

# Medical Treatment of Asthma and Related Equipment / Gadgets





# Overview

- ❖ Review of asthma medications
- ❖ Review and demonstration of common asthma equipment and gadgets
- ❖ Practical tips for integrating asthma medication and equipment/gadget knowledge into daily practice

# Medication Treatment Goals

- ❖ Safe and effective medication delivery
- ❖ Provide the least amount of medication needed to allow the student to be active and symptom-free
- ❖ Avoid adverse effects from medications
- ❖ Meet students and families expectations regarding medication

# Key Aspects In The Medical Treatment Of Asthma

- ❖ Relationship with a primary Health Care Provider who is knowledgeable of current asthma treatment guidelines
- ❖ Development, sharing, and use of a personalized Asthma Action Plan or Asthma Management Plan
- ❖ Monitoring of symptoms with a peak flow meter and pulmonary function testing

# Key Aspects Continued...

- ❖ Catching early warning signs and referring for assessment or treatment
- ❖ Well asthma check-ups
  - ✓ Every 6 months for asthma that is under control
  - ✓ More frequently for asthma that is out of control
  - ✓ Stepping up and down therapy as needed



# Asthma Medication Overview



# Controller vs. Reliever Meds

## ■ Controller medication

- Daily medications for all persistent asthma
  - ✓ Long term control
  - ✓ Anti-inflammatory

## ■ Reliever or Quick-relief medication

- Bronchodilators - As needed for all asthma severity levels
  - ✓ Used PRN and preventative for EIA
  - ✓ Bronchodilators
  - ✓ Oral corticosteroid bursts



# Methods Of Delivery

- Medications may be given by:
  - Metered Dose Inhaler (MDI)
  - Dry Powdered Inhaler (DPI)
  - Nebulizer
  - Orally
- Important to review technique for all delivery methods

# Inhalers



**Press and Breathe**



**Breath Actuated  
Aerosol**



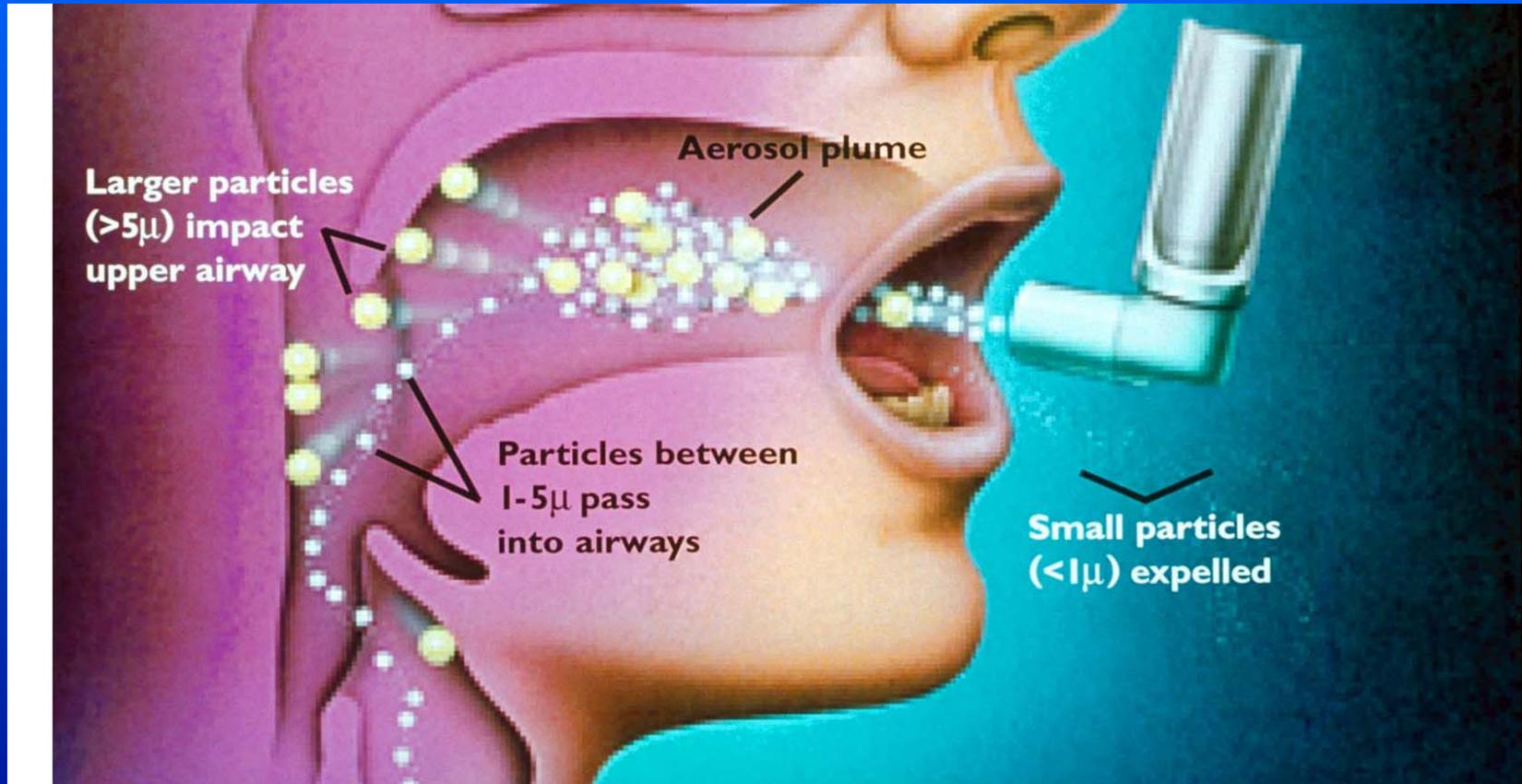
**Dry Powder**

# Aerosol Metered Dose Inhalers and Chambers / Spacers

- **Use a spacer with an aerosol inhaler**
  - ✓ Gets more medication into the lungs (~5 x more than MDI alone)
  - ✓ Fewer side effects such as smaller amount of absorbed medication systemically, less oral thrush and dyphonia



# How MDI Technology Works



# Holding Chamber / Spacer Use



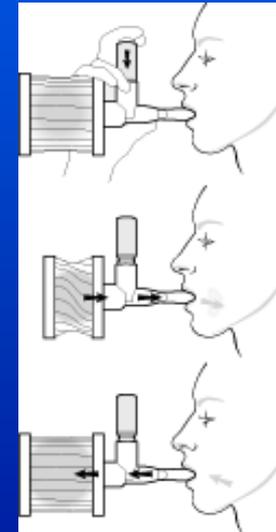


# Common Valved Holding Chambers and Spacers

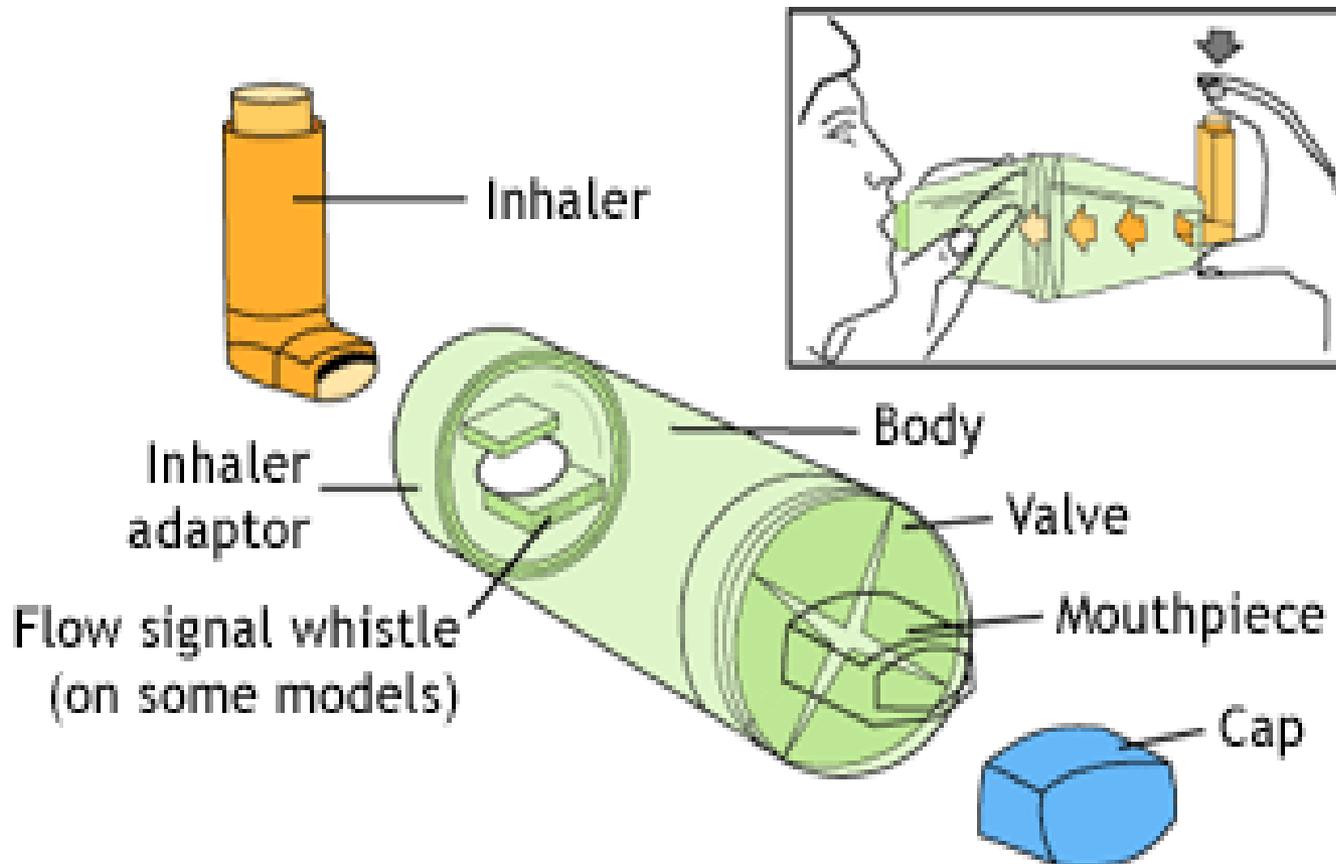


# Chamber / Spacer Demonstration

- ❖ **MDI with common chambers / spacers**
  - ✓ Valved holding chamber (Aerochamber, Optichamber)
  - ✓ Spacer (Ellipse, Optihaler)
- ❖ **MDI with Inspirease spacer**
- ❖ **Cleaning chambers/ spacers**



# How To Use Your Inhaler



# MDI Not Needing A Separate Chamber / Spacer

- **Maxair Autohaler** - Reliever /Rescue med
  - ✓ Breath actuated and should not be used with a chamber or spacer



- **Azmacort** - Controller (daily) med
  - ✓ Has a built-in spacer



# Minnesota Inhaler Law





# MN Asthma Inhaler Law Summary (2001)

- ❖ Allows MN students to self-carry and administer inhalers
- ❖ In order for a child to carry his/her inhaler at school, authorization and signatures from the following individuals are required:
  - ✓ Child's health care provider
  - ✓ Parent/guardian
  - ✓ Assessment and approval of the school nurse (if present in district)

# The Statute: Key Points

- ❖ **Public elementary and secondary school students can possess and use inhalers *if***
  - ✓ The parent has not requested that school personnel administer the medication *and*
  - ✓ The school district receives annual written parental authorization *and*
  - ✓ The inhaler is properly labeled *and*



# Key Points Continued...

- ✓ The school nurse or other appropriate party assesses the student's knowledge and skills to safely possess and use the inhaler and enters a plan into the student's health record

*OR*

- ✓ For schools without a school nurse, the student's physician conducts the assessment and submits written verification



# Discussion

- What knowledge and skills do students need to obtain before being allowed to independently carry and administer their inhalers?



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# Medication: Determined By Severity Level Classification

## 1. Mild Intermittent

Reliever only prn

## 2. Mild Persistent

Controller and reliever

## 3. Moderate Persistent

Controller plus long-acting bronchodilator and reliever

## 4. Severe Persistent

Controller plus long-acting bronchodilator and reliever



# Order Of Medication Administration

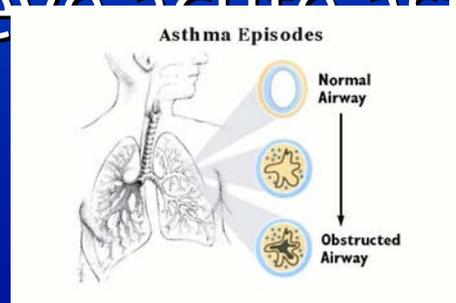
- ❖ If a student is taking both an inhaled reliever and an inhaled controller at the same time:
  - ✓ Give the reliever medication first, before taking the controller
  - ✓ Wait a few minutes between medications



# Controllers

## Inhaled Corticosteroids

- ✓ Reduces airway swelling over time, decreases airway hyper-responsiveness
- ✓ Must be taken daily, even if no symptoms
- ✓ Will **not** relieve acute asthma symptoms



# Controllers

## Inhaled Corticosteroids Cont...

- ✓ When used consistently over time will prevent/control inflammation and acute episodes
- ✓ Dose/strength may need to be increased or decreased depending on season of the year (step up / step down)
- ✓ Inhaled steroids start to work in days to weeks, oral steroids within 6-24 hours



# Inhaled Corticosteroids

- **Flovent** (Fluticasone - MDI)
- **Pulmicort** (Budesonide - DPI or nebs)
- **Asmanex** (Mometasone)
- **Azmacort** (Triamcinolone)
- **Beclovent, Qvar, Vanceril**  
(Beclomethasone)
- **Aerobid** (Flunisolide)



# Inhaled Corticosteroids

- **Potential adverse effects**
  - ✓ Cough, dysphonia, thrush
- **Therapeutic issues**
  - ✓ Chambers/spacers necessary for MDIs
  - ✓ Different inhaled corticosteroids are not interchangeable
  - ✓ Azmacort and Aerobid reportedly have particularly bad taste, Pulmicort Turbuhaler has no taste



# Steroid Phobia: Unfounded!

- ❖ Inhaled steroids in doses most often prescribed are very safe
- ❖ Inhaled meds delivered directly to lungs where they are needed
- ❖ Little systemic absorption if proper technique used
- ❖ CAMP study results

# Turbuhaler Use Demo

- ❖ Need deep, forceful inhalation
- ❖ May use Turbutester to help determine if an individual is able to use
- ❖ Counter (dots in window) turns red when doses running out





# Non-Steroidal Anti-inflammatory

- **Intal** (Cromolyn) (also available as Intal HFA)
- **Tilade** (Nedocromil)
  - ✓ For symptom prevention or as preventive treatment prior to allergen exposure or exercise

## Potential adverse effects

- ✓ None (Tilade tastes bad)

## Therapeutic issues

- ✓ Must be taken up to 4 times a day, maximum benefit after 4-6 weeks



# IgE Blocker Therapy

## **Xolair** (Omalizumab)

- ✓ Dosing based on IgE levels and weight
- ✓ Only for ages over 12 years old
- ✓ Use in conjunction with other meds
- ✓ Must have evidence of specific allergy sensitivity
- ✓ Used for those with poorly controlled asthma and non-compliant with standard recommended therapy
- ✓ Delivered by SQ injection



# Serevent Diskus (Salmeterol)



# Foradil (Formoterol)





# Long-acting Beta-agonists

- **Serevent** (Salmeterol) (Diskus)
- **Foradil** (Fomoterol) (DPI)

## Potential adverse effects

- ✓ Tachycardia, tremors, hypokalemia

## Therapeutic issues

- ✓ Should not be used in place of anti-inflammatory therapy

# Methylxanthines

- **Theophylline**

- ✓ For prevention of symptoms (bronchodilation, and possible epithelial effects)

## Potential adverse effects

- ✓ Insomnia, upset stomach, hyperactivity, bed wetting

## Therapeutic issues

- ✓ Must monitor serum concentrations, not helpful in acute exacerbations, absorption and metabolism affected by many factors

# Combination Medication

## Advair (Flovent + Serevent)

- ✓ Combo *corticosteroid* and *long acting beta-agonist*
- ✓ 3 strengths: **100/50, 250/50, 500/50**
- ✓ Strengths based on Flovent doses, Serevent dose remains the same in all three strengths.
- ✓ Diskus Dry Powdered Inhaler
- ✓ Usual dosing, 1 inhalation every 12 hours
- ✓ Has remaining-dose counter



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# Diskus Demonstration

## Diskus (Advair and Serevent)

- Breath in deep and steady
- 1 breath per dose
- Counter tracks remaining doses
- 3 strengths Advair 100 (green label), 250 (yellow label), 500 (red label)
- 60 doses per diskus



# Leukotriene Modifiers

- **Singulair** (Montelukast)
- **Accolate** (Zafirlukast)
- **Zyflo**
  - ✓ Oral: Prevention of symptoms in mild persistent asthma, and/or to enable a reduction in dosage of inhaled steroids in moderate to severe persistent asthma

## Potential adverse effects

- ✓ None significant elevation of liver enzymes

## Therapeutic issues

- ✓ Drug interactions, monitor hepatic enzymes (esp. Zyflo)



# “Relievers” (Bronchodilators)

- ❖ Relaxes muscles in the airways to help relieve asthma symptoms
- ❖ Should be taken as needed for symptoms
- ❖ Need to wait 1-2 minutes between puffs for best deposition of medication in the lungs
- ❖ Overuse is a big warning sign indicating the child’s asthma may not be well controlled



# Short-acting Inhaled Bronchodilators

- **Proventil, Ventolin** (Albuterol)
- **Xopenex** (Levalbuterol)
- **Maxair Autohaler** (Pirbuterol)
- **Alupent** (Metaproterenol)
  - ✓ For relief of acute symptoms or as preventive treatment prior to exercise

## Potential adverse effects

- ✓ Tremors, tachycardia, headache

## Therapeutic issues

- ✓ Drugs of choice for acute bronchospasm



# Anticholinergics

**Atrovent** (Ipratropium Bromide)

**Combivent** (Albuterol + Atrovent)

- ✓ For relief of acute bronchospasm, especially if albuterol alone isn't effective

## Potential adverse effects

- ✓ Dry mouth, flushed skin, tachycardia

## Therapeutic issues

- ✓ Does not reverse allergy-induced bronchospasm or block exercise-induced asthma
- ✓ May have additive effect to beta-agonist, slower onset

# Systemic Corticosteroids

**Pediapred**

**Prelone**

**Prednisone**

**Orapred**

- ✓ Prevents progression of moderate to severe exacerbations, reduces inflammation

## Potential adverse effects

- ✓ Short-term- increased appetite, fluid retention, mood changes, facial flushing, stomachache.  
Long term- growth suppression, hypertension, glucose intolerance, muscle weakness, cataracts

# Systemic Steroids continued...

- 2 or more bursts a year signifies poor control and need for daily controller
- 5 bursts/year in asthma is considered “steroid dependent” and caution should be used
- Tapering of oral steroids
  - ✓ Not needed if less than 10-14 days of burst



# Herbal Therapy

## Ephedra (Ma Huang)

- ✓ Dangerous and should be avoided
  - ✓ Potent CNS and CV stimulant
  - ✓ Can be a precursor for methamphetamine
  - ✓ FDA recently banned it's use
- ❖ Many other herbal folk remedies used by different cultures

# Remember To...

- ✓ Ask about daytime and nighttime symptoms and the frequency of albuterol use
- ✓ Assess current severity/control
- ✓ If poor control, refer to Health Care Provider to assess for need for controller/s or dosage change (step up or step down)

# Remember To (Continued)...

- ✓ Be aware of meds that are not being used appropriately and educate student and family accordingly
- ✓ Give guidance and suggestions how to better obtain meds and gadgets for home AND school
- ✓ Consider family dynamics when communicating
- ✓ Check inhaler technique at every opportunity
- ✓ Reinforce successful behavior