

Adult Asthma Diagnosis and Management in 2024: Reviewing Updates in the Guidelines

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Conflicts of Interest

- I have no conflicts of interest or disclosures to announce and receive no remuneration from any entity for this lecture.

Learning Objectives

Epidemiology/Asthma data

Understanding asthma phenotypes and pathobiology

Reviewing diagnostic criteria of asthma

Preferred management of asthma

When to consider biologic therapy for asthma



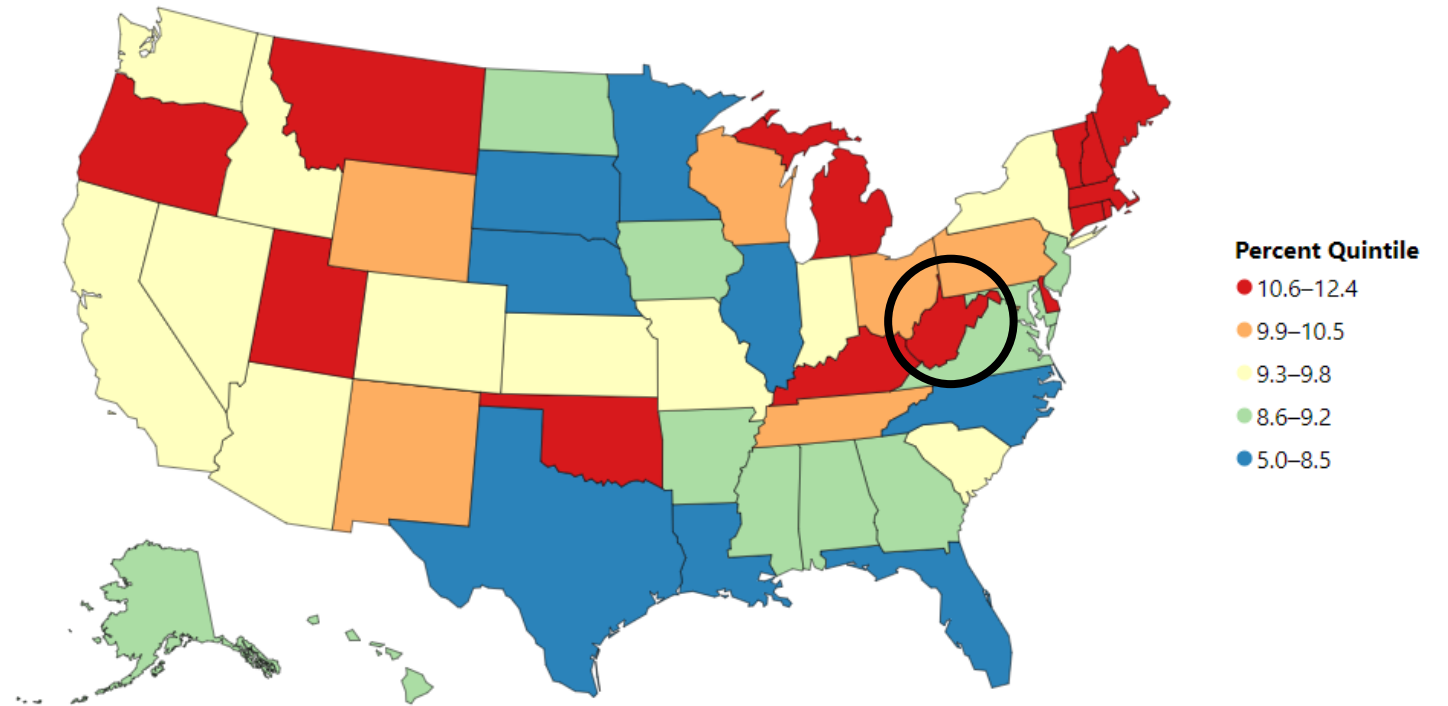
Asthma

A common yet complex and chronic disease

Characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation

Heterogenous disease - Variable presentation, triggers, severity, treatment response, exacerbation risk

Epidemiology of Asthma (2020)



- In the US, over 25 million cases of current asthma with a prevalence of 7.8%
- In WV, asthma prevalence among adults of 12.4%



Asthma Outcomes in the US

In 2020, almost 1 million ED visits resulting in close to 95,000 hospitalizations

In 2019, 60% of adults with asthma were uncontrolled

Healthcare costs are around \$50 billion each year

Every day, approximately 10 people die of asthma

Prevalence and mortality are higher in Black persons and American Indian or Alaska Native persons as compared with White persons

Black persons are nearly 3 times as likely to die from asthma when compared to White persons

Prevalence and outcomes are worse for females compared to males



Asthma Phenotypes

Allergic asthma

Non-allergic asthma

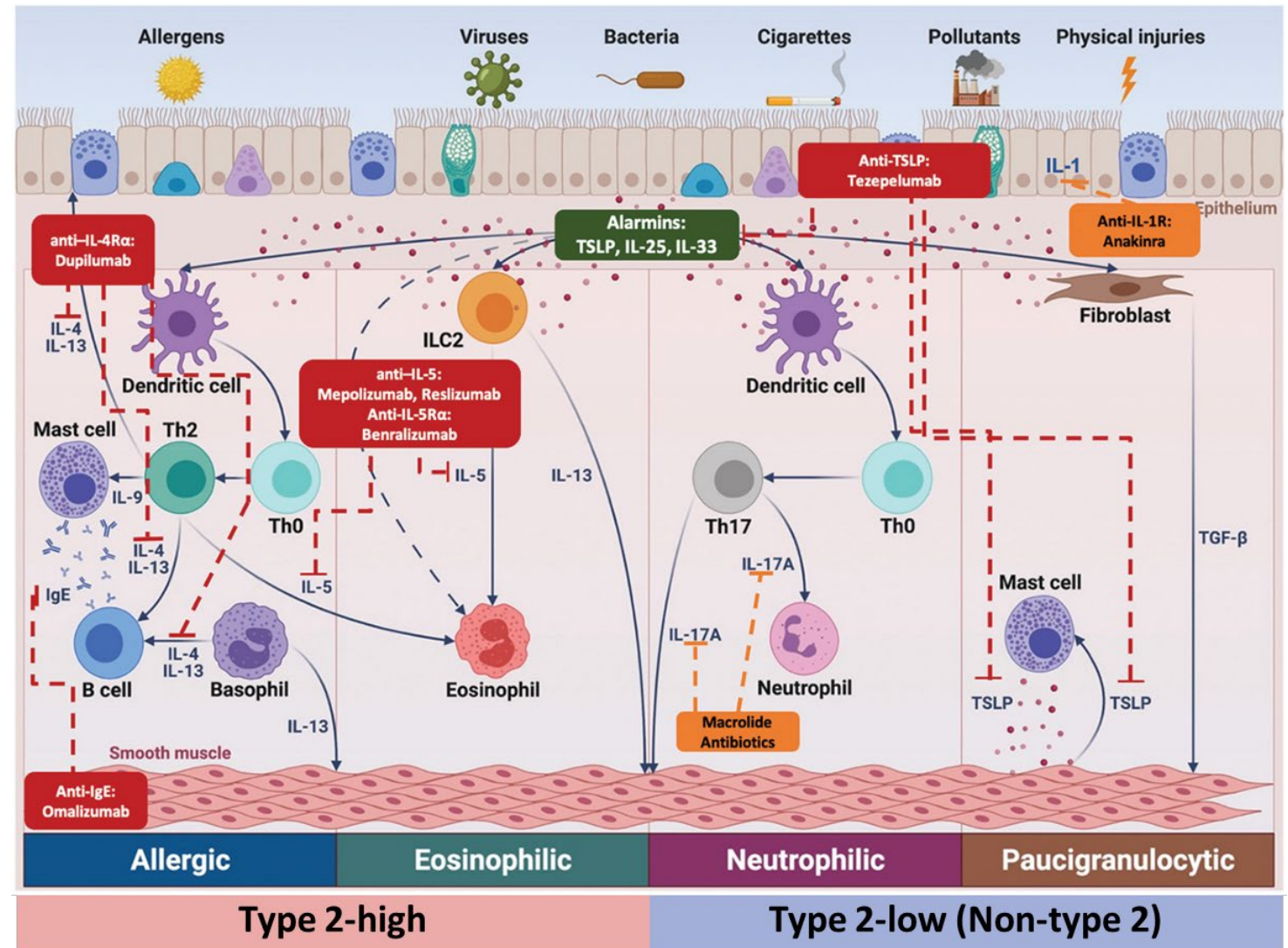
Adult-onset asthma

Asthma with persistent airflow limitation

Asthma with obesity

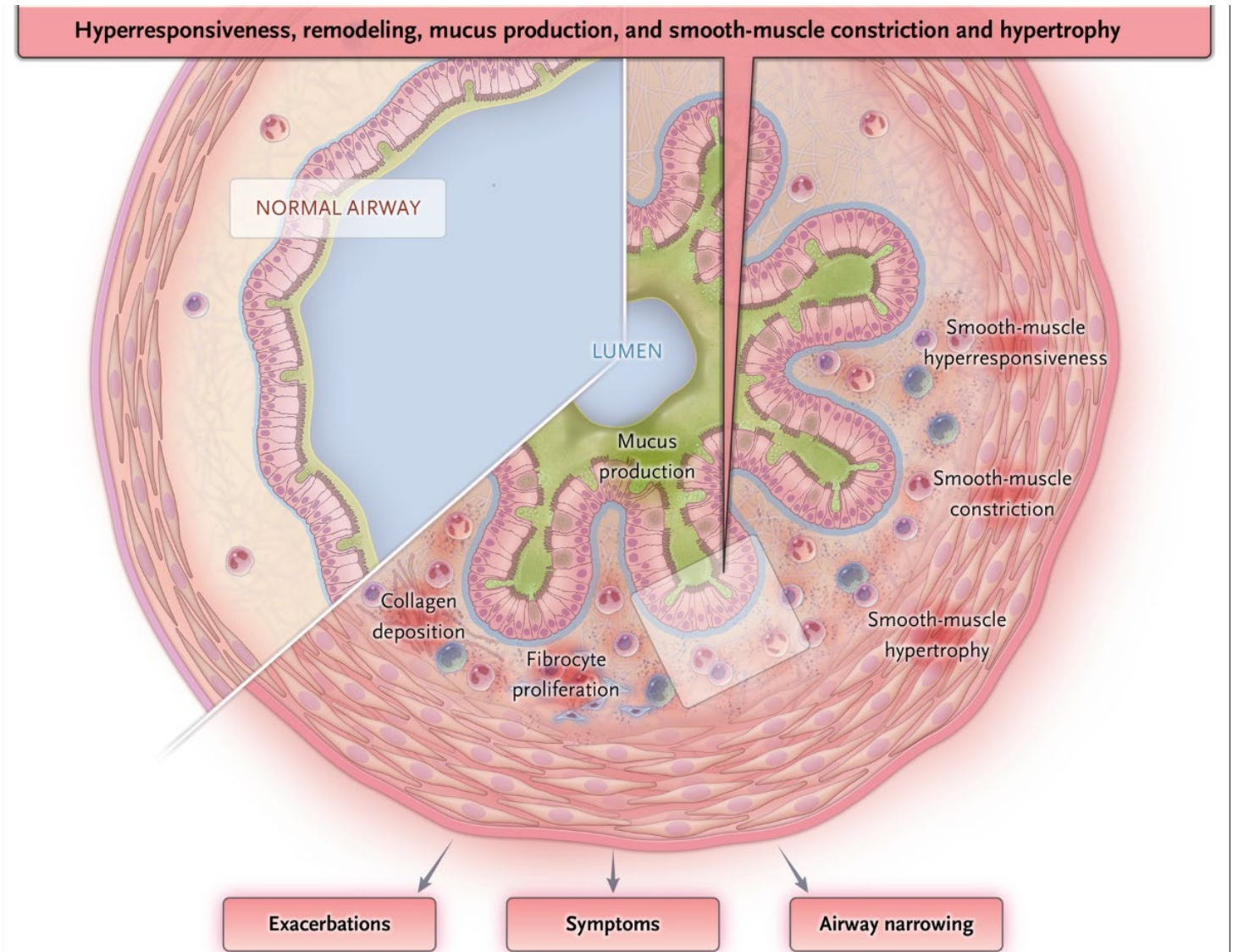
Pathobiology

- Type 2-high asthma
 - Allergic eosinophilic
 - Non-allergic eosinophilic
- Type 2-low asthma
 - Neutrophilic
 - Paucigranulocytic
- Mixed inflammation



Pathobiology

- Inflammation
- Hyperresponsiveness
- Smooth muscle hyperplasia and hypertrophy
- Increased mucus production from goblet cell hyperplasia
- Loss of ciliated epithelial cells
- Fibrocyte proliferation with subepithelial fibrosis
- Mast cells within the smooth muscle layer





Guidelines for Asthma Management

Global Strategy for Asthma
Management and Prevention


The “GINA Guidelines”
Updated annually

2020 Focused Updates to the
Asthma Management Guidelines:
A Report from the NAEPP

The “2020 NAEPP Asthma Update”
Targeted 6 key areas of asthma care



Diagnosis of Asthma

- 
- Definitive diagnosis of asthma requires 2 main components:
 1. History of variable respiratory symptoms
 2. Confirmed variable expiratory airflow limitation
 - A. Excessive variability in lung function
 - AND
 - B. Expiratory airflow limitation
 - Over- and under-diagnosis are common and often from lack of objective lung function testing with variable expiratory airflow limitation
 - Diagnosis should be confirmed prior to starting treatment (if able)



Diagnosis of Asthma - Symptoms

Classic symptoms - SOB, wheezing, chest tightness, cough

- Multiple symptoms simultaneously
- Often worse at night or early morning
- Wheezing is typically expiratory
- Vary over time and in intensity
- Often symptoms are worsened by a trigger: infection, allergen exposure, cold air, exercise, irritants

If history is not consistent, rule out other etiologies

- CHF, bronchiectasis, COPD, interstitial lung disease, pneumonia, inducible laryngeal obstruction, medication-induced cough, inhaled foreign body, endobronchial tumor/mass, etc.

Diagnosis of Asthma - Variable Expiratory Airflow

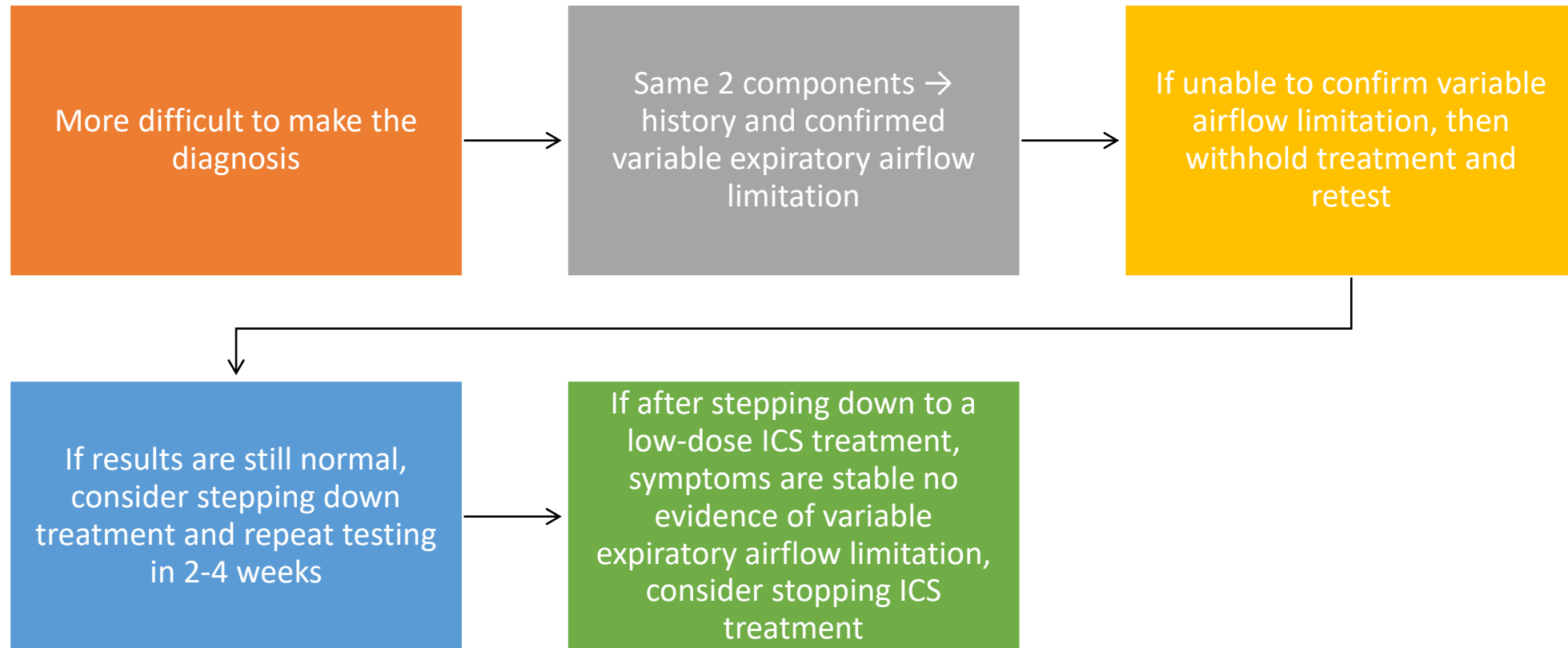
Excessive variability in lung function (≥ 1 of the following):

- Positive bronchodilator responsiveness
- Excess variability in twice daily PEF over 2 weeks: Avg PEF variability $>10\%$
- \uparrow in lung function after 4 weeks of ICS-containing treatment
- Positive exercise challenge test: \downarrow in FEV1 of $>10\%$ and $>200\text{mL}$ from baseline
- Positive bronchial challenge test: \downarrow in FEV1 from baseline of $\geq 20\%$ with standard doses of methacholine
- Excessive variation in lung function between visits

Expiratory airflow limitation

- When FEV1 is reduced (ex. during testing above), confirm that FEV1/FVC is also reduced compared to the lower limit of normal

Diagnosis of Asthma - Patients on ICS Treatment



Diagnosis of Asthma – FeNO

(Fractional Concentration of
Exhaled Nitric Oxide)

- **GINA**
 - FeNO has not been established for ruling in or out the diagnosis of asthma
 - FeNO is higher in asthma with Type 2 airway inflammation but can also be elevated in non-asthma conditions
 - FeNO is not elevated in non-Type 2 asthma, like neutrophilic asthma
- **2020 NAEPP Asthma Update**
 - Use of FeNO may support a diagnosis of asthma when diagnosis is uncertain after complete workup
 - Should not be used alone to diagnosis asthma
 - Withdrawing ICS treatment should not be based on FeNO alone



Asthma Treatment

GINA and 2020 NAEPP Asthma Updates

1

Recommend **against** using SABA-only treatment

2

Recommend ICS-containing treatment in all STEPS of treatment

3

Recommend **Maintenance And Reliever Therapy (MART)** for Steps 3 and 4 of treatment

Asthma Treatment – GINA

Anti-Inflammatory Reliever = AIR

- ICS-formoterol, ICS-SABA
- Provides rapid symptom relief, plus a small dose of ICS
- Efficacious regardless of baseline symptom frequency, lung function, exacerbation history, or inflammatory profile (T2-high or T2-low)

Regimens with ICS-formoterol

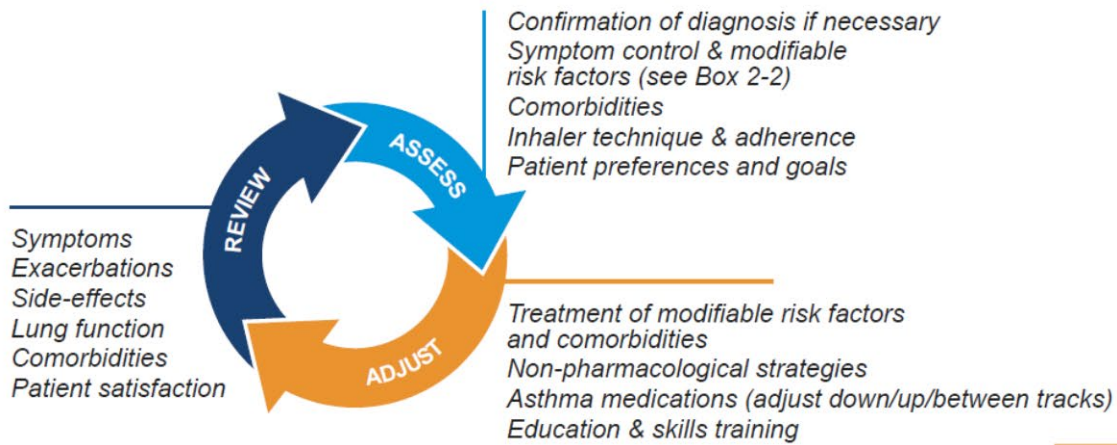
- As-needed-only ICS-formoterol = AIR-only for symptom relief
- MART = Low dose ICS-formoterol used as maintenance treatment, plus as needed for symptom relief
- ICS-formoterol can also be used before exercise or allergen exposure



GINA 2023 – Adults & adolescents 12+ years

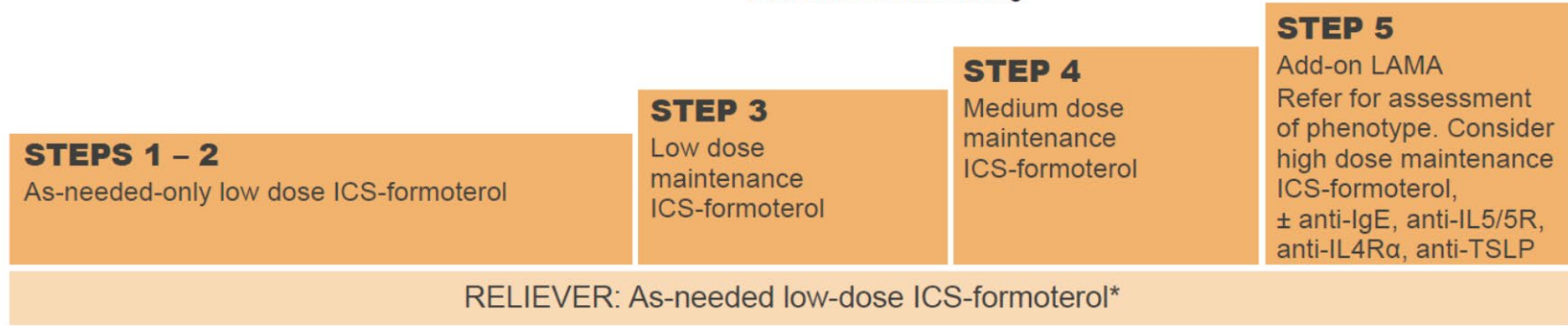
Personalized asthma management

Assess, Adjust, Review for individual patient needs



TRACK 1: PREFERRED CONTROLLER and RELIEVER

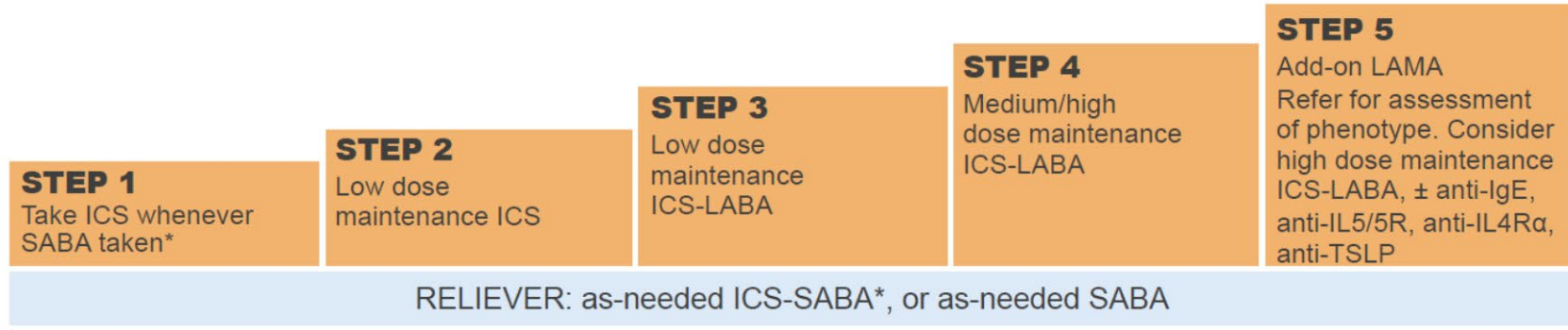
Using ICS-formoterol as the reliever* reduces the risk of exacerbations compared with using a SABA reliever, and is a simpler regimen



See GINA severe asthma guide

TRACK 2: Alternative CONTROLLER and RELIEVER

Before considering a regimen with SABA reliever, check if the patient is likely to adhere to daily controller treatment



Other controller options (limited indications, or less evidence for efficacy or safety – see text)

	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. As last resort consider adding low dose OCS but consider side-effects
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*Anti-inflammatory reliever (AIR)



GINA Track 1 – Preferred Regimen

Steps 1–2 (AIR-only): Low dose ICS-formoterol as needed only

- 60-64% decreased risk of severe exacerbations when compared to prn SABA only
- 37% decreased risk of ED visits/hospitalizations when compared to daily ICS plus prn SABA

Steps 3–5 (MART): ICS-formoterol maintenance and as needed reliever

- Reduced severe exacerbations by 32% when compared to same dose ICS-LABA plus prn SABA and by 23% when compared to higher dose ICS-LABA plus prn SABA

GINA Track 1 – For Adults and Adolescents

Severity	STEP	Presenting Symptoms	Medication and dose (mcg)	Dosage (Max 12 inhalations/day)
Mild	Step 1 AIR-only	Infrequent asthma symptoms (<2x/month)	Budesonide-formoterol 160/4.5	1 inhalation as needed
	Step 2 AIR-only	Asthma symptoms 2x/month or more		
Moderate	Step 3 MART	Troublesome asthma symptoms most days (4-5x/week) or waking due to asthma 1x/week or more	Budesonide-formoterol 160/4.5	1 inhalation once or twice daily, PLUS 1 inhalation as needed
	Step 4 MART	Initial asthma presentation with severely uncontrolled asthma or an acute exacerbation (course of oral corticosteroids may be needed)	Budesonide-formoterol 160/4.5	2 inhalations twice daily, PLUS 1 inhalation as needed
Severe	Step 5 MART	Uncontrolled despite Step 4 treatment	Budesonide-formoterol 160/4.5	2 inhalations twice daily, PLUS 1 inhalation as needed *Add-on LAMA *Consider high dose maintenance ICS-formoterol +/- adding biologic therapy

*Advise patients to take extra inhalations when symptoms persist or recur, but to seek medical care if they need more than 12 inhalations in a day.

Assessment of Asthma Control

A. Symptoms and B. Risk of adverse outcome

A. Asthma symptom control

In the past 4 weeks, has the patient had (Yes/No):
Daytime asthma symptoms more than twice/week?
Any night waking due to asthma?
SABA* reliever for symptoms more than twice/week?
Any activity limitation due to asthma?



1 point for each yes



Well controlled	Partly Controlled	Uncontrolled
None	1-2 points	3-4 points

- Several numerical asthma control tools exist

Assessment of Asthma Control

B. Risk factors for poor asthma outcome

a. Risk factors for exacerbations		
Uncontrolled asthma	Having uncontrolled asthma symptoms is an important risk factor for exacerbations.	
Factors that increase the risk of exacerbations even if the patient has few asthma symptoms	Medications	High SABA use, Inadequate ICS
	Comorbidities	Obesity, chronic rhinosinusitis, GERD, pregnancy
	Exposures	Smoking, e-cigarettes, allergen exposures, air pollution
	Psychosocial	Psychological or socioeconomic problems
	Lung function	Low FEV1, High bronchodilator responsiveness
	T2 inflammation	Higher blood eosinophils, elevated FeNO
	H/o Exacerbation	Prior intubation or ICU admission for asthma, ≥1 severe exacerbations in the last 12 months
b. Risk factors for developing persistent airflow limitation		
	History	Preterm birth, low birth weight, chronic mucus hypersecretion
	Medications	Lack of ICS treatment in patient with history of severe exacerbation
	Exposures	Tobacco smoke, noxious chemicals; occupational or domestic exposures
	Test findings	Low initial FEV1, sputum or blood eosinophilia
Risk factors for medication side-effects		
	Systemic	Frequent OCS, long-term, high-dose and/or potent ICS, P450 inhibitors
	Local	High-dose or potent ICS, poor inhaler technique



Uncontrolled Asthma

Review current treatment

Inhaler technique

- Don't ask if they know how to use it but have them show you
- Consider use of a spacer for pMDI

Assess adherence and side-effects

Check that the patient has a written asthma action plan and provide self-management education

Discuss trigger avoidance

Consider non-pharmacological treatment

Assess comorbidities or other etiologies that may contribute to symptoms

- Rhinitis, sinusitis, GERD, obesity, sleep apnea, depression and anxiety

If patient remains uncontrolled, confirm the diagnosis, and consider stepping up their therapy



Severe Asthma

- Uncontrolled despite adherence with optimized high-dose ICS-LABA therapy and treatment of contributory factors
- ≈ 3-10% of people with asthma have severe asthma
- If diagnosed with severe asthma, referral to a specialist is recommended
- Broaden investigation
 - Consider: CBC w/ differential, CRP, immunoglobulin levels, fungal precipitins, FeNO, CXR and/or CT chest, allergy testing, evaluate for COPD, bronchoscopy if indicated
- Evaluate for type 2 airway inflammation → Blood eos, IgE levels, FeNO
- Rule out other causes of Type 2 inflammation if warranted
 - Aspirin-exacerbated respiratory disease, ABPA, Strongyloidiasis, Eosinophilic GPA

Severe Asthma

- No Type 2 inflammation
 - Consider add-on treatment with LAMA, low-dose azithromycin
 - Consider biologic with anti-TSLP
- Type 2 high inflammation
 - Consider add-on treatment with LAMA, LTRA, low-dose azithromycin
 - Consider add-on biologic treatment – all are indicated for severe eosinophilic asthma
 - IL-5R ab: **Benralizumab** (Fasenra)
 - IL-4R ab: **Dupilumab** (Dupixent) – Also in oral glucocorticoid dependent asthma
 - IL-5 ab: **Mepolizumab** (Nucala) – Also in EGPA and hyper-eosinophilic syndromes
 - IL-5 ab: **Reslizumab** (Cinqair)
 - IgE ab: **Omalizumab** (Xolair) – Severe allergic asthma as well as chronic idiopathic urticaria
 - Anti-TSLP: **Tezepelumab** (Tezspire) – Severe asthma regardless of inflammation type
- Add on treatment with bronchial thermoplasty – not frequently recommended
 - Could be considered if no option for biologic therapy but should be completed only in the context of an independent IRB approved systematic registry or a clinical study



Other Reasons to Consider Referral to a Specialist

Unable to confirm the diagnosis of asthma

Risk factors for asthma-related death

Need for long term oral steroid use

Frequent oral steroid use (≥ 2 episodes in a year)

Concern for asthma subtypes or related disease

Thank You!
