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Hospitalizations and Emergency Room Visits Increase Following High Particulate Matter Episodes, Study Finds

SACRAMENTO -- Hospitalizations and emergency room visits increase after periods of high particulate matter episodes in the San Joaquin Valley, a recent California Air Resources Board (ARB) study shows.

“The immediate health impacts following periods of poor air quality are a real reminder that there is still more work to be done to clean California’s skies,” said ARB Chairman, Dr. Alan C. Lloyd.

Hospital and emergency room admissions of Kaiser Permanente patients in the San Joaquin Valley, an area of high particulate matter (PM) emissions, were followed between 1996 and 2000. Air quality and weather monitors around the region were used to track pollution levels, air temperatures and wind direction, while investigators monitored the number and type of admissions to Kaiser Permanente facilities. Researchers catalogued hospitalizations and emergency room visits for acute and chronic respiratory ailments and cardiovascular maladies. There were 500,000 patients in the study area, all enrolled in Kaiser Permanente health plans.

Following wintertime episodes of high PM, and to a lesser extent, carbon monoxide and nitrogen oxides, admission rates increased for patients who suffer from acute respiratory ailments such as asthma and bronchitis. Admissions for chronic respiratory ailments, such as emphysema, were similarly elevated, particularly during the winter months.

For every 10 microgram per cubic meter ($\mu\text{g}/\text{m}^3$) increase:

- Acute respiratory hospitalizations increased by 2.3 percent for PM10 and 4.1 percent for PM2.5.
- Acute respiratory emergency room visits increased by 3.4 percent for PM10 and 5.2 percent for PM2.5.
- Chronic respiratory hospitalizations increased by 5.5 percent for PM10 and 7.5 percent for PM2.5.

- Chronic respiratory emergency room visits increased 3.8 percent for PM10 and 6.5 percent for PM2.5.

Average rates of PM2.5 in the urban areas of the San Joaquin Valley range from 15 to 25 $\mu\text{g}/\text{m}^3$, but levels as high as 160 $\mu\text{g}/\text{m}^3$ have been recorded on individual days.

These particles are so small they can bypass the body's defenses and lodge in the lungs. One 10-micron particle (PM10) is one-seventh the size of a human hair.

The principal investigators of the \$265,000 study were Kaiser Permanente and Sonoma Technology.

A copy of the study can be obtained [here \(PDF - 480K\)](#).

The Air Resources Board is a department of the California Environmental Protection Agency. ARB's mission is to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy. The ARB oversees all air pollution control efforts in California to attain and maintain health based air quality standards.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy cost, see our website at <http://www.arb.ca.gov>.

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