

EPA Junk Science on Air Pollution Deaths



By John Dunn — December 22, 2004

What if I told you that the EPA, to push more stringent air pollution limits, would use bad air pollution research to claim current air pollution kills? What if I told you the research was published by the most prestigious American medical journals without any comment about whether it was funded by the EPA or organizations the EPA sponsors such as the Health Effects Institute and American Lung Association?

The November 17, 2004 issue of *Journal of the American Medical Association* (JAMA)(1) published an article on how ozone kills Americans, less than one month after the *New England Journal of Medicine* (NEJM) released a German study that claimed that traffic pollution causes heart attacks(2) and ran it with an editorial by Peter Stone, Harvard cardiologist, explaining how pollution might cause heart attacks.(3)

The December 14, 2000, issue of the *New England Journal of Medicine* (NEJM) reported an "association" between dust and deaths in twenty American cities in the years 1987-1994.(4) A 2002 article in JAMA asserted long-term exposure death effects from fine particulate air pollution.(5)

These studies used the same bad methods and data analysis as two critical and influential air pollution death studies called the "Six City"(6) study (in 1993) and the "Pope" Study(7) (in 1995), which EPA Director Carol Browner used in 1997 to justify draconian reductions in ozone and particulate ambient air limits across the country. Those limits have created the most recent round of air pollution compliance State Implementation Plans (SIPs). Browner acted to impose the new ozone and pollution limits and even put them on a fast track emergency adoption schedule, in spite of disapproval by the EPA Clean Air Scientific Advisory Committee (CASAC), which voted against the new limits, citing the weak science of the Pope and Dockery studies.

All these studies claiming "population dies from air pollution" are another chapter in environmental science deceptions orchestrated by the EPA, but why do journals like NEJM and JAMA publish the studies? These are the same journals that fret about corporate funding contaminating scientific studies. Do the editorial staffs of these journals dismiss the possible influence of government funding? Are government programs above bias and cheating? The Samet 2000 study was funded by the Health Effects Institute, which is funded by the EPA. The Pope and Dockery studies refused to release their raw data to public request, but the Health Effects Institute has declared the two studies valid. Should we feel reassured?

This incest between EPA and public health academia, the medical journals, and so-called independent research organizations like the Health Effects Institute is unfortunate because it prevents impartial analysis of environmental health effects research. There develop too many conflicts of financial and policy interest. This is not just a pattern for the EPA but is symptomatic of

the growth of government. The EPA and other government agencies use taxpayer dollars to fund the work of activist organizations. The EPA funds the American Lung Association, the Sierra Club, and the Environmental Defense Fund, then the EPA "endures" activist organizations' lawsuits and demands for more EPA activity. The EPA funds, supports, and rewards research that "forces" more aggressive EPA regulatory activities. The economic and risk analysis research funded by the EPA, not surprisingly, usually confirms EPA action and policy. When EPA internal or external research conflicts with policy, it is stifled.

Basic Science and Epidemiology

The "green" movement in America and Europe will give no ground on air and other pollution issues, but sensible regulatory regimes require balancing risks and benefits intelligently. Air Pollution Death Studies must be examined closely. I use the 2000 Samet study as an example of the bad science, but the criticisms apply to panic literature on air pollution in general.

Samet Studies Pollution, Particulates, and Mortality in Twenty American Cities

The Samet article of 2000 studies death rates in twenty American cities and compares them with air pollution monitor reports, and finds:

--"the relative rate of death from all causes was 0.51 percent increase for each increase in the PM 10 (10 micron size particulates) of 10 micrograms per cubic meter" (an incredibly small amount of particulates in a cube of air a yard on a side and an epidemiologically insignificant death effect)

--"the relative rate of death from cardiovascular and respiratory diseases rises 0.68 percent for each increase of 10 micrograms per cubic meter," so if the cities had a daily total death rate of 300, the increase caused by a change of 10 micrograms of pollution would be less than 2 (and such small associations defy normal rules for epidemiologic evidence in population studies, which require 200 to 300% changes in rates to prove an effect; consider again the 0.68 percent effect, similar in all the pollution death studies)

--No death effect from ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide (an immense bit of news that was ignored by the environmentalist press at the time)

--No death trend created by socioeconomic factors (a faulty conclusion, since the study only looked at average area incomes for the twenty cities; a vast body of health research shows that socioeconomics is independently a cause of significant reductions in life expectancy and probably neutralizes the death effect of outside air pollution changes for many reasons)

But the devil is the details. The study includes some cautionary notes on the limitations of their methodology. Here are the 2000 Samet study admissions, which apply to other studies on air pollution:

1. "For the pollutants measured on an hourly basis we calculated the 24-hour average."
2. "If the pollutants were measured at multiple locations in a metropolitan area, we averaged the data."

3. "Since the Environmental Protection Agency requires levels of PM 10 to be measured only every six days, data for ozone and other pollutants were generally more available on more days."
4. "We analyzed the effect of the day on which the pollution data were obtained (the current day, the day before, or two days before) on the association with mortality rates. The overall effect did not vary with the lag interval selected. We report data for a one day lag between pollution variables and mortality." (Then they turn around and say they found a temporal causal relationship -- astounding! The Ozone study found a pollution/mortality lag time of one week, but who's to know when the blips in the data sometimes are differences of less than 1%?)
5. "Data on levels of PM 2.5 (small particulates) are not yet available nationally, since a monitoring network for particles in this size range is currently being implemented." (No matter, the authors just use the PM 10 number that is measured every six days as a surrogate for PM 2.5 -- again, incredible. Cautionary note #5 is also true for the 2004 studies because they are retrospective data dredges from before 2000.)
6. "Our analyses also did not address the extent to which life is shortened in association with daily exposure to the various pollutants." (No kidding. That would not be possible considering the weak "associations" the studies use to assert causation of death. And since everyone dies, evidence of life shortening across the relevant populations would be more informative.)
7. "The finding that the association between PM 10 levels and the risk of death was strongest for cardiovascular and respiratory causes of death is consistent with the hypothesis that persons made frail by advanced heart and lung disease are more susceptible to the adverse effects of air pollution." (And more susceptible to many other things, of course, like how much salt they ate or whether they forgot their medicines.)

Despite the caveats stated above, the authors of all these air pollution death and disease studies still applaud the EPA and environmentalist concern about small particulates or whatever other pollution factor they can associate with an increase in death rate. Most of the authors would agree with the Samet research group's assertion: "Our analyses provide evidence that particulate air pollution continues to have an adverse effect on the public's health and strengthen the rationale for limiting levels of respirable particles in outdoor air."

The NEJM Editorial Comment: Political Collusion

Clearly there is a good case for not publishing an epidemiological ragbag like the Samet 2000 study, but the authors are from Johns Hopkins, and they are talking about cleaning up the air, so throw out your calculators and science -- it's story time. NEJM chose James Ware, Ph.D. of the Harvard School of Public Health to underscore that story in an editorial. Dr. Ware sounded many notes of caution, but his comments were subdued. He noted that PM 10 was being used as a surrogate for fine particles of 2.5 micron size, which is not scientific. As he said, "there are important gaps in both the scientific evidence of causation and the scientific basis for the regulatory response. The most important is our inability to explain how fine particles affect health." (If there were experiments on health effects of PM 10 or PM 2.5 we would have heard about them by now. The new regs have been in litigation for years, all the way to the Supreme Court.)

Dr. Ware alternately supports and warns of the limits of the Samet study. He allows for the expansive and ambitious assertions of the study authors even while commenting on the weakness of the data and methodology.(8) Ware should know better than to use a word like "proof" to refer to the study's "associations" and tiny relative risks.

Dr. Ware says too little about the weak biological plausibility and the confounding variables in the methodology of the Samet study. Dr. Ware ignores the weakness of these retrospective population studies and falls short when he ignores the requirement that a study show a 200 to 300% difference in death risk to establish real causation. Samet's study declares differences smaller than 1% important. "Association" is a powerful word and should be reserved for something more than a change that could be accounted for by chance.

It may seem unnecessary to criticize Dr. Ware so harshly for being gentle with the Samet article, but that is part of a pattern: weak studies are lauded and thus soon become respected precedents. Soon, even Ware and his colleagues at Harvard will favorably reference the Samet study as support of their research into air pollution effects. The dust-as-public-health-menace research community is a pretty small club. Note, for example that Pope was a researcher in the study named after him, but also in the Six City Study.

So What About the Six City and Pope Studies?

The quick answer is that both used the same bad methodology as Samet, only on a smaller scale. The barriers to proof for Dockery and Pope were the same as for Samet: low autopsy rate producing unreliable death certificates and raw death data (with cause of death based on attending physician speculation), plus dredging death numbers as a measure of the effect of air pollution at non-toxic levels. Unless the air pollution indices rise to toxic levels, short temporal relationships causing disease and death don't exist -- period.

The Killer Smog Game

The game that the junk scientists are playing dates to the days of killer smog studies in London in the 40s and 50s, when real air pollution -- measured in multiples of ten compared to today -- did effect the oxygenation and lung function of patients with lung and heart disease. Of course, the deaths during [killer smog days of yore](#) [1] have nothing to do with the relatively clean air of today or the modern management of cardiorespiratory diseases, but those minor details are ignored by some on the fringes of the public health community.

Consider an editorial by C. Arden Pope in the September 9, 2004 NEJM(9) that describes killer air in Belgium in 1930, Pennsylvania in 1948, and London in 1952 -- and uses those incidents as support for a study in that same issue that claims to show a causal relationship between non-toxic air pollution and children's pulmonary functions.(10)

People do not go out into the streets of America, choke and die. The bad old days of London and Pittsburgh soot and smoke are gone. The public health hanky brigade wants Americans to think air is killing their children and old folks, but air quality in the cities of America has been steadily improving since the 1950s, before any effect from the environmental movement, Rachel Carson, the Clean Air Act Amendments of 1970, or Al Gore.

The Clean Air Act(11) was written into law in 1955 and amended in '63, '65, '66, and '67, with major amendments in 1970 and minor ones since. Ambient air pollution has been declining for a long time and is at non-toxic levels, but those changes are due to modifications of manufacturing processes and self-imposed changes in discharges -- evidence of changed priorities in an increasingly successful and prosperous country.(12)

Real Science and Junk Science Compete in the New England Journal of Medicine

In contrast to the work of the Samet and Pope cabal, briefly consider and compare a study on cerebral edema that appeared in the same journal, NEJM, six weeks later.(13) The study outlined and compared the many theoretical causes of this devastating complication, using what statisticians call multivariate regression analysis -- a routine statistical method for studying whether one or more of many factors are independent causes of a phenomenon. The study and report concluded that only three factors seem to cause cerebral edema in the setting of pediatric diabetic ketoacidosis, but the authors included many caveats, since even this analysis does not completely eliminate confounding variables.

An editorial by Dunger and Edge in the same issue of NEJM reviewed and critiqued the study and called the study what it was, "important," because of its "rigorous design and careful analysis."(14) Why doesn't the NEJM require that same rigor when EPA-style public health studies are done, with billions of dollars at stake in the form of regulatory expenses and future studies? They should have a sense of responsibility as the most prominent medical journal in the land.

The editorial staff of NEJM should apply the same rigor to studies in the public health and politically sensitive sectors that they would to diabetes or we are going to scientific hell in a hand basket. Who will say no to these phony population studies -- with weak data and weaker causation analysis -- if the NEJM or JAMA won't? Rhetorical license and scientific license in the service of a cause has become too common in American academic medicine. Schumpeter once said that the first thing a man will sacrifice for his ideals is the truth. Anxious academics are cheating on the truth to take a short cut to a utopia of bicycles and "alternative" energy sources.

The *New England Journal of Medicine* now vacillates, becoming a propaganda rag on political issues but a scientific paragon when there are no political agendas to consider -- lurching from outrageous dust and air pollution junk science to multivariate regression analysis of alternative causes of cerebral edema in diabetics with ketoacidosis. Which will it be?

The mainstream press is counting on you. Just last week, in the December 15 *USA Today*, Traci Watson reported "Particle Pollution Falls 10% in 4 Years -- EPA Says Many Areas Still Above Limits," sandwiching the good news about decreased pollution between paragraphs on creeping death, claiming, "Particulate kills tens of thousands of people each year by triggering heart and lung problems, EPA reports have said." The environmentalist group Clear the Air is favorably

depicted for keeping track of anti-pollution progress -- with no mention made of whether they benefit from the EPA-inspired paranoia that the *USA Today* reporter helps spread. But can we blame the reporter? If our leading scientific journals don't care about getting the story right, the fallout in the form of mainstream-media scare stories -- and a frightened, taxed, and regulated public -- is inevitable.

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