

PM_{2.5} Does Not *Cause* Premature Deaths

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Major Points

1. Basics of PM_{2.5} & Premature Death Claims
2. Problems with Epidemiology of PM_{2.5} Deaths
3. ACS CPS II & PM_{2.5} Death Claims Since 1995
4. New Analysis of CPS II Finds No PM_{2.5} Deaths
5. Scientists & Journals Block Null PM_{2.5} Results
6. End 'Secret Science' & Reassess EPA NAAQS

'PM_{2.5}-related Co-Benefits' Largely Justify EPA's Clean Power Plan

June 2, 2014 EPA Blog

EPA claims the CPP will: “Avoid up to 6,600 premature deaths . . . providing up to \$93 billion in climate and public health benefits.”

(<http://blog.epa.gov/blog/2014/06/our-clean-power-plan-will-spur-innovation-and-strengthen-the-economy/>)

June 2, 2014 EPA Regulatory Impact Analysis

Section 4.3.2 *Economic Valuation for Health Co-benefits* :

“Avoided premature deaths account for 98 percent of monetized PM-related co-benefits.”

(<http://www2.epa.gov/sites/production/files/2014-06/documents/20140602ria-clean-power-plan.pdf>)

March 15, 2017 *Energize Weekly*

President Trump to Rescind Clean Power Plan by Executive Order

(<https://www.euci.com/trump-to-rescind-epas-clean-power-plan/>)

Fine Particulate Matter (PM_{2.5}) Defined By Size ($\leq 2.5 \mu\text{m}$ Diameter), Not Composition

PM_{2.5} is mainly from combustion: forest fires, residential burning, diesel engines, and China PM_{2.5} (up to 30% in CA)

US EPA established the 1997 Annual National Ambient Air Quality Standard (NAAQS) for PM_{2.5} as $15 \mu\text{g}/\text{m}^3$, which was lowered to $12 \mu\text{g}/\text{m}^3$ in 2012, based largely on “secret science” epidemiology

The PM_{2.5} NAAQS has been used to justify numerous EPA regulations that have multi-billion dollar economic impacts in US: State Implementation Plans, Air Quality Management Plans, CARB Truck and Bus Regulation, EPA Clean Power Plan, etc.

Average US Adult Inhales About One Teaspoon of $PM_{2.5}$ in 80 Years

Amount of Air Inhaled by an Adult Breathing at Rest:
~ 10,000 liters/day ~ 292 M m^3 /80 years

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

$PM_{2.5}$ Inhaled from 100 Cigarettes ~ 4.0 grams

Benefit of EPA PM_{2.5} Regulations Based on Claim of 'PM_{2.5} Premature Deaths' and Assumed \$10 Million 'Value of Statistical Life' for Each Death

EPA claim that PM_{2.5} *causes* 'premature deaths' is based on invalid evidence that the relative risk (RR) between PM_{2.5} and total mortality is greater than 1.0 in US epidemiologic cohort studies

EPA uses unjustified and exaggerated assumptions to claim that the 'value of statistical life (VLS)' is \$10 million for each 'premature death'

Problems with 'PM_{2.5} Premature Deaths'

1) 'Secret Science' Data:

PM_{2.5} studies (like ACS CPS II) need objective reanalysis

2) No Etiologic Mechanism:

No experimental proof that 5 gm of PM_{2.5} causes death

3) Epidemiology Limits:

Positive relative risks do not prove that PM_{2.5} causes death

4) Geographic & Temporal Variation:

Small and declining PM_{2.5}-mortality risk in most of US

5) Ecological Fallacy:

PM_{2.5} monitors exaggerate actual human exposure

6) Confounding Variables:

Co-pollutants, etc. weaken PM_{2.5}-mortality relationship

ACS Cancer Prevention Study (CPS II) Has Exaggerated PM_{2.5} Premature Deaths

1995 *AJRCCM* Article by Pope Thun

Used Inferior PM_{2.5} Data and 'Secret' ACS CPS II Data

2000 HEI Reanalysis Report by Krewski Jerrett

Never Did Sensitivity Analysis Based on Best PM_{2.5} Data

2009 HEI Research Report 140 by Krewski Jerrett Pope Thun

Clearly Ignored PM_{2.5} Risk Variation and Best PM_{2.5} Data

2017 *Dose Response* Article by Enstrom

Found NO PM_{2.5} Risk in CPS II Based on Best PM_{2.5} Data

“Fine Particulate Matter and Total Mortality in Cancer Prevention Study Cohort Reanalysis”

2000 Krewski HEI Reanalysis Report Figure 21

1982-1989 CPS II PM2.5 Mortality Risk Varies in US

Enstrom 2017 Analysis of PM_{2.5} and Total Mortality During 1982-1988 in ACS CPS II Cohort

<u>1979-83 PM2.5</u>	<u>Subjects</u>	<u>Relative Risk (95% CI)</u>
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Fully Adjusted for 50 Counties in Continental US

IPN	195,215	1.025 (0.990-1.061)
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HEI	195,215	1.082 (1.039-1.128)
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Fully Adjusted for Ohio Valley (IN,KY,OH,PA,WV)

IPN	42,174	1.050 (0.918-1.201)
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HEI	42,174	1.111 (0.983-1.256)
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Fully Adjusted for States Other Than Ohio Valley

IPN	153,041	0.975 (0.936-1.051)
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HEI	153,041	1.025 (0.975-1.078)
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Enstrom 2017 Analysis of PM_{2.5} and Total Mortality During 1982-1988 in California ACS CPS II Cohort Compared with Krewski 2010 HEI Special Analysis

<u>1979-83 PM2.5</u>	<u>Subjects</u>	<u>Relative Risk (95% CI)</u>
Enstrom 2017 Fully Adjusted For 1982-1988 Deaths		
IPN (4 Counties)	36,201	0.879 (0.805-0.960)
HEI (4 Counties)	36,201	0.870 (0.788-0.960)
Krewski 2010 Fully Adjusted For 1982-1989 Deaths		
“Same” Standard Cox Model		
HEI (4 Counties)	40,408	0.872 (0.805-0.944)
“Different” Standard Cox Model		
HEI (4 Counties)	38,925	0.893 (0.823-0.969)

PM_{2.5} and Total Mortality in US and California: Enstrom 2017 re 1982-1988 ACS CPS II Cohort Thurston 2016 re 2000-2009 NIH AARP Cohort

<u>Geographic Area</u>	<u>Subjects</u>	<u>Relative Risk (95% CI)</u>
<u>United States</u>		
Enstrom Analysis Fully Adjusted for 1982-1988 Deaths 85 Counties	269,766	1.023 (0.997-1.049)
Thurston Analysis Fully Adjusted for 2000-2009 Deaths 6 States & 2 Cities	517,041	~1.025 (1.000-1.049)
<u>California</u>		
Enstrom Analysis Fully Adjusted for 1982-1988 Deaths 11 Counties	60,521	0.992 (0.954-1.032)
Thurston Analysis Fully Adjusted for 2000-2009 Deaths 58 Counties	160,209	~1.017 (0.990-1.040)

PM_{2.5} and Total Mortality in California: Six Cohorts

<u>Author & Year</u>	<u>CA Cohort</u>	<u>Relative Risk (95% CI)</u>
McDonnell 2000	AHSMOG	RR ~ 1.03 (0.95-1.12)
Enstrom 2005	CA CPS I	RR = 1.00 (0.98-1.02)
Zeger 2008	MCAPS “West”	RR = 0.99 (0.97-1.01)
Jerrett 2011 9 RRs	CA CPS II	RR = 1.00 (0.99-1.01)
Ostro 2015	CA Teachers	RR = 1.01 (0.98-1.05)
Thurston 2016	CA NIH AARP	RR = 1.02 (0.99-1.04)
Weighted Average (Six Cohorts)		RR = 1.00 (0.99-1.01)

(<http://scientificintegrityinstitute.org/NoPMDdeaths081516.pdf>)

C. Arden Pope, III, Ph.D., BYU Economics

(“World’s Leading Expert on the Effects of Air Pollution on Health”)

Cited Enstrom 2005 in 2006 JAWMA Review, but Never Again
Ignored July 11, 2008 CARB Teleconference re Null CA Results
Ignored February 26, 2010 CARB PM_{2.5} Deaths Symposium
Ignored August 1, 2013 House Science Committee Subpoena
Omitted Many Null CA results from Jerrett 2013 AJRCCM paper
Ignored Enstrom Invitation to Attend June 11, 2015 ICC-10

(<http://scientificintegrityinstitute.org/Pope111513.pdf>)

Michael L. Jerrett, Ph.D., USC, UCB, UCLA

(PM_{2.5} 'Expert' Who Never Cites His or Others' Null Evidence)

2013 AJRCCM Jerrett Krewski Thun Pope: PM_{2.5} & CA Deaths

Browns Filed 2014 Claim with UCLA re Jerrett 2013 Paper:
Claim Ignored by UCLA Chancellor Block & Provost Waugh

Enstrom Refiled Browns' Claim with UCLA in 2015:
Claim Dismissed by UCLA Research Integrity Officer Goldberg

Enstrom Filed 2016 Detailed Claim with UCLA re Jerrett 2013:
Claim & Null Findings Dismissed by UCLA RIO Karagozian

Enstrom Filed 2016 Detailed Claim with US ORI re Jerrett 2013:
ORI Officer Concluded Jerrett 2013 shows NO PM_{2.5} Deaths

<http://scientificintegrityinstitute.org/ORI111116.pdf>

American Cancer Society Epidemiologists Michael Thun, M.D. & Susan Gapstur, Ph.D. Refuse to Clarify CPS II Findings re PM_{2.5}

ACS Has Misused the “Secret Science” CPS II Data Since
1995 to Claim PM_{2.5} Causes Premature Deaths

ACS Refused to Comply with 2013 House Subpoena and Has Provided NO CPS II
Data for Independent Analysis

ACS Has Refused to Cooperate with Qualified Ph.D.-level
PM_{2.5} Critics, including Enstrom, Young, and Briggs

ACS Continues to Participate in Falsification of PM_{2.5} Deaths
in CPS II Cohort and WILL NOT Respond to Critics

<http://scientificintegrityinstitute.org/GapsturEns092013.pdf>

Health Effects Institute President Daniel W. Greenbaum and Chief Scientist Aaron J. Cohen Have Never Clarified 2000 HEI Reanalysis Findings re CPS II

HEI 2000 Reanalysis Never Tested Sensitivity of
PM_{2.5} Mortality Risk in Pope 1995 with best PM_{2.5} Data

Since 2002 HEI has not provided PM_{2.5} Mortality Risk
for 50 Cities in Pope 1995 and HEI 2000 Figures 5 and 21

Krewski 2010 HEI Analysis: No PM_{2.5} Deaths in CA CPS II

HEI Has Not Conducted Requested Analysis of PM_{2.5}
Mortality Risk in CPS II for Ohio Valley and Other States

<http://scientificintegrityinstitute.org/Greenbaum031017.pdf>

***Science* Rejection of PM_{2.5} Deaths Papers**

Editor Marcia McNutt Rejected June 2015 Letter re Falsification in Jerrett 2013 and
Need for Secret Science Reform Act

July 2015 Policy Forum on PM_{2.5} Rejected Without Review

August 2015 Perspective on PM_{2.5} Rejected Without Review

June 2016 PM_{2.5} Deaths CPS II Paper Rejected Without Review

Enstrom 2017 Findings That PM_{2.5} Does Not Cause Deaths and Other Evidence
Shows Publication Bias of *Science*

(https://www.nas.org/articles/nas_letter)

March 9, 2017 US House Science Committee

H.R. 1430 “Honest and Open New EPA Science Treatment (HONEST) Act of 2017”

“To prohibit the Environmental Protection Agency from proposing, finalizing, and disseminating regulations or assessments based upon science that is not transparent or reproducible.”

H.R. 1431 “EPA Science Advisory Board Reform Act of 2017”

“the scientific and technical points of view represented on and the functions to be performed by the Board are fairly balanced among the members of the Board”

Conclusions

1. **Strong Evidence from Two Major US Cohorts That PM_{2.5} Does Not Cause Premature Deaths**
2. **Strong Evidence That EPA, HEI, and Lead PM_{2.5} Researchers Have Falsified the PM_{2.5} and Total Mortality Relationship Since 1995**
3. **H.R. 1430 and H.R. 1431 Must Become Law, and There Must Be Complete Reassessment of EPA PM_{2.5} NAAQS as per Those Laws**
4. **California Waivers (Clear Air Act Section 209) Must Not Be Granted: They Are Misused to Implement Unjustified Regulations in CA**