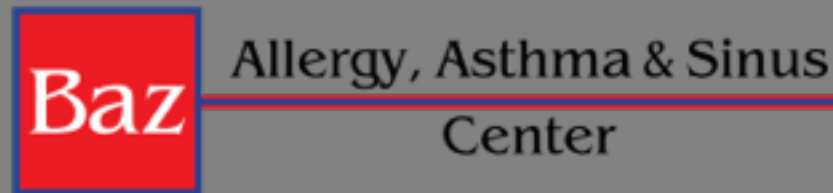


Asthma, Allergies, Air quality, and Climate change



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Disclosures

Speakers Bureau- TEVA , MYLAN

Objectives

Understand Asthma and Allergies

Identify Impacts of Climate change and co-pollutants on respiratory disease

Utilize Application in clinical care;

Assessing individual climate change vulnerability;

Physician role in advocacy e.g. Clean Power Plan, SB32/
SB350

Introduction

Current estimates suggest that as many as 300 million people worldwide have asthma and atopy.

- In the United States about 22 million people have asthma, 1/3 being children.
- Yet despite the persistently high prevalence of disease, the most recently available data indicate improved outcomes, with fewer annual hospitalizations for asthmatic attacks and fewer asthma-related deaths.
- Improved management is a likely reason for this improved outcome.

Asthma definition 2015

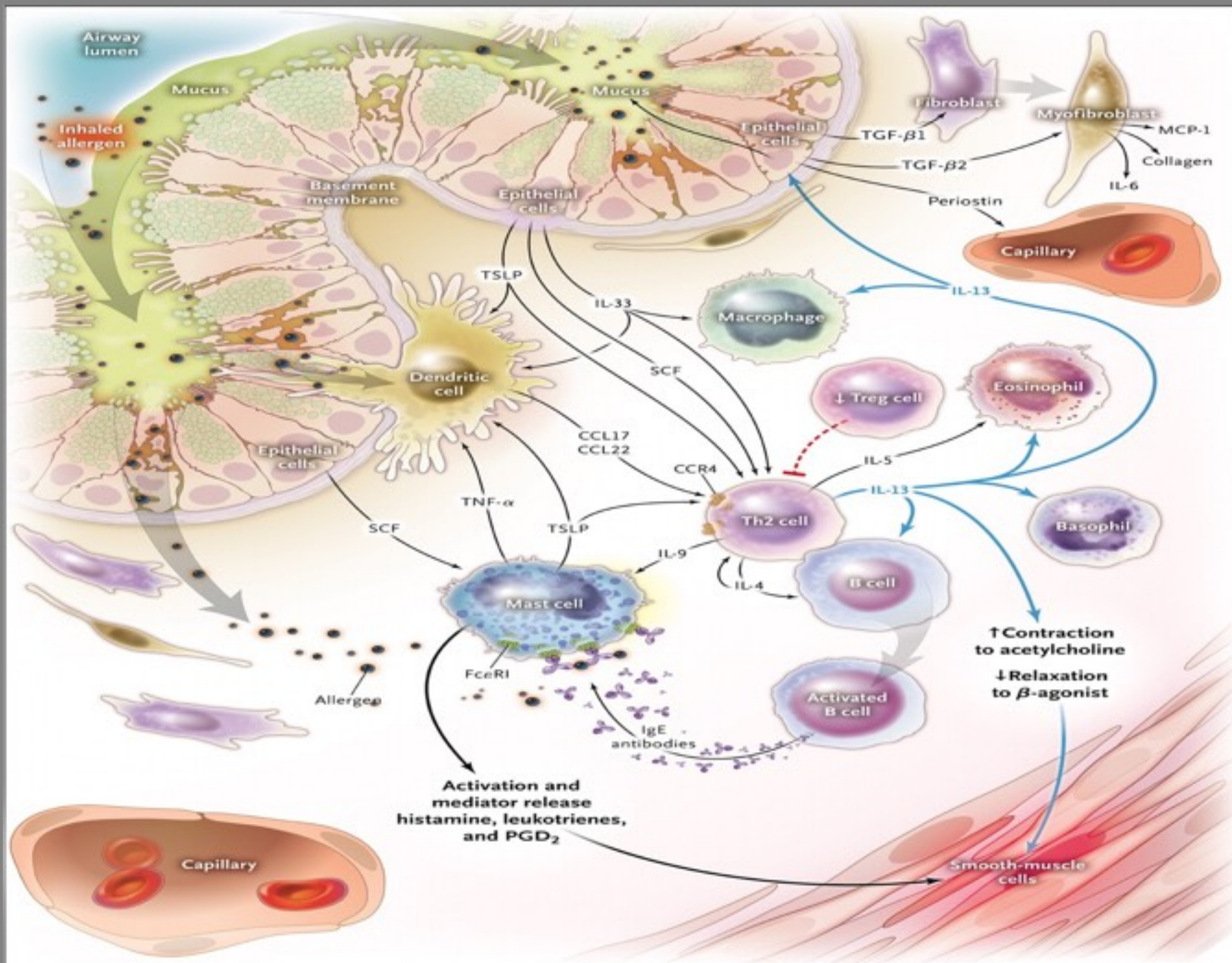
A chronic inflammatory disorder of the airways

Many cells and cellular elements (cytokines, interleukins, cell mediators & factors) play a role

Chronic inflammation leads to an increase in airway hyperresponsiveness with recurrent episodes of wheezing, coughing, and shortness of breath

Widespread, variable, and often reversible airflow limitation

Inflammatory Pathways in Asthma



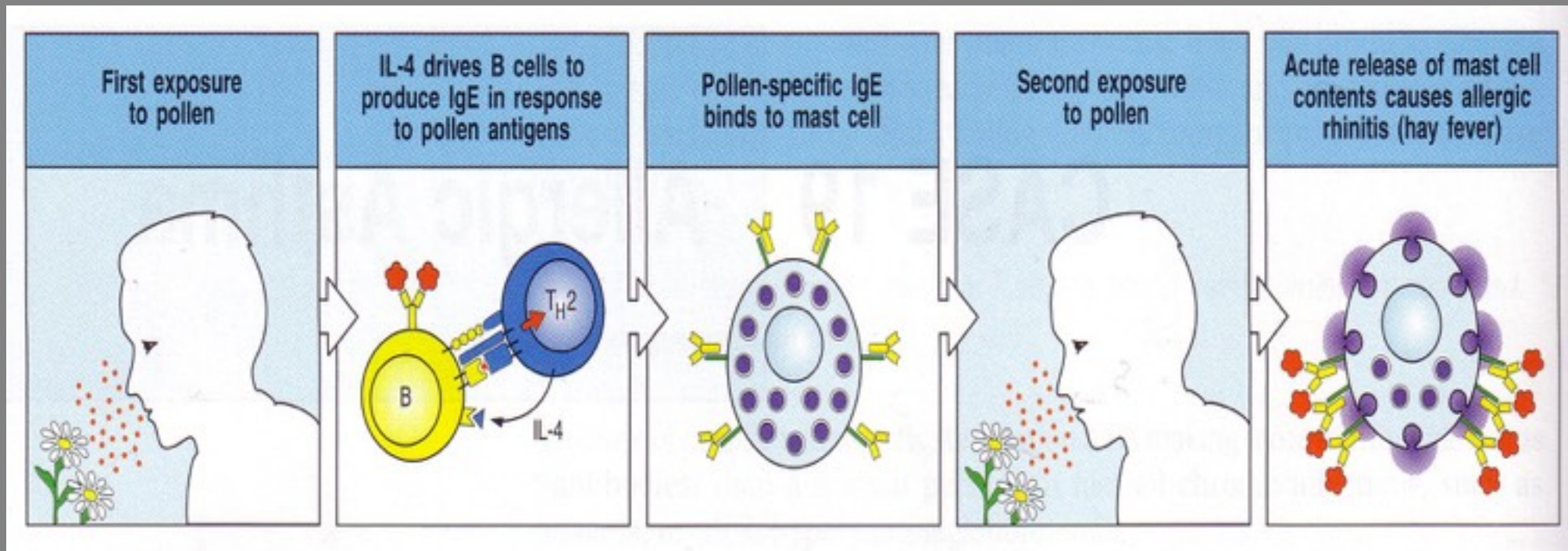
Kraft M. N Engl J Med 2011;365:1141-1144.

Asthma Epidemiology

- Annual burden of illness:
 - 497,000 hospitalizations annually
 - 1.8 million ED visits annually
 - Approximately 4000 deaths per year in 2003
 - 14 million lost school days in children and 14.5 million lost workdays
 - \$16.1 billion in health costs annually
 - Approximately 11 people die on a daily basis
 - Asthma Death is preventable

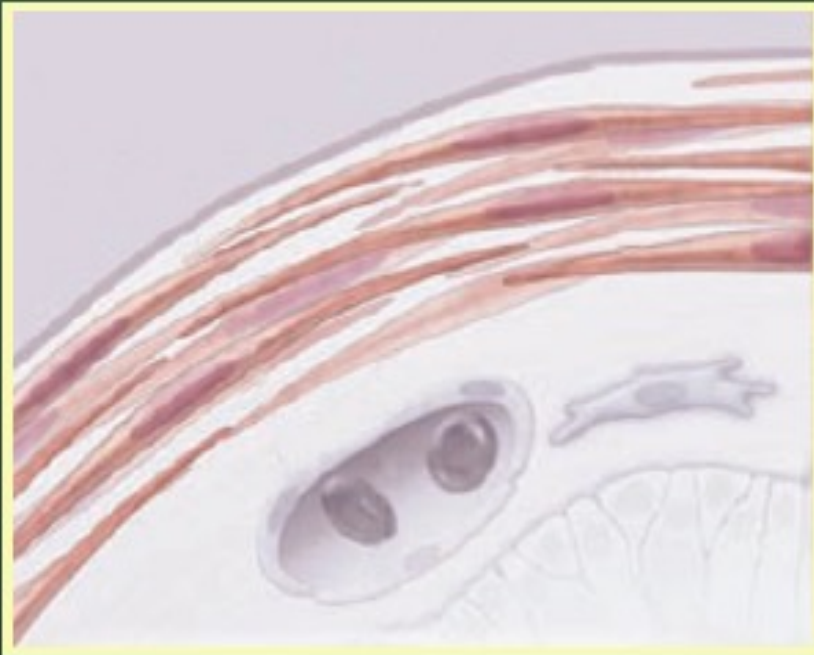
American Lung Association Epidemiology & Statistics Unit Research Program Services.
Trends in Asthma Morbidity and Mortality. July 2006. Available at: www.lungusa.org.

Allergic Asthma Pathophysiology

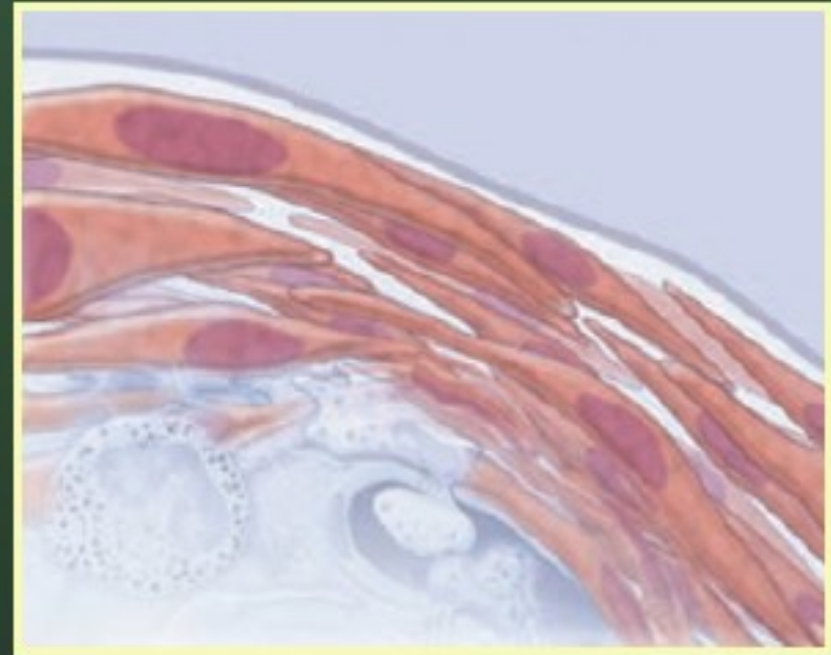


Asthma – Smooth Muscle Hyperplasia

Normal Airway



Asthmatic Airway



Reprinted with permission from Solway J et al. CG. *N Engl J Med.* 2007;356:1387-1389.

Ozone + PM

Ground-level Ozone	Health Effects	Particulate Matter
x	Coughing, irritation of the airways, discomfort in the chest or when breathing	
x	Premature aging of the lungs	
x	Faster or more shallow breathing	x
x	Aggravation of asthma, emphysema, and other respiratory diseases	x
x	Increased risk of respiratory infections	x
x	Premature death (primarily among older adults and those with existing heart and lung disease)	x

CARB (2008); Jerrett et al. (2009)

There is a 10% (CI: 3% to 20%) increase in the number of premature deaths per 10 $\mu\text{g}/\text{m}^3$ increase in PM_{2.5} exposure (CARB 2008)



Climate change: How do we know?

This graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO₂ has increased since the Industrial Revolution. (Source: <http://www.ncdc.noaa.gov/paleo/icecore/> [NOAA])

CALIFORNIA SB350 - SB 32

SB350

SPUR INNOVATION AND INVESTMENT INTO CALIFORNIA BY SETTING GOALS FOR 2030

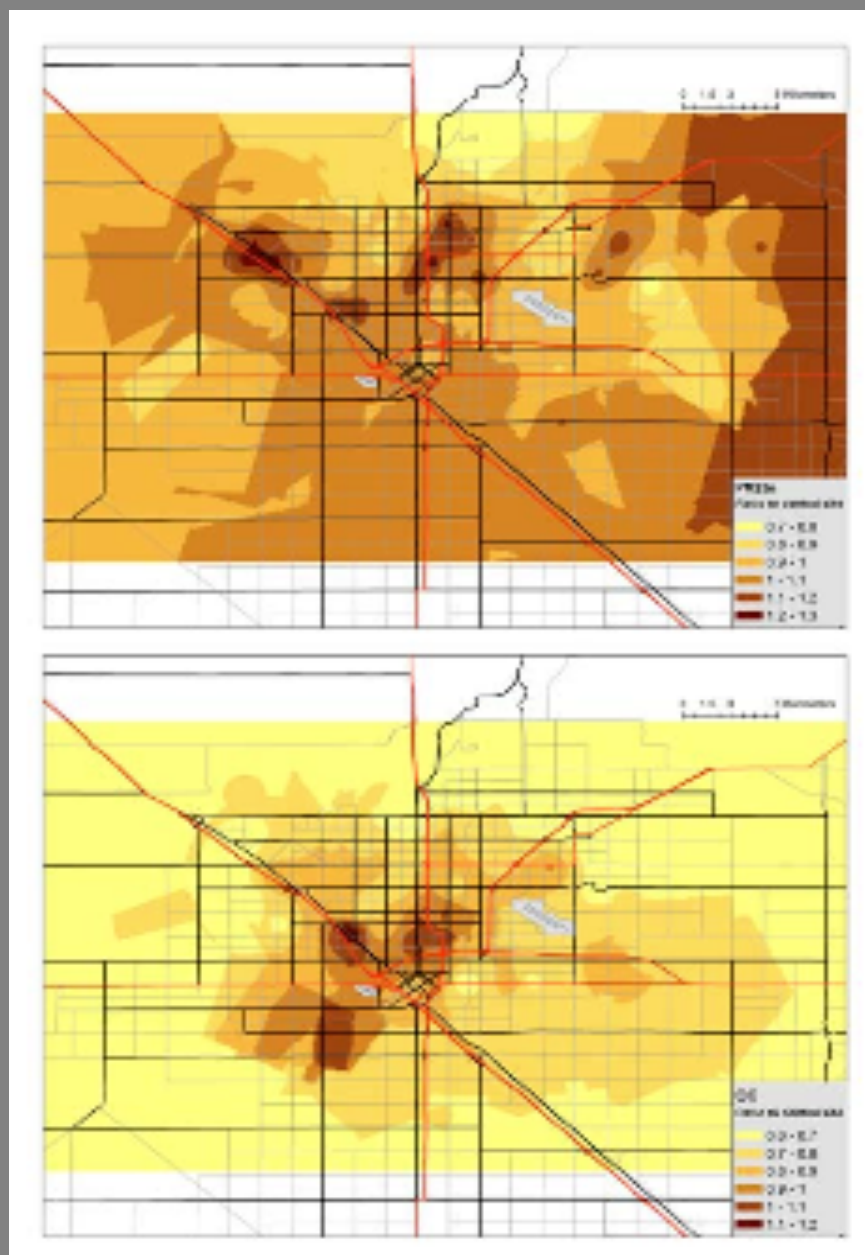
50% UTILITY POWER FROM RENEWABLE ENERGY – SOLAR/WIND

50% INCREASE EFFICIENCY IN EXISTING BUILDINGS

SB32

SET CLIMATE POLLUTION REDUCTION TARGET FOR 2050 THAT WILL PROVIDE CALIFORNIA BUSINESSES WITH REGULATORY CERTAINTY, IMPROVE PUBLIC HEALTH AND STRENGTHEN THE ECONOMY

Asthma rate in the central valley



Average spatial concentration gradients in Fresno and Clovis for PM2.5 mass, Ozone concentration OC expressed as ratios of ambient concentration to central site concentrations.

Darker color shows increasing intensity and concentration of Particulate matter PM2.5 and Ozone.

STRONG FUEL ECONOMIC STANDARDS

INCREASED CLEAN ENERGY

DECREASED CARBON POLLUTION

**RENEWABLE ENERGY & EFFICIENCY
TARGETS**

Summary – Accomplishments in better understanding of Climate Change – Public Health – Dependence on Fossil Fuels

Reduced mortality and Improved Public Health

Decreased hospitalizations

Energy Independence

Less cost of Electrical Bill

Less cost of Fuel or Gas Bill

Stronger Economy

Increased Jobs

Thank You !

Questions / Answers

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