May 9, 2014

MEMORANDUM

SUBJECT: Request for Revised Ozone HREA Chapter 7 Appendix Tables

FROM: Erika Sasser, Acting Director /s/
Health and Environmental Impacts Division (C504-02)
Office of Air Quality Planning and Standards
United States Environmental Protection Agency

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

On May 1, 2014, members of the Clean Air Scientific Advisory Committee's Ozone Review Panel requested EPA provide revised appendix tables associated with the recently corrected Chapter 7 epidemiological-based risk results (see April 28, 2014 technical memorandum "*Corrections to Estimates of Epidemiology-based Mortality and Morbidity Risks Presented in the Health Risk and Exposure Assessment for Ozone, Second External Review Draft*). Attached to this memorandum are all of the revised appendix tables that support the updated results provided in the above mentioned technical memorandum; these revised appendix tables correspond numerically to the Chapter 7 appendix tables found in the *Health Risk and Exposure Assessment for Ozone, Second External Review Draft* (second draft ozone HREA).

One structural change is reflected in the attached Appendix B Tables 7B-3, 7B-4, and 7B-5 that differs from the original Appendix B tables in the second draft ozone HREA. In addition to point estimates of risk related to short-term ozone-attributable morbidity (as was done in the second draft ozone HREA), we have also included the 95^{th} percentile confidence intervals associated with these point estimates. Because these additional results expanded the number of data rows beyond that used in the former table structure, we now provide two sub-tables for each former table -- one for each simulation year. For example, the former Appendix B Table 7B-3, which contained risk results for the years 2007 and 2009, is now presented as Table 7B-3a and 7B-3b, which contains risk results for years 2007 and 2009, respectively.

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[b]		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	0.0002411	0.0002919	19,995	20,442	5,033,453	5,205,933
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.0004192	0.00033	11,703	11,598	2,664,335	2,692,803
Mortality, All Cause	Smith et al., 2009	Boston, MA	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.0002807	0.0003429	16,688	16,436	4,439,453	4,519,143
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.0005654	0.0003149	10,964	10,692	2,093,376	2,082,741
Mortality, All Cause	Smith et al., 2009	Denver, CO	CBSA	D8HourMax	March-September	0-99	distributed lag 0-6 d	-	log-linear	0.0001657	0.0003565	6,750	6,856	2,408,986	2,498,144
Mortality, All Cause	Smith et al., 2009	Detroit, MI	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.0006432	0.0003117	17,169	16,815	4,381,785	4,316,185
Mortality, All Cause	Smith et al., 2009	Houston, TX	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.0004999	0.0002075	30,191	30,927	5,539,894	5,823,529
Mortality, All Cause	Smith et al., 2009	Los Angeles, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.0002179	0.0001571	72,824	72,935	12,615,165	12,756,237
Mortality, All Cause	Smith et al., 2009	New York, NY	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.0010114	0.0002074	78,036	76,645	18,554,574	18,779,754
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000714	0.0002846	28,177	27,658	5,876,683	5,936,034
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.0003016	0.0003145	13,198	13,361	2,077,487	2,127,784
Mortality, All Cause	Smith et al., 2009	St. Louis, MO	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.0005401	0.0003428	13,944	13,686	2,779,558	2,803,333
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	0.0039221	0.0013249	3,133	3,216	2,833,399	2,954,650
Mortality, Respiratory	Jerrett et al., 2010	Baltimore, MD	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	2,056	2,034	1,587,538	1,609,957
Mortality, Respiratory	Jerrett et al., 2011	Boston, MA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	3,685	3,622	2,690,981	2,747,634
Mortality, Respiratory	Jerrett et al., 2012	Cleveland, OH	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	1,833	1,783	1,294,458	1,294,845

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
Mortality, Respiratory	Jerrett et al., 2013	Denver, CO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	1,549	1,574	1,396,514	1,454,586
Mortality, Respiratory	Jerrett et al., 2014	Detroit, MI	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	3,230	3,153	2,636,935	2,628,339
Mortality, Respiratory	Jerrett et al., 2015	Houston, TX	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	2,790	2,859	3,001,537	3,165,283
Mortality, Respiratory	Jerrett et al., 2016	Los Angeles, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	7,480	7,512	7,072,418	7,236,439
Mortality, Respiratory	Jerrett et al., 2017	New York, NY	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	12,304	12,067	11,118,315	11,303,888
Mortality, Respiratory	Jerrett et al., 2018	Philadelphia, PA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	4,993	4,891	3,488,101	3,545,106
Mortality, Respiratory	Jerrett et al., 2019	Sacramento, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	1,669	1,690	1,185,990	1,221,735
Mortality, Respiratory	Jerrett et al., 2020	St. Louis, MO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	-	log-linear	0.0039221	0.0013249	2,535	2,485	1,649,209	1,676,509
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	0.000352	6,538	6,694	539,077	557,511
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	0.0003571	6,538	6,694	539,077	557,511
HA, Asthma	Silverman and Ito, 2010	New York, NY	CBSA	D8HourMax	April-October	6-18	average of lag 0 and lag 1	-	log-linear	0.007907	0.0037862	1,697	1,683	3,197,360	3,173,355
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	0.0055553	0.0036926	1,697	1,683	3,197,360	3,173,355
HA, Chronic Lung Disease	Lin et al. (a), 2008	New York, NY	CBSA	D1HourMax	April-October	0-17	Lag 2 d	-	log-linear	0.0007609	0.000163	4,340	4,300	4,388,434	4,344,448
HA, All Respiratory	Linn et al., 2000	Los Angeles, CA	CBSA	D24HourMean	June-August	30-99	Lag 0d	-	log-linear	0.0006	0.0007	19,320	20,259	7,072,418	7,236,439
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	0.000199	2,160	2,358	412,999	453,851
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	0.000199	1,540	1,593	320,763	334,599

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	Boston, MA	CBSA	D8HourMean	June-August	65-99	distributed lag 0-1 d	-	logistic	0.00054	0.000199	2,577	2,657	559,310	581,219
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	0.000199	1,587	1,612	305,763	312,042
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	0.000199	623	665	227,092	245,643
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	0.000199	2,870	2,935	539,077	557,511
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	0.000199	2,716	2,922	451,335	489,474
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	0.000199	4,059	4,302	1,309,329	1,372,256
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	0.000199	9,026	9,235	2,359,351	2,427,316
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	0.000199	3,825	3,920	755,595	780,220
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	0.000199	606	649	235,921	250,905
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	0.000199	1,653	1,697	357,309	368,743
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	0.0047864	0.0007602	33,322	34,432	963,574	995,654
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	0.002699	0.0006456	33,322	34,432	963,574	995,654
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	0.001286	0.0002062	122,122	126,013	5,033,453	5,205,934

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
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	0.0011408	0.0002283	122,122	126,013	5,033,453	5,205,934
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	0.0010287	0.0002506	122,122	126,013	5,033,453	5,205,934
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	0.0008032	0.000267	122,122	126,013	5,033,453	5,205,934
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	0.0007749	0.0002672	122,122	126,013	5,033,453	5,205,934
Emergency Room Visits, Respiratory	Darrow et al., 2011	Atlanta, GA	Atlanta, GA	D8HourMax	March-October (8)	0-99	Lag 1d	-	log-linear	0.0006852	0.0001385	122,122	126,013	5,033,453	5,205,934
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	0.0052134	0.0009087	52,867	53,243	18,554,574	18,779,754
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	0.0039757	0.0009789	52,867	53,243	18,554,574	18,779,754
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	0.0032337	0.0009359	52,867	53,243	18,554,574	18,779,754
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	0.0055437	0.0008939	52,867	53,243	18,554,574	18,779,754
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	0.004115	0.0009226	52,867	53,243	18,554,574	18,779,754
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.0007609	0.0020002	138,691	138,494	702,975	700,631
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D8HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.0057036	0.0020217	138,691	138,494	702,975	700,631
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	PM2.5	logistic	0.0077052	0.0022666	138,691	138,494	702,975	700,631
Asthma Exacerbation, Chest Tightness	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	PM2.5	logistic	0.0070131	0.0022734	138,691	138,494	702,975	700,631
Asthma Exacerbation, Shortness of Breath	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.003977	0.0017947	173,364	173,117	702,975	700,631

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	D8HourMax	April-September (6)	0-12	Lag 1d	-	logistic	0.0052473	0.0021808	173,364	173,117	702,975	700,631
Asthma Exacerbation, Wheeze	Gent et al., 2003	Boston, MA	Boston, MA	D1HourMax	April-September (6)	0-12	Lag 0d	PM2.5	logistic	0.0060021	0.0020225	323,613	323,152	702,975	700,631
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	0.0002411	0.0002919	SA completed for 2009	6,267	SA completed for 2009	1,589,914
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.0004192	0.00033		3,287		621,421
Mortality, All Cause	Smith et al., 2009	Boston, MA	Epi study based	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.0002807	0.0003429		2,252		715,296
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.0005654	0.0003149		7,541		1,287,137
Mortality, All Cause	Smith et al., 2009	Denver, CO	Epi study based	D8HourMax	March-September	0-99	distributed lag 0-6 d	-	log-linear	0.0001657	0.0003565		5,140		1,578,451
Mortality, All Cause	Smith et al., 2009	Detroit, MI	Epi study based	D8HourMax	April-September	0-99	distributed lag 0-6 d	-	log-linear	0.0006432	0.0003117		8,174		1,842,465
Mortality, All Cause	Smith et al., 2009	Houston, TX	Epi study based	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.0004999	0.0002075		19,642		4,017,371
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	0.0002179	0.0001571		55,949		9,776,644
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	0.0010114	0.0002074		33,006		9,066,479
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	Epi study based	D8HourMax	April-October	0-99	distributed lag 0-6 d	-	log-linear	0.000714	0.0002846		7,835		1,513,040
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	Epi study based	D8HourMax	January-December	0-99	distributed lag 0-6 d	-	log-linear	0.0003016	0.0003145		9,225		1,405,572
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	0.0005401	0.0003428		1,688		319,302
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	0.0002603	0.0002359	SA completed for 2009	20,442	SA completed for 2009	5,205,933
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	0.0009399	0.0002829		11,598		2,692,803

				Study information (C-R function)								Baseline incidence[b]		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
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	0.0008827	0.0003004		16,436		4,519,143
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	0.0006789	0.0002637		10,692		2,082,741
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	0.0003502		6,856		2,498,144
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	0.0007159	0.0002622		16,815		4,316,185
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	0.000423	0.0001825		30,927		5,823,529
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	0.0001988	0.000151		72,935		12,756,237
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	0.0011223	0.0001808		76,645		18,779,754
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	0.001026	0.0002395		27,658		5,936,034
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	0.000107	0.000323		13,361		2,127,784
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	0.0006754	0.00028		13,686		2,803,333
Mortality, All Cause	Smith et al., 2009	Atlanta, GA	CBSA	D8HourMax	March-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.0001183	0.0005456		20,442		5,205,933
Mortality, All Cause	Smith et al., 2009	Baltimore, MD	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.0004727	0.000531	SA completed for 2009	11,598	SA completed for 2009	2,692,803
Mortality, All Cause	Smith et al., 2009	Boston, MA	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	PM10	log-linear	0.0001591	0.0005752		16,436		4,519,143

Endpoint	Study	Urban study area	Study area template	Study information (C-R function): Air metric	Risk assessment modeling period	Age range	Lag	Additional study details	Statistical Model	Effect estimate (Beta)	SE (effect estimate)[a]	Baseline incidence[b]: 2007	2009	Population: 2007	2009
Mortality, All Cause	Smith et al., 2009	Cleveland, OH	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.0004626	0.0004335		10,692		2,082,741
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	0.0005263		6,856		2,498,144
Mortality, All Cause	Smith et al., 2009	Detroit, MI	CBSA	D8HourMax	April-September	0-99	distributed lag 0-6 d	PM10	log-linear	0.000286	0.0004066		16,815		4,316,185
Mortality, All Cause	Smith et al., 2009	Houston, TX	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	PM10	log-linear	0.000631	0.0003623		30,927		5,823,529
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	0.0003473		72,935		12,756,237
Mortality, All Cause	Smith et al., 2009	New York, NY	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.0004407	0.0003904		76,645		18,779,754
Mortality, All Cause	Smith et al., 2009	Philadelphia, PA	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.0005445	0.0005186		27,658		5,936,034
Mortality, All Cause	Smith et al., 2009	Sacramento, CA	CBSA	D8HourMax	January-December	0-99	distributed lag 0-6 d	PM10	log-linear	0.0002805	0.0005434		13,361		2,127,784
Mortality, All Cause	Smith et al., 2009	St. Louis, MO	CBSA	D8HourMax	April-October	0-99	distributed lag 0-6 d	PM10	log-linear	0.0003602	0.0005813		13,686		2,803,333
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Atlanta, GA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0002954	0.0002886		8,448		5,205,933
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Baltimore, MD	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.000515	0.000314		5,327		2,692,803
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Boston, MA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0006816	0.0003284		8,726		4,519,143
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Cleveland, OH	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0005962	0.0003546	SA completed for 2009	4,838	SA completed for 2009	2,082,741
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Denver, CO	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0003518	0.0004088		3,351		2,498,144
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Detroit, MI	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0010459	0.0003441		8,977		4,316,185
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Houston, TX	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0001629	0.0002628		8,712		5,823,529

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
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Los Angeles, CA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0002737	0.0002134		19,665		12,756,237
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	New York, NY	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0010925	0.0002357		34,611		18,779,754
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Philadelphia, PA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0006246	0.0003146		12,678		5,936,034
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	Sacramento, CA	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0005691	0.0003885		3,657		2,127,784
Mortality, All Cause	Zanobetti and Schwartz (b), 2008	St. Louis, MO	CBSA	D8HourMean	June-August	0-99	distributed lag 0-3 d	-	log-linear	0.0005444	0.0003334		6,359		2,803,333
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	0.0113329	0.0031929	SA completed for 2009	3,216	SA completed for 2009	2,954,650
Mortality, Respiratory	Jerrett et al., 2010	Baltimore, MD	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	-0.001005	0.0038531		2,034		1,609,957
Mortality, Respiratory	Jerrett et al., 2011	Boston, MA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	-0.001005	0.0038531		3,622		2,747,634
Mortality, Respiratory	Jerrett et al., 2012	Cleveland, OH	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0	0.0046043		1,783		1,294,845
Mortality, Respiratory	Jerrett et al., 2013	Denver, CO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.0058269	0.0031178		1,574		1,454,586
Mortality, Respiratory	Jerrett et al., 2014	Detroit, MI	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0	0.0046043		3,153		2,628,339
Mortality, Respiratory	Jerrett et al., 2015	Houston, TX	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.0113329	0.0031929		2,859		3,165,283
Mortality, Respiratory	Jerrett et al., 2016	Los Angeles, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.000995	0.0027674		7,512		7,236,439
Mortality, Respiratory	Jerrett et al., 2017	New York, NY	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	-0.001005	0.0038531		12,067		11,303,888
Mortality, Respiratory	Jerrett et al., 2018	Philadelphia, PA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	-0.001005	0.0038531		4,891		3,545,106
Mortality, Respiratory	Jerrett et al., 2019	Sacramento, CA	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0.0058269	0.0031178		1,690		1,221,735

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
Mortality, Respiratory	Jerrett et al., 2020	St. Louis, MO	CBSA	Seasonal-avg D1hrMax	April-September	30-99	NA	Regional	log-linear	0	0.0046043		2,485		1,676,509

a-all Beta distributions assumed to be normal

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

Appendix 7B – Detailed Summary of Core Risk Estimates

Table 7B-1. Core Short-Term Ozone-Attributable Mortality (2007) (incidence, percent of baseline mortality, incidence per 100,000) (Smith et al., 2009)

	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	250	220	210	200	190	31	10	18	28
	(-350 - 840)	(-310 - 740)	(-300 - 710)	(-280 - 680)	(-270 - 650)	(-42 - 100)	(-13 - 32)	(-24 - 60)	(-39 - 95)
Baltimore, MD	240	230	220	210	210	12	7	14	23
	(-130 - 600)	(-130 - 570)	(-120 - 560)	(-120 - 540)	(-110 - 520)	(-6 - 30)	(-4 - 17)	(-8 - 35)	(-13 - 59)
Boston, MA	210	200	200	190	180	3	4	11	18
	(-290 - 680)	(-290 - 670)	(-280 - 660)	(-270 - 640)	(-260 - 620)	(-5 - 11)	(-6 - 14)	(-16 - 39)	(-25 - 62)
Cleveland, OH	270	270	260	250	230	0	8	20	40
	(-25 - 550)	(-25 - 550)	(-24 - 540)	(-23 - 510)	(-21 - 470)	(0 - -1)	(-1 - 18)	(-2 - 41)	(-4 - 83)
Denver, CO	59	58	57	55	53	1	1	3	5
	(-190 - 300)	(-190 - 300)	(-190 - 290)	(-180 - 280)	(-170 - 270)	(-2 - 3)	(-4 - 7)	(-10 - 15)	(-17 - 27)
Detroit, MI	520	520	500	480	460	2	18	33	54
	(26 - 990)	(26 - 990)	(25 - 960)	(25 - 930)	(24 - 890)	(0 - 4)	(1 - 35)	(2 - 64)	(3 - 110)
Houston, TX	540	580	580	570	560	-39	4	9	20
	(100 - 970)	(110 - 1000)	(110 - 1000)	(110 - 1000)	(110 - 1000)	(-7 - -71)	(1 - 8)	(2 - 17)	(4 - 37)
Los Angeles, CA	640	750	730	700	660	-110	26	52	96
	(-270 - 1500)	(-310 - 1800)	(-300 - 1700)	(-290 - 1700)	(-270 - 1600)	(46 - -270)	(-11 - 62)	(-22 - 130)	(-40 - 230)
New York, NY	3400	3200	3100	2500	NA	170	150	740	NA
	(2000 - 4700)	(1900 - 4500)	(1900 - 4300)	(1500 - 3500)		(100 - 240)	(92 - 220)	(440 - 1000)	
Philadelphia, PA	960	920	890	860	830	47	26	56	86
	(210 - 1700)	(200 - 1600)	(200 - 1600)	(190 - 1500)	(180 - 1500)	(10 - 84)	(6 - 46)	(12 - 100)	(19 - 150)
Sacramento, CA	170	160	160	160	150	5	3	6	10
	(-180 - 500)	(-170 - 480)	(-170 - 470)	(-160 - 470)	(-160 - 450)	(-5 - 15)	(-3 - 9)	(-6 - 17)	(-11 - 31)
St. Louis, MO	370	350	330	320	300	22	15	31	49
	(-92 - 810)	(-86 - 770)	(-83 - 740)	(-79 - 700)	(-74 - 660)	(-6 - 50)	(-4 - 33)	(-8 - 70)	(-12 - 110)

	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	1.2	1.1	1.1	1.0	1.0	12	4	8	13
Baltimore, MD	2.0	1.9	1.9	1.8	1.7	5	3	6	10
Boston, MA	1.2	1.2	1.2	1.1	1.1	2	2	5	9
Cleveland, OH	2.4	2.4	2.4	2.3	2.1	-0.1	3	7	14
Denver, CO	0.9	0.8	0.8	0.8	0.8	1	2	5	9
Detroit, MI	3.0	3.0	2.9	2.8	2.7	0.3	3	6	10
Houston, TX	1.8	1.9	1.9	1.9	1.9	-7	1	2	3
Los Angeles, CA	0.9	1.0	1.0	1.0	0.9	-17	3	7	13
New York, NY	4.3	4.1	3.9	3.2	NA	5	5	22	NA
Philadelphia, PA	3.4	3.2	3.2	3.1	3.0	5	3	6	9
Sacramento, CA	1.2	1.2	1.2	1.2	1.1	3	2	3	6
St. Louis, MO	2.6	2.5	2.4	2.3	2.1	6	4	9	14

	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	5.0	4.4	4.2	4.1	3.8	0.61	0.19	0.35	0.56
Baltimore, MD	9.0	8.6	8.3	8.1	7.7	0.44	0.25	0.52	0.87
Boston, MA	4.6	4.5	4.5	4.3	4.1	0.074	0.092	0.26	0.41
Cleveland, OH	13	13	12	12	11	-0.011	0.40	0.95	1.9
Denver, CO	2.4	2.4	2.4	2.3	2.2	0.023	0.054	0.12	0.22
Detroit, MI	12	12	11	11	11	0.049	0.41	0.75	1.2
Houston, TX	9.8	10	10	10	10	-0.70	0.075	0.17	0.36
Los Angeles, CA	5.1	6.0	5.8	5.6	5.2	-0.88	0.20	0.41	0.76
New York, NY	18	17	17	14	NA	0.93	0.83	4.0	NA
Philadelphia, PA	16	16	15	15	14	0.81	0.44	0.96	1.5
Sacramento, CA	8.0	7.7	7.6	7.5	7.3	0.23	0.14	0.27	0.49
St. Louis, MO	13	13	12	11	11	0.81	0.53	1.1	1.7

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7B-2. Core Short-Term Ozone-Attributable Mortality (2009) (incidence, percent of baseline mortality, incidence per 100,000) (Smith et al., 2009)

Study Area	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	200	200	190	190	180	4	7	13	19
	(-280 - 680)	(-280 - 670)	(-270 - 650)	(-260 - 620)	(-250 - 610)	(-5 - 13)	(-10 - 24)	(-18 - 45)	(-26 - 64)
Baltimore, MD	210	210	200	200	190	3	4	9	14
	(-120 - 530)	(-110 - 520)	(-110 - 510)	(-110 - 500)	(-110 - 480)	(-2 - 7)	(-2 - 10)	(-5 - 23)	(-8 - 37)
Boston, MA	180	180	180	180	180	-1	-1	3	8
	(-260 - 610)	(-260 - 610)	(-260 - 620)	(-260 - 600)	(-250 - 590)	(2 - -4)	(1 - -2)	(-4 - 10)	(-11 - 27)
Cleveland, OH	250	250	240	230	220	-3	7	18	31
	(-23 - 510)	(-23 - 510)	(-22 - 500)	(-21 - 480)	(-20 - 450)	(0 - -6)	(-1 - 15)	(-2 - 37)	(-3 - 64)
Denver, CO	56	56	56	55	51	0	0	1	5
	(-180 - 290)	(-180 - 290)	(-180 - 290)	(-180 - 280)	(-170 - 260)	(1 - -1)	(-1 - 1)	(-4 - 7)	(-15 - 25)
Detroit, MI	460	460	470	460	440	NA	-17	-5	12
	(23 - 880)	(23 - 880)	(24 - 910)	(23 - 890)	(23 - 850)		(-1 - -33)	(0 - -10)	(1 - 23)
Houston, TX	550	600	600	590	580	-47	-1	3	12
	(100 - 990)	(110 - 1100)	(110 - 1100)	(110 - 1100)	(110 - 1000)	(-9 - -85)	(0 - -1)	(1 - 6)	(2 - 22)
Los Angeles, CA	670	770	750	720	670	-99	25	53	98
	(-280 - 1600)	(-320 - 1800)	(-310 - 1800)	(-300 - 1700)	(-280 - 1600)	(41 - -240)	(-10 - 60)	(-22 - 130)	(-41 - 240)
New York, NY	2900	3000	2900	2500	NA	-89	96	500	NA
	(1800 - 4100)	(1800 - 4200)	(1800 - 4100)	(1500 - 3500)		(-53 - -120)	(57 - 130)	(300 - 700)	
Philadelphia, PA	820	820	810	790	770	-4	14	33	51
	(180 - 1400)	(180 - 1400)	(180 - 1400)	(170 - 1400)	(170 - 1400)	(-1 - -8)	(3 - 25)	(7 - 58)	(11 - 90)
Sacramento, CA	170	160	160	160	150	5	3	5	9
	(-180 - 500)	(-170 - 490)	(-170 - 480)	(-170 - 470)	(-160 - 460)	(-5 - 14)	(-3 - 8)	(-6 - 17)	(-10 - 28)
St. Louis, MO	310	310	300	290	280	1	7	17	30
	(-77 - 690)	(-77 - 690)	(-75 - 670)	(-73 - 650)	(-69 - 620)	(0 - 3)	(-2 - 15)	(-4 - 37)	(-7 - 67)

Study Area	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	1.0	1.0	0.9	0.9	0.9	2	3	7	9
Baltimore, MD	1.8	1.8	1.7	1.7	1.7	1	2	4	7
Boston, MA	1.1	1.1	1.1	1.1	1.1	-1	-0.3	2	4
Cleveland, OH	2.3	2.3	2.3	2.2	2.0	-1	3	7	12
Denver, CO	0.8	0.8	0.8	0.8	0.7	-0.4	0.3	2	8
Detroit, MI	2.7	2.7	2.8	2.7	2.6	NA	-4	-1	3
Houston, TX	1.8	1.9	1.9	1.9	1.9	-8	-0.1	0.5	2
Los Angeles, CA	0.9	1.1	1.0	1.0	0.9	-15	3	7	13
New York, NY	3.8	4.0	3.8	3.3	NA	-3	3	16	NA
Philadelphia, PA	2.9	3.0	2.9	2.9	2.8	-1	2	4	6
Sacramento, CA	1.2	1.2	1.2	1.2	1.1	3	2	3	6
St. Louis, MO	2.3	2.3	2.2	2.1	2.0	0.4	2	5	9

Study Area	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	3.9	3.9	3.7	3.6	3.5	0.071	0.14	0.26	0.37
Baltimore, MD	7.8	7.7	7.6	7.4	7.2	0.11	0.14	0.33	0.54
Boston, MA	4.0	4.1	4.1	4.0	3.9	-0.028	-0.013	0.064	0.18
Cleveland, OH	12	12	12	11	11	-0.14	0.35	0.86	1.5
Denver, CO	2.2	2.2	2.2	2.2	2.1	-0.0098	0.0081	0.054	0.19
Detroit, MI	11	11	11	11	10	NA	-0.39	-0.11	0.28
Houston, TX	9.4	10	10	10	10	-0.80	-0.010	0.054	0.21
Los Angeles, CA	5.3	6.0	5.8	5.6	5.3	-0.77	0.19	0.42	0.77
New York, NY	16	16	16	14	NA	-0.47	0.51	2.7	NA
Philadelphia, PA	14	14	14	13	13	-0.070	0.24	0.55	0.85
Sacramento, CA	7.8	7.6	7.5	7.4	7.2	0.21	0.13	0.26	0.44
St. Louis, MO	11	11	11	10	10	0.041	0.24	0.60	1.1

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb. For Detroit, 2009 base air quality already just meets existing standard.

Figure 7B-1 Core Short-Term Ozone-Attributable Mortality (2007) (heat map tables – absolute ozone-attributable incidence) (Smith et al., 2009)

Recent conditions

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	1	2	4	10	13	17	24	34	47	29	30	20	19	252
Baltimore, MD	0	0	0	1	4	10	10	25	20	28	30	29	18	33	20	13	240
Boston, MA	0	0	0	0	5	10	27	24	36	22	17	18	14	10	5	17	205
Cleveland, OH	0	0	0	2	5	14	28	30	45	34	33	25	23	15	6	7	268
Denver, CO	0	0	0	0	0	0	2	3	4	6	9	12	12	6	3	1	59
Detroit, MI	0	0	1	0	5	23	31	48	76	96	50	30	41	20	29	68	518
Houston, TX	0	1	6	20	41	58	74	71	61	49	51	28	25	27	26	3	542
Los Angeles, CA	0	0	3	14	33	38	69	58	96	84	81	79	35	20	15	17	643
New York, NY	0	0	0	47	93	169	339	549	326	446	306	228	222	266	205	197	3,391
Philadelphia, PA	0	0	1	5	15	39	63	70	118	97	112	117	69	93	86	76	961
Sacramento, CA	0	0	0	2	7	10	17	25	19	21	20	19	10	7	5	3	165
St. Louis, MO	0	0	1	1	2	9	17	34	49	33	58	48	32	25	23	36	369

Current Standard (75)

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	0	2	4	15	20	34	43	52	31	12	5	3	0	222
Baltimore, MD	0	0	0	0	1	6	11	22	43	37	36	38	23	6	5	2	228
Boston, MA	0	0	0	0	2	11	26	29	33	33	20	12	17	5	7	6	202
Cleveland, OH	0	0	0	1	3	9	25	41	55	50	27	25	19	8	6	0	268
Denver, CO	0	0	0	0	0	0	1	3	4	9	12	15	10	3	1	0	58
Detroit, MI	0	0	0	0	1	5	33	56	97	116	59	41	44	16	34	14	516
Houston, TX	0	0	0	0	14	42	107	124	126	81	42	42	2	0	0	0	580
Los Angeles, CA	0	0	0	0	0	0	0	10	204	268	233	27	8	3	0	0	753
New York, NY	0	0	0	0	24	113	341	625	851	545	418	268	45	0	0	0	3,230
Philadelphia, PA	0	0	0	2	0	25	46	115	157	175	155	122	75	31	7	7	916
Sacramento, CA	0	0	0	0	1	8	23	43	29	29	17	9	2	1	0	0	161
St. Louis, MO	0	0	0	1	2	6	15	52	53	61	60	38	24	23	10	3	348

Alternative Standard 70

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	0	2	7	16	23	43	53	43	17	6	3	0	0	212
Baltimore, MD	0	0	0	0	1	6	7	28	49	44	43	26	11	5	2	0	222
Boston, MA	0	0	0	0	2	11	27	35	31	31	21	16	8	7	4	4	198
Cleveland, OH	0	0	0	1	2	10	26	45	67	47	24	21	14	4	0	0	260
Denver, CO	0	0	0	0	0	0	0	3	5	11	17	15	4	2	0	0	57
Detroit, MI	0	0	0	0	0	5	33	65	119	113	50	55	23	24	13	0	499
Houston, TX	0	0	0	0	8	41	108	141	139	81	45	11	0	0	0	0	576
Los Angeles, CA	0	0	0	0	0	0	0	17	240	362	98	5	5	0	0	0	727
New York, NY	0	0	0	0	15	156	392	749	930	597	224	20	0	0	0	0	3,083
Philadelphia, PA	0	0	0	0	2	23	45	133	202	167	160	89	57	6	7	0	891
Sacramento, CA	0	0	0	0	0	7	24	47	35	30	9	6	0	1	0	0	158
St. Louis, MO	0	0	0	1	2	7	20	61	61	68	47	34	24	9	0	0	333

Alternative Standard 65

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	0	1	8	20	24	54	55	31	8	4	0	0	0	204
Baltimore, MD	0	0	0	0	1	5	11	34	51	44	43	19	6	2	0	0	215
Boston, MA	0	0	0	0	1	11	31	36	37	31	21	12	6	3	2	0	191
Cleveland, OH	0	0	0	0	2	11	34	57	65	42	22	11	4	0	0	0	249
Denver, CO	0	0	0	0	0	0	0	2	7	14	21	10	2	0	0	0	55
Detroit, MI	0	0	0	0	0	3	33	74	144	96	56	37	29	12	0	0	484
Houston, TX	0	0	0	0	4	36	119	155	149	69	38	0	0	0	0	0	571
Los Angeles, CA	0	0	0	0	0	0	0	63	312	288	29	7	3	0	0	0	701
New York, NY	0	0	0	0	43	694	710	1,057	15	0	0	0	0	0	0	0	2,519
Philadelphia, PA	0	0	0	0	2	23	45	143	228	197	148	63	6	6	0	0	862
Sacramento, CA	0	0	0	0	0	5	28	50	41	22	7	2	1	0	0	0	155
St. Louis, MO	0	0	0	0	2	7	29	62	69	75	38	28	6	0	0	0	317

Alternative Standard 60

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	0	2	10	21	41	53	48	16	2	0	0	0	0	194
Baltimore, MD	0	0	0	0	1	5	12	45	56	56	25	7	0	0	0	0	206
Boston, MA	0	0	0	0	1	12	39	29	53	26	12	7	3	2	0	0	184
Cleveland, OH	0	0	0	0	3	15	51	66	70	15	10	0	0	0	0	0	229
Denver, CO	0	0	0	0	0	0	0	2	9	21	18	3	0	0	0	0	53
Detroit, MI	0	0	0	0	0	2	39	106	139	101	47	31	0	0	0	0	463
Houston, TX	0	0	0	0	0	28	136	192	152	48	4	0	0	0	0	0	560
Los Angeles, CA	0	0	0	0	0	0	7	225	264	151	11	0	0	0	0	0	658
New York, NY	NA																
Philadelphia, PA	0	0	0	0	2	21	61	161	263	218	97	5	6	0	0	0	834
Sacramento, CA	0	0	0	0	0	4	33	59	38	13	4	1	0	0	0	0	151
St. Louis, MO	0	0	0	0	2	8	45	73	92	46	29	4	0	0	0	0	300

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Figure 7B-2. Core Short-Term Ozone-Attributable Mortality (2007) (heat map tables – change in absolute ozone-attributable incidence) (Smith et al., 2009) **Note:** negative values are risk increases, positive values are risk reductions

Decrease recent conditions to 75

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	0	0	1	2	4	6	5	5	4	4	31	0	31
Baltimore, MD	0	0	0	0	-1	-1	-1	-1	0	1	2	2	2	4	3	2	12	-6	18
Boston, MA	0	0	0	0	-1	0	-1	0	0	0	1	1	1	1	0	1	3	-4	6
Cleveland, OH	0	0	0	-1	-1	-2	-2	-1	-1	1	1	1	1	1	1	0	0	-8	7
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
Detroit, MI	0	0	-1	0	-2	-4	-4	-4	-3	1	1	2	3	2	3	9	2	-19	22
Houston, TX	0	-2	-6	-11	-14	-15	-10	-6	0	3	5	3	4	4	5	1	-39	-65	26
Los Angeles, CA	0	0	-7	-18	-28	-22	-26	-14	-14	-5	1	7	5	4	3	4	-111	-134	25
New York, NY	0	0	0	-18	-30	-31	-43	-25	7	44	39	38	38	56	48	49	172	-169	341
Philadelphia, PA	0	0	-1	-3	-3	-9	-9	-5	0	3	10	12	9	14	14	15	47	-36	82
Sacramento, CA	0	0	0	-1	-2	-2	-1	0	1	2	2	3	2	1	1	1	5	-7	13
St. Louis, MO	0	0	0	0	0	-1	-1	0	2	2	4	4	3	3	3	5	22	-3	27

Decrease 75 to 70

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	0	0	1	2	3	2	1	0	0	0	10	0	10
Baltimore, MD	0	0	0	0	0	0	0	0	1	1	1	2	1	0	0	0	7	0	6
Boston, MA	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	4	0	3
Cleveland, OH	0	0	0	0	0	0	0	0	1	2	1	2	1	1	0	0	8	0	10
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Detroit, MI	0	0	0	0	0	0	0	0	2	4	3	2	3	1	3	1	18	0	19
Houston, TX	0	0	0	0	-1	-1	-1	0	2	2	2	2	0	0	0	0	4	-3	8
Los Angeles, CA	0	0	0	0	0	0	0	0	4	10	10	1	0	0	0	0	26	0	25
New York, NY	0	0	0	0	-1	-2	0	14	31	37	41	29	6	0	0	0	154	-13	167
Philadelphia, PA	0	0	0	0	0	-1	0	0	2	5	6	6	4	2	0	1	26	-2	27
Sacramento, CA	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3	0	4
St. Louis, MO	0	0	0	0	0	0	0	1	2	3	3	2	2	2	1	0	15	0	16

Decrease 75 to 65

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	1	1	2	4	5	3	1	1	0	0	18	0	18
Baltimore, MD	0	0	0	0	0	0	0	0	2	2	3	4	2	1	1	0	14	0	15
Boston, MA	0	0	0	0	0	0	0	1	1	2	2	1	2	1	1	1	11	0	12
Cleveland, OH	0	0	0	0	0	0	0	1	4	4	3	3	3	1	1	0	20	-1	20
Denver, CO	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3	0	3
Detroit, MI	0	0	0	0	0	0	-1	0	3	7	5	4	5	2	5	2	33	-2	35
Houston, TX	0	0	0	0	-2	-2	-3	0	4	4	3	4	0	0	0	0	9	-8	16
Los Angeles, CA	0	0	0	0	0	0	0	0	8	20	21	2	1	0	0	0	52	0	52
New York, NY	0	0	0	0	-1	2	27	98	172	156	156	103	22	0	0	0	735	-7	742
Philadelphia, PA	0	0	0	0	0	-1	-1	0	5	11	13	14	9	4	1	1	56	-4	60
Sacramento, CA	0	0	0	0	0	0	-1	1	1	2	1	1	0	0	0	0	6	-1	6
St. Louis, MO	0	0	0	0	0	0	0	2	4	6	6	5	3	3	2	0	31	0	31

Decrease 75 to 60

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	1	2	4	6	7	5	2	1	1	0	28	0	29
Baltimore, MD	0	0	0	0	0	0	0	0	3	4	5	6	4	1	1	0	23	0	25
Boston, MA	0	0	0	0	0	0	0	1	2	3	3	2	3	1	2	1	18	0	19
Cleveland, OH	0	0	0	0	0	0	0	3	7	9	6	6	5	2	2	0	40	-2	41
Denver, CO	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	5	0	6
Detroit, MI	0	0	0	0	0	0	-1	1	6	11	8	7	8	4	7	3	54	-2	57
Houston, TX	0	0	0	0	-2	-4	-4	1	7	8	6	7	1	0	0	0	20	-11	31
Los Angeles, CA	0	0	0	0	0	0	0	1	24	35	29	4	1	1	0	0	96	0	95
New York, NY	NA																		
Philadelphia, PA	0	0	0	0	0	-1	-1	1	8	17	19	20	13	6	1	2	86	-4	89
Sacramento, CA	0	0	0	0	0	-1	-1	2	3	3	2	1	0	0	0	0	10	-2	11
St. Louis, MO	0	0	0	0	0	0	0	4	6	9	10	7	5	5	2	1	49	0	49

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Figure 7B-3. Core Short-Term Ozone-Attributable Mortality (2009) (heat map tables – absolute ozone-attributable incidence) (Smith et al., 2009)

Recent conditions

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	1	3	6	16	13	20	36	32	26	23	18	8	1	0	204
Baltimore, MD	0	0	1	1	6	12	20	20	20	29	40	33	15	7	5	0	210
Boston, MA	0	0	0	0	6	19	21	32	29	31	25	6	2	3	5	2	182
Cleveland, OH	0	0	0	4	8	17	20	31	50	33	35	24	7	15	2	0	246
Denver, CO	0	0	0	0	0	1	1	2	7	11	13	13	6	1	1	0	56
Detroit, MI	0	0	1	7	5	21	36	53	89	116	30	40	36	0	17	5	456
Houston, TX	0	1	7	18	34	68	80	85	60	55	53	41	21	14	6	7	549
Los Angeles, CA	0	1	4	12	23	40	68	51	63	109	98	75	67	41	12	10	672
New York, NY	0	0	5	93	165	248	322	373	466	367	370	240	153	116	25	0	2,944
Philadelphia, PA	0	0	4	10	22	56	88	67	116	110	114	124	68	30	7	0	817
Sacramento, CA	0	0	2	3	7	12	17	15	22	21	19	13	10	15	9	3	166
St. Louis, MO	0	0	1	5	4	15	21	47	38	55	60	39	17	9	0	0	311

Current Standard (75)

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	1	2	7	13	15	28	41	37	24	25	8	1	0	0	201
Baltimore, MD	0	0	0	0	2	7	21	36	33	47	33	23	6	0	0	0	207
Boston, MA	0	0	0	0	7	14	26	33	29	31	27	4	2	3	5	2	183
Cleveland, OH	0	0	0	0	3	16	28	42	46	50	35	17	7	4	0	0	249
Denver, CO	0	0	0	0	0	1	2	3	6	12	15	13	4	1	0	0	56
Detroit, MI	0	0	1	7	5	21	36	53	89	116	30	40	36	0	17	5	456
Houston, TX	0	0	0	5	24	43	105	107	96	77	72	31	23	6	3	3	595
Los Angeles, CA	0	0	0	0	0	0	1	10	168	196	297	91	5	0	0	0	770
New York, NY	0	0	0	7	41	246	489	407	724	538	314	201	64	0	0	0	3,031
Philadelphia, PA	0	0	0	2	12	38	118	93	162	130	151	67	50	0	0	0	822
Sacramento, CA	0	0	0	0	1	10	28	30	32	24	18	14	3	0	0	0	162
St. Louis, MO	0	0	1	5	5	14	22	44	42	63	53	43	11	7	0	0	310

Alternative Standard 70

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	1	8	14	18	38	48	27	24	16	1	0	0	0	194
Baltimore, MD	0	0	0	0	2	7	20	40	42	46	37	10	0	0	0	0	203
Boston, MA	0	0	0	0	1	17	23	37	34	33	25	3	0	5	5	0	184
Cleveland, OH	0	0	0	0	1	16	35	47	53	49	31	5	5	0	0	0	242
Denver, CO	0	0	0	0	0	0	2	2	7	11	20	11	2	1	0	0	56
Detroit, MI	0	0	0	0	9	10	33	58	82	137	66	50	7	15	4	0	472
Houston, TX	0	0	0	2	21	41	104	124	99	97	70	22	10	3	3	0	596
Los Angeles, CA	0	0	0	0	0	0	1	24	198	301	185	36	0	0	0	0	745
New York, NY	0	0	0	0	42	203	548	609	847	434	256	0	0	0	0	0	2,940
Philadelphia, PA	0	0	0	0	13	33	109	127	152	180	127	62	5	0	0	0	808
Sacramento, CA	0	0	0	0	1	7	34	35	35	21	22	6	0	0	0	0	159
St. Louis, MO	0	0	0	3	8	12	28	51	58	58	52	25	8	0	0	0	304

Alternative Standard 65

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	1	7	10	27	44	53	21	23	1	0	0	0	0	187
Baltimore, MD	0	0	0	0	1	6	22	44	56	38	29	2	0	0	0	0	198
Boston, MA	0	0	0	0	1	17	27	37	40	33	14	1	5	5	0	0	181
Cleveland, OH	0	0	0	0	1	15	50	51	57	43	10	5	0	0	0	0	231
Denver, CO	0	0	0	0	0	0	1	3	7	16	21	5	1	0	0	0	55
Detroit, MI	0	0	0	0	8	8	31	68	115	135	52	26	14	4	0	0	461
Houston, TX	0	0	0	0	10	38	118	142	115	109	41	12	5	3	0	0	592
Los Angeles, CA	0	0	0	0	0	0	1	55	241	319	96	5	0	0	0	0	717
New York, NY	0	0	0	0	43	540	827	1,080	58	0	0	0	0	0	0	0	2,547
Philadelphia, PA	0	0	0	0	11	31	102	171	193	172	85	25	0	0	0	0	791
Sacramento, CA	0	0	0	0	0	6	36	43	34	19	18	1	0	0	0	0	156
St. Louis, MO	0	0	0	1	10	10	33	61	70	52	46	12	0	0	0	0	294

Alternative Standard 60

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	0	7	12	35	47	47	25	8	0	0	0	0	0	182
Baltimore, MD	0	0	0	0	1	5	27	54	55	37	14	0	0	0	0	0	193
Boston, MA	0	0	0	0	1	19	34	37	45	26	5	4	5	0	0	0	176
Cleveland, OH	0	0	0	0	1	17	68	50	58	21	4	0	0	0	0	0	219
Denver, CO	0	0	0	0	0	0	0	5	12	29	5	0	0	0	0	0	51
Detroit, MI	0	0	0	0	4	13	31	95	129	123	36	10	3	0	0	0	444
Houston, TX	0	0	0	0	4	32	117	177	155	79	17	2	0	0	0	0	583
Los Angeles, CA	0	0	0	0	0	0	4	199	216	242	11	0	0	0	0	0	673
New York, NY	NA																
Philadelphia, PA	0	0	0	0	5	23	109	214	220	142	61	0	0	0	0	0	773
Sacramento, CA	0	0	0	0	0	4	38	52	31	25	2	0	0	0	0	0	153
St. Louis, MO	0	0	0	0	10	11	47	76	64	58	16	0	0	0	0	0	281

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Figure 7B-4. Core Short-Term Ozone-Attributable Mortality (2009) (heat map tables – change in absolute ozone-attributable incidence) (Smith et al., 2009) **Note:** negative values are risk increases, positive values are risk reductions

Decrease recent conditinos to 75

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	-1	0	0	1	1	1	1	1	1	0	0	4	-1	6
Baltimore, MD	0	0	-1	0	-2	-2	-2	-1	0	2	3	3	2	1	1	0	3	-9	13
Boston, MA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0
Cleveland, OH	0	0	0	-2	-2	-2	-2	-1	0	1	2	1	1	1	0	0	-3	-10	7
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Detroit, MI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Houston, TX	0	-1	-4	-7	-9	-12	-10	-8	-3	-1	1	2	1	1	1	1	-47	-55	7
Los Angeles, CA	0	-2	-9	-15	-19	-23	-26	-13	-10	-8	1	5	7	7	2	3	-99	-126	26
New York, NY	0	0	-3	-34	-47	-42	-27	-18	-4	10	23	20	16	13	3	0	-89	-198	109
Philadelphia, PA	0	0	-2	-4	-6	-9	-7	-4	1	3	5	9	5	3	1	0	-4	-36	32
Sacramento, CA	0	0	-1	-1	-2	-2	-1	0	1	2	2	2	2	3	2	1	5	-7	15
St. Louis, MO	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	2

Decrease 75 to 70

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	0	1	1	2	2	2	1	0	0	0	7	0	9
Baltimore, MD	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	4	0	4
Boston, MA	0	0	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	-1	-3	2
Cleveland, OH	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0	7	0	7
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Detroit, MI	0	0	-1	-2	-1	-4	-4	-4	-4	-1	0	1	2	0	1	0	-17	-22	5
Houston, TX	0	0	0	-1	-2	-2	-3	-1	1	1	2	1	1	0	0	0	-1	-9	6
Los Angeles, CA	0	0	0	0	0	0	0	0	3	6	12	4	0	0	0	0	25	0	25
New York, NY	0	0	0	-1	-4	-16	-9	9	26	36	26	21	7	0	0	0	96	-44	139
Philadelphia, PA	0	0	0	0	-1	-2	-2	-1	3	4	6	3	3	0	0	0	14	-6	21
Sacramento, CA	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	3	0	4
St. Louis, MO	0	0	0	-1	0	-1	0	0	1	2	2	2	1	0	0	0	7	-2	9

Decrease 75 to 65

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	-1	-1	0	1	3	4	3	3	1	0	0	0	13	-2	15
Baltimore, MD	0	0	0	0	0	0	0	0	1	3	2	2	1	0	0	0	9	-1	11
Boston, MA	0	0	0	0	-1	-1	-1	0	1	1	2	0	0	0	1	0	3	-4	6
Cleveland, OH	0	0	0	0	0	-1	0	2	3	5	4	3	1	1	0	0	18	-1	21
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Detroit, MI	0	0	-1	-3	-1	-5	-4	-3	-2	3	1	4	4	0	2	1	-5	-21	16
Houston, TX	0	0	0	-1	-4	-4	-5	-1	2	3	5	3	3	1	1	0	3	-15	19
Los Angeles, CA	0	0	0	0	0	0	0	0	6	14	25	8	0	0	0	0	53	0	53
New York, NY	0	0	0	-1	-5	-19	18	60	122	138	93	72	24	0	0	0	500	-48	550
Philadelphia, PA	0	0	0	0	-2	-3	-3	-1	8	8	13	7	6	0	0	0	33	-11	44
Sacramento, CA	0	0	0	0	0	-1	0	1	2	2	1	1	0	0	0	0	5	-2	7
St. Louis, MO	0	0	0	-1	-1	-1	0	1	2	5	5	5	1	1	0	0	17	-4	22

Decrease 75 to 60

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	-1	-1	0	2	4	5	4	4	2	0	0	0	19	-2	21
Baltimore, MD	0	0	0	0	0	-1	0	1	2	5	4	3	1	0	0	0	14	-2	16
Boston, MA	0	0	0	0	-1	-1	-1	1	1	3	3	1	0	0	1	0	8	-4	11
Cleveland, OH	0	0	0	0	0	0	1	4	5	8	7	4	2	1	0	0	31	-1	33
Denver, CO	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	5	0	5
Detroit, MI	0	0	-1	-4	-2	-6	-4	-2	1	8	3	6	6	0	4	1	12	-22	32
Houston, TX	0	0	0	-2	-6	-6	-6	0	4	7	9	5	5	1	1	1	12	-22	35
Los Angeles, CA	0	0	0	0	0	0	0	1	19	26	37	13	1	0	0	0	98	0	97
New York, NY										NA									
Philadelphia, PA	0	0	0	-1	-2	-4	-3	0	12	12	19	10	8	0	0	0	51	-14	65
Sacramento, CA	0	0	0	0	0	-1	-1	1	3	3	2	2	0	0	0	0	9	-2	11
St. Louis, MO	0	0	-1	-2	-1	-1	0	3	4	8	8	7	2	1	0	0	30	-6	34

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7B-3a. Core Short-Term Ozone-Attributable Morbidity – Hospital Admissions (2007)

Endpoint/Study Area/Descriptor	Air Quality Scenario: Absolute Ozone-Attributable Incidence: Base	75ppb	70ppb	65ppb	60ppb	Change in Ozone-Attributable Incidence: Base-75	75-70	75-65	75-60
2007 Simulation Year									
HA (respiratory); Detroit (Katsouyanni et al., 2009)									
1hr max, penalized splines	200	190	180	170	160	14	10	18	29
	(56 - 430)	(52 - 410)	(49 - 380)	(47 - 370)	(44 - 340)	(3.8 - 31)	(2.8 - 23)	(5.1 - 41)	(8.1 - 65)
1hr max, natural splines	190	180	170	160	150	13	9.8	18	28
	(46 - 430)	(43 - 400)	(41 - 380)	(39 - 360)	(36 - 340)	(3.2 - 31)	(2.3 - 22)	(4.2 - 40)	(6.8 - 65)
HA (respiratory); NYC (Silverman and Ito, 2010; Lin et al., 2008)									
HA Chronic Lung Disease (Lin)	160	140	140	110	NA	14	7.9	34	NA
	(120 - 220)	(110 - 200)	(100 - 190)	(84 - 160)		(10 - 19)	(5.9 - 11)	(26 - 48)	
HA Asthma (Silverman)	520	490	460	380		58	33	140	
	(260 - 860)	(240 - 810)	(230 - 780)	(180 - 660)		(27 - 110)	(15 - 63)	(64 - 250)	
HA Asthma, PM2.5 (Silverman)	390	360	340	280		42	23	98	
	(100 - 760)	(93 - 710)	(87 - 680)	(70 - 570)		(10 - 91)	(5.5 - 53)	(24 - 210)	
HA (respiratory); LA (Linn et al., 2000)									
1hr max penalized splines	370	480	460	450	440	-110	11	23	36
	(-480 - 1,200)	(-630 - 1,500)	(-610 - 1,500)	(-600 - 1,500)	(-580 - 1,400)	(140 - -370)	(-15 - 37)	(-29 - 74)	(-47 - 120)
HA (COPD less asthma); all 12 study areas (Medina-Ramon, et al., 2006)									
Atlanta, GA	64	55	52	50	47	10	3	5	8
	(37 - 110)	(32 - 93)	(30 - 89)	(29 - 85)	(27 - 80)	(6 - 17)	(2 - 5)	(3 - 9)	(5 - 14)
Baltimore, MD	43	40	38	37	35	3	1	3	5
	(25 - 73)	(23 - 68)	(22 - 66)	(21 - 63)	(20 - 60)	(2 - 6)	(1 - 3)	(2 - 5)	(3 - 8)
Boston, MA	59	58	57	54	52	2	1	3	6
	(34 - 100)	(33 - 99)	(33 - 97)	(31 - 93)	(30 - 90)	(1 - 3)	(1 - 2)	(2 - 6)	(3 - 9)
Cleveland, OH	38	37	36	34	31	1	1	3	6
	(22 - 65)	(22 - 64)	(21 - 62)	(20 - 59)	(18 - 53)	(0 - 1)	(1 - 2)	(2 - 6)	(4 - 11)
Denver, CO	18	18	18	17	16	0	1	1	2
	(11 - 32)	(10 - 31)	(10 - 30)	(10 - 29)	(9 - 27)	(0 - 1)	(0 - 1)	(1 - 2)	(1 - 4)
Detroit, MI	72	72	69	67	64	0	2	4	7
	(41 - 120)	(41 - 120)	(40 - 120)	(39 - 110)	(37 - 110)	(0 - 1)	(1 - 4)	(3 - 8)	(4 - 13)
Houston, TX	55	57	56	55	54	-2	1	2	3
	(32 - 94)	(33 - 97)	(33 - 96)	(32 - 94)	(31 - 92)	(-1 - -4)	(0 - 1)	(1 - 3)	(2 - 6)
Los Angeles, CA	110	110	110	100	96	2	5	10	15
	(65 - 190)	(64 - 190)	(61 - 180)	(58 - 170)	(55 - 160)	(1 - 3)	(3 - 9)	(6 - 17)	(9 - 26)
New York, NY	220	200	190	150	NA	21	13	57	NA
	(130 - 380)	(120 - 350)	(110 - 330)	(85 - 250)		(12 - 37)	(7 - 22)	(33 - 98)	
Philadelphia, PA	110	97	93	90	86	9	3	7	11
	(61 - 180)	(56 - 160)	(54 - 160)	(52 - 150)	(50 - 150)	(5 - 15)	(2 - 6)	(4 - 12)	(6 - 18)
Sacramento, CA	17	15	14	14	13	2	1	1	2
	(10 - 29)	(9 - 25)	(8 - 25)	(8 - 24)	(8 - 23)	(1 - 3)	(0 - 1)	(1 - 2)	(1 - 3)
St. Louis, MO	46	43	41	38	36	4	2	4	7
	(27 - 79)	(25 - 73)	(24 - 69)	(22 - 66)	(21 - 62)	(2 - 6)	(1 - 4)	(3 - 8)	(4 - 12)

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7B-3b. Core Short-Term Ozone-Attributable Morbidity – Hospital Admissions (2009)

Endpoint/Study Area/Descriptor	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
	2009 Simulation Year								
HA (respiratory); Detroit (Katsouyanni et al., 2009)									
1hr max, penalized splines	170	170	170	160	150	NA	2.8	10	20
	(48 - 380)	(48 - 380)	(47 - 370)	(45 - 350)	(42 - 330)		(0.78 - 6.2)	(2.8 - 23)	(5.5 - 44)
1hr max, natural splines	160	160	160	160	150		2.7	9.8	19
	(40 - 370)	(40 - 370)	(39 - 370)	(38 - 350)	(35 - 330)		(0.65 - 6.2)	(2.3 - 22)	(4.5 - 43)
HA (respiratory); NYC (Silverman and Ito, 2010; Lin et al., 2008)									
HA Chronic Lung Disease (Lin)	140	140	130	110	110	0.053	5.9	25	25
	(100 - 190)	(100 - 190)	(100 - 190)	(86 - 160)	(86 - 160)	(0.046 - 0.056)	(4.5 - 8.4)	(19 - 35)	(19 - 35)
HA Asthma (Silverman)	480	470	450	390	390	9.4	28	110	110
	(240 - 800)	(230 - 790)	(220 - 770)	(190 - 670)	(190 - 670)	(4.4 - 17)	(13 - 54)	(51 - 200)	(51 - 200)
HA Asthma, PM2.5 (Silverman)	350	350	330	280	280	6.8	20	79	79
	(92 - 700)	(90 - 700)	(86 - 670)	(72 - 580)	(72 - 580)	(1.7 - 14)	(4.8 - 45)	(19 - 170)	(19 - 170)
HA (respiratory); LA (Linn et al., 2000)									
1hr max penalized splines	390	500	490	480	460	-120	11	23	37
	(-510 - 1,200)	(-660 - 1,600)	(-650 - 1,600)	(-630 - 1,500)	(-610 - 1,500)	(150 - -390)	(-14 - 35)	(-30 - 76)	(-48 - 120)
HA (COPD less asthma); all 12 study areas (Medina-Ramon, et al., 2006)									
Atlanta, GA	53	52	50	48	46	2	3	4	6
	(31 - 91)	(30 - 89)	(29 - 85)	(28 - 82)	(27 - 79)	(1 - 3)	(1 - 4)	(3 - 8)	(4 - 11)
Baltimore, MD	38	37	36	35	34	1	1	2	3
	(22 - 65)	(21 - 62)	(21 - 61)	(20 - 59)	(19 - 57)	(1 - 3)	(0 - 1)	(1 - 3)	(2 - 5)
Boston, MA	53	53	53	52	51	0	0	1	2
	(30 - 90)	(31 - 91)	(31 - 91)	(30 - 89)	(30 - 87)	(0 - -1)	(0 - 0)	(0 - 1)	(1 - 4)
Cleveland, OH	36	36	35	33	31	0	1	3	5
	(21 - 61)	(21 - 61)	(20 - 59)	(19 - 56)	(18 - 53)	(0 - 0)	(1 - 2)	(2 - 5)	(3 - 9)
Denver, CO	18	18	18	17	16	0	0	1	2
	(10 - 30)	(10 - 30)	(10 - 30)	(10 - 29)	(9 - 27)	(0 - 0)	(0 - 0)	(0 - 1)	(1 - 4)
Detroit, MI	64	64	66	65	63	NA	-3	-1	1
	(37 - 110)	(37 - 110)	(38 - 110)	(38 - 110)	(36 - 110)		(-2 - -4)	(-1 - -2)	(1 - 2)
Houston, TX	60	63	63	62	60	-3	0	1	3
	(35 - 100)	(37 - 110)	(36 - 110)	(36 - 110)	(35 - 100)	(-2 - -5)	(0 - 1)	(1 - 2)	(2 - 6)
Los Angeles, CA	120	120	110	110	100	3	5	10	16
	(69 - 200)	(68 - 200)	(65 - 190)	(62 - 180)	(59 - 170)	(2 - 5)	(3 - 8)	(6 - 17)	(9 - 27)
New York, NY	190	190	190	160	NA	-1	8	40	NA
	(110 - 330)	(110 - 330)	(110 - 320)	(90 - 270)		(0 - -1)	(5 - 14)	(23 - 69)	
Philadelphia, PA	90	88	87	84	82	1	2	4	6
	(52 - 150)	(51 - 150)	(50 - 150)	(49 - 140)	(48 - 140)	(1 - 2)	(1 - 3)	(2 - 7)	(4 - 11)
Sacramento, CA	18	16	15	15	14	2	1	1	2
	(10 - 31)	(9 - 27)	(9 - 26)	(9 - 25)	(8 - 24)	(1 - 4)	(0 - 1)	(1 - 2)	(1 - 3)
St. Louis, MO	41	41	39	38	36	0	2	3	5
	(24 - 70)	(24 - 69)	(23 - 67)	(22 - 64)	(21 - 61)	(0 - 1)	(1 - 3)	(2 - 5)	(3 - 9)

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb. For Detroit, 2009 base air quality already just meets existing standard.

Table 7B-4a. Core Short-Term Ozone-Attributable Morbidity – Emergency Room Visits (2007)

Endpoint/Study Area/Descriptor	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
2007 Simulation Year									
ER Visits (repiratory); Atlanta (Strickland et al., 2007)									
Distributed lag 0-7 days	7,400	6,600	6,300	6,000	5,700	1,100	350	650	1,000
	(5,300 - 9,400)	(4,700 - 8,300)	(4,500 - 8,000)	(4,300 - 7,700)	(4,100 - 7,300)	(790 - 1,500)	(240 - 460)	(450 - 850)	(710 - 1,300)
Average day lag 0-2	4,400	3,900	3,700	3,600	3,400	650	200	370	580
	(2,400 - 6,300)	(2,100 - 5,500)	(2,000 - 5,300)	(1,900 - 5,100)	(1,800 - 4,800)	(350 - 950)	(110 - 290)	(200 - 540)	(310 - 850)
ER-visits (respiratory); Atlanta (Tolbert et al., 2007, Darrow et al., 2011)									
Tolbert	8,000	7,000	6,700	6,500	6,200	1,000	310	580	920
	(5,500 - 10,000)	(4,900 - 9,200)	(4,700 - 8,800)	(4,500 - 8,500)	(4,300 - 8,000)	(680 - 1,300)	(220 - 410)	(400 - 760)	(630 - 1,200)
Tolbert-CO	7,100	6,300	6,000	5,800	5,500	880	280	510	810
	(4,400 - 9,800)	(3,800 - 8,600)	(3,700 - 8,300)	(3,500 - 8,000)	(3,400 - 7,600)	(540 - 1,200)	(170 - 390)	(310 - 710)	(490 - 1,100)
Tolbert-NO2	6,400	5,700	5,400	5,200	5,000	800	250	460	730
	(3,400 - 9,400)	(3,000 - 8,300)	(2,900 - 7,900)	(2,800 - 7,600)	(2,600 - 7,300)	(420 - 1,200)	(130 - 370)	(240 - 680)	(380 - 1,100)
Tolbert-PM10	5,000	4,400	4,300	4,100	3,900	620	200	360	570
	(1,800 - 8,200)	(1,600 - 7,300)	(1,500 - 7,000)	(1,400 - 6,700)	(1,400 - 6,400)	(220 - 1,000)	(68 - 320)	(130 - 600)	(200 - 940)
Tolbert-PM10, NO2	4,900	4,300	4,100	4,000	3,800	600	190	350	550
	(1,600 - 8,000)	(1,400 - 7,100)	(1,300 - 6,800)	(1,300 - 6,600)	(1,200 - 6,200)	(200 - 1,000)	(61 - 320)	(110 - 580)	(180 - 920)
Darrow	4,300	3,800	3,600	3,500	3,300	530	170	310	490
	(2,600 - 6,000)	(2,300 - 5,300)	(2,200 - 5,100)	(2,100 - 4,900)	(2,000 - 4,600)	(320 - 740)	(100 - 230)	(190 - 430)	(300 - 680)
ER-visits (asthma); NYC (Ito et al, 2007)									
single pollutant model	11,000	11,000	10,000	8,200		920	620	2,700	
	(9,200 - 14,000)	(8,600 - 14,000)	(8,200 - 13,000)	(6,700 - 11,000)		(740 - 1,200)	(500 - 830)	(2,200 - 3,600)	
PM2.5	8,800	8,300	7,900	6,400		710	480	2,100	
	(6,500 - 12,000)	(6,100 - 12,000)	(5,800 - 11,000)	(4,700 - 9,200)		(510 - 1,000)	(340 - 700)	(1,500 - 3,100)	
NO2	7,300	6,800	6,500	5,300	NA	580	390	1,700	NA
	(5,000 - 11,000)	(4,700 - 10,000)	(4,400 - 9,800)	(3,600 - 8,000)		(390 - 890)	(260 - 610)	(1,200 - 2,700)	
CO	12,000	11,000	11,000	8,700		970	660	2,900	
	(9,900 - 15,000)	(9,300 - 14,000)	(8,800 - 13,000)	(7,200 - 11,000)		(800 - 1,300)	(540 - 870)	(2,400 - 3,800)	
SO2	9,100	8,500	8,100	6,600		730	490	2,200	
	(6,900 - 13,000)	(6,500 - 12,000)	(6,100 - 11,000)	(5,000 - 9,200)		(550 - 1,000)	(370 - 710)	(1,600 - 3,100)	

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7B-4b. Core Short-Term Ozone-Attributable Morbidity – Emergency Room Visits (2009)

Endpoint/Study Area/Descriptor	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
2009 Simulation Year									
ER Visits (repiratory); Atlanta (Strickland et al., 2007)									
Distributed lag 0-7 days	6,100	5,900	5,700	5,500	5,400	150	270	490	700
	(4,300 - 7,700)	(4,200 - 7,600)	(4,100 - 7,300)	(3,900 - 7,100)	(3,800 - 6,900)	(100 - 200)	(190 - 350)	(340 - 640)	(480 - 910)
Average day lag 0-2	3,600	3,500	3,400	3,300	3,100	86	150	280	400
	(2,000 - 5,100)	(1,900 - 5,000)	(1,800 - 4,800)	(1,800 - 4,700)	(1,700 - 4,500)	(46 - 130)	(81 - 220)	(150 - 410)	(210 - 580)
ER-visits (respiratory); Atlanta (Tolbert et al., 2007, Darrow et al., 2011)									
Tolbert	6,600	6,400	6,200	6,000	5,900	120	230	440	620
	(4,500 - 8,500)	(4,500 - 8,400)	(4,300 - 8,100)	(4,200 - 7,900)	(4,000 - 7,600)	(84 - 160)	(160 - 300)	(300 - 570)	(430 - 820)
Tolbert-CO	5,800	5,700	5,500	5,400	5,200	110	200	390	550
	(3,600 - 8,000)	(3,500 - 7,900)	(3,400 - 7,600)	(3,300 - 7,400)	(3,200 - 7,200)	(66 - 150)	(120 - 290)	(240 - 540)	(340 - 770)
Tolbert-NO2	5,300	5,200	5,000	4,900	4,700	97	180	350	500
	(2,800 - 7,700)	(2,700 - 7,600)	(2,600 - 7,300)	(2,600 - 7,100)	(2,500 - 6,900)	(51 - 140)	(97 - 270)	(180 - 520)	(260 - 740)
Tolbert-PM10	4,100	4,100	3,900	3,800	3,700	76	140	270	390
	(1,500 - 6,800)	(1,400 - 6,600)	(1,400 - 6,400)	(1,300 - 6,200)	(1,300 - 6,000)	(27 - 130)	(50 - 240)	(95 - 450)	(140 - 640)
Tolbert-PM10, NO2	4,000	3,900	3,800	3,700	3,600	73	140	260	380
	(1,300 - 6,600)	(1,300 - 6,500)	(1,200 - 6,300)	(1,200 - 6,100)	(1,200 - 5,900)	(24 - 120)	(45 - 230)	(86 - 440)	(120 - 630)
Darrow	3,500	3,500	3,400	3,300	3,200	65	120	230	330
	(2,200 - 4,900)	(2,100 - 4,800)	(2,000 - 4,700)	(2,000 - 4,500)	(1,900 - 4,400)	(39 - 91)	(74 - 170)	(140 - 320)	(200 - 470)
ER-visits (asthma); NYC (Ito et al, 2007)									
single pollutant model	10,000	10,000	9,900	8,500	NA	-84	470	2,100	NA
	(8,300 - 13,000)	(8,400 - 13,000)	(8,100 - 13,000)	(7,000 - 11,000)		(-65 - -120)	(380 - 630)	(1,700 - 2,800)	
PM2.5	8,000	8,100	7,800	6,700		-62	360	1,600	
	(5,900 - 11,000)	(5,900 - 11,000)	(5,700 - 11,000)	(4,900 - 9,600)		(-43 - -97)	(260 - 530)	(1,200 - 2,300)	
NO2	6,600	6,700	6,400	5,500		-49	290	1,300	
	(4,500 - 9,900)	(4,500 - 10,000)	(4,400 - 9,700)	(3,700 - 8,300)		(-32 - -81)	(200 - 460)	(880 - 2,000)	
CO	11,000	11,000	10,000	9,000		-90	500	2,200	
	(9,000 - 14,000)	(9,000 - 14,000)	(8,700 - 13,000)	(7,500 - 12,000)		(-71 - -130)	(410 - 660)	(1,800 - 2,900)	
SO2	8,200	8,300	8,000	6,900		-64	370	1,700	
	(6,300 - 11,000)	(6,300 - 12,000)	(6,100 - 11,000)	(5,200 - 9,600)		(-46 - -98)	(280 - 530)	(1,200 - 2,400)	

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7B-5a. Core Short-Term Ozone-Attributable Morbidity – Asthma Exacerbations (2007)

Endpoint/Study Area/Descriptor	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
2007 Simulation Year									
Asthma exacerbation (wheeze); Boston (Gent et al., 2003, 2004)									
Chest Tightness (1hr max)	41,000	40,000	40,000	38,000	37,000	1,500	1,200	3,300	5,100
	(22,000 - 57,000)	(21,000 - 56,000)	(21,000 - 55,000)	(20,000 - 53,000)	(19,000 - 52,000)	(720 - 2,200)	(600 - 1,800)	(1,600 - 4,900)	(2,500 - 7,500)
Chest Tightness (8hr max)	30,000	30,000	29,000	28,000	28,000	530	680	1,900	3,000
	(10,000 - 47,000)	(9,900 - 47,000)	(9,800 - 46,000)	(9,400 - 45,000)	(9,100 - 43,000)	(170 - 870)	(210 - 1,100)	(580 - 3,100)	(920 - 4,900)
Chest Tightness (1hr max, PM2.5)[a]	42,000	41,000	40,000	39,000	37,000	1,500	1,200	3,300	5,100
	(20,000 - 59,000)	(19,000 - 58,000)	(19,000 - 57,000)	(18,000 - 56,000)	(17,000 - 54,000)	(640 - 2,300)	(530 - 1,900)	(1,400 - 5,100)	(2,200 - 7,900)
Chest Tightness (1hr max, PM2.5)[b]	39,000	38,000	37,000	36,000	34,000	1,400	1,100	3,000	4,700
	(16,000 - 57,000)	(15,000 - 56,000)	(15,000 - 55,000)	(14,000 - 53,000)	(14,000 - 52,000)	(500 - 2,200)	(420 - 1,800)	(1,100 - 4,900)	(1,800 - 7,500)
Shortness of Breath (1hr max)	29,000	29,000	28,000	27,000	26,000	970	800	2,200	3,400
	(3,700 - 51,000)	(3,600 - 50,000)	(3,500 - 49,000)	(3,400 - 47,000)	(3,200 - 45,000)	(110 - 1,800)	(93 - 1,500)	(250 - 4,000)	(400 - 6,200)
Shortness of Breath (8hr max)	35,000	35,000	34,000	33,000	32,000	610	780	2,100	3,400
	(7,200 - 58,000)	(7,000 - 57,000)	(6,900 - 56,000)	(6,700 - 55,000)	(6,400 - 53,000)	(120 - 1,100)	(150 - 1,400)	(400 - 3,800)	(640 - 6,000)
Wheeze (PM2.5)	78,000	76,000	75,000	72,000	69,000	2,700	2,200	6,000	9,300
	(29,000 - 120,000)	(28,000 - 120,000)	(28,000 - 110,000)	(26,000 - 110,000)	(25,000 - 110,000)	(930 - 4,400)	(760 - 3,700)	(2,100 - 9,800)	(3,200 - 15,000)

a-previous day, b-same day

Table 7B-5b. Core Short-Term Ozone-Attributable Morbidity – Asthma Exacerbations (2009)

Endpoint/Study Area/Descriptor	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
2009 Simulation Year									
Asthma exacerbation (wheeze); Boston (Gent et al., 2003, 2004)									
Chest Tightness (1hr max)	38,000	38,000	38,000	37,000	36,000	-92	290	1,400	2,800
	(20,000 - 53,000)	(20,000 - 53,000)	(20,000 - 53,000)	(19,000 - 52,000)	(19,000 - 50,000)	(-44 - -140)	(140 - 430)	(690 - 2,100)	(1,400 - 4,200)
Chest Tightness (8hr max)	28,000	28,000	28,000	27,000	27,000	-220	-110	470	1,300
	(9,100 - 43,000)	(9,200 - 44,000)	(9,200 - 44,000)	(9,100 - 43,000)	(8,800 - 42,000)	(-66 - -370)	(-32 - -190)	(150 - 780)	(410 - 2,200)
Chest Tightness (1hr max, PM2.5)[a]	38,000	38,000	38,000	37,000	36,000	-93	300	1,400	2,900
	(18,000 - 55,000)	(18,000 - 55,000)	(18,000 - 55,000)	(17,000 - 54,000)	(17,000 - 52,000)	(-39 - -150)	(130 - 460)	(610 - 2,200)	(1,200 - 4,400)
Chest Tightness (1hr max, PM2.5)[b]	35,000	35,000	35,000	34,000	33,000	-84	270	1,300	2,600
	(14,000 - 52,000)	(14,000 - 53,000)	(14,000 - 52,000)	(14,000 - 51,000)	(13,000 - 50,000)	(-30 - -140)	(100 - 430)	(480 - 2,100)	(980 - 4,200)
Shortness of Breath (1hr max)	26,000	27,000	26,000	26,000	25,000	-59	190	930	1,900
	(3,300 - 46,000)	(3,300 - 46,000)	(3,300 - 46,000)	(3,200 - 45,000)	(3,100 - 44,000)	(-6.8 - -110)	(23 - 360)	(110 - 1,700)	(220 - 3,500)
Shortness of Breath (8hr max)	32,000	32,000	32,000	32,000	31,000	-250	-120	540	1,500
	(6,500 - 53,000)	(6,500 - 54,000)	(6,500 - 54,000)	(6,400 - 53,000)	(6,200 - 52,000)	(-46 - -450)	(-22 - -230)	(100 - 960)	(280 - 2,600)
Wheeze (PM2.5)	71,000	71,000	71,000	69,000	67,000	-170	530	2,600	5,200
	(26,000 - 110,000)	(26,000 - 110,000)	(26,000 - 110,000)	(25,000 - 110,000)	(25,000 - 100,000)	(-56 - -280)	(190 - 870)	(880 - 4,200)	(1,800 - 8,500)

a-previous day, b-same day

Table 7B-6. Core Long-Term Ozone-Attributable Respiratory Mortality (2007) (incidence, percent of baseline mortality, incidence per 100,000) (Jerrett et al., 2009)

Study Area	Air Quality Scenario								
	Absolute Incidence					Change in Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	base-75	75-70	75-65	75-60
Atlanta, GA	690	590	560	530	500	120	35	64	100
	(250 - 1100)	(210 - 920)	(200 - 870)	(190 - 840)	(180 - 790)	(42 - 200)	(12 - 59)	(22 - 110)	(34 - 160)
Baltimore, MD	420	390	380	360	340	41	17	35	57
	(150 - 650)	(140 - 610)	(140 - 590)	(130 - 560)	(120 - 540)	(14 - 67)	(6 - 29)	(12 - 57)	(19 - 93)
Boston, MA	660	640	620	590	570	24	20	53	82
	(240 - 1000)	(230 - 1000)	(220 - 980)	(210 - 930)	(200 - 900)	(8 - 39)	(7 - 33)	(18 - 88)	(28 - 140)
Cleveland, OH	340	330	310	300	270	13	16	35	64
	(120 - 530)	(120 - 510)	(110 - 490)	(110 - 470)	(97 - 430)	(4 - 21)	(6 - 27)	(12 - 58)	(22 - 100)
Denver, CO	340	330	320	300	290	16	13	26	43
	(120 - 520)	(120 - 500)	(110 - 490)	(110 - 470)	(100 - 450)	(5 - 26)	(4 - 21)	(9 - 44)	(15 - 71)
Detroit, MI	620	600	580	560	540	24	28	50	78
	(220 - 960)	(220 - 940)	(210 - 900)	(200 - 880)	(190 - 840)	(8 - 40)	(10 - 46)	(17 - 82)	(27 - 130)
Houston, TX	470	460	450	450	440	18	8.0	16	27
	(170 - 740)	(160 - 720)	(160 - 710)	(160 - 700)	(160 - 690)	(6 - 30)	(3 - 13)	(5 - 26)	(9 - 44)
Los Angeles, CA	1,600	1,500	1,500	1,400	1,300	57	82	160	240
	(580 - 2500)	(560 - 2400)	(540 - 2300)	(510 - 2200)	(490 - 2100)	(19 - 95)	(28 - 140)	(54 - 260)	(83 - 400)
New York, NY	2,400	2,100	2,000	1,600	NA	320	140	550	NA
	(860 - 3700)	(750 - 3300)	(710 - 3100)	(570 - 2600)		(110 - 530)	(47 - 230)	(190 - 900)	
Philadelphia, PA	1,000	930	890	850	820	120	42	87	130
	(370 - 1600)	(330 - 1400)	(320 - 1400)	(310 - 1300)	(290 - 1300)	(42 - 200)	(14 - 69)	(30 - 140)	(44 - 210)
Sacramento, CA	350	300	290	280	260	56	14	26	44
	(130 - 530)	(110 - 470)	(100 - 450)	(100 - 440)	(94 - 410)	(19 - 92)	(5 - 22)	(9 - 43)	(15 - 73)
St. Louis, MO	520	480	460	430	410	48	27	56	84
	(190 - 800)	(170 - 750)	(170 - 710)	(160 - 680)	(150 - 640)	(16 - 80)	(190 - 800)	(19 - 92)	(29 - 140)

Study Area	Air Quality Scenario								
	Percent of Baseline Incidence					Change in O_3-Attributable Risk			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	21.7	18.6	17.7	16.9	16.0	14	5	9	15
Baltimore, MD	20.3	18.8	18.1	17.4	16.5	8	4	8	12
Boston, MA	17.7	17.2	16.7	16.0	15.3	3	3	7	11
Cleveland, OH	18.2	17.7	16.9	16.1	14.8	3	4	9	17
Denver, CO	21.6	20.8	20.1	19.4	18.6	4	3	7	11
Detroit, MI	19.0	18.4	17.7	17.2	16.4	3	4	7	11
Houston, TX	16.9	16.3	16.1	15.9	15.5	3	1	3	5
Los Angeles, CA	21.0	20.4	19.6	18.8	17.8	3	4	9	13
New York, NY	19.0	16.9	15.9	13.1	NA	11	6	24	NA
Philadelphia, PA	20.4	18.4	17.7	17.0	16.3	10	4	8	12
Sacramento, CA	20.5	17.8	17.1	16.5	15.6	13	4	7	13
St. Louis, MO	20.3	18.8	17.9	17.0	16.0	7	5	10	15

Study Area	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	24	21	20	19	18	4.4	1.3	2.3	3.5
Baltimore, MD	27	25	24	23	22	2.6	1.1	2.2	3.6
Boston, MA	24	24	23	22	21	0.88	0.74	2.0	3.1
Cleveland, OH	26	25	24	23	21	1.00	1.2	2.7	4.9
Denver, CO	24	23	23	22	21	1.1	0.91	1.9	3.1
Detroit, MI	24	23	22	21	20	0.91	1.1	1.9	3.0
Houston, TX	16	15	15	15	15	0.61	0.27	0.52	0.89
Los Angeles, CA	23	22	21	20	19	0.81	1.2	2.2	3.4
New York, NY	21	19	18	15	NA	2.9	1.3	4.9	NA
Philadelphia, PA	29	27	26	24	23	3.5	1.2	2.5	3.7
Sacramento, CA	29	25	24	23	22	4.7	1.1	2.2	3.7
St. Louis, MO	32	29	28	26	25	2.9	1.6	3.4	5.1

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7B-7. Core Long-Term Ozone-Attributable Respiratory Mortality (2009) (incidence, percent of baseline mortality, incidence per 100,000) (Jerrett et al., 2009)

Study Area	Air Quality Scenario								
	Absolute Incidence					Change in Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	base-75	75-70	75-65	75-60
Atlanta, GA	570	550	520	500	480	26	32	59	82
	(210 - 890)	(200 - 860)	(190 - 820)	(180 - 790)	(170 - 760)	(9 - 43)	(11 - 53)	(20 - 98)	(28 - 140)
Baltimore, MD	380	360	350	340	320	25	12	27	41
	(140 - 590)	(130 - 560)	(120 - 540)	(120 - 530)	(120 - 510)	(8 - 41)	(4 - 20)	(9 - 44)	(14 - 68)
Boston, MA	580	580	580	560	540	-1.1	3.7	23	47
	(210 - 910)	(210 - 920)	(210 - 910)	(200 - 890)	(190 - 860)	(0 - -2)	(1 - 6)	(8 - 38)	(16 - 77)
Cleveland, OH	310	300	290	280	260	9.4	14	32	50
	(110 - 490)	(110 - 470)	(100 - 460)	(98 - 430)	(92 - 410)	(3 - 16)	(5 - 24)	(11 - 53)	(17 - 82)
Denver, CO	320	320	310	300	280	0.49	5.8	18	45
	(120 - 490)	(120 - 490)	(110 - 490)	(110 - 470)	(100 - 440)	(0 - 1)	(2 - 10)	(6 - 30)	(16 - 75)
Detroit, MI	540	540	550	530	510	NA	-6.7	14	38
	(190 - 850)	(190 - 850)	(200 - 850)	(190 - 830)	(180 - 800)		(-2 - -11)	(5 - 23)	(13 - 64)
Houston, TX	490	490	480	470	460	-3.9	11	24	40
	(170 - 760)	(180 - 770)	(170 - 750)	(170 - 740)	(160 - 720)	(-1 - -7)	(4 - 18)	(8 - 40)	(14 - 66)
Los Angeles, CA	1,600	1,600	1,500	1,400	1,400	63	77	160	250
	(590 - 2500)	(570 - 2400)	(550 - 2300)	(520 - 2200)	(500 - 2100)	(21 - 100)	(26 - 130)	(54 - 260)	(84 - 400)
New York, NY	2,100	2,000	1,900	1,700	NA	61	120	420	NA
	(750 - 3300)	(730 - 3200)	(690 - 3000)	(590 - 2700)		(21 - 100)	(40 - 200)	(140 - 690)	
Philadelphia, PA	880	850	820	790	770	40	31	66	97
	(320 - 1400)	(310 - 1300)	(300 - 1300)	(280 - 1200)	(270 - 1200)	(13 - 66)	(11 - 52)	(23 - 110)	(33 - 160)
Sacramento, CA	360	310	300	280	270	61	14	28	44
	(130 - 550)	(110 - 480)	(110 - 460)	(100 - 450)	(96 - 420)	(21 - 100)	(5 - 24)	(9 - 46)	(15 - 73)
St. Louis, MO	450	440	430	410	390	5.6	19	41	66
	(160 - 700)	(160 - 690)	(150 - 670)	(150 - 650)	(140 - 610)	(2 - 9)	(160 - 700)	(14 - 67)	(23 - 110)

Study Area	Air Quality Scenario								
	Percent of Baseline Incidence					Change in O_3-Attributable Risk			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	17.6	17.0	16.2	15.4	14.8	4	5	9	13
Baltimore, MD	18.4	17.4	16.9	16.3	15.7	5	3	6	10
Boston, MA	15.9	16.0	15.9	15.4	14.9	-0.2	1	3	7
Cleveland, OH	17.2	16.8	16.1	15.3	14.5	2	4	9	15
Denver, CO	20.1	20.0	19.8	19.1	17.7	0.1	1	5	12
Detroit, MI	17.0	17.0	17.2	16.6	16.0	NA	-1	2	6
Houston, TX	16.8	16.9	16.6	16.3	15.8	-1	2	4	7
Los Angeles, CA	21.4	20.7	19.9	19.1	18.1	3	4	8	13
New York, NY	17.1	16.7	15.9	13.8	NA	2	5	18	NA
Philadelphia, PA	17.9	17.2	16.7	16.1	15.5	4	3	7	10
Sacramento, CA	20.9	18.0	17.3	16.7	15.8	14	4	8	12
St. Louis, MO	17.9	17.7	17.1	16.4	15.5	1	4	8	13

Study Area	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	19	19	18	17	16	0.88	1.1	2.0	2.8
Baltimore, MD	23	22	22	21	20	1.5	0.75	1.7	2.6
Boston, MA	21	21	21	21	20	-0.041	0.13	0.82	1.7
Cleveland, OH	24	23	22	21	20	0.73	1.1	2.5	3.8
Denver, CO	22	22	22	21	19	0.034	0.40	1.3	3.1
Detroit, MI	21	21	21	20	19	NA	-0.25	0.52	1.5
Houston, TX	15	15	15	15	14	-0.12	0.35	0.76	1.3
Los Angeles, CA	22	22	21	20	19	0.87	1.1	2.2	3.4
New York, NY	18	18	17	15	NA	0.54	1.0	3.7	NA
Philadelphia, PA	25	24	23	22	22	1.1	0.88	1.9	2.7
Sacramento, CA	29	25	24	23	22	5.0	1.2	2.3	3.6
St. Louis, MO	27	27	26	25	23	0.34	1.1	2.4	3.9

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb. For Detroit, 2009 base air quality already just meets existing standard.

Appendix 7C – Detailed Sensitivity Analysis Results

Table 7C-1. Sensitivity Analysis – *ST Mortality: Smaller Smith et al., 2009-based study area* (2009) (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-2

	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	64	64	64	62	61	-1	1	2	4
	(-25 - 210)	(-26 - 210)	(-25 - 210)	(-25 - 210)	(-24 - 200)	(0 - -2)	(0 - 3)	(-1 - 8)	(-2 - 13)
Baltimore, MD	55	58	58	57	56	-3	0	1	2
	(5 - 140)	(6 - 150)	(6 - 140)	(5 - 140)	(5 - 140)	(0 - -8)	(0 - 1)	(0 - 3)	(0 - 6)
Boston, MA	24	25	26	26	26	-1	-1	-1	-1
	(-10 - 82)	(-10 - 84)	(-11 - 87)	(-11 - 87)	(-10 - 86)	(0 - -2)	(0 - -4)	(0 - -3)	(0 - -2)
Cleveland, OH	170	180	170	170	160	-8	4	10	18
	(61 - 350)	(64 - 360)	(63 - 360)	(60 - 340)	(57 - 330)	(-3 - -17)	(1 - 8)	(4 - 21)	(7 - 38)
Denver, CO	41	42	42	42	40	0	-1	0	2
	(-61 - 210)	(-62 - 210)	(-63 - 220)	(-62 - 210)	(-59 - 200)	(1 - -3)	(1 - -3)	(0 - 0)	(-3 - 11)
Detroit, MI	220	220	230	220	220	NA	-11	-7	0
	(97 - 420)	(97 - 420)	(100 - 440)	(100 - 430)	(97 - 420)		(-5 - -22)	(-3 - -14)	(0 - 0)
Houston, TX	350	380	380	380	380	-36	-2	-1	3
	(180 - 620)	(200 - 690)	(200 - 690)	(200 - 690)	(200 - 680)	(-19 - -66)	(-1 - -3)	(0 - -2)	(2 - 6)
Los Angeles, CA	520	600	580	560	520	-83	21	44	81
	(89 - 1200)	(100 - 1400)	(99 - 1400)	(95 - 1300)	(89 - 1200)	(-14 - -200)	(4 - 50)	(8 - 110)	(14 - 190)
New York, NY	1200	1400	1400	1200	NA	-170	5	140	NA
	(930 - 1700)	(1100 - 1900)	(1100 - 1900)	(950 - 1700)		(-130 - -240)	(4 - 6)	(110 - 200)	
Philadelphia, PA	210	220	220	220	220	-15	1	3	5
	(110 - 370)	(120 - 390)	(120 - 390)	(120 - 390)	(120 - 380)	(-8 - -27)	(0 - 1)	(1 - 5)	(3 - 9)
Sacramento, CA	110	110	110	110	110	1	2	4	7
	(-23 - 340)	(-23 - 340)	(-23 - 340)	(-22 - 330)	(-22 - 320)	(0 - 2)	(0 - 6)	(-1 - 11)	(-1 - 20)
St. Louis, MO	36	37	39	39	39	-1	-2	-3	-2
	(10 - 80)	(10 - 81)	(11 - 86)	(11 - 87)	(11 - 86)	(0 - -2)	(-1 - -5)	(-1 - -6)	(-1 - -5)

	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	1.0	1.0	1.0	1.0	1.0	-1	1	4	6
Baltimore, MD	1.7	1.8	1.7	1.7	1.7	-6	1	2	4
Boston, MA	1.1	1.1	1.1	1.1	1.1	-2	-4	-4	-2
Cleveland, OH	2.2	2.3	2.3	2.2	2.1	-5	2	5	10
Denver, CO	0.8	0.8	0.8	0.8	0.8	-1	-1	-0.2	5
Detroit, MI	2.6	2.6	2.8	2.7	2.6	NA	-5	-3	0.03
Houston, TX	1.8	1.9	2.0	1.9	1.9	-10	-1	-0.3	1
Los Angeles, CA	0.9	1.1	1.0	1.0	0.9	-16	3	7	13
New York, NY	3.7	4.2	4.1	3.8	NA	-14	0.3	10	NA
Philadelphia, PA	2.6	2.8	2.8	2.8	2.8	-7	0.2	1	2
Sacramento, CA	1.2	1.2	1.2	1.2	1.2	1	2	3	6
St. Louis, MO	2.1	2.2	2.3	2.3	2.3	-2	-6	-7	-6

	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	4.0	4.1	4.0	3.9	3.8	-0.041	0.050	0.15	0.25
Baltimore, MD	8.8	9.3	9.3	9.1	9.0	-0.52	0.073	0.21	0.38
Boston, MA	3.4	3.5	3.6	3.6	3.6	-0.084	-0.16	-0.14	-0.087
Cleveland, OH	13	14	13	13	12	-0.63	0.28	0.77	1.4
Denver, CO	2.6	2.6	2.7	2.6	2.5	-0.030	-0.036	-0.0040	0.13
Detroit, MI	12	12	12	12	12	NA	-0.62	-0.38	0.011
Houston, TX	8.6	9.5	9.6	9.5	9.4	-0.91	-0.047	-0.022	0.081
Los Angeles, CA	5.3	6.1	5.9	5.7	5.3	-0.85	0.21	0.45	0.83
New York, NY	13	15	15	14	NA	-1.9	0.050	1.5	NA
Philadelphia, PA	14	15	15	15	14	-1.0	0.039	0.18	0.34
Sacramento, CA	8.2	8.1	8.0	7.8	7.6	0.060	0.13	0.26	0.46
St. Louis, MO	11	12	12	12	12	-0.27	-0.66	-0.82	-0.69

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7C-1. Sensitivity Analysis – *ST Mortality: Smaller Smith et al., 2009-based study area* (2009) (heat maps for just meeting existing standard and risk reductions from just meeting alternative standards) (see Key at bottom of figure)

Current Standard (75)

Study area	Daily 8hr Max Ozone Level (ppb)																Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75	
Atlanta, GA	0	0	0	0	2	4	5	8	12	11	7	8	2	0	0	0	61
Baltimore, MD	0	0	0	0	0	2	6	11	10	14	10	7	2	0	0	0	63
Boston, MA	0	0	0	0	1	2	4	5	4	4	4	1	0	0	1	0	25
Cleveland, OH	0	0	0	0	2	11	20	30	33	35	25	12	5	3	0	0	176
Denver, CO	0	0	0	0	0	0	1	2	5	9	11	10	3	1	0	0	42
Detroit, MI	0	0	0	3	3	10	18	26	43	56	15	19	18	0	8	2	221
Houston, TX	0	0	0	3	15	28	66	68	61	49	46	19	15	4	2	2	378
Los Angeles, CA	0	0	0	0	0	0	1	8	129	151	228	70	4	0	0	0	590
New York, NY	0	0	0	3	18	106	211	175	312	232	135	86	28	0	0	0	1,305
Philadelphia, PA	0	0	0	1	3	11	33	26	46	37	43	19	14	0	0	0	234
Sacramento, CA	0	0	0	0	1	7	19	21	22	17	13	10	2	0	0	0	112
St. Louis, MO	0	0	0	1	1	2	3	5	5	8	7	5	1	1	0	0	38

Decrease 75 to 70

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	0	2
Baltimore, MD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Boston, MA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cleveland, OH	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	5	0	6
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Detroit, MI	0	0	0	-1	-1	-2	-2	-2	-2	-1	0	1	1	0	1	0	-8	-11	3
Houston, TX	0	0	0	0	-1	-1	-2	-1	0	1	2	1	1	0	0	0	0	-5	5
Los Angeles, CA	0	0	0	0	0	0	0	0	2	5	9	3	0	0	0	0	19	0	19
New York, NY	0	0	0	0	-2	-7	-4	4	11	15	11	9	3	0	0	0	41	-19	59
Philadelphia, PA	0	0	0	0	0	-1	-1	0	1	1	2	1	1	0	0	0	4	-2	6
Sacramento, CA	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	0	3
St. Louis, MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Decrease 75 to 65

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	4	0	4
Baltimore, MD	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	3	0	3
Boston, MA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cleveland, OH	0	0	0	0	0	0	0	2	2	4	3	2	1	0	0	0	13	-1	14
Denver, CO	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Detroit, MI	0	0	0	-1	-1	-2	-2	-2	-1	1	1	2	2	0	1	0	-2	-9	9
Houston, TX	0	0	0	-1	-2	-3	-3	0	1	2	3	2	2	0	0	0	2	-10	10
Los Angeles, CA	0	0	0	0	0	0	0	0	4	10	19	6	0	0	0	0	41	0	39
New York, NY	0	0	0	-1	-2	-8	8	26	53	59	40	31	10	0	0	0	215	-21	236
Philadelphia, PA	0	0	0	0	0	-1	-1	0	2	2	4	2	2	0	0	0	9	-3	12
Sacramento, CA	0	0	0	0	0	-1	0	1	1	1	1	1	0	0	0	0	4	-1	5
St. Louis, MO	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	2	0	3

Decrease 75 to 60

Study area	Daily 8hr Max Ozone Level (ppb)																Total	Change in risk	
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	>75		Inc.	Dec.
Atlanta, GA	0	0	0	0	0	0	0	1	1	2	1	1	1	0	0	0	6	0	7
Baltimore, MD	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	4	0	5
Boston, MA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Cleveland, OH	0	0	0	0	0	0	0	3	4	6	5	3	1	1	0	0	22	-1	24
Denver, CO	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	4	0	4
Detroit, MI	0	0	0	-2	-1	-3	-2	-1	1	4	2	3	3	0	2	1	6	-10	17
Houston, TX	0	0	0	-1	-4	-4	-4	0	3	4	6	3	3	1	1	0	8	-14	22
Los Angeles, CA	0	0	0	0	0	0	0	1	15	20	29	10	1	0	0	0	75	0	76
New York, NY	NA																		
Philadelphia, PA	0	0	0	0	-1	-1	-1	0	3	4	5	3	2	0	0	0	14	-4	18
Sacramento, CA	0	0	0	0	0	-1	0	1	2	2	2	2	0	0	0	0	6	-2	9
St. Louis, MO	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	4	0	4

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Key: For *current standard (75)* which is an absolute risk metric, color gradient ranges from blue (smallest ozone-related mortality count) to red (highest ozone-related mortality count). For *Decrease results*, color gradient ranges from red (increase in risk – negative cell values) to blue (reduction in risk – positive cell values).

Table 7C-2. Sensitivity Analysis – *ST Mortality: Alternate method for simulating standards* (2009) (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-2

Study Area	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Denver, CO	56	57	57	56	52	-1	0	1	5
	(-180 - 290)	(-190 - 290)	(-190 - 290)	(-180 - 290)	(-170 - 270)	(3 - -5)	(0 - -1)	(-3 - 6)	(-16 - 25)
Detroit, MI	460	460	460	450	430	NA	-9	4	24
	(23 - 880)	(23 - 880)	(24 - 890)	(23 - 870)	(22 - 830)		(0 - -18)	(0 - 7)	(1 - 46)
Houston, TX	550	580	580	580	560	-31	-2	2	18
	(100 - 990)	(110 - 1000)	(110 - 1000)	(110 - 1000)	(110 - 1000)	(-6 - -57)	(0 - -3)	(0 - 3)	(3 - 32)
Los Angeles, CA	670	690	680	660	640	-19	15	32	48
	(-280 - 1600)	(120 - 1700)	(120 - 1600)	(110 - 1600)	(110 - 1500)	(-3 - -46)	(3 - 36)	(5 - 77)	(8 - 120)
New York, NY	2900	2900	2900	2700	NA	-3	24	290	NA
	(1800 - 4100)	(2300 - 4100)	(2200 - 4100)	(2000 - 3700)		(-2 - -4)	(18 - 33)	(220 - 400)	
Philadelphia, PA	820	810	790	780	750	9	16	35	58
	(180 - 1400)	(180 - 1400)	(180 - 1400)	(170 - 1400)	(170 - 1300)	(2 - 16)	(4 - 28)	(8 - 61)	(13 - 100)
Sacramento, CA	170	160	160	150	150	7	3	6	10
	(-180 - 500)	(-170 - 480)	(-170 - 470)	(-160 - 460)	(-160 - 450)	(-7 - 20)	(-3 - 10)	(-6 - 18)	(-10 - 30)

Study Area	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Denver, CO	0.8	0.8	0.8	0.8	0.7	-2	-0.2	2	8
Detroit, MI	2.7	2.7	2.8	2.7	2.6	NA	-2	1	5
Houston, TX	1.8	1.9	1.9	1.9	1.8	-6	-0.3	0.2	3
Los Angeles, CA	0.9	0.9	0.9	0.9	0.9	-3	2	5	7
New York, NY	3.8	3.8	3.8	3.5	NA	-0.1	1	9	NA
Philadelphia, PA	2.9	2.9	2.9	2.8	2.7	1	2	4	7
Sacramento, CA	1.2	1.2	1.2	1.1	1.1	4	2	4	6

Study Area	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Denver, CO	2.2	2.3	2.3	2.2	2.1	-0.039	-0.0044	0.042	0.19
Detroit, MI	11	11	11	10	10	NA	-0.21	0.086	0.54
Houston, TX	9.4	10.0	10.0	9.9	9.7	-0.54	-0.026	0.028	0.30
Los Angeles, CA	5.3	5.4	5.3	5.2	5.0	-0.15	0.12	0.25	0.38
New York, NY	16	16	16	14	NA	-0.014	0.13	1.5	NA
Philadelphia, PA	14	14	13	13	13	0.15	0.27	0.58	0.99
Sacramento, CA	7.8	7.5	7.4	7.2	7.1	0.30	0.15	0.28	0.46

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7C-3. Sensitivity Analysis – *ST Mortality: Regional Bayes Adjustment* (2009) (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-2)

	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	220	220	210	200	200	4	8	14	21
	(-10 - 610)	(-9 - 590)	(-9 - 570)	(-9 - 560)	(-8 - 540)	(0 - 11)	(0 - 21)	(-1 - 40)	(-1 - 57)
Baltimore, MD	460	460	450	440	430	7	9	20	32
	(310 - 730)	(300 - 720)	(300 - 710)	(290 - 690)	(280 - 670)	(4 - 10)	(6 - 13)	(13 - 32)	(21 - 51)
Boston, MA	570	570	570	560	550	-4	-2	9	25
	(350 - 930)	(350 - 940)	(350 - 940)	(340 - 920)	(330 - 900)	(-2 - -7)	(-1 - -3)	(6 - 15)	(15 - 41)
Cleveland, OH	290	300	290	280	260	-4	9	21	37
	(160 - 510)	(170 - 520)	(160 - 500)	(150 - 480)	(150 - 460)	(-2 - -6)	(5 - 15)	(12 - 38)	(20 - 65)
Denver, CO	10	10	10	10	9	0	0	0	1
	(-130 - 240)	(-130 - 240)	(-130 - 240)	(-130 - 230)	(-120 - 220)	(1 - -1)	(0 - 1)	(-3 - 6)	(-11 - 21)
Detroit, MI	510	510	520	510	490	NA	-19	-5	13
	(290 - 860)	(290 - 860)	(310 - 890)	(300 - 870)	(290 - 840)		(-11 - -32)	(-3 - -9)	(8 - 23)
Houston, TX	470	500	500	500	490	-40	-1	3	10
	(240 - 850)	(260 - 920)	(260 - 930)	(250 - 920)	(250 - 910)	(-20 - -73)	(0 - -1)	(1 - 5)	(5 - 19)
Los Angeles, CA	610	700	680	650	610	-90	23	49	90
	(78 - 1500)	(89 - 1700)	(86 - 1700)	(83 - 1600)	(78 - 1500)	(-11 - -220)	(3 - 56)	(6 - 120)	(11 - 220)
New York, NY	3300	3400	3300	2800	NA	-98	110	550	NA
	(2700 - 4300)	(2700 - 4400)	(2700 - 4300)	(2300 - 3700)		(-80 - -130)	(87 - 140)	(450 - 730)	
Philadelphia, PA	1200	1200	1200	1100	1100	-6	20	47	73
	(860 - 1700)	(860 - 1700)	(850 - 1700)	(830 - 1600)	(810 - 1600)	(-4 - -9)	(15 - 29)	(34 - 68)	(53 - 110)
Sacramento, CA	59	58	57	56	54	2	1	2	3
	(-150 - 400)	(-140 - 390)	(-140 - 390)	(-140 - 380)	(-140 - 370)	(-4 - 11)	(-2 - 7)	(-5 - 13)	(-8 - 23)
St. Louis, MO	390	390	380	370	350	1	8	21	37
	(200 - 690)	(200 - 690)	(200 - 680)	(190 - 660)	(180 - 630)	(1 - 3)	(4 - 15)	(11 - 38)	(20 - 68)

	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	1.1	1.1	1.0	1.0	1.0	2	3	7	9
Baltimore, MD	4.0	3.9	3.9	3.8	3.7	1	2	4	7
Boston, MA	3.4	3.5	3.5	3.4	3.3	-1	-0.3	1	4
Cleveland, OH	2.7	2.8	2.7	2.6	2.4	-1	3	7	12
Denver, CO	0.1	0.1	0.1	0.1	0.1	-0.4	0.2	2	7
Detroit, MI	3.0	3.0	3.1	3.0	2.9	NA	-4	-1	3
Houston, TX	1.5	1.6	1.6	1.6	1.6	-8	-0.1	0.5	2
Los Angeles, CA	0.8	1.0	0.9	0.9	0.8	-15	3	7	13
New York, NY	4.2	4.4	4.2	3.7	NA	-3	3	16	NA
Philadelphia, PA	4.2	4.2	4.2	4.1	4.0	-1	2	4	6
Sacramento, CA	0.4	0.4	0.4	0.4	0.4	2	2	3	6
St. Louis, MO	2.8	2.8	2.8	2.7	2.6	0.4	2	5	9

	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	4.2	4.2	4.0	3.9	3.8	0.077	0.15	0.28	0.40
Baltimore, MD	17	17	17	16	16	0.24	0.32	0.74	1.2
Boston, MA	13	13	13	12	12	-0.088	-0.043	0.20	0.55
Cleveland, OH	14	14	14	13	13	-0.17	0.42	1.0	1.8
Denver, CO	0.40	0.40	0.40	0.39	0.36	-0.0017	0.0014	0.0095	0.034
Detroit, MI	12	12	12	12	11	NA	-0.43	-0.12	0.31
Houston, TX	8.0	8.7	8.7	8.6	8.5	-0.68	-0.0085	0.045	0.18
Los Angeles, CA	4.8	5.5	5.3	5.1	4.8	-0.70	0.18	0.38	0.70
New York, NY	17	18	17	15	NA	-0.52	0.57	3.0	NA
Philadelphia, PA	20	20	19	19	19	-0.10	0.34	0.79	1.2
Sacramento, CA	2.8	2.7	2.7	2.6	2.6	0.076	0.046	0.091	0.16
St. Louis, MO	14	14	13	13	12	0.052	0.30	0.74	1.3

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7C-4. Sensitivity Analysis – *ST Mortality: Copollutant model (PM_{10})* (2009) (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-2)

Study Area	Air Quality Scenario: Absolute Ozone-Attributable Incidence: Base	75ppb	70ppb	65ppb	60ppb	Change in Ozone-Attributable Incidence: Base-75	75-70	75-65	75-60
Atlanta, GA	100	99	95	92	89	2	4	7	9
	(-440 - 980)	(-430 - 970)	(-420 - 940)	(-400 - 910)	(-390 - 880)	(-8 - 18)	(-15 - 35)	(-28 - 65)	(-40 - 94)
Baltimore, MD	240	230	230	220	220	3	4	10	16
	(-70 - 740)	(-69 - 730)	(-68 - 720)	(-66 - 700)	(-64 - 680)	(-1 - 10)	(-1 - 14)	(-3 - 32)	(-5 - 52)
Boston, MA	100	100	100	100	100	-1	0	2	5
	(-330 - 820)	(-330 - 820)	(-340 - 830)	(-330 - 810)	(-320 - 790)	(2 - -6)	(1 - -3)	(-5 - 13)	(-14 - 36)
Cleveland, OH	200	200	200	190	180	-3	6	15	25
	(-16 - 560)	(-16 - 570)	(-16 - 550)	(-15 - 530)	(-14 - 500)	(0 - -7)	(0 - 17)	(-1 - 41)	(-2 - 71)
Denver, CO	-13	-13	-13	-13	-12	0	0	0	-1
	(-220 - 330)	(-220 - 330)	(-220 - 330)	(-220 - 320)	(-200 - 300)	(1 - -2)	(-1 - 1)	(-5 - 8)	(-19 - 28)
Detroit, MI	200	200	210	210	200	NA	-7	-2	5
	(-130 - 760)	(-130 - 760)	(-140 - 790)	(-130 - 770)	(-130 - 740)		(5 - -28)	(1 - -8)	(-4 - 20)
Houston, TX	690	750	750	750	730	-59	-1	4	16
	(240 - 1400)	(260 - 1600)	(260 - 1600)	(260 - 1600)	(250 - 1500)	(-20 - -130)	(0 - -2)	(1 - 8)	(5 - 33)
Los Angeles, CA	160	190	180	170	160	-24	6	13	24
	(-1100 - 2200)	(-1200 - 2600)	(-1200 - 2500)	(-1200 - 2400)	(-1100 - 2200)	(160 - -330)	(-40 - 83)	(-85 - 180)	(-160 - 330)
New York, NY	1300	1300	1300	1100	NA	-38	42	220	NA
	(-25 - 3500)	(-26 - 3600)	(-25 - 3500)	(-22 - 3000)		(1 - -110)	(-1 - 110)	(-4 - 600)	
Philadelphia, PA	630	630	620	610	590	-3	11	25	39
	(-61 - 1800)	(-61 - 1800)	(-60 - 1700)	(-59 - 1700)	(-57 - 1700)	(0 - -9)	(-1 - 31)	(-2 - 71)	(-4 - 110)
Sacramento, CA	150	150	150	150	140	4	3	5	9
	(-190 - 720)	(-190 - 710)	(-180 - 690)	(-180 - 680)	(-180 - 670)	(-5 - 20)	(-3 - 12)	(-6 - 24)	(-11 - 41)
St. Louis, MO	210	210	200	200	190	1	4	11	20
	(-180 - 840)	(-180 - 840)	(-180 - 830)	(-170 - 800)	(-160 - 760)	(-1 - 3)	(-4 - 18)	(-10 - 46)	(-17 - 83)

Study Area	Air Quality Scenario: Percent of Baseline Incidence Attributable to Ozone: Base	75ppb	70ppb	65ppb	60ppb	Change in O_3-Attributable Risk: Base-75	75-70	75-65	75-60
Atlanta, GA	0.5	0.5	0.4	0.4	0.4	2	3	6	9
Baltimore, MD	2.0	2.0	2.0	1.9	1.9	1	2	4	7
Boston, MA	0.6	0.6	0.6	0.6	0.6	-1	-0.4	1	4
Cleveland, OH	1.9	1.9	1.8	1.8	1.7	-1	3	7	12
Denver, CO	-0.2	-0.2	-0.2	-0.2	-0.2	-0.5	1	3	10
Detroit, MI	1.2	1.2	1.2	1.2	1.2	NA	-4	-1	3
Houston, TX	2.2	2.4	2.4	2.4	2.4	-8	-0.1	0.5	2
Los Angeles, CA	0.2	0.2	0.2	0.2	0.2	-14	3	7	12
New York, NY	1.7	1.7	1.7	1.5	NA	-3	3	16	NA
Philadelphia, PA	2.2	2.3	2.2	2.2	2.1	-1	2	4	6
Sacramento, CA	1.1	1.1	1.1	1.1	1.0	2	2	3	6
St. Louis, MO	1.5	1.5	1.5	1.4	1.3	0.3	2	5	9

Study Area	Air Quality Scenario: Ozone-Attributable Deaths per 100,000: Base	75ppb	70ppb	65ppb	60ppb	Change in Ozone-Attributable Deaths per 100,000: Base-75	75-70	75-65	75-60
Atlanta, GA	1.9	1.9	1.8	1.8	1.7	0.035	0.066	0.13	0.18
Baltimore, MD	8.8	8.7	8.5	8.3	8.1	0.12	0.16	0.37	0.61
Boston, MA	2.3	2.3	2.3	2.3	2.2	-0.016	-0.0076	0.036	0.100
Cleveland, OH	9.7	9.8	9.5	9.1	8.6	-0.12	0.28	0.70	1.2
Denver, CO	-0.52	-0.52	-0.52	-0.51	-0.48	0.0023	-0.0019	-0.012	-0.044
Detroit, MI	4.7	4.7	4.9	4.8	4.6	NA	-0.17	-0.049	0.12
Houston, TX	12	13	13	13	13	-1.0	-0.013	0.068	0.27
Los Angeles, CA	1.3	1.5	1.4	1.4	1.3	-0.19	0.047	0.10	0.19
New York, NY	6.9	7.1	6.9	6.0	NA	-0.20	0.22	1.2	NA
Philadelphia, PA	11	11	10	10	10.0	-0.053	0.18	0.42	0.65
Sacramento, CA	7.3	7.1	7.0	6.8	6.7	0.20	0.12	0.24	0.41
St. Louis, MO	7.4	7.4	7.2	7.0	6.7	0.028	0.16	0.40	0.71

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7C-5. Sensitivity Analysis – ***ST Mortality: Alternate risk model (Zanobetti and Schwartz, 2008)*** **(2009)** (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-2)

Study Area	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	120	110	100	96	91	6	8	14	19
	(-14 - 330)	(-14 - 320)	(-13 - 290)	(-12 - 280)	(-11 - 260)	(-1 - 18)	(-1 - 24)	(-2 - 41)	(-2 - 56)
Baltimore, MD	130	120	120	110	110	13	4	10	15
	(40 - 290)	(36 - 260)	(35 - 250)	(33 - 240)	(32 - 230)	(4 - 29)	(1 - 10)	(3 - 21)	(4 - 32)
Boston, MA	220	220	210	210	200	1	6	11	19
	(99 - 420)	(98 - 420)	(96 - 410)	(93 - 400)	(90 - 390)	(0 - 2)	(3 - 11)	(5 - 22)	(9 - 37)
Cleveland, OH	120	110	110	100	95	5	5	12	20
	(38 - 260)	(37 - 240)	(35 - 230)	(33 - 220)	(30 - 200)	(2 - 11)	(2 - 11)	(4 - 27)	(6 - 44)
Denver, CO	62	62	60	57	51	0	2	4	10
	(-21 - 200)	(-21 - 200)	(-20 - 190)	(-20 - 180)	(-18 - 170)	(0 - 1)	(-1 - 6)	(-1 - 14)	(-4 - 33)
Detroit, MI	370	370	380	370	350	NA	-6	5	21
	(230 - 600)	(230 - 600)	(240 - 610)	(230 - 600)	(220 - 570)		(-4 - -10)	(3 - 8)	(13 - 35)
Houston, TX	52	56	56	55	54	-4	0	1	3
	(-45 - 220)	(-48 - 230)	(-48 - 230)	(-47 - 230)	(-46 - 220)	(3 - -15)	(0 - 1)	(-1 - 4)	(-2 - 10)
Los Angeles, CA	270	270	260	240	230	6	13	27	40
	(28 - 690)	(28 - 670)	(27 - 640)	(25 - 600)	(24 - 570)	(1 - 16)	(1 - 32)	(3 - 69)	(4 - 100)
New York, NY	1500	1500	1400	1000	NA	96	110	420	NA
	(1200 - 2200)	(1100 - 2100)	(1000 - 1900)	(790 - 1500)		(72 - 140)	(83 - 160)	(320 - 600)	
Philadelphia, PA	360	340	320	310	300	24	12	26	38
	(150 - 700)	(140 - 660)	(140 - 640)	(130 - 610)	(130 - 590)	(10 - 47)	(5 - 24)	(11 - 51)	(16 - 76)
Sacramento, CA	110	93	89	86	82	15	4	7	12
	(23 - 250)	(20 - 210)	(19 - 210)	(19 - 200)	(18 - 190)	(3 - 36)	(1 - 9)	(2 - 17)	(3 - 27)
St. Louis, MO	160	150	150	140	130	2	8	15	24
	(46 - 340)	(46 - 330)	(43 - 320)	(41 - 300)	(39 - 280)	(1 - 5)	(2 - 17)	(5 - 34)	(7 - 53)

Study Area	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	1.4	1.3	1.2	1.1	1.1	5	7	13	17
Baltimore, MD	2.5	2.2	2.2	2.1	2.0	10	4	8	12
Boston, MA	2.5	2.5	2.4	2.4	2.3	0.3	2	5	8
Cleveland, OH	2.5	2.4	2.3	2.1	2.0	4	4	10	17
Denver, CO	1.8	1.8	1.8	1.7	1.5	1	3	7	16
Detroit, MI	4.1	4.1	4.2	4.1	3.9	NA	-2	1	5
Houston, TX	0.6	0.6	0.6	0.6	0.6	-7	0.3	2	4
Los Angeles, CA	1.4	1.4	1.3	1.2	1.2	2	5	10	15
New York, NY	4.5	4.2	3.9	3.0	NA	6	7	28	NA
Philadelphia, PA	2.8	2.6	2.6	2.4	2.4	6	3	7	11
Sacramento, CA	2.9	2.5	2.4	2.3	2.2	14	4	7	12
St. Louis, MO	2.4	2.4	2.3	2.2	2.0	1	5	10	15

Study Area	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	2.2	2.1	2.0	1.8	1.7	0.12	0.16	0.27	0.37
Baltimore, MD	4.9	4.4	4.3	4.1	3.9	0.49	0.16	0.35	0.55
Boston, MA	4.9	4.8	4.7	4.6	4.4	0.017	0.13	0.25	0.42
Cleveland, OH	5.7	5.5	5.3	4.9	4.6	0.25	0.25	0.59	0.97
Denver, CO	2.5	2.5	2.4	2.3	2.1	0.014	0.077	0.17	0.41
Detroit, MI	8.6	8.6	8.8	8.5	8.2	NA	-0.14	0.12	0.50
Houston, TX	0.90	0.96	0.96	0.95	0.92	-0.062	0.0029	0.016	0.043
Los Angeles, CA	2.2	2.1	2.0	1.9	1.8	0.050	0.10	0.21	0.31
New York, NY	8.2	7.8	7.2	5.6	NA	0.51	0.59	2.2	NA
Philadelphia, PA	6.1	5.7	5.5	5.2	5.0	0.40	0.20	0.43	0.64
Sacramento, CA	5.1	4.4	4.2	4.0	3.8	0.72	0.17	0.34	0.55
St. Louis, MO	5.5	5.5	5.2	4.9	4.6	0.075	0.28	0.55	0.86

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7C-6. Sensitivity Analysis – ***LT Mortality: Alternate risk model (regional effect estimates)*** **(2009)** (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-7)

Study Area	Air Quality Scenario								
	Absolute Ozone-Attributable Incidence					Change in Ozone-Attributable Incidence			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	1,400	1,300	1,300	1,200	1,200	75	92	170	230
	(720 - 1900)	(690 - 1800)	(660 - 1800)	(630 - 1700)	(610 - 1700)	(34 - 110)	(42 - 140)	(77 - 260)	(110 - 350)
Baltimore, MD	-110	-100	-100	-96	-92	-6.4	-3.1	-6.9	-11
	(-1200 - 590)	(-1100 - 560)	(-1000 - 550)	(-980 - 530)	(-930 - 510)	(-55 - 41)	(-27 - 20)	(-59 - 44)	(-93 - 68)
Boston, MA	-170	-170	-170	-160	-150	0.29	-0.95	-5.8	-12
	(-1700 - 920)	(-1700 - 920)	(-1700 - 920)	(-1600 - 890)	(-1500 - 860)	(3 - -2)	(-8 - 6)	(-50 - 38)	(-100 - 77)
Cleveland, OH	0	0	0	0	0	0	0	0	0
	(-990 - 630)	(-950 - 620)	(-900 - 600)	(-840 - 570)	(-780 - 540)	(-22 - 22)	(-34 - 33)	(-76 - 73)	(-120 - 110)
Denver, CO	450	450	440	430	400	0.73	8.6	27	67
	(-26 - 780)	(-26 - 780)	(-26 - 770)	(-25 - 760)	(-23 - 710)	(0 - 2)	(0 - 18)	(-1 - 55)	(-3 - 130)
Detroit, MI	0	0	0	0	0	NA	0	0	0
	(-1700 - 1100)	(-1700 - 1100)	(-1700 - 1100)	(-1700 - 1100)	(-1600 - 1000)		(15 - -15)	(-31 - 31)	(-90 - 88)
Houston, TX	1,200	1,200	1,200	1,200	1,100	-11	32	69	110
	(610 - 1600)	(620 - 1600)	(610 - 1600)	(590 - 1600)	(580 - 1500)	(-5 - -18)	(14 - 49)	(31 - 110)	(51 - 170)
Los Angeles, CA	450	440	420	400	380	16	19	41	63
	(-2400 - 2500)	(-2300 - 2400)	(-2200 - 2300)	(-2100 - 2200)	(-1900 - 2100)	(-72 - 100)	(-87 - 120)	(-180 - 260)	(-290 - 400)
New York, NY	-600	-580	-550	-470	NA	-16	-31	-110	NA
	(-6200 - 3300)	(-6000 - 3200)	(-5600 - 3100)	(-4600 - 2700)		(-130 - 100)	(-260 - 200)	(-960 - 690)	
Philadelphia, PA	-260	-240	-240	-230	-220	-10	-8.0	-17	-25
	(-2700 - 1400)	(-2500 - 1300)	(-2400 - 1300)	(-2300 - 1300)	(-2200 - 1200)	(-88 - 66)	(-69 - 52)	(-150 - 110)	(-220 - 160)
Sacramento, CA	500	440	420	400	380	90	21	41	65
	(-29 - 870)	(-25 - 770)	(-24 - 750)	(-23 - 720)	(-21 - 690)	(-5 - 180)	(-1 - 43)	(-2 - 82)	(-3 - 130)
St. Louis, MO	0	0	0	0	0	0	0	0	0
	(-1400 - 910)	(-1400 - 910)	(-1400 - 880)	(-1300 - 850)	(-1200 - 810)	(-13 - 13)	(-44 - 43)	(-96 - 92)	(-160 - 150)

Study Area	Air Quality Scenario								
	Percent of Baseline Incidence Attributable to Ozone					Change in O_3-Attributable Risk			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	42.6	41.3	39.6	38.1	36.9	3.1	4.0	7.6	10.7
Baltimore, MD	-7.4	-6.9	-6.6	-6.3	-5.9	7.7	4.0	8.7	13.4
Boston, MA	-6.1	-6.1	-6.0	-5.8	-5.5	-0.2	0.7	4.5	9.2
Cleveland, OH	0	0	0	0	0	0	0	0	0
Denver, CO	27.5	27.5	27.1	26.3	24.5	0.1	1.3	4.2	10.7
Detroit, MI	0	0	0	0	0	NA	0	0	0
Houston, TX	41.0	41.2	40.6	39.8	38.9	-0.5	1.5	3.4	5.7
Los Angeles, CA	4.7	4.6	4.4	4.3	4.1	2.4	3.1	6.7	10.6
New York, NY	-6.7	-6.5	-6.0	-5.0	NA	3.4	6.8	23.5	NA
Philadelphia, PA	-7.1	-6.7	-6.5	-6.1	-5.9	5.3	4.3	9.1	13.3
Sacramento, CA	28.5	24.9	24.0	23.2	22.1	12.8	3.6	6.9	11.2
St. Louis, MO	0	0	0	0	0	0	0	0	0

Study Area	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	47	44	44	41	41	2.5	3.1	5.8	7.8
Baltimore, MD	-6.8	-6.2	-6.2	-6.0	-5.7	-0.40	-0.19	-0.43	-0.68
Boston, MA	-6.2	-6.2	-6.2	-5.8	-5.5	0.011	-0.035	-0.21	-0.44
Cleveland, OH	0	0	0	0	0	0	0	0	0
Denver, CO	31	31	30	30	27	0.050	0.59	1.9	4.6
Detroit, MI	0	0	0	0	0	NA	0	0	0
Houston, TX	38	38	38	38	35	-0.35	1.0	2.2	3.5
Los Angeles, CA	6.2	6.1	5.8	5.5	5.3	0.22	0.26	0.57	0.87
New York, NY	-5.3	-5.1	-4.9	-4.2	NA	-0.14	-0.27	-0.97	NA
Philadelphia, PA	-7.3	-6.8	-6.8	-6.5	-6.2	-0.28	-0.23	-0.48	-0.71
Sacramento, CA	41	36	34	33	31	7.4	1.7	3.4	5.3
St. Louis, MO	0	0	0	0	0	0	0	0	0

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.

Table 7C-7. Sensitivity Analysis – *LT Mortality: Alternate risk model (ozone-only effect estimate)* (2009) (incidence, percent of baseline mortality, incidence per 100,000) - compare with Core Results in Table 7B-7)

	Air Quality Scenario								
	Absolute Incidence					Change in Incidence			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	base-75	75-70	75-65	75-60
Atlanta, GA	400	390	370	350	340	18	22	40	56
	(120 - 660)	(120 - 630)	(110 - 600)	(100 - 580)	(100 - 550)	(5 - 30)	(6 - 37)	(12 - 69)	(16 - 96)
Baltimore, MD	260	250	240	230	230	17	8.2	18	28
	(80 - 430)	(75 - 410)	(73 - 400)	(70 - 380)	(67 - 370)	(5 - 29)	(2 - 14)	(5 - 31)	(8 - 48)
Boston, MA	410	410	400	390	380	-0.77	2.5	15	32
	(120 - 670)	(120 - 670)	(120 - 670)	(120 - 650)	(110 - 620)	(0 - -1)	(1 - 4)	(4 - 26)	(9 - 54)
Cleveland, OH	220	210	200	190	180	6.4	9.9	22	34
	(65 - 360)	(63 - 350)	(61 - 330)	(57 - 320)	(54 - 300)	(2 - 11)	(3 - 17)	(6 - 37)	(10 - 58)
Denver, CO	220	220	220	210	200	0.34	3.9	12	31
	(68 - 370)	(68 - 360)	(67 - 360)	(65 - 350)	(59 - 320)	(0 - 1)	(1 - 7)	(4 - 21)	(9 - 53)
Detroit, MI	380	380	380	370	350	NA	-4.5	9.2	26
	(110 - 620)	(110 - 620)	(110 - 630)	(110 - 610)	(110 - 580)		(-1 - -8)	(3 - 16)	(8 - 45)
Houston, TX	340	340	340	330	320	-2.7	7.5	16	27
	(100 - 560)	(100 - 560)	(100 - 550)	(98 - 540)	(95 - 520)	(-1 - -5)	(2 - 13)	(5 - 28)	(8 - 46)
Los Angeles, CA	1,100	1,100	1,100	1,000	960	43	52	110	170
	(350 - 1900)	(340 - 1800)	(320 - 1700)	(310 - 1700)	(290 - 1600)	(12 - 73)	(15 - 89)	(31 - 180)	(49 - 290)
New York, NY	1,500	1,400	1,300	1,200	NA	42	81	290	NA
	(440 - 2400)	(430 - 2300)	(400 - 2200)	(350 - 1900)		(12 - 71)	(23 - 140)	(83 - 490)	
Philadelphia, PA	620	590	580	550	530	27	21	45	66
	(190 - 1000)	(180 - 970)	(170 - 940)	(170 - 910)	(160 - 880)	(8 - 46)	(6 - 36)	(13 - 77)	(19 - 110)
Sacramento, CA	250	220	210	200	190	42	9.8	19	30
	(76 - 410)	(65 - 350)	(62 - 340)	(60 - 330)	(56 - 310)	(12 - 71)	(3 - 17)	(5 - 32)	(9 - 51)
St. Louis, MO	320	310	300	290	270	3.8	13	28	45
	(95 - 520)	(94 - 510)	(90 - 490)	(86 - 470)	(81 - 450)	(1 - 7)	(95 - 520)	(8 - 47)	(13 - 77)

	Air Quality Scenario								
	Percent of Baseline Incidence					Change in O_3-Attributable Risk			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	12.4	11.9	11.3	10.8	10.4	4	5	10	14
Baltimore, MD	12.9	12.2	11.9	11.4	11.0	6	3	7	10
Boston, MA	11.1	11.2	11.1	10.8	10.4	-0.2	1	3	7
Cleveland, OH	12.1	11.8	11.3	10.7	10.1	3	4	10	15
Denver, CO	14.1	14.1	13.9	13.5	12.4	0.1	2	5	12
Detroit, MI	11.9	11.9	12.0	11.7	11.2	NA	-1	2	6
Houston, TX	11.8	11.9	11.6	11.4	11.0	-1	2	4	7
Los Angeles, CA	15.1	14.6	14.1	13.4	12.7	3	4	9	14
New York, NY	12.0	11.7	11.1	9.6	NA	3	5	19	NA
Philadelphia, PA	12.5	12.1	11.7	11.2	10.9	4	3	7	10
Sacramento, CA	14.7	12.6	12.1	11.7	11.1	14	4	8	13
St. Louis, MO	12.6	12.4	12.0	11.5	10.9	1	4	8	13

	Air Quality Scenario								
	Ozone-Attributable Deaths per 100,000					Change in Ozone-Attributable Deaths per 100,000			
Study Area	Base	75ppb	70ppb	65ppb	60ppb	Base-75	75-70	75-65	75-60
Atlanta, GA	14	13	12	12	11	0.60	0.74	1.4	1.9
Baltimore, MD	16	16	15	15	14	1.0	0.51	1.1	1.7
Boston, MA	15	15	15	14	14	-0.028	0.091	0.56	1.2
Cleveland, OH	17	16	16	15	14	0.49	0.76	1.7	2.6
Denver, CO	15	15	15	15	14	0.023	0.27	0.85	2.1
Detroit, MI	14	14	15	14	14	NA	-0.17	0.35	1.00
Houston, TX	11	11	11	10	10	-0.084	0.24	0.51	0.86
Los Angeles, CA	16	15	15	14	13	0.59	0.72	1.5	2.3
New York, NY	13	13	12	10	NA	0.37	0.71	2.5	NA
Philadelphia, PA	17	17	16	16	15	0.76	0.60	1.3	1.9
Sacramento, CA	21	18	17	16	15	3.4	0.80	1.5	2.5
St. Louis, MO	19	19	18	17	16	0.23	0.76	1.6	2.7

NA: for NYC, the model-based adjustment methodology was unable to estimate ozone concentrations that would meet the alternative standard level of 60 ppb.