Major Epidemiologic Studies of $PM_{2.5}$ and Total Mortality in California
(http://scientificintegrityinstitute.org/PM25RRs121510.pdf)

Relative risk of death from all causes (RR and 95% CI) associated with increase of 10 µg/m³ in $PM_{2.5}$

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McDonnell 2000	CA AHSMOG Cohort (N~3,800 [1,347 M + 2,422 F]; Adventists in 9 airsheds, used to estimate $PM_{2.5}$)	RR ~ 1.03 (0.95 – 1.12) during 1976-1992
Krewski 2000 (from Krewski 2010)	CA CPS II Cohort (N=40,408 [18,000 M + 22,408 F]; 4 MSAs; 1979-1983 $PM_{2.5}$; 44 covariates)	RR = 0.872 (0.805-0.944) during 1982-1989
Enstrom 2005	CA CPS I Cohort (N=35,783 [15,573 M + 20,210 F]; 11 counties; 1979-1983 $PM_{2.5}$)	RR = 1.039 (1.010-1.069) during 1973-1982 RR = 0.997 (0.978-1.016) during 1983-2002
Enstrom 2006	CA CPS I Cohort (N=35,783 [15,573 M + 20,210 F]; 11 counties; 1979-1983 & 1999-2001 $PM_{2.5}$)	RR = 1.061 (1.017-1.106) during 1973-1982 RR = 0.995 (0.968-1.024) during 1983-2002
Zeger 2008	"West" portion of MCAPS Cohort (3.1 M [1.5 M M + 1.6 M F]; Medicare enrollees in CA+OR+WA; 2000-2005 $PM_{2.5}$)	RR = 0.989 (0.970-1.008) during 2000-2005
Jerrett 2010	CA CPS II Cohort (N~95,000 [42,000 M + 53,000 F]; ~50 counties; 1999-2000 $PM_{2.5}$)	RR ~ 0.994 (0.965-1.025) during 1982-2000
Krewski 2010	CA CPS II Cohort (N=40,408; 4 MSAs; 1979-1983 $PM_{2.5}$) 44 covariates (N=50,930; 7 MSAs; 1999-2000 $PM_{2.5}$)	RR = 0.960 (0.920-1.002) during 1982-2000 RR = 0.968 (0.916-1.022) during 1982-2000
Ostro 2010	CA Teachers Cohort (N~45,000 [45,000 F]; 2002-2007 $PM_{2.5}$)	RR ~ 1.8 (1.6 – 2.0) during 2002-2007

Epidemiologic Study of $PM_{2.5}$ and Total Mortality in United States Relied Upon by CARB and US EPA as of 2010
Relative risk of death from all causes (RR and 95% CI) associated with increase of 10 µg/m^3 in $PM_{2.5}$

Krewski 2009	CPS II Cohort (N=342,521; 58 MSAs; 1979-1983 $PM_{2.5}$)	RR = 1.028 (1.014-1.043) during 1982-2000
	44 covariates (N=488,370; 116 MSAs; 1999-2000 $PM_{2.5}$)	RR = 1.036 (1.017-1.054) during 1982-2000

FJC	Requirement to establish causal epidemiologic relationship	RR >= 2.0

Federal Judiciary Center "Reference Manual on Scientific Evidence, 2nd Edition"
(http://www.fjc.gov/public/pdf.nsf/lookup/sciman06.pdf/$file/sciman06.pdf)
Reference Guide on Epidemiology
(http://www.fjc.gov/public/pdf.nsf/lookup/6.epide.pdf/$File/6.epide.pdf)

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Author & Year	Home Institution	Underlying Study Cohort	Primary Funding

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1) Unpublished August 31, 2010 letter from Krewski to HEI with California-specific results from Table 33 in Krewski 2009 (http://www.arb.ca.gov/research/health/pm-mort/HEI_Correspondence.pdf)
2) "Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality: HEI Special Report. July 2000" (http://pubs.healtheffects.org/view.php?id=6). Figure 21 on page 197 of Part II: Sensitivity Analyses (http://pubs.healtheffects.org/getfile.php?u=275).
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Co-Investigators: Burnett RT, Krewski D, Pope CA III, Thurston G, Christakos G, Hughes E, Calle E, Thun M.
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April 21, 2010 Enstrom Comments to CARB on PM2.5 and Mortality in CA:
(http://www.arb.ca.gov/lists/offroad09/25-carb_enstrom_comments_on_pm2.5___mortality_in_ca_042110.pdf)

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(http://www.bakersfield.com/news/local/x618251275/Air-board-must-be-held-accountable)

October 26, 2010 CBS 13 Sacramento report by Mike Luery
"On The Money: Air Pollution Fight Gets Dirty--Critics Accuse State Agency of Using Bad Science"
(http://cbs13.com/onthemoney/air.pollution.california.2.1982137.html)

November 14, 2010 Bakersfield Californian article by Lois Henry "Air pollution 'deaths' all over the map"
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CARB Diesel Regulatory Documents Based in Part on Epidemiologic Studies of $PM_{2.5}$ and Total Mortality

Proposed Amendments to the Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use On-Road Diesel-Fueled Vehicles, the Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure, and the Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Intermodal Rail Yard Facilities
(http://www.arb.ca.gov/regact/2010/truckbus10/truckbus10.htm)

Appendix J Methodology for Estimating Ambient Concentrations of Particulate Matter from Diesel-Fueled Engine Emissions And Health Benefits Associated with Reductions in Diesel PM Emissions from In-Use On-Road Heavy-Duty Diesel-Fueled Vehicles
(http://www.arb.ca.gov/regact/2010/truckbus10/truckbusappj.pdf)
Page J-17:
Table 1: Estimate of Premature Deaths Avoided Associated with Emission Reductions from Implementation of the On-Road Truck Regulation (2010-2025)*
Total deaths avoided (from PM & NOx) = 3,500 (2,700 - 4,400) in 15 years ---> 233 / year
(based on US EPA methodology using national results (Krewski 2009))

Proposed Amendments to the Regulations for In-Use Off-Road Diesel-Fueled Fleets and Off-Road Large Spark Ignition Engine Fleet Requirements
(http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadlsi10.htm)

APPENDIX G: HEALTH BENEFITS AND METHODOLOGY
APPENDIX G1: HEALTH BENEFITS ASSOCIATED WITH REDUCTIONS IN DIESEL PM EMISSIONS FROM OFF-ROAD DIESEL VEHICLES
APPENDIX G2: METHODOLOGY FOR ESTIMATING AMBIENT CONCENTRATIONS OF PARTICULATE MATTER FROM DIESEL-FUELED ENGINE EMISSIONS
(http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadappg.pdf)
Page G1-1:
Table 1: Estimate of Premature Deaths Avoided Associated with Emission Reductions from Implementation of the Off-Road Vehicle Regulation (2010-2029)*
Total deaths avoided (from PM & NOx) = 470 (360-570) in 19 years ---> 25 / year
(based on US EPA methodology using national results (Krewski 2009))

Total deaths avoided = 233 (on-road) + 25 (off-road) = 258 per year
(based on US EPA methodology using national results)

Total deaths avoided ~ 0 (on-road) + 0 (off-road) = 0 per year
(based on US EPA methodology using CA-specific results)

Total deaths in CA ~ 235,000 per year