

Asthma Update

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Disclosure

I have no financial interests or relationships to disclose.



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Learning Objectives

1. Diagnose and appropriately assess step care in asthma patients using the most recent guidelines
2. Employ inhaled corticosteroid/long-acting beta-agonist (ICS/LABA) as first line care for patients, and determine what sequence to add additional treatments if uncontrolled on first-line management
3. Create an asthma action/management plan for a patient

Abbreviations

- LABA = long-acting beta agonist
- SABA = short-acting beta agonist
- LAMA = long-acting muscarinic antagonist
- SAMA = short-acting muscarinic antagonist
- ICS = inhaled corticosteroid
- LTRA = leukotriene receptor antagonist

Abbreviations

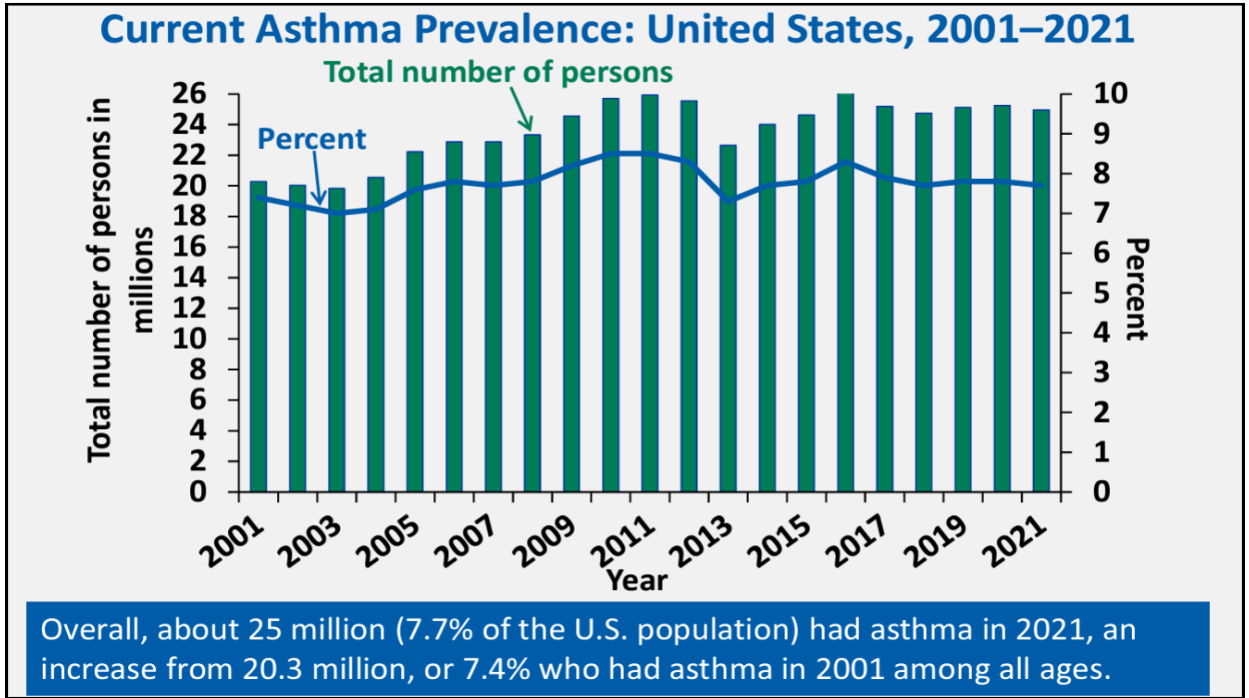
- “SMART”
- In quality improvement, aim for goals that are:
 - Specific, Measurable, Attainable, Realistic, Timely
- In asthma care:
 - **Single Maintenance And Reliever Therapy**
- “MART” – Maintenance and reliever therapy
- “AIR” – anti-inflammatory reliever, ICS-formoterol, ICS-SABA

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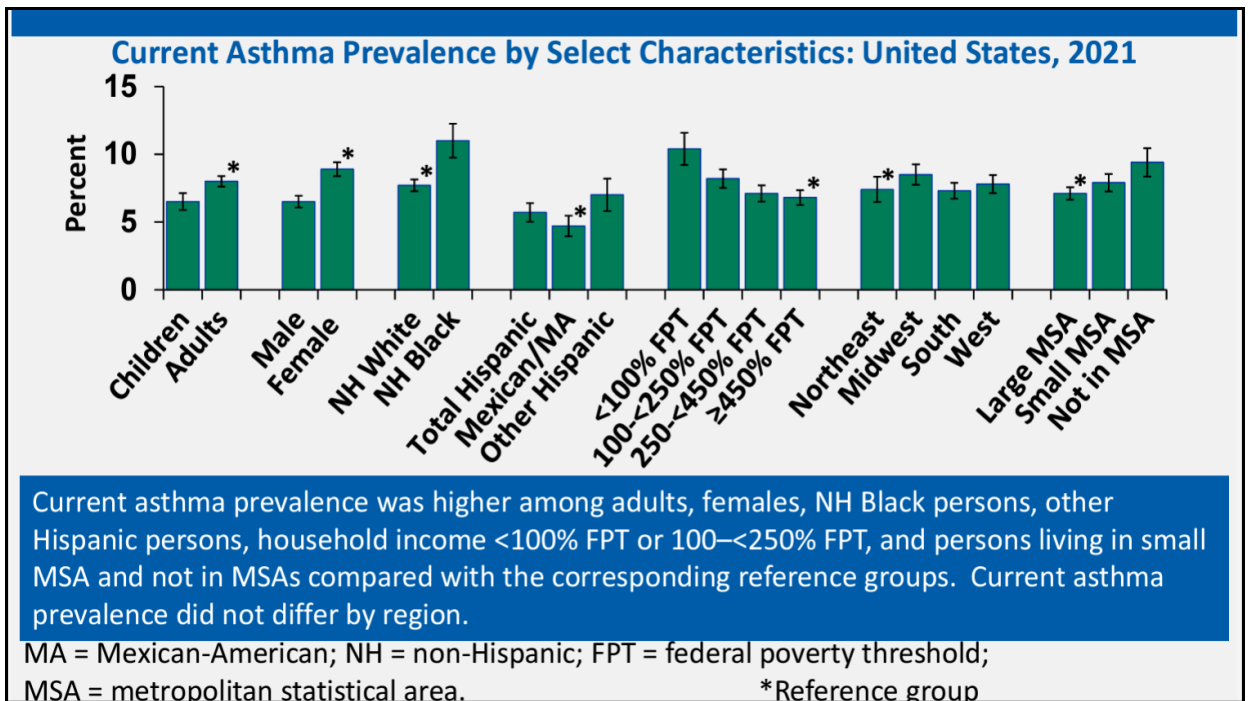
Asthma Epidemiology in the USA

- 19 million adults and 7 million children have asthma
 - 7.7% US population
- Third most common reason for hospitalization of children
- 75% patients are diagnosed before the age of 7
- National Asthma Education and Prevention Plan – Focused Update 2020
 - <https://www.nhlbi.nih.gov/health-topics/asthma-management-guidelines-2020-updates>
- GINA guidelines updates annually – Global Initiative for Asthma
 - 2024 released mid-May 2024
 - <https://ginasthma.org/gina-reports/>
- [CDC’s slide set on asthma statistics](#)

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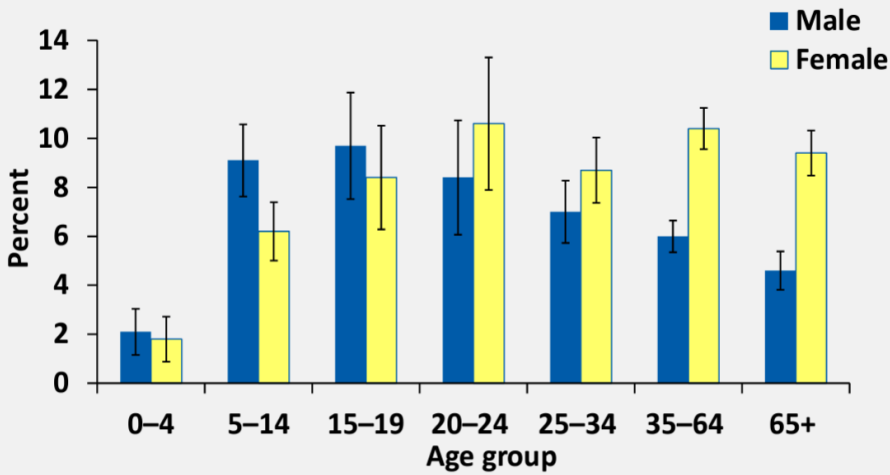


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Child and Adult Current Asthma Prevalence by Age and Sex: United States, 2021

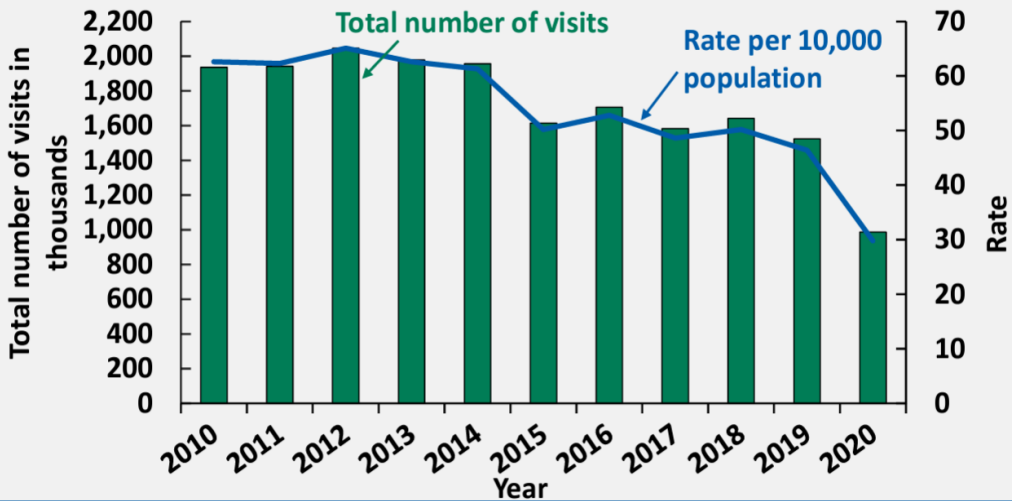


Current asthma prevalence for children aged 5–14 years was higher for males than for females. Among adults 35 years and older, current asthma prevalence was higher for females than males.

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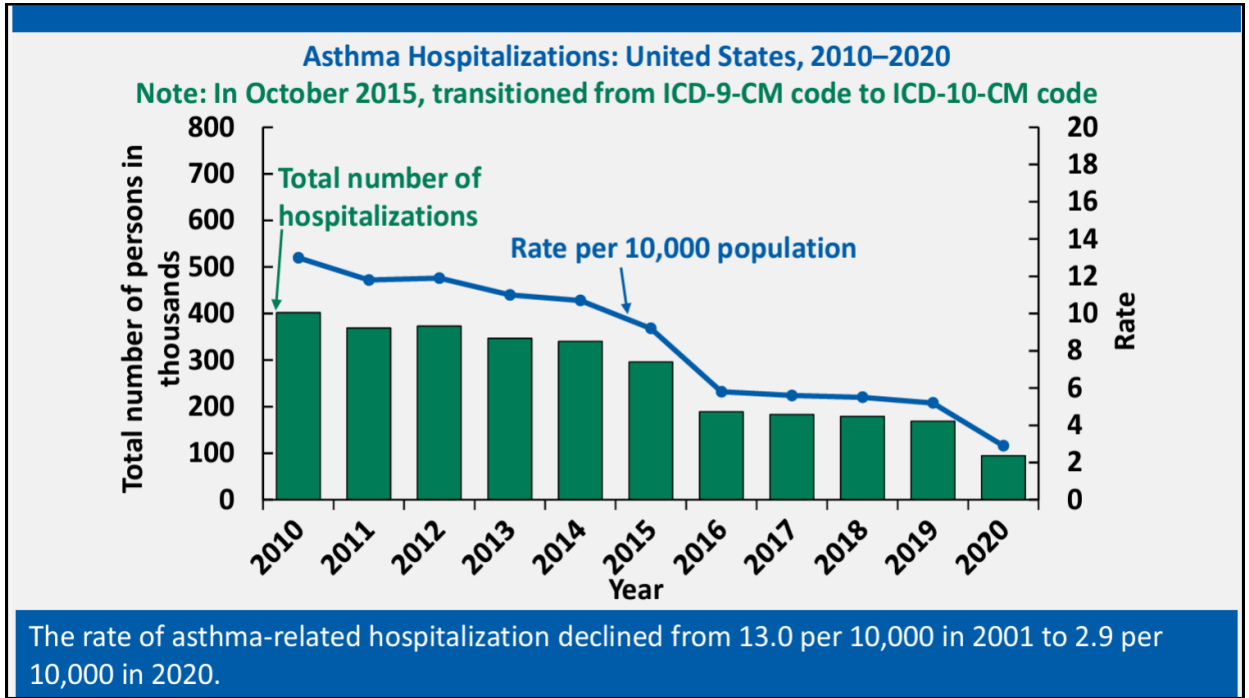
Asthma Emergency Department Visits: United States, 2001–2020

Note: In October 2015, transitioned from ICD-9-CM code to ICD-10-CM code

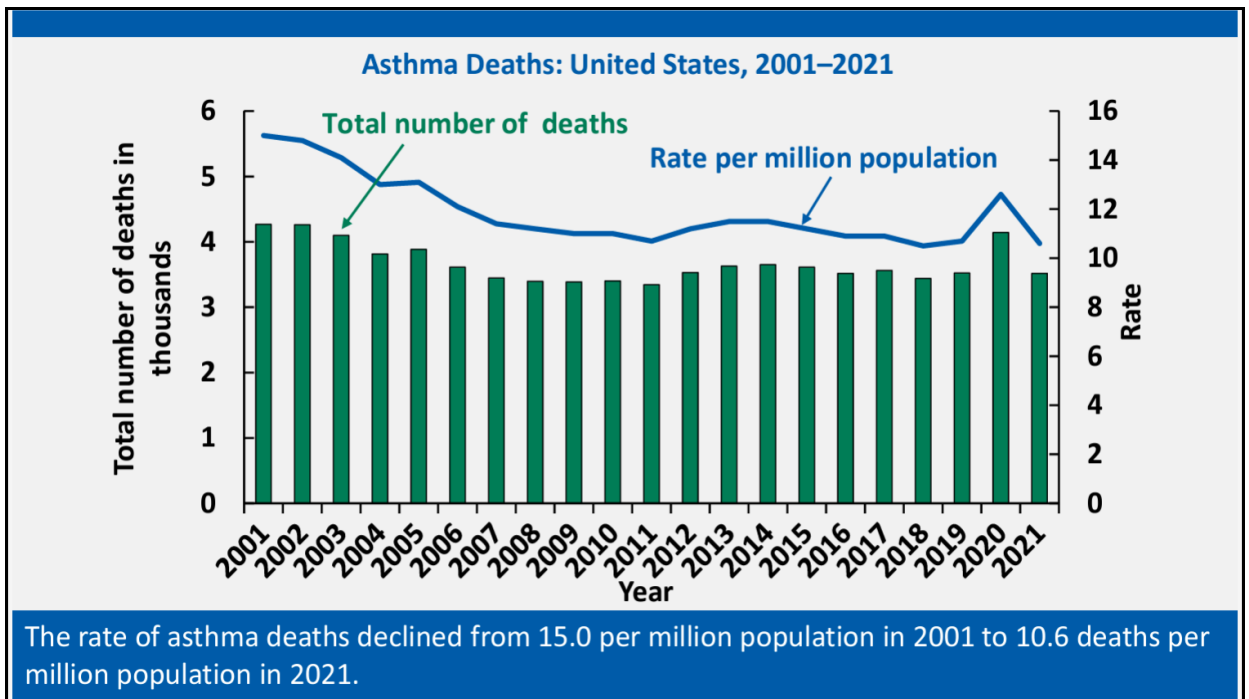


The rate of asthma-related emergency department visits declined from 62.6 per 10,000 in 2001 to 29.8 per 10,000 in 2020.

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Asthma in FL – CDC Data

Barriers
to
Practice

Patient Education: Adults with Current Asthma ⁶	Respondents	Yes
Ever taught how to recognize early signs or symptoms of an asthma episode	304	56%
Ever told what to do during an asthma attack	303	68%
Ever taught how to use a peak flow meter to adjust daily medications	308	45%
Ever given an asthma action plan	305	23%
Ever taken a course on how to manage asthma	310	9%

Medication Use: Adults with Current Asthma ⁶	Respondents	Yes
Used a prescription asthma medication in the past 3 months ⁷	298	64%

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Asthma Diagnosis

Symptoms

- Cough
- Wheezing
- Dyspnea
- Chest tightness

Physical exam findings

- Tachypnea and tachycardia
- Hypoxia
- Accessory muscle use
- Intercostal retractions
- Expiratory wheezing
- Pulsus paradoxus > 12mmHg

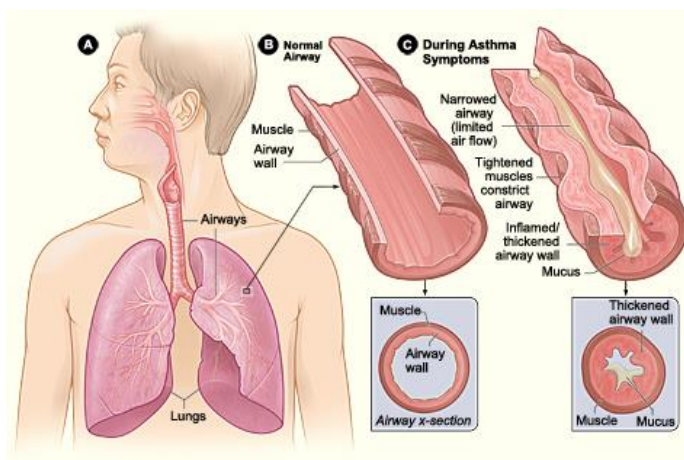
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Goals of Therapy

1. Reduce impairment
 - A. Frequency and intensity of symptoms
 - B. Functional limitations
2. Reduce risk
 - A. Likelihood of future attacks, hospitalizations, death
 - B. Progressive decline in lung function
 - C. Medication side effects

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Importance of Airway Size



Bronchospasm
+
Inflammation

Poiseuille's
Equation

$$R \sim \frac{1}{r^4}$$

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Asthma Diagnosis

- The hallmark is **reversible** airway obstruction.
- Spirometry shows an increase in the FEV₁ of 10% or more after treatment with a beta agonist.
- Usually, the increase is 15-20% - not subtle.
- Diagnostic spirometry should be performed when the patient is symptomatic; o/w, the results may be normal.

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How Hard Is It to Do PFT's?

Hold Out Your Hand

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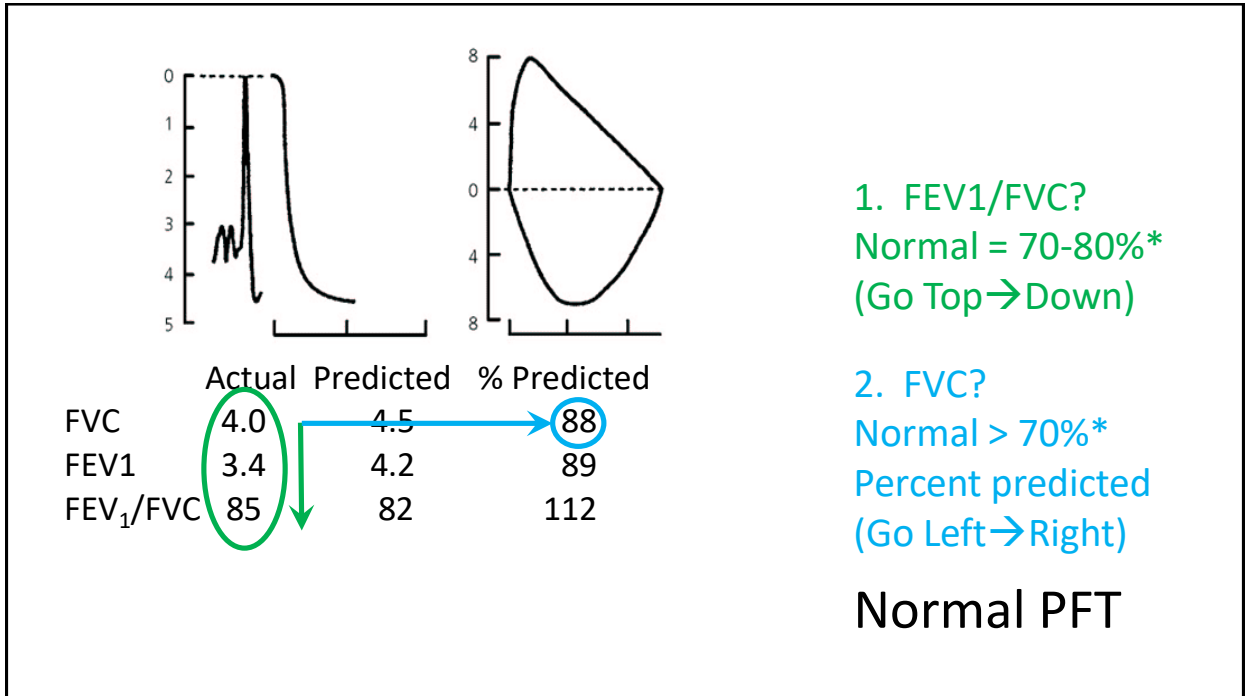
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PFT Interpretation in a Family Medicine Clinic

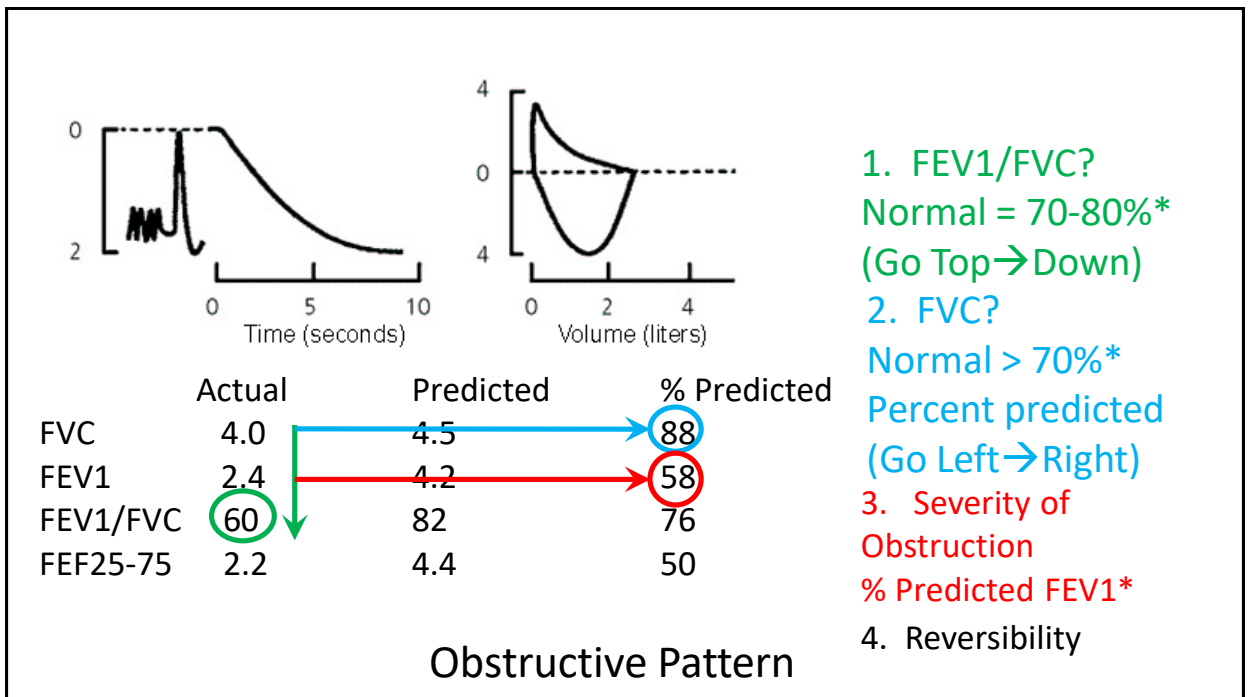
1. **Determine if the FEV₁/FVC is low: obstructive pattern**
2. **Determine if the FVC is low: restrictive pattern**
(If low, consider DLCO – pulmonology office)
3. **Grade the severity**
4. **Determine reversibility for obstructive PFT pattern: asthma vs COPD - Perform post beta agonist PFT**
5. (Consider bronchoprovocation if considering EIB - exercise induced bronchospasm – with methacholine in pulmonology office)
Text in black is probably best done in a pulmonology office

Johnson JD, Theurer WM. A Stepwise Approach to the Interpretation of Pulmonary Function Tests. AFP. 2014 Mar 1; 89(5): 359-366

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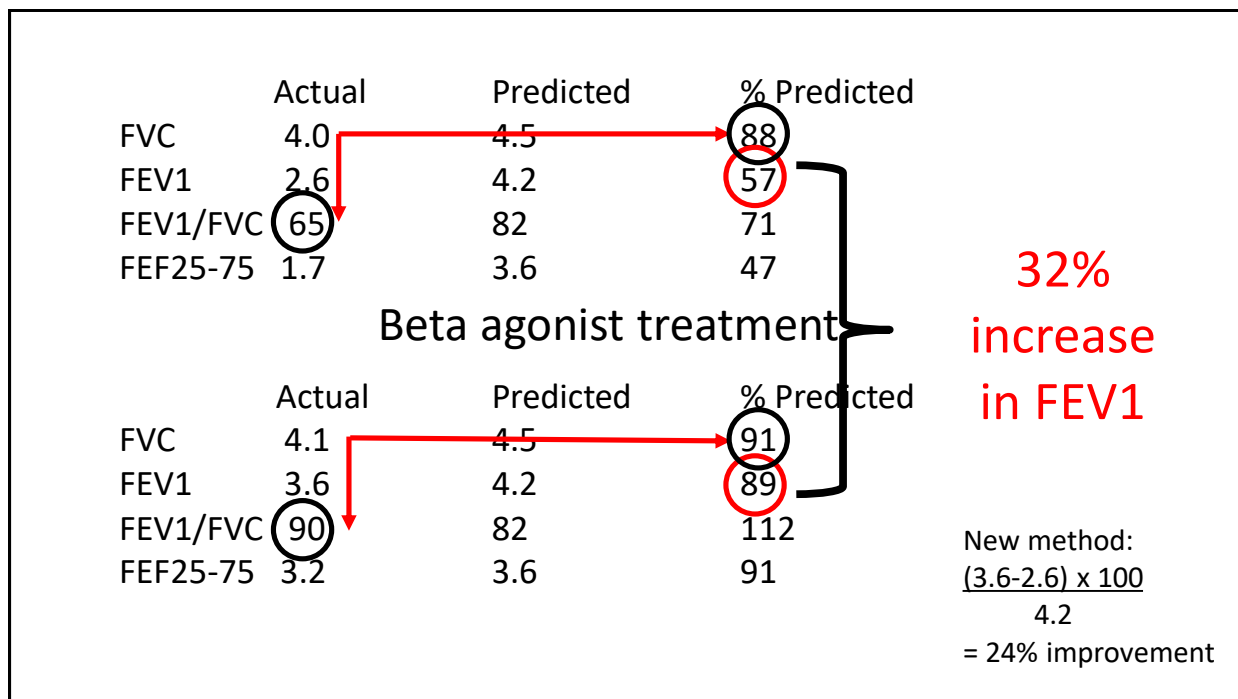
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Beta Agonist Challenge

- Perform this when there is a suspicion that the obstructive defect may be reversible → asthma.
- Give the patient a beta agonist treatment (two puffs of an albuterol MDI or an albuterol nebulizer) and repeat the PFTs several minutes later. If you notice a 10% or more increase in FEV₁ (or FVC), then you have diagnosed reversible airway disease/ asthma.
- Bronchodilator response:

$$\frac{([\text{Postbronchodilator value} - \text{Prebronchodilator value}] \times 100)}{\text{Predicted value}}$$

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Which of the Following Medication Choices for Steps 1-2 (Mild) Asthma Is a Preferred GINA Treatment Option in Adults and Adolescents?

- A. Salmeterol 50 mcg, 1 puff bid maintenance and albuterol rescue.
- B. Budesonide/formoterol (80/4.5 mcg) bid maintenance and rescue.
- C. Fluticasone 110 mcg, 2 puffs bid + montelukast 10 mg qHS maintenance and albuterol rescue.
- D. Fluticasone + salmeterol (250/50) mcg 1 puff PRN



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2024 GINA MAIN REPORT

Global Strategy for Asthma Management and Prevention

The 2024 update of the *Global Strategy for Asthma Management and Prevention* incorporates new scientific information about asthma based on a review of recent scientific literature by an international panel of experts on the GINA Science Committee. This comprehensive and practical resource about one of the most common chronic lung diseases worldwide contains extensive citations from the scientific literature and forms the basis for other GINA documents and programs.

2024 GINA REPORT – DOWNLOAD FOR PERSONAL USE

An update to the GINA 2024 report was published on 22 May, to clarify some medication doses that we found were being misread. Please see the 'What's new in GINA 2024?' section for details.

WHAT'S NEW IN 2024 – SLIDE SET

PURCHASE PRINTED COPIES OF GINA REPORTS

NEWS

[In Memoriam: A tribute to the late Professor Huahao Shen](#)
May 14, 2024
In Memoriam: A tribute to the late Professor Huahao Shen, Hangzhou, People's Republic of China. [...]

[World Asthma Day – Asthma Education Empowers](#)
May 7, 2024
On this World Asthma Day, May 7, 2024, the Global Initiative for Asthma (GINA), emphasizes the need [...]

[World Asthma Day – May 7, 2024](#)
March 1, 2024

In celebration of World Asthma Day 2024

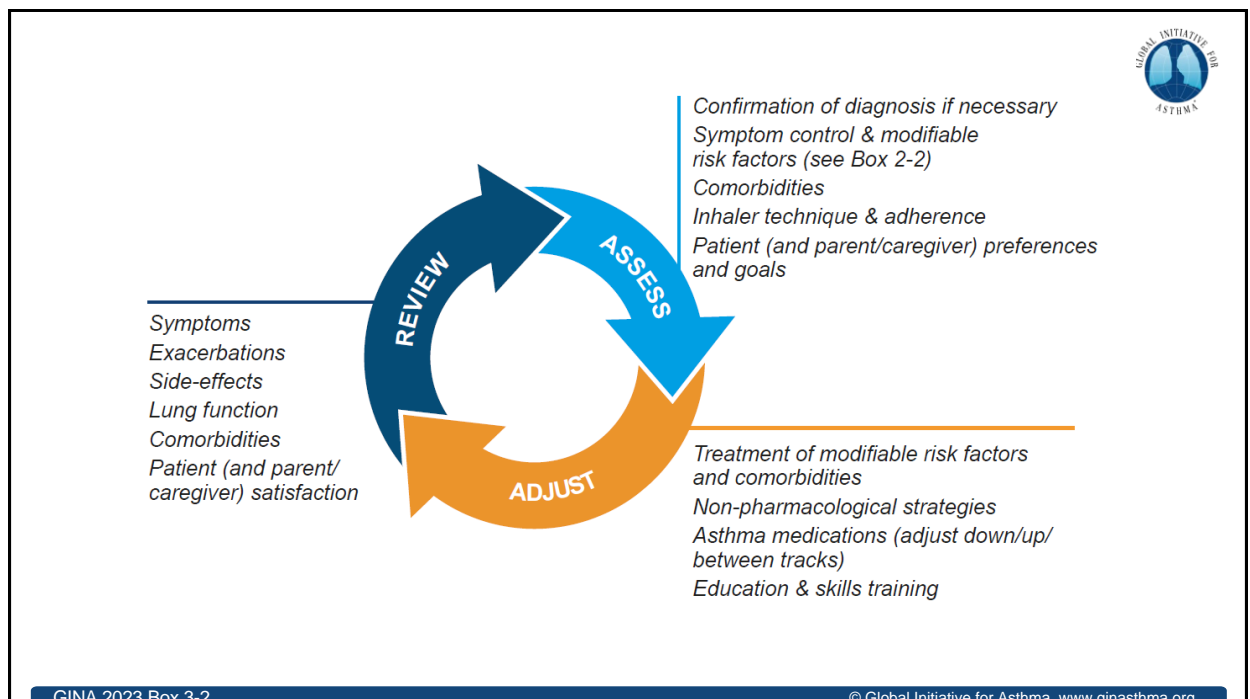
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Global Initiative in Asthma (GINA) 2024

- International guideline for asthma
- Advocate for **regular or prn ICS/LABA in step 1 patients**
- Asthma classifications: mild, moderate, severe
 - **They do not distinguish intermittent and persistent**
- Formoterol is approved as a rescue inhaler in Europe
 - Is not approved in USA for rescue
- Excellent GINA slide set at: <https://ginasthma.org>

Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention, 2024.
Available from: www.ginasthma.org

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A reminder – the key change in GINA 2019



EDITORIAL
GINA 2019

GINA 2019: a fundamental change in asthma management

Treatment of asthma with short-acting bronchodilators alone is no longer recommended for adults and adolescents

Helen K. Reddel¹, J. Mark FitzGerald², Eric D. Bateman³, Leonard B. Bacharier⁴, Allan Becker⁵, Guy Brusselle⁶, Roland Buhl⁷, Alvaro A. Cruz⁸, Louise Fleming⁹, Hiromasa Inoue¹⁰, Fanny Wai-san Ko¹¹, Jerry A. Krishnan¹², Mark L. Levy¹³, Jiangtao Lin¹⁴, Søren E. Pedersen¹⁵, Aziz Sheikh¹⁶, Arzu Yorgancıoğlu¹⁷ and Louis-Philippe Boulet¹⁸

@ERSpublications

GINA no longer recommends treating adults/adolescents with asthma with short-acting bronchodilators alone. Instead, they should receive symptom-driven (in mild asthma) or a daily corticosteroid-containing inhaler, to reduce risk of severe exacerbations. <http://bit.ly/310LLzE>

Cite this article as: Reddel HK, FitzGerald JM, Bateman ED, *et al*. GINA 2019: a fundamental change in asthma management. *Eur Respir J* 2019; 53: 1901046 [https://doi.org/10.1183/13993003.01046-2019].

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GINA 2019 – landmark changes in asthma management



- For safety, GINA no longer recommends SABA-only treatment for Step 1 in adults and adolescents
 - This decision was based on evidence that SABA-only treatment increases the risk of severe exacerbations, and that adding any ICS significantly reduces the risk
- GINA now recommends that all adults and adolescents with asthma should receive ICS-containing controller treatment, to reduce the risk of serious exacerbations
 - The ICS can be delivered by regular daily treatment or, in mild asthma, by as-needed low dose ICS-formoterol
- This is a population-level risk reduction strategy
 - Other examples: statins, anti-hypertensives
 - The aim is to reduce the probability of serious adverse outcomes at a population level
 - Individual patients may not necessarily experience (or be aware of) short-term clinical benefit

ICS: inhaled corticosteroids; SABA: short-acting beta₂-agonist

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NAEPP VS GINA

The National Asthma Education and Prevention Program recommendations

STEP 1 SABA as needed	STEP 2 Preferred: low-dose ICS plus SABA as needed Alternative: daily LTRA plus SABA as needed	STEP 3 Preferred: low-dose ICS plus formoterol daily; use as needed up to 12 times daily Alternative: medium-dose ICS plus SABA as needed or low-dose ICS plus LABA daily or low-dose ICS plus LAMA daily or low-dose ICS plus LTRA daily and SABA as needed	STEP 4 Preferred: medium-dose ICS plus formoterol daily and as needed up to 12 times daily Alternative: medium-dose ICS plus LABA or medium-dose ICS plus LAMA daily and SABA as needed	STEP 5 Preferred: medium- or high-dose ICS plus LABA and LAMA daily and SABA as needed Alternative: medium- or high-dose ICS plus LABA or high-dose ICS plus LTRA daily and SABA as needed Consider biologics	STEP 6 High-dose ICS plus LABA and LAMA daily Consider oral corticosteroids and biologics
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STEP UP: assess control, adherence, and inhaler technique; STEP DOWN: asthma has been controlled for three months

STEP 1 Preferred: low-dose ICS plus formoterol as needed Alternative: low-dose ICS plus SABA as needed	STEP 2 Preferred: low-dose ICS plus formoterol as needed Alternative: low-dose ICS daily plus SABA as needed Other: low-dose ICS plus SABA as needed or LTRA daily	STEP 3 Preferred: low-dose ICS plus formoterol daily and as needed Alternative: low-dose ICS plus LABA daily plus SABA as needed Other: medium-dose ICS daily plus SABA as needed, or consider adding LTRA	STEP 4 Preferred: medium-dose ICS plus formoterol daily and as needed Alternative: medium- or high-dose ICS plus LABA and SABA as needed	STEP 5 Medium- or high-dose ICS plus LABA and LAMA daily and SABA as needed Refer for expert assessment Other: consider adding biologics, oral corticosteroids, or azithromycin
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The Global Initiative for Asthma recommendations

Guideline-directed stepwise management of asthma in children 12 years and older and adults.

ICS = inhaled corticosteroid; LABA = long-acting beta₂ agonist; LAMA = long-acting muscarinic antagonist; LTRA = leukotriene receptor antagonist; SABA = short-acting beta₂ agonist.

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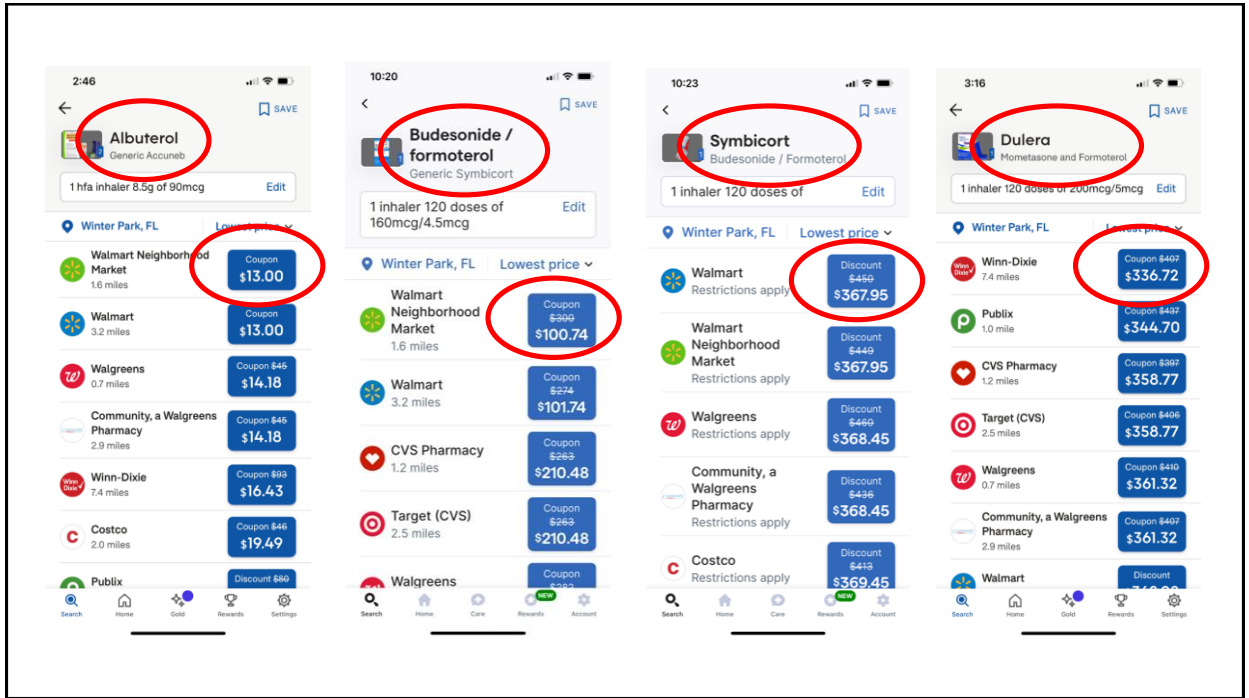
NAEPP VS GINA

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STEP UP: assess control, adherence, and inhaler technique; STEP

STEP 1 Preferred: low-dose ICS plus formoterol as needed Alternative: low-dose ICS plus SABA as needed	STEP 2 Preferred: low-dose ICS plus formoterol as needed Alternative: low-dose ICS daily plus SABA as needed Other: low-dose ICS plus SABA as needed or LTRA daily	STEP 3 Preferred: low-dose ICS plus formoterol daily and as needed Alternative: low-dose ICS plus LABA daily plus SABA as needed Other: medium-dose ICS daily plus SABA as needed, or consider adding LTRA
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Florida Medicaid Formula Search

B60	ANTIHISTAMINE COMB.	ATROVENT 17 MCG HFA INHALER	IPRATROPIUM BROMIDE	0	999	No
	ANTICHOLINERGICS, ORALLY INHALED SHORT ACTING					
B61	ANTICHOLINERGICS, ORALLY INHALED LONG ACTING	IPRATROPIUM BR 0.02% SOLN	IPRATROPIUM BROMIDE	0	999	No
		SPIRIVA HANDIHALER 18 MCG CAP	TIOTROPIUM BROMIDE	18	999	No
B62	BETA-ADRENERGIC AND ANTICHOLINERGIC COMBO, INHALED	SPIRIVA RESPIMAT 1.25 MCG INH	TIOTROPIUM BROMIDE	6	999	No
		SPIRIVA RESPIMAT 2.5 MCG INH	TIOTROPIUM BROMIDE	6	999	No
		ANORO ELLIPTA 62.5-25 MCG INH	UMECLIDINIUM BRM/VILANTEROL TR	18	999	No
B63	BETA-ADRENERGIC AND GLUCOCORTICOID COMBO, INHALED	COMBIVENT RESPIMAT 20-100 MCG	IPRATROPIUM/ALBUTEROL SULFATE	0	999	No
		IPRAT-ALBUT 0.5-3(2.5) MG/3 ML	IPRATROPIUM/ALBUTEROL SULFATE	0	999	No
		STIOLTO RESPIMAT INHAL SPRAY	TIOTROPIUM BR/OLODATEROL HCL	0	999	No
		ADVAIR 100-50 DISKUS	FLUTICASONE PROPION/SALMETEROL	4	999	No
		ADVAIR 250-50 DISKUS	FLUTICASONE PROPION/SALMETEROL	4	999	No
		ADVAIR 500-50 DISKUS	FLUTICASONE PROPION/SALMETEROL	4	999	No
		ADVAIR HFA 115-21 MCG INHALER	FLUTICASONE PROPION/SALMETEROL	4	999	No
		ADVAIR HFA 230-21 MCG INHALER	FLUTICASONE PROPION/SALMETEROL	4	999	No
		ADVAIR HFA 45-21 MCG INHALER	FLUTICASONE PROPION/SALMETEROL	4	999	No
		DULERA 100 MCG-5 MCG INHALER	MOMETASONE/FORMOTEROL	5	999	No
		DULERA 200 MCG-5 MCG INHALER	MOMETASONE/FORMOTEROL	5	999	No
		DULERA 50 MCG-5 MCG INHALER	MOMETASONE/FORMOTEROL	5	999	No
		SYMBICORT 160-4.5 MCG INHALER	BUDESONIDE/FORMOTEROL FUMARATE	5	999	No
		SYMBICORT 80-4.5 MCG INHALER	BUDESONIDE/FORMOTEROL FUMARATE	5	999	No

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B6M	GLUCOCORTICOIDS, ORALLY INHALED	ALVESCO 160 MCG INHALER	CICLESONIDE	5	999	No		
		ALVESCO 80 MCG INHALER	CICLESONIDE	5	999	No		
		ASMANEX TWISTHALER 110 MCG #30	MOMETASONE FUROATE	4	999	No		
		ASMANEX TWISTHALER 220 MCG #14	MOMETASONE FUROATE	4	999	No		
		ASMANEX TWISTHALER 220 MCG #30	MOMETASONE FUROATE	4	999	No		
		ASMANEX TWISTHALER 220 MCG #60	MOMETASONE FUROATE	4	999	No		
		ASMANEX TWISTHALR 220 MCG #120	MOMETASONE FUROATE	4	999	No		
		BUDESONIDE 0.25 MG/2 ML SUSP	BUDESONIDE	1	8	No		
		BUDESONIDE 0.5 MG/2 ML SUSP	BUDESONIDE	1	8	No		
		BUDESONIDE 1 MG/2 ML INH SUSP	BUDESONIDE	1	8	No		
		FLOVENT HFA 110 MCG INHALER	FLUTICASONE PROPIONATE	0	999	No		
		FLOVENT HFA 220 MCG INHALER	FLUTICASONE PROPIONATE	0	999	No		
		Page 8 of 94		Effective January 1, 2023				
HIC3	HIC3 Description	Label Name	Generic Name	Min Age	Max Age	Clinical P		
B6W	BETA-ADRENERGIC AGENTS, INHALED, SHORT ACTING	FLOVENT HFA 44 MCG INHALER	FLUTICASONE PROPIONATE	0	999	No		
		PULMICORT 180 MCG FLEXHALER	BUDESONIDE	5	999	No		
		PULMICORT 90 MCG FLEXHALER	BUDESONIDE	5	999	No		
		ALBUTEROL 2.5 MG/0.5 ML SOL	ALBUTEROL SULFATE	0	999	No		
		ALBUTEROL 5 MG/ML SOLUTION	ALBUTEROL SULFATE	0	999	No		
		ALBUTEROL SUL 0.63 MG/3 ML SOL	ALBUTEROL SULFATE	0	999	No		
		ALBUTEROL SUL 1.25 MG/3 ML SOL	ALBUTEROL SULFATE	0	999	No		
		ALBUTEROL SUL 2.5 MG/3 ML SOLN	ALBUTEROL SULFATE	0	999	No		
		PROAIR HFA 90 MCG INHALER	ALBUTEROL SULFATE	0	999	No		
		PROVENTIL HFA 90 MCG INHALER	ALBUTEROL SULFATE	0	999	No		
B6Y	BETA-ADRENERGIC AGENTS, ORALLY INHALED, LONG ACTING	VENTOLIN HFA 90 MCG INHALER	ALBUTEROL SULFATE	0	999	No		
		SEREVENT DISKUS 50 MCG	SALMETEROL XINAFOATE	4	999	No		
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Money Slide – Work Smarter, Not Harder



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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

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)

STEP 1 As-needed-only low dose ICS-formoterol
STEP 2 Low dose maintenance ICS-formoterol
STEP 3 Low dose maintenance ICS-formoterol
STEP 4 Medium dose maintenance ICS-formoterol
STEP 5 Add-on LAMA. Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: As-needed low-dose ICS-formoterol*

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 assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

RELIEVER: as-needed ICS-SABA*, or as-needed SABA

See GINA severe asthma guide

*Anti-inflammatory reliever (AIR)

Box 3-12 © Global Initiative for Asthma. www.ginasthma.org

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STARTING TREATMENT

in adults and adolescents 12+ years with a diagnosis of asthma

FIRST ASSESS: Confirmation of diagnosis, Symptom control & modifiable risk factors (including lung function), Comorbidities, Inhaler technique & adherence, Patient preferences & goals

IF: Daily symptoms, waking at night once a week or more and low lung function?

START WITH: **TRACK 1 (preferred)** Medium dose ICS-formoterol maintenance and reliever (MART) **OR** **TRACK 2** Medium/high dose ICS-LABA + as-needed SABA **STEP 4**

IF: Symptoms most days, or waking at night once a week or more?

START WITH: Low dose ICS-formoterol maintenance and reliever (MART) **OR** Low dose ICS-LABA + as-needed SABA **STEP 3**

IF: Symptoms twice a month or more?

START WITH: As-needed low dose ICS-formoterol **OR** Low dose ICS + as-needed SABA **STEP 2**

IF: (No symptoms) **START WITH:** As-needed low dose ICS-formoterol **OR** Take low dose ICS whenever SABA is taken **STEP 1**

Short course OCS may also be needed for patients presenting with severely uncontrolled asthma

As-needed ICS-formoterol is preferred if the patient is likely to be poorly adherent with daily ICS

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 3-4Bii © Global Initiative for Asthma. www.ginasthma.org

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As-needed ICS-formoterol – maximum daily dose?



- As-needed low dose budesonide-formoterol
 - Prescribed in maintenance and reliever therapy (Steps 3–5), or as-needed only (Steps 1–2), or within an asthma action plan
 - From product information, the maximum recommended total in one day is 72 mcg formoterol (12 inhalations of budesonide-formoterol Turbuhaler 200/6 mcg)

- As-needed low dose beclometasone-formoterol
 - Prescribed in maintenance and reliever therapy (Steps 3–5), or within an asthma action plan
 - From product information, the maximum recommended total in one day is 48 mcg formoterol (6 inhalations of beclometasone-formoterol pMDI100/6 mcg)

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Assessment of symptom control



- Frequency of SABA use is included in symptom control assessment
 - Higher SABA use is associated with worse outcomes, even in patients taking ICS

A. Asthma symptom control		Level of asthma symptom control		
In the past 4 weeks, has the patient had:		Well controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice/week?	Yes <input type="checkbox"/> No <input type="checkbox"/>	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes <input type="checkbox"/> No <input type="checkbox"/>			
• Reliever (SABA) for symptoms more than twice/week?*	Yes <input type="checkbox"/> No <input type="checkbox"/>			
• Any activity limitation due to asthma?	Yes <input type="checkbox"/> No <input type="checkbox"/>			

- Our current view is that frequency of ICS-formoterol use should not be included in symptom control assessment, particularly in patients not taking maintenance ICS
 - The as-needed ICS-formoterol is providing the patient’s controller therapy
 - Further data awaited: this issue will be reviewed again next year

GINA 2020. Box 2-2A

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Adverse effects with montelukast



- FDA boxed warning in March 2020 about risk of serious neuropsychiatric events, including suicidality, with montelukast
 - Includes suicidality in adults and adolescents
 - Nightmares and behavioral problems in children
- Before prescribing montelukast, health professionals should consider its benefits and risks, and patients should be counselled about the risk of neuropsychiatric events

FDA requires Boxed Warning about serious mental health side effects for asthma and allergy drug montelukast (Singular); advises restricting use for allergic rhinitis

Risks may include suicidal thoughts or actions

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Combination ICS/LABA

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Fluticasone/vilanterol – DPI <ol style="list-style-type: none"> A. 100mcg/25mcg, 200/25 B. 1 puff qday 2. Fluticasone/salmeterol – DPI and MDI <ol style="list-style-type: none"> A. 100-250-500mcg/50mcg DPI B. 45-115-230mcg/21mcg MDI HFA C. 2 puffs 2x/day, dose depends on severity 3. Budesonide/formoterol – MDI <ol style="list-style-type: none"> A. 80-160mcg/4.5mcg B. 2 puffs 2x/day, dose depends on severity 4. Mometasone/formoterol – MDI <ol style="list-style-type: none"> A. 50-100-200mcg/5mcg B. 2 puffs 2x/day, dose depends on severity | <p>Comments:</p> <p>A. Formoterol – short onset of action like SABA</p> <p>B. Two ICS/Formoterol combos available in USA</p> <p>C. Only BDS/FORM has strong evidence to date → GINA recommendations</p> |
|---|---|

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Other Asthma Control Medications

1. Leukotriene Receptor Antagonists (LTRAs)
 - A. Montelukast (Singulair) 10 mg qHS (\$10-15 USD/mo)
 - B. Zafirlukast (Accolate) 40 mg daily (20mg 2x/day, \$30-50 USD/mo)
2. 5-Lipoxygenase Inhibitor
 - A. Zileuton 600 mg ER bid (>\$1000/mo USD... !!!)

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Other Asthma Control Medications

1. Immunomodulator – Omalizumab (Anti-IgE)
 - A. 150-375 mg subcut. INJ q2-4 weeks, \$2000 USD/mo
 - B. Other biologic therapies
2. Mast cell stabilizer – Cromolyn nebulizer
 - A. 1 neb 4x/day, \$160-250 USD/mo
3. Methylxanthine – Theophylline
 - A. 300-600mg/day, divided daily to bid, \$50-60 USD/mo
 - B. Multiple toxicities

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ICS/SABA Combo vs ICS/LABA .. The Future?

- 3040 patients > 12 yo with uncontrolled moderate-to-severe asthma
- Randomized to three groups for rescue:
 - Budesonide-albuterol 160/180 mcg (high dose BDS)
 - Budesonide-albuterol 80/180 mcg (low dose BDS)
 - Albuterol alone 180 mcg
- Risk of severe asthma exacerbation was significantly lower, by 26%, high dose BDS vs albuterol alone. (hazard ratio, 0.74; 95% confidence interval [CI], 0.62 to 0.89; P=0.001).
- Hazard ratio in low dose BDS vs albuterol was 0.84 (95% CI, 0.71 to 1.00; P=0.052).
- The incidence of adverse events was similar in the three trial groups.

Papi A et al. Albuterol–budesonide fixed-dose combination rescue inhaler for asthma. *N Engl J Med* 2022 May 15; [e-pub].

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ICS/SABA Combo vs ICS/LABA ... The Future?

- Risk of severe exacerbations in group using ICS/SABA was significantly less.
- Airsupra FDA approved January 2023
 - Budesonide/albuterol
- Cost? Ouch! →

Airsupra

1 inhaler 120 inhalations of 90mcg/80mcg Edit

📍 Winter Park, FL Popular ▾

GoodRx Gold Get one month free	As low as \$486.25 >
Publix	\$493.00 > <small>\$599 Save 17%</small>
CVS Pharmacy	\$493.46 > <small>\$568 Save 12%</small>
Walgreens	\$493.71 > <small>\$574 Save 13%</small>
Walmart	\$504.20 > <small>\$570 Save 11%</small>

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Generic Fluticasone
\$90/Month
Generic Albuterol
\$13/Month
= \$103/Month in Two
Inhalers

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Asthma Patients: Meds vs Cost

- Good insurance → SMART with budesonide/formoterol generic
 - Brand Symbicort is tier 2 with many providers...including Amazon
 - \$100/month generic on GoodRx
 - Brand Dulera (mometasone/form.) is tier 2-3 with some providers
- No insurance and qualifies for Medicaid
 - Symbicort (budesonide/formoterol) and Dulera (mometasone/formoterol) both covered
- Catastrophic only/no insurance
 - Generic budesonide/formoterol \$100/mo might be a reach financially, and...
 - Generic albuterol \$13/mo at Walmart
 - Generic ICS (\$90/mo) + generic SABA (\$13/mo) = \$103
 - ...about the same as generic BDS/FOR

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Every Patient Needs an Asthma Action Plan

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Peak Flow Meters

These Two Enable Setting the Three Zones



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Overall Pick



Fingertip Pulse Oximeter Blood Oxygen Saturation Monitor with...

1 Count (Pack of 1)

★★★★☆ ~ 112,929
10K+ bought in past month

\$14.99 (\$14.99/Count)




✓prime Same-Day FREE delivery Today 5 PM - 10 PM on \$25 of qualifying items

Carbon impact ~ FSA or HSA eligible

DUAL ZONE PEAK FLOW METER

\$14.99

-18% \$65.99 (\$65.99 / Count)
List Price: \$79.99



Roll over image to zoom in

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CDC's Asthma Action Plan

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Asthma Action Plan

Name: _____ Date: ____/____/____

Doctor's Name: _____ Main Emergency Contact: _____
 Doctor's Phone Number: _____ Backup Emergency Contact: _____

Green Zone: No coughing, wheezing, chest tightness, or shortness of breath. Can do usual activities. Doing Well

Every day: Take these medicines, even if you're not having any symptoms. Avoid triggers that you know make your asthma worse.

Medicine	How much to take	When to take

Before you exercise: Take [] 2 or [] 4 Puffs of _____ 5 minutes before you start, as needed.

Yellow Zone: One or more of these symptoms: coughing, wheezing, chest tightness, breathing trouble, waking up at night due to asthma. Or, if you can only do some, but not all, usual activities. Some Symptoms

Keep taking your Green Zone medicine and avoiding triggers as usual **AND** take this medicine:

Medicine	How much to take and how often
(Quick-relief)	_____ Puffs Can repeat every _____ minutes. Up to _____ times OR [] Nebulizer: Use it once

If you return to the Green Zone after 1 hour, keep monitoring to be sure you stay in the Green Zone.
 If you do not return to the Green Zone after 1 hour take this medicine:

Medicine	How much to take and how often
(Quick-relief)	_____ Puffs OR [] Nebulizer: Use it once
AND: (Oral Steroid)	Take _____ mg each day for _____ (3 to 10) days

Call your doctor (or have someone call) just before you take the oral steroid **OR** _____ minutes/hours after taking the oral steroid, based on the instructions your doctor gave when the medicine was prescribed.

Asthma Action Plan

Name: _____ Date: ____/____/____

Doctor's Name: _____ Main Emergency Contact: _____
 Doctor's Phone Number: _____ Backup Emergency Contact: _____

Red Zone: EMERGENCY! Very short of breath, or quick-relief medicines have not helped, or symptoms are the same or worse after 24 hours in the Yellow Zone. Or, if you cannot do any of your usual activities. Severe Symptoms
Emergency

Take this medicine	How much to take
(Quick-relief)	_____ Puffs Can repeat every _____ minutes, up to _____ times OR [] Nebulizer: Can repeat every _____ minutes, up to _____ times
(Oral steroid)	Take _____ mg.

After you take your medicine, call your doctor right away!
 If you're still in the Red Zone after 15 minutes and have not reached your doctor, go to the hospital or call 911!

If you have these **DANGER SIGNS**: trouble walking or talking due to shortness of breath or your lips or fingernails are blue, pale, or gray, take _____ puffs of your quick-relief medicine and **GO to the hospital or call 911 NOW!**

These **DANGER SIGNS** mean you need help right away. Don't wait to hear back from your doctor. **GO to the hospital or call 911 NOW!**

If you use a peak flow meter you can use these scores to determine your current zone:

Your best score	Your green zone	Your yellow zone	Your red zone
_____	_____ or higher (80% of best score)	_____ to _____ (50 to 80% of best score)	_____ or lower (50% of best score)

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Know Your Asthma Triggers.

Learn how to avoid triggers to control your asthma.

Triggers are things that make your asthma symptoms worse. People with asthma do not all have the same triggers. Avoiding your triggers is one step you can take to help keep your asthma under control. Work with your healthcare provider to check whether any of these things make your asthma worse, then take the related steps below. Check CDC's webpage for other steps you can take: www.cdc.gov/asthma

Outdoor Triggers

Weather

- Pay attention to radio, television, the Internet, or newspaper reports about things that might trigger your asthma. These might include reports about weather, air quality, pollen count, or wildfire conditions.
- Plan outdoor activities for when the air quality is best.
- If pollen triggers your asthma, close windows and turn on air conditioning (if possible) when pollen levels are high.
- When there are wildfires, stay away from areas where there is smoke or vapors. Stay indoors, if possible, to avoid smoke or vapors.
- When it is cold, wear a scarf or face mask that covers your nose and mouth to keep airflow as warm as possible.

Air Quality

Pollen

Indoor Triggers

If you are allergic to dust mites, cockroaches, rodents, indoor mold, or pets, use an air purifier with a high-energy particulate air (HEPA) filter, and use HEPA filters for vacuum cleaners. Keep your home as clean as possible. If you can, ask someone else to clean your home regularly, or wear a dust mask while you clean.

Pets

If you are allergic to your pet, the best way to avoid exposure is to remove the pet from your home and have the house cleaned. If you can't remove the pet:

- Keep the pet out of your bedroom.
- Ask a family member to wash your pet regularly.
- Use allergen-proof pillow and mattress covers.
- Use an air cleaner with HEPA filter.

Note: Pet fur, skin, and saliva trigger some people's asthma.

Dust mites (tiny bugs that live in dust and fabric)

- Keep relative humidity levels in your home low, around 30%-50%.
- Wash your bedding every week and dry completely.
- Use allergen-proof pillow and mattress covers.

Know Your Asthma Triggers.

Indoor Triggers

Cockroaches

- Keep your kitchen clean and store food and garbage in closed containers.
- Don't leave out any standing water or other liquids.

Mice

Rats

- Seal cracks or openings in cabinets, walls, floorboards, and around plumbing.
- Use traps or poison bait to get rid of roaches, mice, or rats. Keep bait away and out of reach of children and pets. Avoid sprays and foggers.

Mold

Humidity

- Fix water leaks as soon as possible and dry damp or wet items within 48 hours.
- Remove all moldy items from your home.
- Use an air conditioner or dehumidifier to keep the air dry in your home. Keep relative humidity levels in your home low, around 30%-50%.
- Empty and clean refrigerator and air conditioner drip pans regularly.
- Use bathroom exhaust fans or open windows when you shower.

Smoke

Sprays

Scents

Disinfectants

- Avoid places where people smoke. If you smoke, ask your healthcare provider how to quit.
- Don't use a wood-burning stove, kerosene heater, or fireplace.
- Avoid perfume, paint, hairspray, and talcum powder.
- Try to stay away when cleaners or disinfectants are being used and right after their use.
- Increase air flow by opening doors and windows and turning on exhaust fans.

Other Common Triggers

Illness

- Contact your healthcare provider if you think you have another health problem that is making it harder for you to breathe. Such problems might include the flu, a cold, acid reflux (heartburn), a sinus infection, severe allergies, or another health concern.

Emotions

- Talk to your healthcare provider if anxiety, stress, or other emotions make your asthma worse.

Notes:

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Environmental Triggers

- Identify and avoid provocative allergens
 - House dust mites (HDM-SLIT), animal danders, mold
 - Food allergies rarely cause isolated asthma sx
 - Consider allergy eval: ImmunoCAP, Allergy c/s
- Respiratory irritants
 - Smoke – tobacco, fire, ... volcano
 - Vog in Hawaii with an east wind:
 - Magma + NaCl (salt water) = HCl in the wind

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Prevention in Asthma

- Immunizations include:
 - Annual influenza vaccination
 - CDC recommends **Pneumococcal vaccination** for all patients with lung disease (asthma)
 - COVID-19
- Aspirin and NSAID sensitivity in 3-5% asthma patients

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You've Controlled All Triggers
and the Patient Is Still in the
Hospital Several Times a Year ...
What to Do?

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Arizona, Here I Come!



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When to Refer

1. Patient has a life-threatening exacerbation (ICU, intubation, code)
- 2. Patient requiring hospitalization or ≥ 2 oral steroid bursts in a year**
3. Step 4 care in an adult (Daily medium dose ICS/FORM)
4. Asthma uncontrolled after 3-6 months active therapy and monitoring
5. Patient appears unresponsive to therapy

Ref, NAEPP 2020

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When to Refer

6. Diagnosis of asthma is uncertain
7. Other complicating conditions exist (nasal polyps, **COPD**, chronic sinusitis, others)
8. Additional tests are needed (allergy skin testing, bronchoscopy)
9. Patient may be a candidate for allergen immunotherapy

Ref, NAEPP 2020

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Key Practice Points

1. Use ICS/formoterol as the preferred GINA 2024 choice for **all** patients ≥ 12 yo with asthma
 - Generic BDS/FORM cost (\$100) = Generic FLUT+ALB (\$103)
2. All patients need an asthma action plan
 - Can create AAP using sx alone w/o using peak flow values
3. Do not use LABAs as monotherapy in Asthma
4. Immunize patients as appropriate

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