ANALYSIS

Health Risks of Ozone Are Exaggerated

Part 1 in a series

Rethinking America's Ozone Policy
In the first of a series of four articles, Joel Schwartz, an air quality scientist at the American Enterprise Institute, shows where national ozone policy has gone wrong and how we can achieve healthy air at a far lower price.

by Joel Schwartz

Americans spend perhaps more than a hundred billion dollars each year for measures to reduce emissions of ozone-forming pollutants from motor vehicles, power plants, and a host of other sources. Costs continue to rise over time, as the Environmental Protection Agency (EPA) increasingly tightens its ozone standards and adopts ever more stringent regulations.

Air quality regulation has become more about process and power than about results. Most regulatory activity involves creating, and then demonstrating compliance with, administrative requirements rather than actually reducing air pollution. And in the case of ozone, evidence is mounting that regulators' policies are actually counterproductive, slowing the rate of ozone improvement in much of the nation.

The costs of reducing ozone might be worth bearing if ozone were exacting a large toll on people's health. But even as environmental activists have become more strident in asserting health alarms, evidence has mounted that ozone at current levels is causing little or no harm, even in the most polluted areas of the country.

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Smog appears as a brown streak across the horizon.

Ozone and Asthma

The prevalence of asthma has nearly doubled in America during the past 25 years, at the same time levels of ozone and other air pollutants sharply declined nationwide. Emergency room visits for asthma are at their lowest in July and August—when ozone levels are at their highest. A government-funded study of thousands of children in California reported that children who grew up in the highest-ozone areas had a 30 percent lower risk of developing asthma, when compared with children in low-ozone areas.

"[E]liminating virtually all human-caused ozone in California ... would reduce asthma-related emergency room (ER) visits by only 1.8 percent."

While ozone can trigger asthma attacks, the effect is small. According to estimates by the California Air Resources Board (CARB), eliminating virtually all human-caused ozone in California—where millions of people live in areas with by far the highest ozone levels in the country—would reduce asthma-related emergency room (ER) visits by only 1.8 percent.

Risks Are Exaggerated

If ozone is at worst a minor health issue, why does the problem seem so serious? Regulators and environmental activists don't maintain their jobs, power, and funding by admitting we've solved the problems that justify their existence. These groups need to maintain a climate of fear to stay in business, and they do so by creating an unwarranted appearance of serious and pervasive harm from air pollution.

According to an EPA fact sheet, "ozone can irritate lung airways and cause inflammation much like a sunburn. ... People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high."

These claims stand in stark contrast to EPA's own estimates of the actual health effects of ozone. In a recent paper published in the journal *Environmental Health Perspectives*, EPA scientists predicted that going from ozone levels during 2002, which were by far the highest of the past several years, down to national attainment of the new federal eight-hour ozone standard—about a 10 percent to 20 percent ozone reduction for most non-attainment areas—would reduce respiratory-related hospital admissions by 0.35 percent and asthma-related emergency room visits by 0.2 percent.

The story is similar for long-term ozone exposure. CARB's Children's Health Study (CHS) followed nearly 1,800 children in 12 California communities from ages 10 to 18. Researchers from the University of Southern California (USC), who carried out the study, reported ozone had no effect on children's lung development, despite the fact that the study included areas with the worst air pollution in the country: more than 100 days per year exceeding the federal eight-hour ozone standard.

Nevertheless, in its *State of the Air 2005* report, the American Lung Association claimed, "Almost half of all Americans are living in counties where [ozone] places them at risk for decreased lung function."

"[W]hile higher ozone was associated with a greater risk of developing asthma for children who played three or more team sports ..., higher ozone was associated with a 30 percent *lower* risk of asthma in the full sample of children in the [California] study."

Scientists Complicit

Unfortunately, air pollution health scientists are also complicit in the exaggeration of air pollution's health effects. A key example comes once again from the Children's Health Study.

At a joint news conference in 2002, USC scientists and CARB officials reported children who played three or more team sports were more than three times as likely to develop asthma if they lived in high-ozone CHS communities,

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when compared with low-ozone communities.

What the researchers failed to disclose at the news conference was that, while higher ozone was associated with a greater risk of developing asthma for children who played three or more team sports (8 percent of the children), higher ozone was associated with a 30 percent *lower* risk of asthma in the full sample of children in the study.

The researchers also claimed the study showed child athletes all across the country were at increased risk of developing asthma. That too was false. The study was based on ozone levels during 1994-1997 in southern California, when the high-ozone CHS communities averaged 90 eight-hour ozone exceedance days per year. But no area outside California has ever had ozone levels anywhere near that high. In fact, by the time the study was released in 2002, it didn't even apply in southern California anymore, as ozone exceedances had declined more than 50 percent in the interim—a fact that also went unmentioned at the news conference.

"[R]educing ozone would rank near the bottom of any rational list of priorities for improving Americans' health."

False Claims Repeated

Unfortunately, medical experts are often key players in the exaggeration of air pollution's health effects. Scientists, regulators, activists, and journalists continue to cite the CHS study as evidence that air pollution increases people's risk of developing asthma.

For example:

- A researcher from the Bloomberg School of Public Health at Johns Hopkins asserted in the introduction to a recent Sierra Club report, "Traffic presents a unique public health threat" including "children's asthma rates occurring at epidemic proportions."
- After the American Lung Association gave Tarrant County (Fort Worth), Texas a failing grade for ozone in 2003, the president of a local branch of the Tarrant County Medical Society asserted, "It means we can anticipate a worsening of an already epidemic asthma problem."
- In a recent commentary on air pollution and asthma in the *Journal of the American Medical Association*, two prominent air pollution health researchers state, "Evidence exists that air pollution may have contributed to the increasing prevalence of asthma." The evidence they cite is the CHS asthma study.
- When the CHS asthma study was released, the director of the pediatric asthma program at the University of California at Davis asserted, "Sacramento is a very high ozone area, so [the CHS asthma study] is going to be very relevant to us."

Conflicts of Interest Evident

Regulators and activists have clear institutional and ideological interests in exaggerating air pollution risks. And it is no secret that bad news sells, encouraging journalists to seek out pessimistic environmental stories. But why would scientists help manufacture air pollution scares?

Self-selection is one factor. Scientists who choose a career in air pollution health research are probably more likely to hold an environmentalist ideology and to believe air pollution is a serious problem. Many air pollution health researchers have explicitly aligned themselves with environmental groups.

The political economy of regulation-related science is also key. Regulatory agencies are major funding sources for the health research that is then used to justify those agencies' power and budgets. We shouldn't be surprised if regulators are more likely to fund researchers whose views are congenial to regulators' interests.

Regulations Proving Costly

None of this would matter if reducing air pollution were free. But Americans will have to spend more than $100 billion per year—about $1,000 per household—just to attain the current eight-hour ozone standard. That money—or more correctly, the labor, capital, and know-how that money represents—would otherwise go to health care, food, housing, entertainment, education, and other things Americans value. Instead, for this stupendous sum we will eliminate at best a few tenths of a percent of all respiratory disease and distress.

Health is the main justification for the nation's costly air quality management system, but reducing ozone would rank near the bottom of any rational list of priorities for improving Americans' health.

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INTERNET INFO

For a more detailed discussion of ozone and health, see Joel Schwartz's recent study, *Rethinking the California Air Resources Board's Ozone Standards*, available online at **http://www.aei.org/doclib/20050912_Schwartz-whitepaper.pdf**.

EPA's New NOx Rules Could Increase Urban Smog Problem

Short-term effect may be paraded as excuse for even more regulation

by James M. Taylor

The U.S. Environmental Protection Agency (EPA) will be allowed to implement potentially counterproductive smog-prevention regulations after the U.S. Supreme Court on November 14 let stand a lower court decision that a legal technicality prevented the National Alternative Fuels Association (NAFA) from challenging the regulations.

Complex Interactions

EPA says regulations it implemented in 2000 will reduce the formation of ground-level ozone, a key smog component. Ozone forms when nitrous oxides (NOx) react with volatile organic compounds (VOC) on hot, sunny days. Accordingly, "smog season" in the U.S. tends to run from approximately April 1 through September 30.

A cursory look at the components of ozone formation would lead one to believe cutting either NOx or VOC concentrations would reduce ozone and, hence, smog. However, computer models and real-world observations indicate the equation is not so simple.

Ozone formation is not dependent only on the mere presence of NOx and VOC. "Ozone formation depends on the ratio of VOC to NOx, and different ratios of VOC/NOx lead to very different outcomes," explained Joel Schwartz, a visiting fellow at the American Enterprise Institute.

According to computer models, "when the VOC/NOx ratio is high—greater than about 10 to one—ozone formation is limited by the availability of NOx, and VOC reductions have no effect on ozone levels. But when the VOC/NOx ratio falls below 10 to one, VOC reductions begin to reduce ozone," Schwartz observed. Paradoxically, when the VOC/NOx ration is below 10 to one, "reducing NOx actually increases ozone."

Urban areas currently tend to have the lowest VOC/NOx ratios and are therefore most prone to this paradox. According to the computer models, NOx reductions in urban areas will actually increase ozone and, thus, smog.

"Smog in many urban areas increases when NOx concentrations are further reduced, while declines generally occur in less heavily populated areas," noted Dr. Kay Jones of the Competitive Enterprise Institute.

Real-World Observations

The computer models, moreover, have been verified by real-world observations. "A disproportionate number of exceedances of the ozone standard are occurring on weekends, when emissions of ozone-forming chemicals—especially NOx—are down anywhere from 10 to 40 percent," Schwartz reports.

"At some monitoring locations in the Los Angeles area," Schwartz said, "weekend exceedances account for nearly 80 percent of total exceedances. And these ozone increases are occurring in spite of large declines in NOx. Although the 'weekend effect' is most pronounced in California, it is becoming increasingly prevalent in other cities across the nation, including Denver, Chicago, Philadelphia, and New York."

"EPA failed to consider compelling science that its NOx reducing regulation would actually severely worsen the nation's air quality," observed a summary of the issue prepared by NAFA.

"Ozone is not very likely to improve much in the future," explained Doug Lawson, a researcher with the National Renewable Energy Laboratory. "In fact, it's very likely to get worse, given that all the regulations in place for the next decade or so have larger NOx reductions built in to them than VOC reductions, which is exactly what takes place now on weekends relative to weekdays."

Negative Consequences

The negative effects of this policy are twofold. The first negative effect is apparent: Increases in urban smog result in greater discomfort and greater alleged health impairments associated with smog.

Second, a short-term rise in ground-level ozone and resulting smog is likely to be paraded by activist groups as "proof" that EPA's mandated NOx reductions are not stringent enough. More stringent, and more costly, reductions would then be advocated on the false premise that more stringent NOx reductions would further reduce ground-level ozone.

"EPA ignored other viable less costly solutions, which could have easily resolved the stated ozone problem," observed the NAFA summary.

A solution, agreed Schwartz, lies in targeting more front-loaded VOC reductions rather than front-loaded NOx reductions.

"What makes this strategy appealing is that VOC reductions will reduce ozone in most places, especially places where most people live," Schwartz noted.

"After substantial near-term VOC reductions, later NOx reductions would achieve the EPA's ozone standard on the same schedule as currently planned, but with less harm in the interim," Schwartz said. "In addition, this change would give each non-attainment area flexibility to tailor its ozone reduction strategy based on the specifics of local emissions and air chemistry."

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