



Decision Time March 12, 2008: EPA to Announce Final Revisions to the Smog Standards

Overview

By March 12, 2008, U.S. Environmental Protection Agency (EPA) must finalize revisions to the official “limit” on ground level ozone air pollution—the National Ambient Air Quality Standard—at a level that protects public health with an adequate margin of safety. The standard drives all the action to get rid of ozone air pollution commonly known as smog, at the national, state and local levels. Overwhelming scientific evidence shows that the smog standard must be much stronger to protect public health from serious harm. The American Lung Association urged EPA to adopt an ozone standard of 0.060 parts per million (60 parts per billion).¹

What is ozone?

Ozone (O₃), a molecule of three oxygen atoms, is the most widespread outdoor air pollutant. Ozone forms when emissions of hydrocarbon vapors and nitrogen oxides react chemically in the air in the presence of sunlight and heat.² 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, causing inflammation, like a “sunburn” of the lungs.³ Ozone acts as a powerful respiratory irritant at the levels frequently found across the nation during the summer months. Breathing ozone may lead to:

- shortness of breath, chest pain;⁴
- wheezing and coughing;⁵
- increased susceptibility to respiratory infection;⁶
- increased risk of asthma attacks;⁷
- increased need for medical treatment and for hospitalization for people with lung diseases, such as asthma or chronic obstructive pulmonary disease (COPD);⁸ and
- premature death.⁹

Long-term, repeated exposure to high levels of ozone may also lead to reduced lung capacity.¹⁰

Who are most at risk?

People at greatest risk from breathing ozone include:

- people with lung disease, especially chronic lung diseases such as asthma and COPD;¹¹
- children, because their airways are smaller, their respiratory defenses are not fully developed, and their higher breathing rates increase their exposure;¹²
- senior citizens;¹³
- people who work or exercise outdoors;¹⁴ and
- “responders” -- otherwise healthy individuals who experience health effects at lower levels of exposure than the average person.¹⁵

Why is EPA considering revisions to the ozone standard?

The Clean Air Act requires that EPA review the air quality standards every five years to ensure the standards reflect the latest scientific and medical knowledge. The last time the EPA revised the standard for ozone air pollution was 1997. The American Lung Association took legal action in 2003 to get EPA to follow the law and review the science again.

What is the current standard?

The current 8-hour average ozone standard is 0.08 parts per million (ppm), measured based on average of the 4th highest reading taken each year for 3 years. The EPA currently allows communities to round of to the nearest two decimals, so the effective standard is 0.084 ppm or 84 parts per billion (ppb). EPA adopted it in 1997.

Why does the current standard need strengthening ?

- New clinical and epidemiological studies have shown that **breathing ozone can harm health at concentrations lower than the current standard**. The current standard fails to adequately protect public health from harm.
- **EPA’s own scientific advisors unanimously concluded that the current standard “needs to be tighter.”** They cited clinical studies of healthy adults showing decreased lung function, increased respiratory symptoms, inflammation, and increased susceptibility to respiratory infection at the current standard of 85 ppb. “Importantly, adverse lung function effects and symptoms were also observed in some individuals at 60 ppb.”¹⁶
- **Sixteen major public health and medical organizations have supported stricter standards of 60 ppb** including: the American Academy of Pediatrics, the American Medical Association, the American College of Chest Physicians, the American Heart Association, the American Public Health Association and the American Thoracic Society. Also supporting much tighter standards are the World Health Organization, the State of California, the EPA’s Children’s Health Protection Advisory Committee, and the EPA’s Clean Air Scientific Advisory Committee.
- **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 current 8-hour standard.¹⁷
- **The Clean Air Act requires that the EPA set the standard where it will 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.
- **Due to a loophole, communities can round down their measurements and still meet the ozone standard.** This means that some large metropolitan areas don’t have to clean up their air. Newer monitoring technology has eliminated the original reason for this practice.

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 official limits on six widespread air pollutants, formally known as 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 separate analysis by the EPA staff, the 23-member CASAC panel **unanimously** concluded:⁹

- **No scientific justification exists to keep the standard at the current level;**
- **The 8-hour ozone standard should be set in the range of 60 to 70 ppb;**
- The health-based standard must explicitly include the “margin of safety” required by the Clean Air Act; and
- The rounding loophole must be eliminated.

What questions should be asked when evaluating the final rule?

- Is the final standard within the range CASAC recommended (60 to 70 ppb)? If not, why?
- Is the final standard within the range proposed by EPA (70 ppb to 75 ppb)? If not, why?
- Did EPA change other aspects of the standard, such as increasing the number of days allowed over the standard? If so, why? (Such changes could weaken the standard.)
- What changes did EPA make in response to OMB review?

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- ¹ The Lung Association's recommendation is based on the concentration of ozone in the air measured on an 8-hour average and based on the 4th highest monitored reading each year averaged for three years.
- ² <http://www.epa.gov/air/ozonepollution/>
- ³ Mudway IS and Kelly FJ. An Investigation of Inhaled Ozone Dose and the Magnitude of Airway Inflammation in Healthy Adults. *Am J Respir Crit Care Med* 2004; 169:1089-1095.
- ⁴ Horstman DH, Folinsbee LJ, Ives PJ, Abdul-Salaam S, McDonnell WF. Ozone Concentration and Pulmonary Response Relationships for 6.6-hour Exposures with Five Hours of Moderate Exercise to 0.08, 0.10, and 0.12 ppm. *Am Rev Respir Dis* 1990; 142: 1158-1163; McDonnell WF, Stewart PW, Smith MV, Pan WK, Pan J. Ozone-induced Respiratory Symptoms: Exposure-response Models and Association with Lung Function. *Eur Respir J* 1999; 14:845-853.
- ⁵ U.S. Environmental Protection Agency, Smog—Who Does It Hurt? What You Need to Know About Ozone and Your Health, EPA-425/K-99-001, July 1999.
- ⁶ Hollingsworth JW, Kleeberger SR, Foster WM. Ozone and Pulmonary Innate Immunity. *Proc Am Thorac Soc* 2007; 4:240-246.
- ⁷ Gent JF, Triche EW, Holford TR, Belanger K., Bracken MB, Beckett WS, Leaderer BP. Association of Low-level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma. *JAMA* 2003; 290:1859-1867.
- ⁸ Burnett RT, Brook JR, Yung WT, Dales RE, Krewski D. Association between Ozone and Hospitalization for Respiratory Diseases in 16 Canadian Cities. *Environmental Research* 1997; 72:24-31.
- ⁹ 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.
- ¹⁰ 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.
- ¹¹ 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.
- ¹² 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.
- ¹³ 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; 76:67-77.
- ¹⁴ Kinney PL, Lippmann M. Respiratory Effects of Seasonal Exposures to Ozone and Particles. *Arch Environ Health* 2000; 55: 210-216.
- ¹⁵ Devlin RB. Identification of Subpopulations that are Sensitive to Ozone Exposure: Use of End Points Currently Available and Potential Use of Laboratory-based End Points under Development. *Environ Health Perspec* 1993; 101:225-230; and Frampton MW, Morrow PE, Torres A, Cox C, Voter KZ, Utell MJ. Ozone Responsiveness in Smokers and Nonsmokers. *Am J Respir Crit Care Med* 1997; 155:116-121.
- ¹⁶ 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 2nd 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.
- ¹⁷ 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.