

Air Pollution Issues Relevant to USC Preventive Medicine

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Air Pollution Control Agencies That Regulate in California

**US Environmental Protection Agency 1970
1970 Clean Air Act & Amendments
1997 & 2012 Particulate Matter NAAQS**

**California Air Resources Board 1967
Mobile Sources: Cars, Trucks, Buses**

**35 CA Air Pollution Control Districts ~1976
(South Coast Air Quality Management District)
Stationary Sources: Manufacturing & Ports**

Fine Particulate Matter (PM_{2.5})

PM_{2.5} is defined by particle size ($\leq 2.5 \mu\text{m}$ in diameter) and not by chemical composition. PM_{2.5} is generated mainly by combustion processes. The major sources of PM_{2.5} in California are forest fires, agricultural dust, industrial combustion, residential burning, diesel engines (about 5%), and China (up to 30%).

PM_{2.5} epidemiology has been used to establish the following scientifically contested regulations that have had and still have multi-billion dollar economic impacts in California and the US:

- 1) 1997 & 2012 US EPA Annual National Ambient Air Quality Standard (NAAQS) for PM_{2.5} : $15 \mu\text{g}/\text{m}^3$ and now $12 \mu\text{g}/\text{m}^3$
- 2) 2008 CARB Truck and Bus Regulation for Diesel Vehicles
- 3) 2003-2007-2012 SCAQMD Air Quality Management Plans

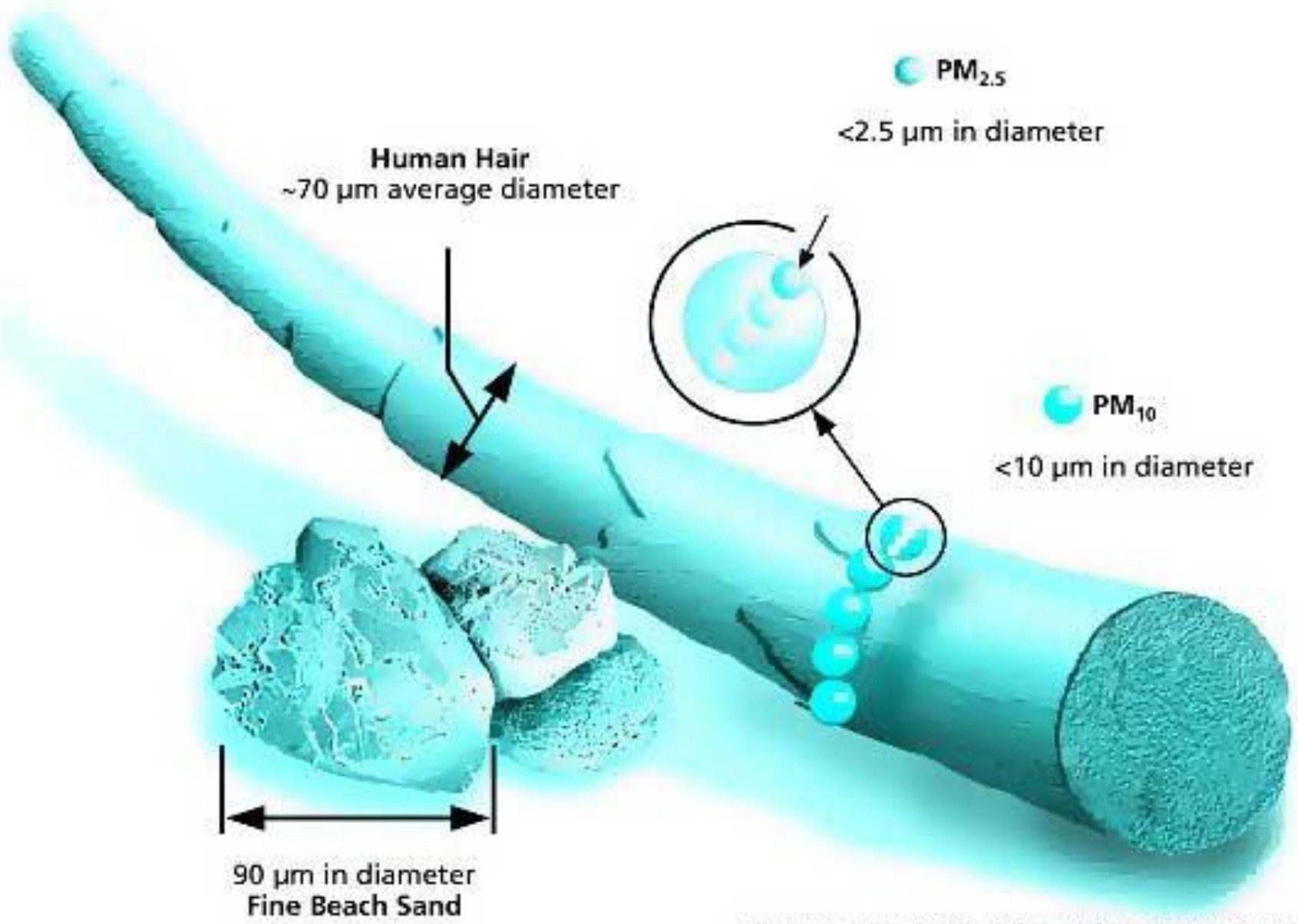


Image courtesy of EPA, Office of Research and Development

Inhaled Particulate Matter ($PM_{2.5}$ & PM_{10})

Amount of Air Inhaled by an Adult Breathing at Rest:
~ 10,000 liters/day = 10 m³/day ~ 292 M m³/80 years

$PM_{2.5}$ Inhaled at NAAQS level of 15 $\mu\text{g}/\text{m}^3$:
292 M m³/80 years x 15 $\mu\text{g}/\text{m}^3$ ~ 4.38 grams/80 years
4.38 grams/80 years = 0.88 teaspoons/80 years

Diesel PM Inhaled, Assuming 5% of total $PM_{2.5}$
0.22 grams/80 years = 0.044 teaspoons/80 years

$PM_{2.5}$ Inhaled from 1 Cigarette ~ 0.04 grams

PM_{10} Inhaled at Owens Lake (Keeler) at Level of 20 $\mu\text{g}/\text{m}^3$:
292 M m³/80 years x 20 $\mu\text{g}/\text{m}^3$ ~ 5.84 grams/80 years

$PM_{2.5}$ and PM_{10} are the only regulated air pollutants
without chemical specification--mass is regulated

Weaknesses of PM_{2.5} Epidemiology

1) **Ecological Fallacy:** ambient PM_{2.5} measurements from selected monitoring stations are assumed to apply to all individual subjects within defined geographical areas

2) **Confounding Variables:** numerous confounding variables, including other pollutants, influence the PM_{2.5} mortality relationship in observational cohort studies

3) **Secret Data:** investigators controlling major PM_{2.5} databases (ACS and Harvard) refuse to allow independent analysis of these databases, in violation of House Subpoena

4) **Definition of PM_{2.5}:** PM_{2.5} is defined as particles less than 2.5 μm in diameter, but its composition varies greatly across US, from mineral dust to coal burning to diesel soot

PM_{2.5} & Total Mortality Relationship

Based on Prospective Epidemiologic Cohorts

Dockery, Pope, et al. NEJM 1993 “An association between air pollution and mortality in six U.S. cities” (H6CS)

Pope, Thun, et al. AJRCCM 1995 “Particulate air pollution as predictor of mortality in prospective study of U.S. adults” (CPS II)

Wall Street Journal April 7, 1997

“Pollution study sparks debate over secret data”

SCIENCE July 25, 1997 “Showdown Over Clean Air Science”
& “Researchers and Lawmakers Clash Over Access to Data”

Robert F. Phalen “The Particulate Air Pollution Controversy”
2002 Book and 2004 Paper

Lamar Smith Wall Street Journal July 30, 2013

“The EPA’s Game of Secret Science”

“Premature Deaths” Attributed to PM_{2.5}

A relative risk greater than 1.0 [RR > 1.00] for the relationship between PM_{2.5} and total (all cause) mortality is interpreted by US EPA and CARB as evidence that PM_{2.5} “causes” “premature deaths.”

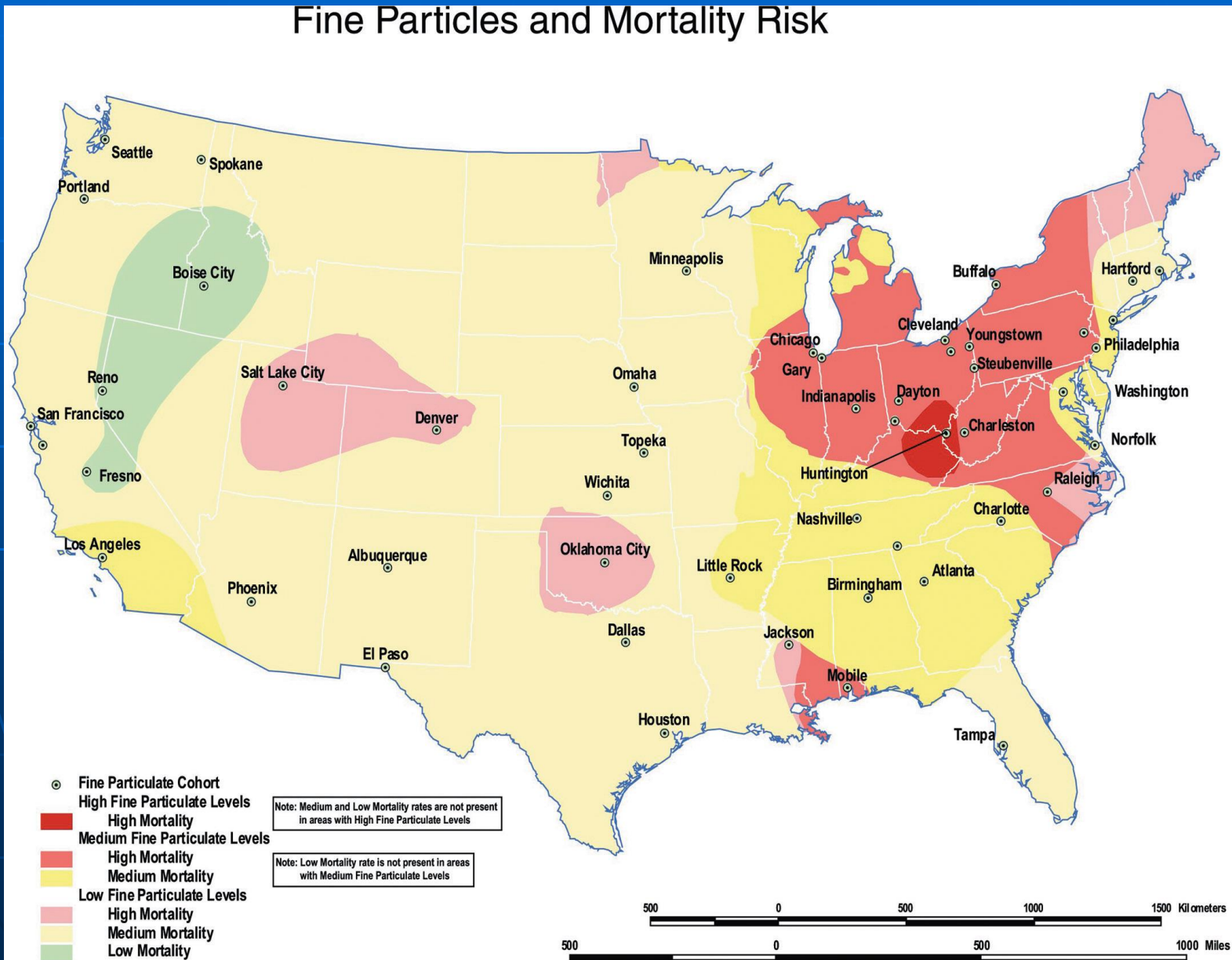
Because EPA assigns a lifetime monetary value of about \$9 million to each “death,” the health benefits of preventing these “deaths” are assumed to exceed the compliance costs of the EPA and CARB regulations that are designed to reduce PM_{2.5} levels and PM_{2.5}-related deaths.

Without PM_{2.5}-related “premature deaths” the EPA and CARB regulations are not justified on a socioeconomic cost-benefit basis.

2000 Krewski Jerrett HEI Report Figure 21

1982-1989 CPS II PM_{2.5} Mortality Risk <1.0 in CA

Fine Particles and Mortality Risk



PM_{2.5} & Total Mortality in California: RR (95% CI)

<http://www.scientificintegrityinstitute.org/ASAS092812.pdf>

McDonnell 2000	AHSMOG	RR ~ 1.03 (0.95-1.12)	1976-1992 (9 air sheds)
Krewski 2000	CA CPS II	RR = 0.87 (0.81-0.94)	1982-1989 (4 MSAs, reported in 2010)
Enstrom 2005	CA CPS I	RR = 1.00 (0.98-1.02)	1983-2002 (11 cos & 25 cos)
Zeger 2008	MCAPS "West"	RR = 0.99 (0.97-1.01)	2000-2005 (CA + OR + WA)
Krewski 2010	CA CPS II	RR = 0.96 (0.92-1.00)	1982-2000 (4 MSAs)
Jerrett 2010-11	CA CPS II	RR = 1.00 (0.99-1.01)	1982-2000 (Nine Model Average)
Lipsett 2011	CA Teachers	RR = 1.01 (0.95-1.09)	2000-2005
Jerrett 2013	CA CPS II	RR = 1.06 (1.00-1.12)	1982-2000 (Conurbation LUR Model Only)
Enstrom Unp	CA NIH AARP	RR ~ 1.03 (1.00-1.06)	1997-2010

PM₁₀ & Total Mortality in California: RR (95% CI)

<http://www.scientificintegrityinstitute.org/ASAS092812.pdf>

Abbey 1999 AHSMOG RR = 1.00 (0.97-1.04) 1977-1992
(N=6,338; SC&SD&SF Air Basins; all natural causes)

Chen 2010 AHSMOG RR = 1.01 (0.98-1.04) 1977-2006
(N=4,830; SC&SD&SF Air Basins; all natural causes)

Jerrett 2011 CA CPS II RR = 1.00 (0.99-1.02) 1982-2000
(N=76,135;KRG Zip Model; 20 ind cov+7 eco var; Table 37)

Lipsett 2011 CA Teachers RR = 1.01 (0.95-1.09) 2000-2005
(N=73,489 F; California)

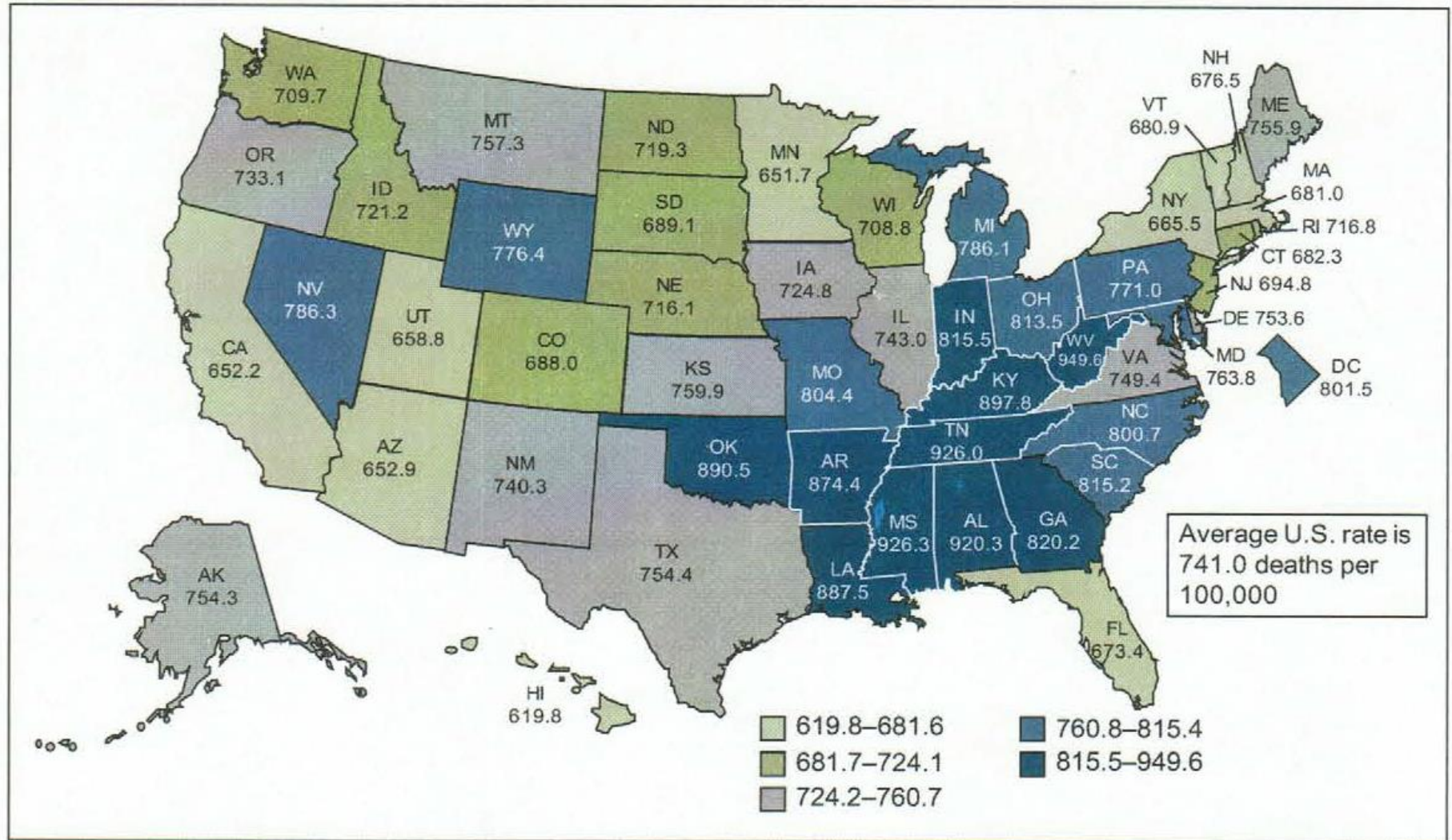
Enstrom Unpub CA CPS I RR ~ 1.00 1983-2002
(N~80,000; California)

Enstrom Unpub NIH RR ~ 1.00 1995-2010
(N~150,000; California)

2009 Age-Adjusted Total Death Rates by State

NCHS (<http://www.cdc.gov/nchs/data/databriefs/db64.pdf>)

Figure 4. Age-adjusted death rates, by state and the District of Columbia: United States, preliminary 2009



SOURCE: CDC/NCHS, National Vital Statistics System, Mortality.

August 1, 2013 US House Science Committee Subpoena of “Secret Science” Data Used by EPA for Deaths Related to PM_{2.5} & Ozone

Seven Subpoened Papers Based on Original Two Papers

1993 Dockery Pope NEJM Paper (H6CS Data—1%)

1995 Pope Thun AJRCCM Paper (ACS CPS II Data—99%)

**ACS has Refused to Comply with Subpoena: NO
De-Identified Data That Can Be Independently Analyzed**

**ACS has Refused to Cooperate in Any Way with Highly
Qualified Ph.D.-level PM_{2.5} Critics, including Enstrom**

**ACS is Heavily Involved with EPA Regulatory Policy on
an Issue Unrelated to Cancer and Will NOT Back Off**

**ACS Violated CPS II Subject Confidentiality by Allowing
Home Addresses for Use in September 2013 AJRCCM Paper**

Conclusions About Air Pollution and Total Mortality in California Based on Prospective Epidemiologic Studies

- 1) Overwhelming Evidence in CA that Premature Death is NOT Related to PM_{2.5}, PM₁₀, and Ozone**
- 2) ACS & Harvard Must Comply with August 2013 Subpoena of “Secret Science” Data Used by EPA**
- 3) EPA and CARB PM_{2.5} & Ozone Regulations in CA Should be Frozen Pending Outcome of Subpoena**
- 4) Air Pollution in CA and South Coast Air Basin Must Be Put Into SES Context Given Low Total Death Rates & More PM_{2.5} from China than Diesel**

Lysenko Pseudoscience

Lysenko, non scientist, gained favor of Stalin
Made false crop claims & used phony plant genetics
Ignored genuine Mendelian plant genetics
Purged opposing scientists, like Vavilov
Famines resulted and Soviet citizens starved
Soviet agriculture was set back decades

Particulate Matter Pseudoscience

A few activist scientists publish most major papers
Descenting scientists ignored & never funded
ACS “secret science” findings cannot be checked
Activists like ALA, UCS, NRDC file many lawsuits
EPA, CARB, SCAQMD exaggerate health effects
Draconian PM2.5 regulations adopted in healthy CA
CA truckers, contractors & general public hurt

Air Pollution Epidemiology Issues Relevant to USC Preventive Medicine

- 1) Examine 2000, 2005, 2009, 2013 Papers of former USC PM Prof Michael Jerrett re PM2.5 & Total Mortality in CA**
- 2) Ask ACS Alpa Patel (USC Epi Ph.D.) About ACS CPS II Confidentiality & Analysis of 1992 CPS II Nutrition Cohort**
- 3) Ask USC PM Chair Jonathan Samet About Zeger 2008 & New EPA Ozone NAAQS Based on Jerrett 2009 (CPS II)**
- 4) Follow “Secret Science Reform Act” (H.R. 4012) re Reform of EPA Regulations & “Secret Science” Data Use**
- 5) Follow CARB & SCAQMD Regulations That are Based on EPA “Secret Science” and Not on Actual Evidence in CA**