UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM MAR 17 2014

SUBJECT: Correction to errors in Appendix 7A and Table 8-1 of the *Health Risk and Exposure Assessment for Ozone, Second External Review Draft*

FROM: Erika N. Sasser, Acting Director ENS
Health and Environmental Impacts Division

TO: Holly Stallworth, Designated Federal Officer
Clean Air Scientific Advisory Committee
EPA Science Advisory Board Staff Office

On February 3, 2014, EPA released the *Health Risk and Exposure Assessment for Ozone, Second External Review Draft* (REA), which was completed as part of the current review of the National Ambient Air Quality Standards (NAAQS) for ozone. Public comments received on that document identified the following two errors:

1. Incorrect city-specific effect estimates were provided in Appendix 7A (and based on Smith et al. [2009]). The corrected Appendix 7A table is attached and the corrected values are shaded.
2. An incorrect value was provided in Table 8-1 (REA page 8-7) for ozone-related premature mortality, estimated using the national average short-term exposure effect estimate by Smith et al. (2009) and applied to all gridcells (located on the first row of the right-most column in Table 8-1). The correct value is 15,000 premature deaths rather than 16,000, and both values have the same 95% confidence interval of 7,200-22,000.

Following identification and correction of the above errors, both of which were the result of an error in transferring information from a data sheet to the document, EPA completed additional quality assurance reviews to ensure that the errors were confined to those instances. Specifically, in relation to the first error, EPA reviewed and verified the model input data included in Appendix 7A, including effect estimates (and their associated confidence intervals), baseline incidence rates, and population totals. We also confirmed that the correct effect estimates were used in the risk calculations. We determined that the error identified in Appendix 7A was isolated to that table; it did not affect the risk calculations presented in Chapter 7 and does not have implications for findings or conclusions presented in that chapter.

In relation to the second error, we first verified that both the input data and the estimated values for premature deaths reported in the REA are correct. We also reviewed all national-scale risk estimates presented in Chapter 8 to confirm that no other transfer errors had been made, and this was the case. Because the results based on the national-scale effect estimate applied to all gridcells were presented as a sensitivity study to compare against the core results based on city-specific effect estimates by Smith et al. (2009), Table 8-1 is the only instance in which the results of this calculation appear in the document. The discussion of this result in the REA was limited to the following: "Compared with applying city-specific effect estimates to the gridcells corresponding to each urban area, using the national average effect estimate for all gridcells yields equivalent central estimates. However, applying the national average also results in tighter confidence intervals since the national average effect estimates had higher statistical power and thus tighter confidence bounds compared with the effect estimates for individual cities." The corrected result continues to support the noted equivalence of the two estimates and does not change the conclusions made regarding this estimate.

Attachment

cc: Susan Anenberg, OAQPS/HEID
Stephen Graham, OAQPS/HEID
Bryan Hubbell, OAQPS/HEID
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Appendix 7A. Detailed Information on Effect Estimates, Baseline Incidence and Demographic Data Used in the Epidemiological-Based Risk Assessment

				Study information (C-R function)								Baseline incidence[a]		Population	
Endpoint	Study	Urban study area	Study area template	Air metric	Risk assessment modeling period	Age range	Lag	Additional study details	Statistical Model	Effect estimate (Beta)	SE (effect estimate)[a]	2007	2009	2007	2009
Core Risk - short-term exposure-related all-cause mortality															
Mortality, All Cause	Smith et al., 2009	Atlanta, GA	CBSA	D8HourMax	March-October	0-99	distributed lag 0-6 d	-	log-linear	0.000241075	0.000291921	24,086	24,565	5,798,520	5,991,005
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000419189	0.000329964	22,709	22,630	5,362,979	5,437,691
Mortality, All Cause	Smith et al., 2009	Boston, MA	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.000280704	0.000342908	29,168	28,606	7,469,168	7,553,629
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000565437	0.000314904	17,651	17,246	3,419,753	3,404,546
Mortality, All Cause	Smith et al., 2009	Denver, CO	CBSA	D8HourMax	March-September	0-99	distributed lag 0-6 d	-	log-linear	0.00016572	0.000356513	9,977	10,128	3,585,323	3,714,085
Mortality, All Cause	Smith et al., 2009	Detroit, MI	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.000643218	0.000311744	21,796	21,387	5,703,138	5,620,925
Mortality, All Cause	Smith et al., 2009	Houston, TX	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.000499872	0.000207509	35,544	36,135	6,145,152	6,437,742
Mortality, All Cause	Smith et al., 2009	Los Angeles, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.000217919	0.000157143	121,194	121,736	21,225,780	21,587,310
Mortality, All Cause	Smith et al., 2009	New York, NY	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.001011366	0.000207428	67,939	66,898	16,024,400	16,202,260
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.00071395	0.000284572	38,076	37,426	7,813,329	7,904,328
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.000301579	0.00031446	30,170	30,336	4,675,398	4,770,990
Mortality, All Cause	Smith et al., 2009	St. Louis, MO	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000540126	0.000342796	17,256	16,888	3,344,163	3,369,708
Core Risk - long-term exposure-related respiratory mortality															
Mortality, Respiratory	Jerrett et al., 2009	Atlanta, GA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	3,803	3,893	3,283,262	3,419,286
Mortality, Respiratory	Jerrett et al., 2010	Baltimore, MD	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	3,970	3,952	3,195,786	3,255,696
Mortality, Respiratory	Jerrett et al., 2011	Boston, MA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	6,466	6,328	4,562,351	4,631,833
Mortality, Respiratory	Jerrett et al., 2012	Cleveland, OH	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	2,947	2,873	2,105,949	2,107,957
Mortality, Respiratory	Jerrett et al., 2013	Denver, CO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	2,287	2,324	2,055,105	2,137,319
Mortality, Respiratory	Jerrett et al., 2014	Detroit, MI	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	4,094	4,007	3,382,306	3,373,240
Mortality, Respiratory	Jerrett et al., 2015	Houston, TX	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	3,317	3,370	3,359,712	3,529,238
Mortality, Respiratory	Jerrett et al., 2016	Los Angeles, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	12,443	12,529	11,723,570	12,038,790
Mortality, Respiratory	Jerrett et al., 2017	New York, NY	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	10,779	10,600	9,670,019	9,817,407
Mortality, Respiratory	Jerrett et al., 2018	Philadelphia, PA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	6,747	6,620	4,647,403	4,726,359
Mortality, Respiratory	Jerrett et al., 2019	Sacramento, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	3,814	3,835	2,695,086	2,765,834
Mortality, Respiratory	Jerrett et al., 2020	St. Louis, MO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.003922071	0.001324866	3,143	3,072	1,998,779	2,028,727
Core Risk - short-term exposure-related morbidity															
HA, All Respiratory	Katsouyanni et al., 2009	Detroit, MI	CBSA	D1HourMax	June-August	65-99	average of lag 0 and lag 1	penalized splines	log-linear	0.00056	0.000352041	8,291	8,519	687,389	713,374
HA, All Respiratory	Katsouyanni et al., 2009	Detroit, MI	CBSA	D1HourMax	June-August	65-99	average of lag 0 and lag 1	natural splines	log-linear	0.00054	0.000357143	8,291	8,519	687,389	713,374
HA, Asthma	Silverman and Ito, 2010	New York, NY	CBSA	D8HourMax	April-October	6-18	average of lag 0 and lag 1	-	log-linear	0.007906969	0.0037862	1,463	1,453	2,804,642	2,787,619
HA, Asthma	Silverman and Ito, 2010	New York, NY	CBSA	D8HourMax	April-October	6-18	average of lag 0 and lag 1	PM2.5	log-linear	0.005555347	0.003692645	1,463	1,453	2,804,642	2,787,619
HA, Chronic Lung Disease	Lin et al. (a), 2008	New York, NY	CBSA	D1HourMax	April-October	0-17	Lag 2 d	-	log-linear	0.00076087	0.000163043	3,706	3,667	3,823,944	3,786,262
HA, All Respiratory	Linn et al., 2000	Los Angeles, CA	CBSA	D24HourMean	June-August	30-99	Lag 0d	-	log-linear	0.0006	0.0007	32,087	33,749	11,723,570	12,038,790
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Atlanta, GA	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	2,646	2,883	505,741	554,624

Endpoint	Study	Urban study area	Study area template	Study Information (C-R function)								Baseline incidence[b]		Population	
				Air metric	Risk assessment modeling period	Age range	Lag	Additional study details	Statistical Model	Effect estimate (Beta)	SE (effect estimate)[a]	2007	2009	2007	2009
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Baltimore, MD	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	2,958	3,086	621,817	654,073
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Boston, MA	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	4,502	4,618	975,770	1,009,556
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Cleveland, OH	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	2,569	2,619	495,715	507,939
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Denver, CO	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	923	987	337,427	365,450
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Detroit, MI	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	3,643	3,740	687,389	713,374
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Houston, TX	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	3,238	3,452	536,446	576,473
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Los Angeles, CA	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	6,741	7,165	2,183,030	2,301,532
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	New York, NY	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	7,850	8,058	2,052,957	2,120,805
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Philadelphia, PA	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	5,173	5,315	1,023,602	1,059,325
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	Sacramento, CA	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	1,385	1,475	536,631	569,298
HA, Chronic Lung Disease (less Asthma)	Medina-Ramon et al, 2006	St. Louis, MO	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.00019898	2,048	2,099	442,691	456,212
Emergency Room Visits, Respiratory	Strickland et al., 2010	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	5-17	distributed lag 0-7 d	-	log-linear	0.004786368	0.000760164	38,242	39,464	1,105,830	1,141,180
Emergency Room Visits, Respiratory	Strickland et al., 2010	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	5-17	average of lags 0-2	-	log-linear	0.002699013	0.00064564	38,242	39,464	1,105,830	1,141,180
Emergency Room Visits, Respiratory	Tolbert et al., 2007	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	average of lags 0-2	-	log-linear	0.001286007	0.000206235	140,690	145,038	5,798,520	5,991,005
Emergency Room Visits, Respiratory	Tolbert et al., 2007	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	average of lags 0-2	CO	log-linear	0.001140[illegible]	0.000228328	140,690	145,038	5,798,520	5,991,005
Emergency Room Visits, Respiratory	Tolbert et al., 2007	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	average of lags 0-2	NO2	log-linear	0.001028713	0.000250581	140,690	145,038	5,798,520	5,991,005
Emergency Room Visits, Respiratory	Tolbert et al., 2007	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	average of lags 0-2	PM10	log-linear	0.000803233	0.000266964	140,690	145,038	5,798,520	5,991,005
Emergency Room Visits, Respiratory	Tolbert et al., 2007	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	average of lags 0-2	PM10, NO2	log-linear	0.000774925	0.000267224	140,690	145,038	5,798,520	5,991,005
Emergency Room Visits, Respiratory	Darrow et al., 2011	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	Lag 1d	-	log-linear	0.000685212	0.000138467	140,690	145,038	5,798,520	5,991,005
Emergency Room Visits, Asthma	Ito et al., 2007	New York, NY	New York, NY	D8HourMax	April-October (7)	0-99	average of lag 0 and lag 1	-	log-linear	0.005213389	0.00090866	45,290	45,547	16,024,400	16,202,260
Emergency Room Visits, Asthma	Ito et al., 2007	New York, NY	New York, NY	D8HourMax	April-October (7)	0-99	average of lag 0 and lag 1	PM2.5	log-linear	0.00397574	0.000978924	45,290	45,547	16,024,400	16,202,260
Emergency Room Visits, Asthma	Ito et al., 2007	New York, NY	New York, NY	D8HourMax	April-October (7)	0-99	average of lag 0 and lag 1	NO2	log-linear	0.003233689	0.00093586	45,290	45,547	16,024,400	16,202,260
Emergency Room Visits, Asthma	Ito et al., 2007	New York, NY	New York, NY	D8HourMax	April-October (7)	0-99	average of lag 0 and lag 1	CO	log-linear	0.005543699	0.000893945	45,290	45,547	16,024,400	16,202,260
Emergency Room Visits, Asthma	Ito et al., 2007	New York, NY	New York, NY	D8HourMax	April-October (7)	0-99	average of lag 0 and lag 1	SO2	log-linear	0.004114984	0.000922644	45,290	45,547	16,024,400	16,202,260
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.00076087	0.002000215	235,224	233,053	1,189,925	1,177,644
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D8HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.005703579	0.002021676	294,030	291,316	1,189,925	1,177,644
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	PM2.5	logistic	0.007705248	0.002266587	235,224	233,053	1,189,925	1,177,644
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	PM2.5	logistic	0.007013137	0.002273393	294,030	291,316	1,189,925	1,177,644

Endpoint	Study	Urban study area	Study area template	Study information (C-R function)								Baseline incidence[b]		Population	
				Air metric	Risk assessment modeling period	Age range	Lag	Additional study details	Statistical Model	Effect estimate (Beta)	SE (effect estimate)[a]	2007	2009	2007	2009
Asthma Exacerbation, Shortness of Breath	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.003977017	0.001794699	235,224	233,053	1,189,925	1,177,644
Asthma Exacerbation, Shortness of Breath	Gent et al., 2003	Boston, MA	Boston, MA	D8HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.005247285	0.002180837	235,224	233,053	1,189,925	1,177,644
Asthma Exacerbation, Wheeze	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 0d	PM2.5	logistic	0.006002092	0.002022527	548,857	543,790	1,189,925	1,177,644
Sensitivity Analysis - short-term exposure-related all-cause mortality															
Mortality, All Cause	Smith et al., 2009	Atlanta, GA	Epi study based	D8HourMax	March-October	0-99	distributed lag 0-6 d	-	log-linear	0.000241075	0.000291921	SA completed for 2009	16,524	SA completed for 2009	4,462,663
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000419189	0.000329964		11,341		1,953,317
Mortality, All Cause	Smith et al., 2009	Boston, MA	Epi study based	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.000280704	0.000342908		14,399		3,609,318
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000565437	0.000314904		15,402		2,786,348
Mortality, All Cause	Smith et al., 2009	Denver, CO	Epi study based	D8HourMax	March-September	0-99	distributed lag 0-6 d	-	log-linear	0.00016572	0.000356513		9,093		2,737,299
Mortality, All Cause	Smith et al., 2009	Detroit, MI	Epi study based	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.000643218	0.000311744		19,846		4,377,305
Mortality, All Cause	Smith et al., 2009	Houston, TX	Epi study based	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.000499872	0.000207509		29,179		5,769,285
Mortality, All Cause	Smith et al., 2009	Los Angeles, CA	Epi study based	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.000217919	0.000157143		92,186		16,403,420
Mortality, All Cause	Smith et al., 2009	New York, NY	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.001011366	0.000207428		50,341		13,239,830
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.00071395	0.000284572		27,057		4,737,330
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	Epi study based	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.000301579	0.00031446		29,479		4,341,150
Mortality, All Cause	Smith et al., 2009	St. Louis, MO	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000540126	0.000342796		11,625		1,855,249
Mortality, All Cause	Smith et al., 2009	Atlanta, GA	CBSA	D8HourMax	March-October	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000260274	0.000235902	SA completed for 2009	24,565	SA completed for 2009	5,991,005
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000939893	0.000282919		22,630		5,437,691
Mortality, All Cause	Smith et al., 2009	Boston, MA	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000882699	0.000300367		28,606		7,553,629
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000678936	0.000263728		17,246		3,404,546
Mortality, All Cause	Smith et al., 2009	Denver, CO	CBSA	D8HourMax	March-September	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.0000293	0.000350178		10,128		3,714,085
Mortality, All Cause	Smith et al., 2009	Detroit, MI	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000715864	0.000262244		21,387		5,620,925
Mortality, All Cause	Smith et al., 2009	Houston, TX	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000422972	0.000182484		36,135		6,437,742
Mortality, All Cause	Smith et al., 2009	Los Angeles, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000198781	0.000150979		121,736		21,587,310
Mortality, All Cause	Smith et al., 2009	New York, NY	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.001122295	0.000180774		66,898		16,202,260
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.001025996	0.000239469		37,426		7,904,328
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000107022	0.000323012		30,336		4,770,990
Mortality, All Cause	Smith et al., 2009	St. Louis, MO	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	Regional Bayes-based	log-linear	0.000675448	0.00028		16,888		3,369,708
Mortality, All Cause	Smith et al., 2009	Atlanta, GA	CBSA	D8HourMax	March-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.000118303	0.000545629	SA completed	24,565	SA completed	5,991,005
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.000472682	0.000530993		22,630		5,437,691
Mortality, All Cause	Smith et al., 2009	Boston, MA	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	PM10	log-linear	0.000159064	0.000575152		28,606		7,553,629
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.000462588	0.000433506		17,246		3,404,546
Mortality, All Cause	Smith et al., 2009	Denver, CO	CBSA	D8HourMax	March-September	0-99	distributed lag 0-6 d	PM10	log-linear	-0.0000383	0.000526263		10,128		3,714,085
Mortality, All Cause	Smith et al., 2009	Detroit, MI	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	PM10	log-linear	0.000286042	0.000406606	SA completed	21,387	SA completed	5,620,925

Endpoint	Study	Urban study area	Study area template	Study information (C-R function)								Baseline incidence[a]		Population	
				Air metric	Risk assessment modeling period	Age range	Lag	Additional study details	Statistical Model	Effect estimate (Beta)	SE (effect estimate)[a]	2007	2009	2007	2009
Mortality, All Cause	Smith et al., 2009	Houston, TX	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	PM10	log-linear	0.000631017	0.000362269	completed for 2009	36,135	for 2009	6,437,742
Mortality, All Cause	Smith et al., 2009	Los Angeles, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	PM10	log-linear	0.0000524	0.000347345		121,736		21,587,310
Mortality, All Cause	Smith et al., 2009	New York, NY	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.000440658	0.000390403		66,898		16,202,260
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.000544544	0.000518628		37,426		7,904,328
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	PM10	log-linear	0.000280547	0.000543375		30,336		4,770,990
Mortality, All Cause	Smith et al., 2009	St. Louis, MO	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.000360175	0.000581296		16,888		3,369,708
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Atlanta, GA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.00029536	0.000288562	SA completed for 2009	10,119	SA completed for 2009	5,991,005
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Baltimore, MD	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000515048	0.00031402		10,408		5,437,691
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Boston, MA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000681639	0.000328429		15,160		7,553,629
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Cleveland, OH	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000596249	0.000354552		7,808		3,404,546
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Denver, CO	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000351818	0.000408829		4,953		3,714,085
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Detroit, MI	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.001045932	0.000344122		11,430		5,620,925
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Houston, TX	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000162925	0.000262836		10,132		6,437,742
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Los Angeles, CA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000273722	0.000213402		32,840		21,587,310
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	New York, NY	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.001092475	0.000235676		30,192		16,202,260
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Philadelphia, PA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000624582	0.000314555		17,137		7,904,328
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Sacramento, CA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000569111	0.000388525		8,295		4,770,990
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	St. Louis, MO	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000544366	0.000333395		7,837		3,369,708
Sensitivity Analysis - long-term exposure-related respiratory mortality															
Mortality, Respiratory	Jerrett et al., 2009	Atlanta, GA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003192937	0.0027397	3,803	3,893	3,283,262	3,419,286
Mortality, Respiratory	Jerrett et al., 2010	Baltimore, MD	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003853068	0.0027397	3,970	3,952	3,195,786	3,255,696
Mortality, Respiratory	Jerrett et al., 2011	Boston, MA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003853068	0.0027397	6,466	6,328	4,552,351	4,631,833
Mortality, Respiratory	Jerrett et al., 2012	Cleveland, OH	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.004604295	0.0027397	2,947	2,873	2,105,949	2,107,957
Mortality, Respiratory	Jerrett et al., 2013	Denver, CO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003117797	0.0027397	2,287	2,324	2,055,105	2,137,319
Mortality, Respiratory	Jerrett et al., 2014	Detroit, MI	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.004604295	0.0027397	4,094	4,007	3,382,306	3,373,240
Mortality, Respiratory	Jerrett et al., 2015	Houston, TX	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003192937	0.0027397	3,317	3,370	3,359,712	3,529,238
Mortality, Respiratory	Jerrett et al., 2016	Los Angeles, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.002767363	0.0027397	12,443	12,529	11,723,570	12,038,790
Mortality, Respiratory	Jerrett et al., 2017	New York, NY	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003853068	0.0027397	10,779	10,600	9,670,019	9,817,407
Mortality, Respiratory	Jerrett et al., 2018	Philadelphia, PA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003853068	0.0027397	6,747	6,620	4,647,403	4,726,359
Mortality, Respiratory	Jerrett et al., 2019	Sacramento, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.003117797	0.0027397	3,814	3,835	2,695,086	2,765,834
Mortality, Respiratory	Jerrett et al., 2020	St. Louis, MO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.004604295	0.0027397	3,143	3,072	1,998,779	2,028,727

a-all Beta distributions assumed to be normal

b-Gent et al., 2003 also usese the following prevalence rates: 0.028 (wheeze), 0.015 (shortness of breath), 0.012 (chest tightness) (from study)