The National Ambient Air Quality Standards for Ozone

OZONE AND HEALTH

On Oct. 1, 2015, the U.S. Environmental Protection Agency (EPA) strengthened the National Ambient Air Quality Standards (NAAQS) for ground-level ozone to 70 parts per billion (ppb), based on extensive scientific evidence about ozone's effects on public health and welfare. The updated standards will improve public health protection, particularly for at risk groups including children, older adults, people of all ages who have lung diseases such as asthma, and people who are active outdoors, especially outdoor workers, among others.

Highlights

- The body of scientific evidence about ozone's effects on health is significantly expanded since EPA last reviewed the standards in 2008.
- Exposure to ozone can harm the respiratory system (the upper airways and lungs), aggravate asthma and other lung diseases, and is linked to premature death from respiratory causes.
- Studies also indicate that ozone is likely to result in harmful respiratory effects, including respiratory symptoms. Evidence indicates ozone also is likely to be one of the many causes of asthma development.
- People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers. In addition, people with certain genetic characteristics, and people with reduced intake of certain nutrients, such as vitamins C and E, are at greater risk from ozone exposure.
- These health impacts pose significant costs on American families and workers, and can adversely affect their daily lives through missed school and work and the need to constrain regular activities.

Thousands of Studies Show that Ozone Can Harm Public Health

- EPA examined thousands of scientific studies in this review of the ozone standards, including more than 1,000 new studies published since EPA last revised the standards in 2008. This extensive body of scientific evidence indicates that breathing air that contains ozone can cause serious health effects. And some of the new studies report harmful health effects even at ozone levels that meet the 2008 8-hour primary (health) standard of 75 parts per billion.

- Studies show harmful health effects from both short-term exposures to ozone (hours to days) and long-term exposures (months to years).

Respiratory effects

- A large body of scientific evidence, spanning several decades, shows that short-term exposure to ozone can cause a broad range of respiratory effects – from inflammation of the airways to respiratory effects that can lead to increased use of medication, school absences, respiratory-related hospital admissions, and emergency room visits for asthma and chronic obstructive pulmonary disease (COPD).

- Studies show that ozone can cause effects such as reductions in lung function, inflammation of the airways, and symptoms such as chest pain, coughing, wheezing and shortness of breath – even in healthy people. These effects can be more serious in people with lung diseases, such as asthma.

- An estimated 23 million people have asthma in the U.S., including 6.1 million children, according to CDC estimates for 2013. Asthma disproportionately affects children, families with lower incomes, and minorities, including Puerto Ricans, Native Americans/Alaska Natives and African-Americans.

- Long-term exposure to ozone is linked to aggravation of asthma and a variety of other effects on the respiratory system, and is likely to be one of many causes of asthma development. In addition, some studies suggest long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children.

Mortality (death)

- The scientific evidence on ozone exposure and premature death has expanded since the last review of the standards (2008), with recent studies consistently reporting associations between short-term ozone exposures and total non-accidental mortality, which includes deaths from respiratory causes. Studies suggest that long-term exposure to ozone also may increase the risk of death from respiratory causes, but the evidence is not as strong as the evidence for short-term exposure.

Cardiovascular effects

- Although the evidence of ozone's effects on the cardiovascular system (the heart, blood and blood vessels) is more limited than the evidence of respiratory effects, it indicates that short-term exposure to ozone may cause effects such as changes in heart rate variability

and systemic inflammation. Some evidence also suggests that long-term ozone exposure also may cause cardiovascular effects.

For More Information

- To read the standards and additional summaries, visit http://www.epa.gov/glo/actions.html
- To read documents from this review of the standard, including the Integrated Science Assessment, Risk and Exposure Assessments, and the staff Policy Assessment, visit: http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_index.html