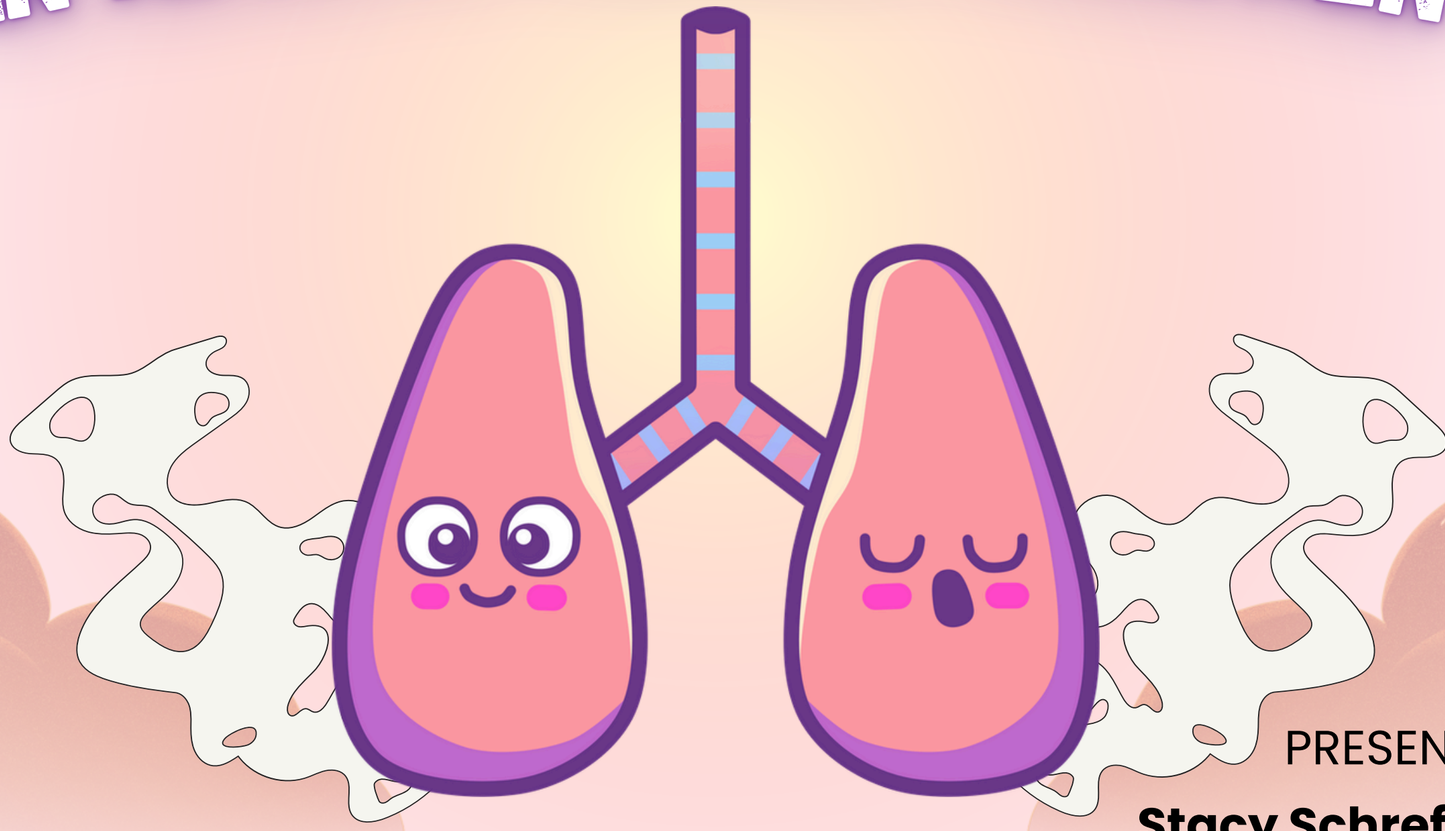
ASTHMA

IN ADULTS VERSUS CHILDREN



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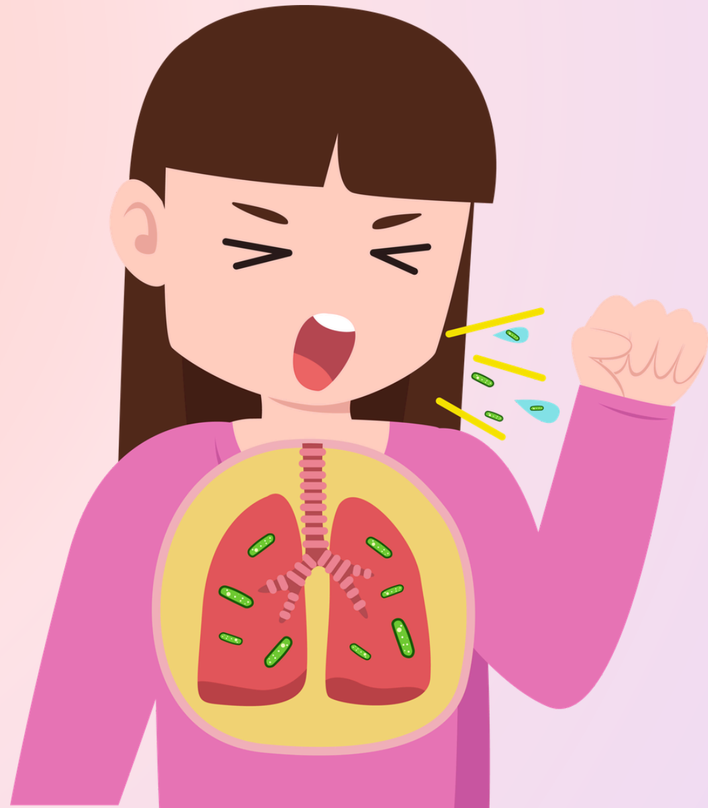
Asthma:

A heterogenous disease characterized by chronic airway inflammation, and associated with intermittent airflow obstruction, and airway hyperresponsiveness.

Defined by a history of:

- **Wheeze**
- **SOB**
- **Chest Tightness**
- **Cough**



Source: Global Initiative For Asthma Management and Prevention-GINA 2026

FACTS SURROUNDING ASTHMA

Over 28 million people in the U.S. have asthma

2008-2013, the annual economic cost of asthma was more than $81.9 billion

Lower socioeconomic groups have higher incidence of asthma

- In adults, more common in women than men
- In children, more common in boys than girls

CDC: From 2001-2020 Asthma attacks in both adults and children have declined

Source: Asthma and Allergy Foundation . aafa.org

Common Triggers:

Allergens

Exercise

Cold Air

Irritants

NSAIDs

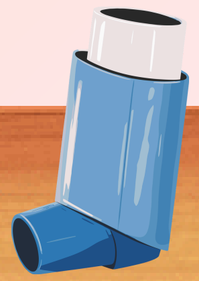
Stress

ASTHMA CHARACTERISTICS

- Episodic symptoms of airflow obstruction are present
- Airflow obstruction or symptoms are at least partially reversible.
  - ***Adults FEV1> 12% and >200ml***
  - ***Children: FEV1>12%***
- Exclusion of alternative diagnoses

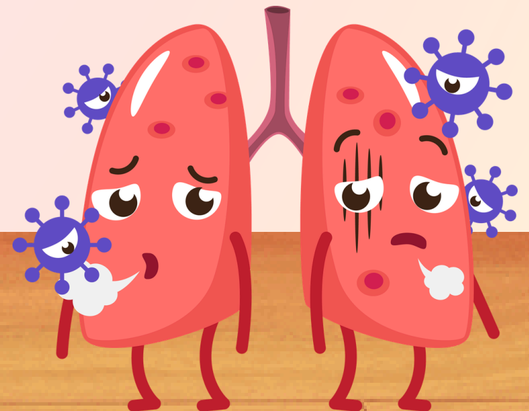
“10-25% of new onset adult asthma are attributable to work related exposure”

Mosnaim, Giselle. "Asthma in Adults." N Engl J Med 389 (2023): 1023-31.



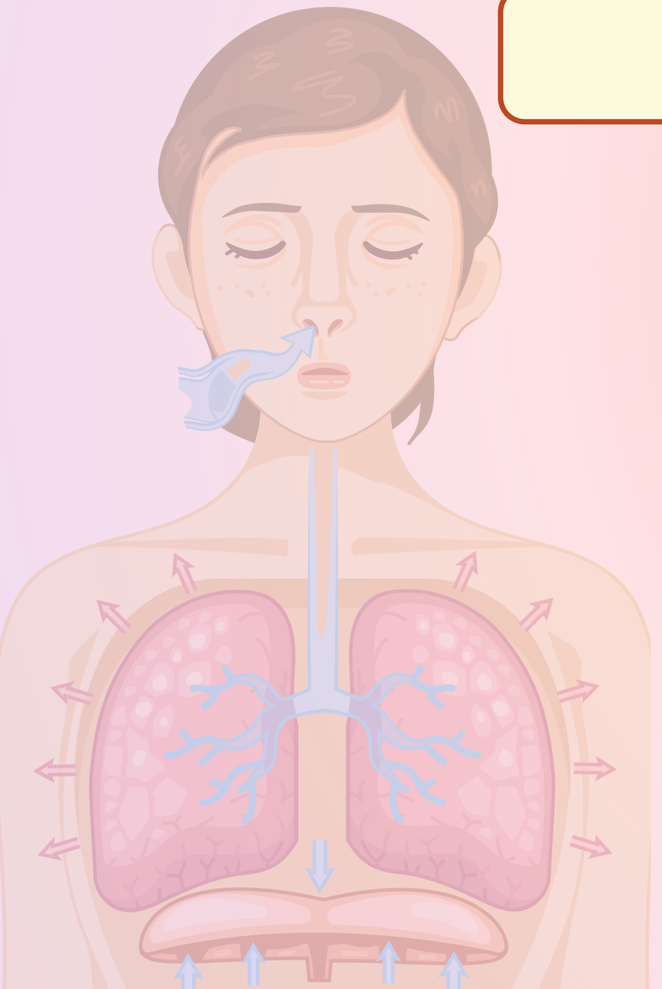
Phenotypes

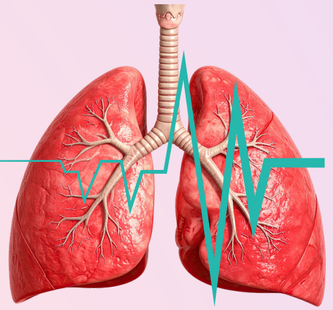
- **Allergic Asthma** ***(Typically responds well to ICS)***
- **Non-allergic Asthma**
- **Cough Variant/Cough Predominant Asthma**
- **Adult Onset** ***(Could this be Occupational?)***
- **Asthma with persistent airflow limitation** ***(Airway remodeling)***
- **Asthma with Obesity**



Source: GINA 2026

PATHOPHYSIOLOGY





Airway Inflammation

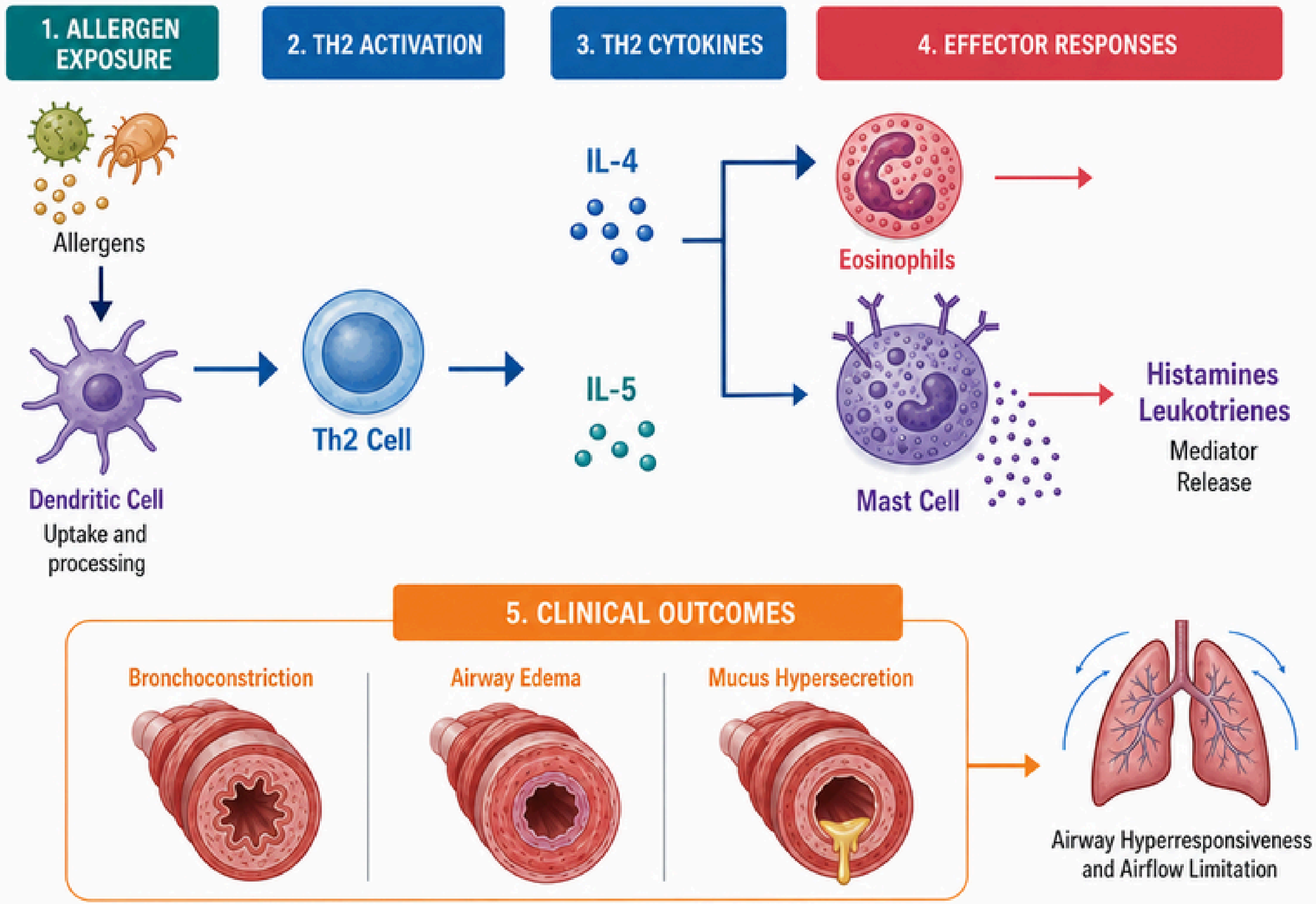
Intermittent Airflow Obstruction

Bronchial Hyperresponsiveness

ASTHMA PATHOPHYSIOLOGY

Type 2 (Th2)-mediated airway inflammation and hyperresponsiveness

Airway Inflammation

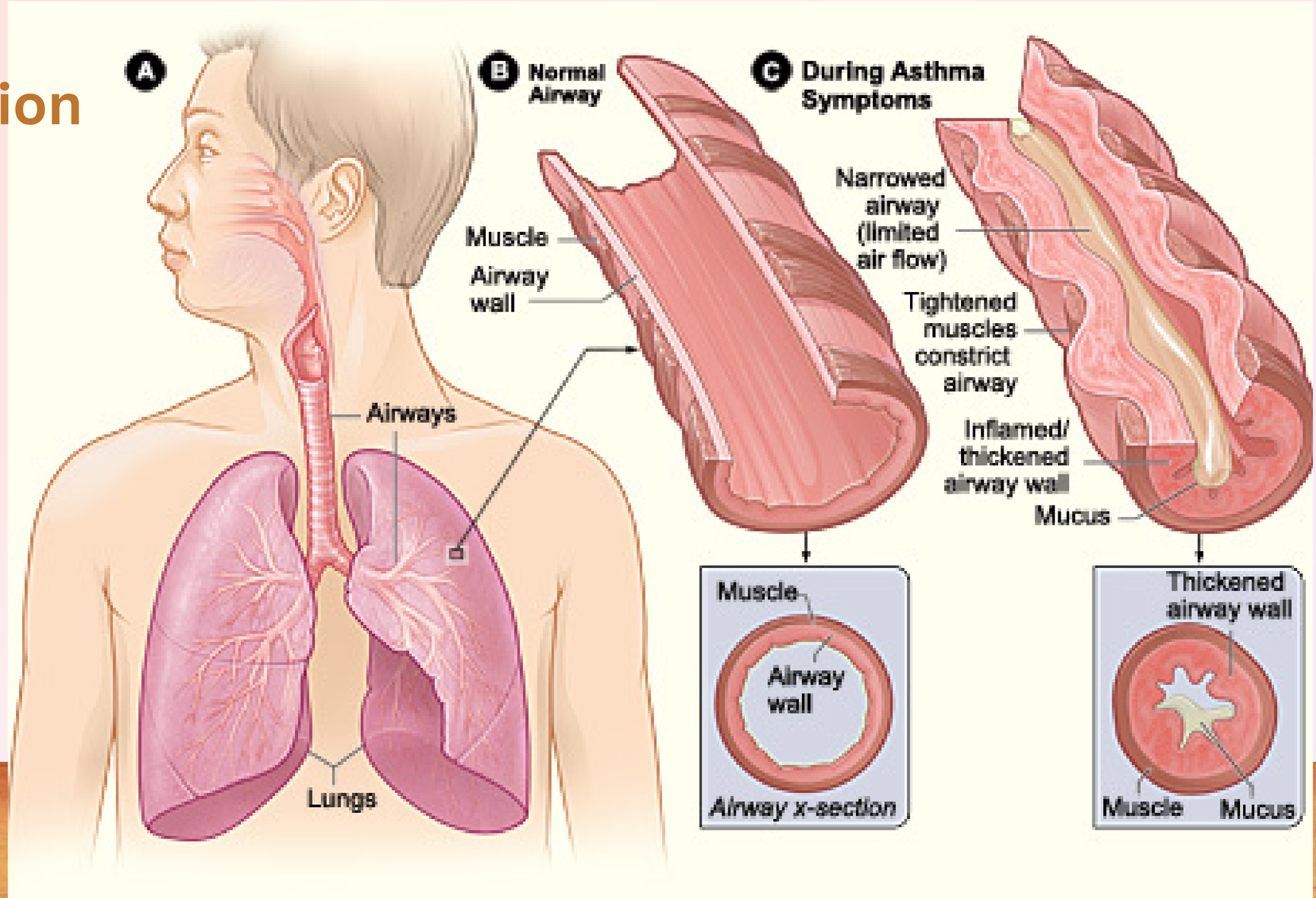


Airway Hyperresponsiveness

1)Bronchoconstriction

2)Airway Edema

3)Mucus Hypersecretion

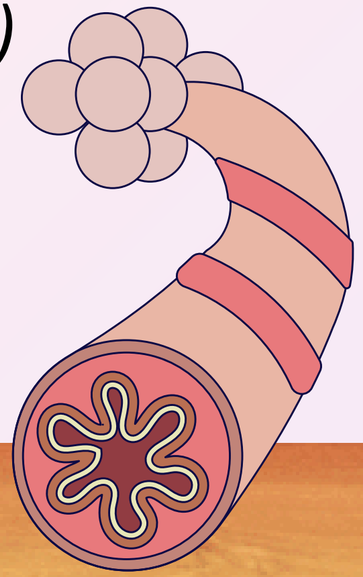


Intermittent Airflow Obstruction

Repeated inflammation leads to airway remodeling:

- *Smooth muscle hypertrophy*
- *Subepithelial fibrosis/Thickened basement membrane*
- *Increased mucus glands (Goblet cell metaplasia)*

-These structural changes make obstruction less reversible



Childhood Asthma Risk Factors:

Genetics:

- *Family history*

Environmental Perinatal Risk Factors:

- *Maternal smoking*
- *Preeclampsia*
- *C-section*

Natal Risk Factors:

- *Preterm birth (23-27 weeks)*
- *C-section*
- *Low Birth Weight*

Medical History:

- *Presence of Atopy*

Allergen Sensitization

- *Dust*
- *Mold*
- *Cockroach*

Hospitalization in children<6 mo is associated with a 3X greater chance of developing asthma

Diagnosing Asthma in Children<5 years

- **No Gold Standard Test**
- **Diagnosis based on symptom patterns (*cough, wheeze, nighttime flare ups)***
- **Spirometry not reliable in children younger than 5.**
- **Family history should be taken into account.**

“Misdiagnosis of asthma remains a major problem with rates of both underdiagnosis and overdiagnosis being high. Overdiagnosis is problematic as it exposes children to unnecessary side effects of medications and runs the risk of trivialising asthma”

Martin J, Townshend J, Brodlie M. Diagnosis and management of asthma in children. BMJ Paediatr Open. 2022

Diagnosing Asthma in Children>5 years

- The Global Initiative for Asthma (GINA) specifically recommends either PEF or spirometry in the diagnosis of asthma in children over 5 years.
- Spirometry findings:
  - ↓ FEV_1, ↓ FEV_1/FVC
  - Reversibility after bronchodilator

DIAGNOSING ADULTS

- *Imaging: **Not required for diagnosing but to rule out alternative diagnosis*

- *Allergy Testing: Differentiates between allergic and non-allergic forms.*
  - *Skin Prick*
  - *IgE levels*

- *Spirometry:*
  - *FEV1*
  - *FVC*
  - *FEV1/FVC ratio*
  - *FEF 25-75%*

- *PEF: Used when spirometry testing is not available. PEF > 20% response to BD*

- *Methacholine Challenge: Used to confirm airway hypperesponsiveness when spirometry alone is inconclusive.*

DIAGNOSING ASTHMA

- *Imaging: **Not required for diagnosing but to rule out alternative diagnosis*
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DIAGNOSING ASTHMA

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- *Methacholine Challenge: Used to confirm airway hypperesponsiveness when spirometry alone is inconclusive.*

- *Exhaled Nitric Oxide: Complementary test to spirometry to support allergic asthma phenotype.*
  - *Adults-: FeNO >50ppb*
  - *Children: FeNO>35ppb*

PHARMACOLOGICAL MANAGEMENT

	Recommendation
Inhaled Coricosteroid (ICS	*Budesonide/Fluticasone/Beclomethasone*
Short acting Beta Agonists (SABA)	*Albuterol/Levalbuterol*
Long acting Beta Agonists (LABA) + ICS	*Breo/Symbicort/Advair*
Long acting Muscarinic Agents (LAMA) Adults>18 and adolescents >12 yrs	*Tiotroprium Bromide/Spiriva*
Oral Corticosteroids	*Prednisone (5-7 days during exacerbations)*

PHARMACOLOGICAL MANAGEMENT (BIOLOGICS)

Drug	Recommendation
Dupixent	For patients who rely heavily on oral steroids. Given as injection every 2 weeks. Patients 6 yrs and older
Xolair	For severe uncontrolled allergic asthma. Given as injection every 2-4 weeks. Patients 6 yrs and older
Tezaspire	Approved to treat all types of severe asthma. Given as injection every 4 weeks. Patients 12 years and older
Nucala	Treats severe eosinophilic asthma. Given as an injection every 4 weeks. Patients 12 years and older
Fasenra	Treats severe eosinophilic asthma. Given as an injection every 4 weeks for the first three doses, then every 8 weeks.

NON PHARMACOLOGICAL MANAGEMENT

- Avoid environmental triggers
- Weight Management
- Vaccinations
- Avoidance of occupational triggers

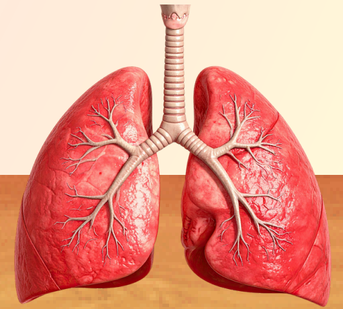
Controlled versus Uncontrolled

- Incorrect Inhaler Technique
- Poor adherence to therapy
- Persistent environmental factors
- Additional comorbidities making management more difficult

RT ROLES IN ADULT EDUCATION

- Address comorbidities that worsen asthma control
- Encourage adherence and self-monitoring strategies
- Review inhaler technique
- Controller vs. rescue medication differences
- Discuss occupational exposures/ environmental triggers
- Peak flow monitoring and action plan zones

- When to escalate care or call EMS



RT ROLES IN PEDIATRIC EDUCATION

- Teach parents how to recognize early signs of distress
- Reinforce trigger avoidance
- Open communication with teachers and school nurse
- Controller vs. rescue medication differences
- Demonstrate spacer use, mask fit, and cleaning

INHALER DEVICE BY AGE

Age	Device Recommendations
0-3	MDI + Spacer + Face mask Nebulizer Mask for acute exacerbations
4-5	MDI + Spacer + Mouthpiece (if lip seal is acceptable) Add face mask if lip seal inadequate Nebulizer for acute exacerbations
6-11	MDI + Spacer + Mouthpiece (Preferred) DPI if inspiratory flow > 30
Greater than 12 years	Any device (match to preference and technique)

CONCLUSIONS

Pediatric asthma is predominantly atopic and viral-triggered

Adult asthmatics show more diverse phenotypes

Early recognition of poor control prevents long-term airway remodeling

Education and a strong action plan are key for positive outcomes and reduction of exacerbations in asthmatics of all ages

RTs are essential in assessment, education, and monitoring.

CITATIONS

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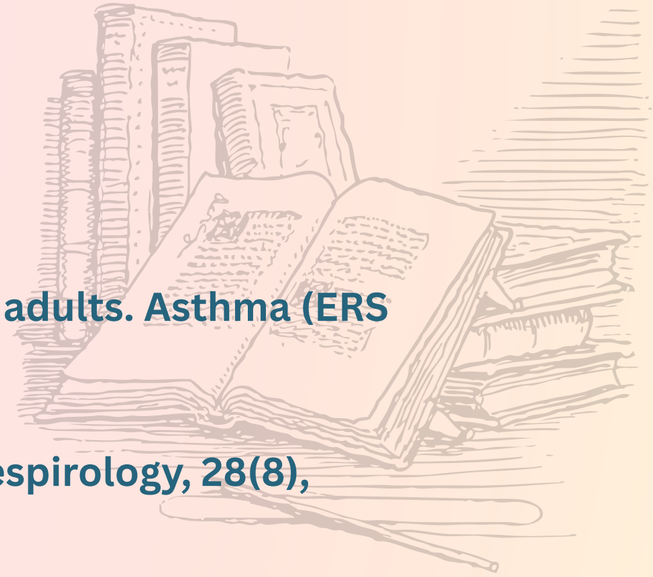

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THANK YOU

Q AND A SESSION