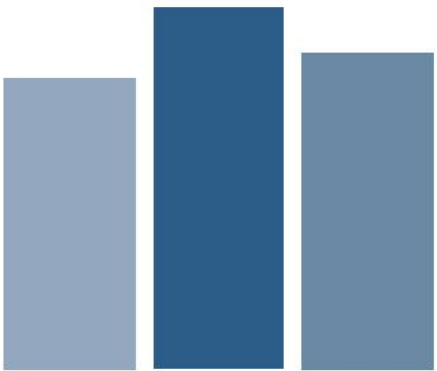


MICIS



Maine Independent Clinical Information Service



Maine Medical Association



Adult & Pediatric Asthma: Evidence-Based Prescribing Update

Elisabeth Fowlie Mock, MD, MPH

Charles Pattavina, MD

Please grab a piece of note paper and a writing instrument or open your phone notes

Disclosures

- MICIS does not accept any money from pharmaceutical companies/commercial interests
- None of the planners or faculty for this educational activity have relevant financial relationships with ineligible companies
- Speakers have no conflicts of interest
- See additional disclosure on slide 12 regarding images of pharmaceutical products.

Learning Objectives

- Categorize medications used in treating asthma
- Apply the newer recommendation for nearly universal inhaled corticosteroids
- Review step-wise asthma therapy

Background Facts

- Most common chronic noncommunicable disease worldwide
- Most common pediatric disease & cause for hospitalization
- Most cases have reversible episodes of airway limitation, followed by inflammation
- Up to 90% of asthma deaths though to be preventable

Diagnosis

- Review history/symptoms
- Confirm using spirometry-avoid empiric trials
- Demonstrate reversibility (FEV1 increase) after bronchodilator

Goals of Treatment

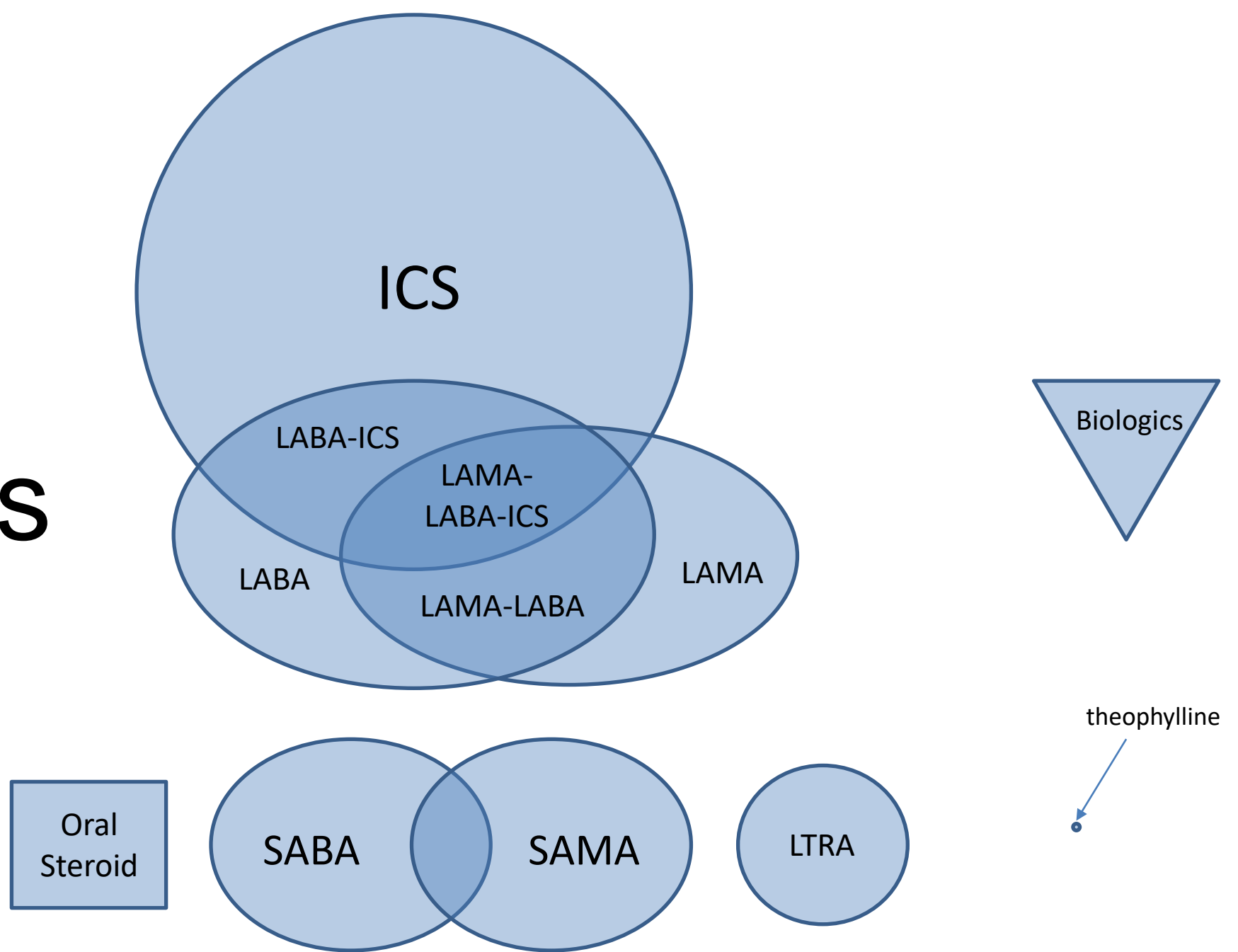
- Achieve symptom-free asthma control
- Prevent exacerbations & hospitalizations
- Prevent decline in lung function
- Avoid adverse effects of (or unnecessary) medications

Learning assessment question 1

- You have a 3rd year medical student/health professions student rotating with you this month
- On day 1, you see 2 patients with asthma & assign the student homework
- On day 2, the student reports back they are having difficulty keeping all the different asthma medicines straight
- What classes of asthma medicines are your highest priority for you to review with the student? (write a list on paper)

Drug Classes

Drug Classes



Mitigation for potential Commercial Bias

- The following image of available branded asthma treatments was produced by the Asthma and Allergy Network whose funders include pharmaceutical corporate sponsors
- The evaluation to include this image considered:
 - it is being presented in an educational manner
 - It is not intended as marketing
 - It is fair and balanced (all available products are represented equally + listed in alphabetical order)

Respiratory Treatments

2021
DISEASE STATES: A = ASTHMA C = COPD



AllergyAsthmaNetwork.org
800.878.4403



American
College
of Allergy,
Asthma
& Immunology

CHEST
FOUNDATION

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.



*used by permission

MICIS
Maine Independent Clinical Information Service

SHORT-ACTING BETA₂-AGONIST BRONCHODILATORS

relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

ProAir® Digihaler™
90 mcg
albuterol sulfate
inhalation powder
D2E A

ProAir® HFA
90 mcg
albuterol sulfate
D2E A G

ProAir® RespiClick®
90 mcg
albuterol sulfate
inhalation powder
D2E A

Proventil® HFA
90 mcg
albuterol sulfate
D2E A G

Ventolin® HFA
90 mcg
albuterol sulfate
D2E A G

Xopenex® HFA
45 mcg
levalbuterol tartrate
A G

LONG-ACTING BETA₂-AGONIST 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

Serevent® Diskus®
50 mcg
salmeterol xinafoate
inhalation powder
D2E A C

Striverdi® Respimat®
2.5 mcg
olodaterol hydrochloride
D2E C

INHALED CORTICOSTEROIDS

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

Alvesco® HFA
90, 180 mcg
ciclesonide
D2E A

ArmonAir® Digihaler™
55, 113, 232 mcg
fluticasone propionate
inhalation powder
D2E A

Arnuity® Ellipta®
50, 100, 200 mcg
fluticasone furoate inhalation powder
D2E A

Asmanex® HFA
50, 100, 200 mcg
mometasone furoate
D2E A

Asmanex® Twisthaler®
110, 220 mcg
mometasone furoate
inhalation powder
D2E A

Flovent® Diskus®
50, 100, 250 mcg
fluticasone propionate
inhalation powder
D2E A

Flovent® HFA
44, 110, 220 mcg
fluticasone propionate
D2E A

Pulmicort Flexhaler®
90, 180 mcg
budesonide inhalation powder
D2E A

QVAR® Redihaler™
40, 80 mcg
beclomethasone dipropionate
D2E A

MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)

relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

Short-acting
Atrovent® HFA
17 mcg
ipratropium bromide
D2E C

Long-acting
Incruse® Ellipta®
62.5 mcg
umeclidinium inhalation powder
D2E C

Spiriva® HandiHaler®
18 mcg
tiotropium bromide inhalation powder
C

Spiriva® Respimat®
1.25, 2.5 mcg
tiotropium bromide
D2E A C

Tudorza™ Pressair™
400 mcg
acridinium bromide inhalation powder
D2E C

COMBINATION MEDICATIONS

contain both short-acting beta₂-agonist and short-acting muscarinic antagonist

Combivent® Respimat®
20/100 mcg
ipratropium bromide and albuterol
D2E C

COMBINATION MEDICATIONS

contain both inhaled corticosteroid and long-acting beta₂-agonist (LABA)

Advair Diskus®
100/50, 250/50, 500/50 mcg
fluticasone propionate and salmeterol xinafoate
D2E A C G

Advair® HFA
45/21, 115/21, 230/21 mcg
fluticasone propionate and salmeterol xinafoate
D2E A G

AirDuo® Digihaler™
55/14, 113/14, 232/14 mcg
fluticasone propionate and salmeterol xinafoate
D2E A

AirDuo® RespiClick®
55/14, 113/14, 232/14 mcg
fluticasone propionate and salmeterol xinafoate
D2E A G

Breo® Ellipta®
100/25, 200/25 mcg
fluticasone furoate and vilanterol inhalation powder
D2E A C

Dulera®
50/5, 100/5, 200/5 mcg
mometasone furoate and formoterol fumarate dihydrate
D2E A

Symbicort®
80/4.5, 160/4.5 mcg
budesonide and formoterol fumarate dihydrate
D2E A C G

Wixela™ Inhub™
100/50, 250/50, 500/50 mcg
fluticasone propionate and salmeterol xinafoate
D2E A C

contain both long-acting beta₂-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

Anoro® Ellipta®
62.5/25 mcg
umeclidinium and vilanterol inhalation powder
D2E C

Bevespi Aerosphere®
9/4.8 mcg
glycopyrrolate and formoterol fumarate
D2E C

Duaklir® Pressair®
400, 12 mcg
acridinium bromide and formoterol fumarate
D2E C

Stiolto™ Respimat®
2.5/2.5 mcg
tiotropium bromide and olodaterol
D2E C

contain inhaled corticosteroid, long-acting beta₂-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

Trelegy® Ellipta®
200/62.5/25 mcg, 100/62.5/25 mcg
fluticasone furoate, umeclidinium and vilanterol inhalation powder
D2E A C

Breztri Aerosphere™
160/9/4.8 mcg
budesonide, glycopyrrolate and formoterol fumarate
D2E C

BIOLOGICS

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

Cinqair®
reslizumab
A

Dupixent®
dupilumab
A

Fasenra™
benralizumab
A

Nucala®
mepolizumab
A

Xolair®
omalizumab
A

BRONCHIAL THERMOPLASTY

A minimally invasive procedure that uses mild heat to reduce airway smooth muscle, leading to fewer severe asthma flares, ER visits, and days lost from activities.
www.bforasthma.com



PDE4 INHIBITORS

ease lung inflammation and reduce exacerbations

Daliresp®
250, 500 mcg
roflumilast
C



Reviewed by Dennis Williams, PharmD

©2021 Allergy & Asthma Network

ICS

INHALED CORTICOSTEROIDS

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
12B A



**ArmonAir®
Digihaler™**
55, 113, 232 mcg
fluticasone
propionate
inhalation
powder
12B A



Arnuity® Ellipta®
50, 100, 200 mcg
fluticasone furoate inhalation
powder
12B A



Asmanex® HFA
50, 100, 200 mcg
mometasone
furoate
12B A



**Asmanex®
Twisthaler®**
110, 220 mcg
mometasone
furoate
inhalation
powder
12B A



Flovent® Diskus®
50, 100, 250 mcg
fluticasone
propionate
inhalation
powder
12B A



Flovent® HFA
44, 110,
220 mcg
fluticasone
propionate
12B A



**Pulmicort
Flexhaler®**
90, 180 mcg
budesonide
inhalation
powder
12B A



**QVAR®
Redihaler™**
40, 80 mcg
beclomethasone
dipropionate
12B A



Benefits of Low-Dose ICS

↑ Quality of life

↑ Lung function

↑ Control of airway
inflammation

↓ Asthma symptoms

↓ Airway hyper-responsiveness

↓ Exacerbations

↓ Mortality

ICS-LABA

COMBINATION MEDICATIONS

contain both inhaled corticosteroid and long-acting beta₂-agonist (LABA)

Advair Diskus®
100/50, 250/50,
500/50 mcg

fluticasone propionate
and salmeterol
inhalation powder

123 A C G



Advair® HFA

45/21, 115/21,
230/21 mcg
fluticasone
propionate and
salmeterol
xinafoate

123 A G



**AirDuo®
DigiHaler™**

55/14, 113/14,
232/14 mcg
fluticasone propionate
and salmeterol
inhalation
powder

123 A



**AirDuo®
RespiClick®**

55/14, 113/14,
232/14 mcg
fluticasone
propionate
and salmeterol
inhalation
powder

123 A G



Breo® Ellipta®
100/25, 200/25 mcg

fluticasone furoate
and vilanterol
inhalation powder

123 A C



Dulera®

50/5, 100/5,
200/5 mcg

mometasone furoate
and formoterol
fumarate dihydrate

123 A



Symbicort®

80/4.5, 160/4.5 mcg
budesonide and
formoterol fumarate
dihydrate

123 A C G



Wixela™ Inhub™

100/50, 250/50,
500/50 mcg

fluticasone propionate
and salmeterol xinafoate
(approved generic of
Advair Diskus)

123 A C



SABA

SHORT-ACTING BETA₂-AGONIST BRONCHODILATORS

relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

ProAir® Digihaler™

90 mcg
albuterol
sulfate
inhalation
powder

123 A



ProAir® HFA

90 mcg
albuterol
sulfate

123 A G



ProAir RespiClick®

90 mcg
albuterol sulfate
inhalation
powder

123 A



Proventil® HFA

90 mcg
albuterol
sulfate

123 A G



Ventolin® HFA

90 mcg
albuterol
sulfate

123 A G



Xopenex HFA®

45 mcg
levalbuterol
tartrate

A G



LABA

LONG-ACTING BETA₂-AGONIST 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

**Serevent[®]
Diskus[®]**

50 mcg

salmeterol xinafoate
inhalation powder

123 AC



**Striverdi[®]
Respimat[®]**

2.5 mcg

olodaterol
hydrochloride

123 C



****don't use as monotherapy in asthma!**

SAMA-LAMA

MUSCARINIC ANTAGONISTS (ANTICHOLINERGIC)

relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

Short-acting

Atrovent[®] HFA
17 mcg
ipratropium
bromide

12B C



Long-acting

Incruse[®] Ellipta[®]
62.5 mcg
umeclidinium
inhalation powder

12B C



Spiriva[®] HandiHaler[®]
18 mcg
tiotropium
bromide
inhalation
powder

C



Spiriva[®] Respimat[®]
1.25, 2.5 mcg
tiotropium
bromide

12B A C



Tudorza[™] Pressair[™]
400 mcg
aclidinium bromide
inhalation powder

12B C



LAMA-LABA & LAMA-LABA-ICS

contain both long-acting beta₂-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

Anoro[®] Ellipta[®]

62.5/25 mcg

umeclidinium and vilanterol inhalation powder

123 C



Bevespi Aerosphere[®]

9/4.8 mcg

glycopyrrolate and formoterol fumarate

123 C



Duaklir[®] Pressair[®]

400, 12 mcg

aclidinium bromide and formoterol fumarate

123 C



Stiolto[™] Respimat[®]

2.5/2.5 mcg

tiotropium bromide and olodaterol

123 C



contain inhaled corticosteroid, long-acting beta₂-agonist (LABA) and long-acting muscarinic antagonist (LAMA)

Trelegy[®] Ellipta[®]

200/62.5/25 mcg, 100/62.5/25 mcg

fluticasone furoate, umeclidinium and vilanterol inhalation powder

123

A C



Breztri Aerosphere[™]

160/9/4.8 mcg

budesonide, glycopyrrolate and formoterol fumarate

C

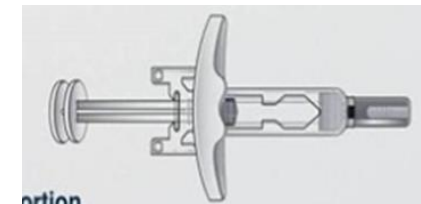


Biologics

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

Cinqair® <i>reslizumab</i> A		Dupixent® <i>dupilumab</i> A		Fasenra™ <i>benralizumab</i> A		Nucala® <i>mepolizumab</i> A		Xolair® <i>omalizumab</i> A	
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Tezspire (tezepelumab-ekko)



Learning assessment question 2

- You and the student see Mira, a 28 year old with appropriately diagnosed asthma who reports she had an old prescription for an albuterol inhaler and it has run out. You recommended an office visit instead of refilling it over the phone.
- What are the markers for poorly controlled asthma that you will look for in Mira and review with the student?
- Write down your list-aim for at least 3 items

When to re-assess asthma control

- Using albuterol > 2x per week
- Awakening >2x per month (or witnessed coughing in sleep in kids)
- Oral steroid use
- Repeat office visits for symptoms
- ED visit or hospitalization

MaineCare preferred Formulary

INHALED CORTICOSTEROIDS 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 12B A	ArmonAir® Digihaler™ 55, 113, 232 mcg fluticasone propionate inhalation powder 12B A	Arnuity® Ellipta® 50, 100, 200 mcg fluticasone furoate inhalation powder 12B A	Asmanex® HFA 50, 100, 200 mcg mometasone furoate 12B A	Asmanex® Twisthaler® 110, 220 mcg mometasone furoate inhalation powder 12B A	Flovent® Diskus® 50, 100, 250 mcg fluticasone propionate inhalation powder 12B A	Flovent® HFA 44, 110, 220 mcg fluticasone propionate 12B A	Pulmicort Flexhaler® 90, 180 mcg budesonide inhalation powder 12B A	QVAR® Redihaler™ 40, 80 mcg beclomethasone dipropionate 12B A
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MaineCare preferred Formulary

COMBINATION MEDICATIONS
contain both inhaled corticosteroid and long-acting beta₂-agonist (LABA)

Medication	Strengths	Formulation	MaineCare Preferred
Advair Diskus®	100/50, 250/50, 500/50 mcg	fluticasone propionate and salmeterol inhalation powder	123 A C G
Advair® HFA	45/21, 115/21, 230/21 mcg	fluticasone propionate and salmeterol xinafoate	123 A G
AirDuo® Digihaler™	55/14, 113/14, 232/14 mcg	fluticasone propionate and salmeterol inhalation powder	123 A
AirDuo® RespiClick®	55/14, 113/14, 232/14 mcg	fluticasone propionate and salmeterol inhalation powder	123 A G
Breo® Ellipta®	100/25, 200/25 mcg	fluticasone furoate and vilanterol inhalation powder	123 A C
Dulera®	50/5, 100/5, 200/5 mcg	mometasone furoate and formoterol fumarate dihydrate	123 A
Symbicort®	80/4.5, 160/4.5 mcg	budesonide and formoterol fumarate dihydrate	123 A C G
Wixela™ Inhub™	100/50, 250/50, 500/50 mcg	fluticasone propionate and salmeterol xinafoate (approved generic of Advair Diskus)	123 A C

MaineCare preferred Formulary

SHORT-ACTING BETA₂-AGONIST BRONCHODILATORS
relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

ProAir® Digihaler™ 90 mcg albuterol sulfate inhalation powder 123 A	ProAir® HFA 90 mcg albuterol sulfate 123 A G	ProAir® RespiClick® 90 mcg albuterol sulfate inhalation powder 123 A	Proventil® HFA 90 mcg albuterol sulfate 123 A G	Ventolin® HFA 90 mcg albuterol sulfate 123 A G	Xopenex HFA® 45 mcg levalbuterol tartrate A G
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2 SETS OF ASTHMA GUIDELINES

- Global Initiative for Asthma (GINA)-Annual updates to reports
- National Institutes of Health-National Heart, Lung and Blood Institute (NIH-NHLBI)- 2020 Focused Updates to the Asthma Management Guidelines

AGE GROUPS FOR ASTHMA RECS

- 12 and older is considered ADULT
- 5-12 (grade school age)
- Under 5 (toddler/preschool age)

Pre-treatment Assessment

ASSESS:

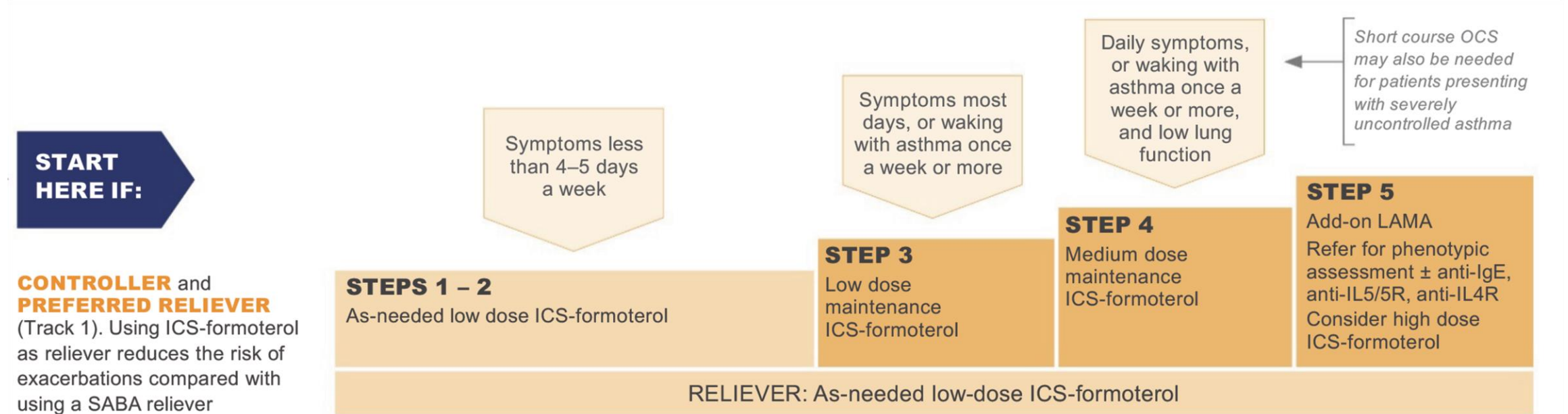
Confirmation of diagnosis
Symptom control & modifiable risk factors
(including lung function)

Comorbidities
Inhaler technique & adherence
Child and parent preferences and goals

Learning assessment question 3

- You and the student see Joey, a 45 yo new patient with PFT diagnosed asthma who was without insurance for the past 2 years (and thus has no prescriptions other than an albuterol MDI from an ED visit 3 months ago). They now have insurance with reasonable drug coverage after 90 days at a new job.
- How will you decide where to start treatment and what treatment to recommend?

Step wise therapy: Starting Treatment Ages 12 & Up



Step wise therapy: Continuing Treatment Ages 12 & Up

**CONTROLLER and
PREFERRED RELIEVER**
(Track 1). Using ICS-formoterol
as reliever reduces the risk of
exacerbations compared with
using a SABA reliever

STEPS 1 – 2

As-needed low dose ICS-formoterol

STEP 3

Low dose
maintenance
ICS-formoterol

STEP 4

Medium dose
maintenance
ICS-formoterol

STEP 5

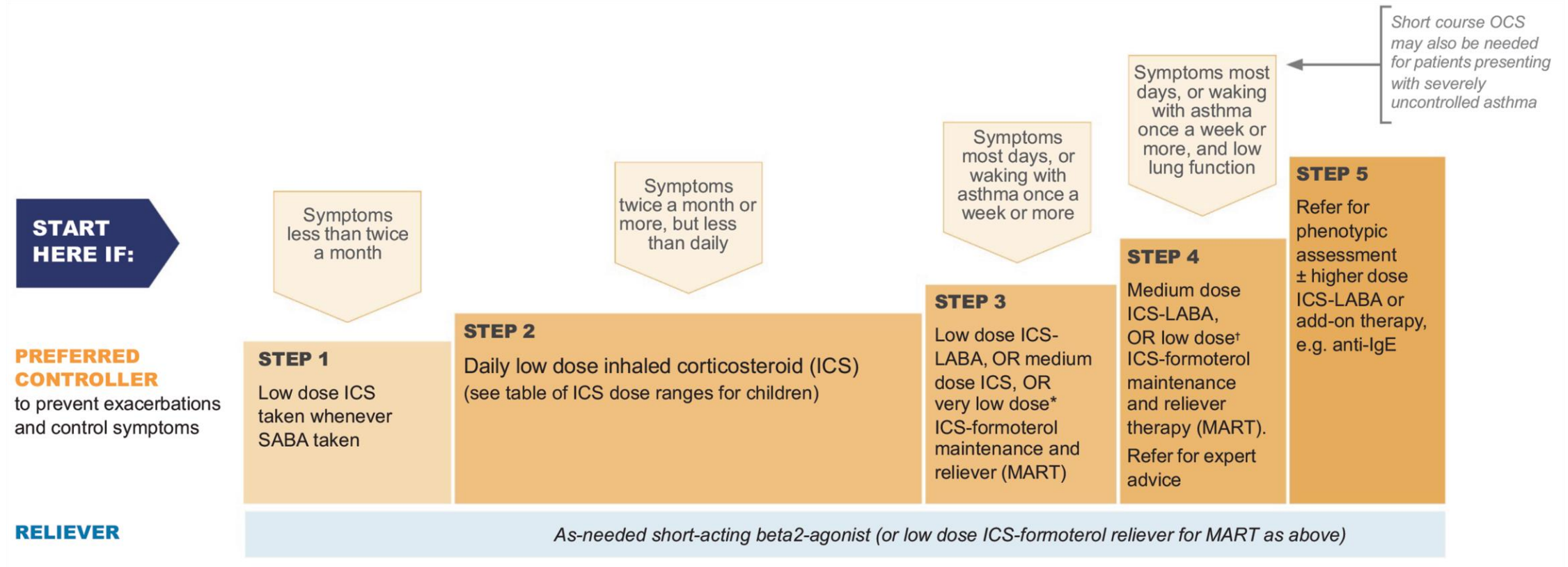
Add-on LAMA
Refer for phenotypic
assessment ± anti-IgE,
anti-IL5/5R, anti-IL4R
Consider high dose
ICS-formoterol

RELIEVER: As-needed low-dose ICS-formoterol

Learning assessment question 4

- The student independently sees Joey's 9 yo son with asthma diagnosed by spirometry. His previous provider prescribed albuterol inhaler for as needed use and he reports symptoms 1-2 times per week.
- The student presents to you and, having read the outline of the most recent GINA guidelines, the suggests this treatment plan: _____

Step wise therapy: Starting Treatment Ages 6-11



Step wise therapy: Continuing Treatment Ages 6-11

Asthma medication options:

Adjust treatment up and down for individual child's needs

PREFERRED CONTROLLER

to prevent exacerbations and control symptoms

RELIEVER

STEP 1

Low dose ICS taken whenever SABA taken

STEP 2

Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)

STEP 3

Low dose ICS-LABA, OR medium dose ICS, OR very low dose* ICS-formoterol maintenance and reliever (MART)

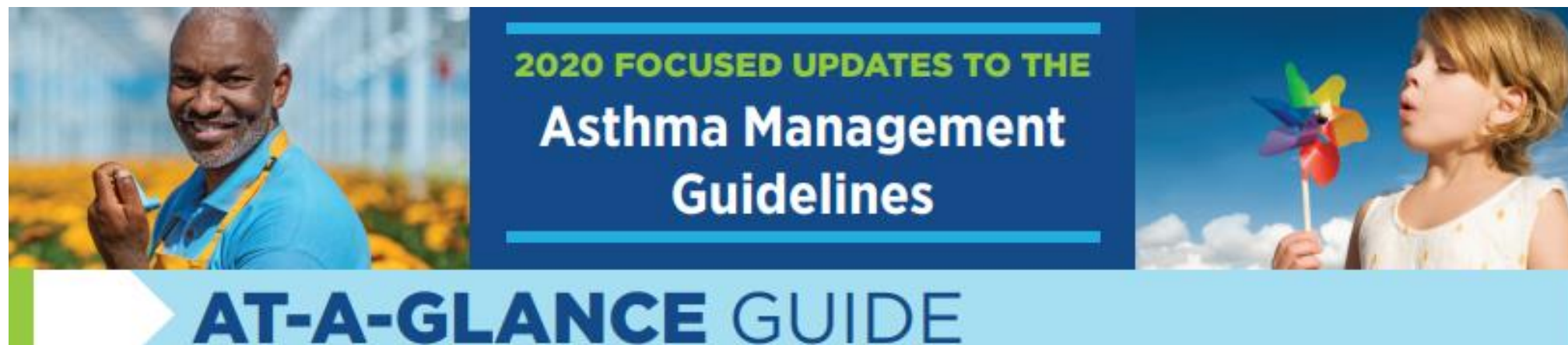
STEP 4

Medium dose ICS-LABA, OR low dose[†] ICS-formoterol maintenance and reliever therapy (MART). Refer for expert advice

STEP 5

Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy, e.g. anti-IgE

As-needed short-acting beta2-agonist (or ICS-formoterol reliever for MART as above)



ADDITIONAL GUIDELINES FROM NIH-NHLBI

AGES 0–4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 0–4 Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Preferred	PRN SABA and At the start of RTI: Add short course daily ICS▲	Daily low-dose ICS and PRN SABA	Daily medium-dose ICS and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast*+ oral systemic corticosteroid and PRN SABA

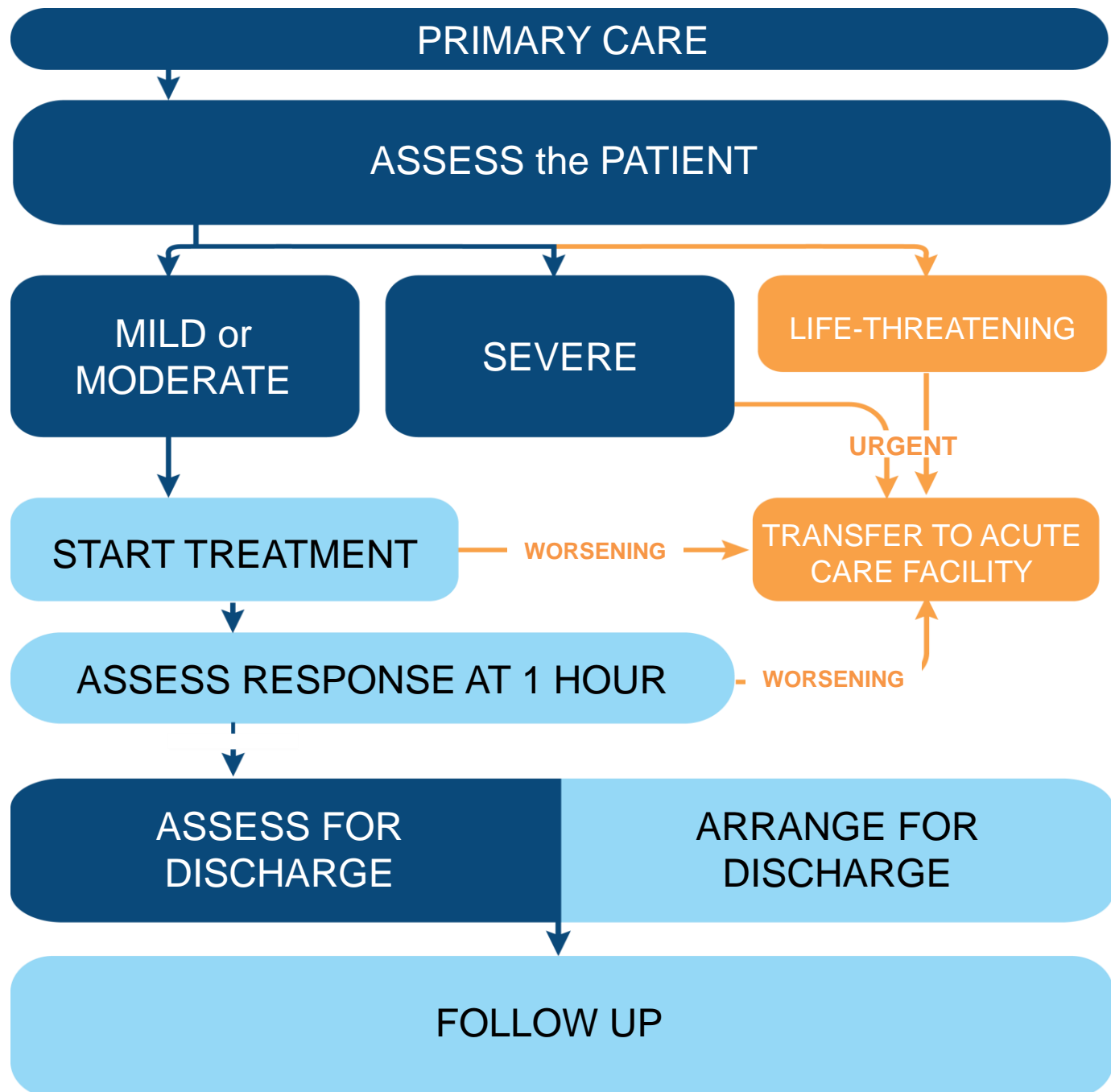
Exacerbation Management

- Can be treated at home as part of a written action plan w/thresholds to act
- Consider increasing ICS-formoterol: 2 puffs q4h (>12 yo)
 - *may run up against insurance quantity limit issues
- OR Step up SABA (i.e. 8 puffs/ day)
- Consider oral steroids (tx above can avoid oral steroid use)
- For severe exacerbations: oxygen and/or ipratropium, consider adding LAMA chronically

Exacerbation Management

See 2022 GINA Pocket Guide, p. 41 for Primary /Acute care exacerbation treatment algorithm

<https://ginasthma.org/pocket-guide-for-asthma-management-and-prevention/>



Exacerbation Management-Oral steroids

	Dexamethasone	Prednisone or prednisolone
Pediatric (0-11 years)	0.3-0.6 mg/kg po SINGLE DOSE (max 16 mg)	1 mg/kg po daily x 3-5 days (max 50mg)
Adult (age 12 or greater)	16 mg po daily x 2 days	40-60 mg po daily x 5 days (occ up to 14 days, no taper)

*in kids, less vomiting with dexamethasone (0% vs 6% in one study)

*in adults, side effects similar between the two medications

*no efficacy benefit of dexamethasone IM vs po, injection site reaction is a risk

Our OLD friend Theophylline

- 4th line due to systemic toxicity/narrow therapeutic window
- Only MILD bronchodilator activity
- May be useful as add-on in pts already requiring high-dose ICS
- Bedtime dosing w/24h formulation may increase clinical effect
- NOT FOR USE in children

Reminder of Indicators of Controlled Asthma

INDICATOR	FREQUENCY/DESCRIPTOR
Daytime symptoms	≤ 2 days/week
Need for reliever therapy	≤ 2 doses/week
Nighttime symptoms	None
Physical activity tolerance	Normal
Exacerbations	Mild + infrequent
Work/school absence	None (due to asthma)
PEF or FEV1	$\geq 90\%$ personal best

Learning assessment question 5

- In your final discussion about asthma with the student, you are surprised to hear the student say a risk factor for asthma-related death is the lack of this non-pharmacological strategy:
-

Self-management & Education

- written action plan
 - daily preventative strategies
 - when & how to adjust reliever & controller medications
 - when to seek care
- encourage physical activity
- smoking cessation
- intensive education programs significantly decrease asthma sx's & hospitalizations
- breathing exercises
- healthy diet

Action Plan

source:

<https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/asthma-action-plan-2020>

ASTHMA ACTION PLAN

For: _____ Doctor: _____ Date: _____

Doctor's Phone Number: _____ Hospital/Emergency Department Phone Number: _____

	DOING WELL	Daily Medications	How much to take	When to take it
GREEN ZONE	<ul style="list-style-type: none">No cough, wheeze, chest tightness, or shortness of breath during the day or nightCan do usual activities <p>And, if a peak flow meter is used,</p> <p>Peak flow: more than _____ (80 percent or more of my best peak flow)</p> <p>My best peak flow is: _____</p>	Medicine _____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
	<p>Before exercise</p>	<input type="checkbox"/> _____	<input type="checkbox"/> 2 or <input type="checkbox"/> 4 puffs	5 minutes before exercise
YELLOW ZONE	<p>ASTHMA IS GETTING WORSE</p> <ul style="list-style-type: none">Cough, wheeze, chest tightness, or shortness of breath, orWaking at night due to asthma, orCan do some, but not all, usual activities <p>-Or-</p> <p>Peak flow: _____ to _____ (50 to 79 percent of my best peak flow)</p>	<p>1st</p> <p>Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.</p> <p>_____ (quick-relief medicine) _____ Number of puffs _____ Can repeat every _____ minutes up to maximum of _____ doses</p> <p>or <input type="checkbox"/> Nebulizer, once</p> <p>2nd</p> <p>If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:</p> <p><input type="checkbox"/> Continue monitoring to be sure you stay in the green zone.</p> <p>-Or-</p> <p>If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:</p> <p><input type="checkbox"/> Take: _____ (quick-relief medicine) _____ Number of puffs or <input type="checkbox"/> Nebulizer</p> <p><input type="checkbox"/> Add: _____ mg per day For _____ (3-10) days (oral steroid)</p> <p><input type="checkbox"/> Call the doctor <input type="checkbox"/> before/ <input type="checkbox"/> within _____ hours after taking the oral steroid.</p>		
RED ZONE	<p>MEDICAL ALERT!</p> <ul style="list-style-type: none">Very short of breath, orQuick-relief medicines have not helped,Cannot do usual activities, orSymptoms are same or get worse after 24 hours in Yellow Zone <p>-Or-</p> <p>Peak flow: less than _____ (50 percent of my best peak flow)</p>	<p>Take this medicine:</p> <p><input type="checkbox"/> _____ (quick-relief medicine) _____ Number of puffs or <input type="checkbox"/> Nebulizer</p> <p><input type="checkbox"/> _____ mg (oral steroid)</p> <p>Then call your doctor NOW. Go to the hospital or call an ambulance if:</p> <ul style="list-style-type: none">You are still in the red zone after 15 minutes ANDYou have not reached your doctor.		
	<p>DANGER SIGNS</p> <ul style="list-style-type: none">Trouble walking and talking due to shortness of breathLips or fingernails are blue			<ul style="list-style-type: none">Take _____ puffs of _____ (quick relief medicine) ANDGo to the hospital or call for an ambulance _____ NOW! (phone)

Caveats & Take-Home Messages

- Majority of pts can be controlled on low dose ICS
- Benefits of ICS start at 1 week but can take up to 8 weeks for full clinical effect
- SABA monotherapy appropriate only in extremely mild asthma-using less than 2 inhalers per **year** (not including exercise-induced)
- Consider ICS-formoterol as needed for exacerbations

Caveats & Take-Home Messages (continued)

- NO LABA MONOTHERAPY
- Choose ICS over LTRA in most pts (increased efficacy)
- When to de-escalate step-wise therapy? (reduce ICS dose by 25-50%) If stable for 3 mos
- Consider referring kids <6 yo to subspecialist

How to get CME

Please fill out evaluation form

Individualized private one-on-one MICIS CME sessions available

- *Asthma Level 2*
- *Hepatitis C Levels 1 + 2*
- *Four different opioid topics*

Next steps if you treat asthma

- Go over the GINA and NHLBI guidelines to familiarize yourself with the recommendations and options (see reference slide for links)
- Better yet, schedule an 'Academic Detailing' session with a MICIS Educator and get CME to go over the guidelines with a peer!

THANK YOU FOR CONSIDERING THE WAYS YOU CAN TEACH HEALTH PROFESSIONS STUDENTS AS
PART OF YOUR CLINICAL PRACTICE!

micismaine.org

Reference Slides

ICS Daily Dose

Adults and Adolescents over 12 years

	Low	Medium	High
beclomethasone (Qvar Redihaler) 40 or 80 mcg	40 BID	80-160 BID	320 BID
budesonide (Pulmicort Flexhaler) 90 or 180 mcg	90 BID	360 BID	720 BID
fluticasone prop (Flovent HFA/Advair HFA) 44/45 mcg, 110/115 mcg or 220/230 mcg	110/115 BID	220/230 BID	440/460 BID
fluticasone prop (Flovent Diskus/Advair Diskus) 50 mcg or 100 mcg Or 250 mcg Or 500 mcg	100 BID	250 BID	500 BID
mometasone (Dulera) 50 or 100 or 200 mcg	100 BID	200.D	200.D

ICS Daily Dose

Ages 5-11

	Low	Medium
beclomethasone (Qvar Redihaler) 40 or 80 mcg	40 BID	80 BID
budesonide (Pulmicort Flexhaler) 90 or 180 mcg	90 BID	180 BID
fluticasone prop (Flovent HFA/Advair HFA) 44/45 mcg, 110/115 mcg or 220/230 mcg	44/45 BID	110/115 BID
fluticasone prop (Flovent Diskus/Advair Diskus) 50 mcg or 100 mcg Or 250 mcg Or 500 mcg	50 BID	100 BID
mometasone (Dulera) 50 mcg or 100 mcg or 200 mcg	50 BID	100.BID

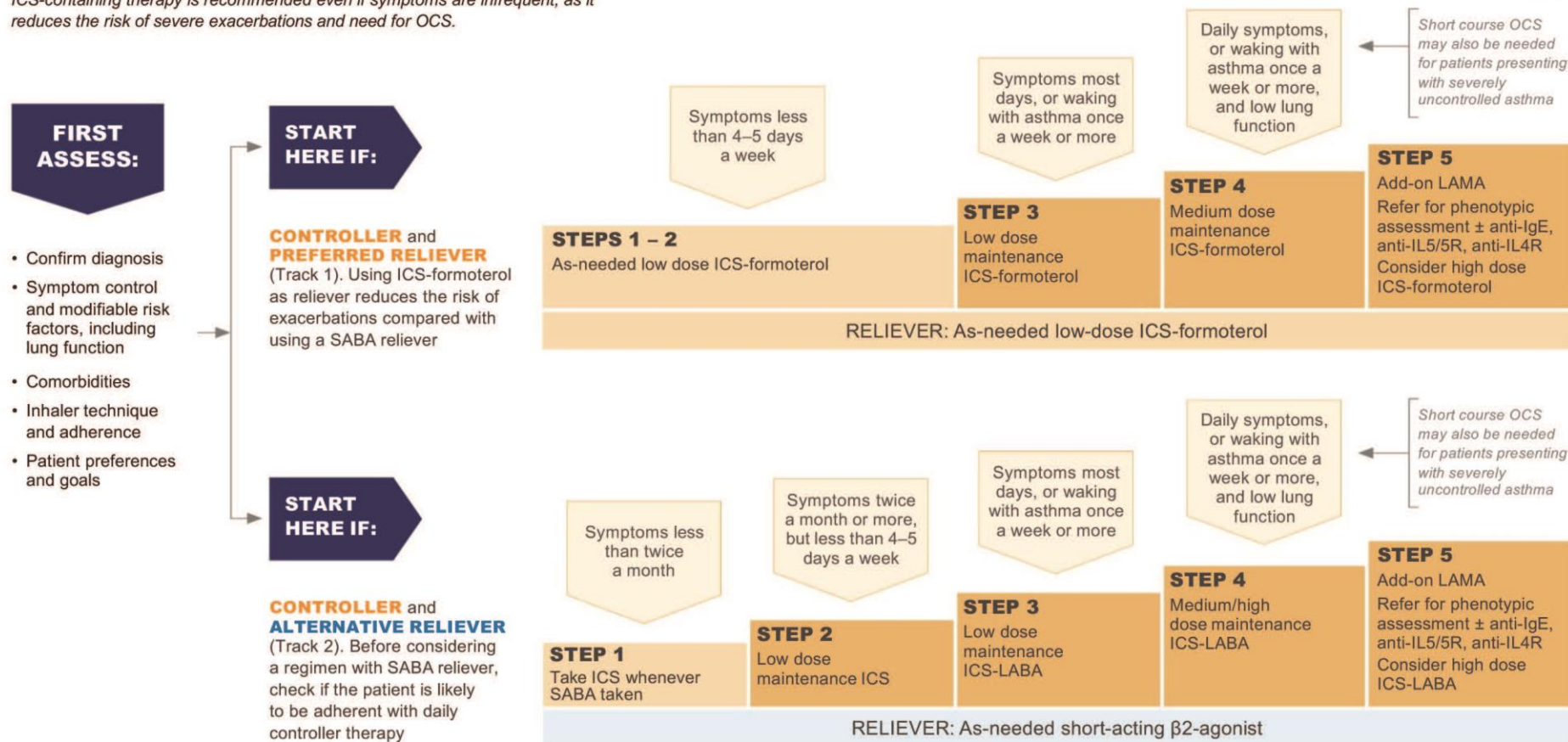
Comparison of asthma biologics

Biologic	Mechanism	Age	Administration	Note
benralizumab (Fasenra)	Anti-IL-5 receptor	>=12 yo	Subq q4w x3 then q8w	
dupilumab (Dupixent)		>=6 yo w/high eosinophils/po steroid dependent	Subq q2w	
mepolizumab (Nucala)	Anti-IL-5	>=18 yo	Subq q4w	
omalizumab (Xolair)	Anti-IgE	>=6 yo	Subq q2-4w	Anaphylaxis can occur up to 4d post-injection; ? inc CV events
reslizumab (Cinquiar)	Anti-IL-5	>=18 yo	IV q4w	Inc CPK
tezepelumab-ekko (Tezspire)	Thymic stromal lymphopoietin (TSLP-a cytokine) blocker	>=12 yo	Subq q4w	Anaphylaxis can occur "days" after injection

*side effects of all: anaphylaxis, injection site reaction, rash, headache, fatigue, ? zoster

STARTING TREATMENT in adults and adolescents with a diagnosis of asthma

Track 1 is preferred if the patient is likely to be poorly adherent with daily controller ICS-containing therapy is recommended even if symptoms are infrequent, as it reduces the risk of severe exacerbations and need for OCS.



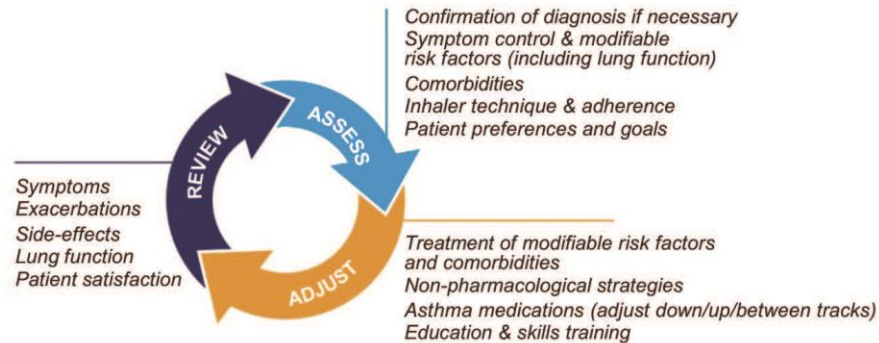
GINA 2021, Box 3-4Bi

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Adults & adolescents 12+ years

Personalized asthma management

Assess, Adjust, Review
for individual patient needs



CONTROLLER and PREFERRED RELIEVER

(Track 1). Using ICS-formoterol as reliever reduces the risk of exacerbations compared with using a SABA reliever

STEPS 1 – 2

As-needed low dose ICS-formoterol

STEP 3

Low dose
maintenance
ICS-formoterol

STEP 4

Medium dose
maintenance
ICS-formoterol

STEP 5

Add-on LAMA
Refer for phenotypic
assessment ± anti-IgE,
anti-IL5/5R, anti-IL4R
Consider high dose
ICS-formoterol

RELIEVER: As-needed low-dose ICS-formoterol

CONTROLLER and ALTERNATIVE RELIEVER

(Track 2). Before considering a regimen with SABA reliever, check if the patient is likely to be adherent with daily controller

STEP 1

Take ICS whenever
SABA taken

STEP 2

Low dose
maintenance ICS

STEP 3

Low dose
maintenance
ICS-LABA

STEP 4

Medium/high
dose maintenance
ICS-LABA

STEP 5

Add-on LAMA
Refer for phenotypic
assessment ± anti-IgE,
anti-IL5/5R, anti-IL4R
Consider high dose
ICS-LABA

RELIEVER: As-needed short-acting β 2-agonist

Other controller options
for either track

Low dose ICS whenever
SABA taken, or daily LTRA,
or add HDM SLIT

Medium dose ICS, or
add LTRA, or add
HDM SLIT

Add LAMA or LTRA or
HDM SLIT, or switch to
high dose ICS

Add azithromycin (adults) or
LTRA; add low dose OCS
but consider side-effects

GINA 2021, Box 3-5A

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Children 6-11 years

Personalized asthma management:

Assess, Adjust, Review

Symptoms
Exacerbations
Side-effects
Lung function
Child and parent satisfaction



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (including lung function)
Comorbidities
Inhaler technique & adherence
Child and parent preferences and goals

Treatment of modifiable risk factors & comorbidities
Non-pharmacological strategies
Asthma medications (adjust down or up)
Education & skills training



Asthma medication options:

Adjust treatment up and down for individual child's needs

PREFERRED CONTROLLER

to prevent exacerbations and control symptoms

Other controller options

RELIEVER

options: d down for	STEP 1		STEP 2		STEP 3		STEP 4		STEP 5		
	Low dose ICS taken whenever SABA taken		Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)		Low dose ICS- LABA, OR medium dose ICS, OR very low dose* ICS-formoterol maintenance and reliever (MART)		Medium dose ICS-LABA, OR low dose† ICS-formoterol maintenance and reliever therapy (MART). Refer for expert advice		Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy e.g. anti-IgE		
	Consider daily low dose ICS		Daily leukotriene receptor antagonist (LTRA), or low dose ICS taken whenever SABA taken		Low dose ICS + LTRA		Add tiotropium or add LTRA		Add-on anti-IL5 or add-on low dose OCS, but consider side-effects		
As-needed short-acting beta2-agonist (or ICS-formoterol reliever for MART as above)											

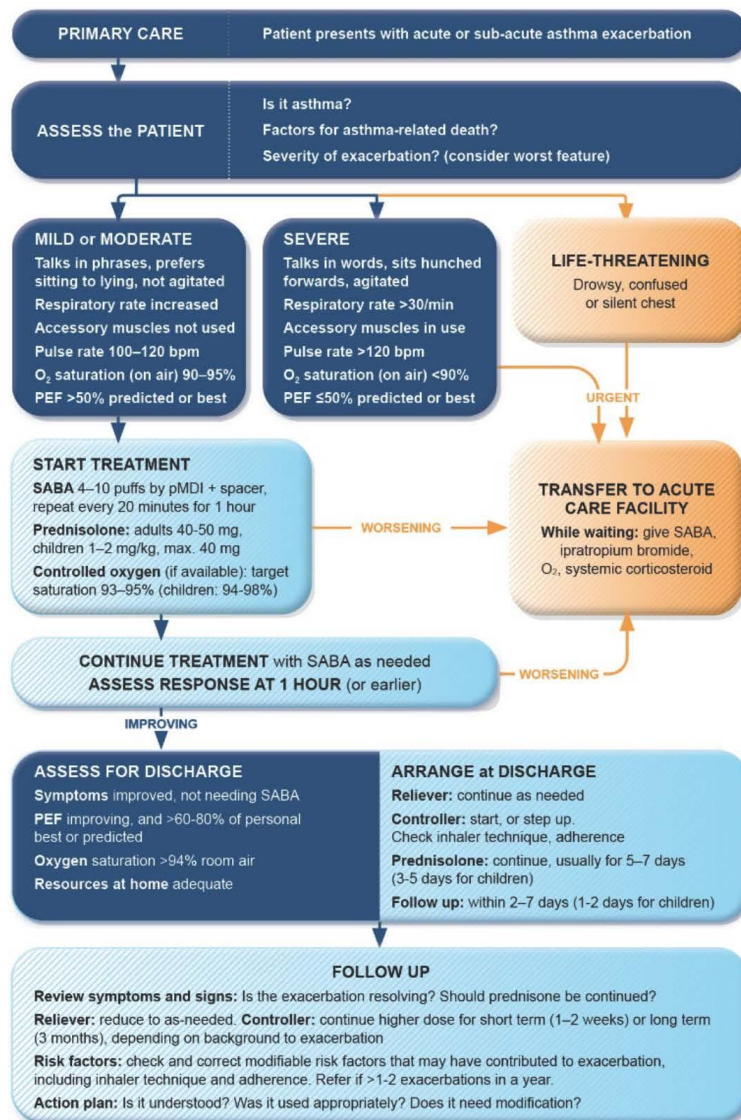
*Very low dose: BUD-FORM 100/6 mcg

†Low dose: BUD-FORM 200/6 mcg (metered doses).

GINA 2021, Box 3-5B

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Primary care management of asthma exacerbation (adults, adolescents, children 6–11 years)



GINA 2021, Box 4-3. Primary care management of worsening asthma

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Resources

- **2022 GINA Pocket Guide for Asthma** <https://ginasthma.org/pocket-guide-for-asthma-management-and-prevention/>
- **Inhaler poster** <https://allergyasthmanetwork.org/news/inhalers-at-a-glance-posters-resources/>
- **Asthma action plan** <https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/asthma-action-plan-2020>
- **NIH Step Wise therapy summary, 2020 (6 pp)** <https://www.nhlbi.nih.gov/health-topics/all-publications-and-resources/at-glance-2020-focused-updates-asthma-management-guidelines>

References

- <https://ginasthma.org/pocket-guide-for-asthma-management-and-prevention/> and <https://ginasthma.org/gina-reports/>
- <https://www.nhlbi.nih.gov/health-topics/asthma-management-guidelines-2020-updates/digital-toolkit>
- Asthma Overview and Drug Comparison Chart, updated March 2022, RxFiles Academic Detailing, University of Saskatchewan (available by subscription), <https://www.rxfiles.ca/rxfiles/>