

Tunnel Vision: How Air Pollution Regulation Shortchanges Californians' Health and Welfare

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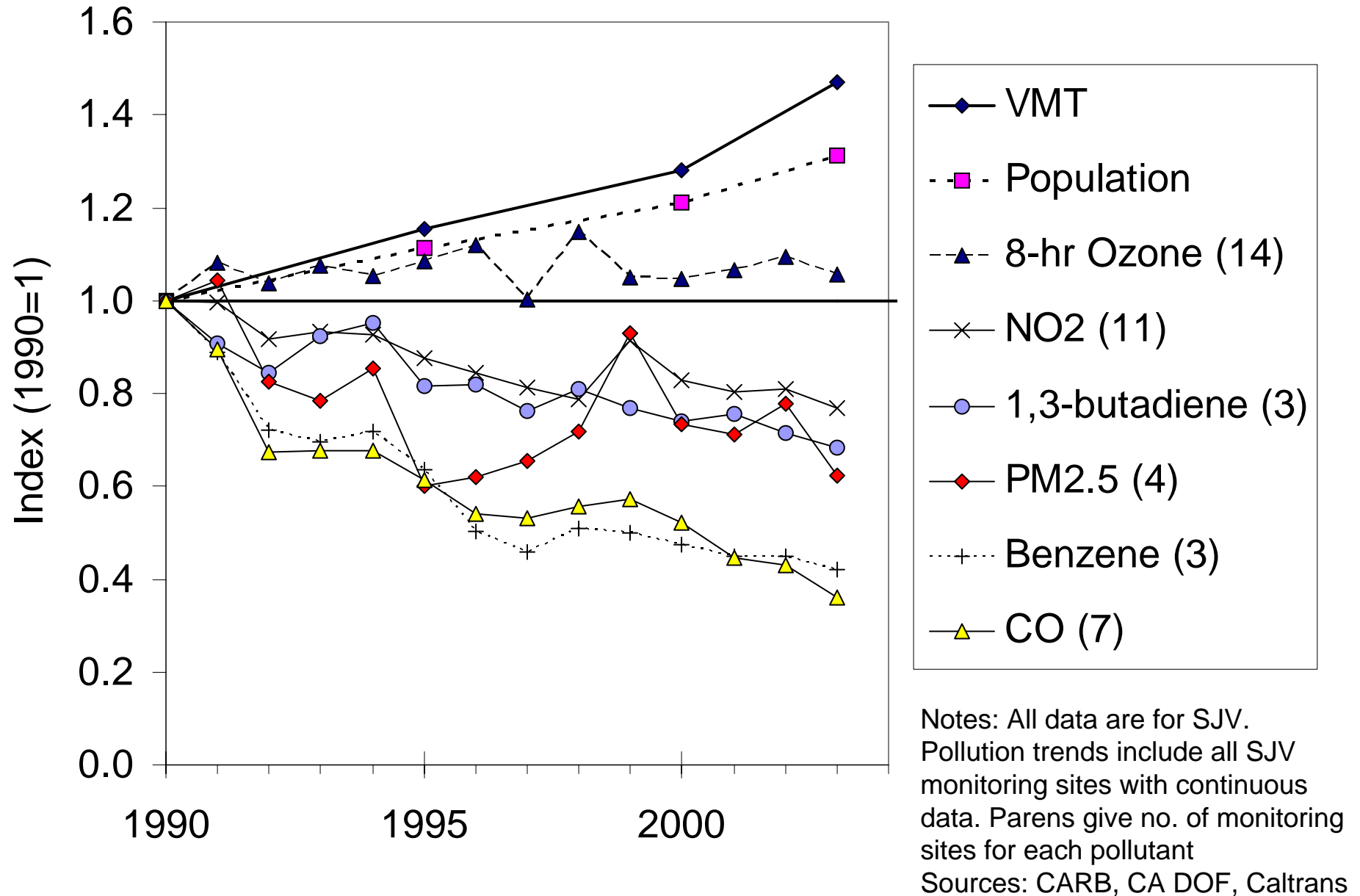
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How has growth affected air pollution in the SJV?

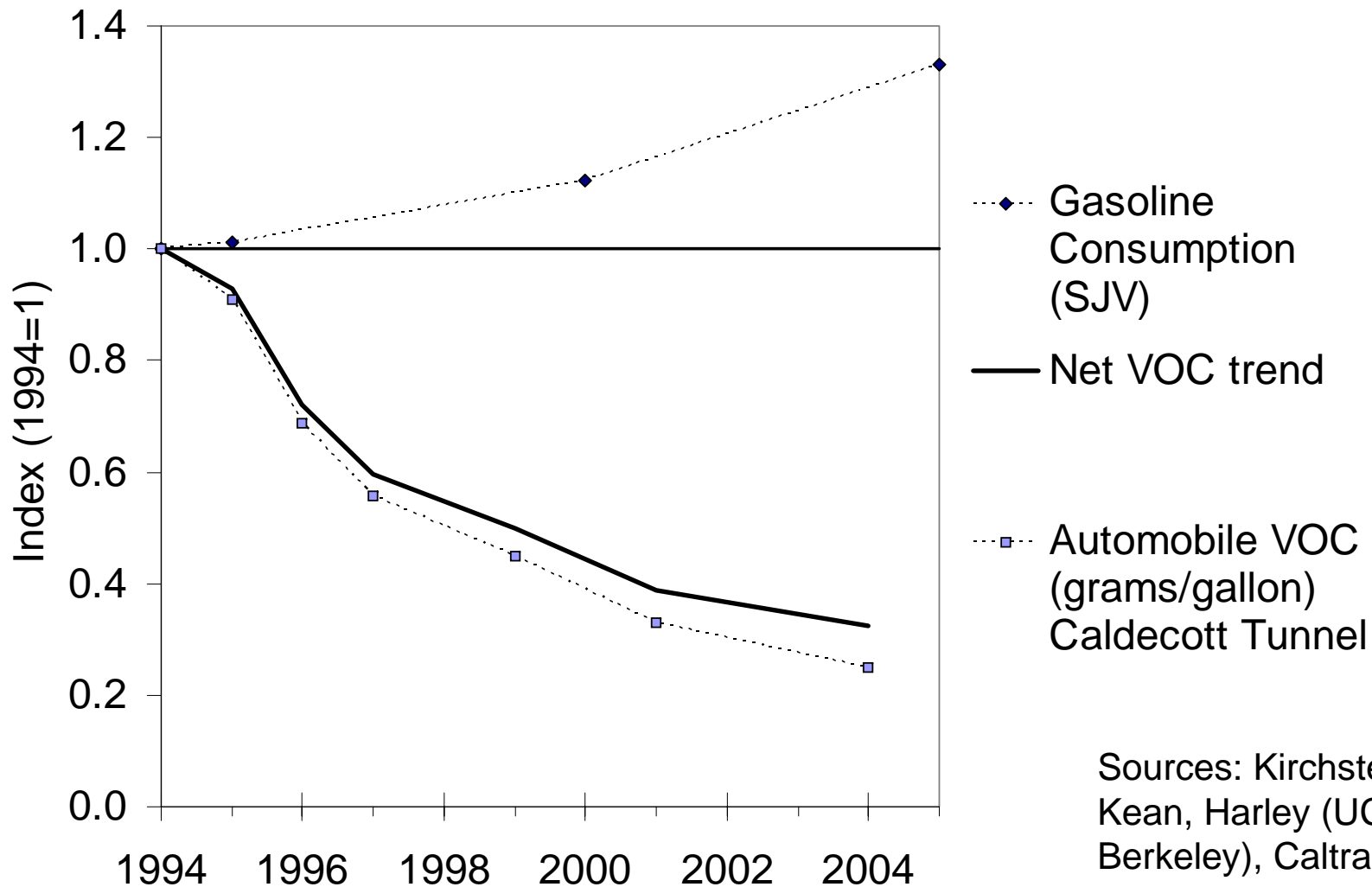
- Despite rapid growth in population, motor fuel consumption, and vehicle miles traveled, ambient pollution and emissions have continued to decline
 - Ozone is the only exception: Ozone-forming emissions have declined, but ozone has been constant or rising in many areas of SJV
- Growth is having only a small offsetting effect on the huge benefits of improved vehicle emissions technology combined with fleet turnover
- Continued fleet turnover ensures continued net reductions in emissions

More driving, less pollution



Huge net emission declines in spite of growth

Automobile (car/SUV) VOC emission rate is dropping about 13%/year, while VMT is increasing about 2.7%/year. So total VOC still declining more than 10%/year.



Regulators' and environmentalists' pet air pollution policies are based on false premises, and are ineffective, extremely inefficient, and/or counterproductive

- Light rail costs at least \$1 million/ton of ozone precursors eliminated. Even this huge cost/ton depends on meeting cost and ridership projections. But costs are usually higher than projected, while ridership is usually lower.
 - Transit is also slower: average transit commute is about 65% longer than average car commute, even though transit commutes cover less distance
- Going beyond ULEVs to SULEVs and PZEVs is probably slowing progress on air pollution by slowing fleet turnover. A fleet of ULEVs would be more than 90% cleaner than the average car currently on the road, so going further than ULEV would have little effect on overall vehicle emissions anyway.
- Alternative fuels are an expensive distraction. SJV estimates alt fuel cost at \$24,000/ton of reductions. Gasoline automobiles are as clean or cleaner than alternatives. Remember, you're replacing a LEV II vehicle with an alt fuel vehicle, so marginal reductions are tiny or zero.
- Indirect source fees miss the target: people who can afford to buy new houses or shop at suburban malls don't drive high-polluting cars
- Density does little to reduce driving, but increases congestion
 - Densest cities have longest commutes. NY metro area has longest average commute time in the U.S. Even Manhattanites' avg commute is 25% longer than U.S. average.
- Automobile ownership and use is a function of income. Europe is experiencing rapid growth in per-capita driving and suburbanization and declining transit market share, despite \$5/gal gas, dense cities, and excellent transit.
- How to solve motor vehicle air pollution
 - Wait 10 or 20 years—fleet turnover heals all wounds
 - To get there faster—identify and repair/scrap highest-emitting cars. Worst 5% produces 50% of automobile VOC.
 - Huge reductions at cost of a few thousand/ton or less.

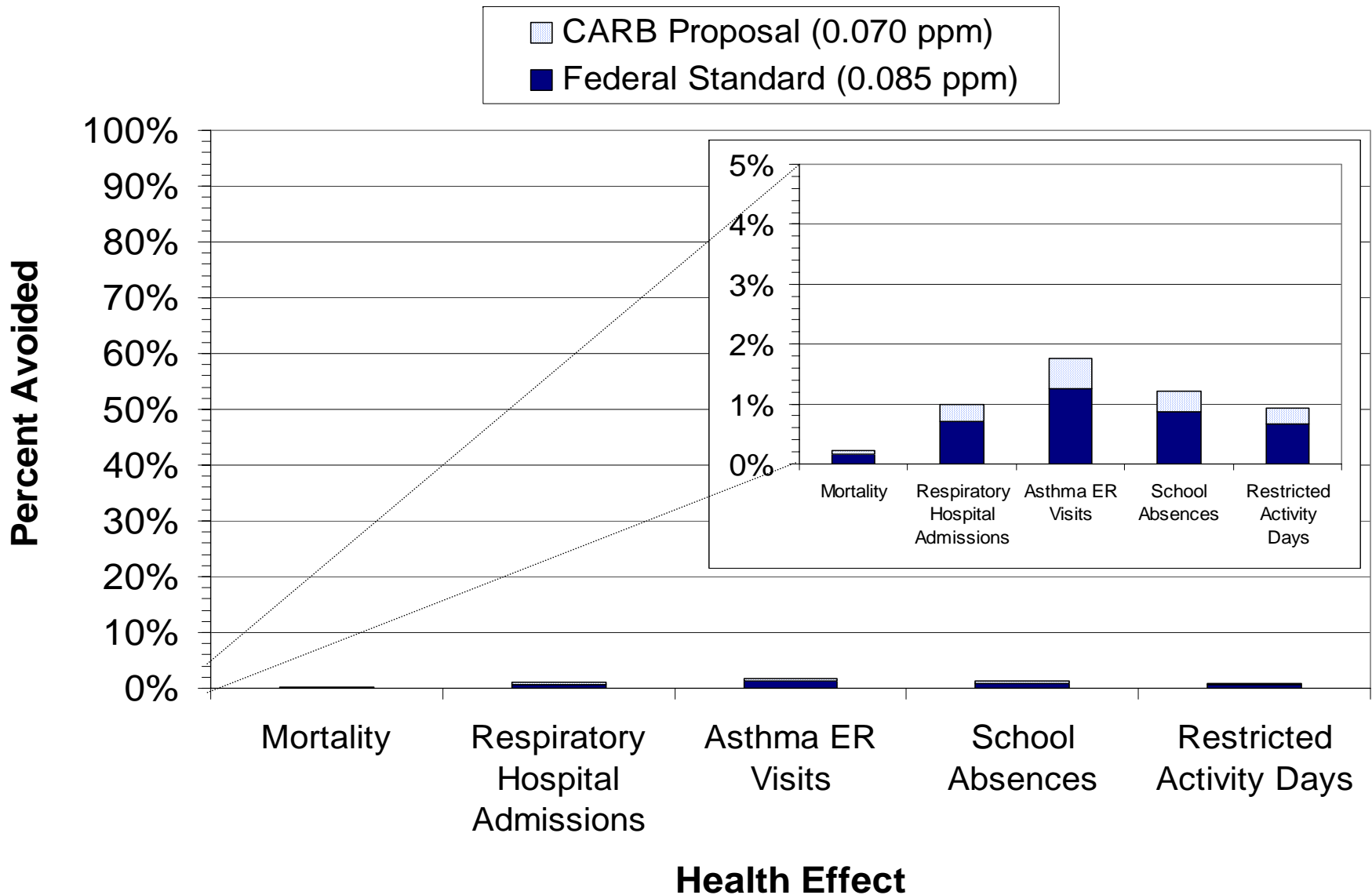
Air pollution is a minor factor in public health

- Even CARB and EPA agree—implicitly at least—that ozone has a minor effect on health, even for people with respiratory diseases.
 - CARB/EPA estimates imply reducing ozone to near background will eliminate an imperceptible fraction of all respiratory discomfort, disease, and death
 - EPA estimates that less than 1% of the benefits of the Clean Air Act are attributable to ozone reductions
 - Yet ozone control is likely responsible for most of the costs of air pollution regulation
- Regulators continue to claim particulate matter (PM) is responsible for tens of thousands of premature deaths each year nationwide. But these ostensible deaths are more likely to be the spurious result of the statistical methods used to analyze the data, rather than a real health effect of current, historically low PM levels.

CARB's estimates show ozone has imperceptible effect on public health

- Based on CARB's own estimates, reducing ozone from current levels to 8-hour max ≤ 0.070 ppm will reduce premature mortality by 0.23%, respiratory hospital admissions by 0.99%, children's asthma ER visits by 1.75%.
 - Not explicitly stated in CARB's Staff Report, but can be calculated from CARB's estimates of (1) number of cases avoided by ozone reductions, and (2) underlying total rate of each condition in CA population.
- Attaining current federal 8-hour standard accounts for 72% of these benefits. Attaining CARB's proposed standard accounts for 28% of benefits.
 - Not explicitly stated in Staff Report, which discusses only *total* health benefits of reducing ozone from current levels, rather than incremental benefit of the proposed standard.
- 80% of all benefits are due to reductions from levels already complying with relevant standard (i.e., assuming no threshold, linear dose-response, constant-proportion decline in ozone across air basin).
 - Staff Report does include this information.
- EPA implicitly draws a similar conclusion.
 - Based on EPA estimates, national attainment of federal 8-hour standard would reduce respiratory hospital admissions by 0.04%, asthma ER visits by 0.02% (Hubbell et al., EHP 1/05).
 - EPA benefit estimate is smaller due to lower starting ozone levels in most of U.S. and assumption that benefits accrue only down to level of 0.085 ppm federal standard.

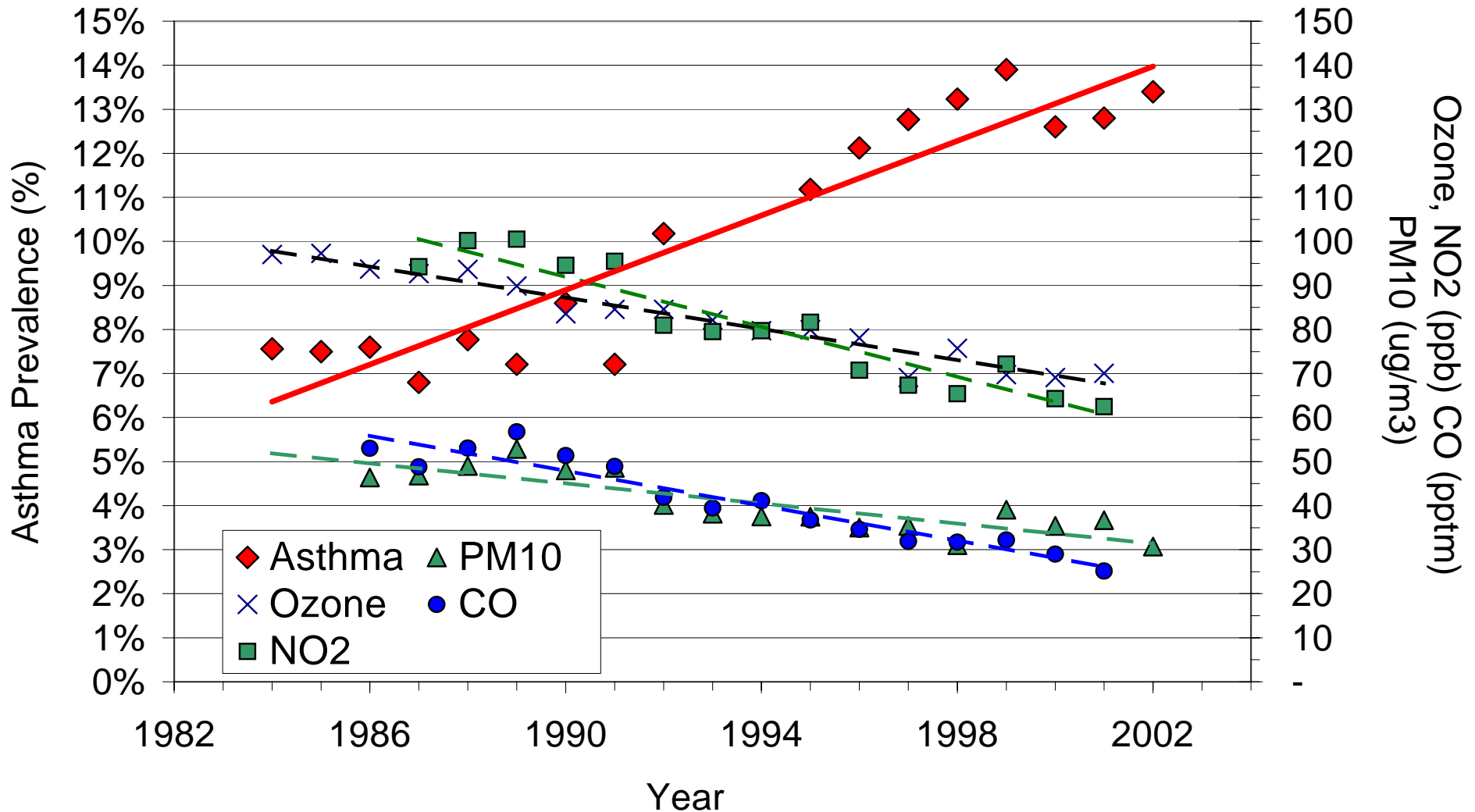
Benefit of CARB's Proposed Standard, Based on CARB's Health Effects Estimates; percent of health effects avoided by reducing ozone from current levels



Even the small effects CARB and EPA estimate for ozone are likely to be overstated

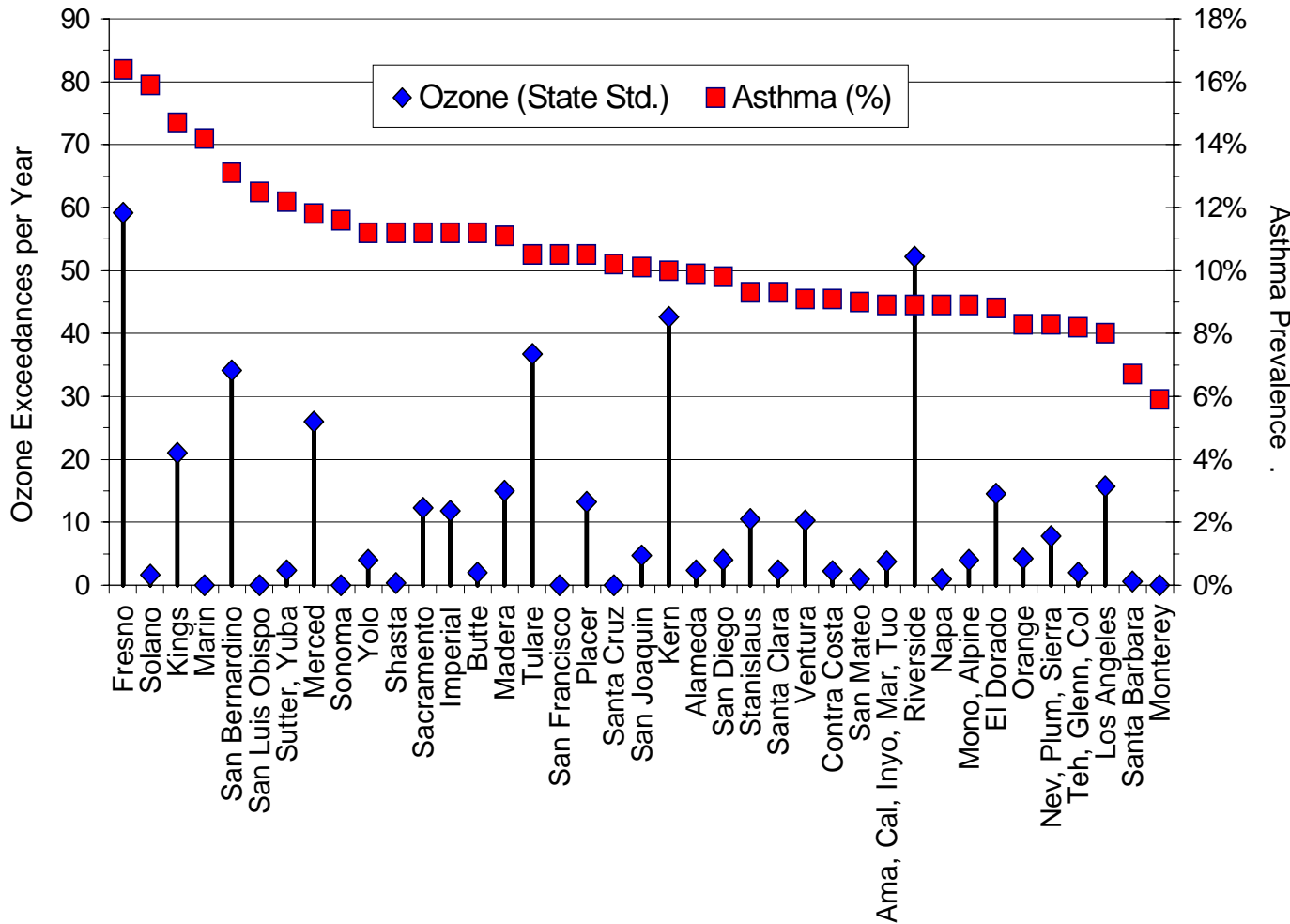
- Evidence for serious health effects comes from epidemiological studies reporting small correlations between ozone and health effects. But these studies suffer from a number of problems including:
 - **Publication bias:** *“Publication bias arises because there are more rewards for publishing positive or at least statistically significant findings. It is a common if not universal problem in our research culture...In the field of air pollution epidemiology, the question of publication bias has only recently begun to be formally addressed.”* (Anderson et al. (WHO), 2004)
 - Recent study estimated publication bias causes more than a factor of 3 overestimate of ozone mortality effect (Bell et al. 2004)
 - Staff Report’s “central estimate” for mortality benefits is based on meta-analyses that are not corrected for publication bias.
 - **Data mining:** *“Estimation of very weak associations in the presence of measurement error and strong confounding is inherently challenging. In this situation, prudent epidemiologists should recognize that residual bias can dominate their results. Because the possible mechanisms of action and their latencies are uncertain, the biologically correct models are unknown. This model selection problem is exacerbated by the common practice of screening multiple analyses and then selectively reporting only a few important results”* (Lumley and Sheppard, 2003)
 - Recent study that accounted for data mining concluded that ozone, PM and other air pollutants likely have no effect on mortality at current levels (Koop and Tole 2004)
- According to NMMAPS study of ozone and mortality in 95 U.S. cities, higher ozone is associated with *lower* mortality in about one-third of cities.
 - Staff Report focuses on NMMAPS average across cities, but ignores this heterogeneity

Declining Air Pollution, Rising Asthma



Pollution levels are average of top 30 readings from all continuous sites in CA, except PM10, which is an annual average from all continuous sites in CA. Asthma prevalence is for all of California, from Department of Health Services.

Focus on Fresno ignores non-relationship of air pollution and asthma across counties



Fresno is the poster child for asthma and air pollution, because it has a lot of both. But the chart shows this is coincidence rather than causal relationship. This chart is for ozone. A chart based on PM looks similar.

Notes: Data are for 2001. Asthma prevalence is for children 0-17. Ozone exceedances is an average for all monitoring sites in a given county.
Sources: CARB and California Health Interview Survey

Personal ozone exposures are much lower than ambient levels, but standards assume ambient = exposure

- Laboratory studies are using unrealistically high exposures for ambient and unrealistically low exposures for background.
 - Studies with personal monitors show actual outdoor ozone exposures are at least 40% below levels measured at ambient monitors.
 - Laboratory studies use filtered air (0.0 ppm ozone) instead of realistic background level.
 - Based on San Diego study with personal ozone monitors, for each day in which ambient ozone exceeds 0.07 ppm, only one-in-200 people are actually exposed to ozone >0.07 ppm.
- Lab study comparing 0.0 and 0.08 ppm ozone is equivalent to an ambient range of 0.0 to 0.13 ppm. A more realistic exposure range to test the current federal standard would be 0.025 to 0.054 ppm (representing an ambient range of 0.040 to 0.090 ppm).
 - Lab evidence suggests there would be no effects across this range of ozone exposures.
- But CARB's main justification for proposed standard is to mitigate the temporary effects of multi-hour, low-level ozone exposures.

Selective Citation and Reporting to Support New Ozone Standard

- CARB produced a Staff Report of nearly 1,000 pages to support its proposed ozone standard. But the report does not cite a CARB-sponsored reporting that higher ozone is associated with a statistically significant *decrease* in emergency room visits
 - When the study was released in 2002, CARB put out a press release that mentioned only the “positive” PM results, but not the “negative” ozone results.
- CARB’s Children’s Health Study reported that children in areas with the highest 1-hour ozone levels were 30% *less* likely to develop asthma than children in low-ozone areas.
 - CARB’s Staff Report summarizes this study by saying the asthma rate was “not higher” in the high-ozone areas.
- CARB’s Staff Report focuses on laboratory results as a main basis for its proposed standard, but does not mention that the lab studies use unrealistically high test exposures and unrealistically low background exposures.
- CARB never explicitly calculates the improvement in public health from reducing ozone. As shown above, based on CARB’s own estimates, the benefits of ozone reductions would be imperceptible. Nevertheless, CARB claims in the Executive Summary of the Staff Report “the statewide potential for significant health impacts associated with ozone exposure is large and wide-ranging.”

Direct harm from lower ozone

- Most UV protection comes from stratospheric ozone. But reducing ground-level ozone results in small increases exposure to solar UV light.
- In 1997 EPA estimated ozone reductions necessary to attain the 8-hour standard would cause about 700 additional cases of non-melanoma skin cancer each year
 - DOE predicted several thousand annual cases of cataracts and a few dozen melanoma deaths
 - EPA never made the analysis public and did not consider the harm from lower ozone in setting the 8-hour standard
- CARB wishes to require much larger ozone reductions, but has not acknowledged any direct health tradeoffs due to higher UV exposure

Particulate Matter and Health

- Biologically implausible results of epidemiological studies
 - According to study used by EPA to set annual PM_{2.5} standard, PM kills men but not women; former smokers but not current or never smokers; people who say they are moderately active but not those who say they are very active or sedentary; those with a high school degree or less but not those with some college
- EPA and CARB discount or ignore contrary studies
 - Long-term study of 50,000 veterans with high blood pressure reported no increase in mortality associated with PM_{2.5}, yet this group would be expected to be more susceptible to any pollution health effects
- Nitrate and sulfate PM are not toxic
 - Ammonium sulfate used as an inert control substance in health effects studies with human volunteers
 - Large doses of ammonium nitrate have no health effects in laboratory studies with human volunteers

Risk-risk tradeoffs: The uncounted health effects of regulatory costs

- Just because the potential benefits of reducing ozone are small, doesn't mean we shouldn't reduce ozone. Of course we would choose to stop 150 premature deaths or 1,000 hospital admissions each year if we could.
- But our choice isn't merely between stopping 150 deaths or not stopping them. People pay for regulations in the form of higher prices, lower wages, and reduced choices. Wealthier people buy safer cars, more and better medical care, etc. and have better health habits. People made poorer by regulatory costs do fewer of these things and are less healthy and safe as a result. In other words, regulations to reduce pollution are not pure risk-reduction measures, but instead inevitably impose tradeoffs that can worsen health.
- Risk researchers estimate each \$17 million in regulatory costs causes one additional statistical fatality. So to break even, a life-saving regulation must save at least 60 lives per \$1 billion in costs.
 - By CARB's estimates, its proposed ozone standard will avoid 150 premature deaths/year. So the standard will kill more people than it saves if attaining the standard costs more than \$2.6 billion/year.
 - CARB provides no cost estimate. But SCAQMD estimates \$4 billion/year in 2010 just to attain 1-hour ozone standard in South Coast. AEI-Brookings estimates \$16 billion/year incremental cost to attain federal 8-hour standard in South Coast.
 - CARB's proposed standard is likely to be unattainable at any cost, but will almost certainly cost at least tens of billions/year.
- Attempting to attain CARB's proposed standard will on net cause hundreds of additional premature deaths each year.

Cost-benefit analysis: should we place a value on life and health?

- We *do* place implicit values on our lives and our health. We are all natural cost-benefit analysts, deciding for example, whether pay more for a safer car or whether to take a riskier job that pays a higher salary. Many people who could afford safer cars or safer homes nevertheless choose not to purchase sprinkler systems or more-crashworthy cars, and many people are willing to incur a greater risk of injury or death in return for a higher salary. When we make these choices we implicitly place values on our lives, even if we would prefer not to think of it in those terms.
- A number of studies have estimated the implicit values people place on their lives based on the actual risk-benefit decisions they make. These studies suggest that on average people value their lives at around \$7 million dollars.
- Based on people's revealed valuations of life and health, and CARB's estimates of various health effects avoided by reducing ozone, the benefits of attaining the federal 8-hour ozone standard in California would total \$3 billion per year. The incremental benefits of CARB's proposed standard would total \$1.2 billion per year.
 - More than 90 percent of these benefits are due to avoiding premature deaths.
 - These benefit estimates don't include the offsetting harm from higher UV exposure.
- But attaining just the federal 8-hour ozone standard in California is likely to cost more than \$20 billion per year. The incremental cost of attempting to attain CARB's proposed standard would be even higher. Because the costs reducing ozone are many times greater than the benefits, attempting to attain the federal 8-hour ozone standard or CARB's proposed standard will make Californians worse off overall.
 - This shouldn't be a surprise. EPA in 1997 concluded that the costs of attaining the federal 8-hour standard would be twice as large as the benefits. Outside economists believe the real costs of attaining the federal 8-hour standard will be several times greater than EPA estimated.

CARB avoids discussion of the costs of its proposed ozone standard

- CARB claims “The proposed ambient air quality standards will in and of themselves have no environmental or economic impacts. Standards simply define clean air.”
 - But CARB provides a detailed estimate of predicted health benefits of its proposed standard. By omitting discussion of costs while discussing benefits in detail, CARB creates the false impression that the predicted health benefits of the proposed standard can somehow be delivered without imposing any offsetting hardships on the people who are ostensibly being helped by the tougher standard. The new standard will unavoidably do both.
- The full effects of attempting to attain CARB’s proposed standard should be assessed before standard is adopted
 - Costs are hidden, so public is never made aware of the tradeoffs they’ve made and whether they’ve struck a good bargain.
- Once the standard is adopted, regulators and environmental activists will ensure that the standard becomes its own justification, preempting the scrutiny that would determine whether attempting to attain the standard will actually make people better off overall.

But isn't air pollution risk involuntary?

- People have a right to be free from unreasonable harms imposed by others. Doesn't right to clean air trump cost/benefit analysis?
- What is an "unreasonable" involuntary risk?
 - Pollen/mold spores impose involuntary risk of hospitalization/ER visit similar to air pollution. Most urban/suburban pollen and mold spores come from lawns, flowers, and trees intentionally planted by people.
 - Annual risk of motor-vehicle death is many times higher than CARB's estimated risk of death from ozone. Much of this risk is arguably involuntary, e.g., getting hit by a drunk, speeding, or inattentive driver.
 - Taking CARB's estimates, the incremental benefit of attaining the proposed standard would be to reduce one's annual risk of premature death by 1/240,000, and respiratory hospital admission by 1/36,000. Are those unreasonable involuntary risks?
 - The very reason for ignoring small risks, even when they are involuntary, is that the costs of reducing many of them are so large compared to the benefits that chasing all those small risks would impoverish us.
- Is all air pollution exposure involuntary?
 - San Bernardino/Riverside population quadrupled from 1960-2000. Virtually anyone would prefer less air pollution. But people who moved to the SB/Riverside area chose a "package" of good, bad, and neutral characteristics that taken together added up to a desirable place to live. Is their air pollution exposure involuntary?

Why would CARB pursue policies that harm Californians?

- CARB's goal is to provide everyone with clean, safe air—something we all agree is crucial. But as a powerful single-purpose agency with a staff that is passionate about air quality, CARB unavoidably suffers from tunnel vision—the pursuit of a single-minded goal to the point where it does more harm than good.
- We all have many needs and aspirations, but limited resources of money, time, knowledge, and attention. This forces us to make implicit and explicit tradeoffs every day based on our goals, tastes, circumstances, and financial means. But CARB deals only in air pollution reduction and places its mission ahead of other people's particular desires. Despite already-stringent air pollution standards, CARB will pursue the next increment of air pollution reduction, and the next, regardless of whether the increasingly marginal benefits are worth having or the costs worth bearing, given all the other things that people will have to give up in the bargain.
- By pursuing marginal and uncertain health benefits at great cost, CARB makes Californians worse off overall.