

Health Update: Health Impacts of Air Pollution in the San Joaquin Valley

December 7, 2006



California Air Resources Board

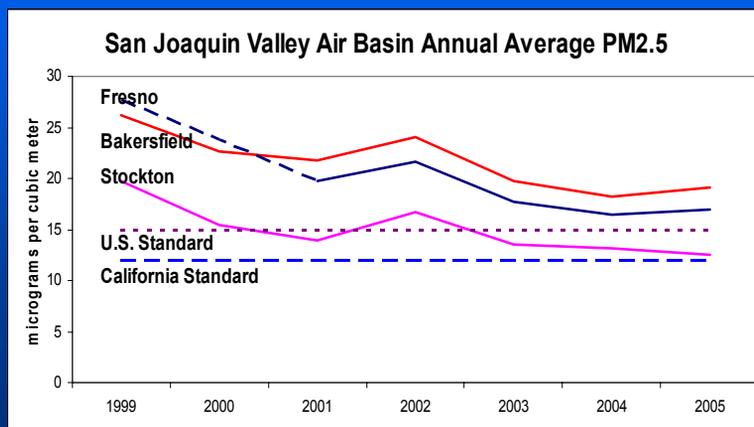
California Environmental Protection Agency

Thank you Ms. Witherspoon. Good morning, Dr. Sawyer and members of the Board.

In today's Health Update, we will present an overview of the health impacts of air pollution in the San Joaquin Valley. We will present results from recent studies and describe research still in progress in the Valley.

Why Are We Concerned?

PM2.5 levels exceed the standards

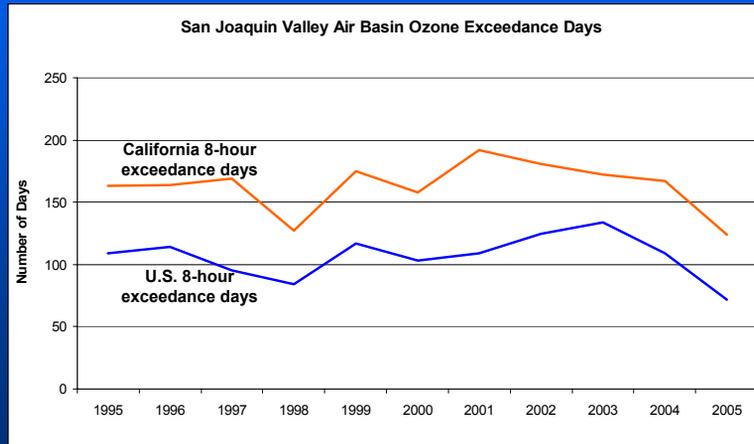


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We are concerned about air pollution's impact in the San Joaquin Valley because both PM2.5 and ozone levels regularly exceed the California and federal ambient air quality standards. The unique geography and meteorology of the Valley and the many air pollution sources contribute to these levels and make it especially difficult to bring them into attainment of the standards. Although PM2.5 levels show improvement, much of the Valley still does not meet the air quality standards for PM2.5.

Why Are We Concerned?

Ozone levels exceed the standards

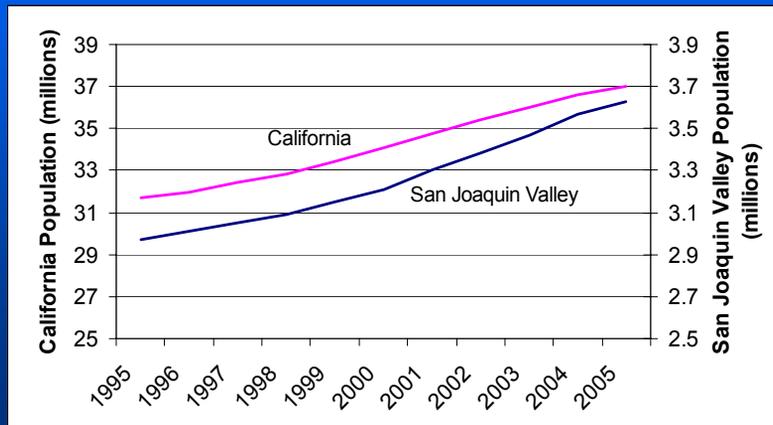


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Despite improvements in ozone exposures over the last several years, the ozone air quality standards are exceeded over one-third of the year.

Why Are We Concerned?

Increasing population impacted



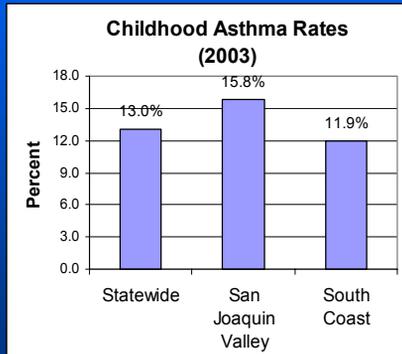
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The population in the San Joaquin Valley has been steadily increasing at a rate somewhat greater than the state as a whole. There are now well over 3.6 million persons in the Valley.

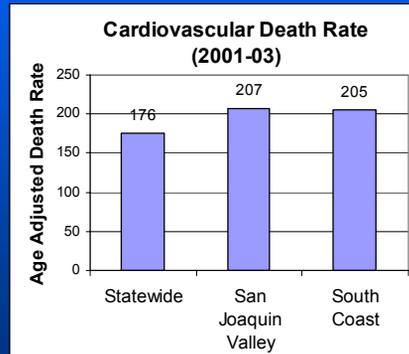
The San Joaquin Valley also has a greater proportion of people living with incomes below the federal poverty level. Almost 18% of people in the Valley live below the federal poverty level compared with a statewide average of about 14%.

Why Are We Concerned?

High incidence of health impacts



Source: California Health Interview Survey



Source: California Department of Health Services

We are also concerned about the potential health impact of air pollution on the San Joaquin Valley's most vulnerable citizens. Asthmatics are known to be especially sensitive to air pollution's effects and the Valley has some of the highest childhood asthma rates in the State. There is a 24% higher prevalence of childhood asthma in the San Joaquin Valley than in the rest of the state and a 10% higher prevalence for adults.

Cardiovascular death rates, which have been linked to high PM_{2.5} levels, are also higher in the Valley than statewide and as high as in the South Coast Air Basin.

Health Benefits of Meeting the State Ambient Air Quality Standards

	Combined PM and Ozone Health Effects*	
	SJV	Statewide
Mortality	1400	8800
Hospital Admissions	1200	7700
School Absences	880,000	4,700,000
Work Loss Days	200,000	1,400,000

* Uncertainty of about 50%, based on 1999 – 2000 air quality

6

Reducing pollution to the levels of California's health-protective ambient air quality standards can have significant health benefits for the Valley. Shown here are combined benefits from meeting the State annual PM_{2.5} standard and the State 8-hr ozone standard.

If the State 8-hour ozone standard and PM_{2.5} annual-average standard for attained, we estimate about 1400 premature deaths would be avoided annually. Other health benefits, including reduced hospital admissions, emergency room visits, and school absences would also occur. One must remember that the numbers quoted are the best estimate for the health benefits of meeting the standards; there is a margin of error associated with each estimate of about 50%.

To better understand the impact of air pollution on citizens of the San Joaquin Valley, a number of studies have been funded to investigate the effects of air quality on health. I will now summarize completed and ongoing studies specific to the Valley.

Completed Studies

- **UC Davis study** - Up to 33% higher heart attack rates in Valley
- **ARB Kaiser study** - Increased respiratory hospitalization and emergency room visits
- **UC Davis study** - Airway changes in young Hispanic males
- **UC Davis study** - Respiratory effects of PM in rats
- **CSU Fullerton study** - Up to \$3 Billion health impact of PM2.5 and ozone

7

Professor Tom Cahill of UC Davis conducted a study of deaths due to heart attacks and stroke for the American Lung Association and found a higher incidence of heart attack, up to 33% above the statewide average, in the Valley which was correlated with the PM10 levels. This study has not been peer reviewed.

Dr. Stephen Van Den Eeden of Kaiser Permanente found that the rates of acute and chronic hospitalizations and acute and chronic emergency room visits in cities from Sacramento to Fresno increased in association with increasing PM2.5 and PM10 levels.

Professor Kent Pinkerton of UC Davis studied changes in the airways of young Hispanic men studied through autopsies following death due to non-respiratory causes. The gas exchange regions of their lungs showed thickening and physiological changes caused by carbonaceous and mineral dusts. These effects are similar to those noted in occupational settings for black lung disease, asbestosis, and silica- and silicate-induced injury.

Professor Pinkerton also examined the effect of concentrated Fresno PM2.5 and ultrafine particles and found inflammatory and other effects on the respiratory system of rats.

Finally, Professor Jane Hall of California State University, Fullerton analyzed the economic benefits of meeting the federal air quality standards for PM2.5 and ozone. This study indicates more than \$3 billion in potential benefits based on improved health, preventing premature deaths, and fewer days of missed school and work. Dr. Hall discussed this study at yesterday's Air Quality Symposium sponsored by the San Joaquin Valley Air Pollution Control District.

Ongoing and Future Studies

- **San Joaquin Valley Health Effects Research Center – UC Davis**
 - PM Research Center
 - Will investigate the mechanistic links between ambient particles and health effects
- **Fresno Asthmatic Children’s Environment Study (FACES)**
- **PM source and toxicity apportionment**

8

A number of new studies are in progress. Last year the U.S. EPA established the San Joaquin Valley Health Effects Research Center, located at the University of California-Davis with the principal field site at Fresno. It is one of only five PM Centers across the country. The Center has \$8 million grant from the EPA to study the mechanistic links between ambient particles and the health effects that they elicit.

The Fresno Asthmatic Children’s Environment Study, or FACES, is investigating the potential impacts of particulate matter; gases, including ozone; and allergens on asthmatic children. The initial phase of the FACES study, funded by the ARB, has been completed. The report for this phase of the work is available through the ARB’s web pages. The FACES project will continue until 2010 with additional funding through the NIH. The FACES researchers have also received a Mickey Leland grant to study the properties of the particulate matter the children are exposed to in Fresno.

Finally, the ARB is expecting to fund a study through the UC Davis PM Center on PM source and toxicity apportionment. The study hopes to produce relative toxicity indices for particles derived from several source categories. This study has been conditionally approved by the RSC and will likely be presented to the Board for approval in January 2007.

Conclusions and Implications

- **Reduction of particulate and ozone pollution is of great importance to the health of the San Joaquin Valley population**
- **Ongoing and future studies will further define the pollution effects**

9

The studies discussed today highlight our concerns regarding particulate matter and ozone pollution in the San Joaquin Valley and the great importance of reducing these exposures to benefit the health and well being of the people living in the San Joaquin Valley.

Thank you for your attention. I would be happy to answer any questions.