

Presenter



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Making the Connection: Climate Changes Allergies and Asthma

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Presenter Disclosures

Mona Sarfaty

- (1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:**

No financial relationships to disclose

Outline

- ❑ Significance of allergic and asthmatic disease
 - Prevalence
 - Symptoms
 - Cost – human and dollar
- ❑ How the changing climate is affecting allergy season and asthma
- ❑ What we learned by surveying physicians
- ❑ Health equity factors
- ❑ Public health approach to these problems

Introduction

- ❑ Allergies are a common cause of misery for many people
- ❑ Allergic runny nose (“hayfever” or “allergic rhinitis”) is the most widespread allergy condition
 - Symptoms: sneezing, nasal stuffiness (obstruction), itching, post nasal drip, cough, irritability, fatigue
 - Effects 10-30% of the population
 - 11 million office visits per year
 - It costs @\$11.2 billion / year to treat

Allergic Rhinitis (Hayfever) Can Drain Human Potential

- ❑ Associated with more absenteeism and more unproductive workdays for adults than any other condition
- ❑ Associated with cognitive and psychiatric issues in children and adults
- ❑ Children: may have lower exam scores, poor concentration, low self-esteem, impaired athletic performance
- ❑ Adults: may have depression, anxiety, lower quality of life scores

Allergies are Changing due to Climate Change

- ❑ Allergic rhinitis has 2 peaks per year: Spring and Fall
 - Both are coming earlier
- ❑ The allergy season is longer
- ❑ Geographic growth region for some allergies is growing
- ❑ Allergy season is more intense

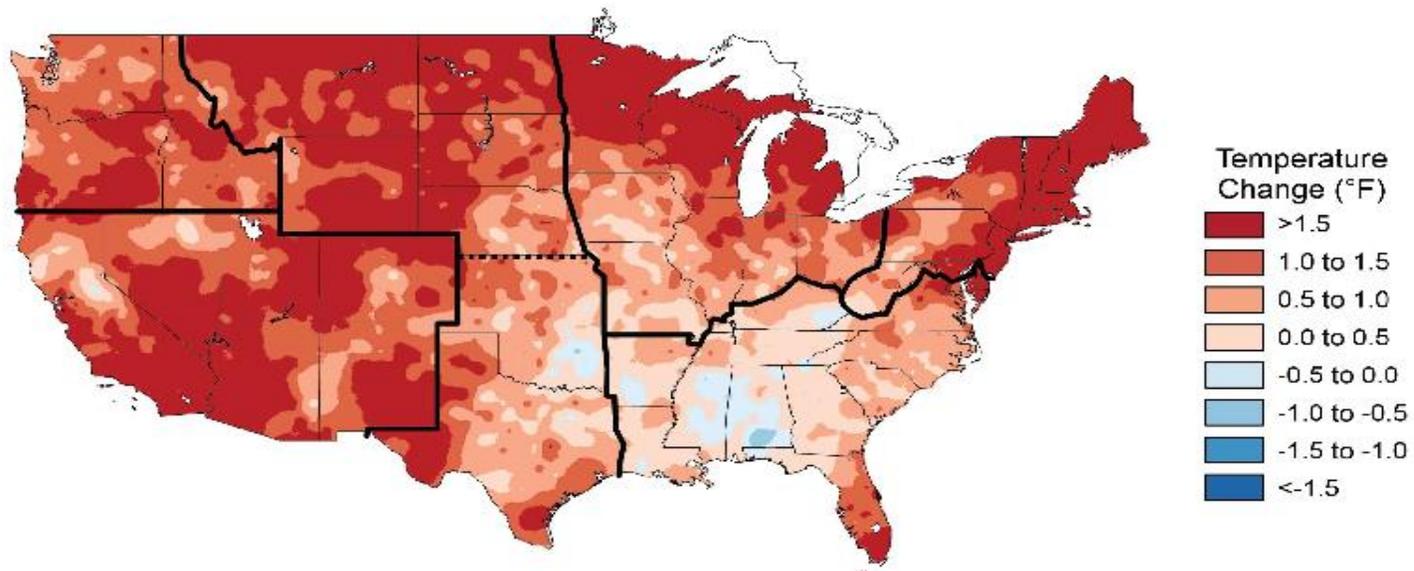
Common complaint: *“allergy season is worse than last year”*

Why is Allergy Season Longer and More Intense?

- ❑ Average temperatures are higher
- ❑ Precipitation is greater in many places
- ❑ More carbon dioxide
- ❑ These climate change related factors affect plants in several ways:
 - Some plants have spread into new areas
 - Pollen season begins earlier and lasts longer
 - Existing plants may be more robust or grow better or produce more pollen
 - The inciting agent, typically the pollen, is actually different

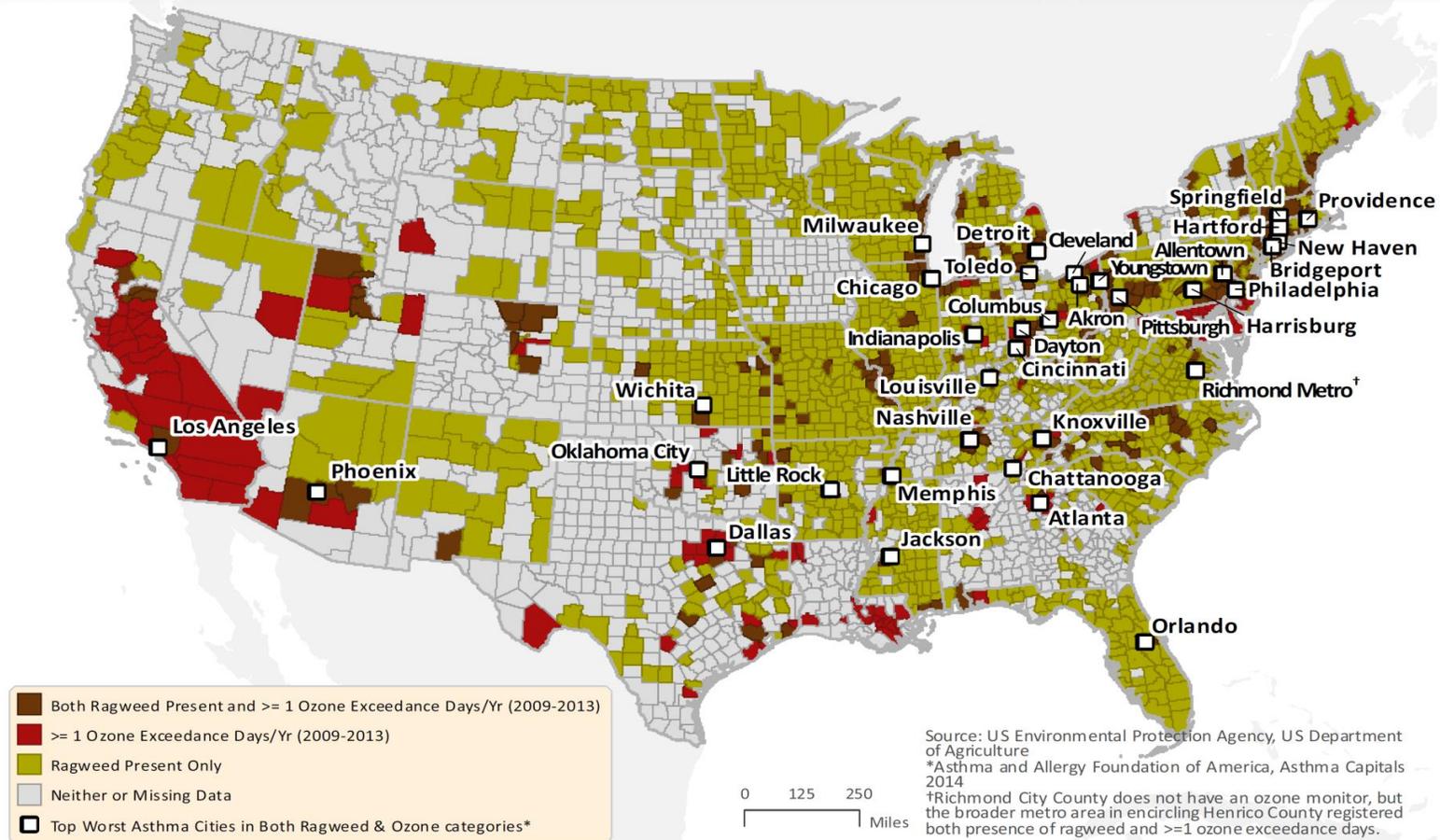
Comparing 1991-2012 with 1900-1961

Observed U.S. Temperature Change

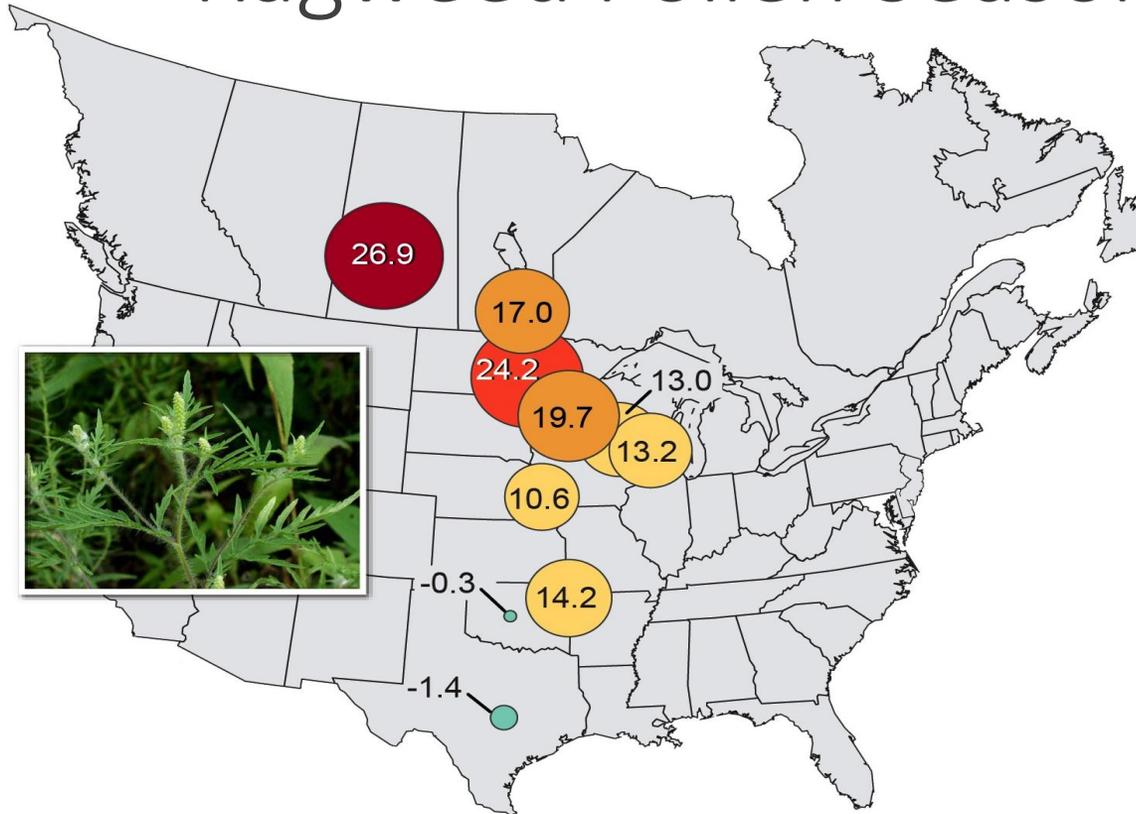


Geographic Vulnerability

Figure 1. Intersection of Ragweed-Positive and Eight-Hour Ozone Exceedance-Positive Areas in the Continental United States



Ragweed Pollen Season Lengthens



Map shows for how long ragweed pollen season has changed from 1995 to 2005. Many people are allergic to Ragweed.

Change in Ragweed Season Length (Days)



<http://www.ars.usda.gov/> &
U.S. National Climate Assessment

Why are Allergy Seasons More Intense?

- ❑ Study of ragweed pollen showed it is more allergenic due to the carbon dioxide enriched atmosphere (L Zizka, PhD)
 - How did they determine this:
 - Carbon dioxide level is not exactly the same in every part of the U.S.
 - Ragweed was grown in different places where carbon dioxide differed
 - Pollen analyzed and found to have different amounts of the allergenic component
- ❑ More pollen production where higher levels of carbon dioxide
- ❑ Greater mold growth in some areas (just mentioned)
- ❑ Deteriorating air quality

Another Factor Causing Allergic Reactions is Mold

- ❑ Mold growth (& spore production) associated with:
 - Increases in precipitation
 - Flooding and recurrent flooding
 - Increases in temperature and/or humidity
 - Plant decay (leaf litter)
 - Improper installation or management of air conditioning

- ❑ Mold allergy can cause coughing, wheezing, nasal & throat conditions, and adversely affect persons with asthma or weakened immune systems

Extensive Mold Contamination of Ceiling and Walls



(Source Terry Brennan,
<http://www.epa.gov/mold/moldcourse/imagegallery5.html>)

Allergic Rhinitis Is Associated with Other Health Conditions

- ❑ Red itchy eyes (conjunctivitis)
- ❑ Eczema, itchy rashes affecting the skin
- ❑ Worsening of asthma
 - Asthma affects 24 million people
 - Close relationship between asthma and allergies
 - 60% Pediatric Asthma is allergy related
 - 40% Adult Asthma is allergy related





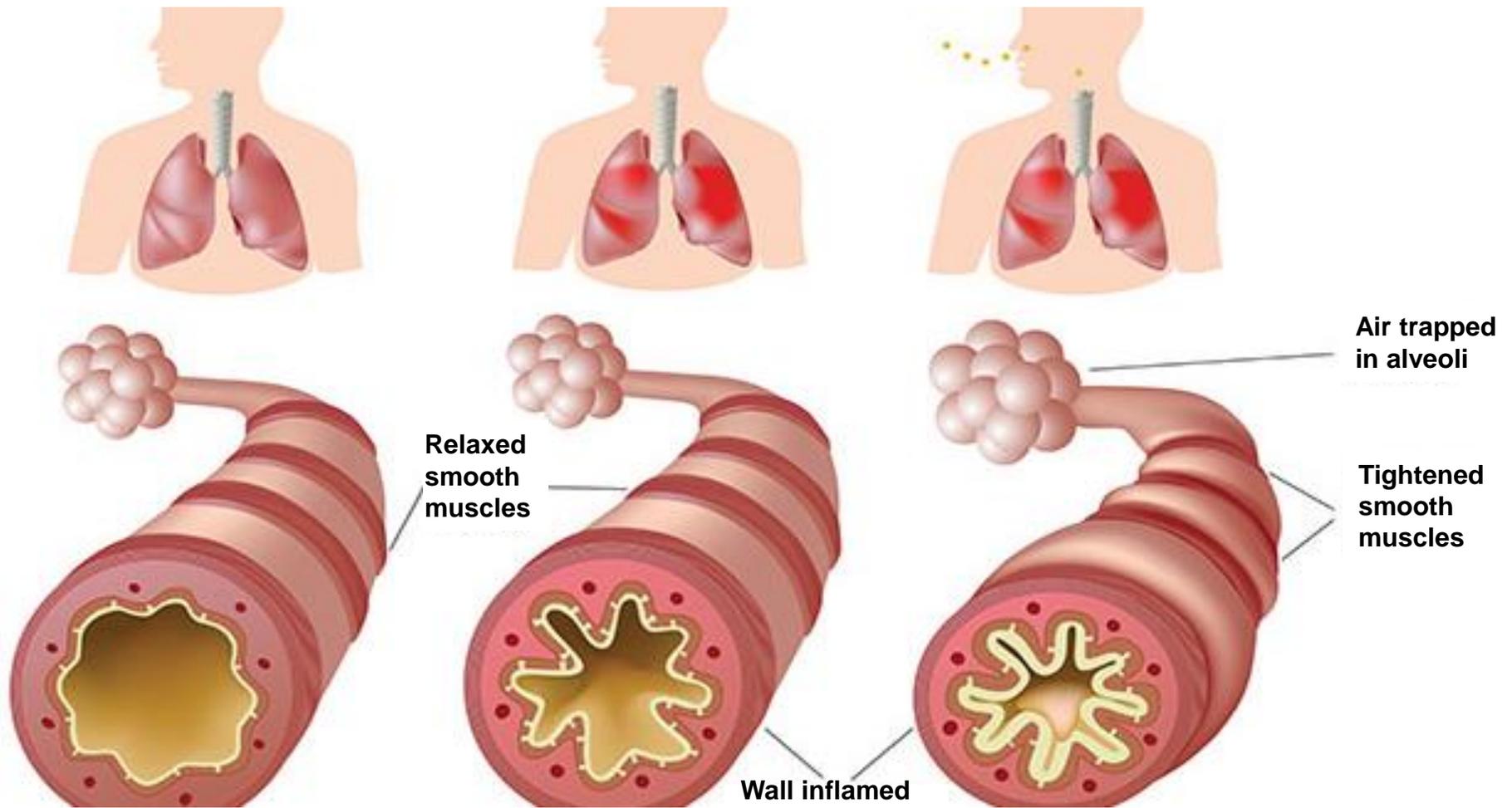
Asthma



- ❑ The most common chronic disease of childhood but affects more adults than children
 - 7% of adults or 17.7 million have asthma (NHIS, 2014)
 - 8.6% of children or 6.3 million (NHIS, 2014), but 20% of children in many urban school systems
- ❑ Characterized by repeated episodes of coughing, wheezing, chest tightness, breathlessness
- ❑ Almost 2 million ED visits, .5 million hospitalizations, 3,630 deaths
- ❑ Cost \$56 billion per year (\$50 billion is direct) (2007)
 - 60% of children and 33% adults with an asthma attack miss school or work

Health Equity Concerns

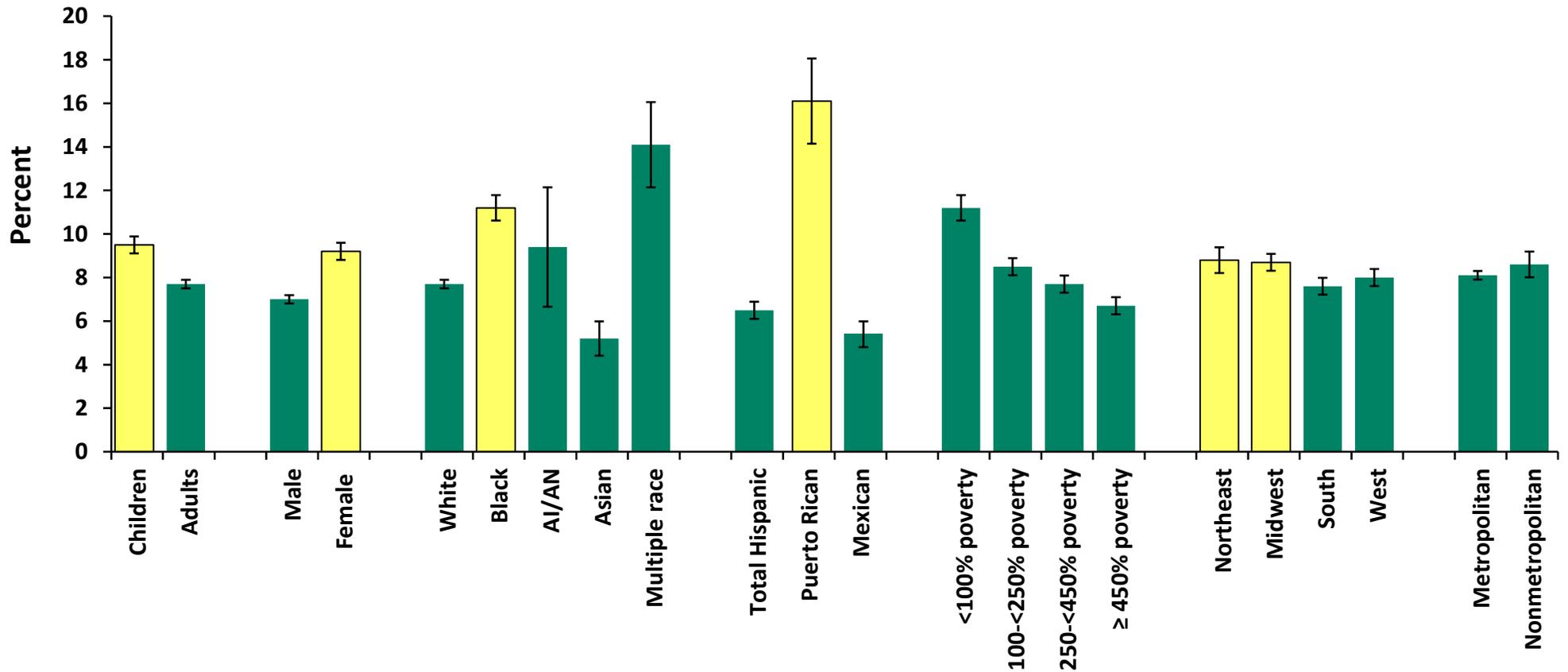
- ❑ Asthma is affected by a number of factors that are a problem for some populations more than others
- ❑ Especially factors that contribute to poorer quality environments:
 1. Outdoor air – ozone, particulates including dust, effluents from incinerators, smokestacks, and businesses that use certain chemicals
 2. Indoor air exposures in housing, school, work environments (mold, dust, insect danders)
- ❑ Due to connection what affects allergies, affects asthma



Pathogenesis: Ozone irritates the lungs and makes people more vulnerable to the effects of small particles and allergens.*

(*Rom WN, et al. Global Warming: A Challenge to all American Thoracic Society Members. Am J Respir Crit Care Med 2008; Vol 177: 1053-1057.)

Current Asthma Prevalence by Age Group, Sex, Race and Ethnicity, Poverty Status, Geographic Region, and Urbanicity: United States, Average Annual 2008-2010 (CDC)



What We Have Learned From Surveying Doctors?

- ❑ Program on Climate and Health, GMU, did 3 Surveys of medical societies representing a. lung specialists (ATS) b. allergists (AAAAI) c. African American physicians (NMA).
- ❑ 76% of physicians in 3 surveys indicated their own patients were experiencing air pollution related worsening of cardiorespiratory disease (including asthma); 63% indicated that climate change was causing their own patients to have more allergy symptoms and visits.
- ❑ We asked for anecdotes describing their patient experiences.

Allergies and Asthma

I have more patients with asthma and allergies coming in with flares earlier and earlier in the year because pollen is produced earlier and earlier. (Tennessee)

Asthma triggered by seasonal allergies which have been getting worse over the past 5 years, with longer pollen periods due to warmer weather. (Nevada)

We all see each year the pollen counts breaking new records which directly impacts our allergic rhinitis and asthmatic patients. (North Carolina)

With the current fluctuations in weather, we have seen quite a few asthma exacerbations. People are used to having the weather be one way so they can predict when they may have trouble with their illness, but now they are finding it more difficult to do so. (Ohio)

Mold Allergies

[I have seen] Numerous patients with fall mold allergies whose symptoms now last well into December since the ground takes longer to freeze. (Michigan)

Mother and daughter who lived in a moldy house presented with asthmatic symptoms that were refractory to treatment until they were moved to a different environment. (Ohio)

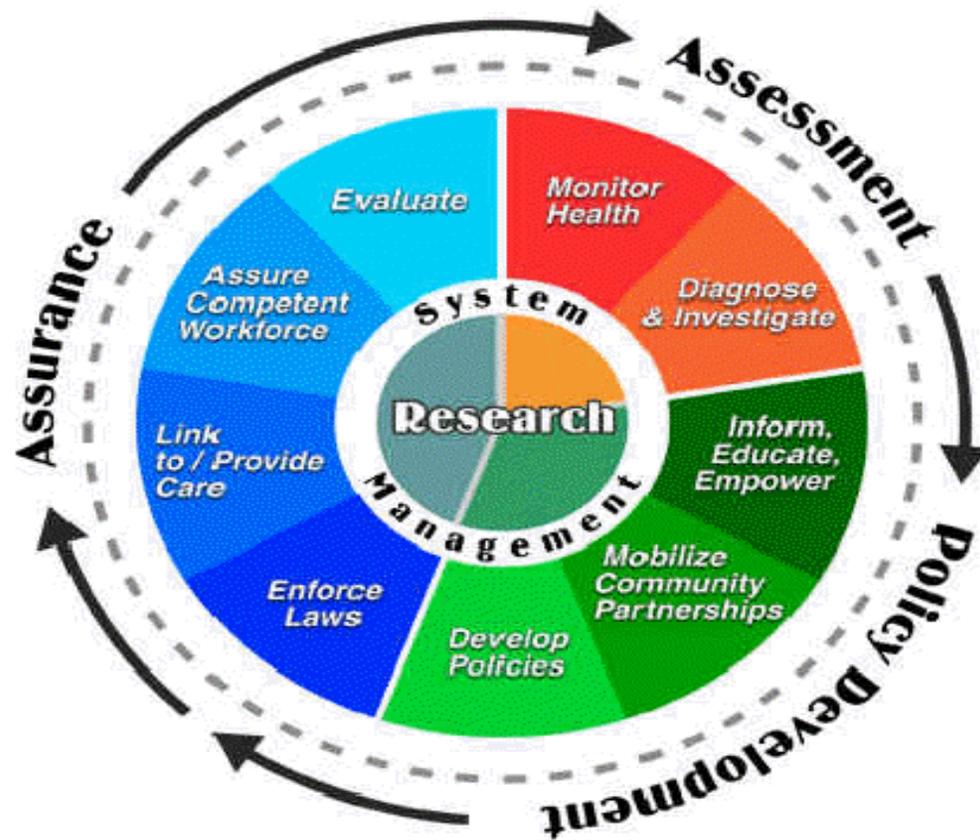
Recent rainfall and flooding increased patient in-home exposure to mold and humidity, (this) resulted in asthma emergency visits and hospitalizations.(Unk)

Vulnerability: Multiple Threats

“...children with asthma with more frequent symptoms, exacerbations due to poor air quality; [air] inversions, high allergen counts, rental living accommodations with visual mold, living in areas with high winds, fires.”

(Lung Specialist, Washington state)

Public Health Approach



Conclusion

- ❑ Allergy problems are common and occurring for longer seasons and at greater intensity due to conditions caused by climate change, including longer pollen seasons, higher carbon dioxide levels, and factors that support mold growth
- ❑ There is a substantial connection between allergies and asthma
- ❑ The risk factors for allergies and asthma are more severe in vulnerable communities where conditions for good health may be compromised and where environmental injustice has been at work
- ❑ Observations from surveyed physicians
- ❑ Public health approach can help address allergies and asthma

References

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Thank You!

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