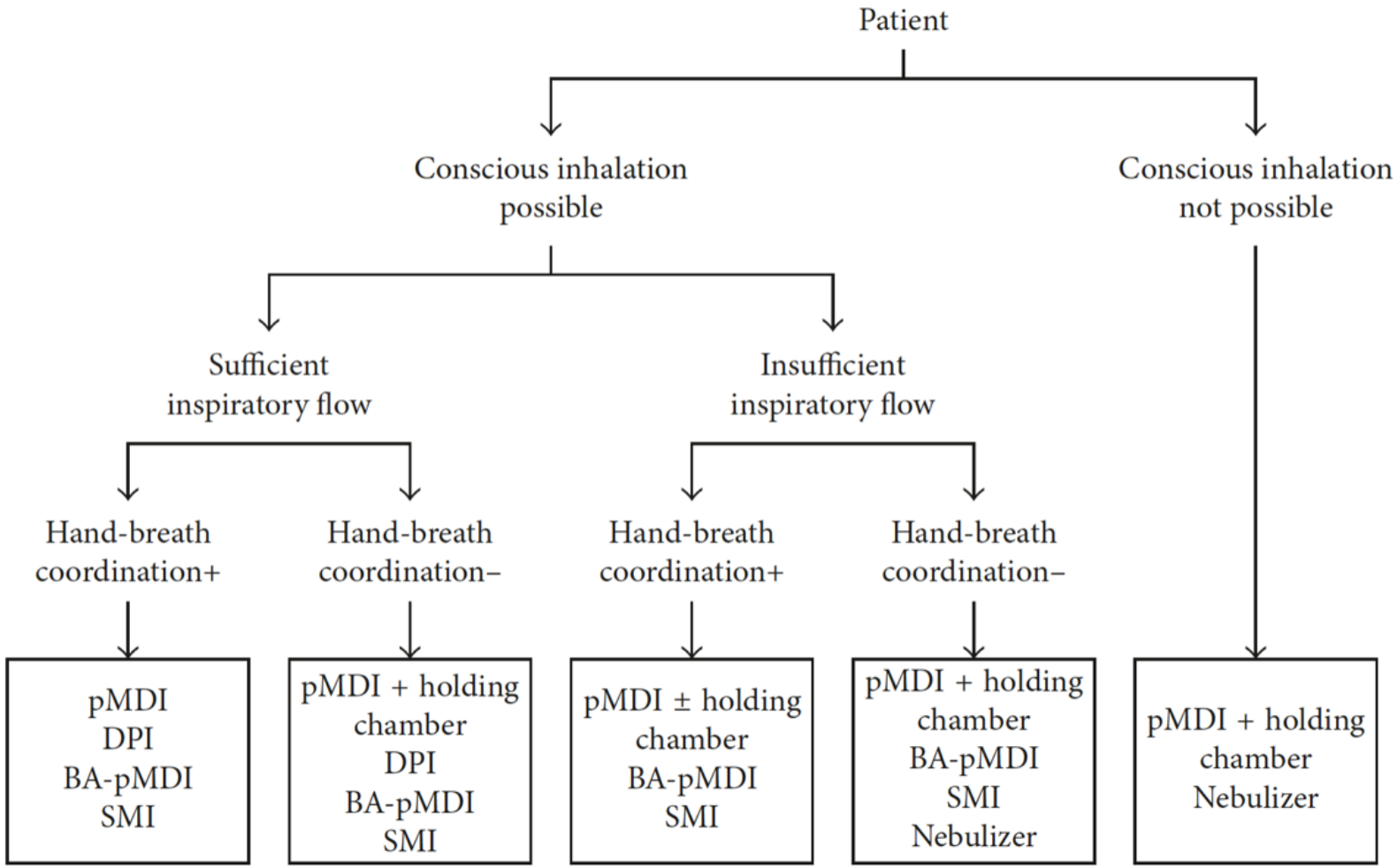
Respiratory Device Decision Tree



Kaplan & Price, 2018

Testing Inspiratory Flow Rate

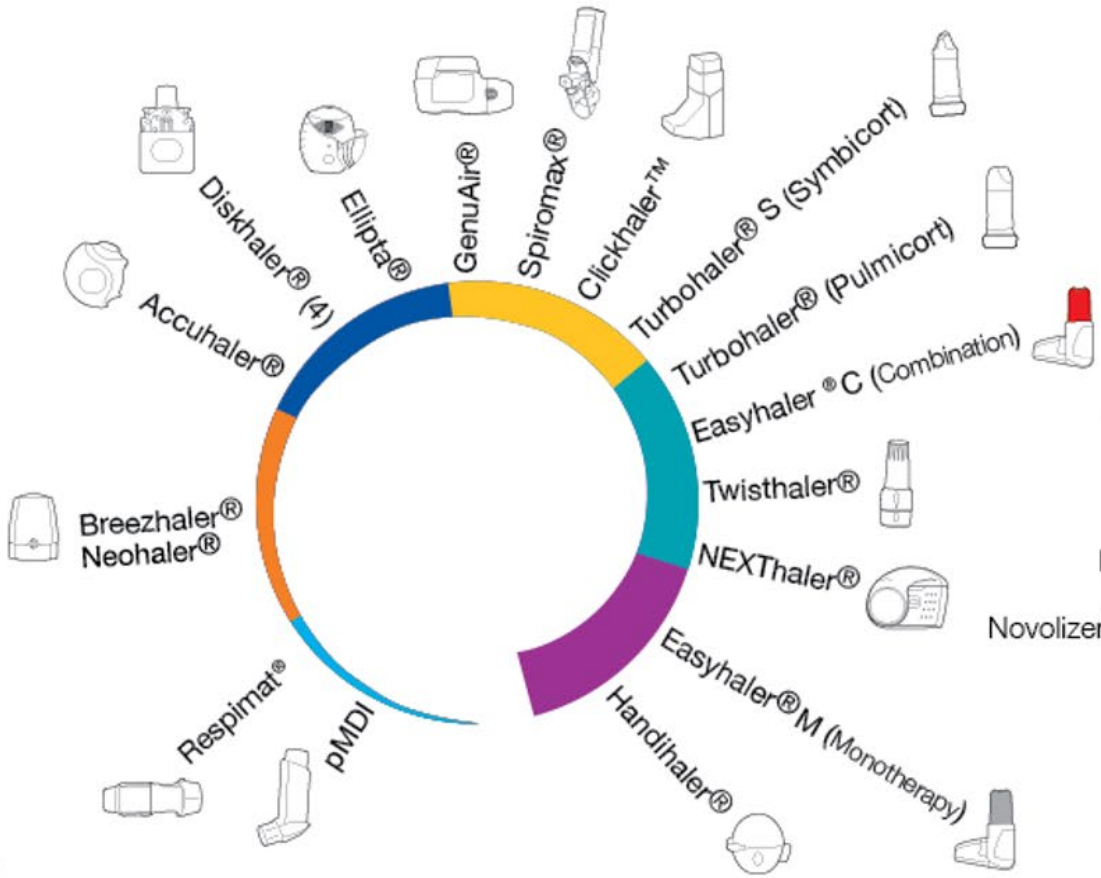
- Post-it note test
- In-Check Dial
- Inhaler Noises

In Check Dial

- Measures inspiratory flow at various resistances

Inhaler Resistance Range

- High
- Med High
- Medium
- Med Low
- Low
- pMDI



International

- Handihaler®
- Easyhaler®
- NEXThaler®
- Twisthaler®
- Turbuhaler®
- Turbuhaler®, Flexhaler®
- Clickhaler™
- RespiClick®, Spiromax®
- Novolizer®, Genuair®, Pressair®
- Ellipta®
- Diskhaler®
- Diskus®
- Breezhaler®, Aerolizer® Neohaler®
- Respimat®

Alliance Tech Medical
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Alliance TECH MEDICAL

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Using the In Check Dial

1. Set resistance to appropriate device
2. Place one way valve
3. Instruct patient on proper breathing technique
    a. Quick for DPI
    b. Slow for pMDI/SMI
4. Review where the red indicator finishes (should be in green zone)
5. Flow will change with different resistances

Link to demo videos & resources

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Using an MDI

1. Prepare the device
2. Exhale completely (away from device)
3. Place inhaler between teeth
4. Seal lips around a mouthpiece
5. Actuate the device and breathe in SLOWLY
6. Take slow, deep breath
7. Hold breath (ideally 5–10 seconds)
8. Exhale

Using an MDI with a Spacer

1. Prepare the device
2. Place inhaler into the end of the spacer
3. Exhale completely (away from device)
4. Close mouth around mouthpiece of spacer
5. Actuate the device and breathe in SLOWLY
    - Some spacers may whistle if you breathe in to quickly
6. Take slow, deep breath
7. Hold breath (ideally 5–10 seconds)
8. Exhale

Using a DPI

1. Prepare the device (this varies on the device)
2. Breathe out completely – away from the device
3. Seal mouth around the mouth piece
    - Teeth should be open
4. Breathe in QUICKLY and deep
5. Hold breath for 5–10 seconds
6. Exhale

Using SoftMist

1. Prime inhaler
2. Breathe out completely – away from the device
3. Seal mouth around the mouth piece
4. Start taking a deep and steady breath as you push the button
5. Hold breath for 5–10 seconds
6. Exhale

Using a nebulizer

1. Assemble nebulizer
2. Place medication in nebulizer cup
3. Place mouthpiece in mouth or don facemask
4. Start nebulizer
5. Breathe normally until nebulizer begins to sputter

Order of Operations

1. Start with SABA
    a. Especially if sick or wheezy
2. Move to controller meds
    a. ESPECIALLY if using a DPI as controller

Key Points

- Respiratory medications are not a one size fits all
- Minimize the number of different devices
- Make sure medication delivery device matches patients needs
- Revisit patient's inhaler technique

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