

# 2022 Updates in Asthma Care

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SCHOOL OF MEDICINE  
INDIANA UNIVERSITY



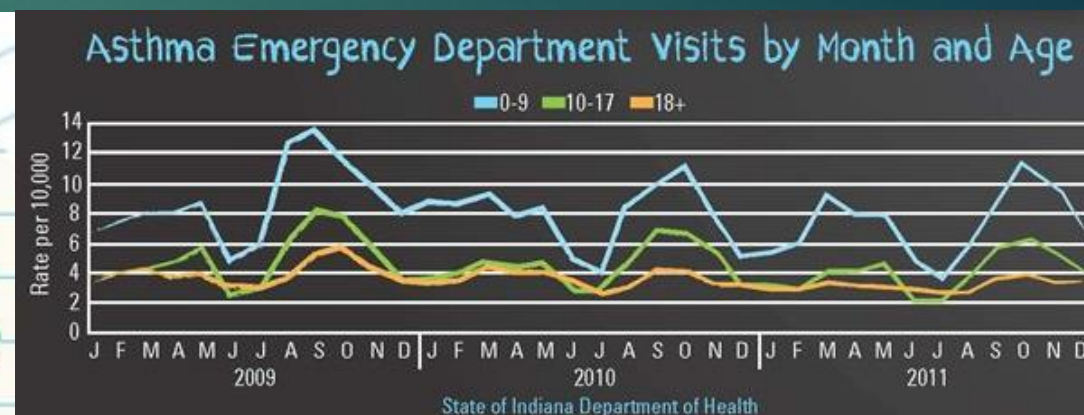
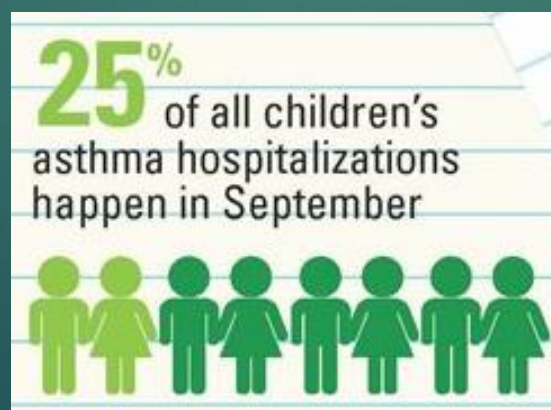
▶ No Disclosures

# Overview

- ▶ Asthma overview
- ▶ New asthma guidelines
  - ▶ Medication usage
  - ▶ Dosing
- ▶ Implications for schools
  - ▶ Reliever therapy
  - ▶ AAPs
  - ▶ Environmental considerations

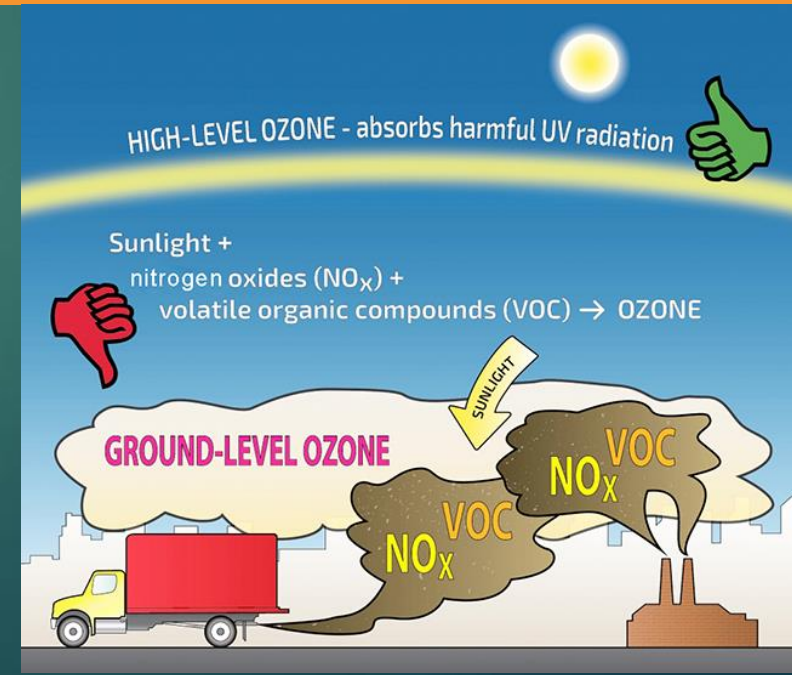
# Asthma in the US

- ▶ Most common chronic disease of childhood
  - ▶ 1 in 11 children
  - ▶ 1 in 6 African American children
- ▶ Severe exacerbations
  - ▶ Hospitalizations
  - ▶ ED visits
  - ▶ September peak



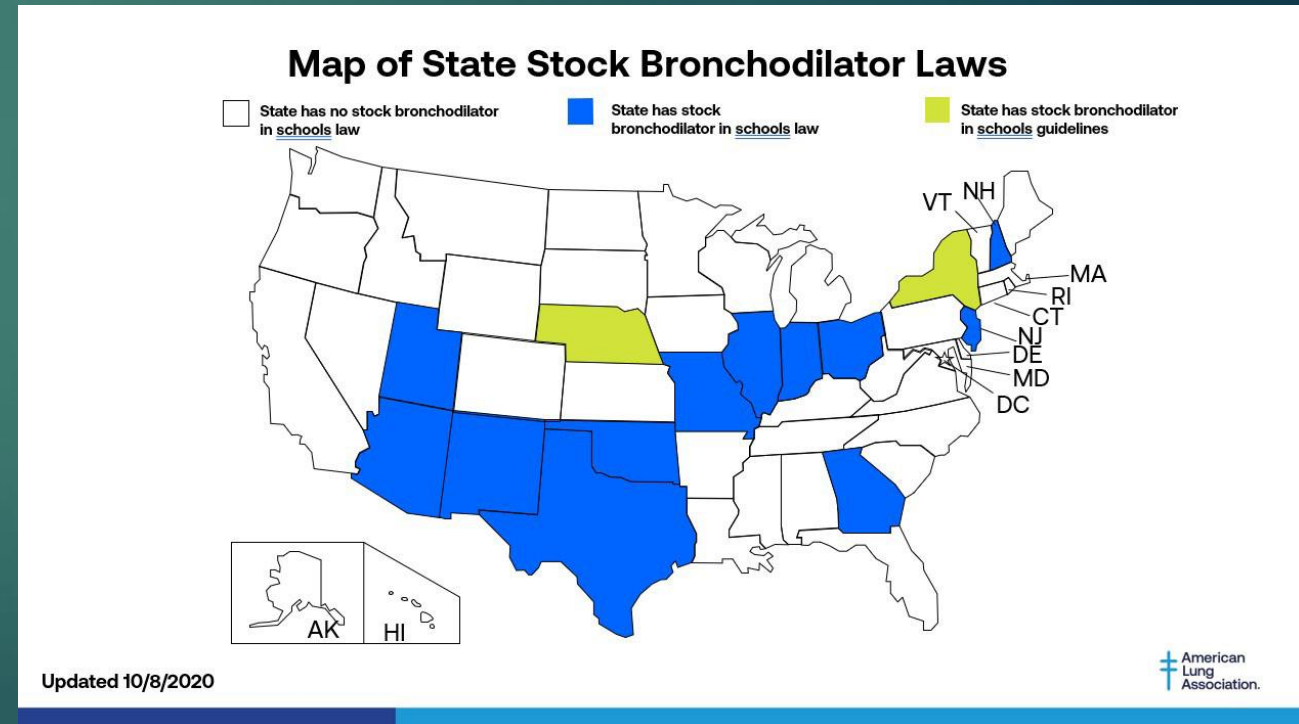
# September Peak

- ▶ Likely due to combination of factors
  - ▶ Mold spores
  - ▶ Weed pollens
  - ▶ Rhinovirus peak
  - ▶ Weather changes
  - ▶ Heat/humidity
  - ▶ Ozone



# September Peak

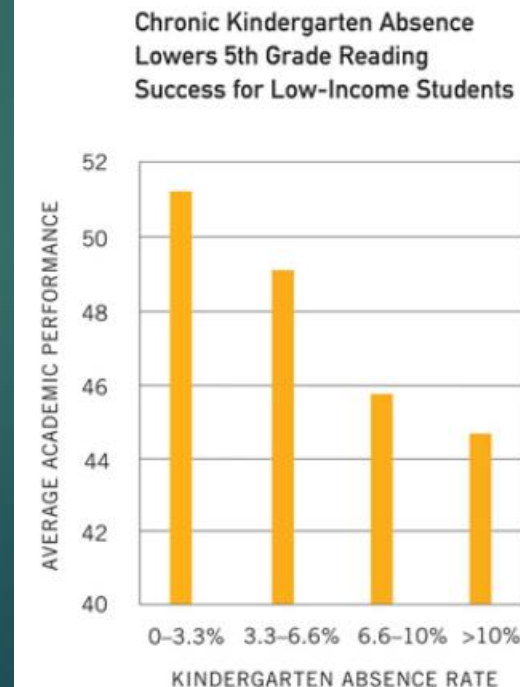
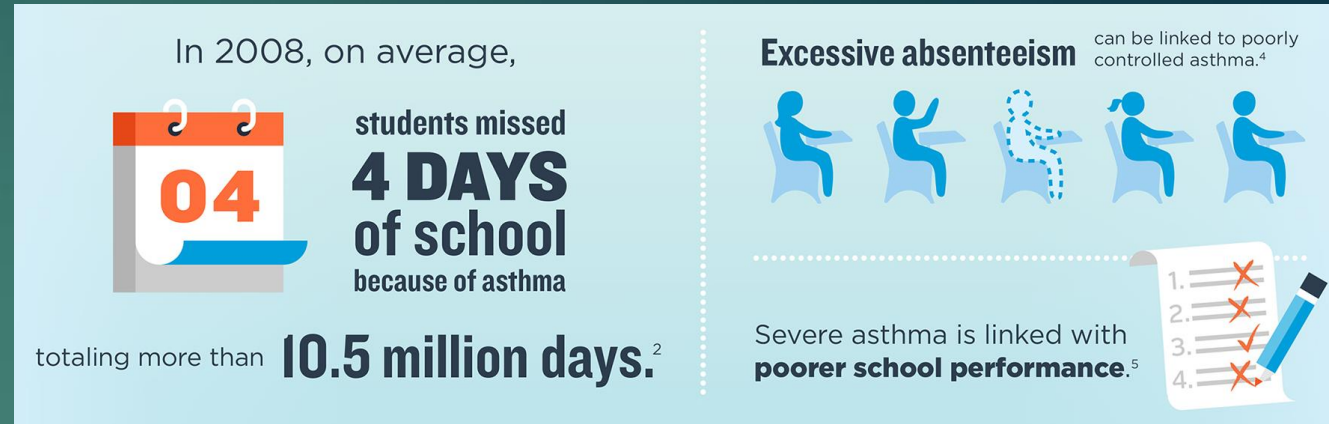
- ▶ First month of school critical
  - ▶ Identify asthmatics as much as possible
  - ▶ Asthma Action Plans
  - ▶ Medication availability
    - ▶ Child's own supply
    - ▶ Stock albuterol
- ▶ Optimize indoor air spaces





# Asthma and School Performance

- ▶ ~ 50% of children with asthma will miss school due to asthma
  - ▶ Average 4 days per child
- ▶ Chronic Absenteeism
  - ▶ Decreased future achievement
- ▶ Uncontrolled asthma
  - ▶ Poor sleep
  - ▶ Increased risk of
    - ▶ ADHD
    - ▶ Anxiety
    - ▶ Depression
  - ▶ Up to >10% school days missed
  - ▶ More likely to repeat a grade



# Changes to Asthma Guidelines



# Ongoing Asthma Care Challenges

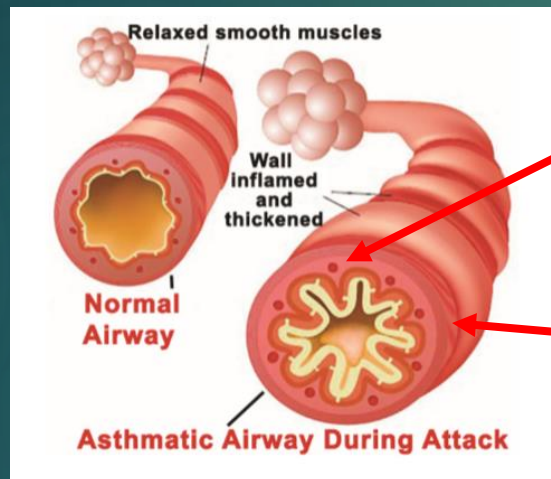
- ▶ Risk of severe exacerbation still significant
  - ▶ Even for “mild” asthmatics
- ▶ Adherence to daily regimen
- ▶ Inhaler confusion
- ▶ Reliance on albuterol

# New Asthma Guidelines

- ▶ Published 2020 by NHLBI
  - ▶ First new set of national US guidelines since 2007
  - ▶ Similar to international GINA guidelines
    - ▶ Updated yearly
- ▶ Try to address some of the challenges in achieving asthma control
- ▶ Main focus:
  - Decrease severe exacerbations**

# Asthma Overview

- ▶ Asthma symptoms are caused by two processes:

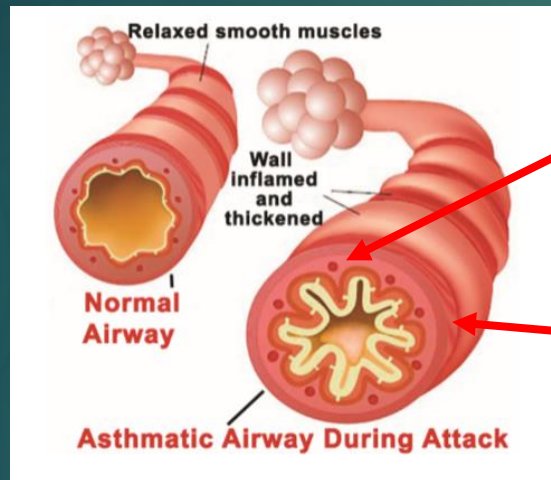


Inflammation

Bronchoconstriction

# Asthma Overview

- ▶ Asthma symptoms are caused by two processes:



Inflammation

- inhaled steroid

← No immediate benefit seen from controller

Bronchoconstriction

- bronchodilator

← Often heavy reliance on reliever

# Types of bronchodilator

- ▶ Short acting beta agonists

- ▶ Albuterol
- ▶ Levalbuterol

Onset of action 10-15 minutes  
Lasts a few hours



- ▶ Long acting beta agonists

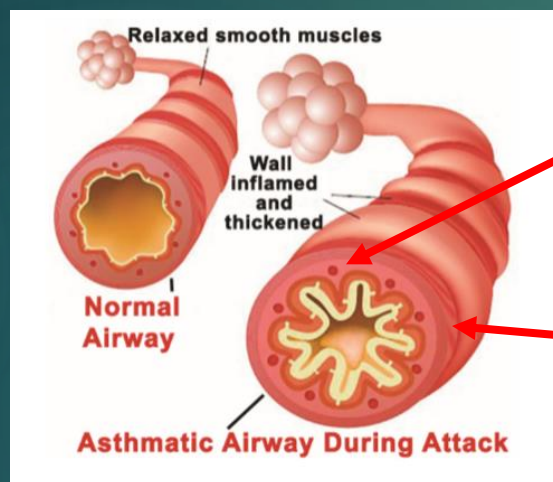
- ▶ Salmeterol (in Advair, Wixela, AirDuo)
- ▶ Vilanterol (in Breo)
- ▶ Formoterol (in Symbicort, Dulera)

Same onset of action as albuterol, levalbuterol  
Longer duration (~12 hours)



# Inhaled steroids with formoterol (ICS-formoterol)

- ▶ ICS-formoterol contains both anti-inflammation and bronchodilator medications



Inflammation

- inhaled steroid

Bronchoconstriction

- bronchodilator

Addresses both

Offers same quick relief as albuterol



# Rationale for ICS-formoterol usage

- ▶ Strong evidence for using both daily and as needed
  - ▶ Multiple studies worldwide, >10,000 participants
- ▶ **25-50%** decrease in severe exacerbations
  - ▶ Hospitalizations
  - ▶ ED visits
- ▶ Avoid confusion of two inhalers
- ▶ Ensure use of ICS rather than bronchodilator alone

# ICS-formoterol: Medications

- ▶ ICS-formoterol formulations:
  - ▶ Symbicort
  - ▶ Generic budesonide-formoterol
  - ▶ Dulera
- ▶ Guidelines have changed
- ▶ FDA approval not yet updated
  - ▶ Still technically “off label”
- ▶ Does **NOT** apply to other combination inhalers (Advair, Breo, AirDuo, etc)



# ICS-formoterol: Strategies

- ▶ Only as needed
  - ▶ Typically age 12+
  - ▶ Similar to albuterol prn
  - ▶ No daily medication
- ▶ Daily and as needed
  - ▶ As young as 4yo
  - ▶ Single inhaler therapy or SMART “Single Maintenance And Reliever Therapy”
- ▶ Dosing 2 puffs up to every 4-6 hours
  - ▶ Age dependent (4-11 y/o: 8 puffs/day; 12+ yrs: 12 puffs/day)

# ICS-formoterol as needed: Key point

If ICS-formoterol is as needed, it

**REPLACES** albuterol

**NOT** in addition to albuterol

# ICS-formoterol as needed

- ▶ Most likely for mild asthmatics with rare exacerbations, no recent hospitalization
- ▶ No daily medication
- ▶ Start Symbicort or Dulera 2 puffs as needed at start of symptoms
  - ▶ Maximum dosing 2 puffs every 4-6 hours
    - ▶ Dependent on age
- ▶ Once symptoms improve, wean back down
  - ▶ Goal to return to no daily medication once flare over

# ICS-formoterol: Single Inhaler/SMART therapy

- ▶ Moderate to severe asthma patients
- ▶ Daily Symbicort or Dulera
  - ▶ Once or twice a day
- ▶ Increase frequency of Symbicort or Dulera at start of symptoms
  - ▶ Maximum dosing 2 puffs every 4-6 hours
    - ▶ Dependent on age
- ▶ Once symptoms improve, wean back down to previous daily dose



# ICS-formoterol: Dosing

- ▶ Important to tell parent/guardian if the child requires unscheduled medication at school
  - ▶ 1-2 puffs per dose, up to every 4-6 hours
  - ▶ Avoid exceeding daily maximum

Age 4-11: **max 8 puffs per day**

Age 12 and up: **max 12 puffs per day**

- ▶ Can be used to pre-treat before activity: 1-2 puffs
  - ▶ Not needed if it has been <4 hours since their last dose
  - ▶ May take a morning dose before school

# ICS-formoterol and albuterol

- ▶ Some children will still have ICS-formoterol daily, albuterol as needed
- ▶ However, should **NOT** be using both
  - ▶ E.g. Symbicort every 6 hours and albuterol every 4 hours
  - ▶ Risk of excessive bronchodilator (heart rate, blood pressure)
  - ▶ Likely needs further evaluation
- ▶ If ICS-formoterol is not available, could substitute a dose of albuterol safely
  - ▶ See school policies regarding emergent albuterol use/stock policy



Other Updates

# ICS and albuterol

- ▶ Typically younger children
  - ▶ Milder disease, no hospitalizations
  - ▶ Usually triggered by viral illnesses
  - ▶ Rare exacerbations (few times per year)
- ▶ No daily medication
  - ▶ Use albuterol as needed for symptoms
  - ▶ Follow each dose of albuterol with a dose of an inhaled steroid (up to every 4 hours)
- ▶ Allows for less steroid use over the course of a year



# Practical Points

# As needed medications

Now multiple options:

- ▶ Albuterol
- ▶ ICS-formoterol
  - ▶ Dulera
  - ▶ Symbicort
  - ▶ Generic budesonide-formoterol
- ▶ Inhaled steroid following albuterol:
  - ▶ Flovent, Qvar, Asmanex





# Insurance Coverage

- ▶ Not all insurance cover more than one ICS-formoterol inhaler per month
  - ▶ If taking as needed, child may have to transport back and forth to home
  - ▶ No additional inhaler to leave at school



# Asthma Action Plan:

## Example for ICS-formoterol prn

### ▶ **Green Zone**

- ▶ None
- ▶ If needs pretreatment, can use 1-2 puffs Symbicort 80/4.5

### ▶ **Yellow Zone**

- ▶ Symbicort 1-2 puffs as needed up to every 6 hours

### ▶ **Red Zone**

- ▶ Symbicort 2 puffs every 4-6 hours (not to exceed # max puffs per day)

# Asthma Action Plan:

## Example for SMART therapy

### ▶ Green Zone

- ▶ Symbicort 2 puffs BID
- ▶ If needs pretreatment, can use 1-2 puffs Symbicort 80/4.5

### ▶ Yellow Zone

- ▶ Symbicort 1-2 puffs as needed up to every 6 hours

### ▶ Red Zone

- ▶ Symbicort 2 puffs every 4-6 hours (not to exceed # max puffs per day)

# Asthma Action Plan:

## Example for ICS and albuterol

### ▶ **Green Zone**

- ▶ None
- ▶ If needs pretreatment, can use 2 puffs albuterol

### ▶ **Yellow Zone**

- ▶ Albuterol 2-4 puffs as needed up to every 4 hours
- ▶ Flovent 44mcg 2 puffs following each albuterol dose

### ▶ **Red Zone**

- ▶ Albuterol 4-6 puffs every 4 hours
- ▶ Flovent 44mcg 2 puffs following each albuterol dose

# Situation #1

- ▶ A 13 y/o comes to school carrying a Dulera inhaler, and an albuterol inhaler
  - ▶ Primarily uses Dulera, but has albuterol too “just in case”
- ▶ How to intervene?
- ▶ Options:
  - ▶ Counsel patient that it's usually better to stick with just one kind of reliever medicine
    - ▶ Avoid “doubling up”
  - ▶ Have child report what their understanding of Dulera usage is
    - ▶ See if fits with new guidelines
  - ▶ Contact parent, request AAP to clarify
  - ▶ Get parent permission to contact doctor's office
    - ▶ Request AAP directly from them

# Situation #2

- ▶ 6 y/o with asthma, parent brings in a steroid inhaler (e.g. Flovent) and says that the doctor said to use as needed
  - ▶ No albuterol
  - ▶ States doctor changed medications
- ▶ Is this potentially true?
- ▶ Yes, but...
  - If inhaled steroids are given only with illnesses, albuterol is given as well
- ▶ Possible scenarios:
  - ▶ Inhaled steroid intended to be given after each albuterol dose, as needed with illnesses
  - ▶ Inhaled steroid intended to be daily, with albuterol as needed



# Non-medication interventions

# Non-medication interventions

- ▶ Guidelines also recommend environmental assessment
- ▶ Decrease exposure to triggers
- ▶ Indoor air quality
  - ▶ Assess
  - ▶ Optimize

# Strategies to improve indoor air quality

- ▶ Avoid irritant use in schools:
  - ▶ Perfumes
  - ▶ Aerosols
  - ▶ Airborne particles
  - ▶ Strong smelling cleaners
- ▶ Knozone action days
- ▶ Pests
  - ▶ Integrated pest management
  - ▶ Weatherization
- ▶ Ventilation
  - ▶ Poor ventilation also related to
    - ▶ Increased virus transmission
    - ▶ Decreased cognitive function
    - ▶ Headaches, nausea, fatigue
    - ▶ Increased energy costs

# Indoor Environments

## ▶ EPA

- ▶ Self-guided assessment app
- ▶ On demand webinars
- ▶ Funding opportunities:

<https://www.epa.gov/iaq-schools/forms/webinar-ventilation-and-virus-mitigation-schools-creating-game-plan-reduce-covid>

**Website:** [www.epa.gov/iaq-schools](https://www.epa.gov/iaq-schools)

**App:** Schools IAQ Assessment Mobile App

**Email:** [iaqschools@epa.gov](mailto:iaqschools@epa.gov)



The screenshot shows the EPA website header with the logo and navigation links: Environmental Topics, Laws & Regulations, and About EPA. A search bar is on the right. Below the header, the page title is 'Healthy Indoor Environments in Schools: Plans, Practices and Principles for Maintaining Healthy Learning Environment'. The page also includes a 'Related Topics' link for 'Indoor Air Quality in Schools' and social media sharing options for Facebook, Twitter, and Email.

**Healthy Indoor Environments in Schools:  
Plans, Practices and Principles for Maintaining  
Healthy Learning Environment**

**Webinar: Ventilation and Virus Mitigation in  
Schools – Creating a Game Plan to Reduce  
COVID-19 Risk and Make Lasting  
Improvements to IAQ**

Recorded February 25, 2021

# Resources / More Information

- ▶ Indiana Joint Asthma Coalition

[www.injac.org](http://www.injac.org)

- ▶ Knozone

[www.knozone.com](http://www.knozone.com)

- ▶ Allergy and Asthma Foundation of America

[www.aaafa.org](http://www.aaafa.org)

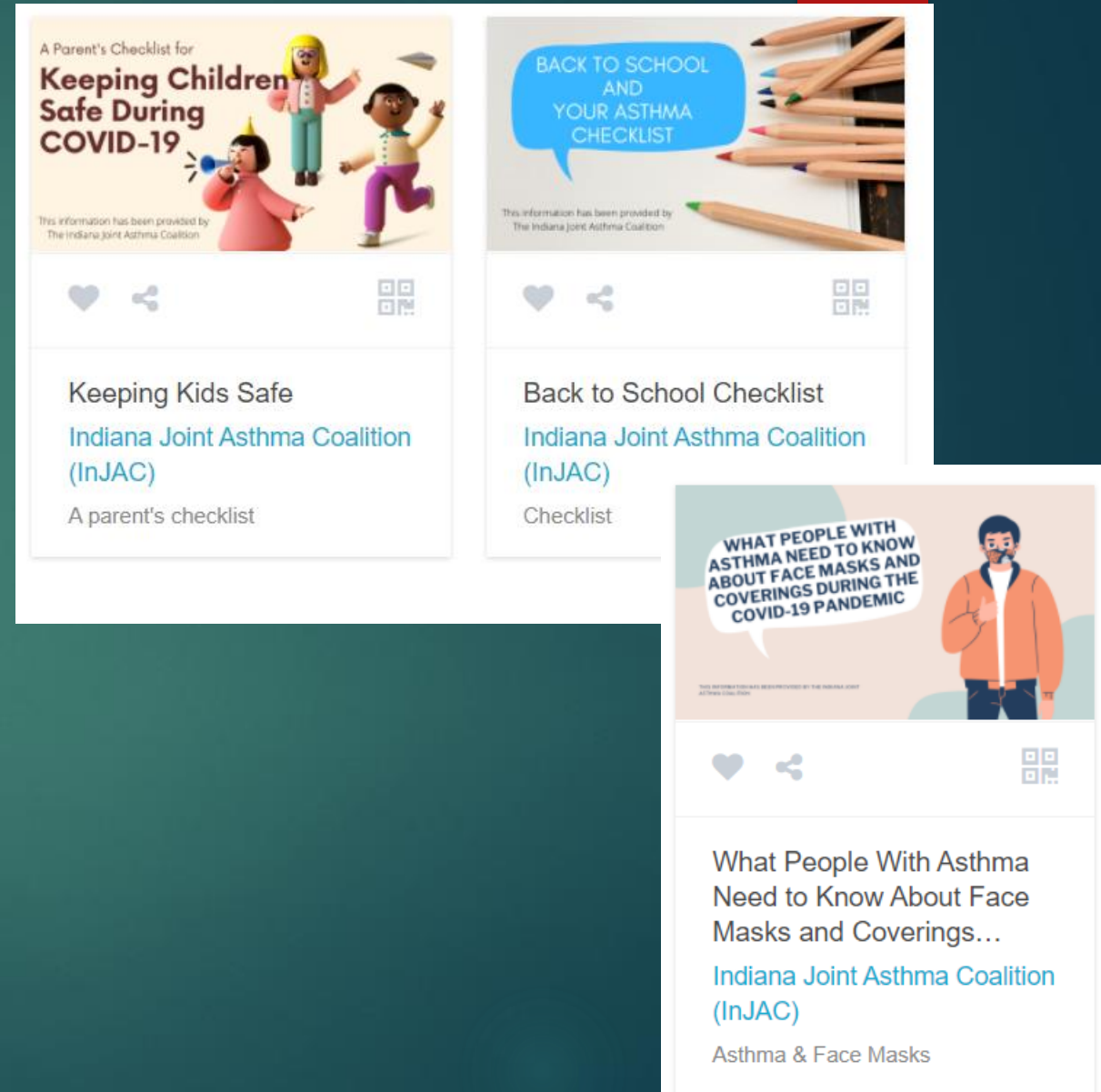
- ▶ Marion County Health Department

- ▶ Indiana State Department of Health



# InJAC Resources

- ▶ Mobissue “books”  
<https://mobissue.com/homepage/avxz>
- ▶ Community Health Worker training
  - ▶ Online modules
- ▶ AAFA: Downloadable booklets
- ▶ Asthma Summit August 2022



# Summary

- ▶ New asthma guidelines
  - ▶ Primary goal: decrease severe exacerbations
  - ▶ ICS-formoterol as reliever
    - ▶ Reliever only
    - ▶ Maintenance and reliever
  - ▶ Intermittent inhaled steroid and albuterol possible for young, mild patients
- ▶ Challenges in implementation
  - ▶ Asthma Action Plan availability
  - ▶ Communication between doctor's office, school, parent
- ▶ Non medication interventions
  - ▶ Ventilation
  - ▶ Indoor air quality
  - ▶ Resources available



Name: \_\_\_\_\_ D.O.B.: \_\_\_\_\_

Allergy to: \_\_\_\_\_

Weight: \_\_\_\_\_ lbs. Asthma: ☐ Yes (higher risk for a severe reaction) ☐ No

PLACE  
PICTURE  
HERE

NOTE: Do not depend on antihistamines or inhalers (bronchodilators) to treat a severe reaction. USE EPINEPHRINE.

Extremely reactive to the following foods: \_\_\_\_\_

THEREFORE:

☐ If checked, give epinephrine immediately for ANY symptoms if the allergen was likely eaten.

☐ If checked, give epinephrine immediately if the allergen was definitely eaten, even if no symptoms are noted.

FOR ANY OF THE FOLLOWING:  
**SEVERE SYMPTOMS**



**LUNG**  
Short of breath,  
wheezing,  
repetitive cough



**HEART**  
Pale, blue,  
faint, weak  
pulse, dizzy



**THROAT**  
Tight, hoarse,  
trouble  
breathing/  
swallowing



**MOUTH**  
Significant  
swelling of the  
tongue and/or lips



**SKIN**  
Many hives over  
body, widespread  
redness



**GUT**  
Repetitive  
vomiting, severe  
diarrhea



**OTHER**  
Feeling  
something bad is  
about to happen,  
anxiety, confusion

OR A  
COMBINATION  
of symptoms  
from different  
body areas.

1. **INJECT EPINEPHRINE IMMEDIATELY.**
2. Call 911. Tell them the child is having anaphylaxis and may need epinephrine when they arrive.
- Consider giving additional medications following epinephrine:
  - Antihistamine
  - Inhaler (bronchodilator) if wheezing
- Lay the person flat, raise legs and keep warm. If breathing is difficult or they are vomiting, let them sit up or lie on their side.
- If symptoms do not improve, or symptoms return, more doses of epinephrine can be given about 5 minutes or more after the last dose.
- Alert emergency contacts.
- Transport them to ER even if symptoms resolve. Person should remain in ER for at least 4 hours because symptoms may return.

**MILD SYMPTOMS**



**NOSE**  
Itchy/runny  
nose,  
sneezing



**MOUTH**  
Itchy mouth



**SKIN**  
A few hives,  
mild itch



**GUT**  
Mild nausea/  
discomfort

FOR MILD SYMPTOMS FROM MORE THAN ONE  
SYSTEM AREA, GIVE EPINEPHRINE.

FOR MILD SYMPTOMS FROM A SINGLE SYSTEM  
AREA, FOLLOW THE DIRECTIONS BELOW:

1. Antihistamines may be given, if ordered by a healthcare provider.
2. Stay with the person; alert emergency contacts.
3. Watch closely for changes. If symptoms worsen, give epinephrine.

**MEDICATIONS/DOSES**

Epinephrine Brand: \_\_\_\_\_

Epinephrine Dose: ☐ 0.15 mg IM ☐ 0.3 mg IM

Antihistamine Brand or Generic: \_\_\_\_\_

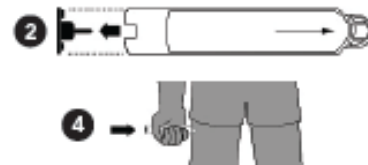
Antihistamine Dose: \_\_\_\_\_

Other (e.g., Inhaler-bronchodilator if wheezing): \_\_\_\_\_

PARENT/GUARDIAN AUTHORIZATION SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_ PHYSICIAN/HEP AUTHORIZATION SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

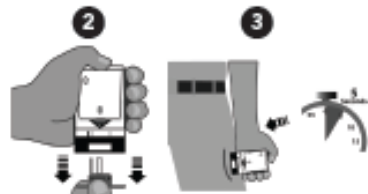
**EPIPEN® (EPINEPHRINE) AUTO-INJECTOR DIRECTIONS**

1. Remove the EpiPen Auto-Injector from the plastic carrying case.
2. Pull off the blue safety release cap.
3. Swing and firmly push orange tip against mid-outer thigh.
4. Hold for approximately 10 seconds.
5. Remove and massage the area for 10 seconds.



**AUVI-Q™ (EPINEPHRINE INJECTION, USP) DIRECTIONS**

1. Remove the outer case of Auvi-Q. This will automatically activate the voice instructions.
2. Pull off red safety guard.
3. Place black end against mid-outer thigh.
4. Press firmly and hold for 5 seconds.
5. Remove from thigh.



**ADRENALIN®/ADRENALIN® GENERIC DIRECTIONS**

1. Remove the outer case.
2. Remove grey caps labeled "1" and "2".
3. Place red rounded tip against mid-outer thigh.
4. Press down hard until needle penetrates.
5. Hold for 10 seconds. Remove from thigh.



**OTHER DIRECTIONS/INFORMATION** (may self-carry epinephrine, may self-administer epinephrine, etc.):

Treat the person before calling emergency contacts. The first signs of a reaction can be mild, but symptoms can get worse quickly.

**EMERGENCY CONTACTS — CALL 911**

RESQUC SQUAD: \_\_\_\_\_

DOCTOR: \_\_\_\_\_ PHONE: \_\_\_\_\_

PARENT/GUARDIAN: \_\_\_\_\_ PHONE: \_\_\_\_\_

**OTHER EMERGENCY CONTACTS**

NAME/RELATIONSHIP: \_\_\_\_\_

PHONE: \_\_\_\_\_

NAME/RELATIONSHIP: \_\_\_\_\_

PHONE: \_\_\_\_\_

PARENT/GUARDIAN AUTHORIZATION SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

# Epinephrine options



0.15 mg (<30 kg) and 0.3 mg (>30 kg)  
Prescribe two plus trainer with refill

0.1 mg (7.5 kg-15 kg)  
0.15 mg (15kg-30 kg)  
0.3 mg (>30 kg)

\$0 for commercial insurance  
OR no insurance and  
household income <\$100k

# Resources for Information



[www.foodallergy.org](http://www.foodallergy.org)

# Questions

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