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Comments from the American Thoracic Society

Presented by Gregory B. Diette MD

House Energy and Commerce Committee

on

EPA's Proposed Ozone National Ambient Air Quality Standard

June 16, 2015

Mr. Chairman, Ranking member, my name is Dr. Gregory Diette. I am a pulmonologist in the Division of Pulmonary and Critical Care Medicine at Johns Hopkins University in Baltimore, Maryland. On behalf of the American Thoracic Society I want to thank the Committee for the opportunity to testify regarding the Ozone National Ambient Air Quality Standard proposed by the Environmental Protection Agency (EPA). The American Thoracic Society is a medical professional organization with over 15,000 professionals and patients who are dedicated to the prevention, detection, treatment and cure of respiratory disease, critical care illnesses and sleep-disordered breathing. We pursue our mission through research, clinical care, education and advocacy.

Ozone (O₃) is a potent oxidant that damages the airways and lungs. The American Thoracic Society strongly supports EPA's proposal to strengthen the National Ambient Air Quality Standard for ozone. If anything, we are disappointed EPA did not go further in recommending a stronger standard of 60 ppb.

For several years, the ATS has encouraged the EPA to issue a more protective ozone standard. When the standard was reviewed in 2007 under the Bush Administration, we recommended a standard of 60 ppb based on the available evidence at that time. When the Obama Administration first reconsidered this standard in 2010, we again urged 60 ppb. While the recommended standard endorsed by physician community has not changed during this time, the scientific evidence supporting this recommendation has significantly strengthened. The scientific evidence available seven years ago justifying this recommendation has been supplemented by an even greater understanding of the health effects of ozone exposure, including higher rates of respiratory disease in infants and children, reduced lung function, and increased mortality in adults. Indeed, there is clear, consistent, and conclusive evidence that we believe should compel EPA to establish an ozone standard no higher than 60 ppb [1,2].

It is the second time that the Obama Administration has considered the current ozone standard of 75 ppb. In 2007, the Bush administration established the current standard outside of the range recommended by the independent Clean Air Science Advisory Committee (CASAC) of 60 ppb to 70 ppb [3]. In 2010, CASAC reaffirmed its initial recommendation as part of an early reassessment the ozone standard, an effort that was ultimately abandoned in 2011 [4]. Since a new scientific assessment was not conducted as part of that review, the current review of the ozone standard is the first to consider new scientific evidence since 2006.

Ozone exposures in the range of 60 ppb to 70 ppb have adverse physiologic effects across the entire age spectrum—from newborn infants to the elderly. While there is also some evidence of health effects of ozone exposure below 60 ppb, the strongest evidence supports the conclusion that serious adverse health effects occur across all ages at levels above 60 ppb.

Highlights of this new body of evidence include several lines of evidence demonstrating dose-response relationships between ozone exposure in the 60-80 ppb range and childhood asthma hospital admissions and emergency room visits. [6-9] A new study of emergency department visits by preschool children in Atlanta found that a 30 ppb increase in the three-day average of ozone was associated with an 8% higher risk of pneumonia [5].

Suffice it to say, ozone pollution – at levels permissible under the current standard – makes children sick. EPA has the authority and obligation to set a standard that protects children from the adverse health effects of ozone exposure. But it's not just children -- adults are also harmed by ozone exposure.

Research has also shown that for each incremental rise in ozone exposure, severe asthma exacerbations, emergency room visits, and hospitalizations for asthma increase for adults [9-11]. Similar associations have been found for adult admissions for chronic obstructive pulmonary disease and [12, 13] and pneumonia [13]. A population-based cohort study of generally healthy adults found that lung function (FEV₁) was lower after days when ambient ozone ranged from 59 ppb to 75 ppb compared to days with levels under 59 ppb [14]. Healthy individuals have normal lung function. Not surprisingly, poorer lung function is associated with greater morbidity in patients who have chronic respiratory diseases and lowers the threshold for exacerbations. Controlled human exposure studies have re-affirmed lung function decrements in healthy adults after exposure to 60 ppb to 70 ppb of ozone [15, 16]. Perhaps of greatest concern, there is now stronger evidence of increased mortality in association with higher ozone levels [17-19], particularly among the elderly and those with chronic disease [20, 21]. These large, multi-city studies found strong and consistent associations with increased risk of premature death, particularly in the warmer months when ozone levels are higher.

In sum, there is accumulating evidence that ozone pollution – at levels permitted by the current standard – is damaging to the human lungs and contributes to disease. We strongly encourage EPA and the Administration to move forward with a strong standard of 60 ppb to protect our nation's health from known health effects of ozone.

While the evidence on ozone and respiratory effects is comprehensive and compelling, recent studies have shown adverse health effects beyond the lung. The Integrated Science Assessment (ISA) has concluded that, "...the evidence is stronger for most every health endpoint, with causal findings strengthened from 'suggestive' to 'likely causal' for cardiovascular effects and total mortality from short-term exposures." In addition, the ISA noted that ozone affects the central nervous system and brain, and comments that a number of recent toxicological studies revealed various changes in neurologic function or histology with long-term exposure to ozone, including changes similar to those observed in neurodegenerative disorders, such as Parkinson disease and Alzheimer disease. The ISA concluded that, "...the toxicological evidence for the impact of O₃ on the brain and behavior is strong, and suggestive of a causal relationship between O₃ exposure and effects on the central nervous system. "[22]

In summary, research only reaffirms and deepens our understanding of the health effects of ozone exposure. Without question, the current EPA ozone standard fails to protect America's public health. The Environmental Protection Agency and the Administration both have the authority and the obligation to establish a more protective ozone standard. The American Thoracic Society strongly urges EPA and the Administration to finalize a more protective ozone standard of 60 ppb.

I would be happy to answer any questions.

References

1. Dey R, Winkle L, Ewart G, Balmes J, Pinkerton K. A second chance. Setting a protective ozone standard. *Am J Respir Crit Care Med* 2010;181:297–9.
2. Pinkerton KE, Balmes JR, Fanucchi M, Rom WN. Ozone, a malady for all ages. *Am J Respir Crit Care Med* 2007;176:107–8.
3. Clean Air Scientific Advisory Committee. *Clean Air Scientific Advisory Committee Recommendations Concerning the Final Rule for the National Ambient Air Quality Standards for Ozone*. 2008. At <<http://nepis.epa.gov/EPA/html/DLwait.htm?url=/Exe/ZyPDF.cgi/P1000JY2.PDF?Dockey=P1000JY2.PDF>>.
4. Clean Air Scientific Advisory Committee. *Review of EPA's Proposed Ozone National Ambient Air Quality Standard*. 2010. At <[http://yosemite.epa.gov/sab/sabproduct.nsf/610BB57CFAC8A41C852576CF007076BD/\\$File/EPA-CASAC-10-007-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/610BB57CFAC8A41C852576CF007076BD/$File/EPA-CASAC-10-007-unsigned.pdf)>.
5. Darrow LA, Klein M, Flanders WD, Mulholland JA, Tolbert PE, Strickland MJ. Air pollution and acute respiratory infections among children 0-4 years of age: an 18-year time-series study. *Am J Epidemiol* 2014;doi:10.1093/aje/kwu234.
6. Strickland MJ, Klein M, Flanders WD, Chang HH, Mulholland JA, Tolbert PE, Darrow LA. Modification of the effect of ambient air pollution on pediatric asthma emergency visits: susceptible subpopulations. *Epidemiology* 2014;25:843–50.
7. Strickland MJ, Darrow LA, Klein M, Flanders WD, Sarnat JA, Waller LA, Sarnat SE, Mulholland JA, Tolbert PE. Short-term associations between ambient air pollutants and pediatric asthma emergency department visits. *Am J Respir Crit Care Med* 2010;182:307–16.
8. Gleason JA, Bielory L, Fagliano JA. Associations between ozone, PM_{2.5}, and four pollen types on emergency department pediatric asthma events during the warm season in New Jersey: a case-crossover study. *Environ Res* 2014;132:421–9.
9. Silverman RA, Ito K. Age-related association of fine particles and ozone with severe acute asthma in New York City. *J Allergy Clin Immunol* 2010;125:367–373.e5.
10. Glad JA, Brink LL, Talbott EO, Lee PC, Xu X, Saul M, Rager J. The relationship of ambient ozone and PM_{2.5} levels and asthma emergency department visits: possible influence of gender and ethnicity. *Arch Environ Occup Health* 2012;67:103–108.
11. Meng YY, Rull RP, Wilhelm M, Lombardi C, Balmes J, Ritz B. Outdoor air pollution and uncontrolled asthma in the San Joaquin Valley, California. *J Epidemiol Community Health*. 2010;64:142–147.
12. Ko FWS, Hui DSC. Air pollution and chronic obstructive pulmonary disease. *Respirology* 2012;17:395–401.
13. Medina-Ramon M, Zanobetti A, Schwartz J. The effect of ozone and PM₁₀ on hospital admissions for pneumonia and chronic obstructive pulmonary disease: a national multicity study. *Am J Epidemiol* 2006;163:579–588.

14. Rice MB, Ljungman PL, Wilker EH, Gold DR, Schwartz JD, Koutrakis P, Washko GR, O'Connor GT, Mittleman MA. Short-term exposure to air pollution and lung function in the Framingham Heart Study. *Am J Respir Crit Care Med* 2013;188:1351–7.
15. Schelegle ES, Morales CA, Walby WF, Marion S, Allen RP. 6.6-hour inhalation of ozone concentrations from 60 to 87 parts per billion in healthy humans. *Am J Respir Crit Care Med* 2009;180:265–72.
16. Kim CS, Alexis NE, Rappold AG, Kehrl H, Hazucha MJ, Lay JC, Schmitt MT, Case M, Devlin RB, Peden DB, Diaz-Sanchez D. Lung function and inflammatory responses in healthy young adults exposed to 0.06 ppm ozone for 6.6 hours. *Am J Respir Crit Care Med* 2011;183:1215–21.
17. Peng RD, Samoli E, Pham L, Dominici F, Touloumi G, Ramsay T, Burnett RT, Krewski D, Le Tertre A, Cohen A, Atkinson RW, Anderson HR, Katsouyanni K, Samet JM. Acute effects of ambient ozone on mortality in Europe and North America: results from the APHENA study. *Air Qual Atmos Health* 2013;6:445–453.
18. Romieu I, Gouveia N, Cifuentes LA, de Leon AP, Junger W, Vera J, Strappa V, Hurtado-Díaz M, Miranda-Soberanis V, Rojas-Bracho L, Carbajal-Arroyo L, Tzintzun-Cervantes G. Multicity study of air pollution and mortality in Latin America (the ESCALA study). *Res Rep Health Eff Inst* 2012;Oct:5–86.
19. Zanobetti A, Schwartz J. Mortality displacement in the association of ozone with mortality: an analysis of 48 cities in the United States. *Am J Respir Crit Care Med* 2008;177:184–9.
20. Medina-Ramón M, Schwartz J. Who is more vulnerable to die from ozone air pollution? *Epidemiology* 2008;19:672–9.
21. Zanobetti A, Schwartz J. Ozone and survival in four cohorts with potentially predisposing diseases. *Am J Respir Crit Care Med* 2011;184:836–41.
22. Integrated Science Assessment for Ozone and Related Photochemical Oxidants. EPA 600/R-10/076F, February 2013; 6-219.