

Preliminary Health Impacts - Mortality

- Health impacts for mortality are based on the previous data and:
 - Ozone: Pooling of L.A.-specific NMMAPS and meta-analysis estimates from Bell et al. (2005).
 - PM_{2.5}: Pooling of Jerrett et al. (2005), Jerrett et al. (2013), and Kriging and LUR estimates from Krewski et al. (2009).
- No threshold effects assumed for either pollutant
 - IEC recommendation based on latest scientific evidence
 - U.S. EPA's practice

In the absence of substantial information in the scientific literature on alternative forms of C-R functions at low O₃ concentrations, the best estimate of the C-R function is a linear, no-threshold function.

U.S. EPA, 2014 Health Risk and Exposure Assessment for Ozone

Note: Confidence intervals provided on supplementary handout.

Preliminary Health Impacts – Mortality (cont'd)

Premature Mortalities Avoided		
	2023	2031
Mortality, All Cause	2193	2563
Short-term Ozone Exposure	51	87
Los Angeles	22	40
Orange	10	14
Riverside	11	16
San Bernardino	9	15
Long-term PM_{2.5} Exposure	2111	2425
Los Angeles	1481	1707
Orange	321	356
Riverside	141	166
San Bernardino	169	197

Note: Confidence intervals provided on supplementary handout.

What Costs Are Being Quantified?

- Measures with quantified emission reductions ready to be committed into State Implementation Plan (SIP)
(Note: Measures that recognize co-benefit ozone emission reductions from other programs will not have incremental costs.)
- MOB-14 existing projects, which are in baseline emissions inventory
- Measures with TBD/NYQ emission reductions – preliminary costs or unit costs, wherever available, will be discussed separately

Preliminary Costs of Draft 2016 AQMP

Measures	Present Value of Compliance Cost (2017) \$MM	Column	Present Value of Incentives (2017) \$MM	Column	Present Worth Value (2017) \$MM	Average Annual Amortized Cost (2017-2031) \$MM
Stationary Source	\$6,639.3	+	\$1,366.6	=	\$8,005.9	\$402.6
SCAQMD Mobile Source	\$861.9	+	\$588.7	=	\$1,450.6	\$120.1
CARB Mobile Source	\$16,945.3	+	\$11,815.8	=	\$28,761.2	\$1,987.6
Total	\$24,446.6	+	\$13,771.1	=	\$38,217.7	\$2,510.3

Note: Numbers may not add up due to rounding.

Summary Table. Epidemiologic cohort studies of PM_{2.5} and total mortality in California, 2000-2016
Relative risk of death from all causes (RR and 95% CI) associated with increase of 10 µg/m³ in PM_{2.5}
<http://scientificintegrityinstitute.org/NoPMDeaths112215.pdf>

Krewski 2000 & 2010	CA CPS II Cohort	N=40,408	RR = 0.872 (0.805-0.944)	1982-1989
(N=[18,000 M + 22,408 F]; 4 MSAs; 1979-1983 PM _{2.5} ; 44 covariates)				
McDonnell 2000	CA AHSMOG Cohort	N~3,800	RR ~ 1.00 (0.95 – 1.05)	1977-1992
(N~[1,347 M + 2,422 F]; SC&SD&SF AB; M RR=1.09(0.98-1.21) & F RR~0.98(0.92-1.03))				
Jerrett 2005	CPS II Cohort in LA Basin	N=22,905	RR = 1.11 (0.99 - 1.25)	1982-2000
(N=22,905 M & F; 267 zip code areas; 1999-2000 PM _{2.5} ; 44 cov + max confounders)				
Enstrom 2005	CA CPS I Cohort	N=35,783	RR = 1.039 (1.010-1.069)	1973-1982
(N=[15,573 M + 20,210 F]; 11 counties; 1979-1983 PM _{2.5})				
			RR = 0.997 (0.978-1.016)	1983-2002
Enstrom 2006	CA CPS I Cohort	N=35,783	RR = 1.061 (1.017-1.106)	1973-1982
(11 counties; 1979-1983 & 1999-2001 PM _{2.5})				
			RR = 0.995 (0.968-1.024)	1983-2002
Zeger 2008	MCAPS Cohort “West”	N=3,100,000	RR = 0.989 (0.970-1.008)	2000-2005
(N=[1.5 M M + 1.6 M F]; Medicare enrollees in CA+OR+WA (CA=73%); 2000-2005 PM _{2.5})				
Jerrett 2010	CA CPS II Cohort	N=77,767	RR ~ 0.994 (0.965-1.025)	1982-2000
(N=[34,367 M + 43,400 F]; 54 counties; 2000 PM _{2.5} ; KRG ZIP; 20 ind cov+7 eco var; Slide 12)				
Krewski 2010 (2009)	CA CPS II Cohort			
(4 MSAs; 1979-1983 PM _{2.5} ; 44 cov)		N=40,408	RR = 0.960 (0.920-1.002)	1982-2000
(7 MSAs; 1999-2000 PM _{2.5} ; 44 cov)		N=50,930	RR = 0.968 (0.916-1.022)	1982-2000
Jerrett 2011	CA CPS II Cohort	N=73,609	RR = 0.994 (0.965-1.024)	1982-2000
(N=[32,509 M + 41,100 F]; 54 counties; 2000 PM _{2.5} ; KRG ZIP Model; 20 ind cov+7 eco var; Table 28)				
Jerrett 2011	CA CPS II Cohort	N=73,609	RR = 1.002 (0.992-1.012)	1982-2000
(N=[32,509 M + 41,100 F]; 54 counties; 2000 PM _{2.5} ; Nine Model Ave; 20 ic+7 ev; Fig 22 & Tab 27-32)				
Lipsett 2011	CA Teachers Cohort	N=73,489	RR = 1.01 (0.95 – 1.09)	2000-2005
(N=[73,489 F]; 2000-2005 PM _{2.5})				
Ostro 2011	CA Teachers Cohort	N=43,220	RR = 1.06 (0.96 – 1.16)	2002-2007
(N=[43,220 F]; 2002-2007 PM _{2.5})				
Jerrett 2013	CA CPS II Cohort	N=73,711	RR = 1.060 (1.003–1.120)	1982-2000
(N=[~32,550 M + ~41,161 F]; 54 counties; 2000 PM _{2.5} ; LUR Conurb Model; 42 ind cov+7 eco var+5 metro; Table 6)				
Jerrett 2013	CA CPS II Cohort	N=73,711	RR = 1.028 (0.957-1.104)	1982-2000
(same parameters and model as above, except including co-pollutants NO ₂ and Ozone; Table 5)				
Thurston 2016	CA NIH-AARP Cohort	N=160,209	RR = 1.02 (0.99 -1.04)	2000-2009
(N=[~95,965 M + ~64,245 F]; full baseline model: PM _{2.5} by zip code; Table 3)				
Enstrom 2016 unpub	CA NIH-AARP Cohort	N=160,368	RR = 1.001 (0.949-1.055)	2000-2009
(N=[~96,059 M + ~64,309 F]; full baseline model: 2000 PM _{2.5} by county)				