

**IN THE NAME OF GOD**

**WORLD ASTHMA DAY 2024**

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# World Asthma Day

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- **World Asthma Day** is an annual event organized by the Global Initiative for Asthma (**GINA**) to improve **Asthma** awareness and care around the world.
- World Asthma Day takes place on the first Tuesday of May. (**May** is Asthma Awareness Month).
- World Asthma Day was initially established in **1998** by the Global Initiative for Asthma (**GINA**).

# World Asthma Day

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- **The truth of the matter is asthma isn't entirely understood**, what is known is that there are multiple factors at play in the complex chemistry that creates an asthma sufferer.
- These include **genetic** interactions and elements in the **environment** that can change both the severity and how likely it is to respond to treatment.
- The known aggravators of asthma are many and include everything from **allergens, air pollution, and other chemicals** that can appear in the environment that irritate the lungs.



# WORLD ASTHMA DAY

May 3, 2016

• *You Can Control Your Asthma* •



# WORLD ASTHMA DAY

May 2, 2017

[ginasthma.org/wad](http://ginasthma.org/wad) • [@ginasthama](https://twitter.com/ginasthama) 



*It's always the right time to address airways disease.*

# WORLDASTHMADAY

MAY 1, 2018 | [GINASTHMA.ORG/WAD](http://GINASTHMA.ORG/WAD) | [@GINASTHMA](https://twitter.com/GINASTHMA)



**STOP for Asthma**

**WORLDASTHMADAY**

MAY 7, 2019 | [GINASTHMA.ORG/WAD](http://GINASTHMA.ORG/WAD) | @GINASTHMA



**Enough Asthma Deaths**



**WORLDASTHMADAY**  
MAY 5, 2020 | [GINASTHMA.ORG/WAD](http://GINASTHMA.ORG/WAD) | [@GINASTHMA](https://twitter.com/GINASTHMA)

GLOBAL INITIATIVE FOR  
ASTHMA

# World Asthma Day 2021

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## Uncovering Asthma Misconceptions

www.ginasthma.org/wad @ginasthma

## World Asthma Day

• Uncovering Asthma Misconceptions •

May 5, 2021 Global Initiative for Asthma

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### How is asthma diagnosed?

- The diagnosis of asthma is based on the history of characteristic symptom patterns and evidence of variable airflow limitation. This should be documented from bronchodilator reversibility testing or other tests.
- Test before treating, wherever possible, i.e. document the evidence for the diagnosis of asthma before starting controller treatment, as it is often more difficult to confirm the diagnosis afterwards.
- Additional strategies may be needed to confirm the diagnosis of asthma in particular populations, including patients already on controller treatment, the elderly, and those in low-resource settings.

### Description of asthma:

Symptoms and airflow limitation may resolve spontaneously or in response to medication, and may sometimes be absent for weeks or months at a time.



On the other hand, patients can experience episodic flare-ups (exacerbations) of asthma that may be life-threatening and carry a significant burden to patients and the community. Asthma is usually associated with airway hyperresponsiveness to direct or indirect stimuli, and airway inflammation. Symptoms usually persist, but may be absent or nearly normal, but may require treatment.

### Asthma Phenotypes

Asthma is a heterogeneous disease, with different underlying disease processes.

### How is lung function testing used?

Asthma is characterized by variable expiratory airflow limitation, i.e. expiratory lung function varies over time and in magnitude, to a greater extent than in healthy populations. In some patients, lung function may vary from completely normal and reversibly obstructed in the same patient. Poorly controlled asthma is associated with greater variability in lung function than well-controlled asthma.







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# CLOSING GAPS IN ASTHMA CARE



World Asthma Day • May 3, 2022

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A world map with a color gradient from light blue in the north to red in the south, overlaid with the main title text.

# Asthma Care *for* ALL

— WORLD ASTHMA DAY 2023 —



GLOBAL  
INITIATIVE  
FOR ASTHMA  
1993-2023

TUESDAY, MAY 2 • [GINASTHMA.ORG](https://GINASTHMA.ORG) • [@GINASTHMA](https://twitter.com/GINASTHMA)



**World Asthma Day**  
• May 7, 2024 •

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**ASTHMA  
EDUCATION  
EMPOWERS**

.....  
*Information is Key*

# ***Definition of Asthma***

# What is asthma?

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- **Asthma** is a major **non-communicable** disease.
- **Asthma** is a **chronic** disease characterized by **recurrent attacks** of breathlessness and wheezing, which **vary** in severity and frequency from person to person.
- Symptoms may occur several times in a day or week in affected individuals, and for some people become worse during **physical activity** or at **night**.

# Definition

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- **Asthma has been more often described than defined.** Agreement on a precise definition of asthma has proved elusive.
- Asthma is derived from the Greek word for “**panting**”.
- Asthma was defined by the **American Thoracic Society** in 1962 as a disease characterized by increased **hyper-responsiveness** of the bronchi and trachea to various stimuli.
- The **World Health Organization** described asthma as a **chronic condition** characterized by **recurrent bronchospasm**.

# Definition ...

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- **American Academy of Asthma Allergy & Immunology (AAAAI)**
- Asthma is a **chronic disease** involving the airways.
- These airways are **inflamed** in people with asthma.
- The inflammation makes the airways very sensitive, and the tubes often **react to allergens** or irritations.
- There is **no cure** for asthma, But with the proper diagnosis, medication and an asthma management plan, symptoms **can be controlled**.

# Definition ...

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- ❑ Asthma is one of the most common **chronic** conditions affecting both children and adults.
- ❑ Asthma is a **heterogeneous** condition. (acute episodic deterioration against a chronic persistent inflammation).
- ❑ **A condition that cannot be cured, but can be controlled.**
  - I. Airflow **obstruction** that varies markedly, both spontaneously and with treatment.
  - II. **Inflammation** in the airways that makes them more responsive to a wide range of triggers.
  - III. **Airway Reversibility**, but in some patients with chronic asthma there may be an element of irreversible.

# Prevalence

- The lack of firm, criteria for defining asthma complicates epidemiologic studies of the prevalence of asthma.
- The **prevalence** of asthma has been **increasing** worldwide over the past several decades, especially among children .
- **WHO estimates**, there were **417,918 deaths** due to asthma at the global level and 24.8 million DALYS attributable to Asthma in **2016**.
- Asthma affected an estimated **262 million** people in **2019**, and caused **455 000 deaths**.
- **Over 300 million** individuals suffer from asthma worldwide, with an additional **100 million** individuals projected to be at risk in **2023**.

# Prevalence ...

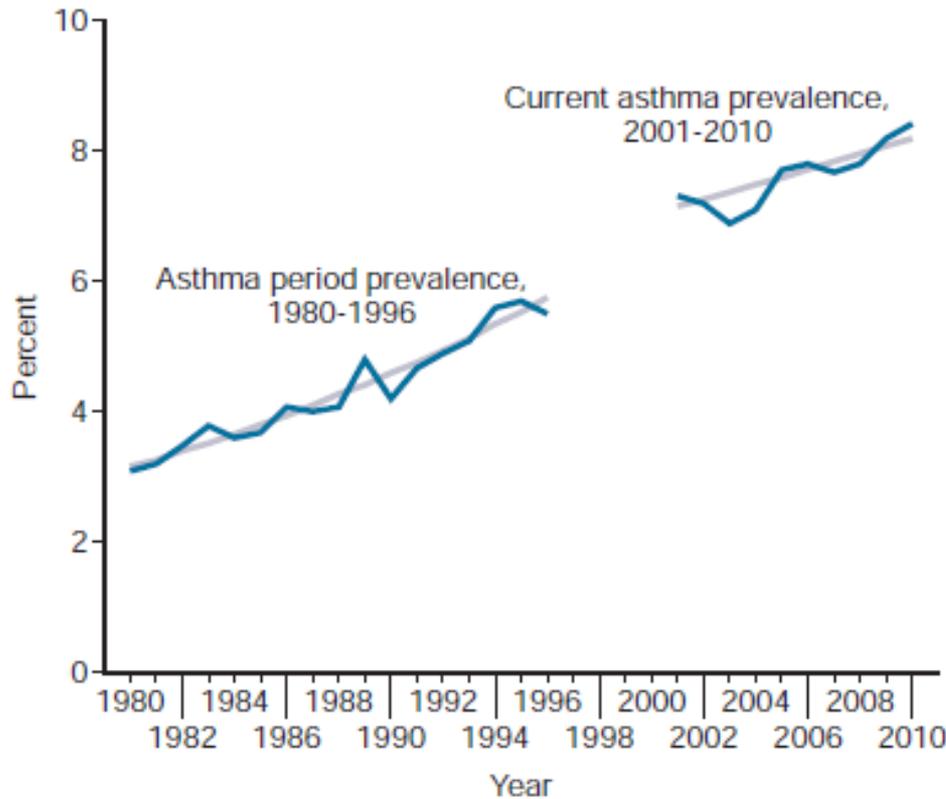
- The prevalence of asthma varies widely around the world, probably because of **gene-by-environment** interactions.
- The strongest risk factors for developing asthma are inhaled substances and particles that may provoke allergic reactions or irritate the airways.
- The recent decline in asthma-related deaths (increased use of ICS, improved access to medical care, and improved recognition and diagnosis)
- Prevalence rates (2%–4%) in Asian countries, and high rates (15%–20%) in the United Kingdom, Canada, Australia, New Zealand.

# How many people have asthma?

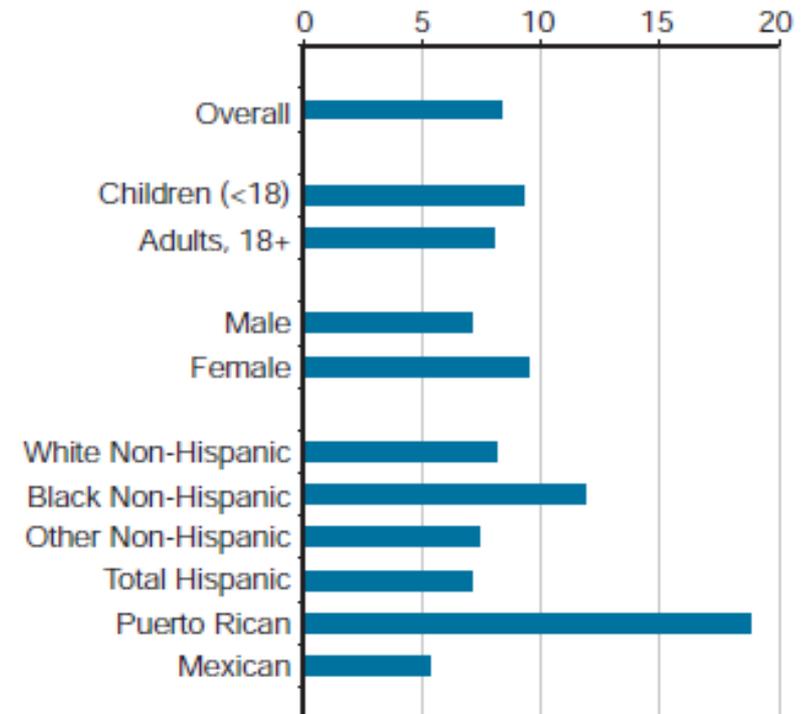
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- Rates vary between countries with prevalence between **1 and 18%**. Globally Asthma affects **5-10%** of the population
- While asthma is twice as common in boys as girls, severe asthma occurs at equal rates.
- In contrast adult women have a higher rate of asthma than men. Asthma is more common in the young than the old.
- Rates of asthma have increased significantly between the 1960s and 2008 with it being recognized as a major public health problem.

# Prevalence of Asthma

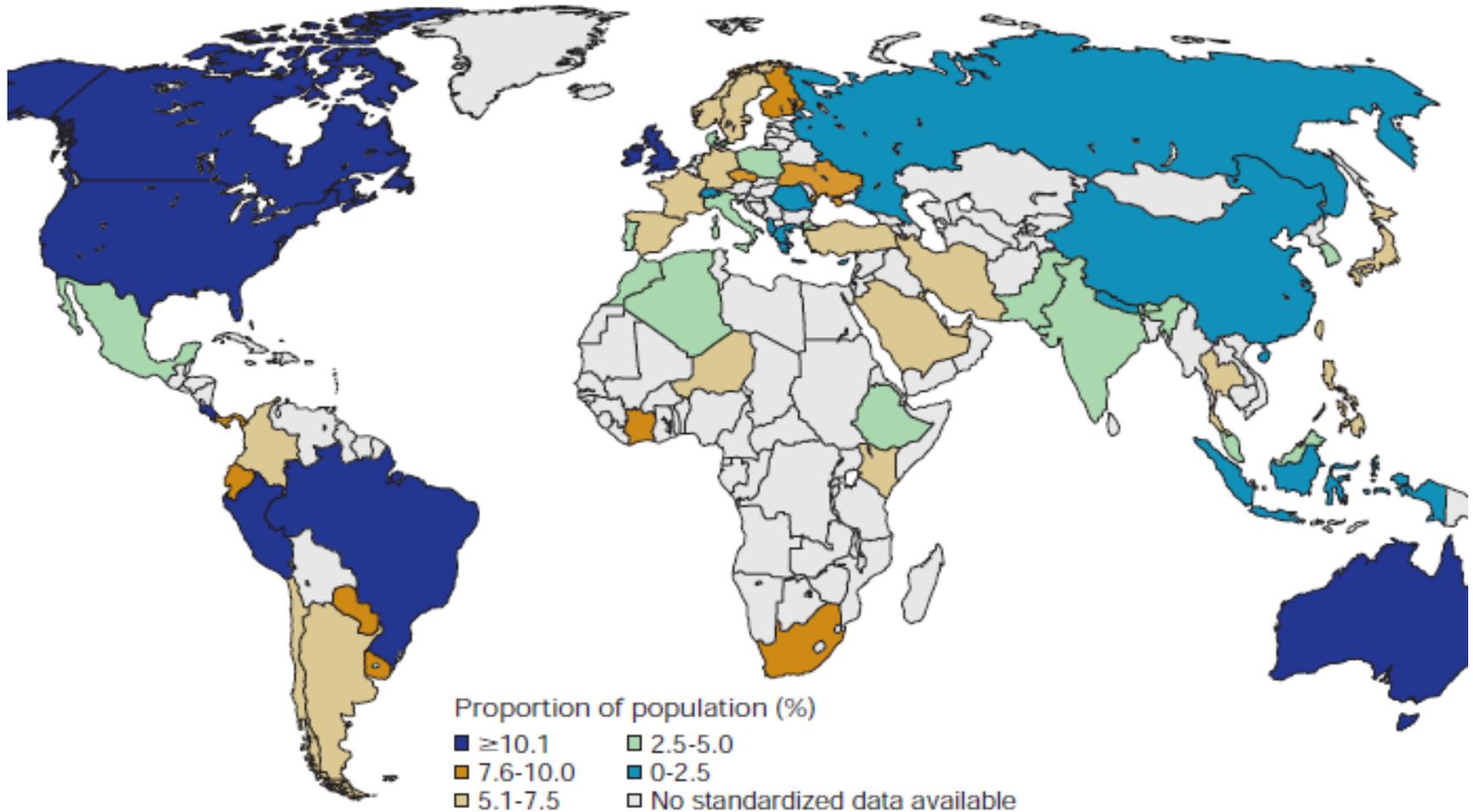


Current Asthma Prevalence in 2012 NHIS Data (Percent of US population)



# Worldwide Prevalence of Asthma

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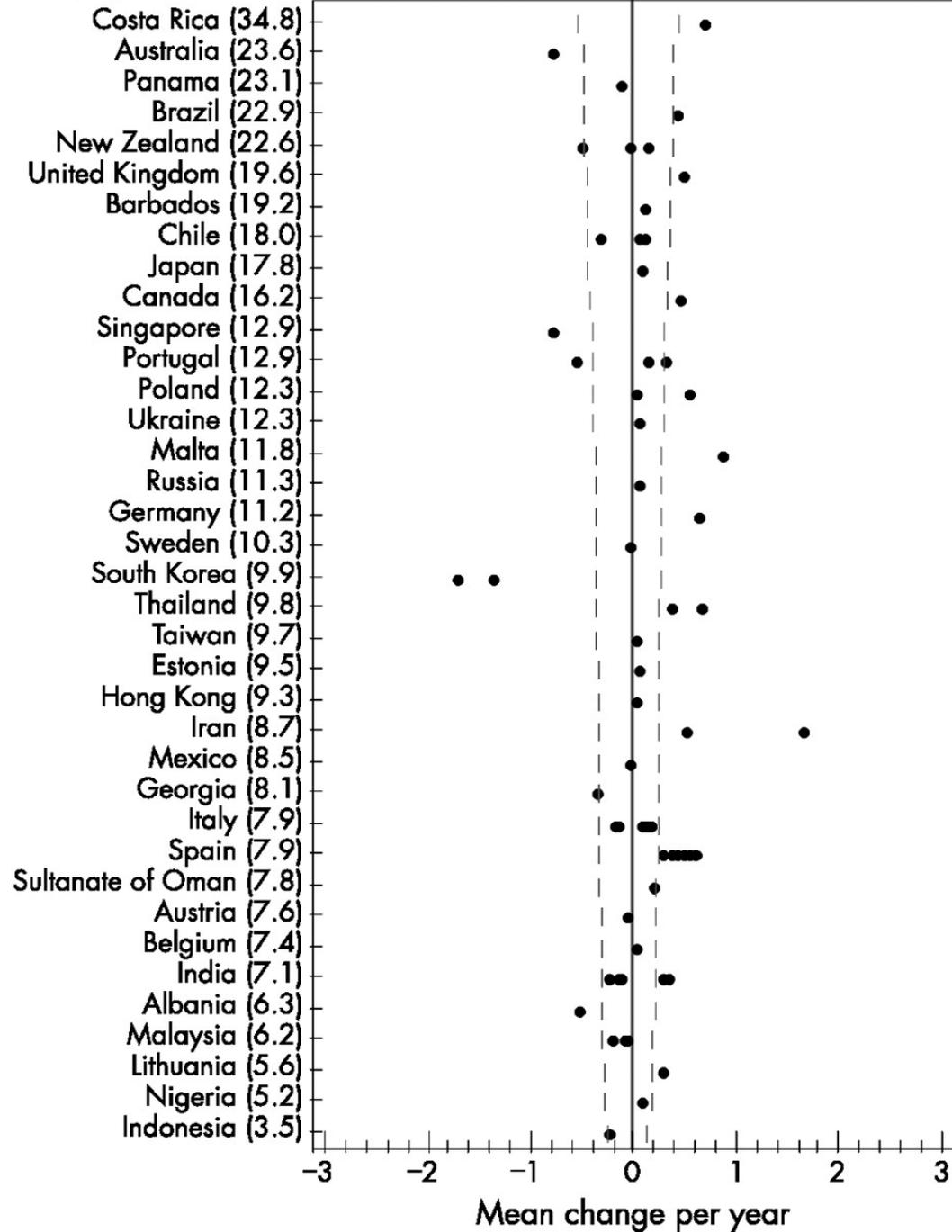


# Prevalence...

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## Country Prevalence of Asthma

Country (prevalence %)



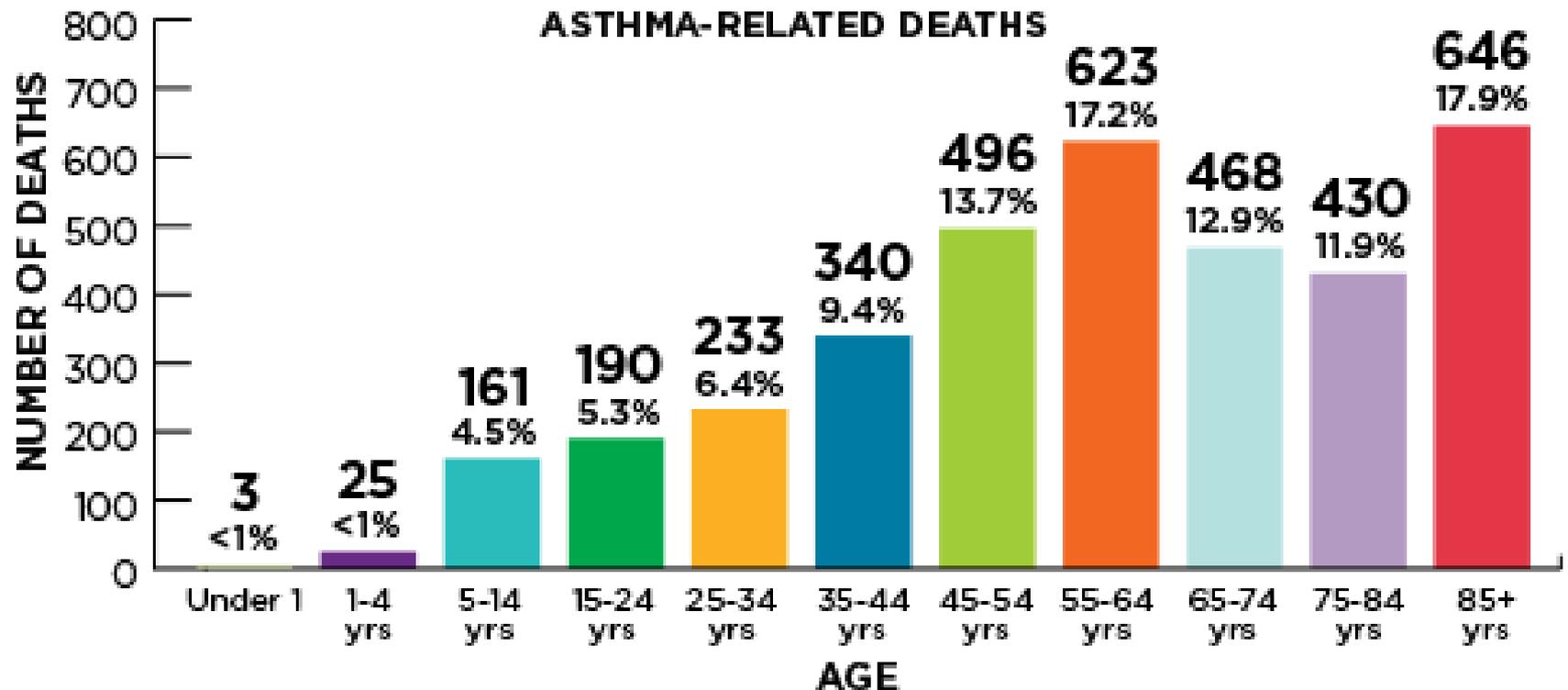
# Global Burden of Asthma

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- Asthma, a disease of the airways, occurs in people of all ages, and wheeze is the most common symptom.
- The most recent revised global estimate of asthma suggests that as many as **339 million** people have asthma, and that the burden of disability is high.
- The historical view of asthma being a disease of high-income countries no longer holds: **most people affected are in low- and middle-income countries**, and its prevalence is estimated to be increasing fastest in those countries.
- According to the latest **WHO** estimates, released in December 2016, there were **383 000 deaths** due to asthma in 2015.

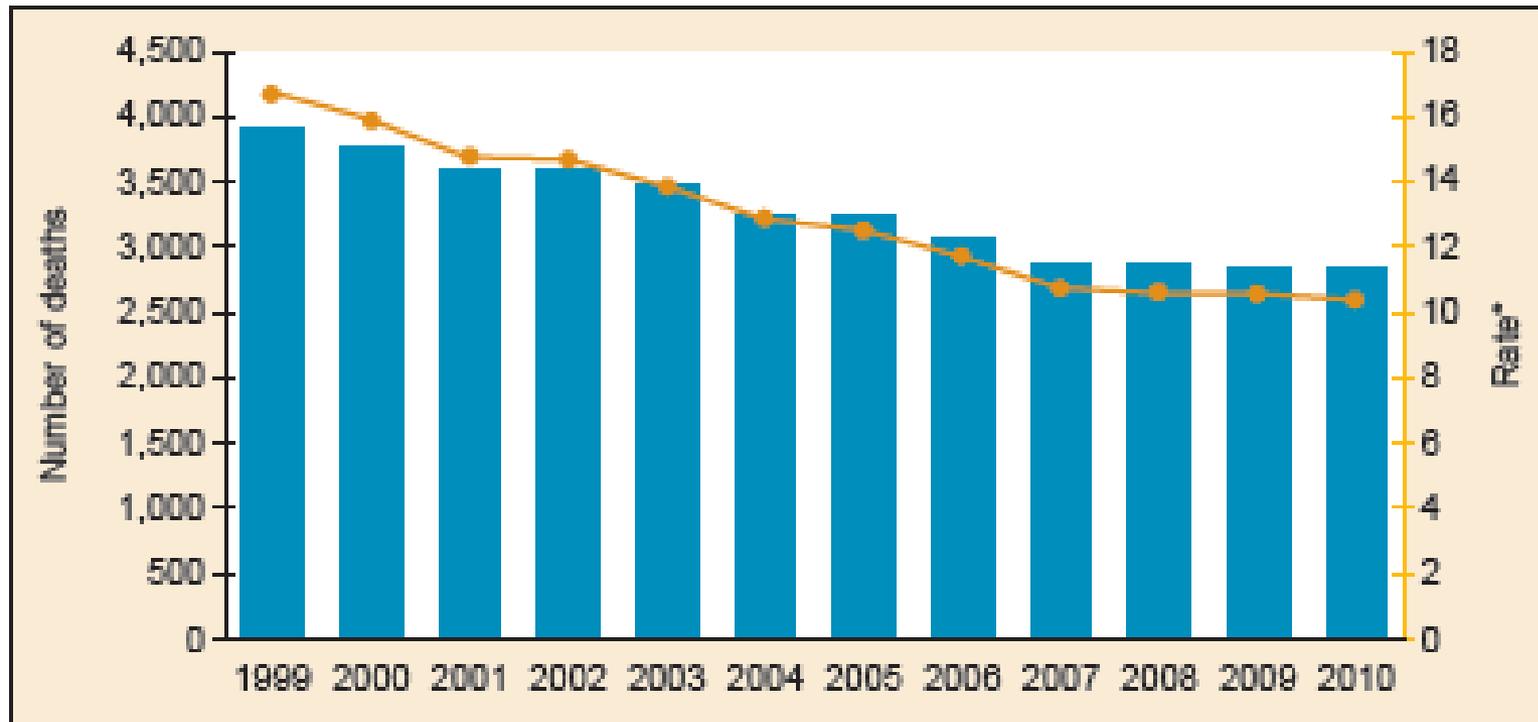
# Asthma Related Deaths

25



Source: Asthma and Allergy Foundation of America [asthmacapitals.com](http://asthmacapitals.com)

# Asthma Related Deaths



**Fig. 63.4.** Asthma death rates and number of deaths from 1999 to 2010. Thirty-five National Asthma Control Program (NACP) grantees. (Puerto Rico is excluded.) \*Age-adjusted rate per million population. (From Centers for Disease Control and Prevention: Asthma facts: CDC's National Asthma Control Program Grantees. Available at [www.cdc.gov/asthma/pdfs/asthma\\_facts\\_program\\_grantees.pdf](http://www.cdc.gov/asthma/pdfs/asthma_facts_program_grantees.pdf).)

# Epidemiology

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- The epidemiology of asthma is complex
- Genetic predisposition
- **Gene by environment interaction**
  
- Risk factors
  - **Prenatal** (maternal smoking, diet and nutrition, stress, use of antibiotics and delivery by cesarean section)
  - **Later in childhood** (exposure to allergens, infections, breastfeeding, Stress, family size, and sex, obesity, atopy and allergic rhinitis, socio-economic status, antibiotics and sex)
  - **In adulthood** (exposure to allergens, occupational contact)

# Risk Factors(Genetics)

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- **Genetics** play a significant role in the development of asthma and allergic diseases.
- The interplay between **genetic predisposition** and **environmental exposures** underlies the development of asthma.
- The phenotypic and genetic **heterogeneity** in asthma poses a challenge to discovering specific genetic mutations that solely increase the risk of asthma.

# Prenatal tobacco smoke

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- **Prenatal maternal smoking** has been consistently associated with early childhood wheezing.
- There is a **dose–response** relation between exposure and decreased airway caliber in early life.
- Prenatal maternal smoking is also associated with increased risks of food allergy, cytokine responses in the cord blood and concentrations of nitric oxide in exhaled air in newborns.
- Studies have shown a clear prenatal effect of smoking; this effect is increased when combined with **postnatal smoke exposure**.

# Diet and nutrition

- Studies focused on **foods** with **anti-inflammatory** properties (e.g., **omega-3**) and antioxidants such as **vitamin E** and **zinc**.
- Higher intake of fish or **fish oil** during pregnancy is associated with lower risk of atopic disease.
- Higher prenatal **vitamin E** and **zinc** levels have been associated with lower risk of development of wheeze up to age 5 years.
- However, no protective effect against the development of atopic disease in infants has been shown for maternal diets that excluded certain foods (e.g., **cow's milk, eggs**) during pregnancy.
- An inverse relation of maternal **vitamin D** levels with wheeze in early life, but no relation with atopy or symptoms in later life.

# Stress

- A number of animal models have suggested that prenatal **maternal stress** acts through regulation of the offspring's hypothalamic–pituitary–adrenal axis to decrease **cortisol** levels, which may affect the development of an allergic phenotype.
- Although there is a correlation between caregiver stress early in the infant's life and higher levels of Ig E in the infant and early wheezing, **no** studies to date have shown an association with asthma.

# Antibiotic use

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- The association between prenatal **antibiotic treatment** and subsequent development of **atopic disease** has been showed.
- Longitudinal **cohort studies** examining any antibiotic use showed a greater risk of persistent wheeze and asthma in early childhood and a dose–response relation between number of **antibiotic** courses and risk of wheeze or **asthma**.

# Mode of delivery

- Development of atopy was 2 to 3 times more likely among infants delivered by **emergency cesarean** section.
- Although no such association occurred with elective cesarean section.
- Potential reasons for these findings include **maternal stress** and differences in the infant's gut micro-flora associated with different modes of delivery.

# Breast feeding

- The influence of **breastfeeding** on the risk of childhood atopy and asthma remains **controversial**.
- Some studies have shown protection, whereas others have reported higher rates of allergy and asthma among breastfed children.
- A meta-analysis and several individual studies showed that exclusive **breastfeeding** for at least 3 months was associated with **lower rates** of **asthma** between 2 and 5 years of age, **with the greatest effect occurring among those with a parental history of atopy**.
- In a longitudinal birth cohort study, **breastfeeding** was associated with a **higher risk of atopic asthma** in later childhood, with the greatest influence occurring among those with a **maternal history of atopy**.
- In some studies, exclusion of milk, eggs and fish from the maternal diet was associated with decreased atopic dermatitis in infancy.

# Phenotypes of asthma

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- Although some 50% of preschool children have wheezing, only 10%–15% have a diagnosis of “**true**” asthma by the time they reach school age.
- Commonly described phenotypes in early infancy and childhood are **transient wheezing, non-atopic wheezing, late-onset wheezing and persistent wheezing.**
- The majority of children with persistent wheezing (in whom asthma will subsequently be diagnosed) experience their first symptoms before age 3.

# Socio-economic status

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- Children of parents with lower socio-economic status have **greater morbidity** from asthma, but findings with respect to the prevalence of asthma are mixed.
- Some studies have reported associations of lower socio-economic status with **greater airway obstruction and symptoms** *but not with a diagnosis of asthma*.
- Whether **socio-economic status** is as relevant to the incidence of allergy and asthma as it is to the expression, severity and management of these diseases remains **unclear**.
- Parental stress has also been prospectively associated with wheezing in infancy, and **family difficulties** have been linked to asthma.
- Children whose caregivers report high levels of stress and who have difficulties parenting are at **greatest risk** for asthma.

# Antibiotics and infections

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- The use of **antibiotics** has been associated with early wheezing and asthma in several studies.
- Mechanism for this association is immunologic stimulation through changes in the **bowel flora**.
- Viral infections of the lower respiratory tract affect early childhood wheezing.
- Whether lower respiratory tract infection promotes sensitization to aeroallergens is **controversial: childhood viral infections might be pathogenic in some children but protective in others**.
- Severe viral infection in genetically susceptible infants who are already sensitized to inhalant allergens may lead to deviation toward **Th2** responses promoting asthma.
- **RSV** and **rhinovirus** may play a role in persistent wheezing, although other studies have suggested no effect.

# Allergic sensitization

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- Total serum **immunoglobulin E** level, a surrogate for allergen sensitivity, has been associated with the incidence of asthma.
- High levels of **immunoglobulin E** at birth were associated with **greater incidence** of both **atopy** and aeroallergen sensitivity but not necessarily asthma.
- However, sensitization to aeroallergens, particularly house dust mite, cat and cockroach allergens, is well documented as being associated with asthma.
- **Immune responses in the developing infant and young child may affect the development of asthma.**
- **Immaturity** in neonatal immune responses may promote the persistence of the **Th2 immune phenotype** and development of **atopy**.

# Exposure to animals

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- Although several studies have demonstrated a **lower risk** of development of atopy and asthma with **exposure to farm animals** in early life, the findings of studies of the influence of exposure to domestic cats and dogs have been inconsistent.
- In some studies, exposure to **cats** was associated with a **greater risk** of allergic sensitization, whereas other studies showed a lower risk.
- **Exposure to dogs** may be protective not only against the development of specific sensitization to dog allergen but also against other sensitization (e.g., to house dust mites) and asthma.
- Other studies of exposure to dogs have suggested that protection against wheezing may be mediated by high levels of **endotoxin**.

# Sex and gender

- Until age **13–14 years**, the incidence and prevalence of asthma are greater among **boys** than among girls.
- Studies through puberty have shown a greater incidence of asthma among **adolescent** and young adult **females** and a greater proportion of males with remission of asthma.
- **Before age 12, boys have more severe asthma than girls, with higher rates of admission to hospital.**
- **In contrast, adult females have more severe asthma than males, with more hospital admissions.**
- Although mechanisms for differences between the sexes have not been established.

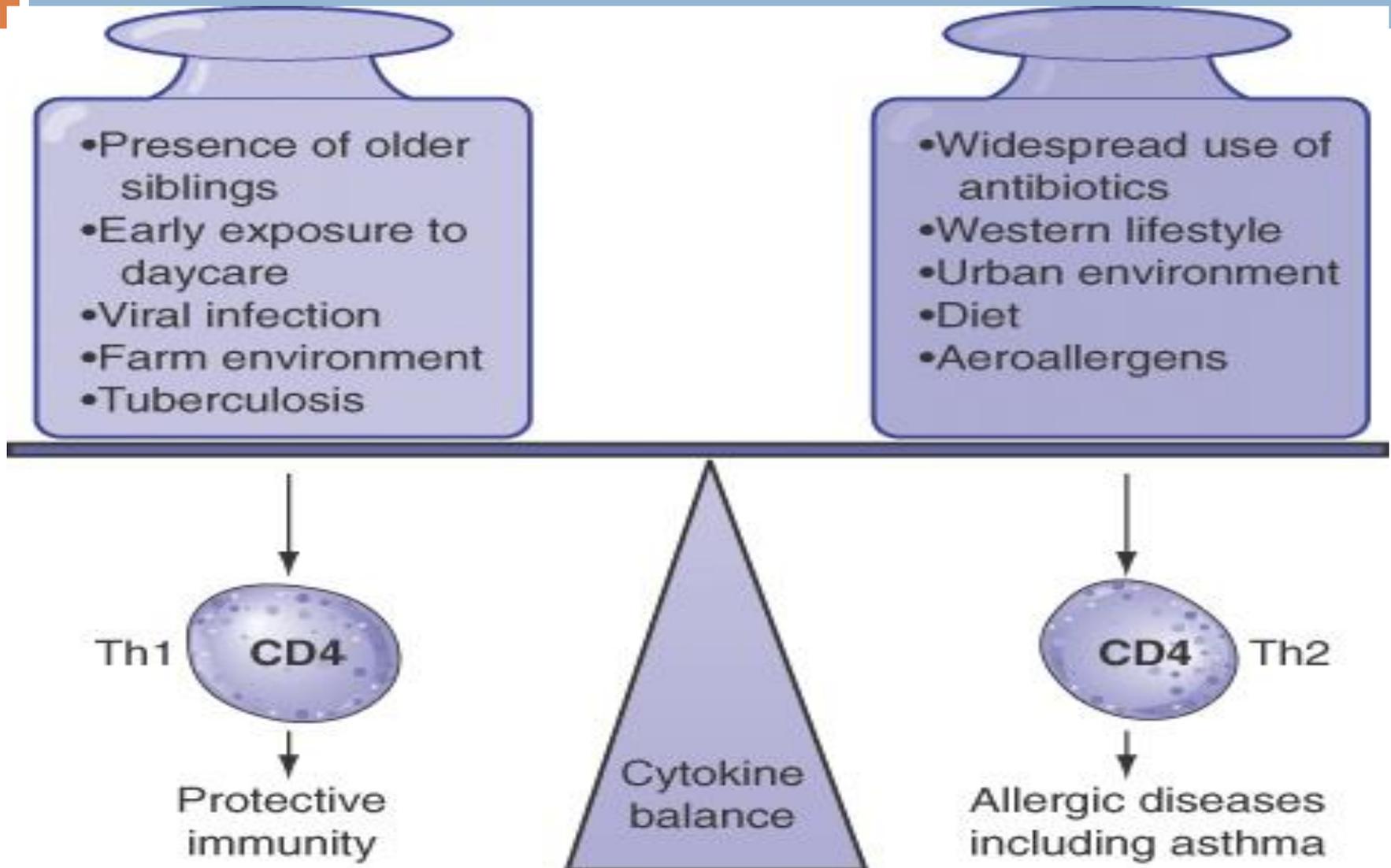
# Adult-onset asthma

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- Asthma in adults may have persisted from childhood, may have occurred as a relapse of earlier childhood asthma or may be true **adult-onset asthma** with no symptoms in earlier life.
- **New-onset asthma** in adulthood may have environmental (especially occupational) causes with or without allergen sensitization.
- Although adult asthma may develop in relation to specific drug treatments (e.g.,  **$\beta$ -blockers, non-steroidal anti-inflammatory drugs**) or, in women, the use of **hormone replacement therapy, occupational exposure** to sensitizing agents or irritants is more common.

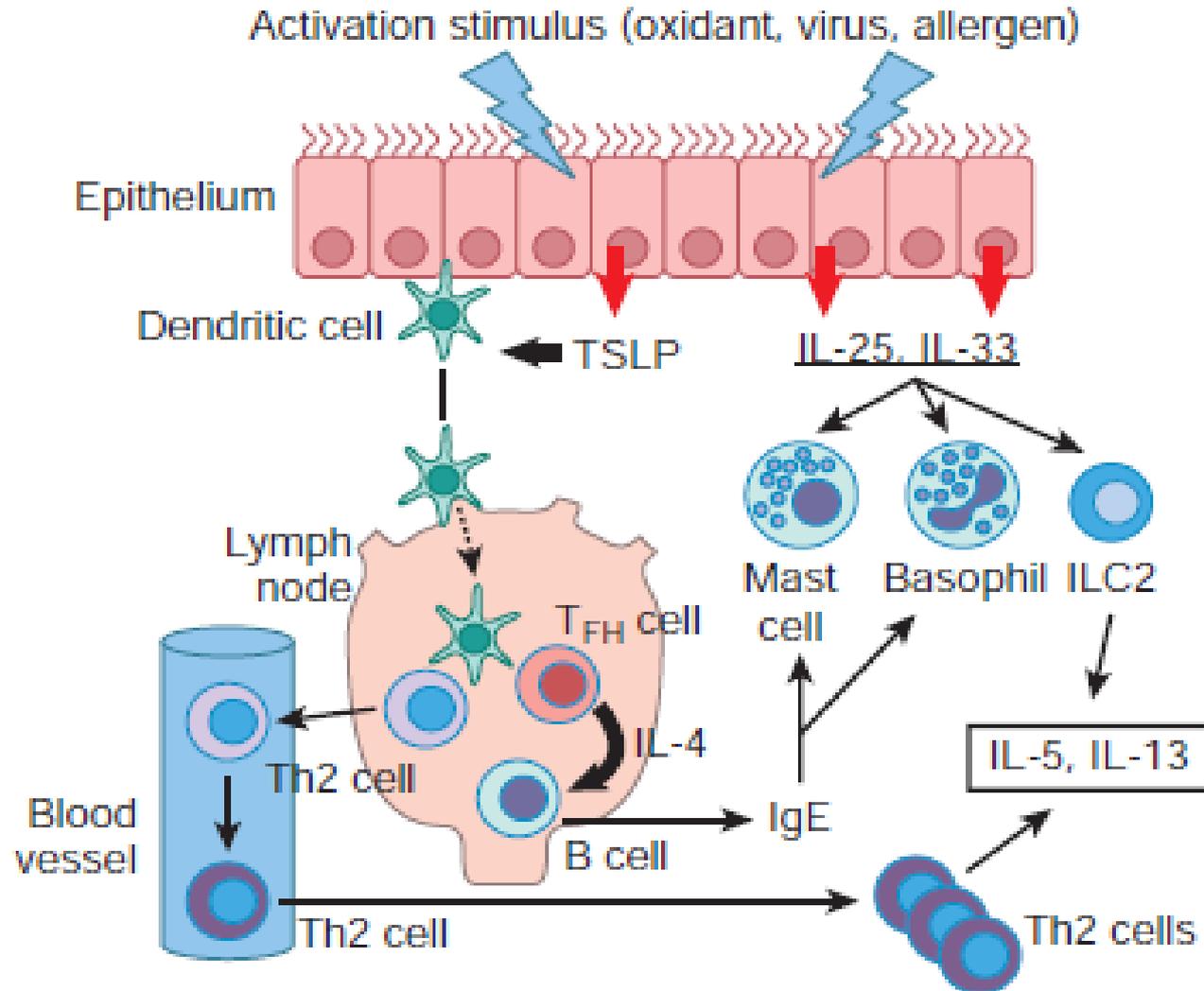
# Hygiene Hypothesis

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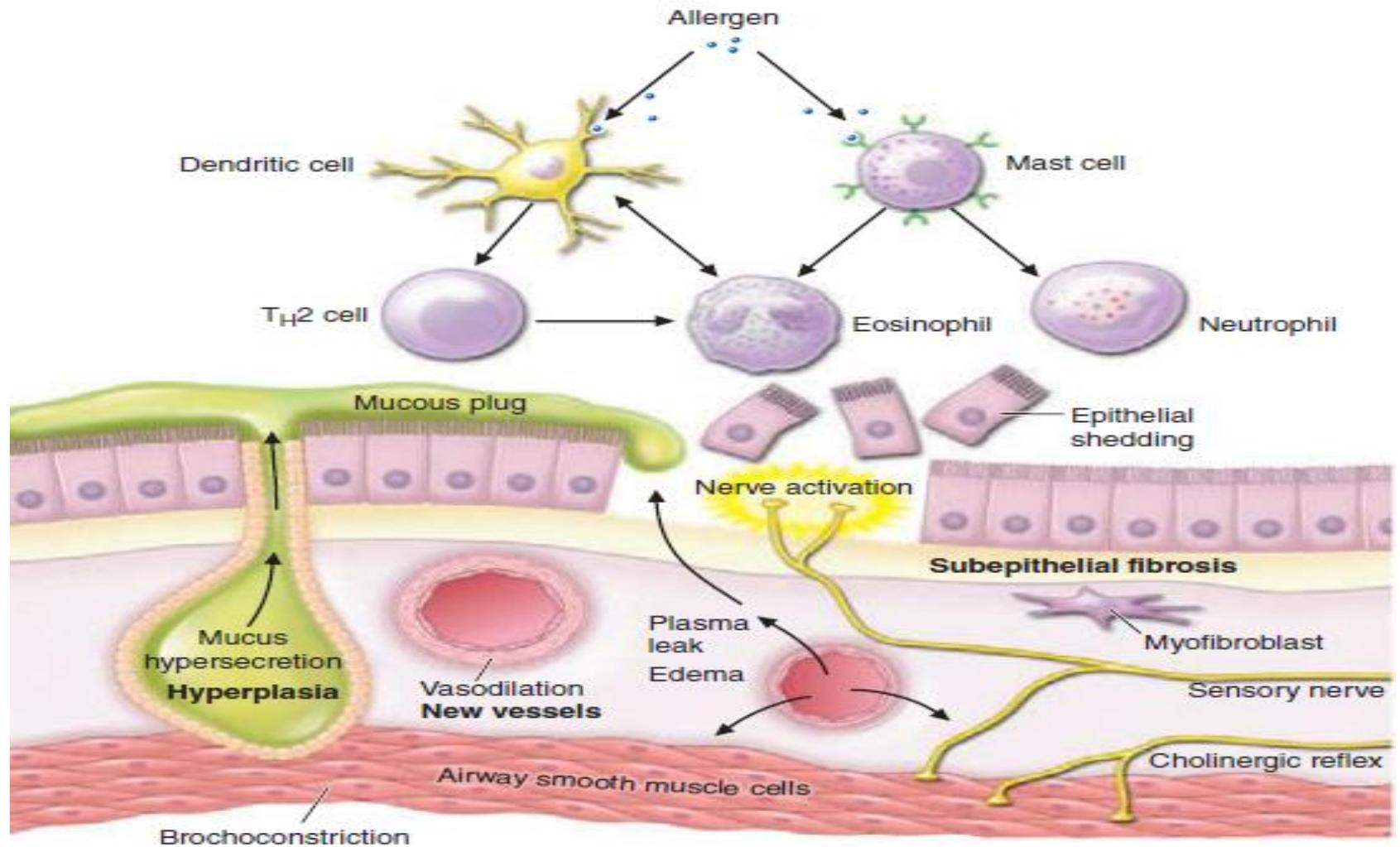
# Generation of Type 2 Immune Responses

43



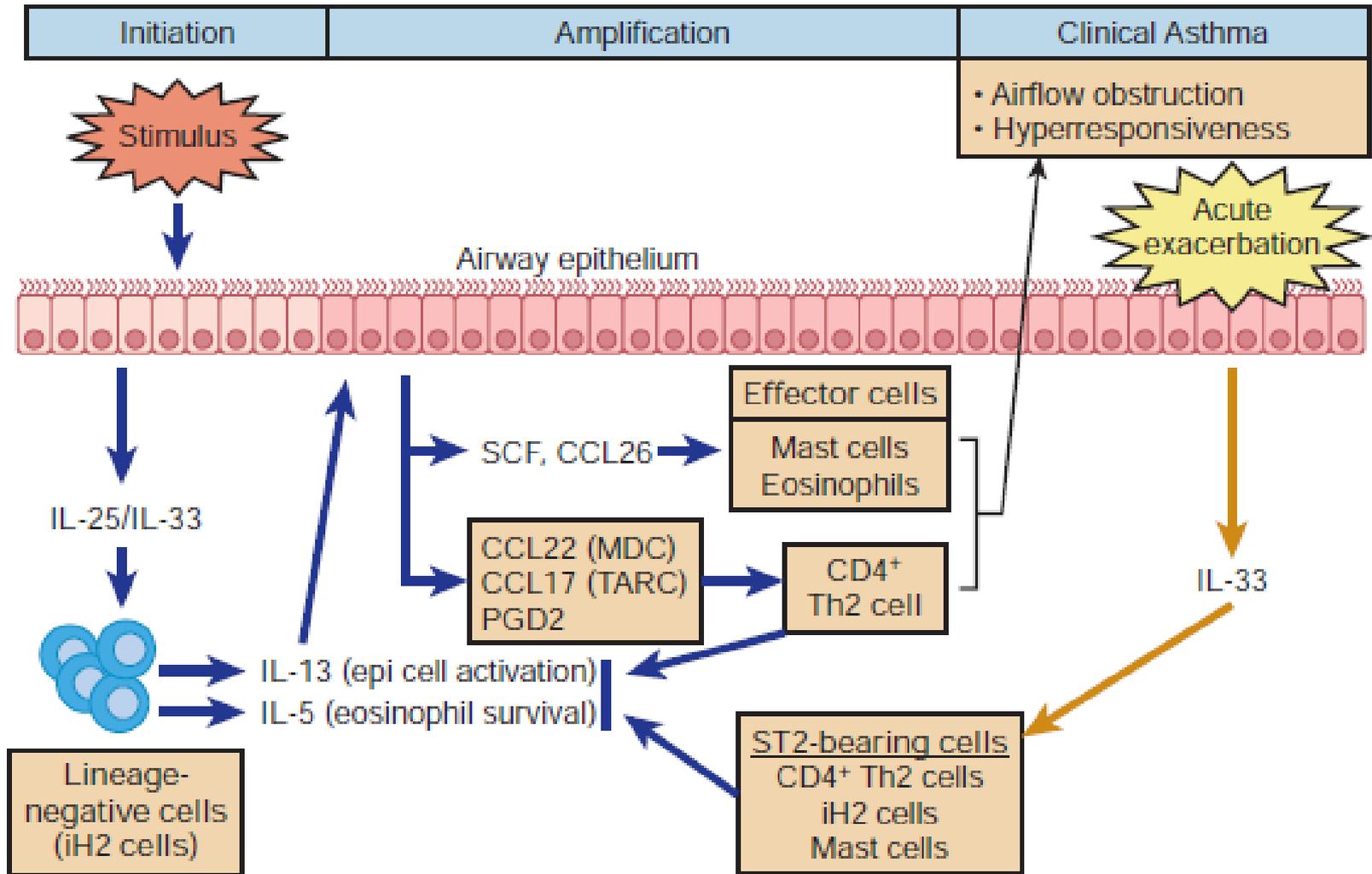
# Asthma Inflammation: Cells and Mediators

44



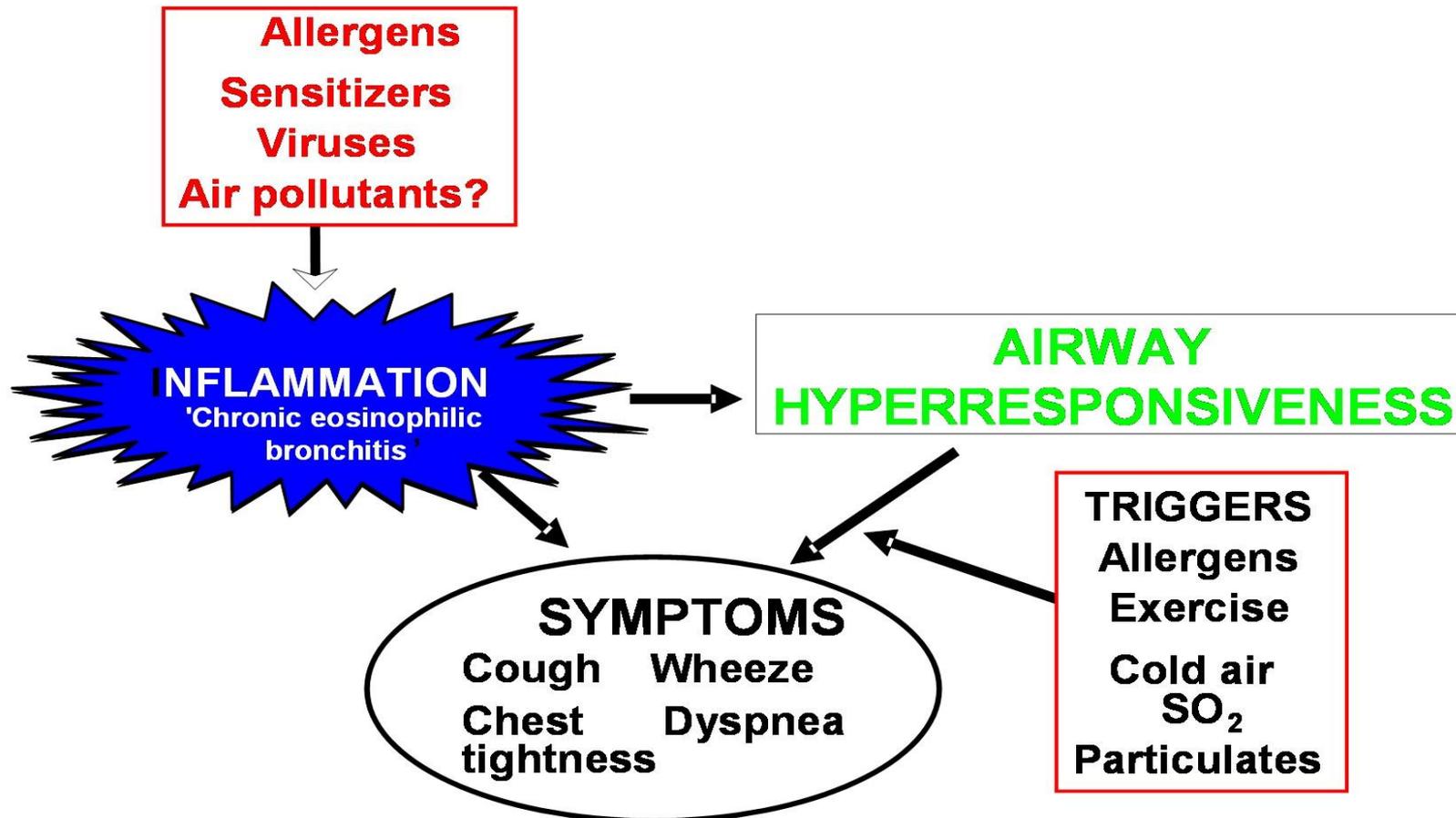
# Initiation and Amplification of Th2 Responses

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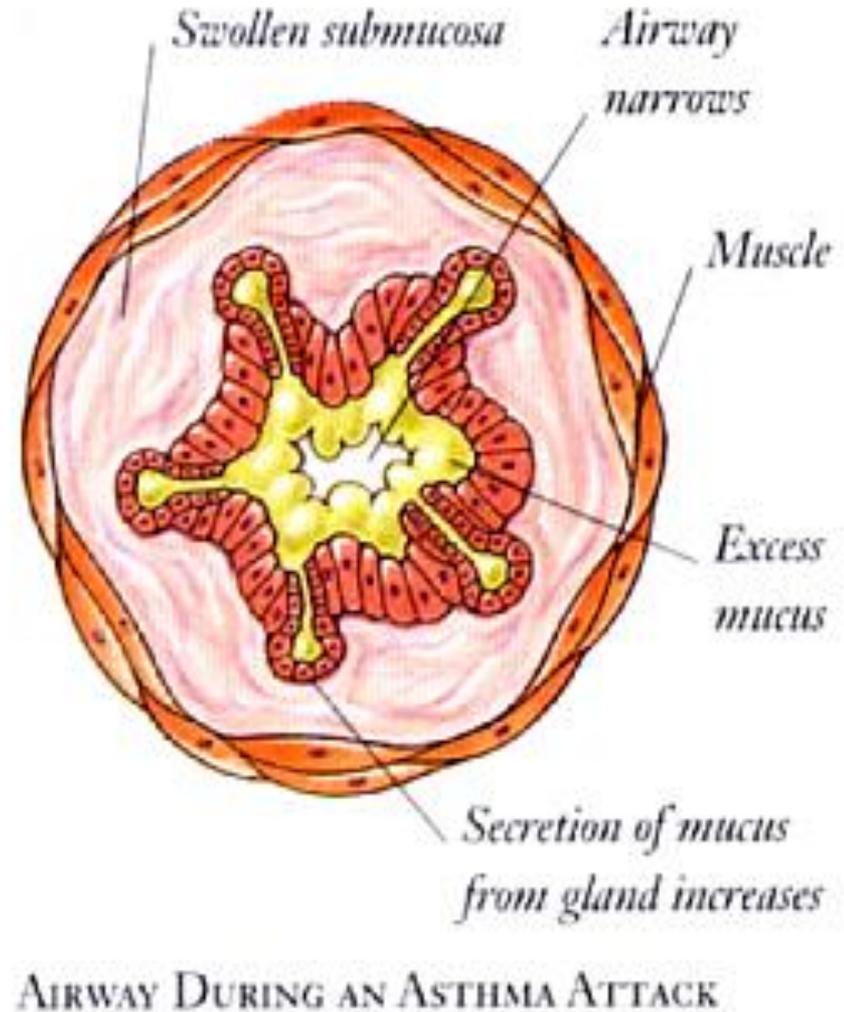
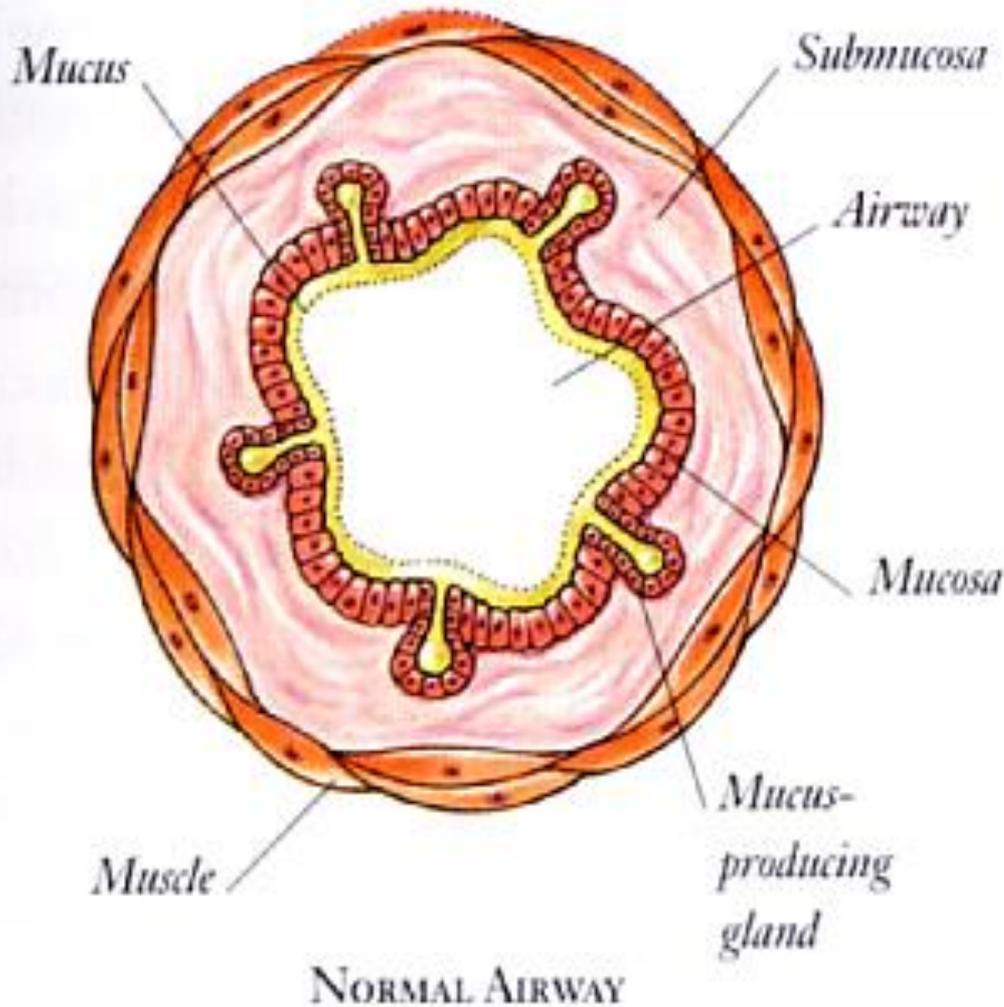
# Mechanisms: Asthma Inflammation

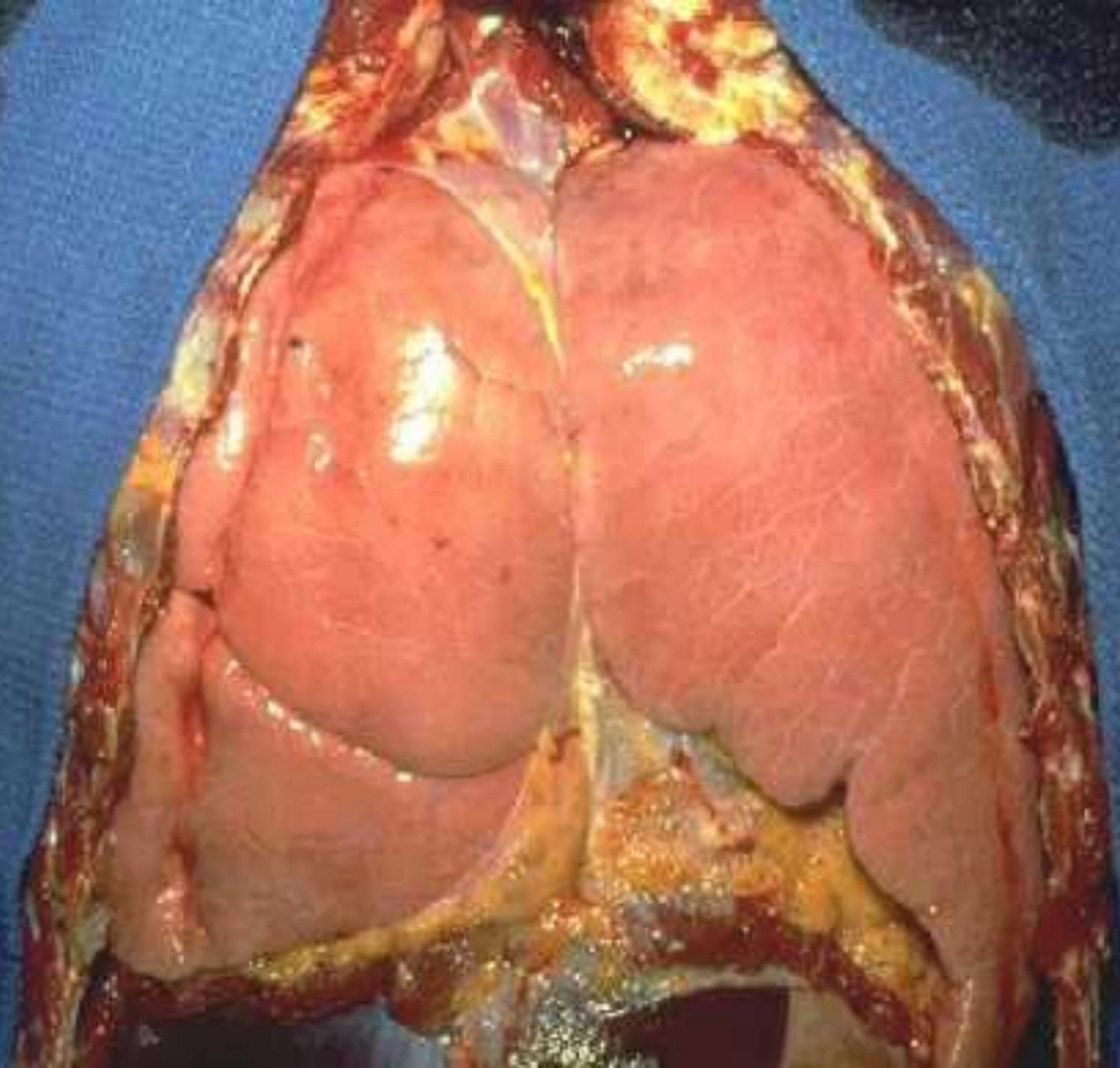
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# Pathological changes

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# Mucous plug in asthma





**Curschmann's spirals**

# ***Symptoms & Signs of Asthma***

# Symptoms (Clinical Features )

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- Wheezing
  - Dyspnea
  - Chest tightness
  - Coughing (day, night, or with exercise)
  - Difficulty breathing/Shortness of breath
  - Trouble sleeping caused by shortness of breath, coughing or wheezing
- 
- These symptoms are **variable**, ( spontaneously , with therapy)
  - Symptoms may be **worse at night** or in the **early morning**.
  - There is increased **mucus production** in some patients.
  - Rhonchi throughout the chest.
  - Chest hyperinflation.

# Signs (Clinical Features )

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- **Difficulty breathing, as measured with peak flow meter.**
- **The need to use a quick-relief inhaler more often.**

**For some people, asthma signs and symptoms flare up in certain situations:**

- **Exercise-induced asthma, which may be worse when the air is cold and dry.**
- **Occupational asthma, triggered by workplace irritants such as chemical fumes, gases or dust.**
- **Allergy-induced asthma, triggered by airborne substances, such as pollen, mold spores, cockroach waste, or particles of skin and dried saliva shed by pets (pet dander).**

# Asthma triggers

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**Asthma triggers are different from person to person and can include:**

- ❑ **Cold air**
- ❑ **Physical activity**
- ❑ **Strong emotions and stress**
- ❑ **Gastro-esophageal reflux disease.**
- ❑ **Air pollutants and irritants, such as smoke**
- ❑ **Respiratory infections, such as the common cold**
- ❑ **Certain medications, (beta blockers, aspirin, and NSAID)**
- ❑ **Sulfites and preservatives added to some types of foods and beverages,**
- ❑ **Airborne allergens, such as pollen, dust mites, mold spores, pet or particles of cockroach waste.**

# Asthma Complications

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- **A permanent narrowing of the airways**
- **Sick days from work or school during asthma flare-ups**
- **Signs and symptoms that interfere with sleep, work and other activities**
- **Emergency room visits and hospitalizations for severe asthma attacks**
- **Side effects from long-term use of some medications used to stabilize severe asthma**

# ***Diagnosis of Asthma***

# Diagnosis (Medical history)

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- What are your **symptoms**? When do they occur? What, if anything, seems to **trigger** them?
- Are you often exposed to **tobacco smoke**, chemical fumes, dust or other airborne irritants?
- Do you have hay fever or another **allergic condition**?
- Do you have blood **relatives**, with asthma, or other allergies?
- What health problems do you have?
- What **medications** or herbal supplements do you take?
- What is your occupation?
- Do you have **pet** birds, or do you raise pigeons?

# Diagnosis (Physical exam)

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- **Examine nose, throat and upper airways.**
- **Listen to breathing, Wheezing, high-pitched whistling sounds.**
- **Examine skin for signs of allergic conditions such as eczema and hives.**
- **Physical exam to rule out other possible conditions, such as a respiratory infection or COPD.**
- **Symptoms variability and Intermittent airways obstruction.**  
**Usually confirmed by objective measurements of lung function test.**

# Diagnosis ...

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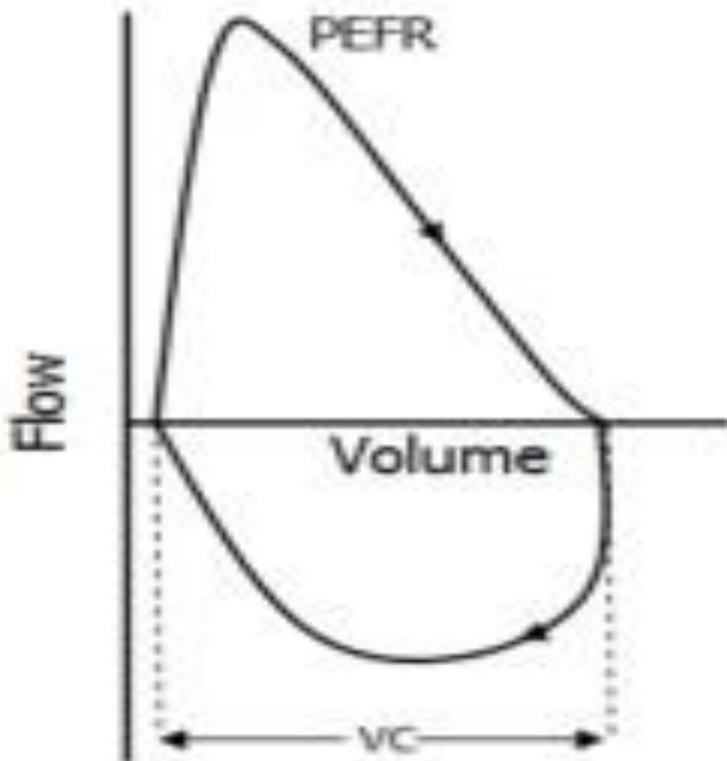
## Lung Function Tests

- **Airflow limitation** with a reduced FEV<sub>1</sub>, FEV<sub>1</sub>/FVC ratio, and PEF.
- **Reversibility** is demonstrated by a >12% and 200 ml increase in FEV<sub>1</sub> 15 min after an inhaled short-acting beta 2-agonist .
- Measurements of **PEF** twice daily may confirm the diurnal variations in airflow obstruction.
- **Flow-volume loops** show reduced peak flow and reduced maximum expiratory flow.

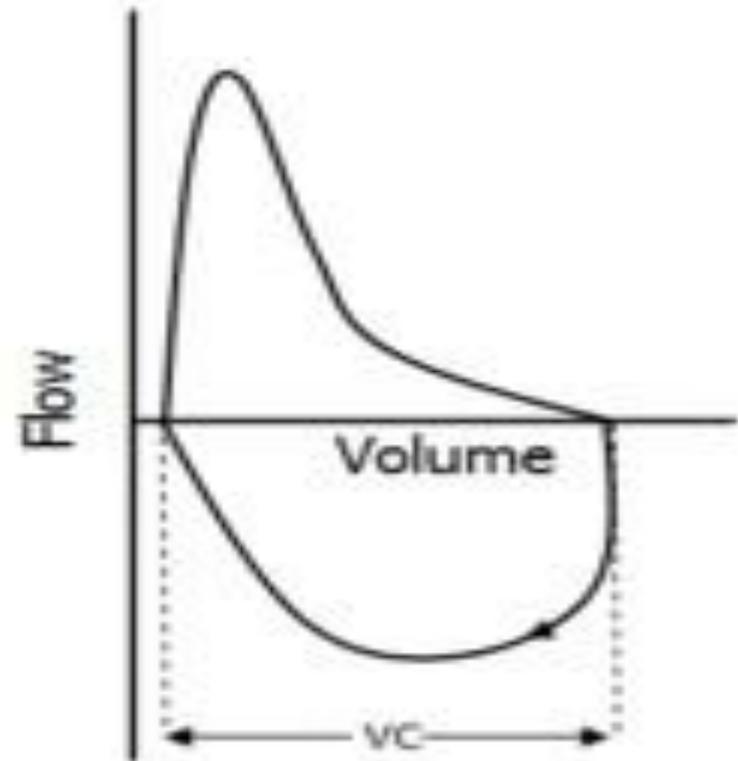
# Flow – Volume Loop

61

## Flow-Volume Loops



Normal



Obstruction

# Diagnosis ...

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## Airway Responsiveness

- **Methacholine or histamine challenge test :**

**The provocative concentration that reduces FEV1 by 20% (PC20).**

- **Allergen challenge is rarely necessary**
- **Should only be undertaken by a specialist if specific occupational agents are to be identified**

# Bronchodilator Reversibility Testing

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<b>Bronchodilator*</b>	<b>Dose</b>	<b>FEV<sub>1</sub> before and after</b>
<b>Salbutamol</b>	<b>200 – 400 µg via large volume spacer</b>	<b>15 minutes</b>
<b>Terbutaline</b>	<b>500 µg via Turbohaler®</b>	<b>15 minutes</b>
<b>Ipratropium</b>	<b>160 µg** via spacer</b>	<b>45 minutes</b>

# Bronchodilator Reversibility Testing

**Figure 5.1-6. Bronchodilator Reversibility Testing in COPD**

## Preparation

- Tests should be performed when patients are clinically stable and free from respiratory infection.
- Patients should not have taken inhaled short-acting bronchodilators in the previous six hours, long-acting bronchodilator in the previous 12 hours, or sustained-release theophylline in the previous 24 hours.

## Spirometry

- FEV<sub>1</sub> should be measured before a bronchodilator is given.
- The bronchodilator should be given by metered dose inhaler through a spacer device or by nebulizer to be certain it has been inhaled.

- The bronchodilator dose should be selected to be high on the dose/response curve.
- Possible dosage protocols are 400 µg β<sub>2</sub>-agonist, up to 160 µg anticholinergic, or the two combined<sup>20</sup>. FEV<sub>1</sub> should be measured again 10-15 minutes after a short-acting bronchodilator is given; 30-45 minutes after the combination.

## Results

- An increase in FEV<sub>1</sub> that is both greater than 200 ml and 12% above the pre-bronchodilator FEV<sub>1</sub> is considered significant<sup>20</sup>. It is usually helpful to report the absolute change as well as the % change from baseline to set the improvement in a clinical context.

# Bronchodilator Reversibility Testing

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## Preparation

- ❑ Tests should be performed when patients are clinically stable and free from respiratory infection
  
- ❑ **Patients should not have taken:**
  - ✓ inhaled short-acting bronchodilators in the previous six hours
  - ✓ long-acting bronchodilator in the previous 12 hours
  - ✓ sustained-release theophylline in the previous 24 hours

# Methacholine Challenge Test

**TABLE 1**

## Contraindications to methacholine challenge testing: American Thoracic Society guidelines

### Absolute contraindications

Severe airflow limitation: forced expiratory volume in 1 second ( $FEV_1$ ) < 50% of predicted or < 1.0 L  
Heart attack or stroke in last 3 months  
Uncontrolled hypertension: systolic blood pressure > 200 mm Hg or diastolic pressure > 100 mm Hg  
Known aortic aneurysm

### Relative contraindications\*

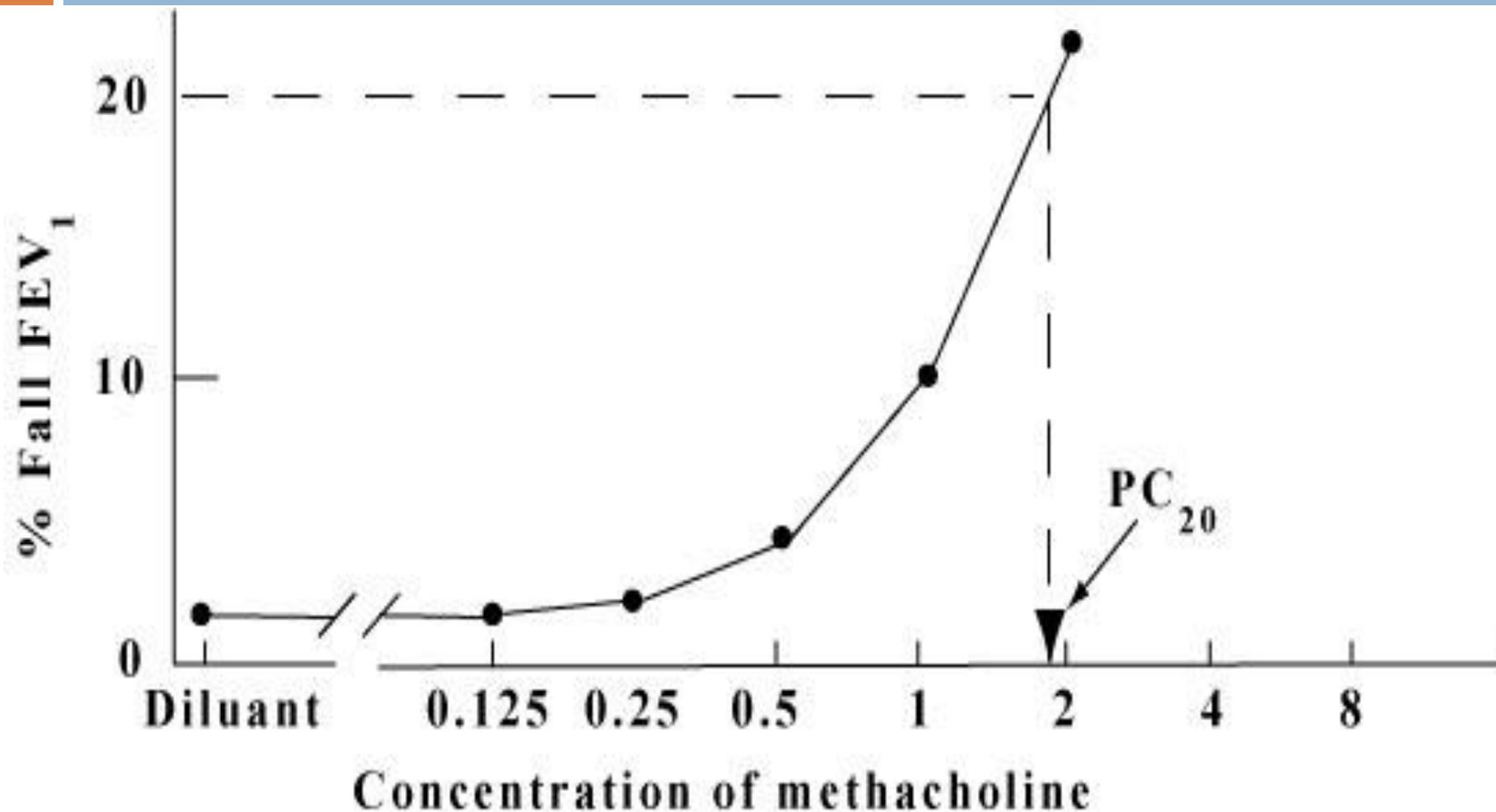
Moderate airflow limitation:  $FEV_1$  < 60% of predicted or < 1.5 L  
Inability to perform spirometry of acceptable quality  
Pregnancy  
Nursing mothers  
Current use of cholinesterase inhibitor medication (for myasthenia gravis)

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\*Authors' additional relative contraindications: cerebral aneurysms; failure to withhold medications (may affect the test results) and upper- or lower-respiratory-tract infection within previous 2 to 6 weeks

# Methacholine Challenge Test

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# Diagnosis...

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## Imaging

- ❖ CXR is usually normal but may show hyperinflated lungs.

## Hematologic Tests

- ❖ Blood tests are not usually helpful. Total serum IgE and specific IgE to inhaled allergens may be measured in some patients.

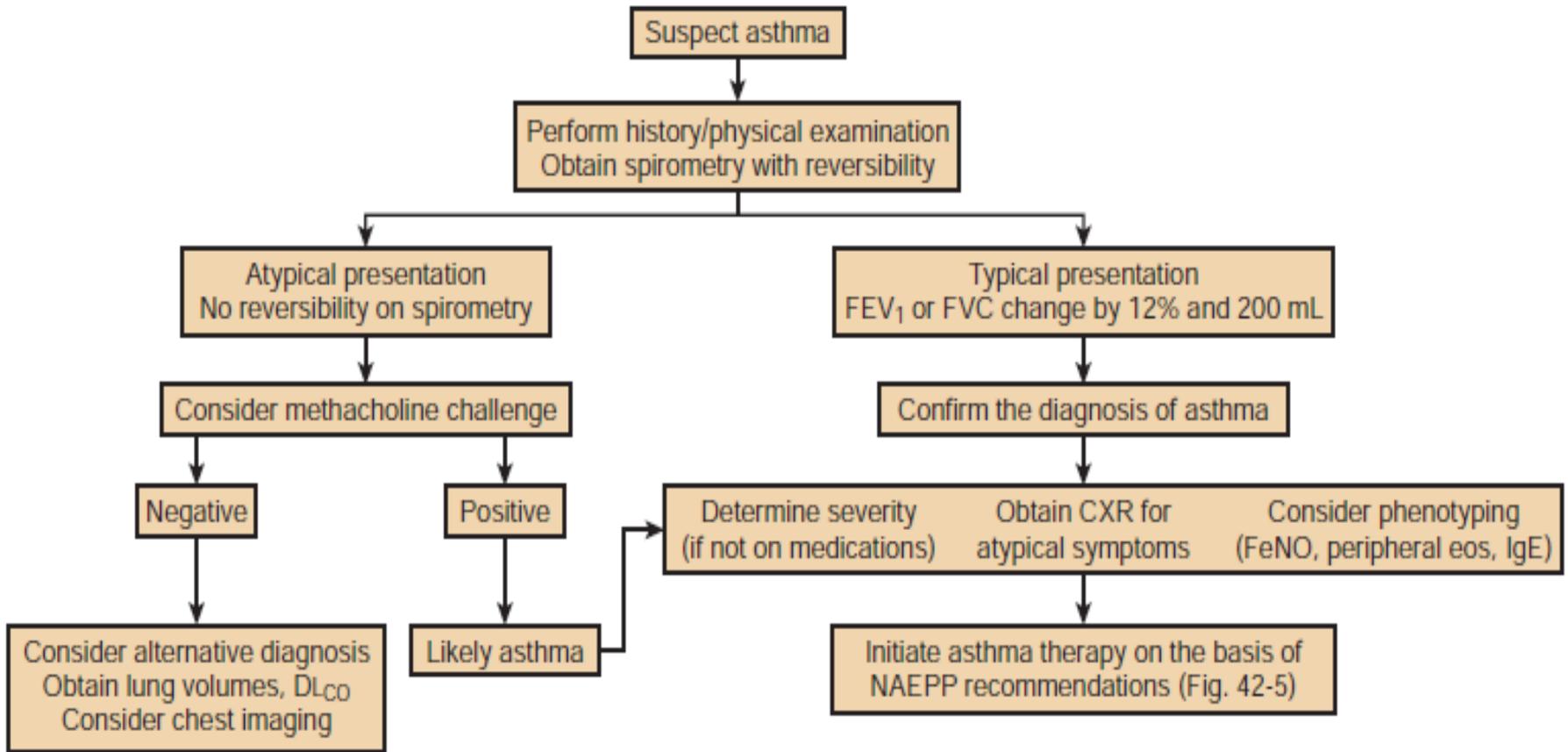
## Skin Prick Tests

- ❖ Skin prick tests (SPT) to common allergens are positive in *allergic* asthma and negative in intrinsic asthma,
- ❖ **SPT are not helpful in diagnosis.**
- ❖ Positive skin responses may be useful in persuading patients to undertake allergen avoidance measures.

# How asthma is classified

<b>Asthma Classification</b>					
	<b>Symptoms</b>		<b>≤ 5 years of age</b>	<b>&gt; 5 years of age</b>	
	<b>Daytime</b>	<b>Nighttime</b>	<b>Exercise tolerance</b>	<b>PEF or FEV1</b>	<b>PEF variability</b>
<b>Mild intermittent</b>	≤ 2 per week	≤ 2 per month	Excellent tolerance	≥ 80%	< 20%
<b>Mild persistent</b>	> 2 per week, but < 1 per day	> 2 per month	Exercise symptoms	≥ 80%	20%-30%
<b>Moderate persistent</b>	Daily symptoms	> 1 per week	Frequent exercise symptoms	60%-80%	> 30%
<b>Severe persistent</b>	Continual day symptoms	Frequent night symptoms	Exercise severely limited	≤ 60%	> 30%

# Asthma Diagnosis Algorithm



# ***Differential Diagnosis of Asthma***

# Differential Diagnosis

## Common diseases causing airflow obstruction

72

- ❖ **Chronic obstructive bronchitis and emphysema,**
- ❖ **Bronchiolitis obliterans,**
- ❖ **Cystic fibrosis,**
- ❖ **Upper airway obstruction**

**Organic or mechanical obstruction of the larynx or trachea**

**Vocal cord paralysis,**

**Arthritis of the crico-arytenoid joints,**

**Trauma,**

**Vocal cord polyps,**

**Laryngeal tumors**

- ❖ **Extrinsic or intrinsic narrowing of trachea or major bronchus.**

# Differential Diagnosis

## Common diseases causing cough

73

- ❖ **Rhinitis,**
- ❖ **Sinusitis,**
- ❖ **Otitis,**
- ❖ **Bronchitis (chronic or postviral),**
- ❖ **Bronchiectasis,**
- ❖ **Cystic fibrosis,**
- ❖ **Pneumonia,**
- ❖ **Diffuse pulmonary fibrosis**

# Differential Diagnosis

## Diseases causing recurrent episodic dyspnea

74

- **Chronic obstructive pulmonary disease,**
- **Coronary artery disease,**
- **Congestive heart failure,**
- **Pulmonary emboli,**
- **Recurrent gastroesophageal reflux with aspiration,**
- **Recurrent anaphylaxis,**
- **Systemic mastocytosis,**
- **Carcinoid syndrome**

# Differential Diagnosis

## Common diseases causing wheezing

75

- **Viral bronchiolitis** In infants under the age of 3 years
- **Wheezing, is more specific for asthma**
- **All that wheezes is not asthma**
- **wheezing can result from any cause of airflow obstruction**

# Differential Diagnosis

	≤5 years	6–11 years	12–39 years	40+ years
Recurrent viral infections	X			
Gastroesophageal reflux	X			
Congenital malformations (tracheomalacia, vascular ring etc.)	X			
Tuberculosis	X			
Protracted bacterial bronchitis	X			
Immunodeficiency	X			
PCD	X	X		
BPD	X	X		
Foreign body aspiration	X	X	X	
Congenital heart defects	X	X	X	
Cystic fibrosis	X	X	X	
Chronic cough (upper respiratory tract)		X	X	
Bronchiectasis		X	X	X
VCD			X	X
Hyperventilation			X	X
Alpha1-antitrypsin deficiency			X	X
COPD				X
Left ventricular heart failure				X
Drug-related cough				X
Parenchymatous lung disease				X
Pulmonary embolism				X
Central airway obstruction				X

# Differential Diagnosis

## Vocal cord dysfunction

77

- ❖ Vocal cord dysfunction, a **functional disorder** of the larynx that appears to be associated with **psychological** disorders
- ❖ The disorder presents with **recurrent**, episodic dyspnea, sometimes with airflow obstruction so severe that **carbon dioxide retention occurs**.
- ❖ The patients have this disorder on referral, most were overweight, had required multiple emergency department visits or hospitalizations for asthma, and were taking chronic oral corticosteroid therapy.
- ❖ Twenty-five percent had been intubated, some repeatedly.
- ❖ Stridor was reported by only 10% of the patients

# Differential Diagnosis

## Vocal cord dysfunction

78

- Sputum production was uncommon, as was blood eosinophilia.
- Between attacks, the FEV1 was normal or minimally reduced and did not improve after bronchodilator treatment;
- Analysis of the flow-volume curve was sometimes helpful, however, showing truncation of the inspiratory limb in 23%
- The diagnosis of vocal cord dysfunction requires visualization of the vocal cords.
- The diagnostic findings are inspiratory anterior vocal cord closure with airflow passing through a posterior glottic chink.
- This finding may be apparent only during attacks, whether spontaneous or provoked, as by histamine or methacholine challenge.
- Psychiatric consultation, speech therapy, and teaching techniques for relaxed throat breathing are often effective.

# Differential Diagnosis

## Disorders of mast cell

79

- **Disorders in the regulation of mast cell numbers or activity are also sometimes confused with asthma.**
- **These rare disorders include systemic mastocytosis and recurrent anaphylaxis**
- **The significance of associated symptoms of hypotension, abdominal cramping, or skin rash**
- **When these diagnoses are suspected, measurement of tryptase in a blood sample immediately after an attack may prove definitive diagnosis**

# Differential Diagnosis

## Carcinoid syndrome

80

- **Carcinoid syndrome, mediated by the release of serotonin, bradykinin, prostaglandin, and histamine from a carcinoid tumor.**
- **High urinary levels of serotonin's major metabolite, 5-hydroxyindoleacetic acid, strongly suggest the diagnosis.**

# Differential Diagnosis

## PIE syndrome

81

**The finding of parenchymal pulmonary infiltrates  
on chest radiographs  
in a wheezing patient  
with peripheral blood eosinophilia**

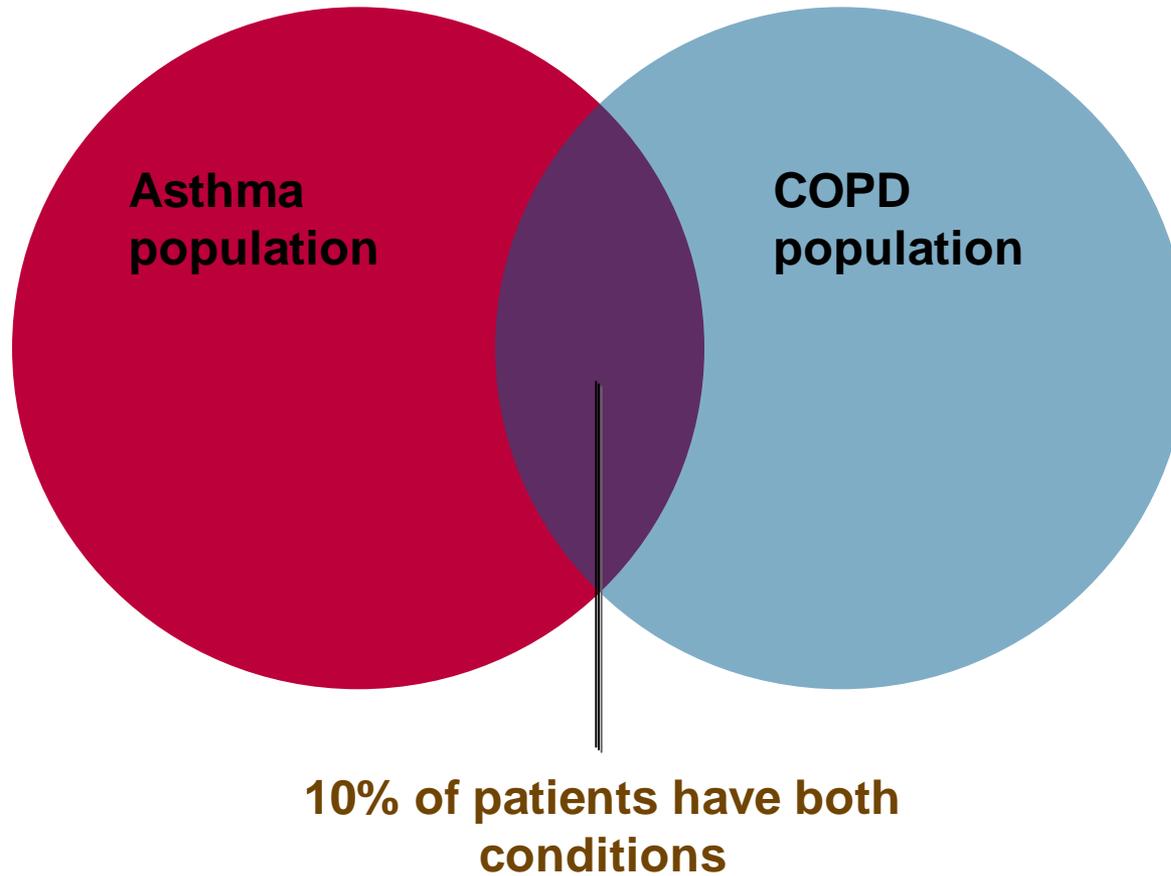
**Parasitic infection,**

**Allergic bronchopulmonary mycosis,**

**Bronchocentric granulomatosis,**

**Pulmonary vasculitides.**

# Asthma – COPD overlap



# Asthma – COPD overlap

83

- **Now recommended by GINA and GOLD to describe patients who have features of both asthma and COPD .**
- **Asthma – COPD overlap does not refer to a single disease entity , but, as for asthma and COPD , it likely includes several different phenotypes caused by different underlying mechanisms.**
- **Asthma – COPD overlap syndrome or ACOS , is not longer advised.**

الهي عاقبت محمودگردان به حق صالحان ونيك مردان

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