Small particles (ash, soot, smoke) in the air, even in amounts that are legal, can harm human health. This fact was emphasized dramatically by events in the Utah Valley near Provo, UT during the period April, 1985, to February, 1988, when a steel mill closed and then reopened. The steel mill was the source of 82% of all the small particles in the local atmosphere, and a researcher at Brigham Young University, Dr. C. Arden Pope, studied hospital admissions for pneumonia, pleurisy, bronchitis, and asthma with the steel mill closed and with the steel mill open. Opening of the mill coincided with a dramatic increase in hospital admissions for these respiratory ailments, especially among children.

Douglas Dockery [see RHWN #134] at the Harvard University School of Public Health called this "a landmark study," when it appeared in the AMERICAN JOURNAL OF PUBLIC HEALTH in May, 1989. In epidemiology, he explained, "you look for unique situations where there is a natural experiment going on." The Utah Valley from 1985 to 1987 provided such an experimental setting.

The Utah Valley is an especially good place to study the effects of air pollution on human health because only 5.5% of the 258,000 adults (18 and older) who reside there smoke tobacco, about one-fourth the national average; smoking is strongly discouraged by the Mormon church.

At times, pollution is very noticeable in the Valley. During winter 1985-86, in a random survey of Valley residents, 29% said they had one or more family members with health problems aggravated by air pollution.

Admissions data from three local hospitals were collected for the period April, 1985, to February, 1988. Emergency and outpatient care were not included, so this study only counted people sick enough to be admitted into the hospital.

Particles in the atmosphere were measured as PM-10 (particulate matter 10 micrometers or less in diameter), which is U.S. Environmental Protection Agency's standard measure for particles in air.

The EPA's allowable limit on PM-10 pollution is a 24-hour average of 150 micrograms of particles per cubic meter of air; higher than that violates the standard. (A microgram is a millionth of a gram and there are 28 grams in an ounce. A meter is approximately a yard.) The allowable annual average is 50 micrograms per cubic meter of air.

Dr. Pope looked at the data four ways. First he compared hospital admissions during those months when the 24-hour PM10 standard was exceeded one or more times, versus hospital admissions during months when the standard was not exceeded. During the four months when the 24-hour standard was exceeded, admissions of children (0-17 years of age) nearly tripled compared to admissions during the 31 months when the 24-hour standard was not exceeded. During months when the 24-hour standard was exceeded, adult hospital admissions rose 44%, compared to months when the standard was not exceeded.

Dr. Pope next compared hospital admissions during eight high months when the average (mean) PM-10 levels exceeded 50 micrograms per cubic meter of air versus admissions during 27 low months when average PM-10 levels never exceeded 50 micrograms per cubic meter. During high months, hospital admissions for children doubled, compared to low months, and adult admissions increased by 47%.

Dr. Pope then compared hospital admissions during periods when the steel mill was open versus when it was closed. During winter months, children's hospital admissions tripled when the steel mill was open, compared to winter months when it was closed. During fall months, children's admissions doubled when the steel mill was open, compared to fall months when it was closed.

The fourth technique, called regression analysis, created a mathematical model of the relationship between PM-10 pollution levels and hospital admissions for chest ailments. The model showed a very strong correlation between pollution and hospital admissions.

Strong correlations do not prove a cause and effect relationship. It is always possible that a third variable (such as a flu epidemic) coincided by chance with the opening of the steel mill.

To try to rule out such extraneous events, Dr. Pope studied admissions at a "control" group of Utah hospitals outside the Utah Valley and he could find no similar effects related to either PM-10 levels or to the opening or closing of the steel mill. He was also unable to find a relationship with the cold winter weather, and he was able to rule out an epidemic of contagious illness (such as flu) as a cause of the peaks in hospital admissions.

"The results indicated that hospital admissions for respiratory illnesses were strongly associated with PM-10 levels. This association is much stronger for children than adults, and is somewhat stronger for asthma and bronchitis than for pneumonia and pleurisy," Dr. Pope concluded.

It is important to note that "increased admissions for children are observed even for months when PM-10 did not exceed 150 micrograms per cubic meter, suggesting that this standard may not be adequate protection for some children," Dr. Pope concludes. The federal standard is not adequate to protect children.

In fact, the EPA itself admitted, when it published the PM-10 standard, there is evidence that NO levels of fine particle pollution are safe, especially for children. The EPA said, "The data do not provide evidence of clear thresholds in exposed populations. Instead, they suggest a continuum of response for a given number of exposed individuals with both the likelihood (risk) of any effects occurring AND the extent (incidence and severity) of any potential effect decreasing with concentration." [See FEDERAL REGISTER, Vol. 126 (July 1, 1987), pg. 24642; emphasis in the original.] The absence of a threshold means that ANY exposure to fine particles will take its toll on the health of the exposed population. The fine particles produced by every incinerator are harmful to humans, especially to children. The cumulative evidence is now overwhelming and has been ignored for too long by the promoters of incineration. It's time they were forced to confront the consequences of their dangerous technology.

Dr. Pope concluded, "It is clear that PM-10 is an important cause of hospital admissions. The 50 microgram standard is not adequate to protect children."

Get: C. Arden Pope III, "Respiratory Disease Associated With Community Air Pollution and a Steel Mill, Utah Valley," AMERICAN JOURNAL OF PUBLIC HEALTH, Vol. 79 (May, 1989), pgs. 623-628. For a free reprint, contact Dr. Pope, Associate Professor of Natural Resources and Environmental Economics, Brigham Young University, Provo, UT 84602; phone (801) 378-2157.

--Peter Montague

=====

RALLY IN ALBANY, NY, SEPTEMBER 15 TO STOP EPA'S LOVE CANAL PLAN

We thank everyone who wrote letters to EPA Administrator William Reilly and to New York Governor Mario Cuomo, protesting the EPA's outrageous plan to move families back into the contaminated neighborhoods at Love Canal, NY. (See RHWN #133.)

A rally and demonstration has been organized by Greenpeace and by the Citizens Clearinghouse for Hazardous Waste (CCHW) in Albany, to impress upon Governor Cuomo the need to stop this lunatic plan. Save the date: Sept. 15. We'll publish more details soon.