

EPA actions to reduce children's health risks from environmental factors

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Office of Children's Health Protection

**TERTIARY
PREVENTION**

disease treatment
(medications)

SECONDARY PREVENTION

early detection of disease
(screening programs)

PRIMARY PREVENTION

prevent disease well before it develops,
reduce risk factors (air quality index)

PRIMORDIAL PREVENTION

Establish or maintain conditions to minimize hazards to health
(air quality standards)

Prevention (primary vs. primordial)

Primary prevention: Preventing personal exposure to risk factors

- Bicycle helmets
- Turning down water heaters
- Using the Air Quality Index (AQI)

Primordial prevention: Actions to minimize future hazards to health and address broad health determinants

- Reducing contaminants in air, water and food
- Reducing CO₂ emissions into the atmosphere

Office of Children's Health Protection

Establishment and Purpose

- 1995 EPA Policy on Evaluating Health Risks to in Children (Reaffirmed in 2014)
- 1997 President Clinton Issues Executive Order 13045
- 1997 EPA establishes Office of Children's Health Protection

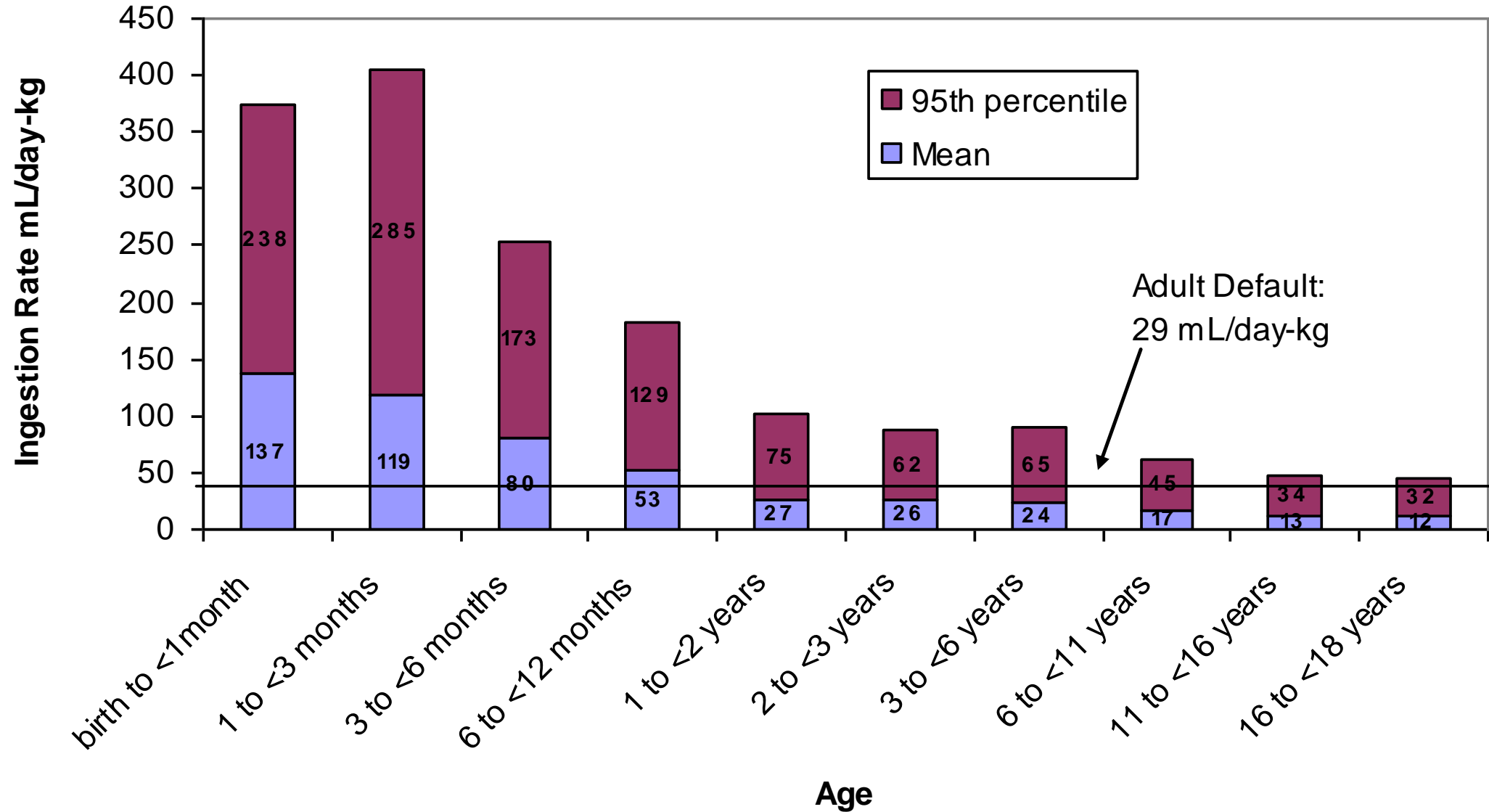
Regulatory Support and Science Policy

- EPA's Work on Protecting Children's Health
 - Cyanobacteria in drinking water
 - National Ambient Air Quality Standards (NAAQS) and Ozone
 - Application of Children's Environmental Health Center's Research on Chlorpyrifos

Cyanobacteria and Drinking Water



Children's Drinking Water Ingestion Rates



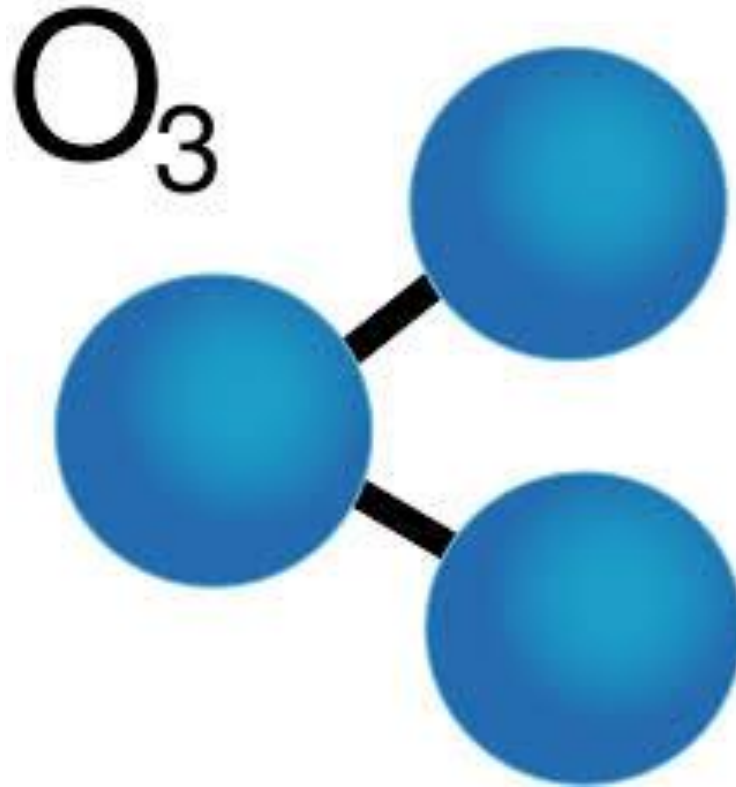
EPA Health Advisory Summary

- 10-Day Health Advisory Values:
 - Microcystins and cylindrospermopsin
 - Exposure Pathway: oral ingestion of drinking water

chemical	10-day advisory	
	Bottle-fed infants and pre-school children	School-age children and adults
microcystins	0.3 µg/L	1.6 µg/L
cylindrospermopsin	0.7 µg/L	3 µg/L

- For those systems who choose to do so, having these two values provides an opportunity to take actions to reduce exposure in finished drinking water by refining treatment processes to minimize public health risks

Ground Level or “Bad” Ozone



State of the U.S. Air: Overall Trends

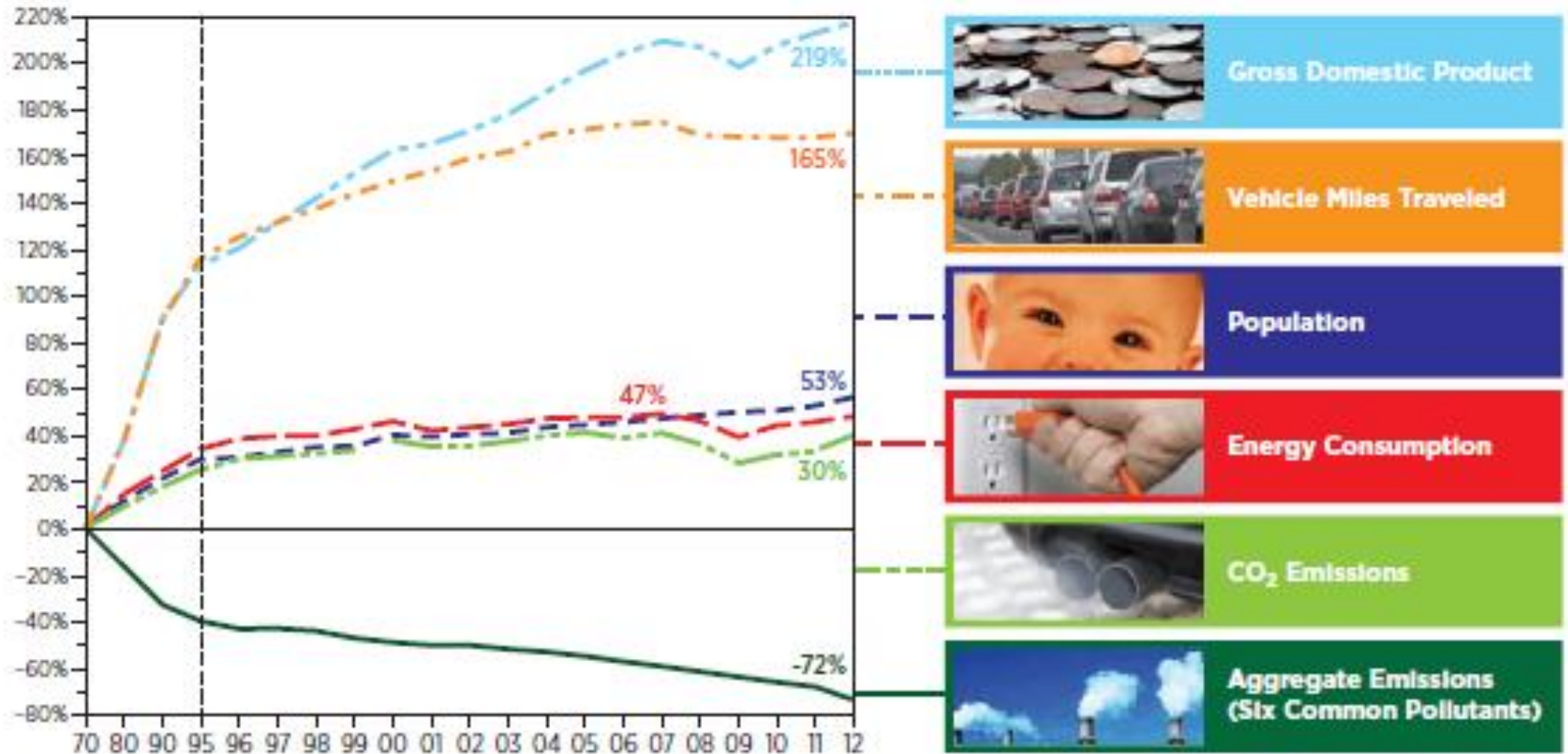
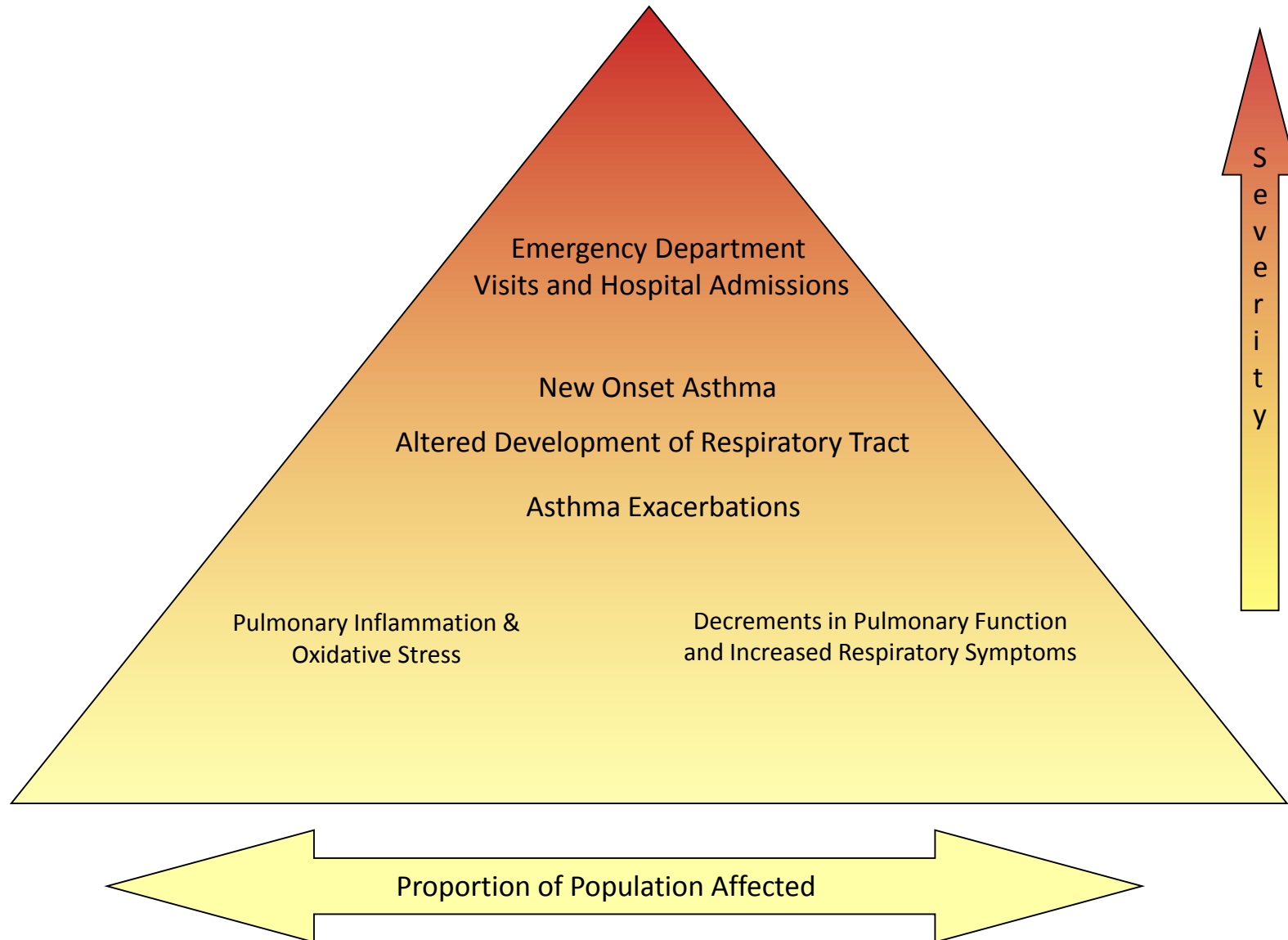


Figure 1 Air emissions have dropped steadily since 1970 thanks to the Clean Air Act. Even as the economy continues to recover from the recession, emissions that contribute to the most widespread pollutants continue to drop. (Source: U.S. EPA, [Air Quality Trends](#), 2014.)

Summary – Respiratory Effects in Children



Current Review of the Ozone NAAQS

- Clean Air Act and NAAQS
 - EPA re-evaluates Ozone NAAQS every 5 years
 - EPA synthesizes and analyzes existing body of scientific literature
 - Integrated Science Assessment
 - EPA assesses potential exposures and health risks associated with ozone, and potential benefits of a revised standard
 - Health Risk and Exposure Assessment
 - Policy Assessment
- Timeline
 - 2014 EPA proposed revising ozone NAAQS level from 75 ppb to 65-70 ppb
 - Revision will be finalized by October 1, 2015

Benefits and Costs of Meeting the Proposed Standards

- EPA estimates that meeting the standards in 2025 will yield annual health benefits of:
 - \$6.4 to \$13 billion for a standard of 70 ppb
 - \$19 to \$38 billion for a standard of 65 ppb
- This includes the value of preventing significant health effects in children and adults.
- EPA estimates that annual costs would be:
 - \$3.9 billion for a standard of 70 ppb
 - \$15 billion for a standard of 65 ppb

Health Effects Avoided	70 ppb	65 ppb
Premature deaths <i>(adults and children)</i>	710 to 1,400 or higher	2,000 to 4,300 or higher
Asthma exacerbation <i>(children 6-18)</i>	320,000	960,000
Acute bronchitis <i>(children 8-12)</i>	790	2,300
Upper and lower respiratory symptoms <i>(children 7 – 14)</i>	24,000	70,000
School loss days <i>(children 5 - 17)</i>	330,000	1 million
Asthma emergency room visits <i>(adults and children)</i>	1,400	4,300
Respiratory hospital admissions <i>(adults and children)</i>	510	1,500

Note: These numbers do not include California which was analyzed separately

Chlorpyrifos



1996 Food Quality Protection Act (FQPA)

- “Reasonable certainty of no harm” established as a single, health-based standard
- Required reassessment and periodic review of all pesticide food tolerances
- 10-fold margin of safety for infants and children – the “FQPA safety factor”
- Consideration of aggregate exposure
- Consideration of cumulative exposure
- Endocrine disruption screening
- Open public process

FQPA Safety Factor

The Federal Food, Drug, and Cosmetic Act, as amended by FQPA, requires that when setting a tolerance that EPA apply

“an additional default 10-fold margin of safety for the pesticide chemical residue and other sources of exposure...for infants and children to take into account potential pre- and post-natal toxicity and completeness of the data with respect to exposure and toxicity to infants and children.”



Chlorpyrifos

Background:

- Chlorpyrifos is an organophosphate pesticide used to kill insects, ticks and mites
- Toxic effect is acetylcholinesterase inhibition; developmental neurotoxicity is also observed

Previous Actions:

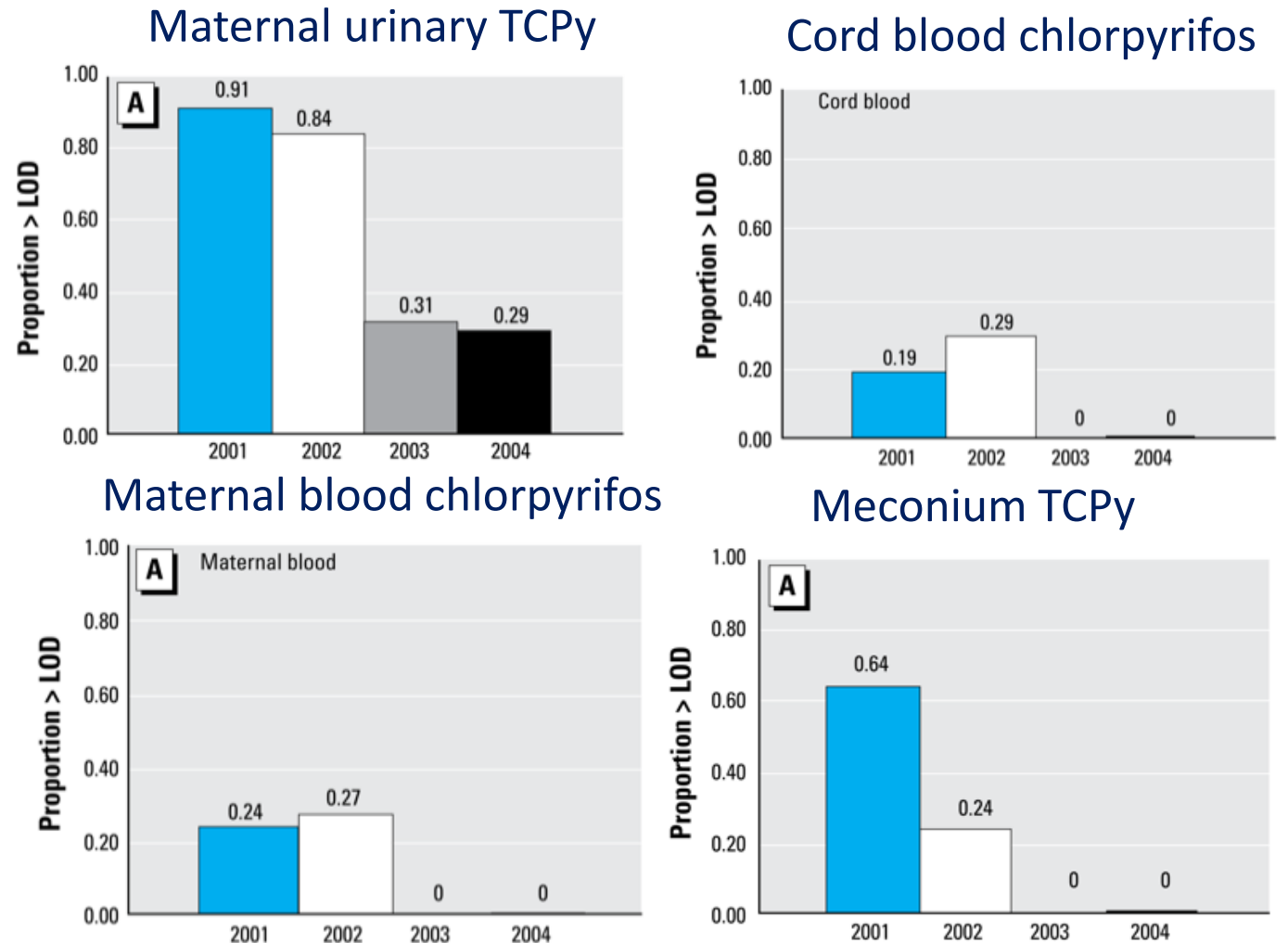
- 2000: all household uses banned – except ant and roach bait in child-resistant packaging
- 2000-2002: uses cancelled (tomatoes) or restricted (e.g., apples, citrus and tree nuts)
- 2012: “no-spray” buffer zones around public places; lower application rates

2015 Revised Human Health Risk Assessment

- Some risks to workers
- Potential drinking water risks in some locations
- FQPA safety factor of 10X retained to account for the uncertainties related to the epidemiological findings of developmental neurotoxicity
- Physiologically based pharmacokinetic model (PBPK) model utilized for all lifestages except pregnant women

Biomarker Trends for Chlorpyrifos 2001-2004

(Whyatt et al., 2009)

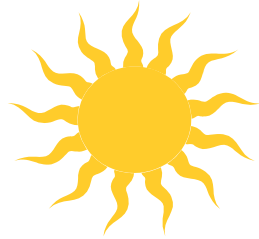


EPA Regulations, Chlorpyrifos, and Centers Research

- The key issues considered in Weight of Evidence include:
 - 1) whether chlorpyrifos causes long-term effects from prenatal and/or early life-stage exposure and
 - 2) whether adverse effects can be attributed to doses lower than those which elicit 10% inhibition of RBC AChE.
- When taken together, the evidence from
 - 1) the experimental toxicology studies evaluating outcomes such as behavior and cognitive function;
 - 2) mechanistic data on possible /modes of action/ adverse outcome pathways (MOA/AOP); and
 - 3) epidemiologic and biomonitoring studies, indicate that chlorpyrifos likely played a role in the neurodevelopmental outcomes reported by the epidemiologic study (Columbia University) investigators.

Climate Change & Health

Possibility of health risks:



Heat-related
mortality & morbidity



Changes in
air quality



Infectious Diseases

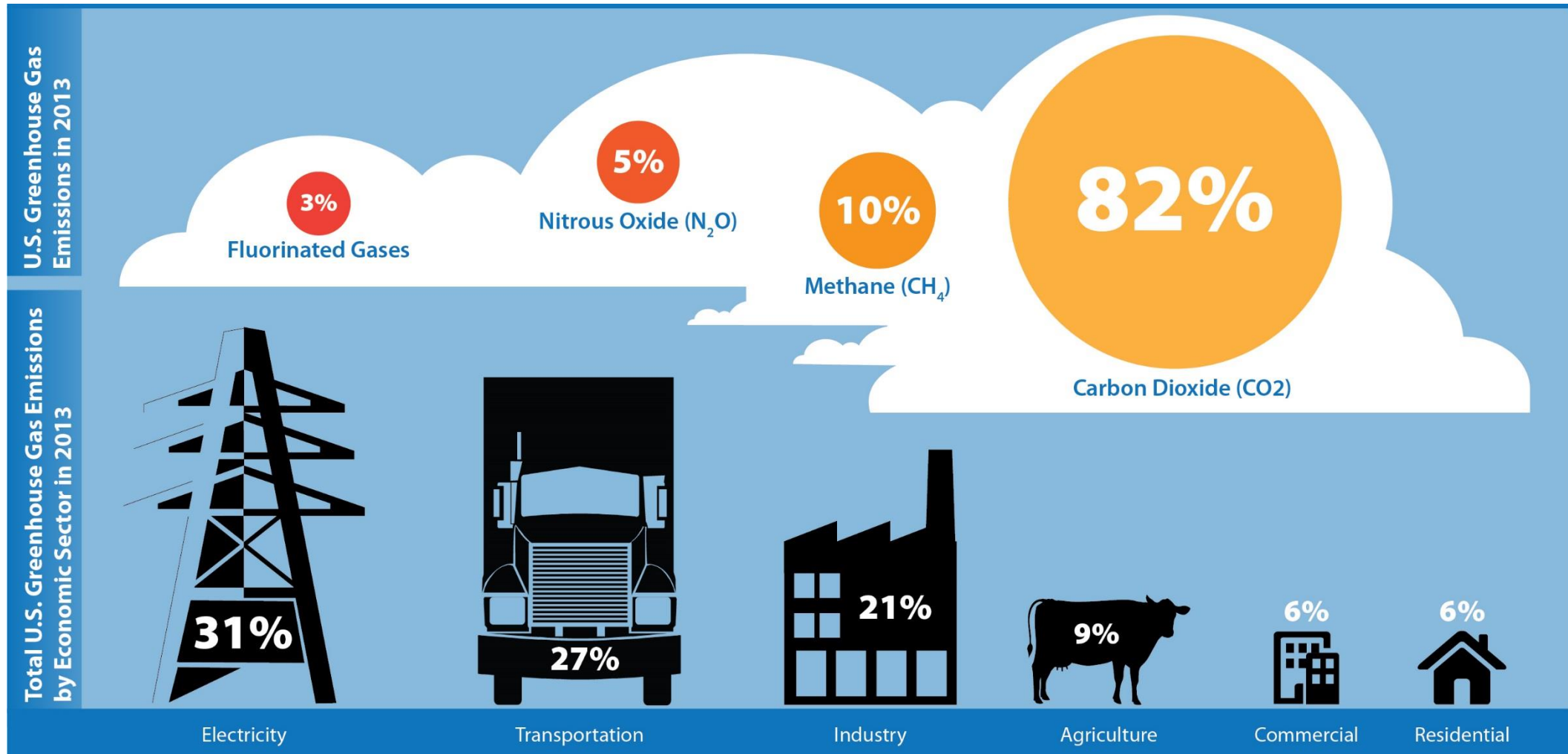


Airborne Allergens
(e.g., asthma)

- There is more certainty about some climate-health threats (e.g., heat), while for others the science is still emerging (e.g., indoor air quality).
- For these we can describe changing exposure pathways and risk, but we cannot quantitatively project future health outcomes (such as the number of new cases of a disease).

CARBON POLLUTION IS THE BIGGEST DRIVER OF CLIMATE CHANGE

U.S. GREENHOUSE GAS POLLUTION INCLUDES:



- Despite growing recognition by scientists and health professionals, most people do not connect climate and health.

- *Few Americans have thought much about the health consequences of global warming*
- *Few Americans are aware of the current or projected future health impacts of global warming [for the U.S. or worldwide].*

Public Perceptions of the Health Consequences of Global Warming, Yale Project on Climate Change Communication

Climate change is a public health issue and is one of the greatest threats to human health.

Lynn Goldman, Testimony to Subcommittee on Energy and Power, Representing American Public Health Association

For public health, climate change is the defining issue for the 21st century.

Margaret Chan: Director General of World Health Organization

Climate Change and Health Assessment Report

- April 7, 2015 President Obama released a draft Climate and Health Assessment Report
- The assessment is intended to inform policy and decision makers, and other stakeholders at multiple levels of government (e.g., public health officials, urban planners), non-profits (especially those with a community health focus), national health associations (e.g., APHA), and the general interested public.

Climate Change and Health Assessment

- The Climate and Health Assessment is an interagency product of the US Global Change Research Program
- Coordinated by the Interagency Crosscutting Group on Climate Change and Human Health, an interagency workgroup of the US Global Change Research Program co-chaired by NIH, CDC, and NOAA
- EPA is coordinating development of the assessment. Several EPA employees are authors on the report.

April 7, 2015 Announcement

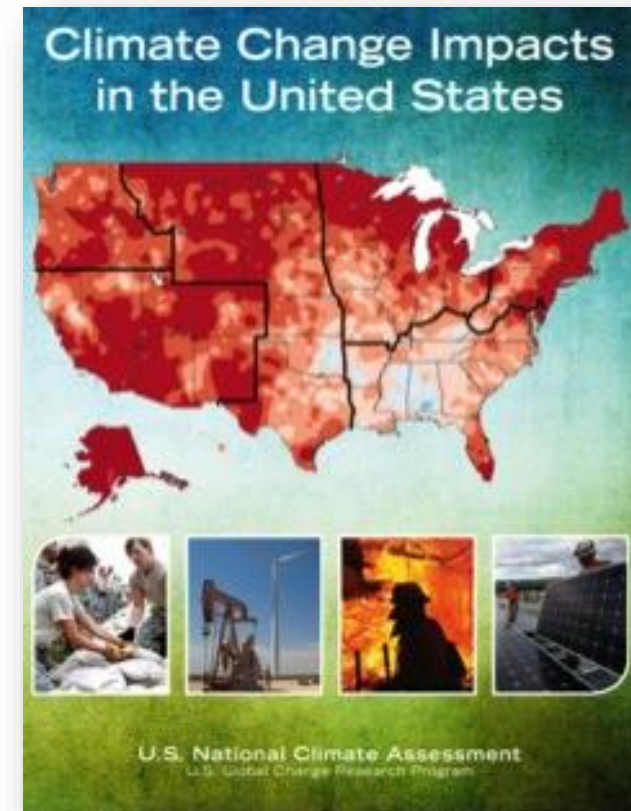
- The President also announced:
- Preparing the Next Generation of Medical and Health Professionals:
 - A coalition of Deans from 30 medical, public health, and nursing schools across the country who are committing to ensure that the next generation of health professionals is trained to address the health impacts of climate change

June 23, 2015 Summit

- White House Climate Change and Health Summit
 - Featuring the Surgeon General
 - Brought together public health, medical, and other health professionals, academics, and other interested stakeholders to discuss the public health impacts of climate change and identify opportunities to minimize these impacts

Resources and activities for protecting children's health in a context of climate change

- President's Task Force Workshop on Effects of Climate Change on Children's Health
 - <http://www.niehs.nih.gov/news/video/scivid/children/index.cfm>
- 3rd National Climate Assessment
 - <http://nca2014.globalchange.gov/report/sectors/human-health>
- USGCRP Climate Health Assessment
 - <http://www.globalchange.gov/health-assessment>
- Climate Resilience Tool Kit- <http://toolkit.climate.gov/>



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