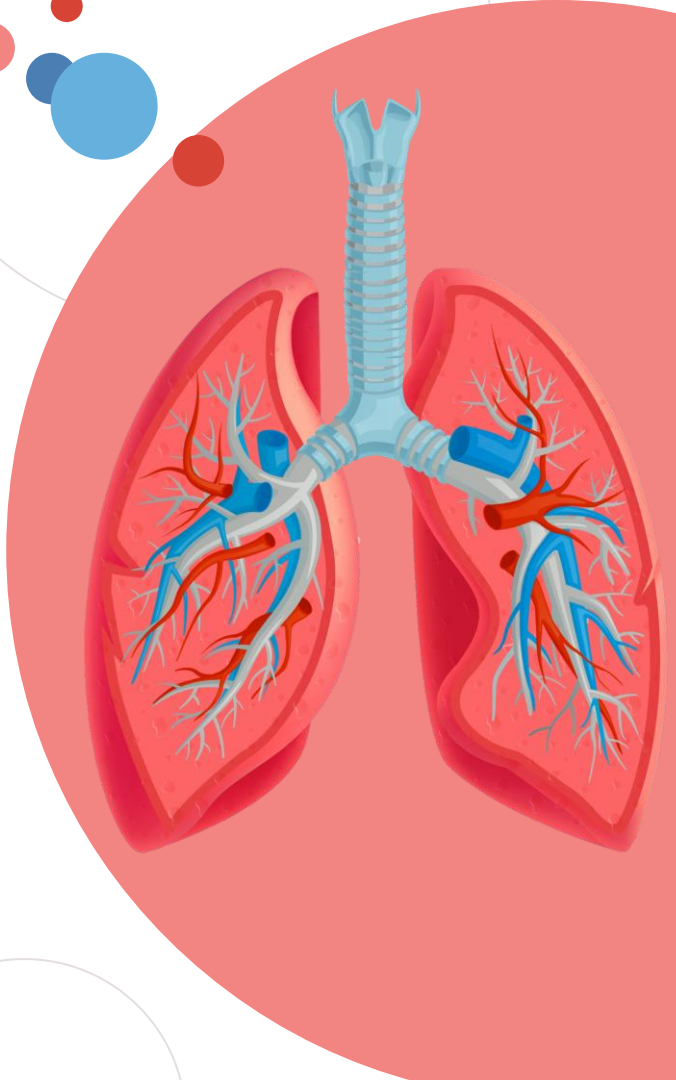
2024 Undergraduate Scholarly Showcase

Olivia Spencer

Mechanisms of Allergic Asthma Diagnosis, Treatment, and Prevention

Lewkowich Laboratory
Cincinnati Children's Hospital Medical Center
Department of Immunobiology
Mentored by Dr. Jaclyn McAlees



Relevance

Asthma disproportionately impacts:

- Women
- Children
- People of color

Economic impact:

- Millions of missed work and school days
- Major cause of ER visits around the country
- Billions of dollars/ year in total economic cost in the US

Asthma and Lung Association. *Asthma trends and burden*. American Lung Association. https://www.lung.org/research/trends-in-lung-disease/asthma-trends-brief/trends-and-burden

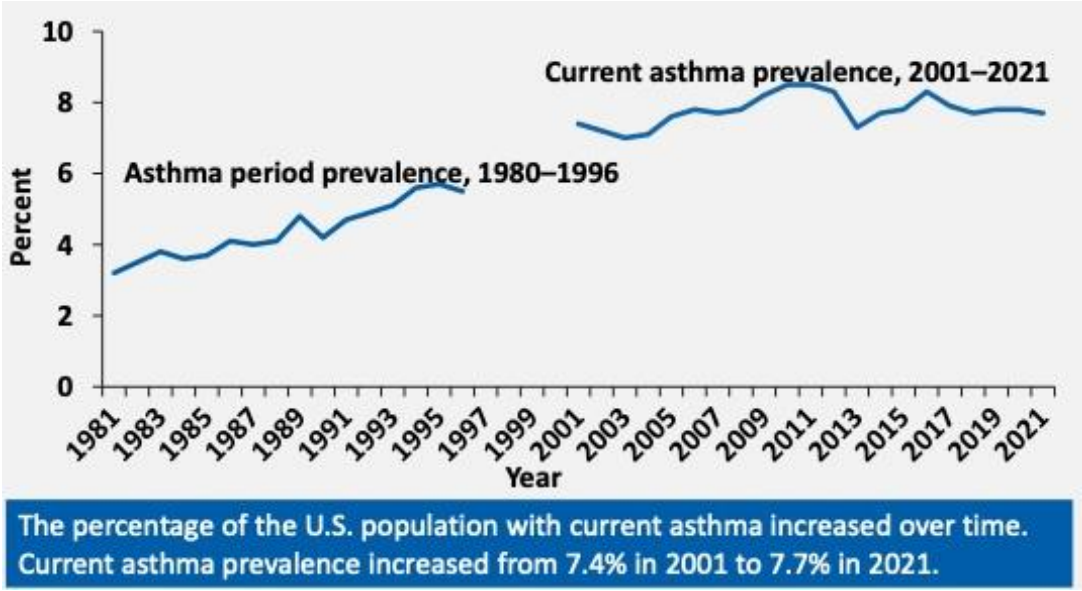
Abundance

Rate is rising too quickly to be driven by genetics alone

- Suggests environmental impact on development

Number of people with asthma increases with industrialization

- Disproportionately impacting developed countries



The percentage of the U.S. population with current asthma increased over time. Current asthma prevalence increased from 7.4% in 2001 to 7.7% in 2021.

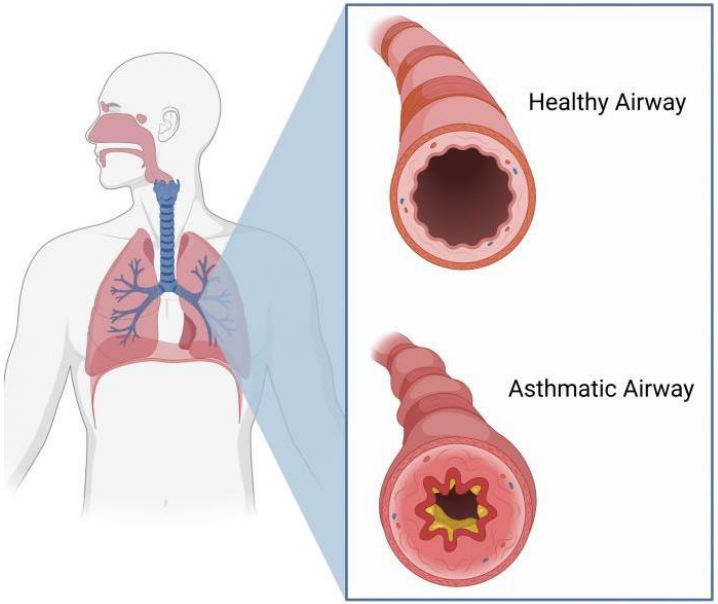
Centers for Disease Control, National Center for Health Statistics, National Health Interview Survey (NHIS). National Surveillance of Asthma: United States, 2001-2021

Physiology

Healthy Airway:
- Open and expanded
- Moderate mucus
- Responsive to stimulants

Asthmatic Airway:
- Hyperresponsiveness
- Inflammation
- Smooth muscle contraction

Symptoms include:
- Chest tightness
- Difficulty breathing
- Persistent coughing



Objectives

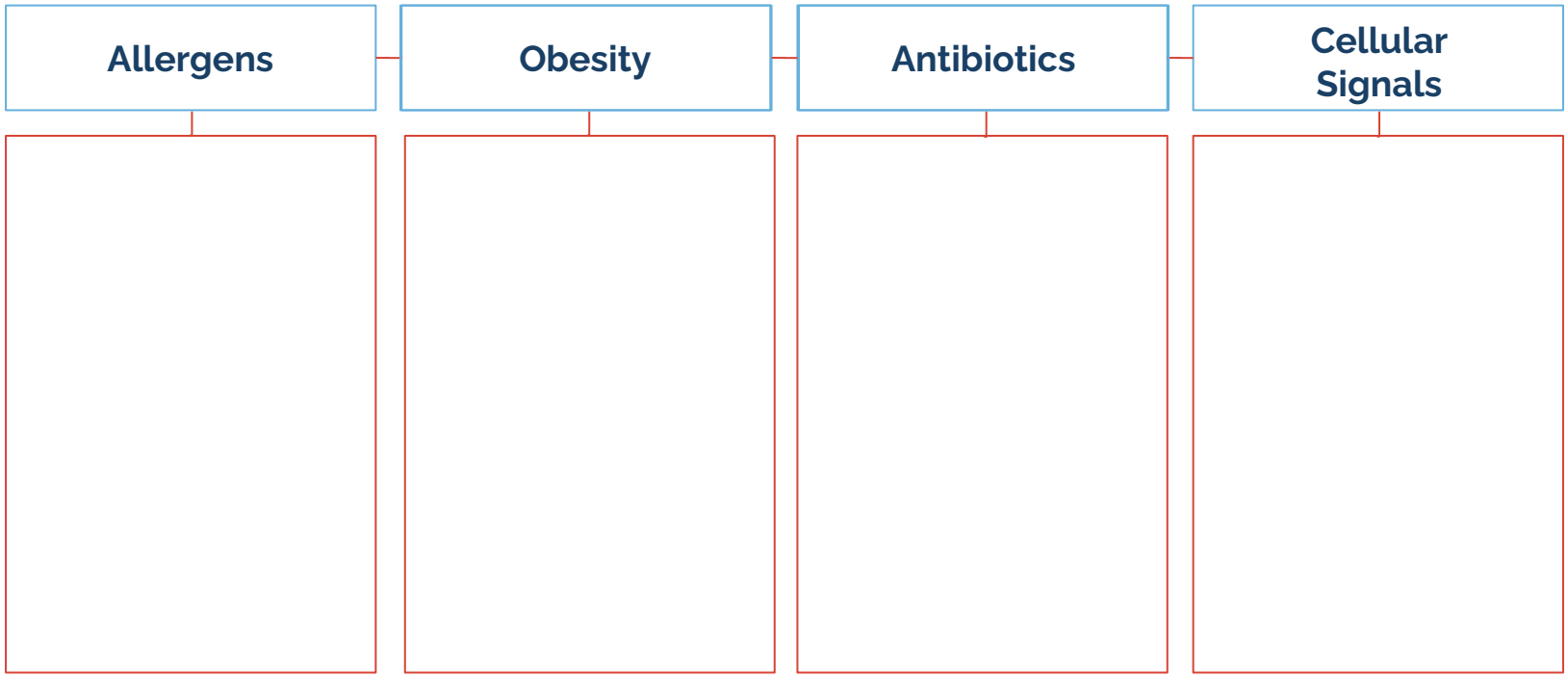
Currently, there is no:

- Universal diagnosis
- Specific treatment
- Cure
- Prevention

Our goal is to understand the underlying physiological mechanism of allergic asthma in diagnosis, treatment, and prevention by:

- Identify specific cellular targets that trigger asthma
- Predict environmental susceptibilities to allergic asthma

Project Overview



Project Overview

Allergens	Obesity	Antibiotics	Cellular Signals
Airway and skin exposure to allergens: • House Dust Mite allergen • Normal vs asthmatic • Parental exposure to allergen			

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Acknowledgements

Meet the Lewkowich Lab

Ian Lewkowich

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Angela Cannata

Julie Hargis

Mousey

Alton Headworth

Jackie McAlees

Archana Shankar

Olivia Spencer

Citations

PowerPoint Template:

Pulmonary hypertension presentation. Slidesgo. (n.d.). https://slidesgo.com/theme/pulmonary-hypertension#search-lungs&position-21&results-99&rs=search&rs=search

Research:

Asthma and Lung Association. *Asthma trends and burden.* American Lung Association. https://www.lung.org/research/trends-in-lung-disease/asthma-trends-brief/trends-and-burden

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