

History of Asthma: An Evolution of Understanding

**KENNETH MILLER MED, MSRT, RRT-ACCS,
AE-C, FAARC**

Learning Objectives

Review	the significance and burden of asthma
Describe	the historical management of asthma
Define	the goals of asthma management during the past centuries
Describe	current asthma management

Current Definition of Asthma

- GINA 2026 defines asthma as:
 - *“Asthma is a heterogenous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness and cough, that vary over time and in intensity, together with variable expiratory airflow limitation.”*
- Caused by interaction of epigenetic factors and environmental exposures

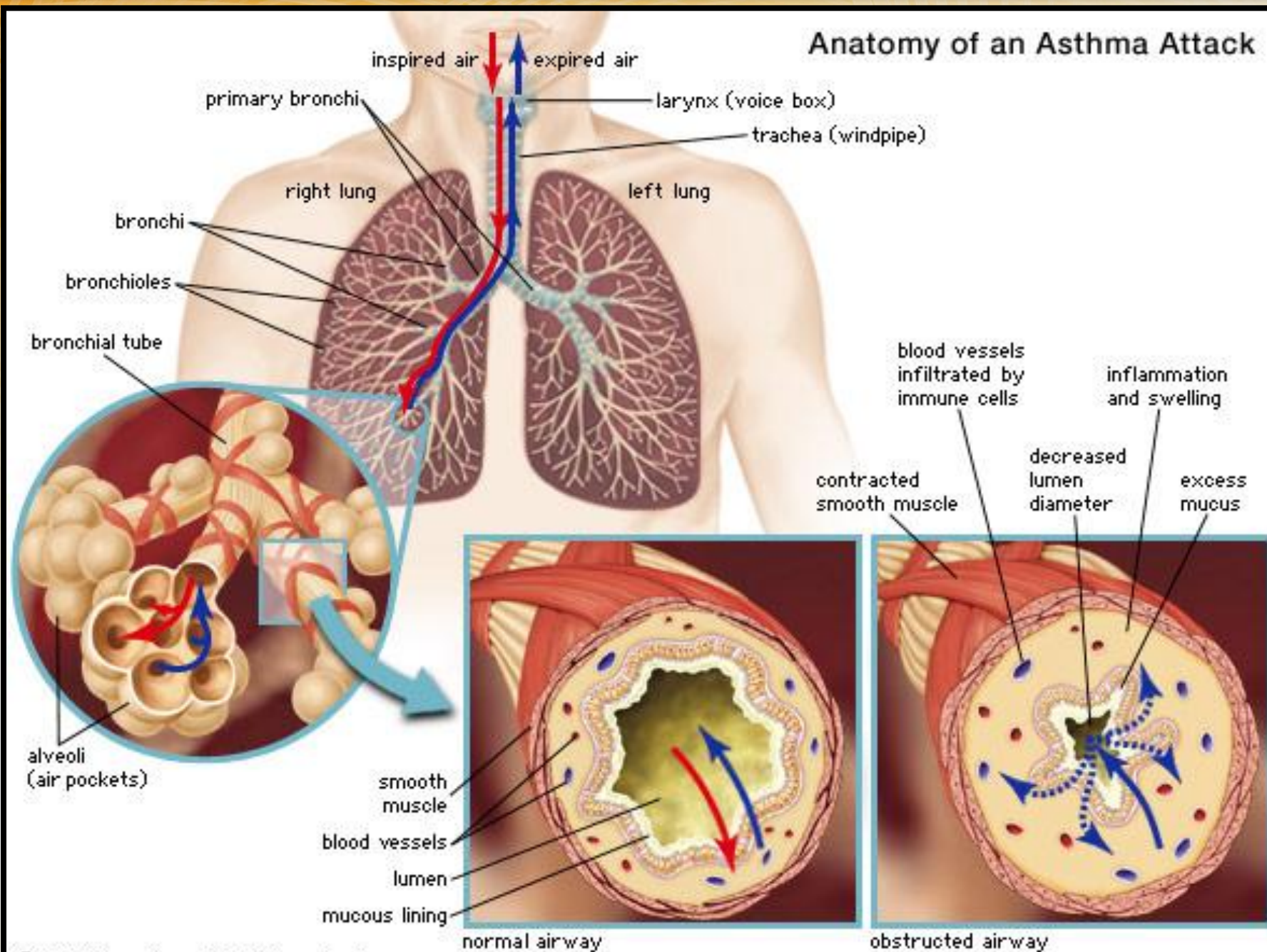
Asthma Demographics

- Affects approximately 300 million people worldwide
 - In the US – prevalence is approximately 8-9% of the population
 - Up to 10% of these people have severe asthma
- In 2018 – total cost in the US was estimated at ~ \$82 billion
- In the US – projected total economic burden of uncontrolled asthma is estimated at **> \$950 billion for the next 20 years**
 - Direct costs - ED visits, hospitalizations, outpatient visits
 - Indirect costs - disability and inability to work
- Psychological burden and quality of life

Key Pathophysiologic Features

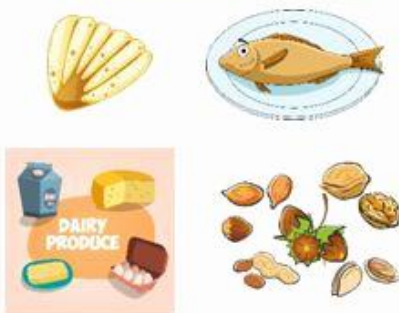
- **Key features:**
 - Airway inflammation
 - Airway remodeling
 - Airway hyperresponsiveness
- **Triggers:**
 - Infection
 - Environmental exposures
 - Stress/emotion
 - Exercise

Anatomy of an Asthma Attack



Common Triggers

Foods



Colds/Infections



Air Pollution



Smoking

House-Dust Mite



Weather



Emotions



Pollen, Moulds, Fungi



Medicines



Hormones

Exercise



Animals



Asthma's history is a 5,000-year journey from a general symptom of "panting" to a precisely defined inflammatory disease.



Corpus Hippocraticum, 4th century BC

Ailments characterised by spasms of breathlessness occurring more frequently in anglers, tailors, and metal workers.



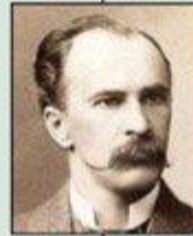
Sir John Floyer, 1698³³

"When the Muscles labour much for Inspiration and Expiration thro' some Obstruction, or Compression of the Bronchia, etc. we properly call this a Difficulty of Breath: but if this Difficulty be by the Constriction of the Bronchia, 'tis properly the Periodic Asthma: And if the Constriction be great, it is with Wheezing; but if less, the Wheezing is not so evident."



Sir William Osler, 1894³⁵

Osler highlighted the following features: spasm of the bronchial muscles; swelling of the bronchial mucous membrane; a special form of inflammation of the smaller bronchioles; similarities with hay fever; running in families; often beginning in childhood and sometimes lasting into old age; symptoms occurring in a variety of circumstances which at times induce a paroxysm; a relationship with climate, atmosphere (ie, hay, dust, cat), violent emotion, diet, and colds; and distinctive sputum containing rounded gelatinous masses (perles), Curschmann spirals, and octahedral crystals of Leyden.



Global Initiative for Asthma, 2002³⁶

Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, neutrophils, and epithelial cells. In susceptible individuals, this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and cough, particularly at night and in the early morning. These episodes are usually associated with widespread airflow obstruction that is typically reversible either spontaneously or with treatment.



Maimonides, 12th century AD

Patient's symptoms often started as a common cold during the wet months. Eventually the patient gasped for air and coughed until phlegm was expelled. Maimonides noted that the dry months of Egypt helped asthma sufferers.



Henry Hyde Salter, 1860³⁴

"Paroxysmal dyspnoea of a peculiar character with intervals of healthy respiration between attacks."

Ciba symposium, 1958²³

Asthma refers to the condition of subjects with widespread narrowing of the bronchial airways, which changes its severity over short periods of time either spontaneously or under treatment, and is not due to cardiovascular disease.

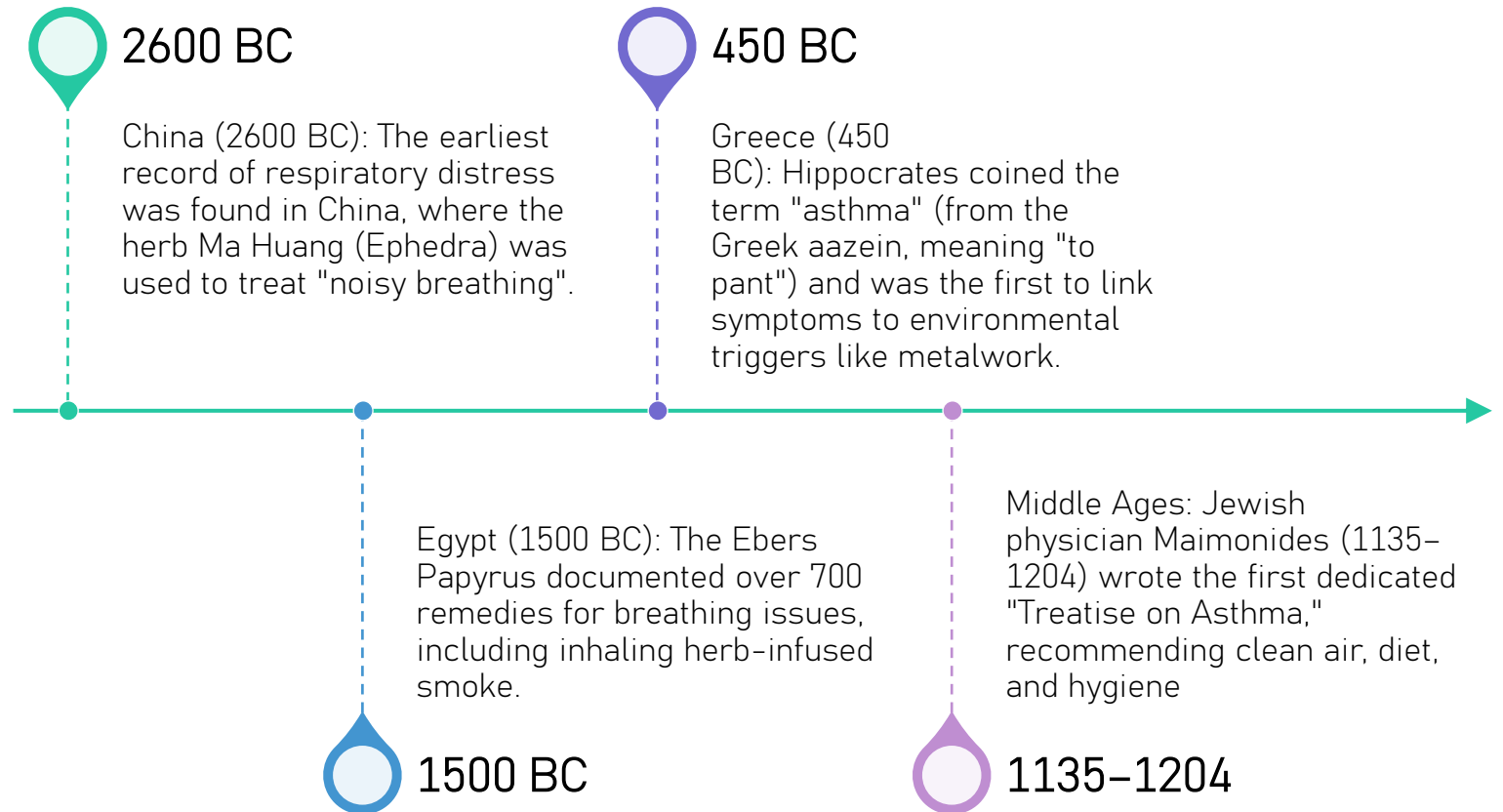
Global Initiative for Asthma 2017³⁷

Asthma is a heterogeneous disease, usually characterised by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

Figure 2: Asthma definitions throughout history

Historical figures and asthma definitions

Ancient Origins (2600 BC – 1000 AD)



Ancient Chinese Management of Asthma



Egyptian Treatment of Asthma





Ephedra, which contains the active compounds ephedrine and pseudoephedrine, acts as a potent stimulant of the central nervous system and cardiovascular system, mimicking adrenaline to increase heart rate, raise blood pressure, and boost metabolic rate.

While used for weight loss and energy, its high-risk side effects—including heart attack, stroke, and seizure—led to a 2004 FDA ban on its use in dietary supplements.



Chinese Philosophy

- Unlike modern medicine's focus on direct airway treatment, early Chinese medicine treated asthma by addressing systemic imbalances:
- **Phlegm Accumulation:** Asthma was often attributed to "retaining phlegm" in the lungs.
- **Organ Interconnection:** Practitioners believed the kidneys were responsible for "grasping" the Qi inhaled by the lungs; thus, a kidney deficiency could lead to breathlessness.
- **Syndrome Differentiation:** Treatment was highly individualized based on whether the patient's condition was categorized as "excess" (acute attack) or "deficiency" (remission period)

•**Herbal Medicine:** The first recorded use of **Ephedra** (Mahuang) as an anti-asthmatic dates back roughly 5,000 years to Shen Nong. Modern research confirms it contains ephedrine, a potent bronchodilator.

•**Classic Formulas:** Several ancient decoctions were developed to treat specific "syndromes" of asthma:

- **Mahuang Decoction (MHD):** A thousands-year-old multi-herbal prescription used for spasmolysis and to resolve phlegm.
- **Ding Chuan Tang:** Specifically used for "phlegm-heat" patterns.
- **Xiao-Qing-Long-Tang:** Prescribed for "phlegm-cold" patterns.

•**Acupuncture:** Used for millennia to regulate Qi flow, strengthen the Lungs, and reduce airway inflammation.

•**Moxibustion:** Applying heat to specific acupoints to dispel "cold" and strengthen the body's defenses.

•**Lifestyle & Diet:** Early advice included drinking warm liquids to keep airways moist and avoiding dairy, which was believed to create congestion

Greek-Roman Philosophy

- **Inhalation Therapy:** Early techniques included inhaling smoke, steam, or vapors to relieve airway restriction.
- Pliny the Elder (c. 50 CE) recommended using herbs, essentially a precursor to modern beta-2 agonists.
- **Herbal and Medicinal Remedies:** Physicians prescribed various substances,
 - including drinking wine mixed with herbal extracts.
- Some, like Pliny, recommended smoking *Datura* or using *Ephedra* to treat spasms.
- **Lifestyle and Diet:** Hippocrates advocated for dietary changes and specialized exercises.
- Other approaches included rest and improving general hygiene.
- **Physical Interventions:** While skeptical of risky procedures,
 - some Greek physicians in the Roman period experimented with early tracheotomies (as suggested by Asclepiades of Bithynia) to relieve acute airway obstructions.
- **Environmental Observations:** Hippocrates recognized the link between asthma symptoms and environmental factors, such as specific locations or weather

The Evolution of Understanding (1600s – 1800s)



Physiological Shifts: In the 17th century, **Van Helmont** noted asthma originated in the "pipes of the lungs," and **Bernardino Ramazzini** first identified exercise-induced asthma.



Allergy Link (1873): **Charles Blackley** proved that pollen caused "hay asthma" by rubbing it on his skin to reproduce symptoms.



Clinical Definition (1892): **Sir William Osler** described asthma as a "spasm of the bronchial muscles" accompanied by swelling of the membranes.

Modern Medical Breakthroughs (1900s – Present)

- In 1916, a physician and allergist named Francis Minot Rackemann reported that not all asthma is related to allergies.
- In 1920s, the deaths from asthma were related to airway structural changes and extensive inflammation but the information on why this happened and how it is responsible for bronchospasm was not known. For some decades, the treatment of asthma was done as episodic exacerbations
- **Psychosomatic Era (1930s–50s):** For a brief period, asthma was classified as one of the "holy seven" psychosomatic illnesses, with some doctors treating it through psychoanalysis.
- **Bronchodilator Boom (1950s–60s):** The invention of the **metered-dose inhaler** (MDI) in 1956 revolutionized treatment, initially using adrenaline and isoproterenol.
- **The Inflammatory Paradigm (1970s):** A major shift occurred when researchers realized inflammation, not just muscle spasms, drove the disease. This led to **inhaled corticosteroids** (ICS) becoming the gold standard for long-term control.
- **Precision Medicine (2000s–Present):** Discovery of the **IgE antibody** and specific cytokines led to "biologics"—targeted therapies for severe asthma that block specific immune pathways.



Asthma (Body Fit)

- From the 1930s to 1950s, asthma was classified as one of the "holy seven" psychosomatic illnesses, a concept developed by Franz Alexander.
- These illnesses were believed to be caused by emotional, psychological, or subconscious conflicts rather than just physical factors.
- The other six illnesses included gastric ulceration, ulcerative colitis, essential hypertension, eczema, hyperthyroidism, and rheumatoid arthritis
- **Psychosomatic Focus:** During that era, asthma was often viewed as a nervous affliction, a symptom of "mental unrest," or a "psychoneurosis".
- **Treatment Paradigm:** Psychoanalysis and other "talking cures" were often used as primary treatments.

Asthma was considered to be a body "fit"



Famous Asthma Sufferer: Teddy Roosevelt



Exercise and a Strong Body Overcome Teddy's Asthma

During this period, Teddy became extremely close to his father, Theodore Sr., who would stay awake with him during nights of sickness and who would take him on nighttime carriage rides to distract his son from his illness.

Theodore Sr. imparted a strong moral conscience into his son. When Teddy was twelve years old, his father lectured him on the importance of developing the body in order to completely develop the mind.

Teddy took this advice to heart and his father built him a home gym. He lifted weights, did gymnastics, and also rode horseback, swam, hiked, wrestled, boxed, and learned judo.

Eventually, as his body became strong, his asthma disappeared, and Teddy went on to Harvard University and eventually to lead a full and adventurous life, both personally and in politics.

Asthma breathing sessions



Asthma Exercises



Early “Nebulizing” Devices

The Mudge Inhaler
With flex tubing

1778



Courtesy of AARC Gallery



- 1850
- Dr. Jean Sates-Girons
- “Father of aerosolized therapy”



1858 Nebulizer developed
by Dr. Jean Staes-Girons

1864 Dr. Siegle's Steam inhaler



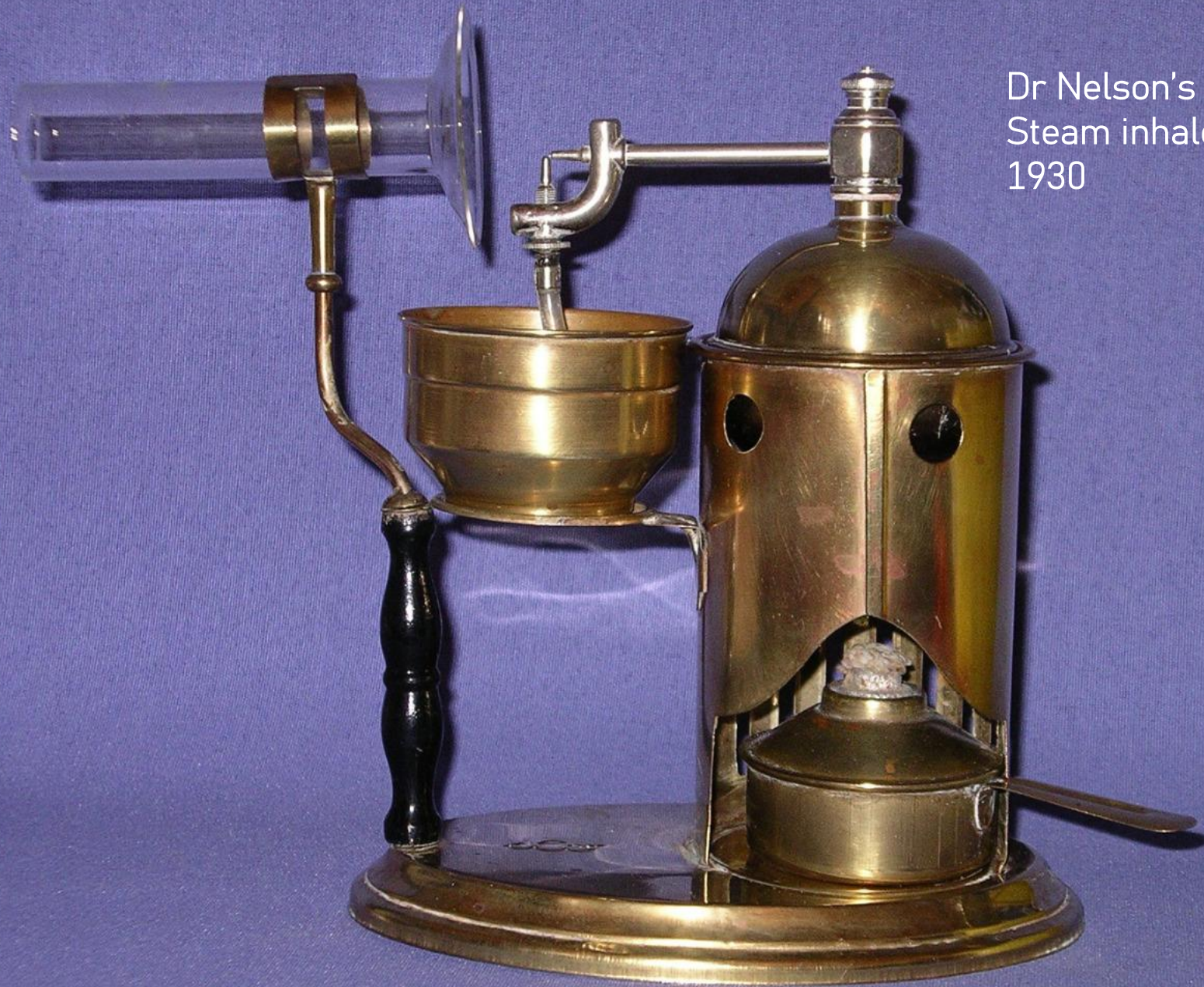
Dr. Nelson's inhaler 1860



Courtesy of AARC Gallery



Dr Tucker's nasal
Inhaler 1890



Dr Nelson's
Steam inhaler
1930

Courtesy of AARC Gallery



-
- 1940 Devibiss portable nebulizer





- DeVibiss Ultra Neb 99
- 1950



Bird Mark 7



Courtesy of Forest Bird Gallery



- Bennett PR-2

Early Asthma “Medications”

Owl's Blood Mixed With Tree Nectars

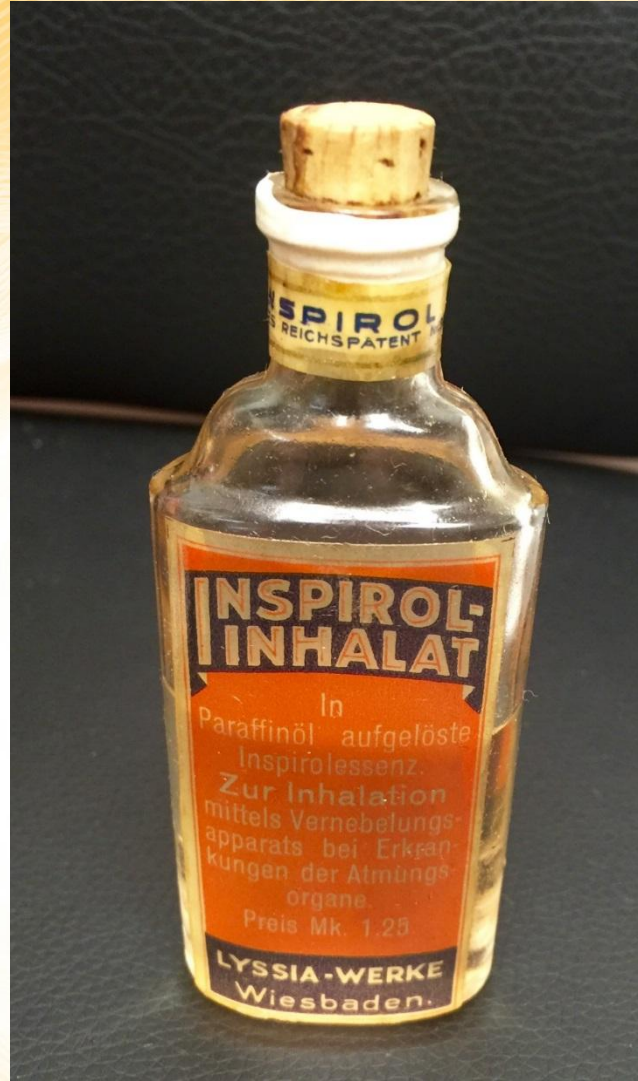


EFN on Kwanzan Cherry



Joe Boggs, OSU Extension©

Asthma Nectar



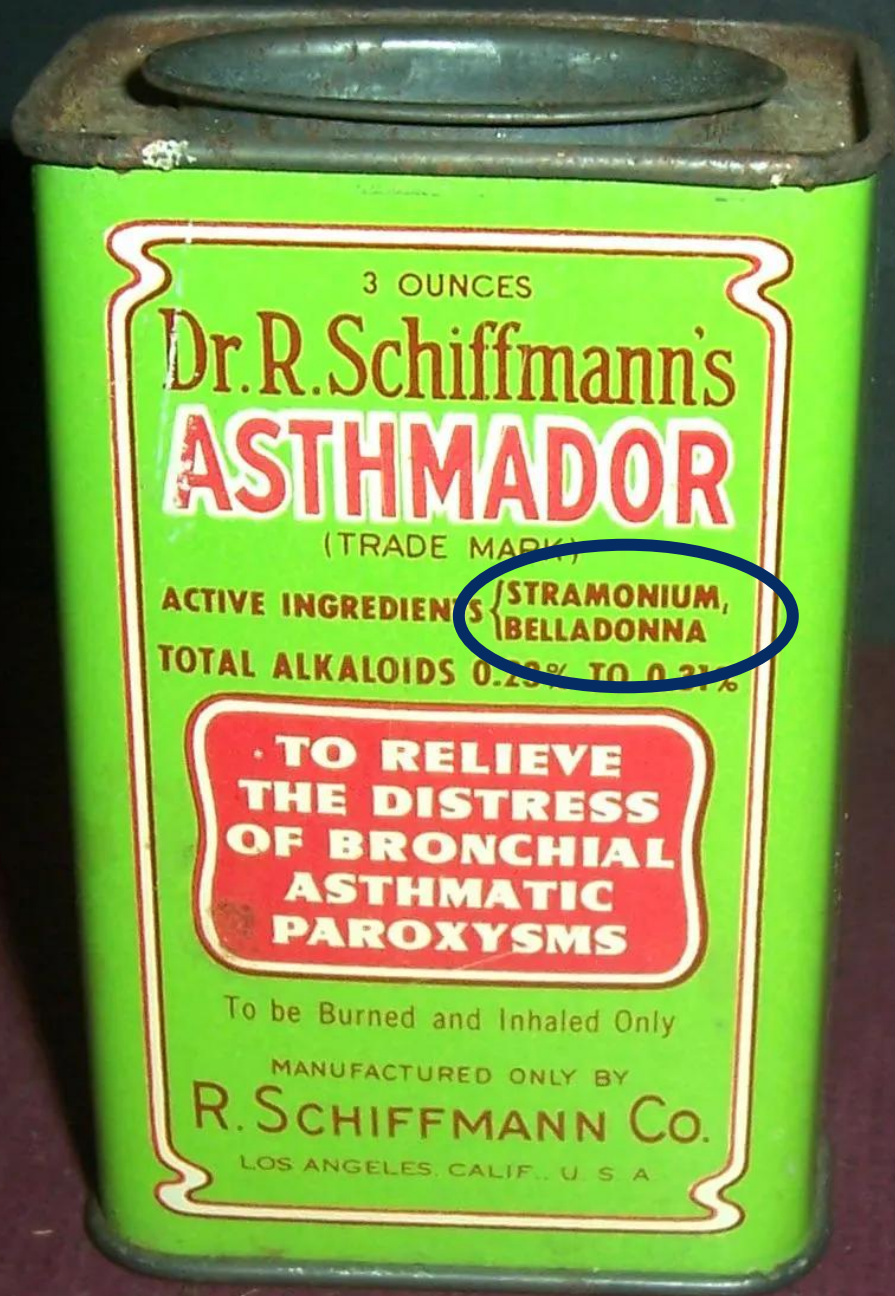


Asthma Cigarettes That contains Medicines Or herbs

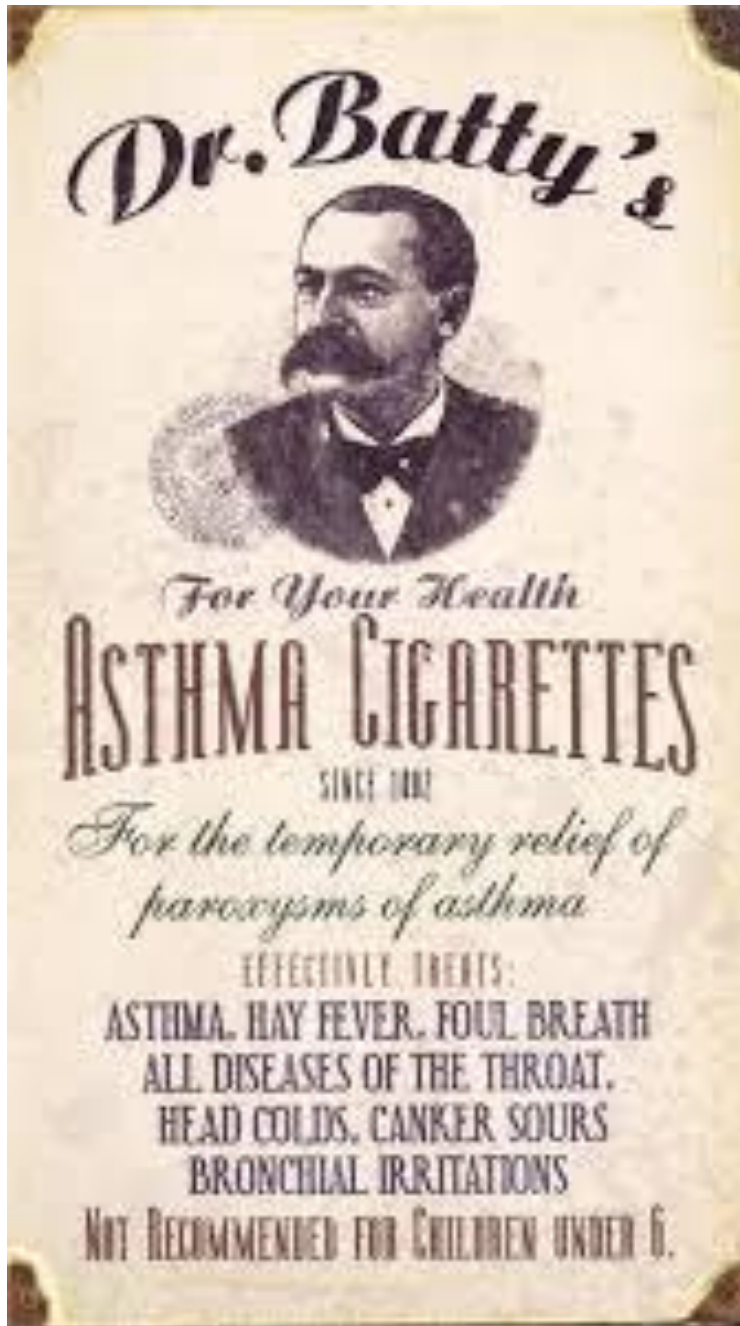
CIGARES de JOY
(JOY'S CIGARETTES)
CURE ASTHMA

JOY'S CIGARETTES afford immediate relief in cases of **ASTHMA, WHEEZING, AND WINTER COUGH,** and a little perseverance will effect a permanent cure. Universally recommended by the most eminent physicians and medical authors. Agreeable to use, certain in their effects, and harmless in their action, they may be safely smoked by ladies and children.

All Chemists and Stores, box of 35, 2s. 6d., or post free from WILCOX & Co., 239, OXFORD STREET, LONDON, W.



Datura stramonium and Atropa belladonna are two of the most infamous members of the nightshade family (Solanaceae). Both are highly toxic and contain tropane alkaloids—primarily atropine, hyoscyamine, and scopolamine—which cause profound hallucinations, delirium, and potentially fatal physical effects.



Dr. Batty's Asthma Cigarettes were a popular "patent medicine" from the late 19th and early 20th centuries, marketed as a "harmless" remedy for asthma, hay fever, and throat ailments. Despite being advertised as safe for all ages, including women and children, they are now recognized as a dangerous historical quackery rather than a legitimate medical treatment.

Bronchodilators 1960-1980

- **Adrenaline**

- Epinephrine works by stimulating adrenergic receptors in the body, which relaxes the bronchial muscles to dilate narrowed airways and improve breathing with 5-10 minutes
- Short duration 30-60 minutes
- Plethora of cardiac effects, seizures, and tachyphylaxis

- **Isuprel**

- It acts as a adrenergic agonist, providing rapid bronchodilation for asthma, bronchitis, and emphysema, usually starting within 2–5 minutes.
- Short duration 30-60 minutes
- Overuse of nebulized isoproterenol has been linked to severe "locked-lung" syndrome (refractory bronchospasm) and is associated with increased mortality due to excessive stimulation of receptors and potential worsening of hypoxemia.

- **Bronkosol**

- Bronkosol (isoetharine) is an inhaled, fast-acting bronchodilator used to treat reversible bronchospasm, including asthma, chronic bronchitis, and emphysema. It acts as a rapid-acting -agonist to relax air passages, usually administered every 4 hours.
- Note: Isoetharine is no longer available in the U.S

Nothing is Quicker*

Nothing is more Effective*

In Asthma

PREMICRONIZED FOR
OPTIMAL
EFFICACY

* Spirograms show
22 1/2% improvement in vital
capacity within moments after
inhalation of Medihaler medication.
Reprinted in The Lung Bulletin (Tung)
of the Boston City Hospital.
March 6, 1964, 36, D., Cleveland.

Available
with either
isoproterenol
or epinephrine

Automatically measured-dose
aerosol medications.
Nonbreakable... Shatterproof
Spillproof... Leakproof

Medihaler-ISO®

Isoproterenol sulfate, 2.0 mg. per cc., suspended
in inert, nontoxic aerosol vehicle. Contains no
alcohol. Each measured dose contains 0.05 mg.
isoproterenol.

Medihaler-EPI®

Epinephrine bitartrate, 7.0 mg. per cc., sus-
pended in inert, nontoxic aerosol vehicle. Con-
tains no alcohol. Each measured dose contains
0.15 mg. epinephrine.



Cambridge, Mass.

Epinephrine inhaler

At Last...

UNIFORM DOSAGE NEBULIZATION in Asthma

MEDIHALERSM

with Your Favorite
Bronchodilator*



MediHaler Oral Adapter is unbreakable. Vial of MediHaler medication is break-proof, spill-proof, provides 200 applications. Economical.



- NO RUBBER BULBS TO DETERIORATE
- NO WASTE OF COSTLY GLASS NEBULIZERS
- NO SPILLING OF SOLUTION IN POCKET OR PURSE

True nebulization—80% of particles from 1/2 to 4 microns radius. Amount of medication released does not depend on pressure applied—dosage always the same. One application usually sufficient for most patients.

*MEDIHALER-EPITM

0.5% solution of epinephrine
N.O. U.S.P.

*MEDIHALER-ISOTM

0.5% solution of isoproterenol
N.O. U.S.P.

For your convenience, be sure to order "MediHaler-Epi" (or "MediHaler-Iso") AND "MediHaler Oral Adapter," since nebulization cannot be used without Adapter. Two refills make the combination only.

Notably safe for use with children. One application usually aborts attack.



Another First from

Riker LABORATORIES

An early advertisement for the medihaler. Picture courtesy of www.inhalatorium.com

Primatime Mist









Serevent
LABA
First LABA

Asthma-Related Death: As a class, LABAs like Serevent can increase the risk of asthma-related death if used alone without a long-term asthma control medication (like an ICS).





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
DBE A

ProAir® HFA
90 mcg
albuterol sulfate
DBE A G

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

Proventil® HFA
90 mcg
albuterol sulfate
DBE A G

Ventolin® HFA
90 mcg
albuterol sulfate
DBE 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
DBE A C

Striverdi® Respimat®
2.5 mcg
olodaterol hydrochloride
DBE 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
80, 160 mcg
ciclesonide
DBE A

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

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

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

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

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

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

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

QVAR® Redihaler™
40, 80 mcg
beclomethasone dipropionate
DBE 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
DBE C

Long-acting
Incuse® Ellipta®
62.5 mcg
umeclidinium inhalation powder
DBE C

Spiriva® HandiHaler®
18 mcg
tiotropium bromide inhalation powder
C

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

Tudorza® Pressair™
400 mcg
acetylcholine bromide inhalation powder
DBE C

COMBINATION MEDICATIONS

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

Combivent® Respimat®
20/100 mcg
ipratropium bromide and albuterol
DBE 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
DBE A C G

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

AirDuo® RespiClick®
55/14, 113/14, 232/14 mcg
fluticasone propionate and salmeterol inhalation powder
DBE A G

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

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

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

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

COMBINATION MEDICATIONS

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

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

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

Duakir® Pressair®
400, 12 mcg
acetylcholine bromide and formoterol fumarate
DBE C

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

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

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

BIOLOGICS

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

Cinqair®
necilizumab
A

Dupixent®
dupilumab
A

Fasenra™
bambalimumab
A

Nucala®
mepolizumab
A

Tezspire™
tezelumab-ahkko
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.btf.org/asthma.com

A



Reviewed by Dennis Williams, PharmD

© 2022 Allergy & Asthma Network

PDE4 INHIBITORS

ease lung inflammation and reduce exacerbations

Daliresp®
250, 500 mcg
roflumilast
C



Eucalyptus oil



Onions



Ginger

Natural Asthma Remedies



Lemon

Mustard Oil

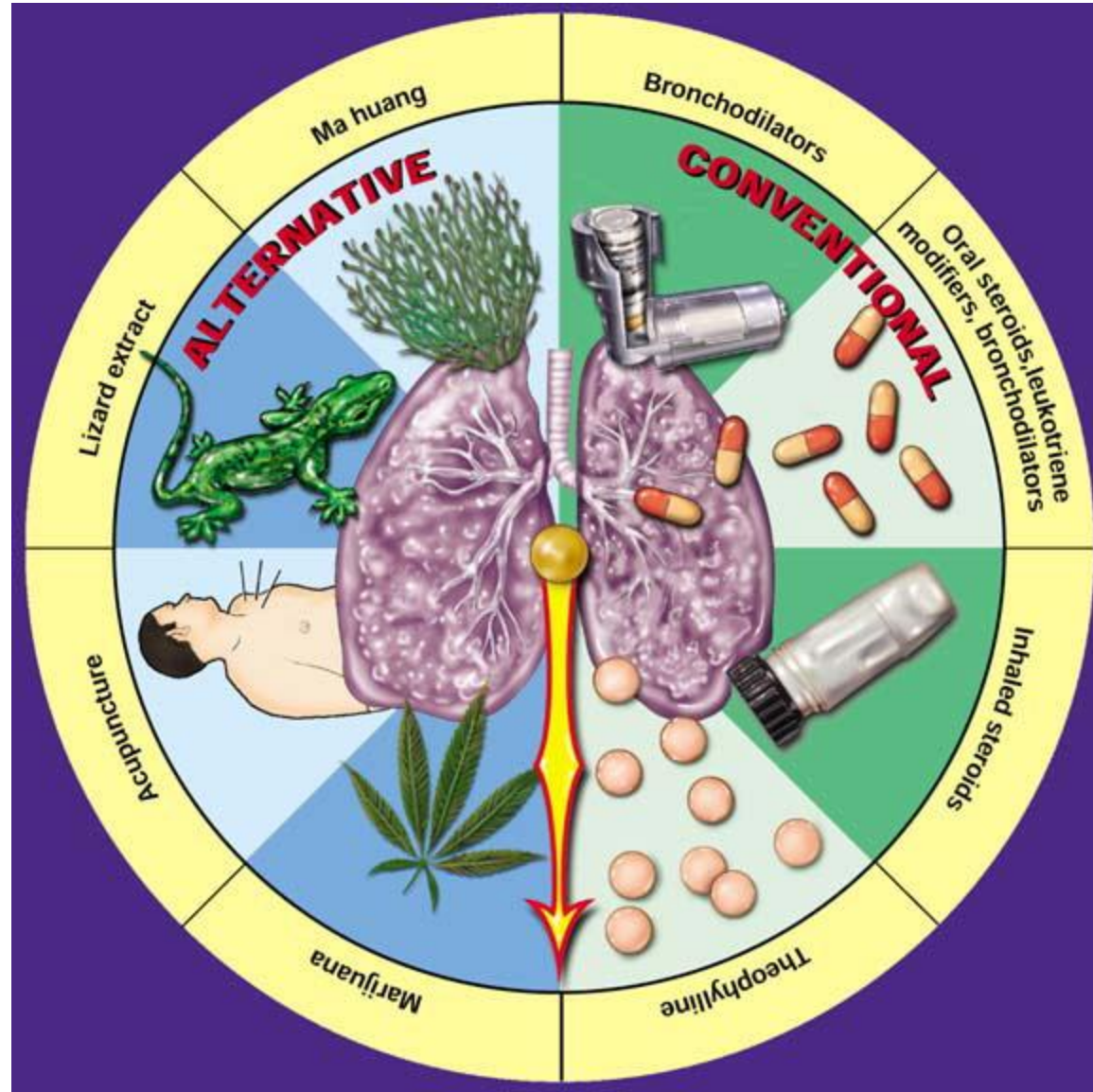


Garlic



Figs

Holistic approach to asthma management



Mullein

for the Lungs

Ancient Lung Ally • Grief Healer • Breath Restorer



Key Benefits of Mullein:

- ✓ Clears congestion in the lungs and sinuses.
- ✓ Relieves chronic cough and soothes sore throats.
- ✓ Opens bronchial airways and reduces inflammation.
- ✓ Eases asthma and bronchitis symptoms.
- ✓ Supports emotional release of grief and trauma.
- ✓ Acts as a natural expectorant and lung tonic.

How to Use Mullein:

- ✓ **Tea (most common):**
 - 1-2 tsp dried mullein leaves or flowers.
 - Steep in hot water (not boiling) for 10-15 minutes.
 - Strain thoroughly (the fine hairs can irritate the throat).
 - Drink 1-3x daily as needed.

Steam Inhalation

Add a handful of dried mullein to a bowl of hot water and inhale deeply under a towel. Clears the chest and sinuses.

- ✓ **Tincture or Glycerite**

10-30 drops 2-3x per day (consult trusted herbalist)

- ✓ **Mullein Oil (for ears or topical use)**

Often infused in olive oil; this version is commonly used for earaches or as a massage oil for lymph or chest.

< Lung pain isn't always physical.

Mullein helps release stored grief, sorrow, and unexpressed emotion that may gather in the lungs over time.

✦ Bonus: Castor Oil and Natural Healing ✦

DISCLAIMER: This article is for educational purposes only. Always consult your trusted knowing and medical care providers when making health decisions. ✦ Shared with love from the

Homeopathic Approach



Drug Facts

Active ingredients	Purpose
Arsenicum album HPUS 6C, 12C, 18C.....	Wheezing, anxiety, inflammation in the airways
Histaminum hydrochloricum HPUS 6C, 12C, 18C.....	Persistent, dry, fitful cough
House dust mite 6C, 12C, 18C.....	Allergies
Magnesia phosphorica HPUS 6C, 12C, 18C.....	Tightness in chest, spasmodic cough
Nux vomica HPUS 6C, 12C, 18C.....	Shallow breathing, dry hacking cough, nervousness
Quebracho HPUS 6C, 12C, 18C.....	Difficulty breathing, shortness of breath
Sulphur HPUS 6C, 12C, 18C.....	Difficult, irregular respiration

"HPUS" indicates the active ingredients of this product are officially monographed in the Homeopathic Pharmacopoeia of the United States.

Uses*

According to homeopathic indications, these ingredients provide temporary relief of Asthma and COPD like symptoms such as:

- Difficulty breathing
- Inflammation in the airways
- Coughing
- Wheezing
- Shortness of breath
- Sensation of tightness in the chest
- Congestion.

*These statements are based upon traditional homeopathic practice. They have not been reviewed by the Food and Drug Administration.

Warnings

• **A PHYSICIAN SHOULD ALWAYS BE CONSULTED TO RULE OUT SERIOUS CAUSES.** • This product is not a fast acting (rescue) inhaler. • This product is intended to complement, not replace, standard medical treatment. • Initial worsening of symptoms may occur.

If pregnant or breast-feeding, ask a health professional before use. Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away.





Music Therapy In Asthma

- **Key Benefits of Music Therapy for Asthma:** Improved Lung Function: Singing and wind instrument training can increase peak expiratory flow (PEF) and overall lung capacity.
- **Breathing Control:** Playing instruments like the harmonica or flute teaches controlled inhalation and exhalation, reducing breathlessness.
- **Reduced Symptom Frequency:** Pediatric studies show that music therapy can lead to fewer hospitalizations and emergency visits.
- **Anxiety Management:** Music-assisted relaxation helps manage the anxiety associated with asthma, contributing to better overall quality of life.
- **Enhanced Quality of Life:** Music therapy provides emotional support and improves the management of asthma symptoms in daily life.

The Evolution of Current Asthma Management

- **1960-1970s**

- Focus was on the treatment and prevention of bronchospasm
- Rescue beta-agonist

- **1980-1990s**

- Focus shifted to avoidance of asthma triggering
- Control chronic inflammation
 - Inhaled corticosteroids

- **Currently**

- Viewed as a heterogenous disease
- Specially individualized designed action plans
- Use of biological therapies



Goals of asthma treatment

- Few asthma symptoms
 - No sleep disturbance
 - No exercise limitation
- } Symptom control (e.g. ACT, ACQ)
-
- Maintain normal lung function
 - Prevent flare-ups (exacerbations)
 - Prevent asthma deaths
 - Minimize medication side-effects (including OCS)
- } Risk reduction
-
- The patient's goals may be different
 - Symptom control and risk may be discordant
 - Patients with few symptoms can still have severe exacerbations

GINA 2025

Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs

Symptoms
Exacerbations
Side-effects
Comorbidities
Lung function
Consider biomarkers
Patient (and parent/caregiver) satisfaction



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors
Comorbidities
Inhaler technique & adherence
Patient (and parent/caregiver) preferences and goals

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications including ICS
Education & skills training, action plan



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

STEPS 1 – 2

AIR-only*: low-dose ICS-formoterol as needed

STEP 3

MART* with low-dose maintenance ICS-formoterol

STEP 4

MART* with medium-dose maintenance ICS-formoterol

STEP 5

Add-on LAMA
Refer for assessment of phenotype. Consider trial of high-dose maintenance ICS-formoterol. Consider anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

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

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

STEP 1

Reliever only; if SABA, take ICS with each dose

STEP 2

Low dose maintenance ICS

STEP 3

Low dose maintenance ICS-LABA

STEP 4

Medium dose maintenance ICS-LABA

STEP 5

Add-on LAMA
Refer for assessment of phenotype. Consider trial of high-dose maintenance ICS-LABA. Consider anti-IgE, anti-IL5/5R, anti-IL4Rα, anti-TSLP

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

Non-pharmacologic strategies include smoking cessation, physical activity, pulmonary rehabilitation, weight reduction, vaccinations (see text for more)

Allergen immunotherapy, e.g. HDM SLIT: consider for patients with clinically relevant sensitization and not well-controlled (but stable) asthma. See text for further information and safety advice

Additional controller options (e.g., add-on LAMA at Step 4, add-on LTRA) have less evidence for efficacy or for safety than Tracks 1 or 2 (see text). Maintenance OCS should only ever be used as last resort.

Global priorities for asthma management

Improving lung health in low-income and middle-income countries: from challenges to solutions

Jamilah Meghji*, Kevin Mortimer*, Alvar Agusti, Brian W Allwood, Innes Asher, Eric D Bateman, Karen Bissell, Charlotte E Bolton, Andrew Bush, Bartolome Celli, Chen-Yuan Chiang, Alvaro A Cruz, Anh-Tuan Dinh-Xuan, Asma El Sony, Kwun M Fong, Paula I Fujiwara, Mina Gaga, Luis Garcia-Marcos, David M G Halpin, John R Hurst, Shamanthi Jayasooriya, Ajay Kumar, Maria V Lopez-Varela, Refiloe Masekela, Bertrand H Mbatchou Ngahane, Maria Montes de Oca, Neil Pearce, Helen K Reddel, Sundee Salvi, Sally J Singh, Cherian Varghese, Claus F Vogelmeier, Paul Walker, Heather J Zar, Guy B Marks

Lancet 2021

J Pan Afr
Thorac Soc
2022

The reality of managing asthma in sub-Saharan Africa – Priorities and strategies for improving care

Kevin Mortimer¹, Refiloe Masekela², Obianuju B Ozoh³, Eric Donn Bateman⁴, Rebecca Nantanda⁵, Arzu A. Yorgancıoğlu⁶, Jeremiah Chakaya⁷, Helen K. Reddel⁸

Asthma management in low and middle income countries: case for change

Kevin Mortimer^{1,2}, Helen K. Reddel³, Paulo M. Pitrez⁴ and Eric D. Bateman⁵

ERJ 2022

Improving access to affordable quality-assured inhaled medicines in low- and middle-income countries

M. Stolbrink,^{1,2} M. J. Chinouya,³ S. Jayasooriya,⁴ R. Nightingale,^{1,5} L. Evans-Hill,⁶ K. Allan,⁷ H. Allen,⁸ J. Balen,⁹ T. Beacon,¹⁰ K. Bissell,¹¹ J. Chakaya,^{1,12} C-Y. Chiang,^{13,14,15} M. Cohen,¹⁶ G. Devereux,¹ A. El Sony,¹⁷ D. M. G. Halpin,¹⁸ J. R. Hurst,¹⁹ C. Kiprop,⁵ A. Lawson,²⁰ C. Macé,¹³ A. Makhanu,⁵ P. Makokha,⁵ R. Masekela,²¹ H. Meme,²² E. M. Khoo,^{23,24} R. Nantanda,²⁵ S. Pasternak,²⁶ C. Perrin,¹³ H. Reddel,^{27,28} S. Rylance,²⁹ P. Schweikert,²⁰ C. Were,²⁶ S. Williams,²⁴ T. Winders,³⁰ A. Yorgancıoğlu,^{31,32} G. B. Marks,^{13,33} K. Mortimer^{13,34}

Int J Tuberc
Lung Dis 2022

MULTI-STAKEHOLDER ACTION PLAN

TO IMPROVE ACCESS TO AFFORDABLE QUALITY-ASSURED INHALED MEDICINES IN LOW- AND MIDDLE-INCOME COUNTRIES

Awareness

Work together with people living with asthma and COPD to **understand their needs and co-create solutions**

Raise awareness and reduce stigma among local communities through multimedia information campaigns

Clinical Guidance

Develop clinical guidance and implementation tools that address the needs of healthcare providers in LMICs

Ensure the WHO Essential Medicines List is **aligned with current evidence** and existing WHO guidance

Supply Chain

Explore targeted solutions to challenges across the inhaled medicines supply chain. Develop strategies to address **challenges** around the **affordability of inhaled medicines**



Data Collect and share CRD-related data (surveillance, clinical, economic) to inform policy and practice

Communications

Develop and deliver targeted messages to local and national governments to drive evidence-based policy and mobilise resources

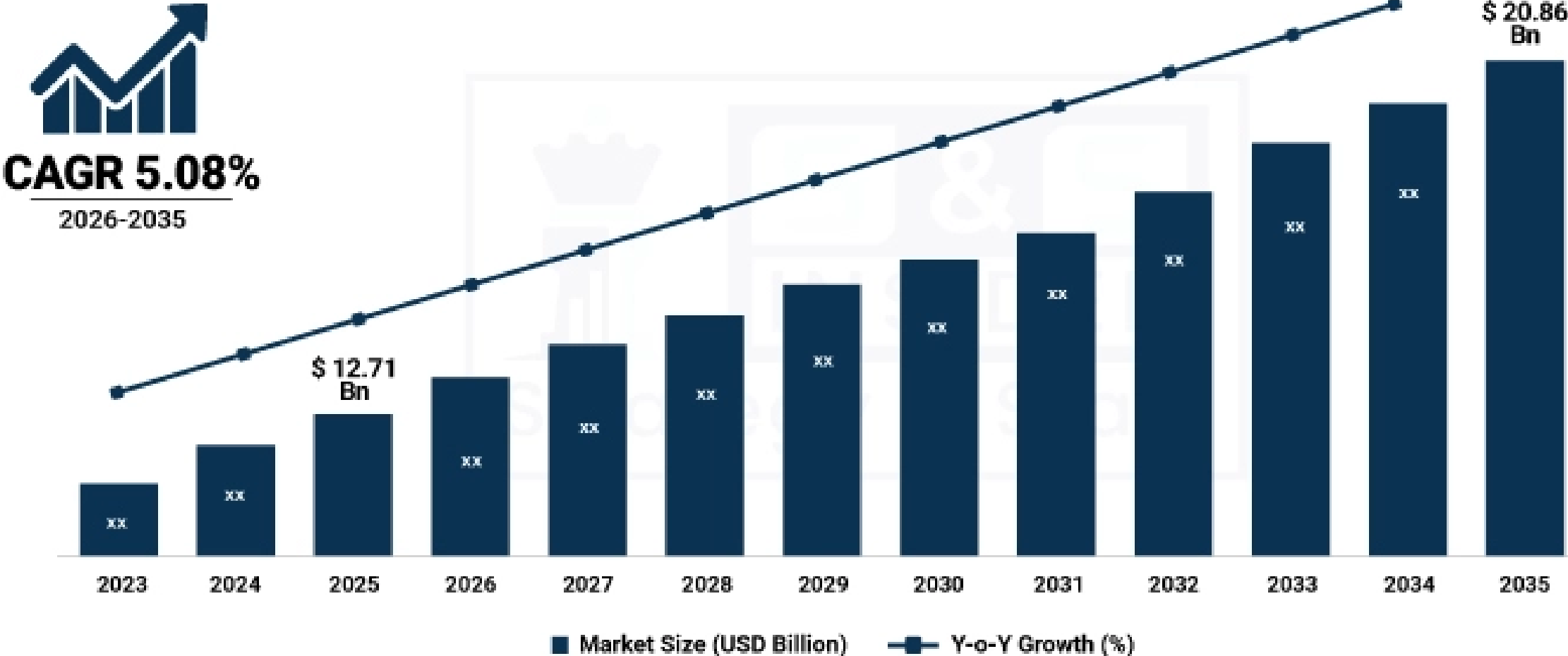
Share examples of good practice, lessons learned, and resources for advocacy or education to maximise impact

World Health Organization

Work with national governments and WHO, to **build the case for a World Health Assembly Resolution** on improving access to effective asthma and COPD care for all

Improved access to affordable, quality-assured inhaled medicines in LMICs

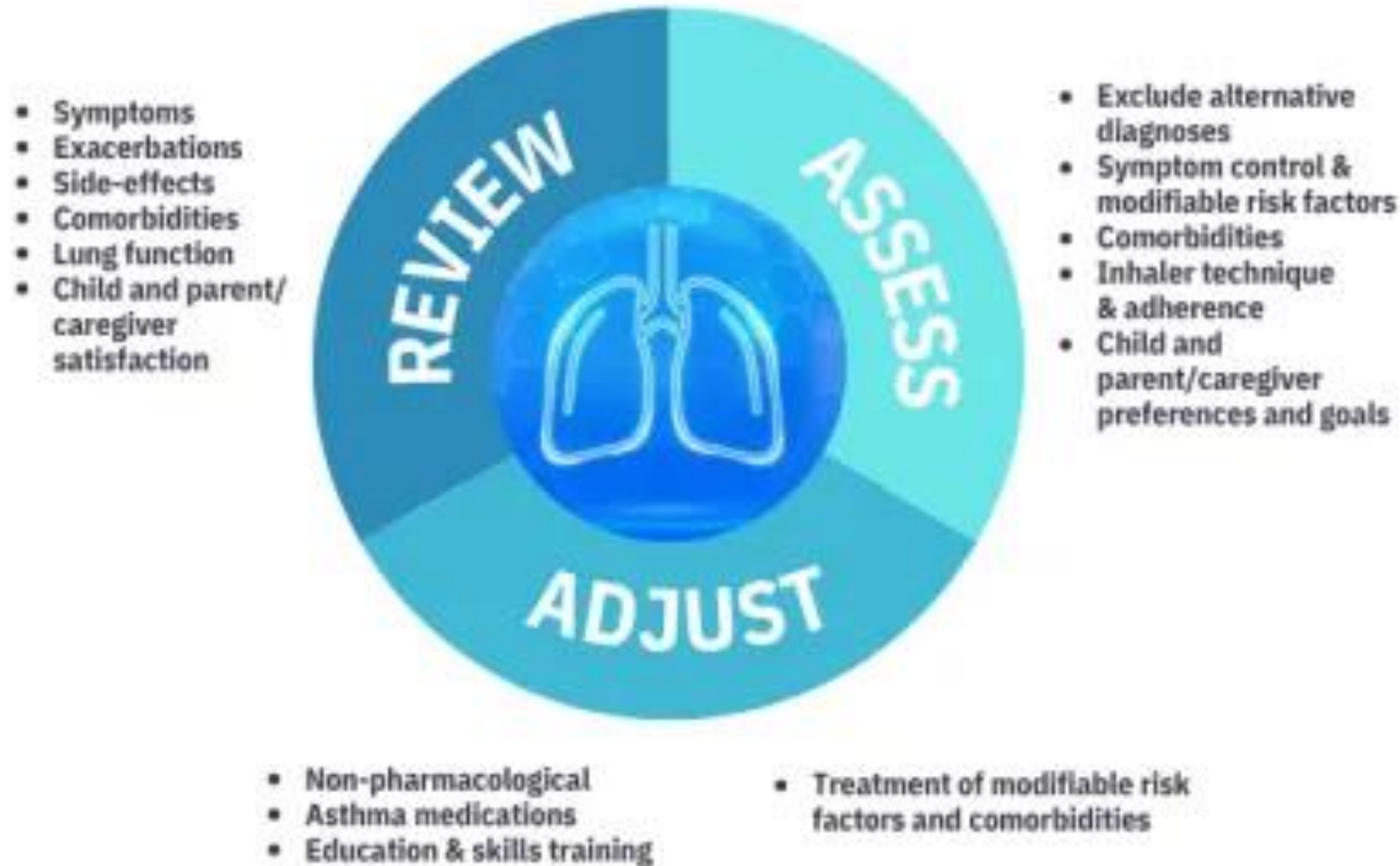
U.S Asthma Therapeutics Market Size



ASTHMA MANAGEMENT CONCEPT MAP



PERSONALIZED MANAGEMENT OF ASTHMA IN CHILDREN 5 YEARS AND YOUNGER
(SEE BOX 11-2 P. 194, GINA GUIDE 2025)

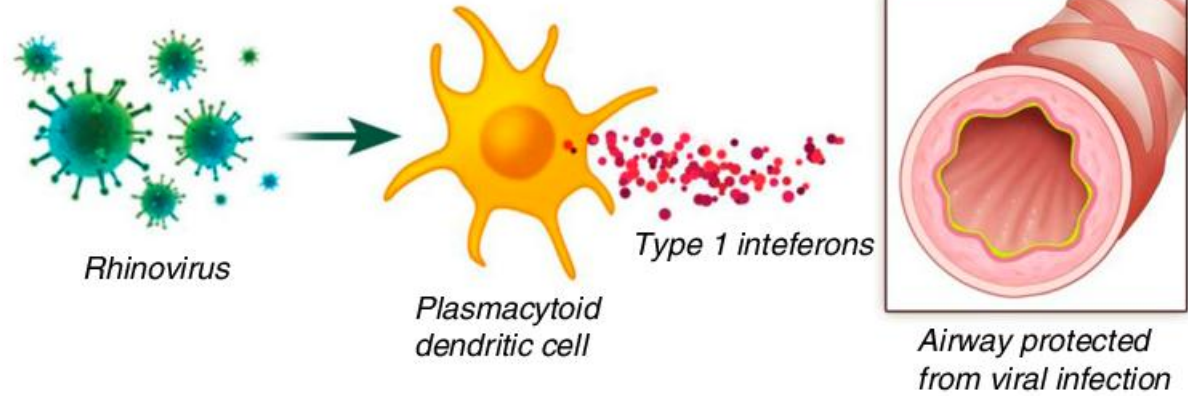


Asthma viewed as a heterogenous disease today

INFLAMMATORY PATHWAY	TYPE 1	TYPE 2	TYPE 3
Primary immune cells	 Macrophage  Th1  ILC1  NK	 Th2  ILC2  Mast cell  Basophil  Eosinophil	 Neutrophil  Th17  ILC3
Key cytokines	IFNγ TNF IL-6 IL-12 IL-18 IL-2	IL-4 IL-5 IL-13 IL-31	IL-17 IL-6 IL-22 IL-23
Function	• Antitumor activity • Cellular immunity: antiviral/antibacterial • Suppression of type 2	• Humoral immunity: antiparasitic helminths • Neutralizes toxins • Regulates wound repair and regeneration • Suppression of type 1	• Regulation of intestinal epithelial barrier • Responses to extracellular bacteria and fungi
Examples of consequence of dysregulation and associated disease	• Ankylosing spondylitis • Atherosclerosis • Autoimmune gastritis • Diabetes mellitus • Hashimoto thyroiditis • Inflammatory bowel disease • Multiple sclerosis • Rheumatoid arthritis • Sarcoidosis	• Allergy • Anaphylaxis • Type 2 asthma • Atopic dermatitis • Chronic obstructive pulmonary disease with type 2 inflammation • Chronic rhinosinusitis with nasal polyps	• Ankylosing spondylitis • Multiple sclerosis • Psoriasis • Rheumatoid arthritis • Uveitis

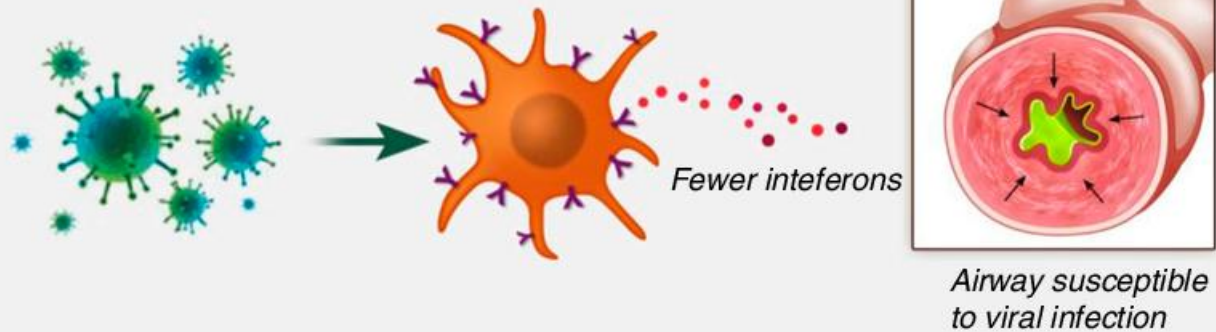
Healthy Airway

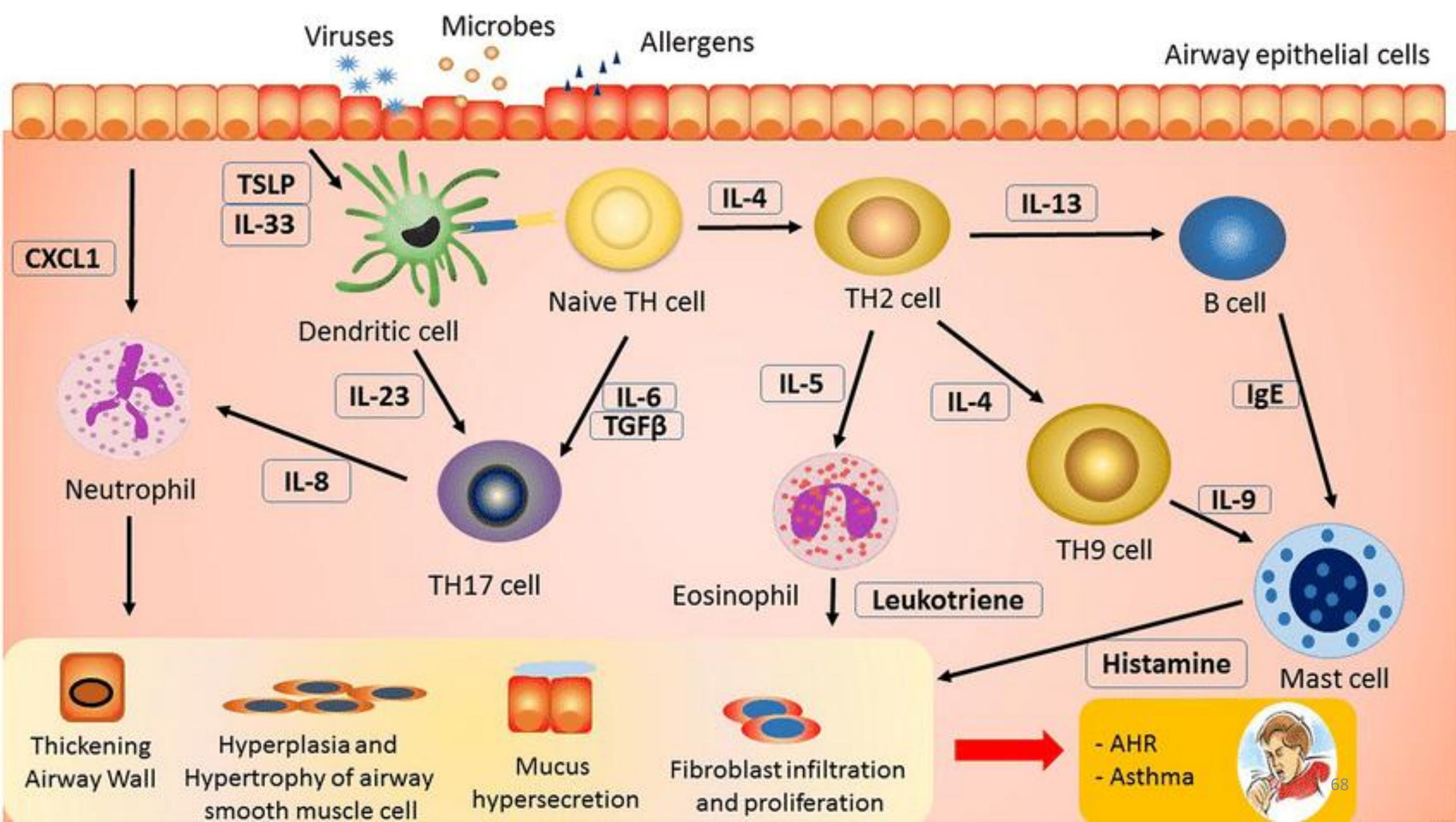
- Absence of type 2 inflammation and low circulation IgE



Asthmatic Airway

- Presence of type 2 inflammation
- IgE arming of Plasmacytoid Dendritic Cells



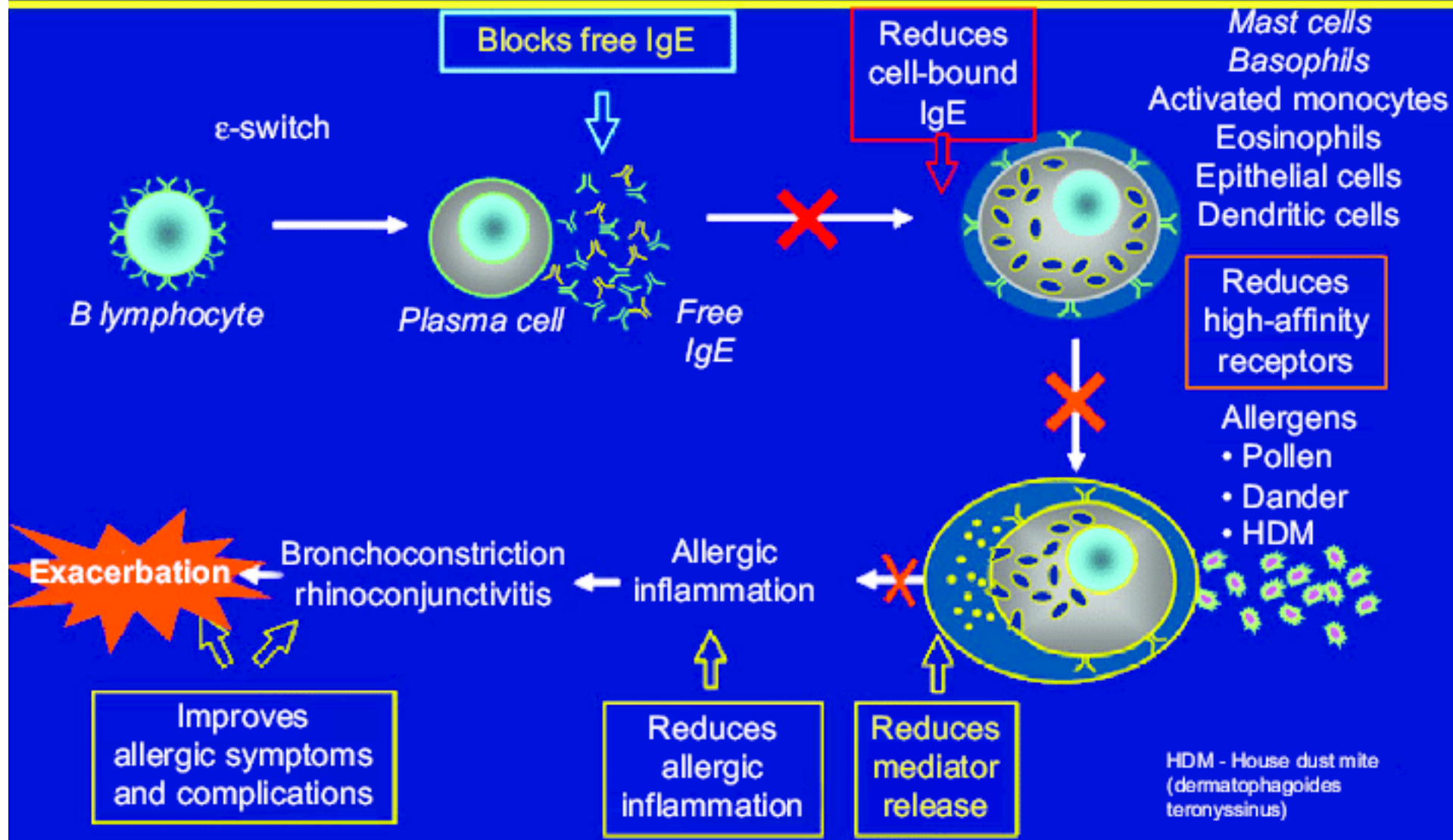


Anti-IgE Monoclonal Antibody

- Goal is to reduce free IgE levels in serum and inhibit the binding of IgE to the mast cells and basophils
- Omalizumab(75 to 375mg) monthly via prefilled syringe



Omalizumab mechanism of action



The Role of Biological Therapy in Asthma

Efficacy and Safety of Itepekimab for Moderate-to-Severe Asthma

PHASE 2, MULTICENTER, RANDOMIZED TRIAL

296 Adults
with moderate-
to-severe
asthma

Itepekimab



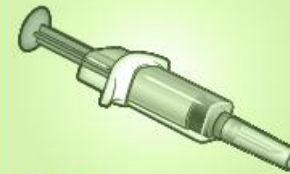
N=73

Itepekimab +
Dupilumab



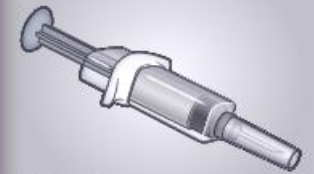
N=74

Dupilumab



N=75

Placebo



N=74

Every 2 wk for 12 wk

Event indicating
loss of asthma
control

16 Participants

22%

20 Participants

27%

14 Participants

19%

30 Participants

41%

OR (95% CI) as compared with placebo
0.42 (0.20–0.88) 0.52 (0.26–1.06) 0.33 (0.15–0.70)

Itepekimab led to a lower incidence of loss of asthma control than placebo and improved lung function.

Monitoring of Effectiveness of Therapy

- 4–6-month treatment assessment
- Review of assessment symptoms and quality of life
- Monitor number of oral steroid use
- Side effects
- Patient compliance
- Review of biomarkers
- Use of health care system
 - Provider visits, ED visits, hospitalizations

Side Effects of Biological Therapy

Irritation at
the injection
site.

Cold-like
symptoms.

Headaches.

Joint pain.

Sore throat

Sinus
infection.

Fatigue.

Conjunctivitis.

Weaken ability
to fight
infections

Conclusion

- Asthma has been prevalent since the origin of time.
- The evolution of the understanding of asthma and its management has been extraordinary.
- The advancement of asthma management will continue to evolve.
- Asthma will continue to be sufficient societal and human burden.

**WORLD
ASTHMA
DAY
2026**

