



# EPA Reconsiders the Ozone Air Quality Standard: Will They Get It Right?

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## In Brief

On September 16, 2009, the U.S. Environmental Protection Agency (EPA) announced that they would reconsider the ozone air quality standards that they adopted in 2008. On January 6, 2010, they will reveal their proposal for the standard, based on that reconsideration.

Ozone is the most widespread and one of the most dangerous air pollutants. The National Ambient Air Quality Standards set the official "limits" on outdoor air pollutants like ozone. The Clean Air Act requires EPA to set standards that protect public health with an adequate margin of safety. The health-based standards drive all the action to get rid of ozone pollution at the national, state and local levels.

Overwhelming evidence shows that the 2008 standard set under the Bush Administration failed to meet the requirements of the law and protect public health from serious harm. Facing a legal challenge from the American Lung Association and others, the Obama Administration agreed to reconsider the 2008 ozone standards.

## What is ozone?

Ozone (O<sub>3</sub>), commonly known as smog, forms when hydrocarbon vapors and nitrogen oxides react in the presence of sunlight and heat.<sup>1</sup> Hydrocarbon vapors are emitted from motor vehicles, small engines, chemical plants, refineries, factories, gas stations, paint and other sources. Nitrogen oxides are emitted from combustion sources such as power plants, industrial boilers, motor vehicles, locomotives, and ships.

## Why is ozone harmful?

Ozone reacts chemically ("oxidizes") with internal body tissues, such as those in the lung. Some have described the inflammation that ozone causes in the airways as similar to a "sunburn" on the lungs. It acts as a powerful respiratory irritant at the levels frequently found across the nation during the summer months. Ozone exposure may lead to:

- shortness of breath, chest pain;
- inflammation of the lung lining, wheezing and coughing;
- increased risk of asthma attacks, need for medical treatment and for hospitalization for people with lung diseases, such as asthma or chronic obstructive pulmonary disease (COPD);<sup>2</sup> and
- premature death.<sup>3</sup>

Children who grow up in areas of high ozone pollution may never develop full lung capacity in adulthood.<sup>4</sup>

### **Who are most at risk?**

People at greatest risk include:

- people with lung disease, especially chronic lung diseases such as asthma and COPD<sup>5</sup>
- children, because their airways are smaller, their respiratory defenses are not fully developed, and their higher breathing rates increase their exposure<sup>6</sup>
- people who work or exercise outdoors<sup>7</sup>
- senior citizens<sup>8</sup>
- “responders”--otherwise healthy individuals who experience health effects at lower levels of exposure than the average person.

### **Why is EPA reconsidering the ozone standard? Didn't they just revise the standard in 2008?**

EPA may be proposing a new standard, in part, because the American Lung Association and others took legal steps to challenge the 2008 standard. In March 2008, EPA announced an ozone standard of 75 ppb. Unfortunately, that standard failed to meet the requirements of the Clean Air Act—to protect public health with an adequate margin of safety.

The Lung Association and others went to Court to compel EPA to comply with the requirements of the Act. In September 2009, EPA told the Court that they were willing to reconsider the standard.

This reconsideration is based on the evidence available to EPA during the last review. Although considerable new science strengthens the case for a standard in the range of 60 to 70 ppb,<sup>9</sup> this proposal is based solely on a reconsideration of the record established in the last review.

The Clean Air Act requires that EPA review the standards every five years to be sure the standards reflect the latest scientific and medical knowledge. EPA is concurrently reviewing the new science in a review cycle that will end in February 2014.<sup>10</sup>

### **Why does the current standard need strengthening?**

Clinical and epidemiological studies have shown that breathing ozone can cause adverse health effects at concentrations lower than the 75 ppb 8-hour average standard.

Clinical studies of healthy adults show decreased lung function, increased respiratory symptoms and inflammation after 6.6 hour exposures to 80 ppb. Importantly, adverse

lung function effects and symptoms are observed in some individuals at 60 ppb.<sup>11</sup> Because subjects in clinical studies are typically healthy adults, standards must be set lower to account for the increased susceptibility of infants, children, and people with moderate or severe asthma.

A dozen epidemiological studies have found that adverse health effects ranging from respiratory symptoms, lung function changes, emergency department visits for respiratory disease, and hospital admissions are associated with 8-hour ozone concentrations below 70 ppb.<sup>12</sup> Numerous other community health studies report adverse respiratory effects in newborns, asthmatic children, outdoor workers and exercisers at concentrations below 60 ppb.<sup>13</sup>

Breathing ozone can kill. Short-term increases in ozone were found to increase deaths from cardiovascular and respiratory causes in a large 14-year study in 95 U.S. cities. The relationship between mortality and ozone was evident even on days when pollution levels were below the EPA 8-hour standard of 75 ppb.<sup>14</sup>

The Clean Air Act requires that the EPA set the standard based on the need to protect public health "with an adequate margin of safety." In 2002, the Supreme Court unanimously ruled that protecting health was the only basis for the standard. The existing standard fails to protect public health with a margin of safety so EPA must strengthen it.

### **What did EPA's independent science advisors recommend?**

The Clean Air Scientific Advisory Committee (CASAC) is chartered under the Clean Air Act to advise the EPA Administrator on the review of the National Ambient Air Quality Standards. After reviewing the 2,000 page summary of the scientific research on the health effects of ozone and an extensive additional analysis by the EPA staff, the 23-member CASAC panel unanimously concluded that an **8-hour ozone standard should be set in the range of 60-70 ppb.**<sup>15</sup>

After EPA published its final decision in 2008, their own scientific advisors sent a rare letter to the Administrator stating that they disagreed with the decision. These expert scientists, members of a panel called the Clean Air Scientific Advisory Committee, notified the Administrator that they "*do not endorse the new primary ozone standard as being sufficiently protective of public health.*" (emphasis in the original). They urged that the Administrator or his successor "select a more health-protective" standard in the next review cycle, in the range of 60-70 ppb.<sup>16</sup>

### **What other medical authorities have endorsed a stricter standard?**

An ozone standard in the range of 60-70 ppb has also been endorsed by EPA's Children's Health Protection Advisory Committee, 100 independent physicians and air pollution scientists, and a host of medical organizations including the American Lung Association, the American Medical Association, the American Public Health Association, the American Thoracic Society, the American Academy of Pediatrics, the International Society for

Environmental Epidemiology, the American College of Preventive Medicine, the American College of Chest Physicians, the American College of Occupational and Environmental Medicine the American Association of Cardiovascular and Pulmonary Rehabilitation, the National Association for the Medical Direction of Respiratory Care, and the Asthma and Allergy Foundation of America.

Furthermore, the State of California has established an 8-hour ozone standard of 70 ppb, not to be exceeded, and the World Health Organization has recommended a standard of 51 ppb.<sup>17</sup>

### What is the timetable for EPA action?

- January 6, 2010—Propose recommendations for the standard for public comment
- Early February—Hold public hearings
- August 31, 2010—Announce the final ozone air quality standards.

### What questions should be asked when evaluating the proposal?

- Does EPA propose a standard within the range CASAC recommended: 60-70 ppb?
- Does the proposal change any other aspects of the standard, such as number of days allowed over the standard?
- Did EPA make any changes in the proposal in response to the White House Office of Management and Budget review?

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<sup>1</sup> U.S. Environmental Protection Agency. *Air Quality Criteria for Ozone and Related Photochemical Oxidants*. 2006. EPA 600/R-05/004aF Available at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=149923>.

<sup>2</sup> U.S. EPA, 2006.

<sup>3</sup> Bell ML, Dominici F, and Samet JM. A Meta-Analysis of Time-Series Studies of Ozone and Mortality with Comparison to the National Morbidity, Mortality, and Air Pollution Study. *Epidemiology* 2005; 16:436-445. Levy JI, Chermerynski SM, Sarnat JA. Ozone Exposure and Mortality: an empiric Bayes metaregression analysis. *Epidemiology* 2005; 16:458-468. Ito K, De Leon SF, Lippmann M. Associations Between Ozone and Daily Mortality: analysis and meta-analysis. *Epidemiology* 2005; 16:446-429.

<sup>4</sup> Kunzli N, Lurmann F, Segal M, Ngo L, Balmes J, Tager IB. Association Between Lifetime Ambient Ozone Exposure and Pulmonary Function in College Freshmen-Results of a Pilot Study. *Environmental Research* 1997; 72: .8-23.

<sup>5</sup> Desqueyroux H, Pujet JC, Prosper M, Le Moullec Y, Momas I. Effects of Air Pollution on Adults with Chronic Obstructive Pulmonary Disease. *Arch Environ Health* 2002; 57:554-560. Höpfe P, Peters A, Rabe G, Praml G, Lindner J, Jakobi G, Fruhmans G, Nowak D. Environmental Ozone Effects in Different Population Subgroups. *Int J Hyg Environ Health* 2003; 206:505-516.

<sup>6</sup> Peters JM, Avol E, Gauderman WJ, Linn WS, Navidi W, London SJ, Margolis H, Rappaport E, Vora H, Gong H, Thomas DC. A Study of Twelve Southern California Communities with Differing Levels and Types of Air Pollution II. Effects on Pulmonary Function., *Am J Respir Crit Care Med* 1999; 159: 768-775; and Thurston GD, Lippmann M, Scott MB, Fine JM. Summertime Haze Air Pollution and Children with Asthma. *Am J Respir Crit Care Med* 1997; .155: 654-660.

<sup>7</sup> Kinney PL, Lippmann M. Respiratory Effects of Seasonal Exposures to Ozone and Particles. *Arch Environ Health* 2000; 55: 210-216.

<sup>8</sup> Delfino RJ, Murphy-Moulton AM, Becklake MR. Emergency Room Visits for Respiratory Illnesses among the Elderly in Montreal: Association with Low Level Ozone Exposure. *Environ Res* 1998; 76 (Section A): 67-77.

<sup>9</sup> U.S. Environmental Protection Agency. *Provisional Assessment of Recent Studies on Health and Ecological Effects of Ozone Exposure*. September 2009, EPA/600/R-09/101.

<sup>10</sup> EPA. *Integrated Review Plan for the Ozone National Ambient Air Quality Standards Review: External Review Draft*. EPA 452/D-09-001. September 2009. Available at <http://www.epa.gov/ttn/naaqs/standards/ozone/data/externalreviewdraftO3IRP093009.pdf>.

<sup>11</sup> Letter from Dr. Rogene Henderson, Chair, Clean Air Scientific Advisory Committee to Stephen L. Johnson, Administrator, U.S. Environmental Protection Agency, re Clean Air Scientific Advisory Committee's (CASAC) Peer Review of the Agency's 2<sup>nd</sup> Draft Ozone Staff Paper, EPA-CASAC-07-001, October 24, 2006; and Letter from Dr. Rogene Henderson, Chair, Clean Air Scientific Advisory Committee to Stephen L. Johnson, Administrator, U.S. Environmental Protection Agency, re Clean Air Scientific Advisory Committee's (CASAC) Review of the Agency's Final Ozone Staff Paper, EPA-CASAC-07-002, March 26, 2007.

<sup>12</sup> Comments of the American Lung Association et al. on the U.S. EPA's Proposed Revisions to the NAAQS for Ozone, October 9, 2007, derived from EPA Staff Paper Appendix 3B. Ozone Epidemiological Study Results: Summary of effect estimates and air quality data reported in studies, distribution statistics for 8-hr daily maximum ozone concentrations for the study period and location, and information about monitoring data used in the study.

<sup>13</sup> American Lung Association et al 2007 comments to EPA.

<sup>14</sup> Bell ML, McDermott A, Zeger SL, Samet JM, Dominici F. Ozone and short-term mortality in 95 US urban communities, 1987-2000. *JAMA* 2004; 292:2372-2378.

<sup>15</sup> Letters from Dr. Rogene Henderson, October 24, 2006 and March 26, 2007.

<sup>16</sup> Letter from Dr. Rogene Henderson, Chair, Clean Air Scientific Advisory Committee to Stephen L. Johnson, Administrator, U.S. Environmental Protection Agency, re Clean Air Scientific Advisory Committee Recommendations Concerning the Final Rule for the National Ambient Air Quality Standards for Ozone, EPA –CASAC 08-009, April 7, 2008.

<sup>17</sup> World Health Organization. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. Global update 2005.