Testimony of Deborah Shprentz
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on
EPA's Proposed Revisions
to the
National Ambient Air Quality Standards for Ozone
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Good morning and thank you to the members of this panel for coming to Philadelphia today. I am Deborah Shprentz and I serve as a consultant to the American Lung Association. I have carefully followed this review of the National Ambient Air Quality Standards (NAAQS) for ozone since its inception.

The proposed range is a major improvement over the existing standard, but it falls short of what is needed to protect public health.

I'd like to focus today on scientific studies demonstrating the adverse effects of ozone at low concentrations, which, along with a raft of other evidence, compel EPA to set a final standard of 60 ppb.

My time is limited, so, with apologies to David Letterman, I've drawn up a list of just the top ten of these studies.

Number 10. Koken (2003): This study tracked summertime cardiovascular hospital admissions of seniors at 11 Denver County hospitals over a four year period. Researchers found that ozone increased the risk of hospitalization *even at levels that meet federal air quality standards.* Daily average ozone concentrations were 25 ppb, and maximum concentrations were 40 ppb.[1]

Number 9. Brunekreef (1994): The study examined effects of ozone in amateur bicyclists in the Netherlands. Researchers collected lung function measurements before and after summer training sessions or competitive races. Ozone concentrations were low on most occasions, with an average of 43 ppb. These low ozone concentrations were significantly associated with a decline in lung function and an increase in respiratory symptoms, especially shortness of breath. *The effect persisted even after removing all observations with hourly ozone concentrations greater than 60 ppb.*[2]

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[1] Koken PJ, Piver WT, Ye F, Elixhauser A, Olsen LM, Portier CJ. Temperature, air pollution, and hospitalization for cardiovascular diseases among elderly people in Denver. *Environ Health Perspec* 2003; 111: 1312-1317,

[2] Brunekreef B, Hoek G, Breugelmans O, Leentvaar M. Respiratory Effects of Low-level Photochemical Air Pollution in Amateur Cyclists. *Am J Respir Crit Care Med* 1994; 150: 962-966.

Number 8. Medina-Ramon (2006): A very large study of Medicare recipients in 36 U.S. cities evaluated the effect of ozone and PM_{10} on respiratory hospital admissions in the elderly over a 13-year period. The analysis found that the risk of daily hospital admissions for COPD and pneumonia increased with short-term increases in ozone concentrations during the warm season. Eight-hour mean ozone concentrations in the warm season ranged from 15 ppb in Honolulu to 63 ppb in Los Angeles, with most cities in the 40-55 ppb range.[3]

Number 7. Dales (2006): This research study examined 15 years of data on newborns in 11 large Canadian cities to determine the influence of gaseous air pollutants on daily hospitalizations for respiratory causes. Ozone concentrations were extremely low, ranging from a 24-hour mean of 13 ppb in Vancouver to 23 ppb in Saint John. Although hospital admissions for respiratory disease are relatively uncommon in newborns compared with adults, this study found a strong association with ozone. In fact, the study suggests that air pollution at ambient levels seen in Canada could account for 15 percent of hospital admissions in newborns.[4]

Number 6. Naeher (1999): Scientists examined the relationship between air pollution and daily changes in lung function in about 500 nonsmoking women in Roanoke, Virginia over the summers of 1995-1996. A 30 ppb increment in 24-hour average ozone was associated with a decrease in evening peak expiratory flow. *Ozone concentrations in this study were well below the current 8-hour ozone standard.* The mean daily maximum 8-hour ozone concentration was 54 ppb, and concentrations never exceeded 88 ppb.[5]

Number 5. Brauer (1996): A study of the effect ozone exposure on lung function of outdoor farm workers was undertaken in British Columbia. The mean work shift concentrations were low, just 26 ppb, with a maximum of 54 ppb. The study found that exposures were associated with decreased lung function over the day, which persisted to the following day. *Even after excluding all days when the ozone was greater than 40 ppb, investigators still observed reduced lung function.*[6]

Number 4. Chan (2005): This study in Taiwan reported acute lung function decline in mail carriers exposed to ozone concentrations below the current air quality standard. The average 8-hour concentration of ozone in this study was 36 ppb, *and the maximum*

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[3] Medina-Ramón M, Zanobetti A, Schwartz J. The Effect of Ozone and PM_{10} on Hospital Admissions for Pneumonia and Chronic Obstructive Pulmonary Disease: A National Multicity Study. *American Journal of Epidemiology 2006*; 163: 579-588.

[4] Dales RE, Cakmak S, Doiron MS. Gaseous Air Pollutants and Hospitalization for Respiratory Disease in the Neonatal Period. *Environ Health Perspect* 2006; 114: 1751-1754.

[5] Naeher LP, Holford TR, Beckett WS, Belanger K, Triche EW, Bracken MB, Leaderer BP. Healthy Women's PEF Variations with Ambient Summer Concentrations of PM_{10}, $PM_{2.5}$, SO_4^{2-}, H^+, and O_3. *Am J Respir Crit Care Med* 1999; 160: 117-125.

[6] Brauer M, Blair J, Vedal S. Effect of Ambient Ozone Exposure on Lung Function in Farm Workers. *Am J Respir Crit Care Med* 1996; 154: 981-987.

concentration was 65 ppb. Each 10 ppb increase in the 8-hour ozone concentration, decreased the night-time peak expiratory flow rate.[7]

Number 3. Mortimer (2002): The effect of daily ambient air pollution was examined in a cohort of 864 asthmatic children in 8 urban areas of the U.S. in a long term study. 8-hour average daytime ozone concentrations were 48 ppb, with a range across cities of 34 to 58 ppb. Adverse effects were observed in all cities. Summertime ozone *at levels below the current air quality standards* was significantly related to respiratory symptoms and decreased pulmonary function in children with asthma.[8]

Number 2. Bell (2004): This is a large 14-year study of residents of 95 U.S. cities, in which short-term increases in ozone were found to increase deaths from heart and lung disease. *Even when days exceeding 60 ppb were excluded from the analysis, the mortality effect was evident.*[9]

Number 1. Adams (2002, 2006): Controlled human exposure studies offer the most compelling evidence of the effects of ozone on lung health. EPA has undertaken a careful reanalysis of the underlying data in the Adams studies to assess the change in lung function following exposure to ozone while exercising. The pre- to post-exposure analysis shows that 6.6 hour exposures to 60 ppb ozone causes a statistically significant decrease in group mean lung function compared to filtered air, in healthy young adults.[10]

There you have it. Ten studies all demonstrating adverse effects of ozone ranging from lung function decline and respiratory symptoms, to hospitalization and even premature death, at concentrations of around 60 ppb. That is why we urge EPA to set a final standard of 60 ppb, at the low end of the ranges recommended by the Clean Air Scientific Advisory Committee (CASAC) and EPA Staff Scientists, in order to protect public health.

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[7] Chan C-C, Wu T-H. Effects of Ambient Ozone Exposure on Mail Carriers' Peak Expiratory Flow Rates. *Environ Health Perspect* 2005; 113: 735-738.

[8] Mortimer, KM, Neas LM, Dockery DW, Redline S, Tager IB. The effect of air pollution on inner-city children with asthma. *Eur Respir J* 2002; 19: 699-705.

[9] 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.

[10] U.S. EPA Memorandum from James S. Brown, EPA, NCEA-RTP Environmental Media Assessment Group, Thru Mary Ross, EPA, NCEA-RTP, EMAG Branch Chief and Ila Cote, EPA, NCEA-RTP, Director, To Ozone NAAQS Review Docket (OAR-2005-0172), The Effects of Ozone on Lung Function at 0.06 ppm in Healthy Adults, June 14, 2007.