



Keck School of Medicine
University of Southern California

United States Senate Committee on Environment and Public Works
“Hearing to Examine Port Pollution and the Need for Additional Controls
on Large Ships”

Thursday August 9, 2007 Los Angeles CA

Department of
Preventive Medicine

Testimony Provided by:
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Good morning. My name is Ed Avol. I am a Professor in the Environmental Health Division of the Department of Preventive Medicine, at the Keck School of Medicine, at the University of Southern California (USC). I direct and participate in numerous health and exposure research studies, many funded by the National Institutes of Health, to understand the relationships between environmental exposure and human health. I am specifically interested in the effects of air pollution on children, and I am one of many investigators participating in the Children’s Health Study, a multi-year investigation of the long-term effects of air pollution in over 11,000 California school children.

I appreciate the opportunity to share with you some of the current scientific research regarding the health effects of air pollution, and I am here today to speak about the health effects of pollutants associated with port operations.

There are four main points I would like to emphasize this morning:

- 1) The health effects of air pollution are measurable and substantial.
- 2) Port operations, specifically ocean-going vessels, account for a large portion of the pollution problem here in Southern California.
- 3) Pollution and health impacts by port operations are disproportionately borne by the local region.
- 4) Pollution reductions made *now* affect children’s health *now* in measurable and meaningful ways.

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Point #1: The Health Effects of Air Pollution are Measurable and Substantial

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There has been a great deal of published research in recent years on the effects of pollution on respiratory and cardiovascular health. Our main body of research has focused on school children, and the effects of air pollution on their respiratory health as they develop into adulthood.

Every child deserves a healthy start, a chance for their lungs and respiratory system to fully develop and provide them with the capacity and capability to breathe...but sadly, many children do not get that equal chance. Our studies have shown that children growing up in more polluted communities have slower-growing lungs^{1,2}, and that after years of losing a percent or two of lung growth each year compared to their peers growing up in communities with cleaner air, children in more polluted communities have higher rates of clinically significant low lung function and decreased ability to move air through their respiratory system³ – just because of the quality of the outdoor air they breathe. Children with asthma have more symptoms and respiratory problems in more polluted communities⁴, and these observations are important because low lung function is a predictor for respiratory disease later in life and even early death⁵⁻⁸.

The documented effects of air pollution on humans are not limited to children. In adults, long-term exposure to pollutants associated with combustion exhaust (that is, energy production for power generation, and to move cars, trucks, planes, and ships) have been shown to result in increased risk for cardiovascular disease such as atherosclerosis⁹⁻¹¹, increased heart attacks¹², increased emergency room visits for acute health events¹³, and increased rates of death¹⁴. Among pregnant mothers, air pollution has been linked to low-birthweight babies¹⁵, premature births¹⁶, and some heart-related birth defects¹⁷. So for a range of health outcomes in numerous segments of the population, the long-term effects of air pollution can be serious and persistent.

Point #2: Port Operations Account for a Large Portion of the Pollution Problem in Southern California

As you have heard from the state and regional air regulatory agencies, the Los Angeles Basin and the larger regional area continues to struggle to meet the current National Ambient Air Quality Standards

(NAAQS). Millions of people in this region regularly breathe what the US Environmental Protection Agency deems to be unacceptably dirty and unhealthy air. Even with the aggressive and progressive policies of the South Coast Air Quality Monitoring District and additional measures by the State of California, the air in this region is unlikely to meet the current NAAQS until after 2014 for PM and 2023 for ozone¹⁸.

Recent inventories conducted in the Ports of Los Angeles and Long Beach have confirmed the importance of ocean-going vessels in port and regional emissions. Based on the Ports' own 2001/2002 inventories, ships account for about 59% of the particle pollution, 36% of the oxides of total nitrogen, and 90% of the sulfur oxides¹⁹. Port emissions alone account for about 12% of basin-wide diesel pollution, about 9% of total NOx, and about 45% of total sulfur oxides. These levels are unacceptably high, and have both direct and subtle effects. Some of the direct effects of pollutant emissions are being discussed here this morning. The subtle effects arise from the fact that gaseous sulfur oxides in the air undergo photochemical reactions resulting in increased particle sulfate, and gaseous nitrogen oxides emissions are involved in a similar photochemical transformation leading to increased ozone. Therefore, the sulfur in dirty fuels and the NOx from port emissions also contribute downwind and throughout the Southern California region to increased particle and ozone pollution. Although motor vehicles are undeniably a major contributor to much of the air pollution in Southern California, the ports, as an area source, are a singularly identifiable and important source of pollution, as well.

Point #3: Pollution and Health Impacts by Port Operations are Disproportionately Borne by the Local Region

The ports of Long Beach and Los Angeles are among the largest in the world, and they are the largest complex (in terms of cargo boxes processed) in the United States. Southern California is a critical link for Pacific Rim countries; almost half of the total cargo entering the United States enters through these two ports. Accordingly, much of the "goods", in terms of cargo intended for the rest of the country, move through the Southern California region, but much of the "bads", in terms of pollution and health impacts, stay right here. Simply put, we need the Federal Government to step up and provide improved leadership, additional funding, and adequate protection for the health of Southern Californians and all Americans living near our nation's seaports.

**Point #4: Pollution Reductions Made Now Affect Children's Health
Now in Measurable and Meaningful Ways**

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Published research from the Children's Health Study has shown that changes in air quality achieved during a child's teen years of lung development can directly affect lung health^{20,21}. While their lungs are rapidly growing, a child who moves to a more polluted area will generally find that their lung growth rate slows down to mimic the rate of children who have been living in the more polluted community. Conversely, a child who moves to a cleaner area will begin to grow at a faster rate, more like children who have been living in the cleaner area for longer periods of time. This suggests that cleaning up the air in a child's community during the period of that child's respiratory growth can measurably change the child's rate of lung growth. Improved respiratory growth, we believe, improves children's prognosis for future respiratory health and quality of life.

It has been noted this morning that this region's air quality will not meet current National Air Quality Guidelines for at least another seven years for particles, and perhaps not for another sixteen years for ozone. Failing to do more at a quicker pace is akin to condemning the current generation of children to lower achieved lung growth and higher risk for later respiratory disease.

We are each entrusted to be responsible wards of our environment and to do whatever we can for succeeding generations. We must ensure that both the environment we leave is better than the one we inherited, and that the collective health of the next generation is not imperiled by our current behavior. As responsible mothers and fathers, we should strive for no less. As responsible regulators and policy makers, you should consider this to be not the ceiling for your objectives, but the floor.

Thank You.

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