

# Health Effects of Ambient Ozone

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**Kevin M. Stewart**  
**Director of Environmental Health**

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# Ozone in New Jersey

Ozone is a powerful respiratory irritant at levels frequently found in much of New Jersey during the ozone season. The American Lung Association's *State of the Air: 2014* report showed the following for

NJ counties / Weighted avg. days / Grade / US rank (worst of 733):

- Atlantic	4.0	F	238	- Hunterdon	7.0	F	130
- Bergen	5.7	F	169	- Mercer	11.7	F	62
- Camden	15.3	F	33	- Middlesex	12.3	F	54
- Cumberland	5.7	F	169	- Monmouth	8.2	F	105
- Essex	8.0	F	108	- Morris	5.0	F	195
- Gloucester	14.0	F	39	- Ocean	11.8	F	59
- Hudson	4.8	F	207	- Passaic	2.7	D	329



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# Who are at risk from ozone?

- Adults with Asthma
- Children with Asthma
- Children and teens
- Seniors
- People with chronic lung diseases
- People who work or exercise outdoors
- “Responders”



# Health Effects of Ozone

## Ozone causes:

- Lung inflammation
- Increased airway reactivity
- Shortness of breath
- Wheezing and coughing
- Chest pain when inhaling deeply
- Reduced lung function even at levels below standard
- Increased asthma attacks
- Increased susceptibility to infection
- Increased need for medical treatment, hospitalization and emergency department use for respiratory problems.



# Examples from the Science

## Conclusions of Some Key Ozone Studies through 2012:

- Long-term exposure risks
  - Higher risk of premature death from respiratory diseases
  - Higher likelihood of a child's hospitalization for asthma, especially among those who are younger or from low-income families
  - Higher likelihood for genetically predisposed teens to develop asthma
  - Higher likelihood of accelerating natural decline in lung function that occurs with age

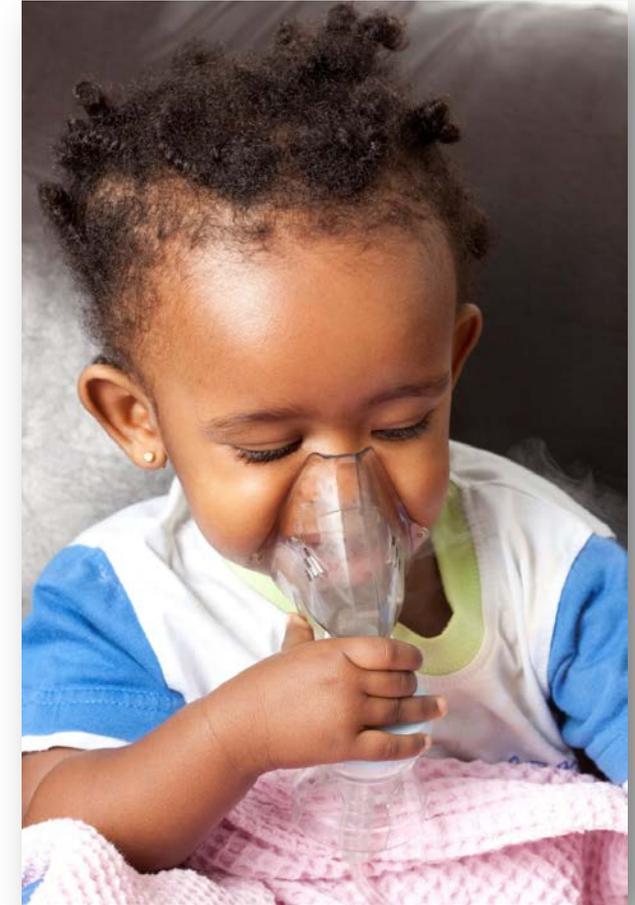


- Repeated short-term ozone damage to children's developing lungs appears likely to lead to permanently reduced lung function in adulthood, increasing risk of lung disease later in life
- Even short-term ozone exposure is likely to be a cause of premature death

# Examples from the Science

## Conclusions of Some Key Ozone Studies through 2012:

- Ozone is likely to cause cardiovascular harm (e.g., heart attacks, strokes, heart disease, congestive heart failure)
- Ozone in a community is associated with lower birth weight and decreased lung function in newborns
- Children living in high ozone communities who actively participate in several sports are more likely to develop asthma than children in these communities not participating in sports.
- Even levels of ozone below the standard contribute to hospitalization for respiratory disease
- Substantial decreases in traffic resulted in substantially less air pollution (including ozone) and substantially reduced asthma incidents in children.



# Examples from the Science

## Conclusions of Some Key Ozone Studies through 2012:

- Controlled human exposure studies have repeatedly demonstrated that some healthy adults experienced reduced lung function and increased airway inflammation following exposures to concentrations of 60 ppb and below (Adams, 2002; Adams, 2006; Brown et al., 2008; and Kim et al., 2011).
- Ozone plus allergens exacerbates allergies and asthma
- Ozone may cause harm to the central nervous system
- Ozone may cause reproductive and developmental harm
- There is evidence that women, people who suffer from obesity, and people with low incomes may face higher risk from ozone.



Reference: *Integrated Science Assessment for Ozone and Related Photochemical Oxidants*, U.S. Environmental Protection Agency, 2013. EPA/600/R-10/076F

# The National Ambient Air Quality Standard

**The Clean Air Act requires updating of air quality standards every 5 years**



- Because of these health impacts, EPA proposed on Nov. 25, 2014 to strengthen the health-based standard.
- EPA's Clean Air Scientific Advisory Committee unanimously concluded
  - There is clear scientific support for the need to revise the current 75 ppb standard
  - Adopting a standard of 60 ppb would certainly offer more public health protection than the levels of 70 ppb or 65 ppb and would provide an adequate margin of safety
- The American Lung Association submitted a letter to EPA in support of a 60 ppb standard signed by over 1,000 health professionals.

# Support for a Stronger Ozone Standard

- Five large epidemiological studies in the U.S. and Canada provide further real-world evidence that a standard of either 70 ppb or 65 ppb fails to provide adequate protection
- These studies are:
  - Bell et al., 2006
  - Cakmak et al., 2006
  - Dales et al., 2006
  - Katsouyanni et al., 2009
  - Stieb et al., 2009
- They reported positive and statistically significant associations with premature death—as well as for hospital admissions and emergency department visits.
- In the majority of locations where increased risk was found, the ozone levels **would have met** weaker standards of 70 or 65 ppb, but would not have met a standard set at 60 ppb.



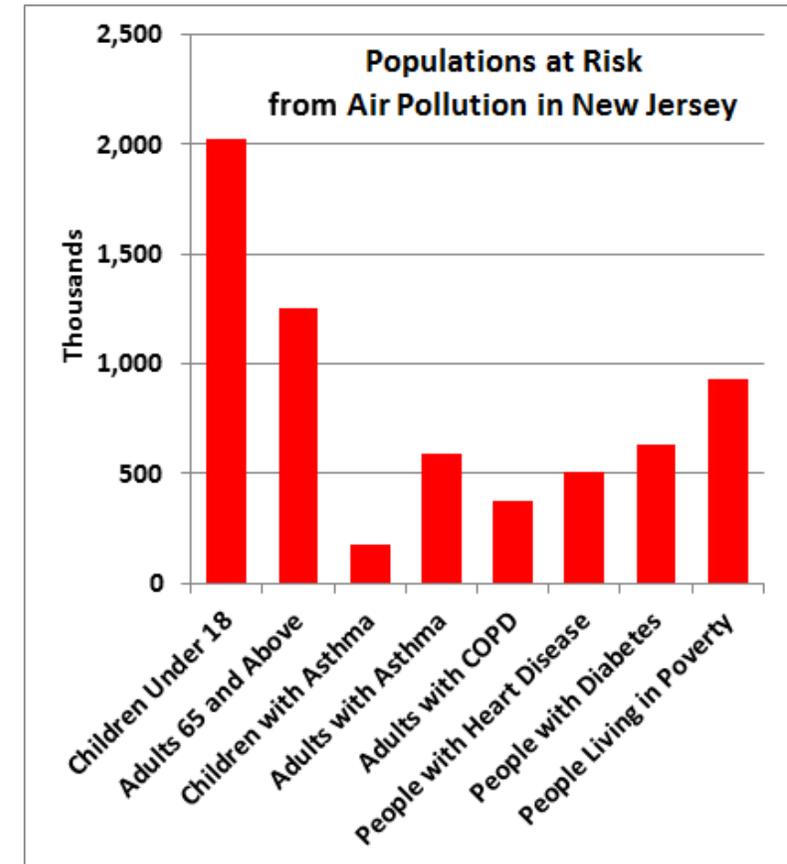
# Costs and Benefits for a Stronger Ozone Standard

- An ozone standard in the proposed range of 65-70 parts per billion has public health benefits worth nationally (excluding California) an estimated:
  - **\$6.4 to \$13 billion** for a standard of 70 ppb, or
  - **\$19 to \$38 billion** for a standard of 65 ppb.
- These benefits outweigh the costs, estimated at:
  - **\$3.9 billion** for a standard of 70 ppb, or
  - **\$15 billion** for a standard of 65 ppb.
- Reducing ozone and particle pollution nationwide (excluding California) in 2025 will avoid:
  - **710 to 4,300** premature deaths
  - **320,000 to 960,000** asthma attacks among children
  - **330,000 to 1 million** days when kids miss school
  - **65,000 to 180,000** missed work days
  - **1,400 to 4,300** asthma-related emergency room visits
  - **790 to 2,300** cases of acute bronchitis among children

Reference: *Regulatory Impact Analysis of the Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone*, U.S. Environmental Protection Agency, 2014. EPA-452/P-14-006

# Estimated Populations at Risk from Air Pollution in New Jersey

Category	Populations
Children Under 18	2,026,384
Adults 65 and Above	1,250,555
Children with Asthma	178,063
Adults with Asthma	593,492
Adults with COPD	378,856
People with Heart Disease	510,617
People with Diabetes	636,107
People Living in Poverty	934,277
Total Population	8,864,590



Based on data for 2012 from U. S. Bureau of the Census, Population Estimates Branch, and from Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System.

# Our Credo

We will breathe easier when the air in every American community is clean and healthy.

We will breathe easier when people are free from the addictive grip of tobacco and the debilitating effects of lung disease.

We will breathe easier when the air in our public spaces and workplaces is clear of secondhand smoke.

We will breathe easier when children no longer battle airborne poisons or fear an asthma attack.

***Until then, we are fighting for air.***