

# **Ozone Health Risk Assessment for Selected Urban Areas: Draft Appendices**

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Figure F-1. Percent Changes in Aggregate Numbers (Across All Locations) of Occurrences of Lung Function Response Among All School Age Children when O<sub>3</sub> Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response .....F-1

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Figure F-3. Percent Changes in Aggregate Numbers (Across All Locations) of All School Age Children Experiencing at Least One Occurrence of Lung Function Response when O<sub>3</sub> Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response .....F-3

Figure F-4. Percent Changes in Numbers of All School Age Children Experiencing at Least One Decrement in FEV<sub>1</sub> >15% when O<sub>3</sub> Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location.....F-4

## **Appendix A: Air Quality**

**Table A-1. Monitor-Specific O<sub>3</sub> Air Quality Information: Atlanta, GA**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1305700011	0.089			
1306700031	0.100	0.084	0.073	0.085
1307700021	0.099	0.077	0.083	0.086
1308500012	0.088	0.077	0.068	0.077
1308900021	0.095	0.080	0.084	0.086
1308930011	0.090	0.091	0.088	0.089
1309700041	0.098	0.085	0.080	0.087
1311300011	0.088	0.077	0.084	0.083
1312100551	0.100	0.091	0.089	0.093
1313500021	0.089	0.088	0.092	0.089
1315100021	0.099	0.082	0.085	0.088
1322300031	0.099	0.083	0.073	0.085
1324700011	0.099	0.078	0.087	0.088
Average:	0.095	0.083	0.082	
<b>Design Value*:</b>				0.093

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-2. Monitor-Specific O<sub>3</sub> Air Quality Information: Boston, MA**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
2500900051	0.088			
2500920061	0.100	0.079	0.081	0.086
2500940041	0.094	0.080	0.077	0.083
2501711021	0.096	0.073	0.070	0.079
2502130031	0.107	0.088	0.078	0.091
2502500411	0.102	0.078	0.079	0.086
2502500421	0.074	0.074	0.064	0.07
2502700151	0.091	0.080	0.074	0.081
Average:	0.094	0.079	0.075	
<b>Design Value*:</b>				0.091

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-3. Monitor-Specific O<sub>3</sub> Air Quality Information: Chicago, IL**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1703100011	0.094	0.077	0.065	0.078
1703100321	0.096	0.080	0.067	0.081
1703100422	0.103			
1703100501	0.084	0.069		
1703100641	0.085	0.067	0.054	0.068
1703100721	0.085	0.075	0.060	0.073
1703100761			0.068	
1703110032	0.092	0.071	0.067	0.076
1703116011	0.081	0.075	0.067	0.074
1703140021	0.084	0.070	0.059	0.071
1703140071	0.093	0.073	0.064	0.076
1703142011	0.087	0.080	0.067	0.078
1703142012	0.067		0.051	
1703170021	0.091	0.082	0.071	0.081
1703180031	0.074			
1704360011	0.084	0.066	0.065	0.071
1708900051	0.082	0.076	0.069	0.075
1709710021	0.090	0.074	0.068	0.077
1709710071	0.100	0.078	0.071	0.083
1709730011	0.087			
1711100011	0.090	0.079	0.068	0.079
1719710081	0.086	0.077	0.063	0.075
1719710111	0.087	0.073	0.068	0.076
1808900221	0.094	0.076	0.064	0.078
1808900241	0.086	0.081		
1808900301			0.064	
1808920081	0.101	0.081	0.067	0.083
1809100051	0.107	0.082	0.070	0.086
1809100101	0.100	0.084		
1812700202	0.097	0.079		
1812700241	0.101	0.077	0.069	0.082
1812700261	0.100	0.082	0.072	0.084
5505900021	0.110	0.085		
5505900191	0.116	0.088	0.078	0.094
5505900221	0.096	0.088		
Average:	0.092	0.077	0.066	
	<b>Design Value*:</b>			0.094

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-4. Monitor-Specific O<sub>3</sub> Air Quality Information: Cleveland, OH**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
3900710011	0.103	0.099	0.081	0.094
3903500341	0.090	0.076	0.057	0.074
3903500641	0.090	0.079	0.063	0.077
3903550021	0.098	0.089	0.077	0.088
3905500041	0.115	0.097	0.075	0.095
3908500031	0.104	0.092	0.079	0.091
3908530021	0.088	0.080	0.076	0.081
3909300171	0.099	0.085	0.074	0.086
3910300031	0.091	0.086	0.077	0.084
3913310011	0.097	0.091	0.081	0.089
3915300201	0.103	0.089	0.077	0.089
Average:	0.098	0.088	0.074	
<b>Design Value*:</b>				0.095

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-5. Monitor-Specific O<sub>3</sub> Air Quality Information: Detroit, MI**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
2604900211	0.088	0.087	0.075	0.083
2604920011	0.089	0.091	0.077	0.085
2609900091	0.095	0.102	0.081	0.092
2609910031	0.092	0.101	0.071	0.088
2612500012	0.093	0.090	0.075	0.086
2614700051	0.100	0.086	0.074	0.086
2616100081	0.091	0.091	0.071	0.084
2616300012	0.088	0.085	0.065	0.079
2616300161	0.092	0.084	0.066	0.08
2616300192	0.083	0.098	0.066	0.082
Average:	0.091	0.092	0.072	
<b>Design Value*:</b>				0.092

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-6. Monitor-Specific O<sub>3</sub> Air Quality Information: Houston, TX**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
4803910032	0.095			
4803910041	0.092	0.097	0.103	0.097
4803910161			0.081	
4816700141	0.093	0.092	0.088	0.091
4816710022	0.083	0.082		
4820100242	0.096	0.095	0.096	0.095
4820100263	0.088	0.098	0.085	0.09
4820100292	0.098	0.096	0.090	0.094
4820100461	0.078	0.093	0.084	0.085
4820100472	0.072	0.082	0.083	0.079
4820100512	0.101	0.103	0.095	0.099
4820100551	0.094	0.107	0.104	0.101
4820100621	0.095	0.094	0.097	0.095
4820100661	0.084	0.081	0.097	0.087
4820100701	0.088	0.100	0.078	0.088
4820100751	0.078	0.096	0.093	0.089
4820110151		0.108	0.093	
4820110342	0.093	0.102	0.091	0.095
4820110353	0.092	0.105	0.092	0.096
4820110391	0.095	0.113	0.097	0.101
4820110411	0.090			
4820110501	0.094	0.092	0.097	0.094
4833900781	0.082	0.094	0.080	0.085
Average:	0.090	0.097	0.091	
	<b>Design Value*:</b>			0.101

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-7. Monitor-Specific O<sub>3</sub> Air Quality Information: Los Angeles, CA**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
0603700021	0.097	0.104	0.092	0.097
0603700161	0.111	0.123	0.095	0.109
0603701131	0.073	0.083	0.076	0.077
0603710021	0.091	0.096	0.089	0.092
0603711031	0.077	0.082	0.078	0.079
0603712011	0.111	0.119	0.101	0.11
0603713011	0.049	0.057	0.065	0.057
0603716011	0.074	0.082	0.079	0.078
0603717011	0.099	0.109	0.095	0.101
0603720051	0.095	0.101	0.093	0.096
0603740021	0.059	0.063	0.070	0.064
0603750011	0.064	0.070		
0603750051			0.085	
0603760121	0.131	0.137	0.107	0.125
0603790331	0.102	0.103	0.095	0.1
0605900071	0.069	0.080	0.088	0.079
0605910031	0.066	0.079	0.076	0.073
0605920221	0.081	0.095	0.085	0.087
0605950011	0.071	0.080	0.075	0.075
0606500121	0.113	0.127	0.112	0.117
0606520021	0.097	0.100	0.094	0.097
0606550011	0.109	0.105	0.099	0.104
0606560011	0.107	0.116	0.095	0.106
0606580011	0.109	0.120	0.111	0.113
0606590011	0.104	0.112	0.100	0.105
0606590031			0.060	
0607100011	0.092	0.088	0.082	0.087
0607100051	0.131	0.130	0.122	0.127
0607100121	0.115	0.103	0.097	0.105
0607100171	0.087	0.084	0.087	0.086
0607103061	0.106	0.104	0.085	0.098
0607110042	0.105	0.114	0.102	0.107
0607112341	0.089	0.087	0.082	0.086
0607120021	0.114	0.132	0.111	0.119
0607140011	0.113	0.110	0.099	0.107
0607140031	0.117	0.137	0.119	0.124
0607190021	0.101	0.111	0.102	0.104
0607190041	0.105	0.123	0.112	0.113
0611100051	0.076			
0611100071	0.080	0.087	0.086	0.084
0611100091	0.087	0.093	0.086	0.088
0611110041	0.097	0.093	0.092	0.094
0611120021	0.092	0.093	0.092	0.092
0611120031	0.064	0.074	0.069	0.069
0611130011	0.064	0.069	0.065	0.066
Average:	0.093	0.099	0.091	
	<b>Design Value*:</b>			0.127

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-8. Monitor-Specific O<sub>3</sub> Air Quality Information: New York, NY**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
3600500831	0.096	0.079	0.074	0.083
3600501101	0.089	0.082	0.069	0.08
3602700071	0.111	0.081	0.076	0.089
3607150011	0.082	0.087	0.078	0.082
3607900051	0.102	0.082	0.082	0.088
3608100981	0.082	0.072	0.064	0.072
3608101241	0.089	0.086	0.075	0.083
3608500671	0.099	0.086	0.083	0.089
3610300021	0.108	0.094	0.081	0.094
3610300041	0.090	0.082		
3610300092	0.103	0.102	0.079	0.094
3611110051	0.084	0.082	0.076	0.08
3611920041	0.102	0.091	0.078	0.09
Average:	0.095	0.085	0.076	
<b>Design Value*:</b>				0.094

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-9. Monitor-Specific O<sub>3</sub> Air Quality Information: Philadelphia, PA**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
4201700121	0.111	0.087	0.082	0.093
4202900501	0.104	0.085		
4202901001	0.112	0.085	0.085	0.094
4204500021	0.106	0.080	0.081	0.089
4209100131	0.101	0.085	0.083	0.089
4210100041	0.082	0.069	0.054	0.068
4210100141	0.098	0.083	0.077	0.086
4210100241	0.110	0.082	0.091	0.094
4210101361	0.094	0.070	0.073	0.079
Average:	0.102	0.081	0.078	
<b>Design Value*:</b>				0.094

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-10. Monitor-Specific O<sub>3</sub> Air Quality Information: Sacramento, CA**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
0601700101	0.098	0.096	0.089	0.094
0601700111	0.067	0.065		
0601700121	0.077	0.075	0.073	0.075
0601700201	0.111	0.106	0.089	0.102
0605700051	0.099	0.098	0.093	0.096
0605700071	0.093	0.090	0.085	0.089
0605710011	0.065			
0606100021	0.101	0.094	0.092	0.095
0606100041	0.101	0.089	0.087	0.092
0606100061	0.095	0.085	0.082	0.087
0606100071		0.068		
0606130011	0.097			
0606700021	0.095	0.086	0.076	0.085
0606700061	0.105	0.097	0.083	0.095
0606700101	0.083	0.076	0.067	0.075
0606700111	0.069	0.087	0.077	0.077
0606700121	0.104	0.098	0.087	0.096
0606700131	0.079	0.075	0.067	0.073
0606750031	0.097	0.097	0.089	0.094
0611300041	0.076	0.077	0.071	0.074
0611310031	0.088	0.082	0.069	0.079
Average:	0.090	0.086	0.081	
	<b>Design Value*:</b>			0.102

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-11. Monitor-Specific O<sub>3</sub> Air Quality Information: St. Louis, MO**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1708310011	0.100	0.083	0.073	0.085
1711700021	0.085	0.077	0.068	0.076
1711900081	0.094	0.089	0.074	0.085
1711910091	0.090	0.088	0.078	0.085
1711920072	0.090	0.082	0.068	0.08
1711930071	0.084	0.083	0.073	0.08
1716300102	0.093	0.079	0.073	0.081
2909900121	0.093	0.082	0.070	0.081
2918310021	0.099	0.091	0.077	0.089
2918310041	0.098	0.090	0.076	0.088
2918900041	0.098	0.088	0.070	0.085
2918900061	0.094	0.086	0.067	0.082
2918930011	0.094	0.082	0.067	0.081
2918950011	0.095	0.088	0.068	0.083
2918970031	0.093	0.088	0.069	0.083
2951000071	0.090	0.084		
2951000721	0.081	0.071	0.058	0.07
2951000861	0.098	0.090	0.072	0.086
Average:	0.093	0.085	0.071	
<b>Design Value*:</b>				0.089

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-12. Monitor-Specific O<sub>3</sub> Air Quality Information: Washington, D.C.**

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1100100251	0.097	0.079	0.080	0.085
1100100411	0.102	0.082	0.070	0.084
1100100431	0.106	0.081	0.081	0.089
Average:	0.102	0.081	0.077	
<b>Design Value*:</b>				0.089

\*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

**Table A-13. Composite Monitor Statistics: 2004**

Urban Area	24-Hour Average (ppm)			1-Hour Maximum (ppm)			8-Hour Maximum (ppm)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Atlanta	0.0091	0.0279	0.0504	0.0170	0.0578	0.1267	0.0146	0.0499	0.1103
Boston 1*	0.0060	0.0276	0.0571	0.0185	0.0433	0.1060	0.0128	0.0379	0.0904
Boston 2*	0.0114	0.0310	0.0603	0.0218	0.0450	0.0956	0.0194	0.0411	0.0842
Chicago	0.0110	0.0270	0.0453	0.0152	0.0432	0.0758	0.0119	0.0389	0.0679
Cleveland	0.0080	0.0257	0.0445	0.0123	0.0404	0.0743	0.0090	0.0360	0.0676
Detroit	0.0074	0.0239	0.0459	0.0140	0.0430	0.0793	0.0094	0.0375	0.0730
Houston	0.0075	0.0262	0.0572	0.0155	0.0510	0.1243	0.0137	0.0443	0.1082
Los Angeles 1**	0.0204	0.0338	0.0491	0.0351	0.0634	0.1005	0.0319	0.0555	0.0867
Los Angeles 2**	0.0249	0.0398	0.0568	0.0410	0.0656	0.0992	0.0387	0.0597	0.0888
New York 1***	0.0055	0.0242	0.0494	0.0128	0.0449	0.0920	0.0085	0.0378	0.0811
New York 2***	0.0052	0.0241	0.0491	0.0115	0.0447	0.0883	0.0076	0.0378	0.0806
Philadelphia	0.0037	0.0272	0.0486	0.0090	0.0492	0.0915	0.0057	0.0426	0.0775
Sacramento	0.0164	0.0323	0.0462	0.0307	0.0593	0.0953	0.0241	0.0520	0.0806
St. Louis	0.0078	0.0248	0.0425	0.0175	0.0468	0.0890	0.0114	0.0409	0.0688
Washington, D.C.	0.0055	0.0283	0.0526	0.0140	0.0521	0.1020	0.0103	0.0450	0.0916

\*\*Boston 1" denotes Suffolk County; "Boston 2" denotes Essex, Middlesex, Norfolk, Suffolk, and Worcester Counties.

\*\*\*Los Angeles 1" denotes Los Angeles County; "Los Angeles 2" denotes Los Angeles, Riverside, San Bernardino, and Orange Counties.

\*\*\*\*New York 1" denotes the 5 boroughs of New York City -- Brooklyn, Queens, Manhattan, Bronx, and Staten Island. "New York 2" denotes the 5 boroughs plus Westchester County.

**Table A-14. Composite Monitor Statistics: 2002**

Urban Area	24-Hour Average (ppm)			1-Hour Maximum (ppm)			8-Hour Maximum (ppm)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Atlanta	0.0102	0.0308	0.0559	0.0193	0.0623	0.1307	0.0157	0.0540	0.1166
Boston 1*	0.0133	0.0314	0.0783	0.0210	0.0503	0.1185	0.0178	0.0434	0.1128
Boston 2*	0.0132	0.0359	0.0852	0.0213	0.0526	0.1213	0.0169	0.0479	0.1162
Chicago	0.0101	0.0295	0.0545	0.0206	0.0488	0.0986	0.0137	0.0437	0.0899
Cleveland	0.0103	0.0338	0.0685	0.0177	0.0548	0.1070	0.0138	0.0488	0.1044
Detroit	0.0085	0.0277	0.0572	0.0170	0.0516	0.0987	0.0151	0.0450	0.0923
Houston	0.0089	0.0258	0.0568	0.0163	0.0492	0.1167	0.0131	0.0427	0.1017
Los Angeles 1**	0.0158	0.0313	0.0492	0.0283	0.0613	0.1009	0.0252	0.0525	0.0842
Los Angeles 2**	0.0192	0.0385	0.0586	0.0292	0.0652	0.0967	0.0247	0.0587	0.0881
New York 1***	0.0062	0.0280	0.0565	0.0130	0.0529	0.1294	0.0088	0.0448	0.0999
New York 2***	0.0075	0.0286	0.0576	0.0133	0.0537	0.1333	0.0088	0.0458	0.1032
Philadelphia	0.0069	0.0322	0.0619	0.0133	0.0573	0.1235	0.0091	0.0501	0.0999
Sacramento	0.0182	0.0353	0.0604	0.0242	0.0647	0.1090	0.0212	0.0564	0.0954
St. Louis	0.0058	0.0289	0.0585	0.0157	0.0556	0.1127	0.0087	0.0484	0.1000
Washington, D.C.	0.0095	0.0357	0.0708	0.0193	0.0627	0.1430	0.0164	0.0548	0.1210

\*\*Boston 1" denotes Suffolk County; "Boston 2" denotes Essex, Middlesex, Norfolk, Suffolk, and Worcester Counties.

\*\*\*Los Angeles 1" denotes Los Angeles County; "Los Angeles 2" denotes Los Angeles, Riverside, San Bernardino, and Orange Counties.

\*\*\*\*New York 1" denotes the 5 boroughs of New York City -- Brooklyn, Queens, Manhattan, Bronx, and Staten Island. "New York 2" denotes the 5 boroughs plus Westchester County.

## **Appendix B: Information on Concentration-Response Functions**

## B.1 Tables of Study-Specific Information

**Table B-1. Study-Specific Information for O<sub>3</sub> Studies in Atlanta, GA**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	71	0.00020	-0.00084	0.00123
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	0	71	0.00120	-0.00039	0.00279
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-2. Study-Specific Information for O<sub>3</sub> Studies in Boston, MA**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	1-day lag	1 hr max.	logistic	none	27	126	0.00462	0.00000	0.00784
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	0-day lag	1 hr max.	logistic	PM2.5	27	126	0.00771	0.00331	0.01220
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	1-day lag	1 hr max.	logistic	PM2.5	27	126	0.00701	0.00262	0.01153
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	1-day lag	8 hr max.	logistic	none	21	100	0.00570	0.00172	0.00965
Gent et al. (2003)	Respiratory symptoms -- shortness of breath	---	0 - 12	1-day lag	1 hr max.	logistic	none	27	126	0.00398	0.00040	0.00743
Gent et al. (2003)	Respiratory symptoms -- shortness of breath	---	0 - 12	1-day lag	8 hr max.	logistic	none	21	100	0.00525	0.00098	0.00952
Gent et al. (2003)	Respiratory symptoms -- wheeze	---	0 - 12	0-day lag	1 hr max.	logistic	PM2.5	21	100	0.00600	0.00209	0.01002

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

**Table B-3. Study-Specific Information for O<sub>3</sub> Studies in Chicago, IL**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Schwartz (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00099	0.00031	0.00166
Schwartz -- 14 US Cities (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00037	0.00012	0.00062
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	0	65	0.00075	-0.00067	0.00218
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO <sub>2</sub>	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO <sub>2</sub>	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-4. Study-Specific Information for O<sub>3</sub> Studies in Cleveland, OH**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00061	-0.00038	0.00161
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00148	-0.00004	0.00299
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO <sub>2</sub>	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO <sub>2</sub>	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Schwartz et al. (1996)	Hospital admissions, respiratory illness	460-519	65+	avg of 1-day and 2-day lags	1 hr max.	log-linear	none	NA	NA	0.00169	0.00039	0.00291

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-5. Study-Specific Information for O<sub>3</sub> Studies in Detroit, MI**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00076	-0.00024	0.00177
Bell et al. -- 95 US Cities	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Schwartz (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00068	-0.00011	0.00148
Schwartz -- 14 US Cities (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00037	0.00012	0.00062
Ito (2003)	Mortality, non-accidental	< 800	all	0-day lag	24 hr avg.	log-linear (GAM str.)	none	NA	55	0.00093	-0.00085	0.00271
Ito (2003)	Mortality, respiratory	460-519	all	0-day lag	24 hr avg.	log-linear	none	NA	55	0.00359	-0.00276	0.00993
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00135	-0.00015	0.00286
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	0-day lag	24 hr avg.	log-linear (GAM str. estimation)**	none	NA	55	-0.00218	-0.00621	0.00186
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	1-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	-0.00054	-0.00459	0.00352
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	2-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00066	-0.00342	0.00473
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	3-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00190	-0.00216	0.00595
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	0-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	-0.00191	-0.00667	0.00286
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	1-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00187	-0.00293	0.00667
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	2-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	-0.00027	-0.00513	0.00459
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	3-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00011	-0.00475	0.00497

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

\*\*\*GAM str. estimation" denotes that estimation of the log-linear C-R function used a generalized additive model with a stringent convergence criterion. This study also estimated log-linear C-R functions using generalized linear models (GLM).

NA denotes "not available."

**Table B-6. Study-Specific Information for O<sub>3</sub> Studies in Houston, TX**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	1	76	0.00079	0.00005	0.00154
Bell et al. -- 95 US Cities	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Schwartz (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00044	0.00004	0.00084
Schwartz -- 14 US Cities (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00037	0.00012	0.00062
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	1	76	0.00122	-0.00016	0.00261
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-7. Study-Specific Information for O<sub>3</sub> Studies in Los Angeles, CA**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)***	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	68	0.00018	-0.00043	0.00079
Bell et al. -- 95 US Cities (2004)***	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	0	68	0.00107	0.00001	0.00213
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Linn et al. (2000)****	Hospital admissions (unscheduled), pulmonary illness --	75-101*****	30+	0-day lag	24 hr avg.	log-linear	none	1	70	0.00110	-0.00047	0.00267
Linn et al. (2000)****	Hospital admissions (unscheduled), pulmonary illness --	75-101*****	30+	0-day lag	24 hr avg.	log-linear	none	1	70	0.00060	-0.00077	0.00197

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties.

\*\*\*\*\*Linn et al. (2000) used DRG codes instead of ICD codes.

**Table B-8. Study-Specific Information for O<sub>3</sub> Studies in New York, NY**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)***	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	-2	81	0.00170	0.00054	0.00286
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Thurston et al. (1992)****	Hospital admissions (unscheduled),	466, 480-486, 490, 491, 492, 493	all	3-day lag	1 hr max.	linear	none	NA	206	1.370E-08	3.312E-09	2.409E-08
Thurston et al. (1992)****	Hospital admissions (unscheduled), asthma	493	all	1-day lag	1 hr max.	linear	none	NA	206	1.170E-08	2.488E-09	2.091E-08

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

\*\*\*New York in this study is defined as the five boroughs of New York City plus Westchester County.

\*\*\*\*New York in this study is defined as the five boroughs of New York City.

NA denotes "not available."

**Table B-9. Study-Specific Information for O<sub>3</sub> Studies in Philadelphia, PA**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Moolgavkar et al. (1995)	Mortality, non-accidental	< 800	all	1-day lag	24 hr avg.	log-linear	none	1	159	0.00140	0.00086	0.00191
Moolgavkar et al. (1995)	Mortality, non-accidental	< 800	all	1-day lag	24 hr avg.	log-linear	TSP, SO2	1	159	0.00139	0.00066	0.00212
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	-3	84	0.00151	0.00007	0.00296
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-10. Study-Specific Information for O<sub>3</sub> Studies in Sacramento, CA**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	71	0.00026	-0.00079	0.00131
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-11. Study-Specific Information for O<sub>3</sub> Studies in St. Louis, MO**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	118	0.00044	-0.00072	0.00159
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

**Table B-12. Study-Specific Information for O<sub>3</sub> Studies in Washington, D.C.**

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O <sub>3</sub> Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Rounded to the nearest ppb.

NA denotes "not available."

## B.2 Concentration-Response Functions and Health Impact Functions

Notation:

$y_0 =$  Incidence under baseline conditions

$y_c =$  Incidence under control conditions

$\Delta y = y_0 - y_c$

$x_0 = O_3$  levels under baseline conditions

$x_c = O_3$  levels under control conditions

$\Delta x = x_0 - x_c$

### B.2.1 Log-linear

The log-linear concentration-response function is:  $y = Be^{\beta x}$

The derivation of the corresponding health impact function is as follows:

$$y = Be^{\beta x}$$

$$y_0 = Be^{\beta x_0}$$

$$y_c = Be^{\beta x_c}$$

$$\Delta y = Be^{\beta x_0} - Be^{\beta x_c}$$

$$\Delta y = Be^{\beta x_0} \cdot \left( 1 - \frac{Be^{\beta x_c}}{Be^{\beta x_0}} \right)$$

$$\Delta y = Be^{\beta x_0} \cdot \left( 1 - e^{\beta \cdot (x_c - x_0)} \right)$$

$$\Delta y = Be^{\beta x_0} \cdot (1 - e^{-\beta \Delta x})$$

$$\Delta y = y_0 \cdot (1 - e^{-\beta \Delta x})$$

### B.2.2 Linear

The linear concentration-response function is:  $y = \alpha + \beta x$

The derivation of the corresponding health impact function is as follows:

$$y = \alpha + \beta x$$

$$y_0 = \alpha + \beta x_0$$

$$y_c = \alpha + \beta x_c$$

$$\Delta y = y_0 - y_c = \beta x_0 - \beta x_c$$

$$\Delta y = \beta(x_0 - x_c) = \beta \Delta x$$

### B.2.3 Logistic

The logistic concentration-response function is:  $y = \left( \frac{e^{\beta x}}{1 + e^{\beta x}} \right) = \frac{1}{1 + e^{-\beta x}}$

The derivation of the corresponding health impact function is as follows:

$$y = \frac{1}{1 + e^{-\beta x}}$$

$$odds = \frac{y}{1 - y} = \frac{\left( \frac{1}{1 + e^{-\beta x}} \right)}{1 - \left( \frac{1}{1 + e^{-\beta x}} \right)}$$

$$odds = \frac{\left( \frac{1}{1 + e^{-\beta x}} \right)}{\left( \frac{e^{-\beta x}}{1 + e^{-\beta x}} \right)} = \frac{1}{e^{-\beta x}} = e^{\beta x}$$

$$odds\ ratio = \frac{e^{\beta x_0}}{e^{\beta x_c}} = e^{\beta \Delta x}$$

$$\frac{\left( \frac{y_c}{1 - y_c} \right)}{\left( \frac{y_0}{1 - y_0} \right)} = e^{-\beta \Delta x}$$

$$\frac{y_c}{1 - y_c} = \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}$$

$$y_c = (1 - y_c) \cdot \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}$$

$$y_c + y_c \cdot \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x} = \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}$$

$$y_c \cdot \left[ 1 + \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x} \right] = \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}$$

$$y_c = \frac{\left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}}{1 + \left( \frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}}$$

$$y_c = \frac{y_0 \cdot e^{-\beta \Delta x}}{1 - y_0 + y_0 \cdot e^{-\beta \Delta x}}$$

$$y_c = \frac{y_0}{(1 - y_0) \cdot e^{\beta \Delta x} + y_0}$$

$$y_0 - y_c = y_0 - \frac{y_0}{(1 - y_0) \cdot e^{\beta \Delta x} + y_0}$$

$$\Delta y = y_0 \cdot \left( 1 - \frac{1}{(1 - y_0) \cdot e^{\beta \Delta x} + y_0} \right)$$

### B.3 The Calculation of “Shrinkage” Estimates from the Location-Specific Estimates Reported in Huang et al. (2004)

“Shrinkage” estimates were calculated from the location-specific estimates reported in Table 1 of Huang et al. (2004), using the method described in DuMouchel (1994). Both Huang et al. (2004) and DuMouchel (1994) consider a Bayesian hierarchical model. Although they use different notation, the models are the same. The notation comparison is given in Table B-13 below.

Given a posterior distribution for  $\tau$ ,  $\pi(\tau | y)$ , a shrinkage estimate for the  $i$ th location is calculated as:

$$\theta_i^* \equiv E[\theta_i | y] = \int \theta_i^*(\tau) \pi(\tau | y) d\tau$$

where  $\theta_i^*(\tau) \equiv E[\theta_i | y, \tau] = \mu^*(\tau) + [y_i - \mu^*(\tau)] \tau^2 / (\tau^2 + s_i^2)$ ,

where  $\mu^*(\tau) \equiv E[\mu | y, \tau] = \sum_i w_i(\tau) y_i$ ,

where  $w_i(\tau) = (\tau^2 + s_i^2)^{-1} / \sum_j (\tau^2 + s_j^2)^{-1}$ .

A shrinkage estimate for the  $i$ th location is thus defined to be the expected value of the  $i$ th location-specific parameter, given all the location-specific estimates (see Table 1 for notation explanations). The posterior variance of the true  $i$ th location-specific parameter, given all the location-specific estimates, is given by:

$$\theta_i^{**} \equiv V[\theta_i | y] = \int \{V[\theta_i | y, \tau] + [\theta_i^*(\tau) - \theta_i^*]^2\} \pi(\tau | y) d\tau,$$

where  $V[\theta_i | y, \tau] = [s_i^2 / (\tau^2 + s_i^2)]^2 / \sum_j (\tau^2 + s_j^2)^{-1} + \tau^2 s_i^2 / (\tau^2 + s_i^2)$ .

A 95 percent credible interval around the  $i$ th shrinkage estimate was calculated as

$$\theta_i^* \pm 1.96 * (\sqrt{\theta_i^{**}}).$$

**Table B-13. Notation**

	Huang et al. (2004)	DuMouchel (1994)
Location indicator	c	i
parameter being estimated for location c (or i)	$\theta^c$	$\theta_i$
Estimate of parameter for location c (or i)*	$\hat{\theta}^c$	$y_i$
variance in the overall distribution of true $\theta$ s.	$\tau^2$	$\tau^2$
variance of the estimate of $\theta^c$ or $(\theta_i)**$	$v^c$	$s_i^2$
The mean of the overall distribution of true $\theta$ s	$\mu$	$\mu$
The model:	$\hat{\theta}^c \sim N(\theta^c, v^c) \quad (1)$ $\theta^c \sim N(\mu, \tau^2) \quad (2)$ $(1) \& (2) \Rightarrow \hat{\theta}^c \sim N(\mu, v^c + \tau^2)$	$y_i = \mu + \delta_i + \varepsilon_i \quad (1)$ $\theta_i = \mu + \delta_i \quad (2)$ $\delta_i \sim N(0, \tau^2) \quad (3)$ $\varepsilon_i \sim N(0, s_i^2) \quad (4)$ $(2) \text{ and } (3) \Rightarrow \theta_i \sim N(\mu, \tau^2)$ $(1), (2), (3) \& (4) \Rightarrow y_i \sim N(\mu, \tau^2 + s_i^2)$

\*Given in Table 1 of Huang et al. (2004)

\*\*Estimated by taking the square of the location-specific standard error, reported in Huang et al. (2004) for each location.

**Appendix C: Estimated Health Risks Associated with “As Is” O<sub>3</sub> Concentrations: April  
– September**

## C.1 Figures

**Figure C-1. Estimated Annual Cases of Non-Accidental Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background: Single-Pollutant, Single-City Models (April – September)**

Figure C-1a. Based on 2004 Air Quality

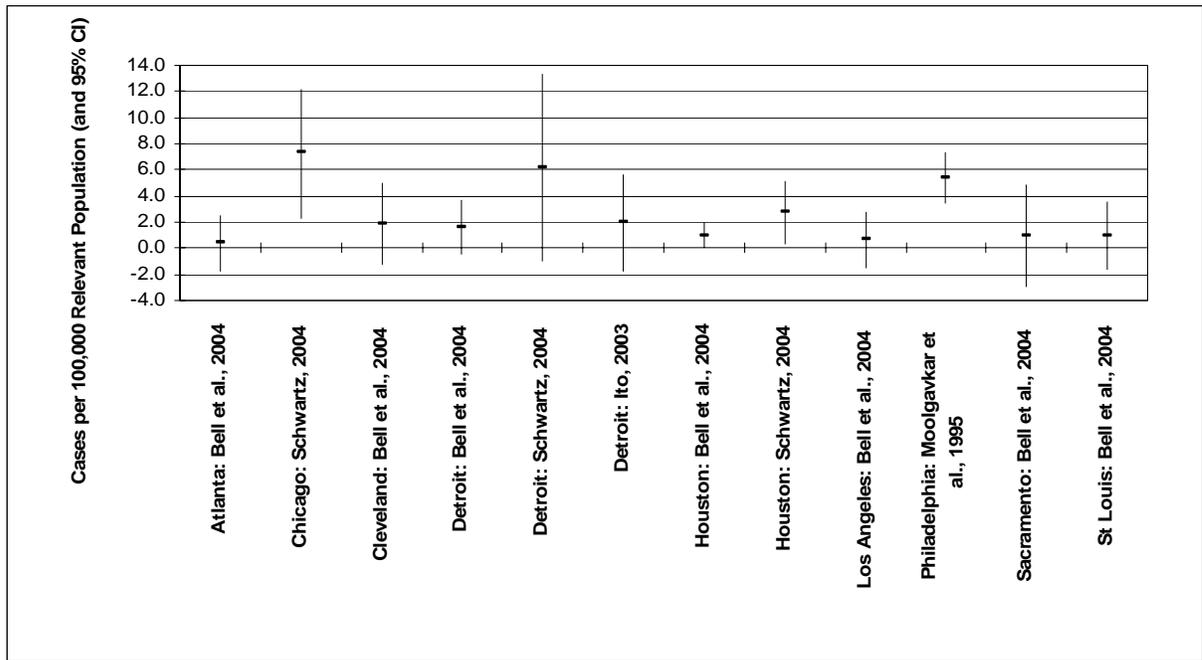
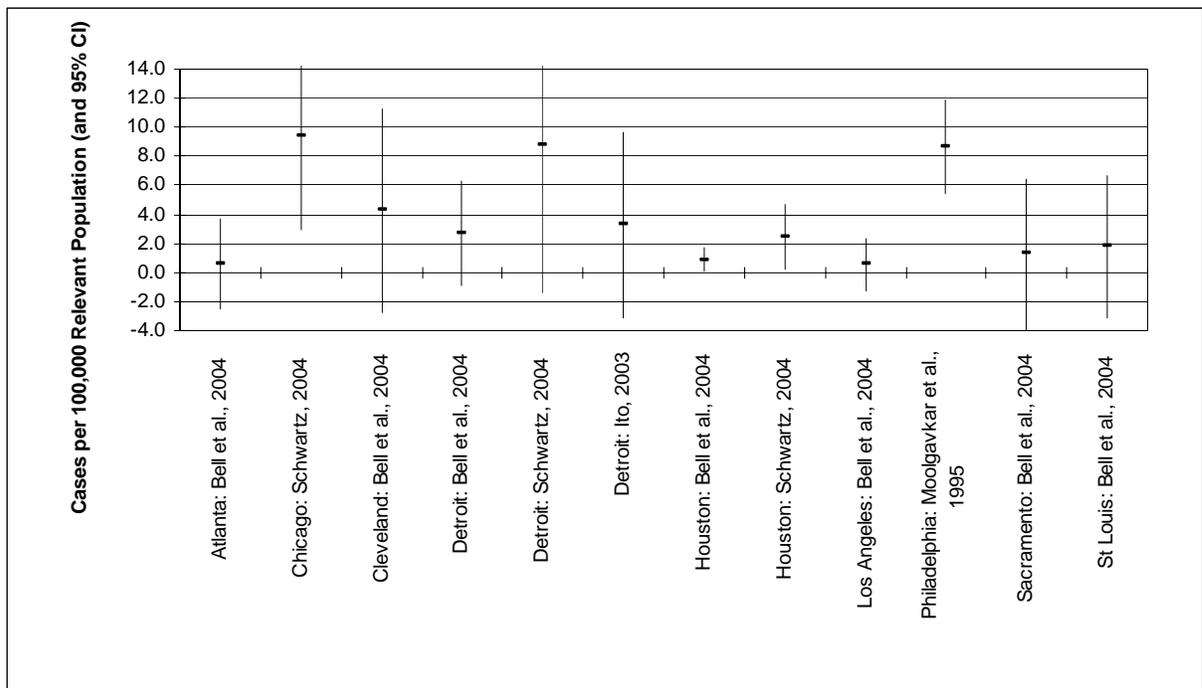
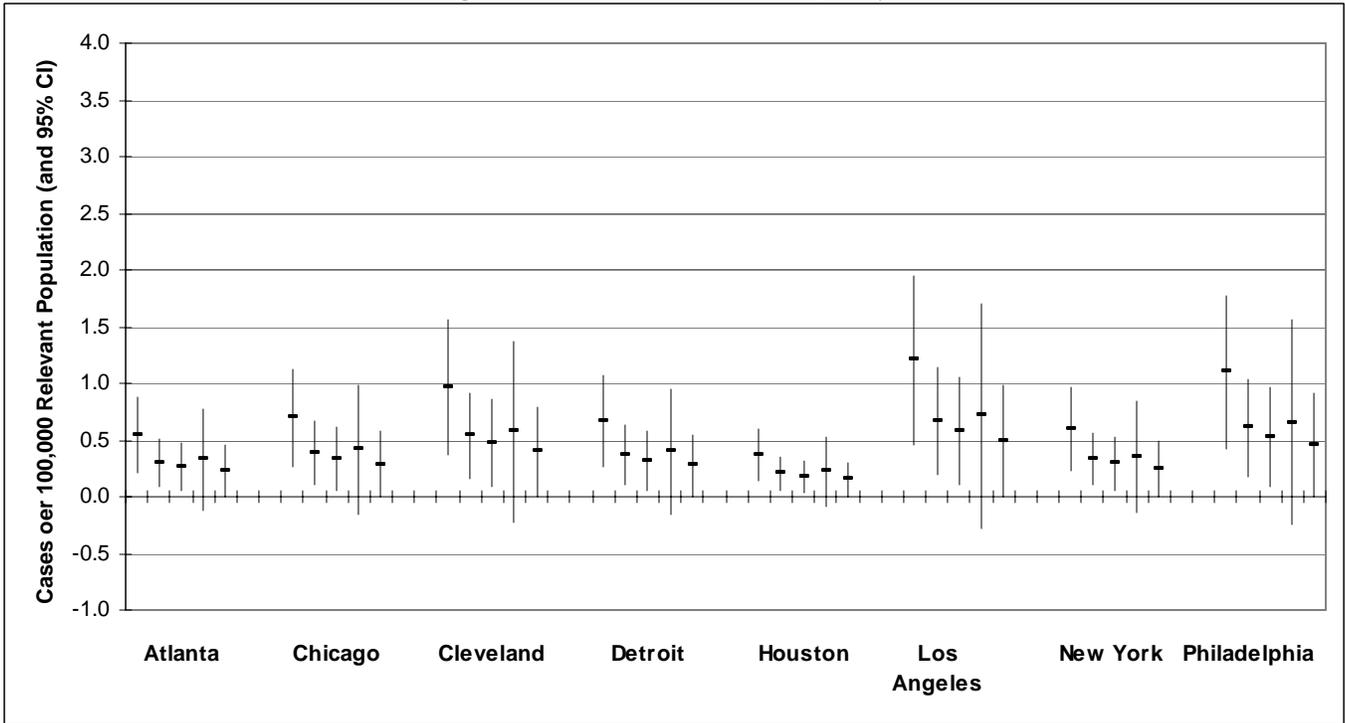


Figure C-1b. Based on 2002 Air Quality

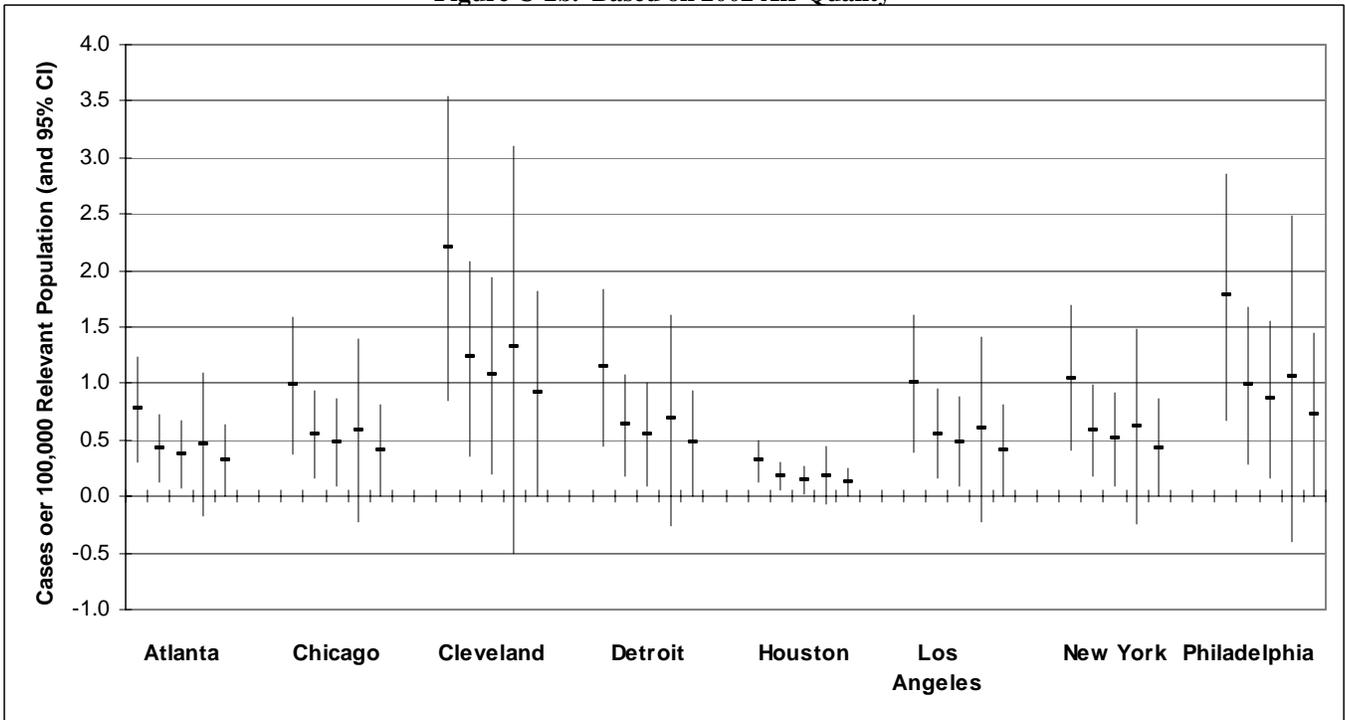


**Figure C-2. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background (April – September): Single-Pollutant vs. Multi-Pollutant Models [Huang et al. (2004), additional pollutants, from left to right: none, CO, NO<sub>2</sub>, PM<sub>10</sub>, SO<sub>2</sub>]**

**Figure C-2a. Based on 2004 Air Quality**

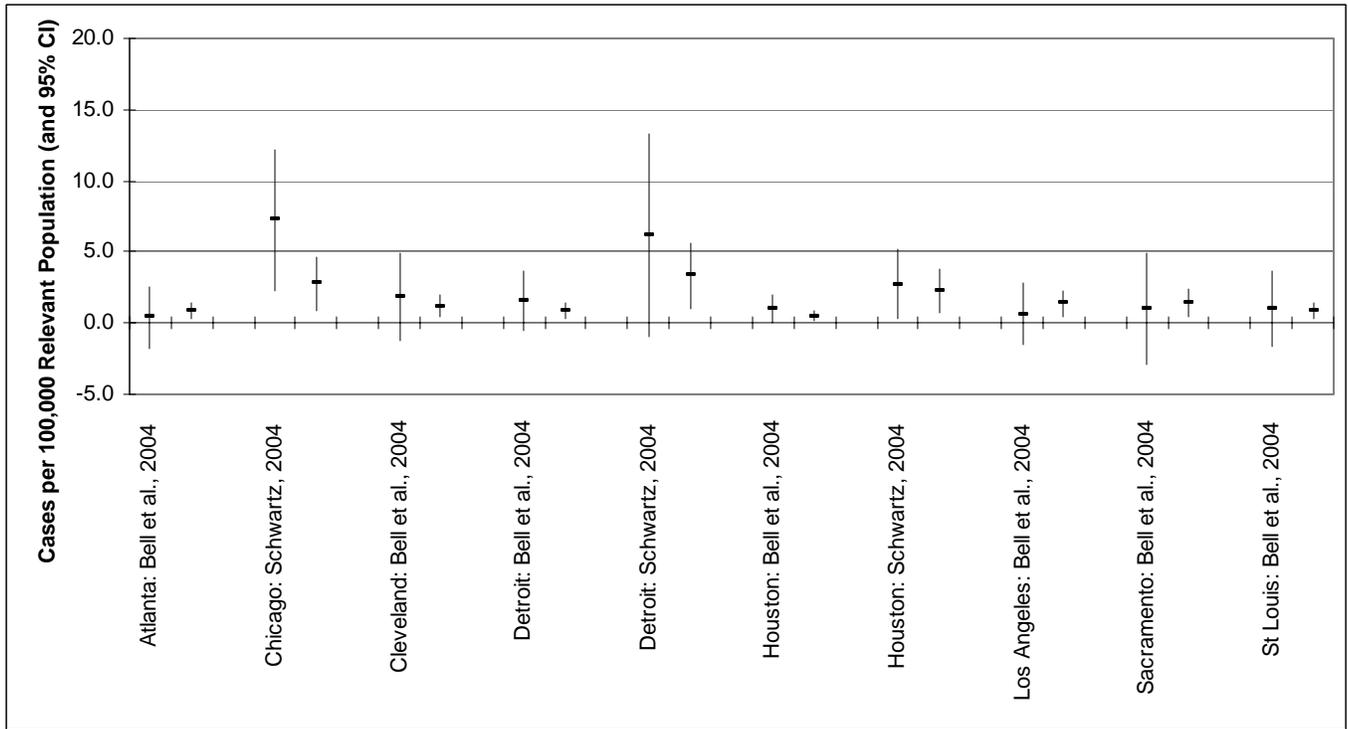


**Figure C-2b. Based on 2002 Air Quality**

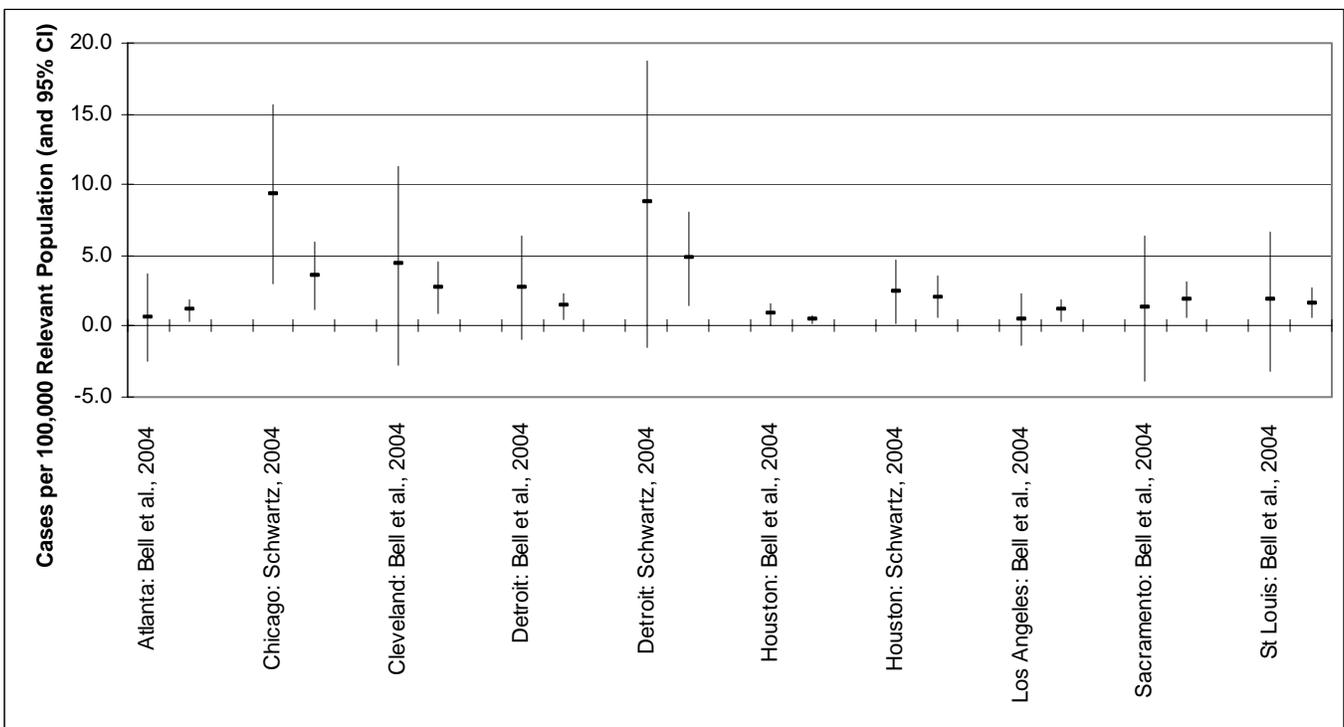


**Figure C-3. Estimated Annual Cases of (Non-Accidental) Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar)**

**Figure C-3a. Based on 2004 Air Quality**

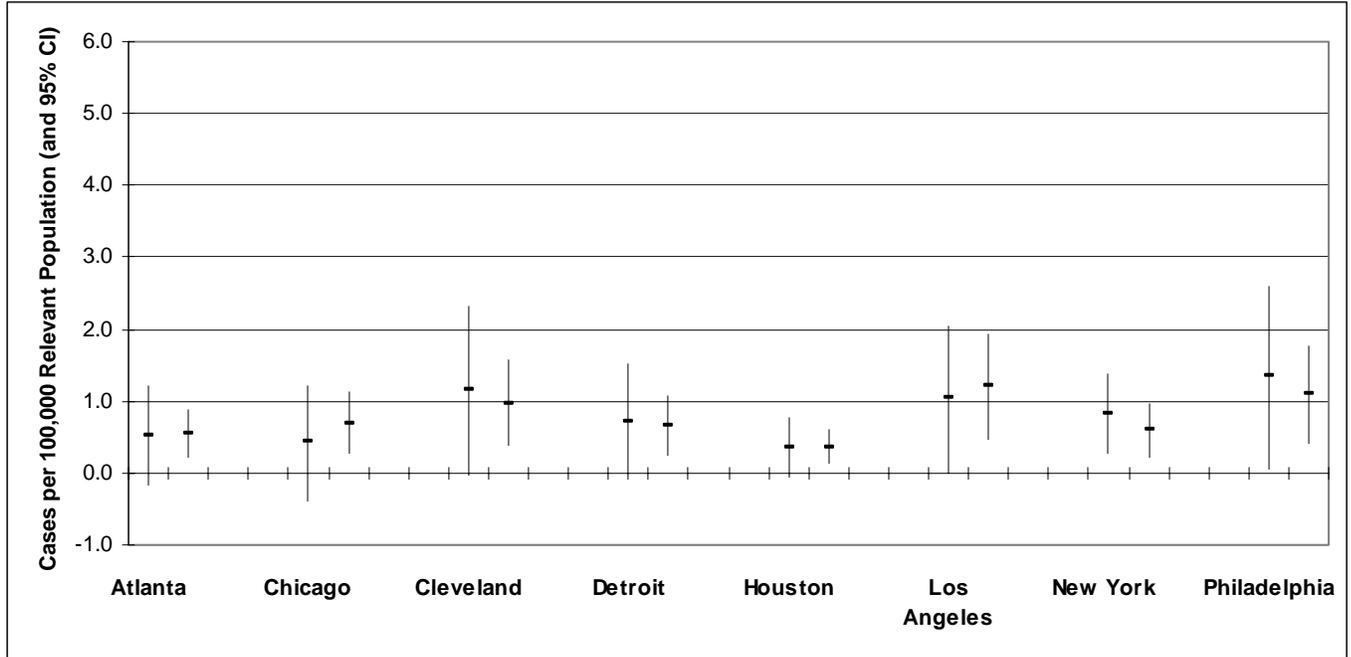


**Figure C-3b. Based on 2002 Air Quality**

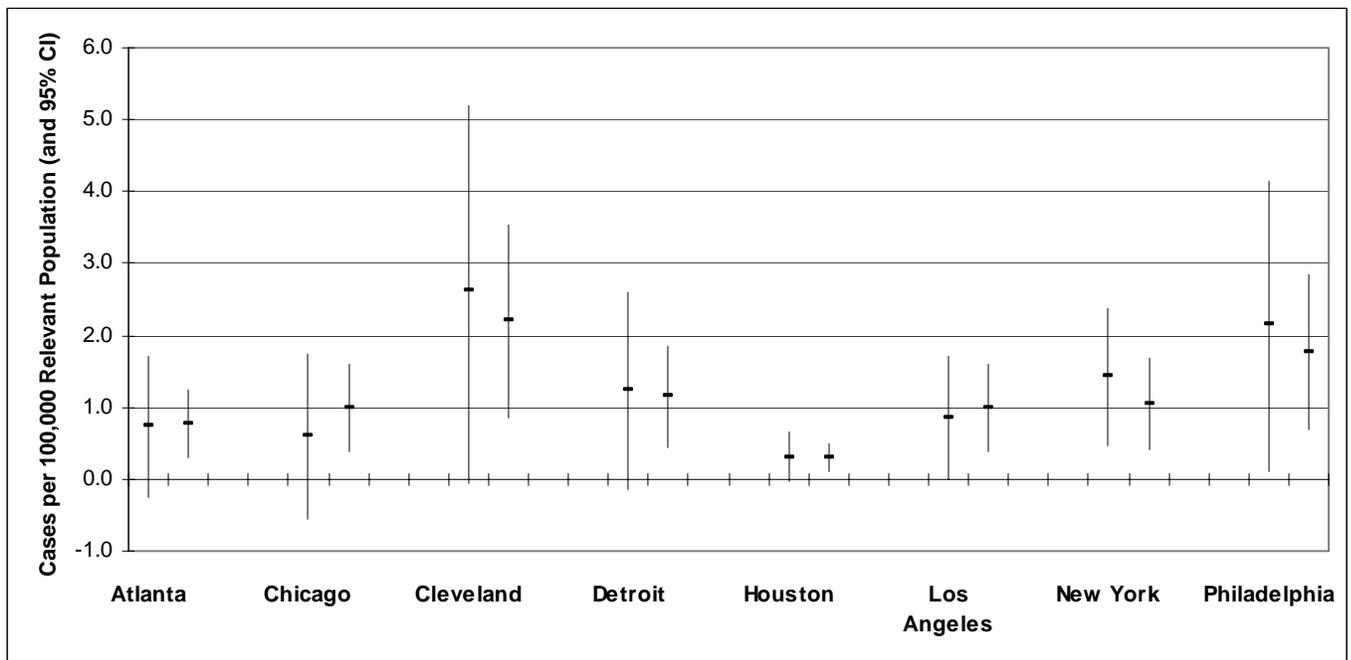


**Figure C-4. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar) – Based on Huang et al. (2004)**

**Figure C-4a. Based on 2004 Air Quality**

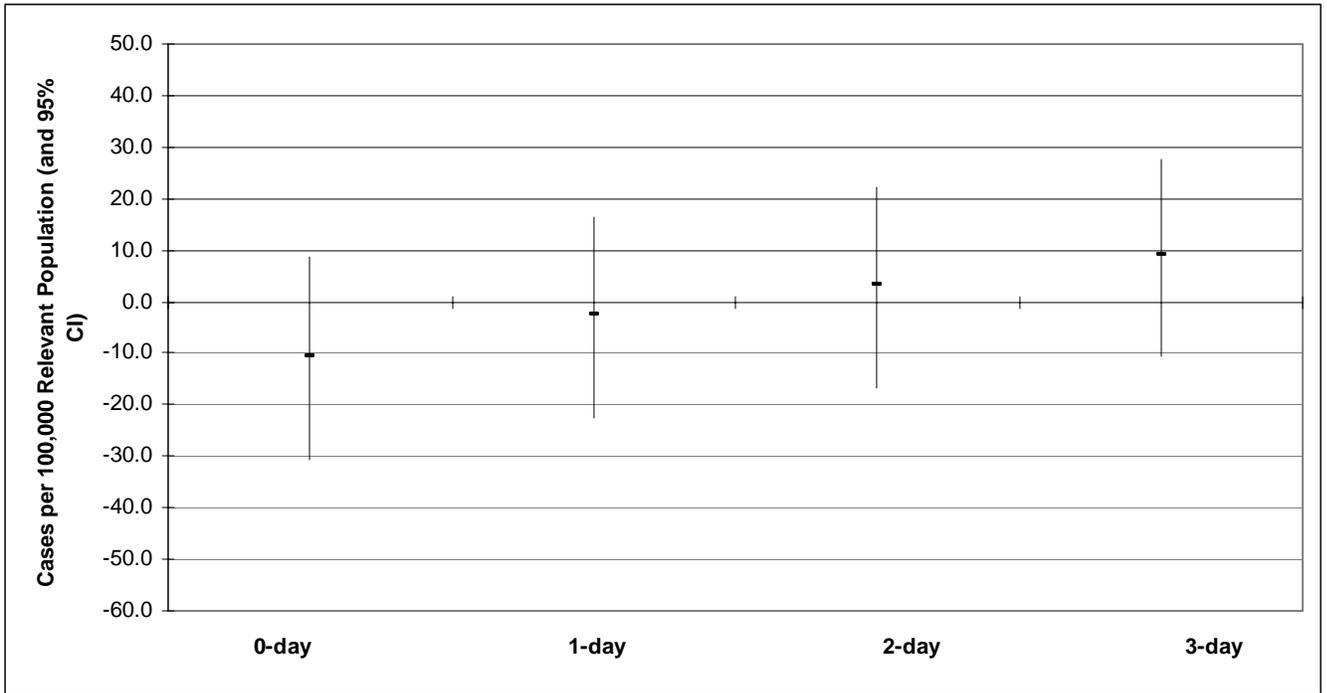


**Figure C-4b. Based on 2002 Air Quality**

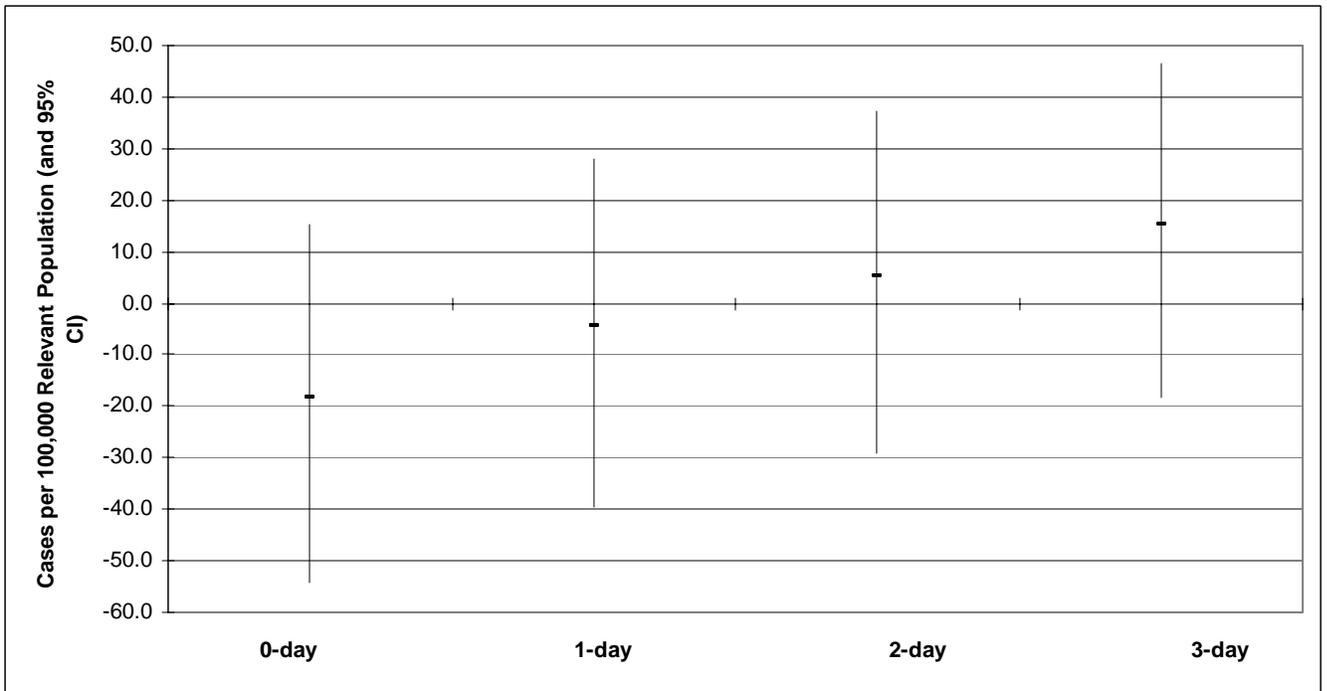


**Figure C-5. Estimated Annual Cases of (Unscheduled) Hospital Admissions for Pneumonia in Detroit per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background (April – September): Different Lag Models – Based on Ito (2003) [bars from left to right are 0-day, 1-day, 2-day, and 3-day lag models]**

**Figure C-5a. Based on 2004 Air Quality**



**Figure C-5b. Based on 2002 Air Quality**



## C.2 Tables

**Table C-1. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Atlanta, GA, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-26 - 38)	0.4 (-1.8 - 2.6)	0.1% (-0.6% - 0.8%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 20)	0.8 (0.3 - 1.4)	0.3% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	8 (-3 - 18)	0.5 (-0.2 - 1.2)	0.8% (-0.3% - 1.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	8 (3 - 13)	0.5 (0.2 - 0.9)	0.8% (0.3% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	4 (1 - 8)	0.3 (0.1 - 0.5)	0.5% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	4 (1 - 7)	0.3 (0 - 0.5)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	5 (-2 - 11)	0.3 (-0.1 - 0.8)	0.5% (-0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	3 (0 - 7)	0.2 (0 - 0.4)	0.3% (0% - 0.7%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-2. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Atlanta, GA, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	9 (-37 - 54)	0.6 (-2.5 - 3.6)	0.2% (-0.8% - 1.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 29)	1.2 (0.4 - 1.9)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	11 (-4 - 25)	0.7 (-0.2 - 1.7)	1.1% (-0.4% - 2.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	11 (4 - 18)	0.8 (0.3 - 1.2)	1.2% (0.5% - 1.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	6 (2 - 11)	0.4 (0.1 - 0.7)	0.7% (0.2% - 1.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	6 (1 - 10)	0.4 (0.1 - 0.7)	0.6% (0.1% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	7 (-3 - 16)	0.5 (-0.2 - 1.1)	0.7% (-0.3% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	5 (0 - 9)	0.3 (0 - 0.6)	0.5% (0% - 1%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-3. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Boston, MA, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	7 (2 - 12)	1.0 (0.3 - 1.7)	0.3% (0.1% - 0.5%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	5300 (800 - 9200)	20700 (3300 - 36300)	9.4% (1.5% - 16.5%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	8400 (3800 - 12400)	33100 (14900 - 49100)	15.1% (6.8% - 22.3%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	7700 (3000 - 11800)	30400 (11800 - 46800)	13.8% (5.4% - 21.3%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	5400 (1700 - 8700)	21400 (6900 - 34500)	9.7% (3.1% - 15.7%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	5700 (700 - 10200)	22500 (2700 - 40200)	8.2% (1% - 14.7%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	6300 (1200 - 10800)	24700 (4800 - 42500)	9% (1.8% - 15.5%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	15400 (5500 - 24200)	60800 (21800 - 95600)	11.9% (4.3% - 18.7%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100. All percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-4. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Boston, MA, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	10 (3 - 17)	1.5 (0.5 - 2.5)	0.4% (0.1% - 0.7%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	6900 (1100 - 11800)	27200 (4500 - 46600)	12.4% (2% - 21.2%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	10800 (5000 - 15700)	42700 (19700 - 62100)	19.5% (9% - 28.3%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	10000 (4000 - 15000)	39400 (15700 - 59400)	17.9% (7.1% - 27%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	7200 (2400 - 11400)	28400 (9300 - 44900)	12.9% (4.2% - 20.5%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	7500 (900 - 13200)	29500 (3700 - 52000)	10.8% (1.3% - 19%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	8300 (1700 - 14000)	32800 (6600 - 55300)	11.9% (2.4% - 20.2%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	20100 (7400 - 31000)	79200 (29000 - 122300)	15.5% (5.7% - 23.9%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100. All percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-5. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Chicago, IL, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	49 (16 - 81)	0.9 (0.3 - 1.5)	0.2% (0.1% - 0.4%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	394 (125 - 658)	7.3 (2.3 - 12.2)	1.9% (0.6% - 3.1%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	148 (46 - 250)	2.8 (0.9 - 4.6)	0.7% (0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	23 (-21 - 66)	0.4 (-0.4 - 1.2)	0.4% (-0.4% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	38 (14 - 61)	0.7 (0.3 - 1.1)	0.7% (0.3% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	21 (6 - 36)	0.4 (0.1 - 0.7)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	18 (3 - 33)	0.3 (0.1 - 0.6)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	22 (-9 - 53)	0.4 (-0.2 - 1)	0.4% (-0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	15 (0 - 31)	0.3 (0 - 0.6)	0.3% (0% - 0.6%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.  
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-6. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Chicago, IL, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	69 (23 - 115)	1.3 (0.4 - 2.1)	0.3% (0.1% - 0.5%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	505 (161 - 840)	9.4 (3 - 15.6)	2.4% (0.8% - 4%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	191 (60 - 321)	3.6 (1.1 - 6)	0.9% (0.3% - 1.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	32 (-29 - 93)	0.6 (-0.5 - 1.7)	0.6% (-0.6% - 1.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	53 (20 - 86)	1.0 (0.4 - 1.6)	1% (0.4% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	30 (9 - 50)	0.6 (0.2 - 0.9)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	26 (5 - 47)	0.5 (0.1 - 0.9)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	32 (-12 - 75)	0.6 (-0.2 - 1.4)	0.6% (-0.2% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	22 (0 - 44)	0.4 (0 - 0.8)	0.4% (0% - 0.9%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-7. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Cleveland, OH, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	27 (-17 - 69)	1.9 (-1.2 - 5)	0.4% (-0.2% - 0.9%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	1.2 (0.4 - 2)	0.2% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	16 (0 - 32)	1.2 (0 - 2.3)	0.9% (0% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 22)	1.0 (0.4 - 1.6)	0.7% (0.3% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	8 (2 - 13)	0.5 (0.2 - 0.9)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	7 (1 - 12)	0.5 (0.1 - 0.9)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	8 (-3 - 19)	0.6 (-0.2 - 1.4)	0.4% (-0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	6 (0 - 11)	0.4 (0 - 0.8)	0.3% (0% - 0.6%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	59 (15 - 102)	27.0 (6.9 - 46.8)	1.5% (0.4% - 2.6%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-8. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Cleveland, OH, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	61 (-38 - 157)	4.3 (-2.7 - 11.3)	0.8% (-0.5% - 2.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	38 (13 - 64)	2.8 (0.9 - 4.6)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	36 (-1 - 72)	2.6 (-0.1 - 5.2)	2% (0% - 3.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	31 (12 - 49)	2.2 (0.8 - 3.5)	1.6% (0.6% - 2.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	17 (5 - 29)	1.2 (0.4 - 2.1)	0.9% (0.3% - 1.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	15 (3 - 27)	1.1 (0.2 - 1.9)	0.8% (0.1% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	18 (-7 - 43)	1.3 (-0.5 - 3.1)	1% (-0.4% - 2.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	13 (0 - 25)	0.9 (0 - 1.8)	0.7% (0% - 1.3%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	106 (27 - 182)	48.9 (12.6 - 84.1)	2.7% (0.7% - 4.6%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-9. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Detroit, MI, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	33 (-11 - 76)	1.6 (-0.5 - 3.7)	0.4% (-0.1% - 0.8%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	0.8 (0.3 - 1.4)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	128 (-21 - 274)	6.2 (-1 - 13.3)	1.4% (-0.2% - 2.9%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	70 (22 - 117)	3.4 (1.1 - 5.7)	0.7% (0.2% - 1.2%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	40 (-37 - 116)	2.0 (-1.8 - 5.6)	0.4% (-0.4% - 1.2%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	15 (-2 - 31)	0.7 (-0.1 - 1.5)	0.6% (-0.1% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 22)	0.7 (0.3 - 1.1)	0.6% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	8 (2 - 13)	0.4 (0.1 - 0.6)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	7 (1 - 12)	0.3 (0.1 - 0.6)	0.3% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	8 (-3 - 19)	0.4 (-0.2 - 0.9)	0.3% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	6 (0 - 11)	0.3 (0 - 0.5)	0.2% (0% - 0.5%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	13 (-10 - 34)	0.6 (-0.5 - 1.6)	1.6% (-1.3% - 4.3%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	0-day lag	24 hr avg.	none	-26 (-77 - 22)	-10.5 (-30.8 - 8.8)	-1% (-3% - 0.9%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	1-day lag	24 hr avg.	none	-6 (-56 - 41)	-2.6 (-22.6 - 16.5)	-0.2% (-2.2% - 1.6%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	2-day lag	24 hr avg.	none	8 (-42 - 55)	3.1 (-16.7 - 22.1)	0.3% (-1.6% - 2.1%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	3-day lag	24 hr avg.	none	22 (-26 - 68)	9.0 (-10.5 - 27.5)	0.9% (-1% - 2.7%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	0-day lag	24 hr avg.	none	-18 (-64 - 26)	-7.1 (-25.6 - 10.4)	-0.9% (-3.2% - 1.3%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	1-day lag	24 hr avg.	none	17 (-27 - 59)	6.8 (-11 - 23.7)	0.9% (-1.4% - 3%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	2-day lag	24 hr avg.	none	-3 (-48 - 41)	-1.0 (-19.5 - 16.5)	-0.1% (-2.4% - 2.1%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	3-day lag	24 hr avg.	none	1 (-45 - 44)	0.4 (-18 - 17.8)	0.1% (-2.3% - 2.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth. Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-10. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Detroit, MI, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	57 (-18 - 131)	2.8 (-0.9 - 6.3)	0.6% (-0.2% - 1.4%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	29 (10 - 48)	1.4 (0.5 - 2.3)	0.3% (0.1% - 0.5%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	181 (-30 - 385)	8.8 (-1.4 - 18.7)	1.9% (-0.3% - 4.1%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	99 (31 - 165)	4.8 (1.5 - 8)	1% (0.3% - 1.8%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	69 (-64 - 198)	3.4 (-3.1 - 9.6)	0.7% (-0.7% - 2.1%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	26 (-3 - 54)	1.2 (-0.1 - 2.6)	1.1% (-0.1% - 2.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	24 (9 - 38)	1.1 (0.4 - 1.8)	1% (0.4% - 1.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	13 (4 - 22)	0.6 (0.2 - 1.1)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	11 (2 - 21)	0.6 (0.1 - 1)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	14 (-5 - 33)	0.7 (-0.3 - 1.6)	0.6% (-0.2% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	10 (0 - 19)	0.5 (0 - 0.9)	0.4% (0% - 0.8%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	22 (-18 - 57)	1.0 (-0.9 - 2.7)	2.8% (-2.3% - 7.2%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	0-day lag	24 hr avg.	none	-45 (-135 - 37)	-18.3 (-54.3 - 15.1)	-1.8% (-5.2% - 1.5%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	1-day lag	24 hr avg.	none	-11 (-98 - 70)	-4.4 (-39.5 - 28.1)	-0.4% (-3.8% - 2.7%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	2-day lag	24 hr avg.	none	13 (-72 - 93)	5.4 (-29.1 - 37.4)	0.5% (-2.8% - 3.6%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	3-day lag	24 hr avg.	none	38 (-45 - 116)	15.3 (-18.2 - 46.5)	1.5% (-1.8% - 4.5%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	0-day lag	24 hr avg.	none	-31 (-112 - 44)	-12.3 (-45.1 - 17.7)	-1.5% (-5.6% - 2.2%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	1-day lag	24 hr avg.	none	29 (-48 - 99)	11.7 (-19.1 - 39.9)	1.5% (-2.4% - 5%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	2-day lag	24 hr avg.	none	-4 (-85 - 69)	-1.7 (-34.2 - 27.9)	-0.2% (-4.3% - 3.5%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	3-day lag	24 hr avg.	none	2 (-78 - 75)	0.7 (-31.5 - 30.2)	0.1% (-3.9% - 3.8%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth. Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-11. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Houston, TX, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	35 (2 - 67)	1.0 (0.1 - 2)	0.4% (0% - 0.7%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	0.5 (0.2 - 0.8)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	93 (9 - 176)	2.7 (0.3 - 5.2)	1% (0.1% - 1.9%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	78 (24 - 130)	2.3 (0.7 - 3.8)	0.9% (0.3% - 1.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	12 (-2 - 26)	0.4 (0 - 0.8)	0.6% (-0.1% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	13 (5 - 20)	0.4 (0.1 - 0.6)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	7 (2 - 12)	0.2 (0.1 - 0.3)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	6 (1 - 11)	0.2 (0 - 0.3)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	7 (-3 - 18)	0.2 (-0.1 - 0.5)	0.4% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	5 (0 - 10)	0.2 (0 - 0.3)	0.2% (0% - 0.5%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-12. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Houston, TX, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	29 (2 - 57)	0.9 (0.1 - 1.7)	0.3% (0% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 24)	0.4 (0.1 - 0.7)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	85 (8 - 161)	2.5 (0.2 - 4.7)	0.9% (0.1% - 1.8%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	71 (22 - 119)	2.1 (0.7 - 3.5)	0.8% (0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	10 (-1 - 22)	0.3 (0 - 0.6)	0.5% (-0.1% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	11 (4 - 17)	0.3 (0.1 - 0.5)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	6 (2 - 10)	0.2 (0.1 - 0.3)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	5 (1 - 9)	0.2 (0 - 0.3)	0.2% (0% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	6 (-2 - 15)	0.2 (-0.1 - 0.4)	0.3% (-0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	4 (0 - 9)	0.1 (0 - 0.3)	0.2% (0% - 0.4%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.  
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-13. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Los Angeles, CA, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)***	all	distributed lag	24 hr avg.	none	62 (-149 - 271)	0.6 (-1.6 - 2.8)	0.2% (-0.5% - 1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)***	all	distributed lag	24 hr avg.	none	133 (45 - 221)	1.4 (0.5 - 2.3)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. (2004)***	all	distributed lag	24 hr avg.	none	99 (1 - 195)	1.0 (0 - 2.1)	1.3% (0% - 2.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	distributed lag	24 hr avg.	none	115 (44 - 185)	1.2 (0.5 - 1.9)	1.6% (0.6% - 2.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	CO	64 (19 - 108)	0.7 (0.2 - 1.1)	0.9% (0.3% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	NO <sub>2</sub>	56 (10 - 101)	0.6 (0.1 - 1.1)	0.8% (0.1% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	PM <sub>10</sub>	68 (-26 - 161)	0.7 (-0.3 - 1.7)	0.9% (-0.4% - 2.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	SO <sub>2</sub>	47 (0 - 94)	0.5 (0 - 1)	0.6% (0% - 1.3%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	75 (-32 - 179)	0.9 (-0.4 - 2.1)	1.7% (-0.7% - 4.1%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	46 (-60 - 148)	0.5 (-0.7 - 1.8)	1.2% (-1.6% - 4%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-14. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Los Angeles, CA, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)***	all	distributed lag	24 hr avg.	none	51 (-124 - 224)	0.5 (-1.3 - 2.4)	0.2% (-0.5% - 0.8%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)***	all	distributed lag	24 hr avg.	none	110 (37 - 184)	1.2 (0.4 - 1.9)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. (2004)***	all	distributed lag	24 hr avg.	none	82 (1 - 162)	0.9 (0 - 1.7)	1.1% (0% - 2.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	distributed lag	24 hr avg.	none	95 (36 - 153)	1.0 (0.4 - 1.6)	1.3% (0.5% - 2.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	CO	53 (16 - 90)	0.6 (0.2 - 0.9)	0.7% (0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	NO <sub>2</sub>	46 (8 - 84)	0.5 (0.1 - 0.9)	0.6% (0.1% - 1.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	PM <sub>10</sub>	57 (-22 - 134)	0.6 (-0.2 - 1.4)	0.8% (-0.3% - 1.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	SO <sub>2</sub>	39 (0 - 78)	0.4 (0 - 0.8)	0.5% (0% - 1.1%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	68 (-29 - 162)	0.8 (-0.3 - 1.9)	1.6% (-0.7% - 3.7%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	44 (-58 - 143)	0.5 (-0.7 - 1.7)	1.2% (-1.6% - 3.9%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-15. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Philadelphia, PA, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	23 (8 - 38)	1.5 (0.5 - 2.5)	0.3% (0.1% - 0.5%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	82 (52 - 112)	5.4 (3.4 - 7.4)	1% (0.6% - 1.4%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO <sub>2</sub>	82 (39 - 124)	5.4 (2.6 - 8.2)	1% (0.5% - 1.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	20 (1 - 39)	1.3 (0.1 - 2.6)	1.1% (0.1% - 2.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 27)	1.1 (0.4 - 1.8)	0.9% (0.3% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	9 (3 - 16)	0.6 (0.2 - 1)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	8 (1 - 15)	0.5 (0.1 - 1)	0.4% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	10 (-4 - 24)	0.7 (-0.3 - 1.6)	0.5% (-0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	7 (0 - 14)	0.5 (0 - 0.9)	0.4% (0% - 0.7%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.  
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-16. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Philadelphia, PA, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	37 (12 - 62)	2.4 (0.8 - 4.1)	0.5% (0.2% - 0.8%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	132 (83 - 180)	8.7 (5.5 - 11.9)	1.6% (1% - 2.2%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO <sub>2</sub>	131 (63 - 198)	8.6 (4.1 - 13.1)	1.6% (0.8% - 2.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	33 (2 - 63)	2.2 (0.1 - 4.1)	1.8% (0.1% - 3.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	27 (10 - 43)	1.8 (0.7 - 2.8)	1.5% (0.6% - 2.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	15 (4 - 25)	1.0 (0.3 - 1.7)	0.8% (0.2% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	13 (2 - 24)	0.9 (0.2 - 1.6)	0.7% (0.1% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	16 (-6 - 38)	1.1 (-0.4 - 2.5)	0.9% (-0.3% - 2.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	11 (0 - 22)	0.7 (0 - 1.5)	0.6% (0% - 1.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.  
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-17. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Sacramento, CA, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	12 (-36 - 59)	1.0 (-3 - 4.8)	0.3% (-0.9% - 1.4%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	18 (6 - 29)	1.4 (0.5 - 2.4)	0.4% (0.1% - 0.7%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-18. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Sacramento, CA, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	16 (-48 - 78)	1.3 (-3.9 - 6.4)	0.4% (-1.1% - 1.9%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	23 (8 - 39)	1.9 (0.6 - 3.2)	0.6% (0.2% - 0.9%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-19. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: St. Louis, MO, April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	3 (-6 - 13)	1.0 (-1.7 - 3.6)	0.2% (-0.3% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	3 (1 - 5)	0.9 (0.3 - 1.5)	0.2% (0.1% - 0.3%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-20. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: St. Louis, MO, April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-11 - 23)	1.9 (-3.1 - 6.7)	0.3% (-0.5% - 1.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 10)	1.7 (0.6 - 2.8)	0.3% (0.1% - 0.5%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-21. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Washington, D.C., April - September, 2004**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	8 (3 - 14)	1.5 (0.5 - 2.4)	0.3% (0.1% - 0.5%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table C-22. Estimated Health Risks Associated with "As Is" O<sub>3</sub> Concentrations: Washington, D.C., April - September, 2002**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O <sub>3</sub> Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	15 (5 - 25)	2.6 (0.9 - 4.4)	0.6% (0.2% - 0.9%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

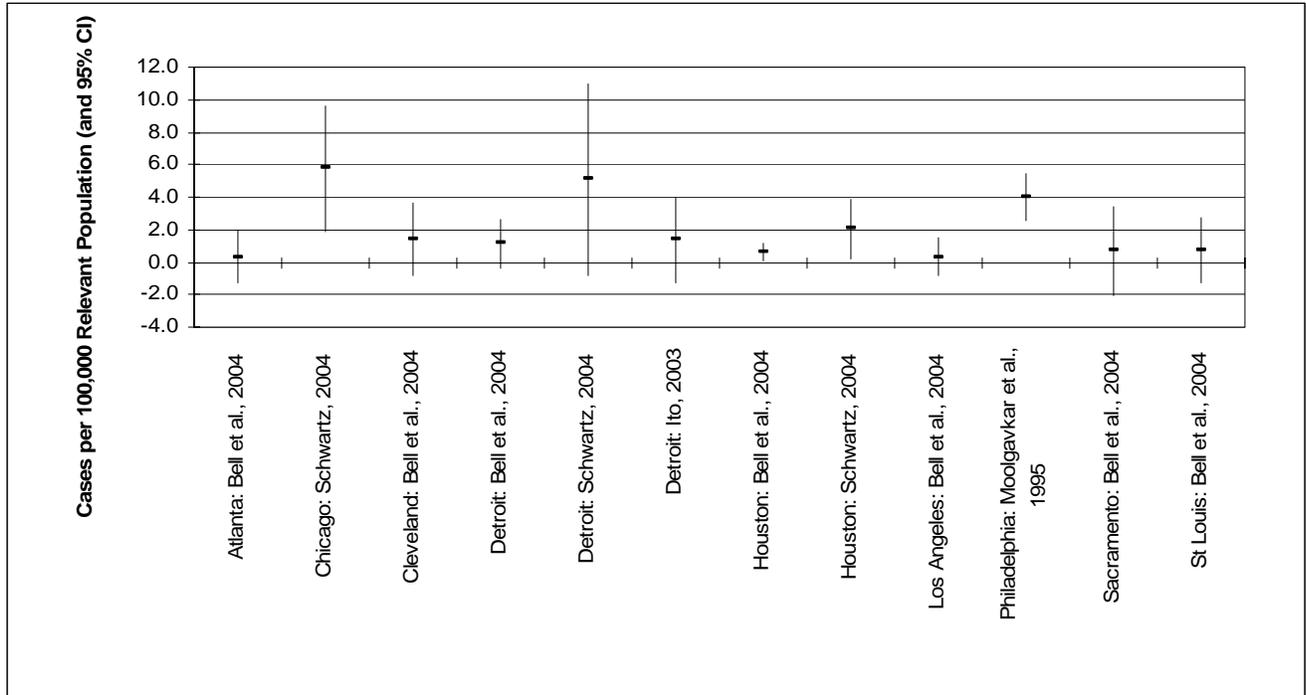
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Appendix D: Estimated Health Risks Associated with O<sub>3</sub> Concentrations That Just Meet the Current 8-Hour Daily Maximum Standard: April – September**

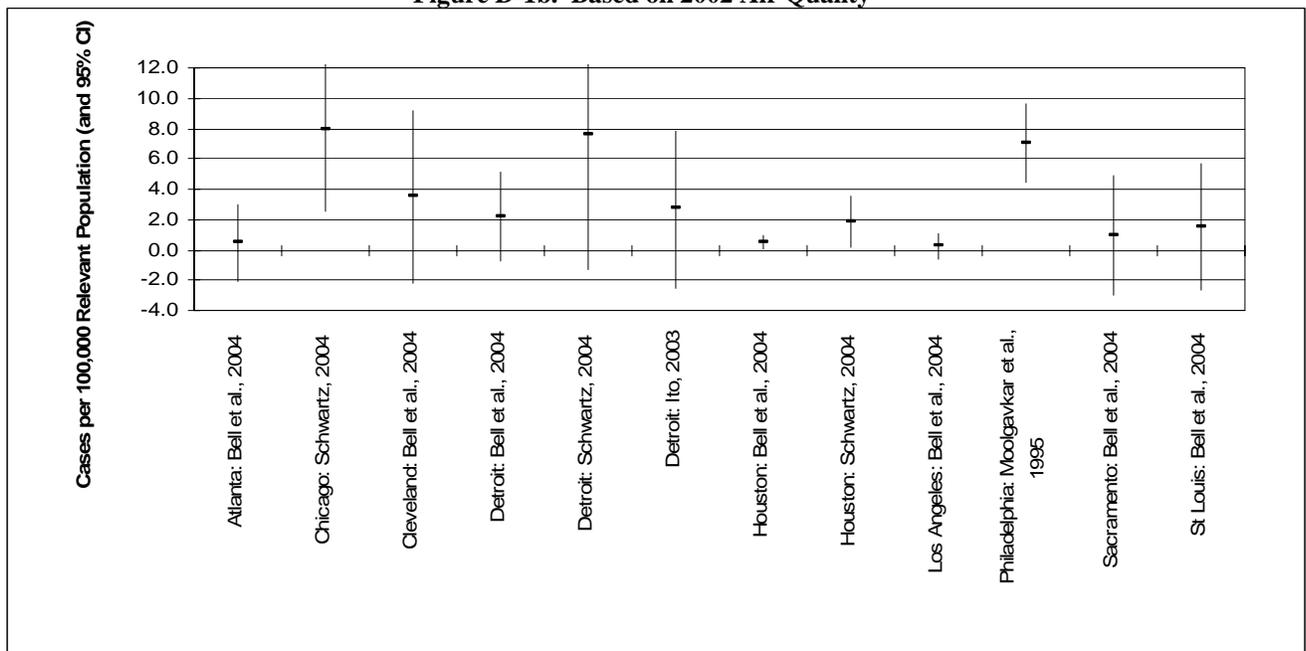
## D.1 Figures

**Figure D-1. Estimated Annual Cases of (Non-Accidental) Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background When the Current 8-Hour Standard is Just Met: Single-Pollutant, Single-City Models (April – September)**

**Figure D-1a. Based on 2004 Air Quality**

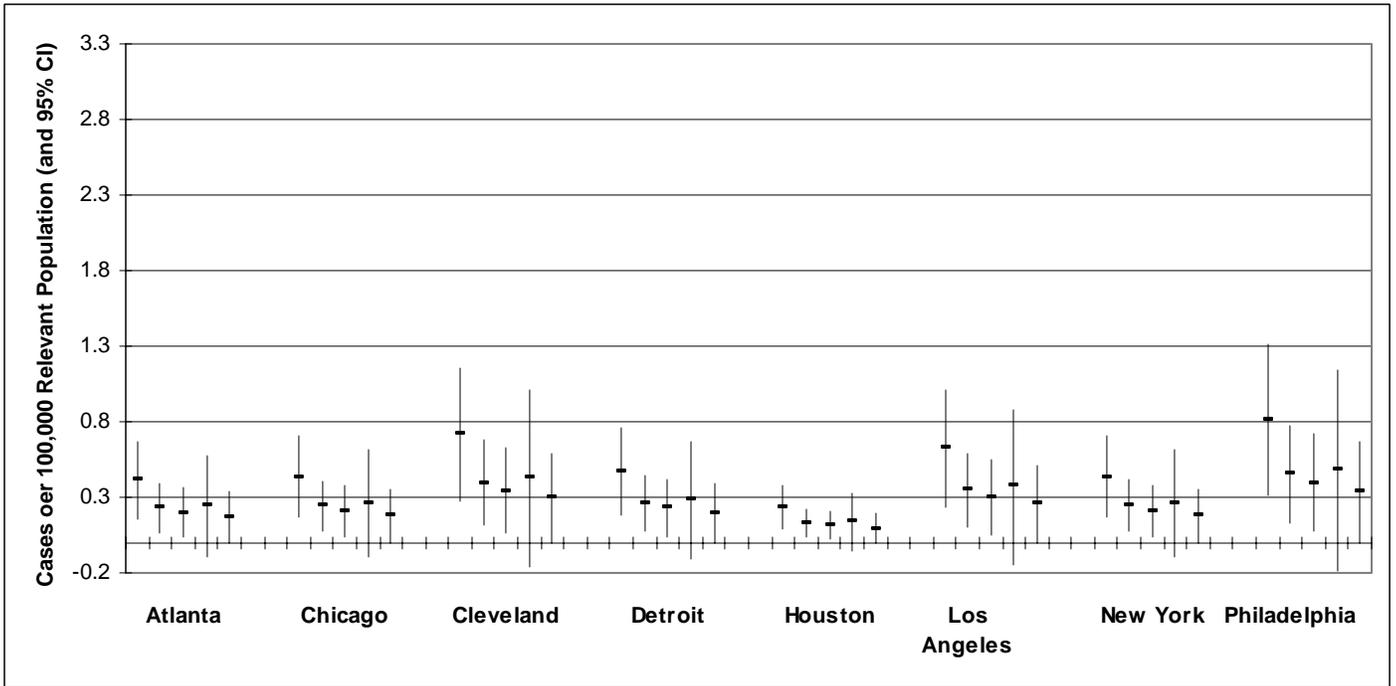


**Figure D-1b. Based on 2002 Air Quality**

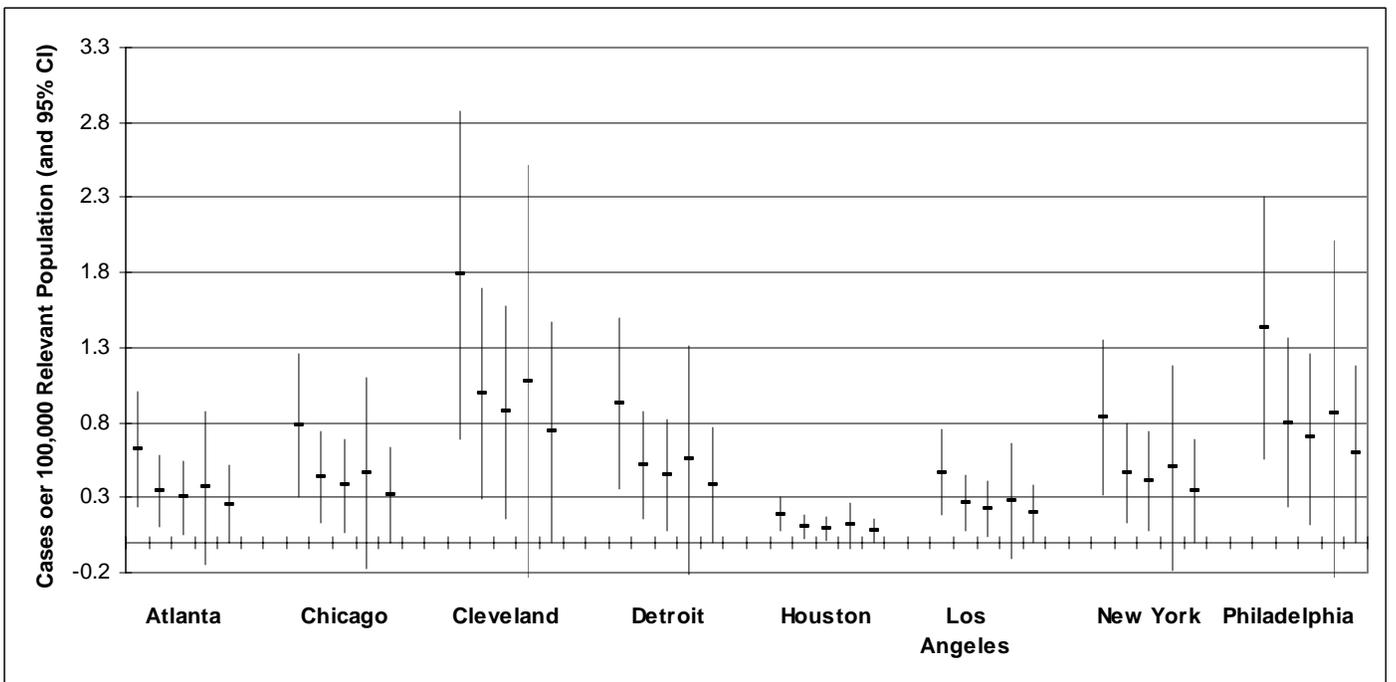


**Figure D-2. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-Pollutant vs. Multi-Pollutant Models [Huang et al. (2004), additional pollutants, from left to right: none, CO, NO<sub>2</sub>, PM<sub>10</sub>, SO<sub>2</sub>]**

**Figure D-2a. Based on 2004 Air Quality**

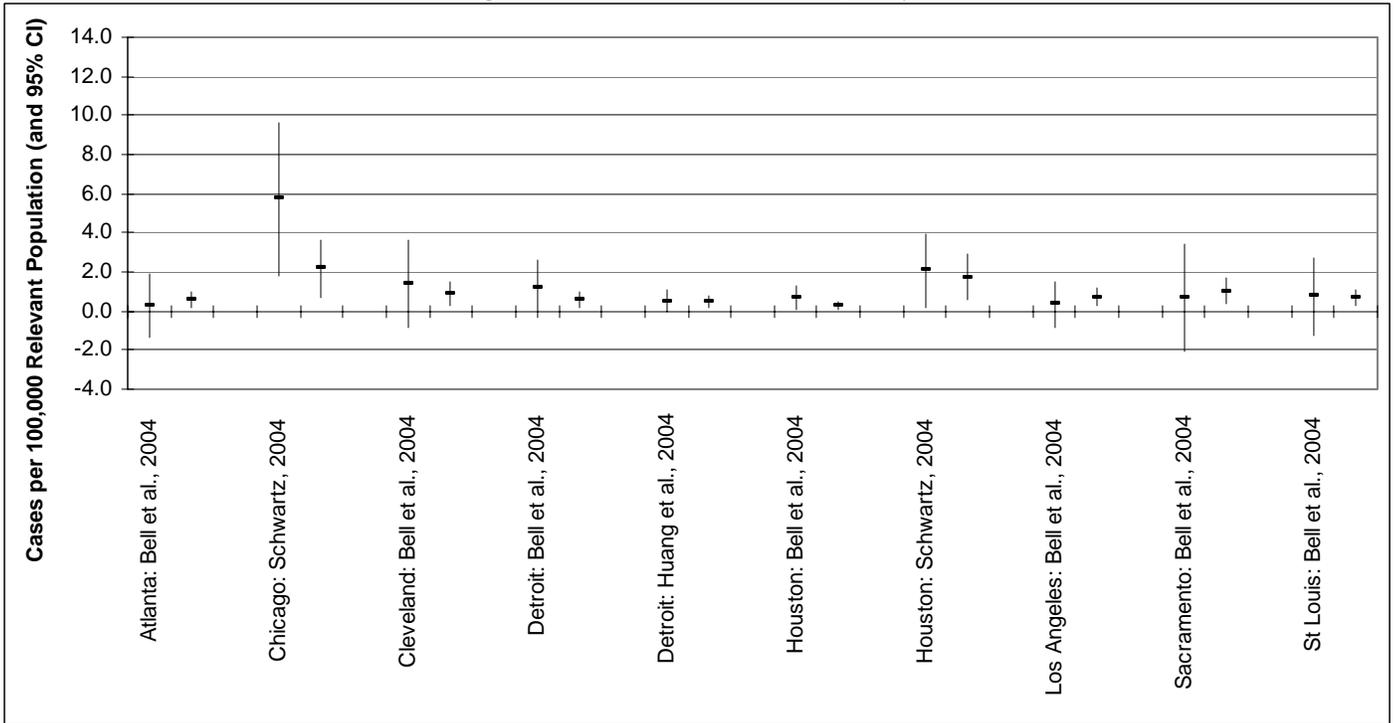


**Figure D-2b. Based on 2002 Air Quality**

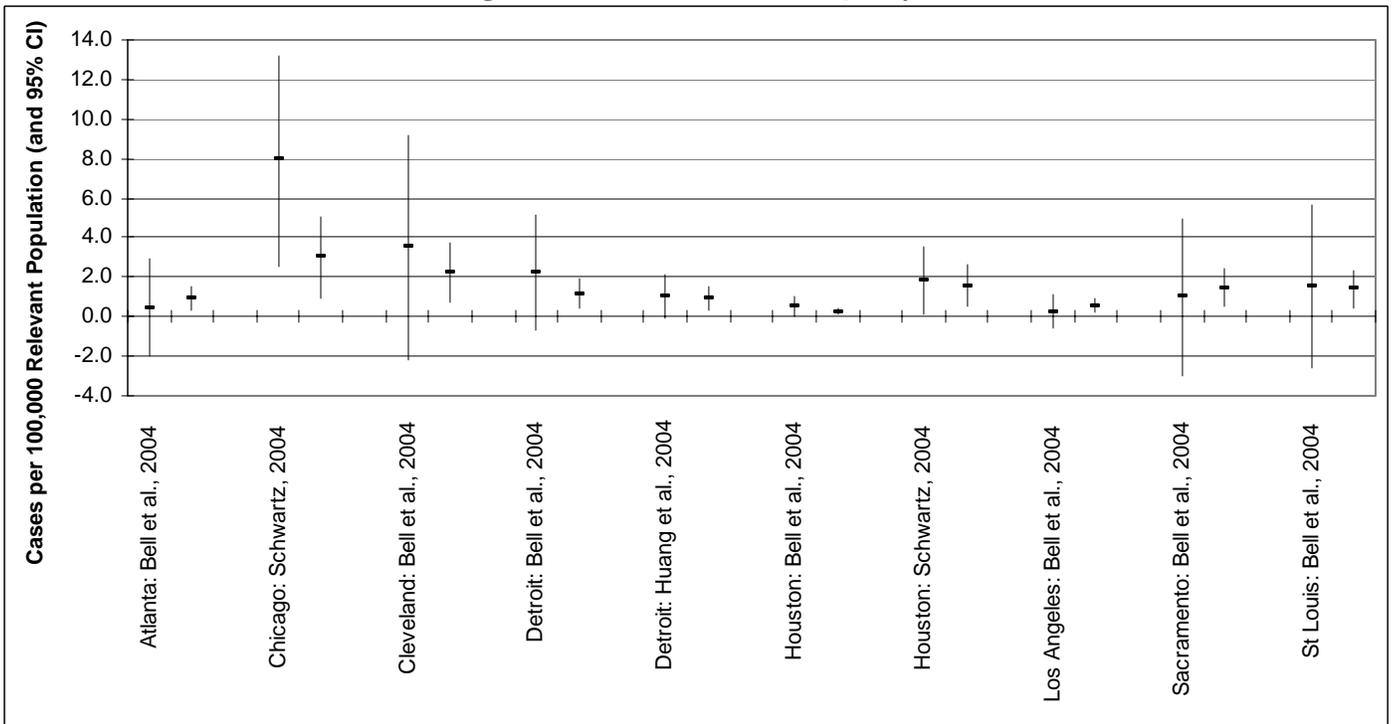


**Figure D-3. Estimated Annual Cases of (Non-Accidental) Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar)**

**Figure D-3a. Based on 2004 Air Quality**



**Figure D-3b. Based on 2002 Air Quality**



**Figure D-4. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar) – Based on Huang et al. (2004)**

Figure D-4a. Based on 2004 Air Quality

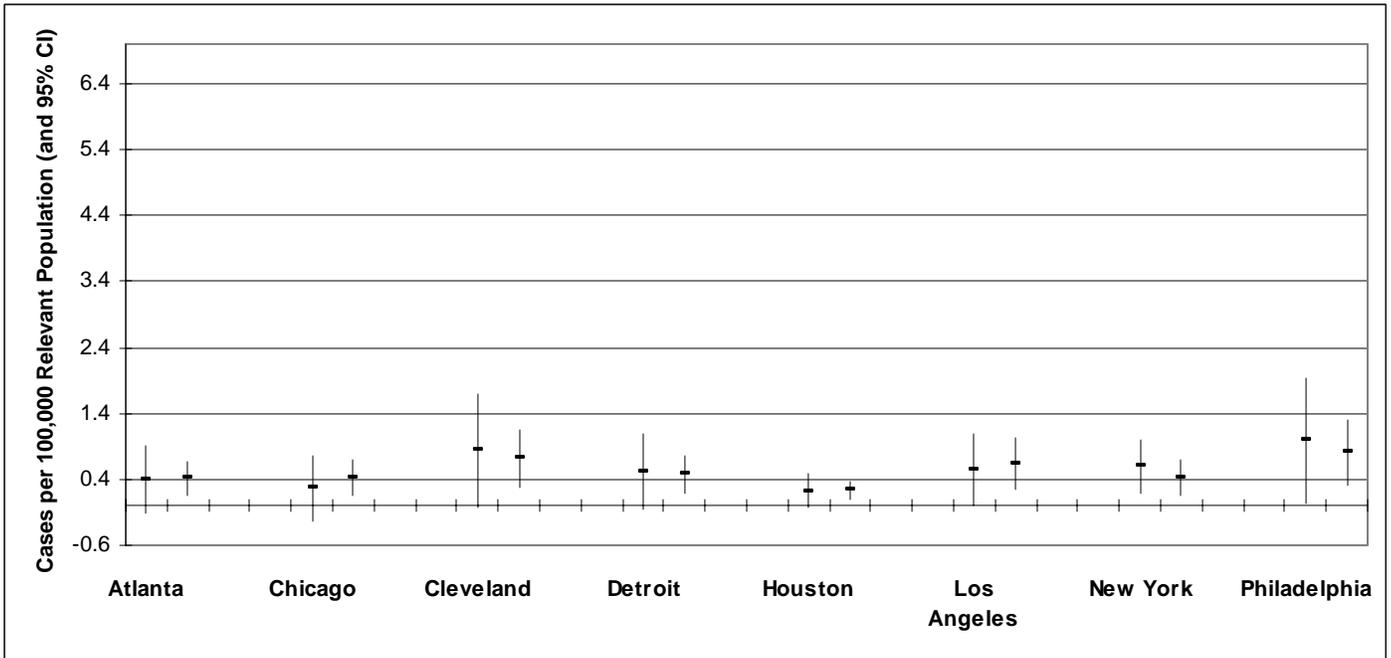
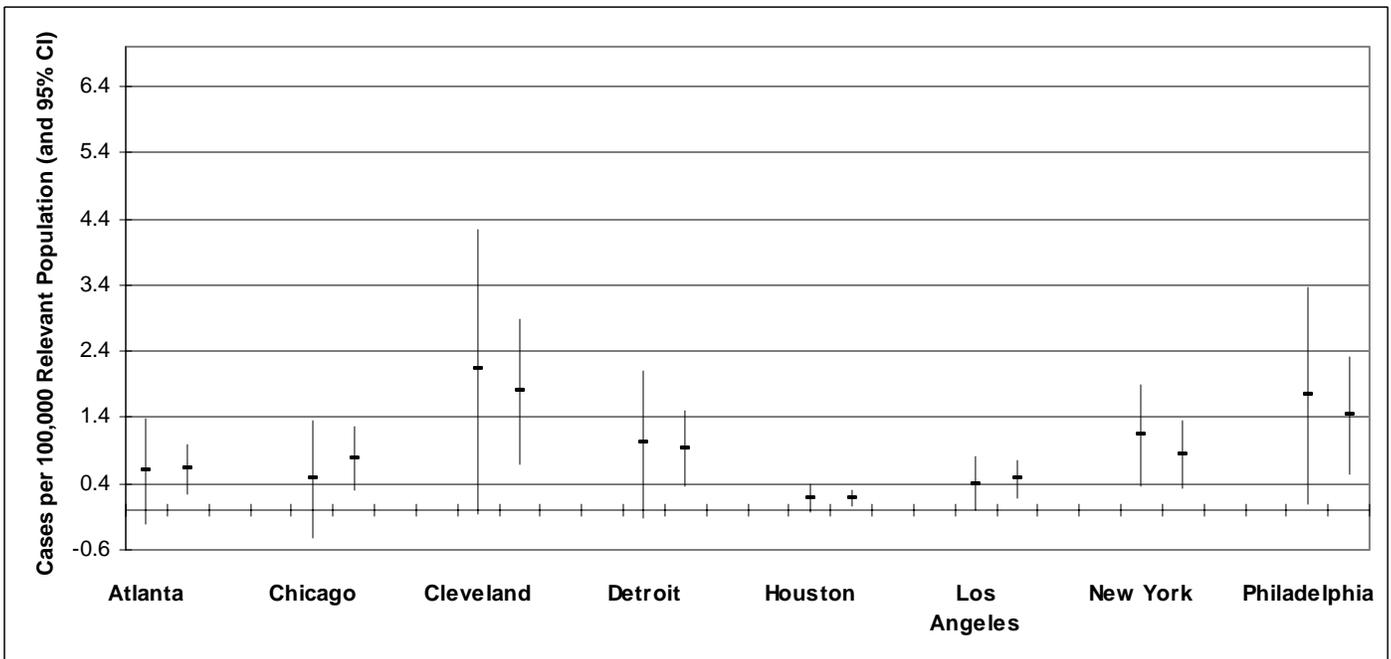
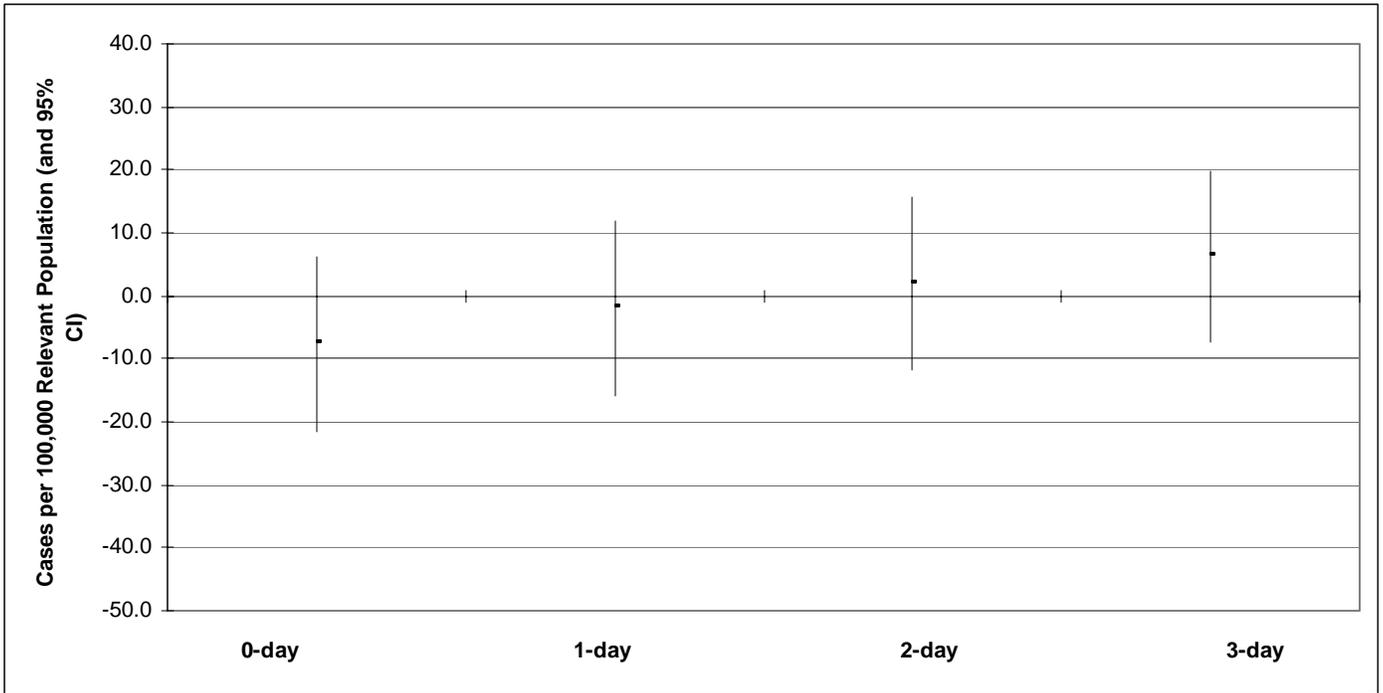


Figure D-4b. Based on 2002 Air Quality

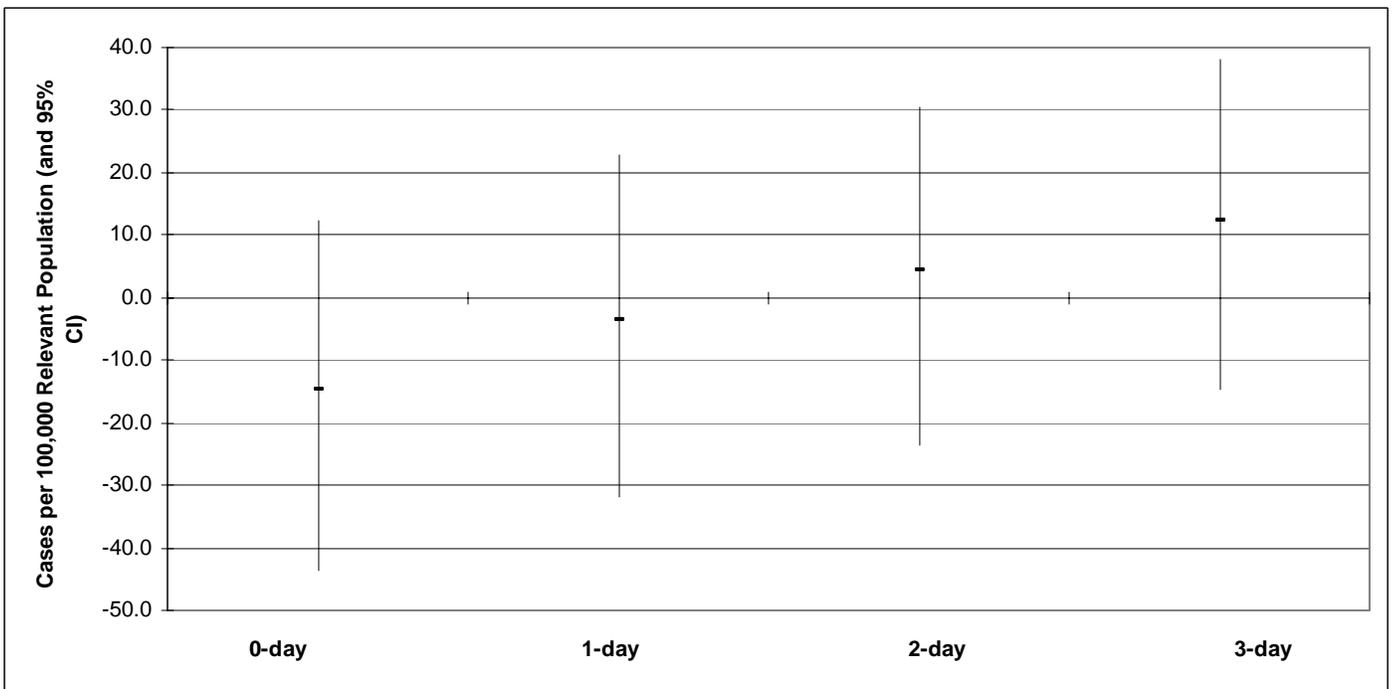


**Figure D-5. Estimated Annual Cases of (Unscheduled) Hospital Admissions for Pneumonia in Detroit per 100,000 Relevant Population Associated with Short-Term Exposure to O<sub>3</sub> Above Background When the Current 8-Hour Standard is Just Met (April – September): Different Lag Models – Based on Ito (2003) [bars from left to right are 0-day, 1-day, 2-day, and 3-day lag models]**

**Figure D-5a. Based on 2004 Air Quality**



**Figure D-5b. Based on 2002 Air Quality**



D.2 Tables

**Table D-1. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	5 (-20 - 29)	5 (-20 - 29)	4 (-18 - 26)	4 (-16 - 23)	4 (-15 - 22)	4 (-15 - 22)	3 (-13 - 19)	3 (-11 - 16)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (3 - 15)	9 (3 - 15)	8 (3 - 14)	7 (2 - 12)	7 (2 - 12)	7 (2 - 12)	6 (2 - 10)	5 (2 - 8)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	5 (-1 - 10)	4 (-1 - 10)	4 (-1 - 9)	3 (-1 - 7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 10)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	5 (2 - 8)	4 (2 - 7)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	3 (1 - 6)	3 (1 - 6)	3 (1 - 5)	3 (1 - 5)	3 (1 - 4)	3 (1 - 4)	2 (1 - 4)	2 (1 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	3 (1 - 5)	3 (1 - 5)	3 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	4 (-1 - 9)	4 (-1 - 9)	3 (-1 - 8)	3 (-1 - 7)	3 (-1 - 7)	3 (-1 - 7)	2 (-1 - 6)	2 (-1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	3 (0 - 5)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	1 (0 - 3)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-2. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3 (-1.3 - 1.9)	0.3 (-1.3 - 1.9)	0.3 (-1.2 - 1.8)	0.3 (-1.1 - 1.6)	0.2 (-1 - 1.5)	0.2 (-1 - 1.5)	0.2 (-0.9 - 1.3)	0.2 (-0.7 - 1.1)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (-0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*The incidence of health effects is based on the estimated policy response for the current standard and alternative standards per relevant population age group to the

nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-3. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.1% (-0.4% - 0.6%)	0.1% (-0.4% - 0.6%)	0.1% (-0.4% - 0.6%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.4%)	0.1% (-0.2% - 0.3%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-4. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	7 (-30 - 43)	7 (-30 - 43)	6 (-28 - 40)	6 (-26 - 38)	6 (-24 - 35)	6 (-24 - 35)	5 (-22 - 32)	4 (-19 - 27)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 23)	14 (5 - 23)	13 (4 - 21)	12 (4 - 20)	11 (4 - 19)	11 (4 - 19)	10 (3 - 17)	9 (3 - 14)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	9 (-3 - 20)	9 (-3 - 20)	8 (-3 - 19)	8 (-3 - 18)	7 (-2 - 17)	7 (-2 - 17)	7 (-2 - 15)	6 (-2 - 13)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (4 - 15)	9 (4 - 15)	9 (3 - 14)	8 (3 - 13)	8 (3 - 12)	8 (3 - 12)	7 (3 - 11)	6 (2 - 9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	5 (2 - 9)	5 (1 - 9)	5 (1 - 8)	4 (1 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	4 (1 - 8)	4 (1 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)	3 (0 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	5 (-2 - 13)	5 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	4 (-2 - 11)	4 (-2 - 11)	4 (-2 - 10)	3 (-1 - 8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	4 (0 - 8)	4 (0 - 8)	4 (0 - 7)	3 (0 - 7)	3 (0 - 6)	3 (0 - 6)	3 (0 - 6)	2 (0 - 5)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-5. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (-2 - 2.9)	0.5 (-2 - 2.9)	0.4 (-1.9 - 2.7)	0.4 (-1.8 - 2.5)	0.4 (-1.6 - 2.4)	0.4 (-1.7 - 2.4)	0.3 (-1.5 - 2.2)	0.3 (-1.3 - 1.8)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.6 (-0.2 - 1.4)	0.6 (-0.2 - 1.4)	0.6 (-0.2 - 1.3)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.1)	0.5 (-0.2 - 1.1)	0.4 (-0.1 - 1)	0.4 (-0.1 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.7)	0.4 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-6. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2002 Q Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (-0.7% - 0.9%)	0.1% (-0.6% - 0.9%)	0.1% (-0.6% - 0.9%)	0.1% (-0.6% - 0.8%)	0.1% (-0.5% - 0.8%)	0.1% (-0.5% - 0.8%)	0.1% (-0.5% - 0.7%)	0.1% (-0.4% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.9% (-0.3% - 2.1%)	0.9% (-0.3% - 2.1%)	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.7% (-0.2% - 1.7%)	0.7% (-0.2% - 1.7%)	0.7% (-0.2% - 1.6%)	0.6% (-0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9% (0.4% - 1.5%)	0.9% (0.4% - 1.5%)	0.9% (0.3% - 1.4%)	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.6% (-0.2% - 1.3%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-7. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 9)	5 (2 - 9)	5 (2 - 9)	5 (2 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	4500 (700 - 7900)	4200 (700 - 7500)	4200 (700 - 7400)	4100 (700 - 7300)	3800 (600 - 6700)	3600 (600 - 6400)	3500 (600 - 6200)	3100 (500 - 5500)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	7200 (3200 - 10700)	6800 (3000 - 10200)	6700 (3000 - 10100)	6600 (2900 - 9900)	6100 (2700 - 9200)	5800 (2600 - 8800)	5600 (2500 - 8500)	5000 (2200 - 7500)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	6600 (2500 - 10200)	6200 (2400 - 9700)	6200 (2400 - 9600)	6100 (2300 - 9400)	5600 (2100 - 8700)	5300 (2000 - 8300)	5200 (2000 - 8100)	4500 (1700 - 7100)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	4600 (1500 - 7500)	4400 (1400 - 7100)	4300 (1400 - 7000)	4200 (1300 - 6900)	3900 (1200 - 6300)	3700 (1200 - 6100)	3600 (1100 - 5900)	3100 (1000 - 5200)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	4800 (600 - 8700)	4600 (600 - 8300)	4500 (500 - 8200)	4400 (500 - 8000)	4100 (500 - 7400)	3900 (500 - 7100)	3800 (500 - 6900)	3300 (400 - 6000)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	5300 (1000 - 9200)	5000 (1000 - 8700)	5000 (1000 - 8700)	4900 (900 - 8500)	4500 (900 - 7800)	4300 (800 - 7500)	4100 (800 - 7200)	3600 (700 - 6400)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	13200 (4700 - 20800)	12400 (4400 - 19700)	12300 (4400 - 19600)	12100 (4300 - 19200)	11100 (3900 - 17700)	10600 (3700 - 16900)	10300 (3600 - 16400)	9000 (3200 - 14500)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-8. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.4)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	17700 (2800 - 31100)	16700 (2700 - 29500)	16600 (2600 - 29200)	16200 (2600 - 28700)	14900 (2400 - 26400)	14200 (2200 - 25200)	13800 (2200 - 24500)	12000 (1900 - 21500)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	28400 (12700 - 42400)	26800 (12000 - 40200)	26600 (11900 - 39900)	26100 (11600 - 39200)	24100 (10700 - 36200)	23000 (10200 - 34700)	22300 (9800 - 33700)	19600 (8600 - 29700)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	26000 (10000 - 40300)	24600 (9500 - 38300)	24400 (9400 - 38000)	23900 (9200 - 37300)	22100 (8400 - 34400)	21000 (8000 - 32900)	20400 (7800 - 32000)	17900 (6800 - 28200)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	18200 (5800 - 29500)	17200 (5500 - 28000)	17100 (5400 - 27700)	16700 (5300 - 27200)	15300 (4900 - 25000)	14600 (4600 - 23900)	14200 (4500 - 23200)	12400 (3900 - 20400)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	19100 (2300 - 34500)	18000 (2200 - 32600)	17900 (2200 - 32400)	17500 (2100 - 31700)	16100 (1900 - 29200)	15300 (1800 - 27900)	14900 (1800 - 27100)	13000 (1500 - 23800)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	21000 (4100 - 36300)	19800 (3800 - 34400)	19700 (3800 - 34100)	19200 (3700 - 33400)	17700 (3400 - 30800)	16800 (3200 - 29400)	16300 (3100 - 28500)	14300 (2700 - 25100)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	51900 (18500 - 82200)	49000 (17400 - 77900)	48700 (17300 - 77300)	47700 (16900 - 75800)	43900 (15500 - 70000)	41800 (14800 - 66900)	40600 (14300 - 64900)	35600 (12500 - 57100)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-9. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	8% (1.3% - 14.2%)	7.6% (1.2% - 13.4%)	7.5% (1.2% - 13.3%)	7.4% (1.2% - 13.1%)	6.8% (1.1% - 12%)	6.5% (1% - 11.5%)	6.3% (1% - 11.2%)	5.5% (0.9% - 9.8%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	12.9% (5.8% - 19.3%)	12.2% (5.5% - 18.3%)	12.1% (5.4% - 18.2%)	11.9% (5.3% - 17.8%)	11% (4.9% - 16.5%)	10.5% (4.6% - 15.8%)	10.1% (4.5% - 15.3%)	8.9% (3.9% - 13.5%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	11.9% (4.6% - 18.4%)	11.2% (4.3% - 17.4%)	11.1% (4.3% - 17.3%)	10.9% (4.2% - 17%)	10% (3.8% - 15.7%)	9.6% (3.7% - 15%)	9.3% (3.5% - 14.6%)	8.2% (3.1% - 12.8%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	8.3% (2.6% - 13.4%)	7.8% (2.5% - 12.7%)	7.8% (2.5% - 12.6%)	7.6% (2.4% - 12.4%)	7% (2.2% - 11.4%)	6.7% (2.1% - 10.9%)	6.5% (2% - 10.6%)	5.7% (1.8% - 9.3%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	7% (0.8% - 12.6%)	6.6% (0.8% - 11.9%)	6.5% (0.8% - 11.8%)	6.4% (0.8% - 11.6%)	5.9% (0.7% - 10.6%)	5.6% (0.7% - 10.2%)	5.4% (0.6% - 9.9%)	4.7% (0.6% - 8.7%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	7.6% (1.5% - 13.2%)	7.2% (1.4% - 12.5%)	7.2% (1.4% - 12.4%)	7% (1.4% - 12.2%)	6.4% (1.2% - 11.2%)	6.1% (1.2% - 10.7%)	5.9% (1.1% - 10.4%)	5.2% (1% - 9.1%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	10.1% (3.6% - 16%)	9.6% (3.4% - 15.2%)	9.5% (3.4% - 15.1%)	9.3% (3.3% - 14.8%)	8.6% (3% - 13.7%)	8.2% (2.9% - 13%)	7.9% (2.8% - 12.7%)	6.9% (2.4% - 11.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-10. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (3 - 15)	8 (3 - 14)	8 (3 - 14)	8 (3 - 13)	7 (3 - 12)	7 (2 - 12)	7 (2 - 12)	6 (2 - 10)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	6100 (1000 - 10500)	5800 (900 - 10100)	5800 (900 - 10000)	5700 (900 - 9900)	5300 (900 - 9300)	5200 (800 - 9000)	5000 (800 - 8800)	4600 (700 - 8000)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	9600 (4400 - 14100)	9300 (4200 - 13600)	9200 (4200 - 13500)	9000 (4100 - 13300)	8500 (3800 - 12600)	8200 (3700 - 12200)	8000 (3600 - 11900)	7300 (3300 - 10900)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	8900 (3500 - 13500)	8500 (3300 - 13000)	8500 (3300 - 12900)	8300 (3200 - 12700)	7800 (3000 - 12000)	7600 (2900 - 11600)	7400 (2900 - 11400)	6700 (2600 - 10400)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	6400 (2100 - 10100)	6100 (2000 - 9700)	6000 (2000 - 9700)	5900 (1900 - 9500)	5600 (1800 - 9000)	5400 (1700 - 8700)	5300 (1700 - 8500)	4800 (1500 - 7700)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	6600 (800 - 11700)	6300 (800 - 11300)	6300 (800 - 11200)	6100 (800 - 11000)	5800 (700 - 10300)	5600 (700 - 10000)	5400 (700 - 9800)	4900 (600 - 8900)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	7300 (1500 - 12500)	7000 (1400 - 12000)	7000 (1400 - 11900)	6800 (1300 - 11700)	6400 (1300 - 11000)	6200 (1200 - 10700)	6100 (1200 - 10400)	5500 (1100 - 9500)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	17800 (6500 - 27700)	17100 (6200 - 26600)	16900 (6100 - 26400)	16600 (6000 - 25900)	15600 (5600 - 24500)	15100 (5400 - 23800)	14700 (5300 - 23200)	13400 (4800 - 21200)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-11. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2002 Q Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.2 (0.4 - 2)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	24100 (3900 - 41600)	23000 (3700 - 39900)	22800 (3700 - 39700)	22400 (3600 - 38900)	21000 (3400 - 36700)	20400 (3300 - 35600)	19800 (3200 - 34700)	18000 (2900 - 31600)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	38100 (17400 - 55800)	36500 (16600 - 53700)	36200 (16500 - 53400)	35500 (16100 - 52400)	33500 (15200 - 49600)	32500 (14700 - 48200)	31700 (14300 - 47100)	28800 (12900 - 43000)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	35000 (13800 - 53300)	33600 (13200 - 51200)	33300 (13100 - 50900)	32700 (12800 - 50000)	30800 (12000 - 47300)	29900 (11600 - 45900)	29100 (11300 - 44800)	26400 (10200 - 41000)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	25100 (8200 - 40000)	24000 (7800 - 38400)	23800 (7700 - 38200)	23400 (7600 - 37400)	22000 (7100 - 35300)	21300 (6800 - 34300)	20800 (6700 - 33500)	18800 (6000 - 30500)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	26100 (3200 - 46300)	25000 (3100 - 44400)	24800 (3000 - 44100)	24200 (3000 - 43200)	22800 (2800 - 40800)	22000 (2700 - 39500)	21500 (2600 - 38500)	19400 (2300 - 35000)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	29000 (5700 - 49300)	27700 (5500 - 47300)	27500 (5400 - 47000)	27000 (5300 - 46100)	25400 (5000 - 43500)	24500 (4800 - 42200)	24000 (4700 - 41200)	21700 (4200 - 37600)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	70200 (25500 - 109400)	67300 (24400 - 105100)	66800 (24200 - 104300)	65400 (23600 - 102400)	61600 (22200 - 96700)	59600 (21400 - 93800)	58100 (20800 - 91600)	52700 (18800 - 83500)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-12. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)					
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	11% (1.8% - 18.9%)	10.5% (1.7% - 18.2%)	10.4% (1.7% - 18.1%)	10.2% (1.6% - 17.7%)	9.6% (1.5% - 16.7%)	9.3% (1.5% - 16.2%)	9% (1.4% - 15.8%)	8.2% (1.3% - 14.4%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	17.3% (7.9% - 25.4%)	16.6% (7.6% - 24.5%)	16.5% (7.5% - 24.3%)	16.2% (7.3% - 23.9%)	15.3% (6.9% - 22.6%)	14.8% (6.7% - 21.9%)	14.4% (6.5% - 21.4%)	13.1% (5.9% - 19.6%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	16% (6.3% - 24.3%)	15.3% (6% - 23.3%)	15.2% (6% - 23.2%)	14.9% (5.8% - 22.7%)	14% (5.5% - 21.5%)	13.6% (5.3% - 20.9%)	13.3% (5.1% - 20.4%)	12% (4.6% - 18.7%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	11.4% (3.7% - 18.2%)	10.9% (3.5% - 17.5%)	10.9% (3.5% - 17.4%)	10.6% (3.4% - 17%)	10% (3.2% - 16.1%)	9.7% (3.1% - 15.6%)	9.5% (3% - 15.2%)	8.6% (2.7% - 13.9%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	9.5% (1.2% - 16.9%)	9.1% (1.1% - 16.2%)	9% (1.1% - 16.1%)	8.8% (1.1% - 15.8%)	8.3% (1% - 14.9%)	8% (1% - 14.4%)	7.8% (0.9% - 14%)	7.1% (0.9% - 12.8%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	10.6% (2.1% - 17.9%)	10.1% (2% - 17.2%)	10% (2% - 17.1%)	9.8% (1.9% - 16.8%)	9.2% (1.8% - 15.8%)	8.9% (1.8% - 15.4%)	8.7% (1.7% - 15%)	7.9% (1.5% - 13.7%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	13.7% (5% - 21.3%)	13.1% (4.8% - 20.5%)	13% (4.7% - 20.4%)	12.8% (4.6% - 20%)	12% (4.3% - 18.9%)	11.6% (4.2% - 18.3%)	11.3% (4.1% - 17.9%)	10.3% (3.7% - 16.3%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-13. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	33 (11 - 55)	31 (10 - 52)	29 (10 - 48)	26 (9 - 43)	23 (8 - 39)	22 (7 - 36)	19 (6 - 32)	14 (5 - 24)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	314 (99 - 525)	300 (95 - 501)	288 (91 - 482)	268 (85 - 448)	249 (79 - 417)	238 (75 - 399)	222 (70 - 372)	183 (58 - 307)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	118 (37 - 199)	113 (35 - 190)	108 (34 - 182)	101 (31 - 170)	93 (29 - 157)	89 (28 - 151)	83 (26 - 140)	69 (21 - 116)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	16 (-14 - 45)	15 (-13 - 42)	14 (-12 - 39)	12 (-11 - 35)	11 (-10 - 31)	10 (-9 - 29)	9 (-8 - 26)	7 (-6 - 19)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	26 (10 - 41)	24 (9 - 39)	22 (9 - 36)	20 (8 - 32)	18 (7 - 29)	17 (6 - 27)	15 (6 - 24)	11 (4 - 18)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	14 (4 - 24)	13 (4 - 23)	12 (4 - 21)	11 (3 - 19)	10 (3 - 17)	9 (3 - 16)	8 (2 - 14)	6 (2 - 10)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	12 (2 - 23)	12 (2 - 21)	11 (2 - 20)	10 (2 - 18)	9 (2 - 16)	8 (1 - 15)	7 (1 - 13)	5 (1 - 10)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	15 (-6 - 36)	14 (-5 - 34)	13 (-5 - 32)	12 (-5 - 28)	11 (-4 - 25)	10 (-4 - 24)	9 (-3 - 21)	7 (-2 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	11 (0 - 21)	10 (0 - 20)	9 (0 - 18)	8 (0 - 16)	7 (0 - 15)	7 (0 - 14)	6 (0 - 12)	5 (0 - 9)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-14. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.4)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	5.8 (1.9 - 9.8)	5.6 (1.8 - 9.3)	5.4 (1.7 - 9)	5 (1.6 - 8.3)	4.6 (1.5 - 7.7)	4.4 (1.4 - 7.4)	4.1 (1.3 - 6.9)	3.4 (1.1 - 5.7)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	2.2 (0.7 - 3.7)	2.1 (0.7 - 3.5)	2 (0.6 - 3.4)	1.9 (0.6 - 3.2)	1.7 (0.5 - 2.9)	1.7 (0.5 - 2.8)	1.6 (0.5 - 2.6)	1.3 (0.4 - 2.2)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.3 (-0.3 - 0.8)	0.3 (-0.2 - 0.8)	0.3 (-0.2 - 0.7)	0.2 (-0.2 - 0.7)	0.2 (-0.2 - 0.6)	0.2 (-0.2 - 0.5)	0.2 (-0.2 - 0.5)	0.1 (-0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-15. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)					
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.5% (0.5% - 2.5%)	1.4% (0.5% - 2.4%)	1.4% (0.4% - 2.3%)	1.3% (0.4% - 2.1%)	1.2% (0.4% - 2%)	1.1% (0.4% - 1.9%)	1.1% (0.3% - 1.8%)	0.9% (0.3% - 1.5%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 0.8%)	0.3% (-0.2% - 0.8%)	0.2% (-0.2% - 0.7%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.5%)	0.1% (-0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-16. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	55 (18 - 91)	52 (18 - 87)	50 (17 - 84)	47 (16 - 79)	44 (15 - 74)	43 (14 - 71)	40 (13 - 67)	34 (11 - 57)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	427 (136 - 712)	412 (131 - 687)	401 (127 - 669)	381 (121 - 636)	361 (115 - 603)	350 (111 - 585)	335 (106 - 559)	294 (93 - 493)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	161 (51 - 271)	156 (49 - 261)	151 (47 - 254)	144 (45 - 242)	136 (43 - 229)	132 (41 - 222)	126 (39 - 212)	111 (35 - 187)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	26 (-23 - 73)	25 (-22 - 70)	24 (-21 - 68)	22 (-20 - 64)	21 (-19 - 60)	20 (-18 - 57)	19 (-17 - 54)	16 (-14 - 46)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	42 (16 - 68)	40 (15 - 65)	39 (15 - 63)	36 (14 - 59)	34 (13 - 55)	33 (13 - 53)	31 (12 - 50)	26 (10 - 43)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	23 (7 - 40)	22 (7 - 38)	22 (6 - 37)	20 (6 - 34)	19 (6 - 32)	18 (5 - 31)	17 (5 - 29)	15 (4 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	20 (4 - 37)	19 (3 - 35)	19 (3 - 34)	18 (3 - 32)	16 (3 - 30)	16 (3 - 29)	15 (3 - 27)	13 (2 - 23)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	25 (-10 - 59)	24 (-9 - 57)	23 (-9 - 55)	22 (-8 - 51)	20 (-8 - 48)	20 (-8 - 46)	18 (-7 - 44)	16 (-6 - 37)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	17 (0 - 34)	17 (0 - 33)	16 (0 - 32)	15 (0 - 30)	14 (0 - 28)	14 (0 - 27)	13 (0 - 25)	11 (0 - 22)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-17. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.6 (0.2 - 1.1)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	7.9 (2.5 - 13.2)	7.7 (2.4 - 12.8)	7.5 (2.4 - 12.4)	7.1 (2.3 - 11.8)	6.7 (2.1 - 11.2)	6.5 (2.1 - 10.9)	6.2 (2 - 10.4)	5.5 (1.7 - 9.2)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	3 (0.9 - 5)	2.9 (0.9 - 4.9)	2.8 (0.9 - 4.7)	2.7 (0.8 - 4.5)	2.5 (0.8 - 4.3)	2.5 (0.8 - 4.1)	2.3 (0.7 - 3.9)	2.1 (0.6 - 3.5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (-0.4 - 1.4)	0.5 (-0.4 - 1.3)	0.4 (-0.4 - 1.3)	0.4 (-0.4 - 1.2)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1)	0.3 (-0.3 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-18. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	2% (0.6% - 3.4%)	2% (0.6% - 3.3%)	1.9% (0.6% - 3.2%)	1.8% (0.6% - 3%)	1.7% (0.5% - 2.9%)	1.7% (0.5% - 2.8%)	1.6% (0.5% - 2.7%)	1.4% (0.4% - 2.3%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5% (-0.5% - 1.4%)	0.5% (-0.4% - 1.4%)	0.5% (-0.4% - 1.3%)	0.4% (-0.4% - 1.2%)	0.4% (-0.4% - 1.2%)	0.4% (-0.4% - 1.1%)	0.4% (-0.3% - 1.1%)	0.3% (-0.3% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.2% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-19. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	19 (-12 - 49)	18 (-11 - 46)	17 (-11 - 44)	15 (-9 - 39)	14 (-9 - 37)	14 (-9 - 36)	13 (-8 - 33)	10 (-6 - 26)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 20)	11 (4 - 19)	11 (4 - 18)	9 (3 - 16)	9 (3 - 15)	9 (3 - 14)	8 (3 - 13)	6 (2 - 11)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	11 (0 - 23)	11 (0 - 21)	10 (0 - 21)	9 (0 - 18)	9 (0 - 17)	8 (0 - 17)	8 (0 - 15)	6 (0 - 12)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	10 (4 - 15)	9 (3 - 15)	9 (3 - 14)	8 (3 - 12)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	5 (2 - 8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	5 (2 - 9)	5 (1 - 9)	5 (1 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	5 (1 - 8)	4 (1 - 8)	4 (1 - 8)	4 (1 - 7)	4 (1 - 6)	3 (1 - 6)	3 (1 - 6)	2 (0 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	6 (-2 - 13)	5 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	4 (-2 - 10)	4 (-2 - 10)	4 (-1 - 9)	3 (-1 - 7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	4 (0 - 8)	4 (0 - 7)	4 (0 - 7)	3 (0 - 6)	3 (0 - 6)	3 (0 - 6)	3 (0 - 5)	2 (0 - 4)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	45 (12 - 79)	43 (11 - 75)	42 (11 - 72)	37 (10 - 65)	36 (9 - 63)	35 (9 - 60)	32 (8 - 56)	27 (7 - 47)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-20. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1.3 (-0.8 - 3.5)	1.3 (-0.8 - 3.3)	1.2 (-0.8 - 3.2)	1.1 (-0.7 - 2.8)	1 (-0.6 - 2.7)	1 (-0.6 - 2.6)	0.9 (-0.6 - 2.4)	0.7 (-0.5 - 1.9)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.8 (0 - 1.6)	0.8 (0 - 1.5)	0.7 (0 - 1.5)	0.6 (0 - 1.3)	0.6 (0 - 1.2)	0.6 (0 - 1.2)	0.5 (0 - 1.1)	0.4 (0 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.7)	0.4 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.2 (-0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	20.9 (5.3 - 36.2)	19.8 (5.1 - 34.4)	19.2 (4.9 - 33.4)	17.3 (4.4 - 30)	16.6 (4.2 - 28.8)	16 (4.1 - 27.8)	14.9 (3.8 - 25.9)	12.4 (3.2 - 21.6)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-21. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.2% - 0.7%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.4%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)				
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.6% (0% - 1.2%)	0.6% (0% - 1.1%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.7%)	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	1.1% (0.3% - 2%)	1.1% (0.3% - 1.9%)	1.1% (0.3% - 1.8%)	0.9% (0.2% - 1.6%)	0.9% (0.2% - 1.6%)	0.9% (0.2% - 1.5%)	0.8% (0.2% - 1.4%)	0.7% (0.2% - 1.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-22. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	49 (-31 - 128)	47 (-30 - 123)	46 (-29 - 120)	43 (-27 - 112)	42 (-26 - 109)	40 (-25 - 105)	39 (-25 - 102)	35 (-22 - 91)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	31 (10 - 52)	30 (10 - 50)	29 (10 - 49)	27 (9 - 45)	27 (9 - 44)	26 (9 - 43)	25 (8 - 41)	22 (7 - 37)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	30 (-1 - 59)	28 (-1 - 57)	28 (-1 - 56)	26 (-1 - 52)	25 (-1 - 51)	24 (-1 - 49)	24 (-1 - 47)	21 (-1 - 42)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	25 (10 - 40)	24 (9 - 39)	24 (9 - 38)	22 (8 - 35)	21 (8 - 34)	21 (8 - 33)	20 (8 - 32)	18 (7 - 29)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	14 (4 - 24)	13 (4 - 23)	13 (4 - 22)	12 (4 - 21)	12 (3 - 20)	11 (3 - 19)	11 (3 - 19)	10 (3 - 17)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	12 (2 - 22)	12 (2 - 21)	11 (2 - 21)	11 (2 - 19)	10 (2 - 19)	10 (2 - 18)	10 (2 - 18)	9 (2 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	15 (-6 - 35)	14 (-6 - 34)	14 (-5 - 33)	13 (-5 - 31)	13 (-5 - 30)	12 (-5 - 29)	12 (-5 - 28)	11 (-4 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	10 (0 - 20)	10 (0 - 20)	10 (0 - 19)	9 (0 - 18)	9 (0 - 18)	8 (0 - 17)	8 (0 - 16)	7 (0 - 15)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	89 (23 - 153)	85 (22 - 147)	84 (22 - 145)	78 (20 - 135)	76 (20 - 132)	73 (19 - 127)	71 (18 - 123)	64 (16 - 111)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-23. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	3.5 (-2.2 - 9.2)	3.4 (-2.1 - 8.8)	3.3 (-2.1 - 8.6)	3.1 (-1.9 - 8)	3 (-1.9 - 7.8)	2.9 (-1.8 - 7.5)	2.8 (-1.8 - 7.3)	2.5 (-1.6 - 6.5)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2.2 (0.8 - 3.7)	2.2 (0.7 - 3.6)	2.1 (0.7 - 3.5)	2 (0.7 - 3.3)	1.9 (0.6 - 3.2)	1.8 (0.6 - 3.1)	1.8 (0.6 - 3)	1.6 (0.5 - 2.7)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	2.1 (-0.1 - 4.2)	2 (-0.1 - 4.1)	2 (-0.1 - 4)	1.9 (0 - 3.7)	1.8 (0 - 3.6)	1.8 (0 - 3.5)	1.7 (0 - 3.4)	1.5 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.8 (0.7 - 2.9)	1.7 (0.7 - 2.8)	1.7 (0.6 - 2.7)	1.6 (0.6 - 2.5)	1.5 (0.6 - 2.5)	1.5 (0.6 - 2.4)	1.4 (0.5 - 2.3)	1.3 (0.5 - 2.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.8 (0.2 - 1.4)	0.8 (0.2 - 1.4)	0.7 (0.2 - 1.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.9 (0.2 - 1.6)	0.8 (0.1 - 1.5)	0.8 (0.1 - 1.5)	0.8 (0.1 - 1.4)	0.7 (0.1 - 1.3)	0.7 (0.1 - 1.3)	0.7 (0.1 - 1.3)	0.6 (0.1 - 1.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	1.1 (-0.4 - 2.5)	1 (-0.4 - 2.4)	1 (-0.4 - 2.4)	0.9 (-0.4 - 2.2)	0.9 (-0.4 - 2.2)	0.9 (-0.3 - 2.1)	0.9 (-0.3 - 2)	0.8 (-0.3 - 1.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.7 (0 - 1.5)	0.7 (0 - 1.4)	0.7 (0 - 1.4)	0.6 (0 - 1.3)	0.6 (0 - 1.3)	0.6 (0 - 1.2)	0.6 (0 - 1.2)	0.5 (0 - 1)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	40.9 (10.5 - 70.6)	39.3 (10.1 - 67.9)	38.6 (9.9 - 66.7)	36 (9.2 - 62.1)	35.2 (9 - 60.8)	33.9 (8.7 - 58.6)	32.9 (8.4 - 56.8)	29.5 (7.5 - 51.1)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-24. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2002 Q<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.7% (-0.4% - 1.7%)	0.6% (-0.4% - 1.7%)	0.6% (-0.4% - 1.6%)	0.6% (-0.4% - 1.5%)	0.6% (-0.4% - 1.5%)	0.5% (-0.3% - 1.4%)	0.5% (-0.3% - 1.4%)	0.5% (-0.3% - 1.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1.6% (0% - 3.2%)	1.5% (0% - 3%)	1.5% (0% - 3%)	1.4% (0% - 2.8%)	1.4% (0% - 2.7%)	1.3% (0% - 2.6%)	1.3% (0% - 2.5%)	1.1% (0% - 2.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.3% (0.5% - 2.1%)	1.3% (0.5% - 2.1%)	1.3% (0.5% - 2%)	1.2% (0.4% - 1.9%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.7%)	1% (0.4% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1%)	0.6% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.8% (-0.3% - 1.8%)	0.7% (-0.3% - 1.6%)	0.7% (-0.3% - 1.6%)	0.7% (-0.3% - 1.5%)	0.6% (-0.2% - 1.5%)	0.6% (-0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.6% (0% - 1.1%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	2.2% (0.6% - 3.9%)	2.2% (0.6% - 3.7%)	2.1% (0.5% - 3.7%)	2% (0.5% - 3.4%)	1.9% (0.5% - 3.3%)	1.9% (0.5% - 3.2%)	1.8% (0.5% - 3.1%)	1.6% (0.4% - 2.8%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-25. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	24 (-8 - 56)	22 (-7 - 51)	21 (-7 - 49)	21 (-7 - 48)	17 (-6 - 40)	16 (-5 - 38)	15 (-5 - 35)	11 (-4 - 27)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 20)	11 (4 - 19)	11 (4 - 18)	11 (4 - 18)	9 (3 - 15)	8 (3 - 14)	8 (3 - 13)	6 (2 - 10)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	107 (-17 - 229)	102 (-17 - 218)	99 (-16 - 212)	97 (-16 - 209)	87 (-14 - 186)	83 (-13 - 178)	78 (-13 - 168)	66 (-11 - 142)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	58 (18 - 98)	55 (17 - 93)	54 (17 - 91)	53 (17 - 89)	47 (15 - 79)	45 (14 - 76)	42 (13 - 72)	36 (11 - 61)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	29 (-27 - 85)	27 (-25 - 78)	26 (-24 - 75)	25 (-23 - 73)	21 (-20 - 62)	20 (-18 - 57)	18 (-17 - 53)	14 (-13 - 41)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	11 (-1 - 23)	10 (-1 - 21)	10 (-1 - 20)	9 (-1 - 20)	8 (-1 - 17)	7 (-1 - 15)	7 (-1 - 14)	5 (-1 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	10 (4 - 16)	9 (4 - 15)	9 (3 - 14)	9 (3 - 14)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	5 (2 - 8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	6 (2 - 9)	5 (2 - 9)	5 (1 - 8)	5 (1 - 8)	4 (1 - 7)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	5 (1 - 9)	4 (1 - 8)	4 (1 - 8)	4 (1 - 8)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)	2 (0 - 4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 13)	5 (-2 - 12)	4 (-2 - 10)	4 (-2 - 10)	4 (-1 - 9)	3 (-1 - 7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	4 (0 - 8)	4 (0 - 8)	4 (0 - 7)	4 (0 - 7)	3 (0 - 6)	3 (0 - 6)	3 (0 - 5)	2 (0 - 4)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	9 (-7 - 25)	9 (-7 - 23)	8 (-7 - 22)	8 (-6 - 22)	7 (-5 - 18)	6 (-5 - 17)	6 (-5 - 16)	4 (-3 - 12)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-19 (-55 - 16)	-18 (-51 - 15)	-17 (-49 - 14)	-16 (-48 - 14)	-14 (-40 - 12)	-13 (-37 - 11)	-12 (-34 - 10)	-9 (-26 - 8)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-5 (-41 - 30)	-4 (-38 - 28)	-4 (-36 - 27)	-4 (-35 - 26)	-3 (-29 - 22)	-3 (-27 - 20)	-3 (-25 - 19)	-2 (-19 - 14)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	6 (-30 - 40)	5 (-28 - 37)	5 (-27 - 36)	5 (-26 - 35)	4 (-22 - 29)	4 (-20 - 27)	4 (-19 - 25)	3 (-14 - 19)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	16 (-19 - 50)	15 (-17 - 46)	14 (-17 - 44)	14 (-16 - 43)	12 (-14 - 37)	11 (-13 - 34)	10 (-12 - 31)	8 (-9 - 24)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-13 (-46 - 19)	-12 (-42 - 17)	-11 (-41 - 17)	-11 (-39 - 16)	-9 (-33 - 14)	-9 (-31 - 13)	-8 (-28 - 12)	-6 (-22 - 9)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	12 (-20 - 43)	11 (-18 - 40)	11 (-18 - 38)	11 (-17 - 37)	9 (-14 - 31)	8 (-13 - 29)	8 (-12 - 27)	6 (-9 - 21)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-2 (-35 - 30)	-2 (-32 - 28)	-2 (-31 - 27)	-2 (-30 - 26)	-1 (-25 - 22)	-1 (-24 - 20)	-1 (-22 - 19)	-1 (-17 - 14)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	1 (-32 - 32)	1 (-30 - 30)	1 (-29 - 29)	1 (-28 - 28)	1 (-23 - 24)	1 (-22 - 22)	0 (-20 - 20)	0 (-15 - 16)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-26. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1.2 (-0.4 - 2.7)	1.1 (-0.3 - 2.5)	1 (-0.3 - 2.4)	1 (-0.3 - 2.3)	0.8 (-0.3 - 2)	0.8 (-0.3 - 1.8)	0.7 (-0.2 - 1.7)	0.6 (-0.2 - 1.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	5.2 (-0.8 - 11.1)	4.9 (-0.8 - 10.6)	4.8 (-0.8 - 10.3)	4.7 (-0.8 - 10.1)	4.2 (-0.7 - 9)	4 (-0.7 - 8.6)	3.8 (-0.6 - 8.2)	3.2 (-0.5 - 6.9)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	2.8 (0.9 - 4.7)	2.7 (0.8 - 4.5)	2.6 (0.8 - 4.4)	2.6 (0.8 - 4.3)	2.3 (0.7 - 3.8)	2.2 (0.7 - 3.7)	2.1 (0.6 - 3.5)	1.7 (0.5 - 2.9)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	1.4 (-1.3 - 4.1)	1.3 (-1.2 - 3.8)	1.3 (-1.2 - 3.6)	1.2 (-1.1 - 3.6)	1 (-1 - 3)	1 (-0.9 - 2.8)	0.9 (-0.8 - 2.6)	0.7 (-0.6 - 2)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (-0.1 - 1.1)	0.5 (-0.1 - 1)	0.5 (-0.1 - 1)	0.5 (-0.1 - 1)	0.4 (0 - 0.8)	0.4 (0 - 0.8)	0.3 (0 - 0.7)	0.3 (0 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.1 (-0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	0.4 (-0.4 - 1.2)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1)	0.3 (-0.3 - 0.9)	0.3 (-0.2 - 0.8)	0.3 (-0.2 - 0.8)	0.2 (-0.2 - 0.6)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-7.6 (-22.3 - 6.4)	-7.1 (-20.6 - 5.9)	-6.8 (-19.7 - 5.7)	-6.6 (-19.2 - 5.5)	-5.5 (-16.1 - 4.7)	-5.1 (-14.9 - 4.3)	-4.7 (-13.7 - 4)	-3.6 (-10.5 - 3.1)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-1.9 (-16.3 - 12)	-1.7 (-15.1 - 11.1)	-1.7 (-14.5 - 10.7)	-1.6 (-14.1 - 10.4)	-1.4 (-11.8 - 8.8)	-1.3 (-11 - 8.1)	-1.2 (-10.1 - 7.5)	-0.9 (-7.7 - 5.8)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	2.3 (-12.1 - 16.1)	2.1 (-11.2 - 14.9)	2 (-10.7 - 14.3)	2 (-10.4 - 13.9)	1.7 (-8.8 - 11.7)	1.5 (-8.1 - 10.9)	1.4 (-7.5 - 10.1)	1.1 (-5.7 - 7.7)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	6.5 (-7.6 - 20.1)	6 (-7 - 18.6)	5.8 (-6.7 - 17.9)	5.6 (-6.5 - 17.4)	4.8 (-5.5 - 14.7)	4.4 (-5.1 - 13.7)	4.1 (-4.7 - 12.6)	3.1 (-3.6 - 9.7)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-5.2 (-18.5 - 7.5)	-4.8 (-17 - 7)	-4.6 (-16.3 - 6.7)	-4.4 (-15.9 - 6.5)	-3.7 (-13.3 - 5.5)	-3.5 (-12.4 - 5.1)	-3.2 (-11.4 - 4.7)	-2.4 (-8.7 - 3.6)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	5 (-8 - 17.3)	4.6 (-7.4 - 16)	4.4 (-7 - 15.4)	4.3 (-6.9 - 15)	3.6 (-5.8 - 12.6)	3.4 (-5.4 - 11.8)	3.1 (-4.9 - 10.8)	2.4 (-3.8 - 8.3)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-0.7 (-14.1 - 12)	-0.7 (-13 - 11.1)	-0.6 (-12.5 - 10.7)	-0.6 (-12.1 - 10.4)	-0.5 (-10.2 - 8.8)	-0.5 (-9.5 - 8.1)	-0.5 (-8.7 - 7.5)	-0.3 (-6.7 - 5.8)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.3 (-13 - 13)	0.3 (-12 - 12)	0.3 (-11.5 - 11.5)	0.3 (-11.2 - 11.2)	0.2 (-9.4 - 9.5)	0.2 (-8.7 - 8.8)	0.2 (-8 - 8.1)	0.1 (-6.1 - 6.3)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-27. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.1% (-0.2% - 2.4%)	1.1% (-0.2% - 2.3%)	1.1% (-0.2% - 2.3%)	1% (-0.2% - 2.2%)	0.9% (-0.1% - 2%)	0.9% (-0.1% - 1.9%)	0.8% (-0.1% - 1.8%)	0.7% (-0.1% - 1.5%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.6%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 0.8%)	0.3% (-0.3% - 0.8%)	0.3% (-0.2% - 0.8%)	0.2% (-0.2% - 0.7%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.6%)	0.1% (-0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5% (-0.1% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	1.2% (-0.9% - 3.2%)	1.1% (-0.9% - 2.9%)	1% (-0.8% - 2.8%)	1% (-0.8% - 2.8%)	0.9% (-0.7% - 2.3%)	0.8% (-0.6% - 2.2%)	0.7% (-0.6% - 2%)	0.6% (-0.4% - 1.5%)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-0.7%	-0.7%	-0.7%	-0.6%	-0.5%	-0.5%	-0.5%	-0.3%
						(-2.1% - 0.6%)	(-2% - 0.6%)	(-1.9% - 0.5%)	(-1.8% - 0.5%)	(-1.6% - 0.5%)	(-1.4% - 0.4%)	(-1.3% - 0.4%)	(-1% - 0.3%)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-0.2%	-0.2%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%
						(-1.6% - 1.2%)	(-1.5% - 1.1%)	(-1.4% - 1%)	(-1.4% - 1%)	(-1.1% - 0.8%)	(-1.1% - 0.8%)	(-1% - 0.7%)	(-0.7% - 0.6%)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%
						(-1.2% - 1.6%)	(-1.1% - 1.4%)	(-1% - 1.4%)	(-1% - 1.3%)	(-0.8% - 1.1%)	(-0.8% - 1.1%)	(-0.7% - 1%)	(-0.6% - 0.7%)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.6%	0.6%	0.6%	0.5%	0.5%	0.4%	0.4%	0.3%
						(-0.7% - 1.9%)	(-0.7% - 1.8%)	(-0.6% - 1.7%)	(-0.6% - 1.7%)	(-0.5% - 1.4%)	(-0.5% - 1.3%)	(-0.5% - 1.2%)	(-0.3% - 0.9%)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-0.6%	-0.6%	-0.6%	-0.6%	-0.5%	-0.4%	-0.4%	-0.3%
						(-2.3% - 0.9%)	(-2.1% - 0.9%)	(-2% - 0.8%)	(-2% - 0.8%)	(-1.7% - 0.7%)	(-1.5% - 0.6%)	(-1.4% - 0.6%)	(-1.1% - 0.5%)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	0.6%	0.6%	0.6%	0.5%	0.5%	0.4%	0.4%	0.3%
						(-1% - 2.2%)	(-0.9% - 2%)	(-0.9% - 1.9%)	(-0.9% - 1.9%)	(-0.7% - 1.6%)	(-0.7% - 1.5%)	(-0.6% - 1.4%)	(-0.5% - 1%)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0%
						(-1.8% - 1.5%)	(-1.6% - 1.4%)	(-1.6% - 1.3%)	(-1.5% - 1.3%)	(-1.3% - 1.1%)	(-1.2% - 1%)	(-1.1% - 0.9%)	(-0.8% - 0.7%)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0%	0%	0%	0%	0%	0%	0%	0%
						(-1.6% - 1.6%)	(-1.5% - 1.5%)	(-1.4% - 1.4%)	(-1.4% - 1.4%)	(-1.2% - 1.2%)	(-1.1% - 1.1%)	(-1% - 1%)	(-0.8% - 0.8%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-28. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	46 (-15 - 106)	43 (-14 - 100)	43 (-14 - 98)	42 (-14 - 97)	38 (-12 - 87)	35 (-11 - 81)	34 (-11 - 79)	29 (-9 - 67)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	24 (8 - 39)	22 (7 - 37)	22 (7 - 36)	22 (7 - 36)	19 (6 - 32)	18 (6 - 30)	18 (6 - 29)	15 (5 - 25)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	158 (-26 - 336)	150 (-24 - 320)	148 (-24 - 316)	147 (-24 - 313)	134 (-22 - 287)	128 (-21 - 274)	125 (-20 - 268)	111 (-18 - 239)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	86 (27 - 144)	82 (26 - 137)	81 (25 - 136)	80 (25 - 134)	73 (23 - 123)	70 (22 - 117)	68 (21 - 115)	61 (19 - 102)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	56 (-52 - 162)	53 (-49 - 151)	52 (-48 - 150)	51 (-48 - 147)	46 (-42 - 132)	43 (-40 - 124)	42 (-39 - 120)	36 (-33 - 103)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	21 (-2 - 44)	20 (-2 - 41)	19 (-2 - 40)	19 (-2 - 40)	17 (-2 - 36)	16 (-2 - 33)	16 (-2 - 33)	13 (-2 - 28)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	19 (7 - 31)	18 (7 - 29)	18 (7 - 29)	17 (7 - 28)	16 (6 - 25)	15 (6 - 24)	14 (5 - 23)	12 (5 - 20)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	11 (3 - 18)	10 (3 - 17)	10 (3 - 17)	10 (3 - 17)	9 (3 - 15)	8 (2 - 14)	8 (2 - 13)	7 (2 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	9 (2 - 17)	9 (2 - 16)	9 (2 - 16)	8 (2 - 15)	8 (1 - 14)	7 (1 - 13)	7 (1 - 13)	6 (1 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	11 (-4 - 27)	11 (-4 - 25)	11 (-4 - 25)	10 (-4 - 25)	9 (-4 - 22)	9 (-3 - 21)	8 (-3 - 20)	7 (-3 - 17)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	8 (0 - 16)	7 (0 - 15)	7 (0 - 15)	7 (0 - 14)	6 (0 - 13)	6 (0 - 12)	6 (0 - 12)	5 (0 - 10)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	18 (-14 - 46)	17 (-13 - 44)	16 (-13 - 43)	16 (-13 - 42)	14 (-12 - 38)	13 (-11 - 36)	13 (-11 - 35)	11 (-9 - 30)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-37 (-109 - 30)	-34 (-102 - 29)	-34 (-100 - 28)	-33 (-99 - 28)	-30 (-88 - 25)	-28 (-82 - 23)	-27 (-80 - 23)	-23 (-68 - 19)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-9 (-79 - 57)	-8 (-74 - 53)	-8 (-73 - 53)	-8 (-72 - 52)	-7 (-64 - 46)	-7 (-60 - 44)	-7 (-58 - 42)	-6 (-50 - 36)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	11 (-58 - 76)	10 (-55 - 71)	10 (-54 - 70)	10 (-53 - 69)	9 (-47 - 62)	8 (-44 - 58)	8 (-43 - 57)	7 (-37 - 48)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	31 (-37 - 94)	29 (-34 - 89)	29 (-34 - 87)	28 (-33 - 86)	25 (-30 - 77)	24 (-28 - 73)	23 (-27 - 71)	20 (-23 - 60)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-25 (-90 - 36)	-23 (-84 - 34)	-23 (-83 - 33)	-23 (-82 - 33)	-20 (-73 - 29)	-19 (-68 - 27)	-18 (-66 - 27)	-16 (-56 - 23)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	24 (-38 - 81)	22 (-36 - 76)	22 (-35 - 75)	22 (-35 - 74)	19 (-31 - 66)	18 (-29 - 62)	18 (-28 - 61)	15 (-24 - 52)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-3 (-69 - 57)	-3 (-64 - 53)	-3 (-63 - 52)	-3 (-62 - 52)	-3 (-55 - 46)	-3 (-52 - 43)	-3 (-50 - 42)	-2 (-43 - 36)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	1 (-63 - 61)	1 (-59 - 57)	1 (-58 - 57)	1 (-57 - 56)	1 (-51 - 50)	1 (-48 - 47)	1 (-47 - 46)	1 (-39 - 39)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-29. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4*****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	2.2 (-0.7 - 5.2)	2.1 (-0.7 - 4.8)	2.1 (-0.7 - 4.8)	2 (-0.7 - 4.7)	1.8 (-0.6 - 4.2)	1.7 (-0.6 - 3.9)	1.7 (-0.5 - 3.8)	1.4 (-0.5 - 3.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.1 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.7 (0.2 - 1.2)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	7.7 (-1.3 - 16.3)	7.3 (-1.2 - 15.5)	7.2 (-1.2 - 15.4)	7.1 (-1.2 - 15.2)	6.5 (-1.1 - 13.9)	6.2 (-1 - 13.3)	6.1 (-1 - 13)	5.4 (-0.9 - 11.6)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	4.2 (1.3 - 7)	4 (1.2 - 6.6)	3.9 (1.2 - 6.6)	3.9 (1.2 - 6.5)	3.5 (1.1 - 6)	3.4 (1.1 - 5.7)	3.3 (1 - 5.6)	2.9 (0.9 - 4.9)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	2.7 (-2.5 - 7.8)	2.6 (-2.4 - 7.4)	2.5 (-2.3 - 7.3)	2.5 (-2.3 - 7.2)	2.2 (-2.1 - 6.4)	2.1 (-1.9 - 6)	2 (-1.9 - 5.8)	1.7 (-1.6 - 5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1 (-0.1 - 2.1)	1 (-0.1 - 2)	0.9 (-0.1 - 2)	0.9 (-0.1 - 1.9)	0.8 (-0.1 - 1.7)	0.8 (-0.1 - 1.6)	0.8 (-0.1 - 1.6)	0.6 (-0.1 - 1.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9 (0.4 - 1.5)	0.9 (0.3 - 1.4)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.5 (0.2 - 0.9)	0.5 (0.1 - 0.8)	0.5 (0.1 - 0.8)	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.8)	0.4 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.6 (-0.2 - 1.3)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.2 (0 - 0.5)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	0.9 (-0.7 - 2.3)	0.8 (-0.6 - 2.1)	0.8 (-0.6 - 2.1)	0.8 (-0.6 - 2.1)	0.7 (-0.6 - 1.9)	0.7 (-0.5 - 1.7)	0.6 (-0.5 - 1.7)	0.5 (-0.4 - 1.5)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-14.8 (-43.7 - 12.3)	-13.9 (-40.8 - 11.5)	-13.7 (-40.3 - 11.4)	-13.5 (-39.7 - 11.2)	-12 (-35.3 - 10)	-11.2 (-33 - 9.4)	-10.9 (-32.1 - 9.1)	-9.3 (-27.2 - 7.8)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-3.6 (-31.9 - 22.9)	-3.4 (-29.8 - 21.5)	-3.3 (-29.4 - 21.2)	-3.3 (-29 - 20.9)	-2.9 (-25.8 - 18.7)	-2.7 (-24.1 - 17.5)	-2.7 (-23.5 - 17.1)	-2.3 (-19.9 - 14.6)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	4.4 (-23.5 - 30.5)	4.1 (-22 - 28.6)	4 (-21.7 - 28.2)	4 (-21.4 - 27.8)	3.6 (-19 - 24.9)	3.3 (-17.8 - 23.4)	3.2 (-17.3 - 22.8)	2.8 (-14.7 - 19.5)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	12.5 (-14.7 - 38)	11.7 (-13.8 - 35.6)	11.6 (-13.6 - 35.2)	11.4 (-13.4 - 34.7)	10.2 (-11.9 - 31.1)	9.5 (-11.2 - 29.2)	9.3 (-10.9 - 28.4)	7.9 (-9.3 - 24.3)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-10 (-36.3 - 14.4)	-9.3 (-33.9 - 13.5)	-9.2 (-33.5 - 13.3)	-9.1 (-32.9 - 13.1)	-8.1 (-29.3 - 11.7)	-7.6 (-27.4 - 11)	-7.4 (-26.6 - 10.7)	-6.3 (-22.6 - 9.1)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	9.5 (-15.5 - 32.6)	8.9 (-14.5 - 30.6)	8.8 (-14.3 - 30.2)	8.7 (-14.1 - 29.8)	7.7 (-12.5 - 26.7)	7.3 (-11.7 - 25.1)	7.1 (-11.4 - 24.4)	6 (-9.7 - 20.9)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-1.4 (-27.6 - 22.8)	-1.3 (-25.8 - 21.4)	-1.3 (-25.4 - 21.1)	-1.3 (-25 - 20.8)	-1.1 (-22.3 - 18.6)	-1.1 (-20.9 - 17.5)	-1 (-20.3 - 17)	-0.9 (-17.2 - 14.5)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.6 (-25.4 - 24.6)	0.5 (-23.8 - 23.1)	0.5 (-23.5 - 22.8)	0.5 (-23.1 - 22.5)	0.5 (-20.6 - 20.1)	0.4 (-19.2 - 18.9)	0.4 (-18.7 - 18.4)	0.4 (-15.9 - 15.7)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-30. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.5% (-0.2% - 1.1%)	0.5% (-0.1% - 1.1%)	0.5% (-0.1% - 1%)	0.4% (-0.1% - 1%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.7% (-0.3% - 3.6%)	1.6% (-0.3% - 3.4%)	1.6% (-0.3% - 3.4%)	1.6% (-0.3% - 3.3%)	1.4% (-0.2% - 3%)	1.4% (-0.2% - 2.9%)	1.3% (-0.2% - 2.8%)	1.2% (-0.2% - 2.5%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.4%)	0.8% (0.3% - 1.4%)	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.6% (0.2% - 1.1%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	0.6% (-0.6% - 1.7%)	0.6% (-0.5% - 1.6%)	0.6% (-0.5% - 1.6%)	0.5% (-0.5% - 1.6%)	0.5% (-0.5% - 1.4%)	0.5% (-0.4% - 1.3%)	0.4% (-0.4% - 1.3%)	0.4% (-0.3% - 1.1%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.9% (-0.1% - 1.8%)	0.8% (-0.1% - 1.7%)	0.8% (-0.1% - 1.7%)	0.8% (-0.1% - 1.6%)	0.7% (-0.1% - 1.5%)	0.7% (-0.1% - 1.4%)	0.6% (-0.1% - 1.3%)	0.5% (-0.1% - 1.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.3%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 1%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	2.2% (-1.8% - 5.9%)	2.1% (-1.7% - 5.6%)	2.1% (-1.7% - 5.5%)	2.1% (-1.7% - 5.4%)	1.8% (-1.5% - 4.9%)	1.7% (-1.4% - 4.6%)	1.7% (-1.3% - 4.5%)	1.4% (-1.1% - 3.8%)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-1.4% (-4.2% - 1.2%)	-1.3% (-3.9% - 1.1%)	-1.3% (-3.9% - 1.1%)	-1.3% (-3.8% - 1.1%)	-1.2% (-3.4% - 1%)	-1.1% (-3.2% - 0.9%)	-1.1% (-3.1% - 0.9%)	-0.9% (-2.6% - 0.8%)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-0.3% (-3.1% - 2.2%)	-0.3% (-2.9% - 2.1%)	-0.3% (-2.8% - 2%)	-0.3% (-2.8% - 2%)	-0.3% (-2.5% - 1.8%)	-0.3% (-2.3% - 1.7%)	-0.3% (-2.3% - 1.6%)	-0.2% (-1.9% - 1.4%)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	0.4% (-2.3% - 2.9%)	0.4% (-2.1% - 2.8%)	0.4% (-2.1% - 2.7%)	0.4% (-2.1% - 2.7%)	0.3% (-1.8% - 2.4%)	0.3% (-1.7% - 2.3%)	0.3% (-1.7% - 2.2%)	0.3% (-1.4% - 1.9%)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	1.2% (-1.4% - 3.7%)	1.1% (-1.3% - 3.4%)	1.1% (-1.3% - 3.4%)	1.1% (-1.3% - 3.3%)	1% (-1.2% - 3%)	0.9% (-1.1% - 2.8%)	0.9% (-1% - 2.7%)	0.8% (-0.9% - 2.3%)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-1.2% (-4.5% - 1.8%)	-1.2% (-4.2% - 1.7%)	-1.2% (-4.2% - 1.7%)	-1.1% (-4.1% - 1.6%)	-1% (-3.7% - 1.5%)	-0.9% (-3.4% - 1.4%)	-0.9% (-3.3% - 1.3%)	-0.8% (-2.8% - 1.1%)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	1.2% (-1.9% - 4.1%)	1.1% (-1.8% - 3.8%)	1.1% (-1.8% - 3.8%)	1.1% (-1.8% - 3.7%)	1% (-1.6% - 3.3%)	0.9% (-1.5% - 3.1%)	0.9% (-1.4% - 3.1%)	0.8% (-1.2% - 2.6%)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-0.2% (-3.5% - 2.9%)	-0.2% (-3.2% - 2.7%)	-0.2% (-3.2% - 2.6%)	-0.2% (-3.1% - 2.6%)	-0.1% (-2.8% - 2.3%)	-0.1% (-2.6% - 2.2%)	-0.1% (-2.5% - 2.1%)	-0.1% (-2.2% - 1.8%)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.1% (-3.2% - 3.1%)	0.1% (-3% - 2.9%)	0.1% (-2.9% - 2.9%)	0.1% (-2.9% - 2.8%)	0.1% (-2.6% - 2.5%)	0.1% (-2.4% - 2.4%)	0.1% (-2.3% - 2.3%)	0% (-2% - 2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-31. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	22 (1 - 42)	20 (1 - 39)	19 (1 - 37)	17 (1 - 32)	16 (1 - 30)	15 (1 - 28)	13 (1 - 25)	8 (0 - 15)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	11 (4 - 18)	10 (3 - 16)	10 (3 - 16)	8 (3 - 13)	8 (3 - 13)	7 (2 - 12)	6 (2 - 11)	4 (1 - 6)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	70 (6 - 132)	66 (6 - 126)	65 (6 - 123)	59 (5 - 112)	57 (5 - 109)	55 (5 - 104)	52 (5 - 99)	42 (4 - 80)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	58 (18 - 98)	55 (17 - 93)	54 (17 - 91)	49 (15 - 83)	48 (15 - 81)	46 (14 - 77)	43 (14 - 73)	35 (11 - 59)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	8 (-1 - 16)	7 (-1 - 15)	7 (-1 - 15)	6 (-1 - 12)	6 (-1 - 12)	5 (-1 - 11)	5 (-1 - 10)	3 (0 - 6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	8 (3 - 13)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)	3 (1 - 5)	3 (1 - 5)	3 (1 - 4)	2 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	4 (1 - 7)	3 (1 - 6)	3 (1 - 6)	3 (1 - 5)	3 (0 - 5)	3 (0 - 5)	2 (0 - 4)	1 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	5 (-2 - 11)	4 (-2 - 10)	4 (-2 - 10)	4 (-1 - 8)	3 (-1 - 8)	3 (-1 - 7)	3 (-1 - 7)	2 (-1 - 4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	3 (0 - 6)	3 (0 - 6)	3 (0 - 6)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	1 (0 - 2)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-32. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.6 (0 - 1.2)	0.6 (0 - 1.1)	0.6 (0 - 1.1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.2 (0 - 0.4)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	2 (0.2 - 3.9)	1.9 (0.2 - 3.7)	1.9 (0.2 - 3.6)	1.7 (0.2 - 3.3)	1.7 (0.2 - 3.2)	1.6 (0.1 - 3.1)	1.5 (0.1 - 2.9)	1.2 (0.1 - 2.3)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	1.7 (0.5 - 2.9)	1.6 (0.5 - 2.7)	1.6 (0.5 - 2.7)	1.4 (0.5 - 2.4)	1.4 (0.4 - 2.4)	1.3 (0.4 - 2.3)	1.3 (0.4 - 2.1)	1 (0.3 - 1.7)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.1 (-0.1 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-33. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	0.8% (0.1% - 1.5%)	0.7% (0.1% - 1.4%)	0.7% (0.1% - 1.4%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0% - 0.9%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.1% (0.1% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-34. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	18 (1 - 34)	16 (1 - 32)	16 (1 - 31)	13 (1 - 26)	13 (1 - 25)	12 (1 - 23)	11 (1 - 21)	7 (0 - 13)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (3 - 15)	8 (3 - 13)	8 (3 - 13)	7 (2 - 11)	6 (2 - 10)	6 (2 - 10)	5 (2 - 9)	3 (1 - 5)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	63 (6 - 119)	59 (5 - 113)	58 (5 - 110)	53 (5 - 100)	51 (5 - 97)	48 (4 - 92)	46 (4 - 87)	36 (3 - 69)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	53 (16 - 88)	50 (16 - 84)	49 (15 - 82)	44 (14 - 74)	43 (13 - 72)	40 (13 - 68)	38 (12 - 64)	30 (9 - 51)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-1 - 13)	6 (-1 - 12)	6 (-1 - 12)	5 (-1 - 10)	5 (-1 - 10)	4 (-1 - 9)	4 (0 - 8)	2 (0 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 10)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 7)	4 (2 - 7)	4 (1 - 6)	2 (1 - 4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)	3 (1 - 5)	3 (1 - 4)	2 (1 - 4)	2 (1 - 4)	1 (0 - 2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	3 (1 - 6)	3 (1 - 5)	3 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	1 (0 - 2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	4 (-1 - 9)	4 (-1 - 8)	3 (-1 - 8)	3 (-1 - 7)	3 (-1 - 7)	3 (-1 - 6)	2 (-1 - 5)	1 (-1 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	3 (0 - 5)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	2 (0 - 3)	1 (0 - 2)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-35. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (0 - 1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.2 (0 - 0.4)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.8 (0.2 - 3.5)	1.7 (0.2 - 3.3)	1.7 (0.2 - 3.2)	1.5 (0.1 - 2.9)	1.5 (0.1 - 2.9)	1.4 (0.1 - 2.7)	1.3 (0.1 - 2.6)	1.1 (0.1 - 2)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	1.5 (0.5 - 2.6)	1.5 (0.5 - 2.5)	1.4 (0.4 - 2.4)	1.3 (0.4 - 2.2)	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.1 (0.4 - 1.9)	0.9 (0.3 - 1.5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0 (0 - 0.1)				
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0 (0 - 0.1)					
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0 (0 - 0.1)	0 (0 - 0.1)				

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-36. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	0.7% (0.1% - 1.3%)	0.7% (0.1% - 1.2%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.4% (0% - 0.8%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-37. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2004 Q Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	31 (-74 - 135)	30 (-72 - 131)	27 (-66 - 120)	22 (-52 - 95)	20 (-49 - 90)	19 (-46 - 83)	16 (-38 - 69)	9 (-22 - 41)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	67 (22 - 111)	64 (22 - 107)	59 (20 - 98)	47 (16 - 78)	44 (15 - 74)	41 (14 - 68)	34 (11 - 56)	20 (7 - 33)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	50 (0 - 98)	48 (0 - 95)	44 (0 - 88)	35 (0 - 69)	33 (0 - 65)	30 (0 - 61)	25 (0 - 50)	15 (0 - 30)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	57 (22 - 93)	56 (21 - 90)	51 (19 - 83)	40 (15 - 65)	38 (15 - 62)	35 (13 - 57)	29 (11 - 47)	17 (7 - 28)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	32 (9 - 54)	31 (9 - 53)	28 (8 - 48)	22 (7 - 38)	21 (6 - 36)	20 (6 - 33)	16 (5 - 28)	10 (3 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO <sub>2</sub>	28 (5 - 50)	27 (5 - 49)	25 (4 - 45)	19 (3 - 35)	18 (3 - 34)	17 (3 - 31)	14 (3 - 26)	8 (1 - 15)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM <sub>10</sub>	34 (-13 - 81)	33 (-13 - 78)	30 (-12 - 72)	24 (-9 - 57)	23 (-9 - 54)	21 (-8 - 50)	17 (-7 - 41)	10 (-4 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO <sub>2</sub>	24 (0 - 47)	23 (0 - 46)	21 (0 - 42)	17 (0 - 33)	16 (0 - 31)	15 (0 - 29)	12 (0 - 24)	7 (0 - 14)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	38 (-16 - 90)	37 (-16 - 88)	34 (-15 - 82)	28 (-12 - 67)	27 (-11 - 64)	25 (-11 - 61)	21 (-9 - 51)	13 (-6 - 32)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	28 (-36 - 90)	27 (-35 - 89)	26 (-34 - 85)	23 (-29 - 73)	22 (-28 - 71)	21 (-27 - 69)	19 (-24 - 61)	14 (-18 - 45)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-38. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.3 (-0.8 - 1.4)	0.3 (-0.8 - 1.4)	0.3 (-0.7 - 1.3)	0.2 (-0.5 - 1)	0.2 (-0.5 - 0.9)	0.2 (-0.5 - 0.9)	0.2 (-0.4 - 0.7)	0.1 (-0.2 - 0.4)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0 - 1)	0.5 (0 - 1)	0.5 (0 - 0.9)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.2 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.1 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.1)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.4 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.4)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.3 (-0.4 - 1.1)	0.3 (-0.4 - 1.1)	0.3 (-0.4 - 1)	0.3 (-0.3 - 0.9)	0.3 (-0.3 - 0.9)	0.3 (-0.3 - 0.8)	0.2 (-0.3 - 0.7)	0.2 (-0.2 - 0.5)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-39. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2004 Q Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.3%)	0.1% (-0.2% - 0.3%)	0.1% (-0.2% - 0.3%)	0.1% (-0.1% - 0.3%)	0% (-0.1% - 0.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.7% (0% - 1.3%)	0.6% (0% - 1.3%)	0.6% (0% - 1.2%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.2% (0% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.6%)	0.2% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.3% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.2% (-0.1% - 0.6%)	0.1% (-0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.9% (-0.4% - 2.1%)	0.8% (-0.4% - 2%)	0.8% (-0.3% - 1.9%)	0.6% (-0.3% - 1.5%)	0.6% (-0.3% - 1.5%)	0.6% (-0.2% - 1.4%)	0.5% (-0.2% - 1.2%)	0.3% (-0.1% - 0.7%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.8% (-1% - 2.5%)	0.7% (-1% - 2.4%)	0.7% (-0.9% - 2.3%)	0.6% (-0.8% - 2%)	0.6% (-0.8% - 1.9%)	0.6% (-0.7% - 1.9%)	0.5% (-0.7% - 1.7%)	0.4% (-0.5% - 1.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the Qcoefficient.

**Table D-40. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	24 (-58 - 105)	23 (-55 - 100)	21 (-50 - 91)	15 (-36 - 66)	15 (-35 - 64)	13 (-32 - 59)	11 (-26 - 48)	7 (-16 - 29)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	52 (17 - 86)	49 (17 - 82)	45 (15 - 74)	33 (11 - 54)	32 (11 - 53)	29 (10 - 48)	24 (8 - 39)	14 (5 - 23)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	38 (0 - 76)	37 (0 - 73)	33 (0 - 66)	24 (0 - 48)	24 (0 - 47)	22 (0 - 43)	18 (0 - 35)	11 (0 - 21)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	45 (17 - 72)	43 (16 - 69)	39 (15 - 62)	28 (11 - 45)	27 (10 - 44)	25 (10 - 41)	20 (8 - 33)	12 (5 - 20)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	25 (7 - 42)	24 (7 - 40)	21 (6 - 37)	16 (5 - 27)	15 (4 - 26)	14 (4 - 24)	11 (3 - 19)	7 (2 - 12)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO <sub>2</sub>	22 (4 - 39)	21 (4 - 37)	19 (3 - 34)	14 (2 - 25)	13 (2 - 24)	12 (2 - 22)	10 (2 - 18)	6 (1 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM <sub>10</sub>	27 (-10 - 63)	25 (-10 - 60)	23 (-9 - 55)	17 (-6 - 40)	16 (-6 - 39)	15 (-6 - 35)	12 (-5 - 29)	7 (-3 - 17)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO <sub>2</sub>	18 (0 - 37)	18 (0 - 35)	16 (0 - 32)	12 (0 - 23)	11 (0 - 22)	10 (0 - 21)	8 (0 - 17)	5 (0 - 10)
Hospital admissions (unscheduled), pulmonary illness --	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	34 (-15 - 82)	33 (-14 - 80)	31 (-13 - 74)	24 (-10 - 59)	24 (-10 - 58)	23 (-10 - 55)	19 (-8 - 46)	12 (-5 - 28)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	27 (-35 - 87)	26 (-34 - 85)	25 (-32 - 81)	21 (-27 - 69)	21 (-27 - 68)	20 (-26 - 66)	18 (-23 - 58)	13 (-17 - 43)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-41. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.3 (-0.6 - 1.1)	0.2 (-0.6 - 1.1)	0.2 (-0.5 - 1)	0.2 (-0.4 - 0.7)	0.2 (-0.4 - 0.7)	0.1 (-0.3 - 0.6)	0.1 (-0.3 - 0.5)	0.1 (-0.2 - 0.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.4 (0 - 0.8)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 0.9)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.2 (-0.1 - 0.5)	0.1 (-0.1 - 0.3)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.3 (-0.4 - 1)	0.3 (-0.4 - 1)	0.3 (-0.4 - 1)	0.3 (-0.3 - 0.8)	0.2 (-0.3 - 0.8)	0.2 (-0.3 - 0.8)	0.2 (-0.3 - 0.7)	0.2 (-0.2 - 0.5)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-42. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2002 Q Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.3%)	0.1% (-0.1% - 0.2%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.2%)	0% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.5% (0% - 1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.7% (-0.3% - 1.7%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.3%)	0.4% (-0.2% - 1.1%)	0.3% (-0.1% - 0.6%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)*****	30+	0-day lag	24 hr avg.	none	0.7% (-0.9% - 2.4%)	0.7% (-0.9% - 2.3%)	0.7% (-0.9% - 2.2%)	0.6% (-0.7% - 1.9%)	0.6% (-0.7% - 1.9%)	0.5% (-0.7% - 1.8%)	0.5% (-0.6% - 1.6%)	0.4% (-0.5% - 1.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles County.

\*\*\*\*\*Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the Qcoefficient.

**Table D-43. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	15 (5 - 25)	15 (5 - 25)	13 (4 - 22)	13 (4 - 21)	12 (4 - 20)	11 (4 - 19)	9 (3 - 15)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	59 (37 - 81)	54 (34 - 75)	54 (34 - 74)	47 (30 - 65)	46 (29 - 63)	42 (27 - 58)	41 (26 - 56)	33 (21 - 46)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	59 (28 - 90)	54 (26 - 82)	53 (25 - 81)	47 (22 - 71)	46 (22 - 69)	42 (20 - 64)	41 (19 - 62)	33 (16 - 50)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	15 (1 - 28)	14 (1 - 26)	13 (1 - 26)	12 (1 - 23)	11 (1 - 22)	10 (0 - 20)	10 (0 - 20)	8 (0 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (5 - 19)	11 (4 - 18)	11 (4 - 18)	10 (4 - 16)	9 (4 - 15)	9 (3 - 14)	8 (3 - 13)	7 (3 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	7 (2 - 11)	6 (2 - 11)	6 (2 - 10)	5 (2 - 9)	5 (2 - 9)	5 (1 - 8)	5 (1 - 8)	4 (1 - 6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	6 (1 - 11)	5 (1 - 10)	5 (1 - 10)	5 (1 - 8)	5 (1 - 8)	4 (1 - 8)	4 (1 - 7)	3 (1 - 6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	7 (-3 - 17)	7 (-3 - 16)	7 (-2 - 15)	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 12)	5 (-2 - 12)	4 (-2 - 10)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	5 (0 - 10)	5 (0 - 9)	5 (0 - 9)	4 (0 - 8)	4 (0 - 8)	4 (0 - 7)	3 (0 - 7)	3 (0 - 6)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-44. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	3.9 (2.5 - 5.3)	3.6 (2.3 - 4.9)	3.5 (2.2 - 4.9)	3.1 (2 - 4.3)	3 (1.9 - 4.2)	2.8 (1.8 - 3.8)	2.7 (1.7 - 3.7)	2.2 (1.4 - 3)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	3.9 (1.8 - 5.9)	3.6 (1.7 - 5.4)	3.5 (1.7 - 5.4)	3.1 (1.5 - 4.7)	3 (1.4 - 4.6)	2.8 (1.3 - 4.2)	2.7 (1.3 - 4.1)	2.2 (1 - 3.3)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1 (0 - 1.9)	0.9 (0 - 1.7)	0.9 (0 - 1.7)	0.8 (0 - 1.5)	0.8 (0 - 1.5)	0.7 (0 - 1.3)	0.7 (0 - 1.3)	0.5 (0 - 1.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.2)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-45. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	0.7% (0.5% - 1%)	0.7% (0.4% - 0.9%)	0.7% (0.4% - 0.9%)	0.6% (0.4% - 0.8%)	0.6% (0.4% - 0.8%)	0.5% (0.3% - 0.7%)	0.5% (0.3% - 0.7%)	0.4% (0.3% - 0.6%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO <sub>2</sub>	0.7% (0.3% - 1.1%)	0.7% (0.3% - 1%)	0.7% (0.3% - 1%)	0.6% (0.3% - 0.9%)	0.6% (0.3% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.8% (0% - 1.5%)	0.7% (0% - 1.4%)	0.7% (0% - 1.4%)	0.6% (0% - 1.2%)	0.6% (0% - 1.2%)	0.6% (0% - 1.1%)	0.6% (0% - 1.1%)	0.4% (0% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-46. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	30 (10 - 50)	28 (10 - 47)	28 (9 - 47)	26 (9 - 43)	26 (9 - 42)	24 (8 - 40)	24 (8 - 40)	21 (7 - 35)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	107 (67 - 146)	101 (63 - 138)	101 (63 - 137)	93 (58 - 127)	91 (57 - 124)	86 (54 - 117)	85 (53 - 116)	75 (47 - 103)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO <sub>2</sub>	106 (51 - 161)	100 (48 - 152)	100 (48 - 151)	92 (44 - 140)	90 (43 - 137)	85 (41 - 129)	84 (40 - 128)	75 (36 - 114)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	26 (1 - 51)	25 (1 - 48)	25 (1 - 48)	23 (1 - 44)	23 (1 - 44)	21 (1 - 41)	21 (1 - 41)	19 (1 - 36)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	22 (8 - 35)	21 (8 - 33)	21 (8 - 33)	19 (7 - 30)	19 (7 - 30)	18 (7 - 28)	17 (7 - 28)	15 (6 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	12 (4 - 21)	11 (3 - 19)	11 (3 - 19)	11 (3 - 18)	10 (3 - 18)	10 (3 - 17)	10 (3 - 16)	9 (3 - 15)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	11 (2 - 19)	10 (2 - 18)	10 (2 - 18)	9 (2 - 17)	9 (2 - 16)	8 (2 - 15)	8 (1 - 15)	7 (1 - 14)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	13 (-5 - 31)	12 (-5 - 29)	12 (-5 - 29)	11 (-4 - 27)	11 (-4 - 26)	10 (-4 - 25)	10 (-4 - 24)	9 (-4 - 22)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	9 (0 - 18)	8 (0 - 17)	8 (0 - 17)	8 (0 - 16)	8 (0 - 15)	7 (0 - 14)	7 (0 - 14)	6 (0 - 13)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-47. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2 (0.7 - 3.3)	1.9 (0.6 - 3.1)	1.9 (0.6 - 3.1)	1.7 (0.6 - 2.9)	1.7 (0.6 - 2.8)	1.6 (0.5 - 2.6)	1.6 (0.5 - 2.6)	1.4 (0.5 - 2.3)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	7 (4.4 - 9.6)	6.6 (4.2 - 9.1)	6.6 (4.2 - 9.1)	6.1 (3.9 - 8.4)	6 (3.8 - 8.2)	5.7 (3.6 - 7.7)	5.6 (3.5 - 7.6)	5 (3.1 - 6.8)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO <sub>2</sub>	7 (3.3 - 10.6)	6.6 (3.2 - 10)	6.6 (3.1 - 10)	6.1 (2.9 - 9.2)	6 (2.8 - 9)	5.6 (2.7 - 8.5)	5.6 (2.7 - 8.4)	4.9 (2.4 - 7.5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1.7 (0.1 - 3.4)	1.6 (0.1 - 3.2)	1.6 (0.1 - 3.2)	1.5 (0.1 - 2.9)	1.5 (0.1 - 2.9)	1.4 (0.1 - 2.7)	1.4 (0.1 - 2.7)	1.2 (0.1 - 2.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.4 (0.5 - 2.3)	1.4 (0.5 - 2.2)	1.4 (0.5 - 2.2)	1.2 (0.5 - 2)	1.2 (0.5 - 2)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1 (0.4 - 1.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.8 (0.2 - 1.4)	0.8 (0.2 - 1.3)	0.8 (0.2 - 1.3)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.7 (0.1 - 1.3)	0.7 (0.1 - 1.2)	0.7 (0.1 - 1.2)	0.6 (0.1 - 1.1)	0.6 (0.1 - 1.1)	0.6 (0.1 - 1)	0.6 (0.1 - 1)	0.5 (0.1 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.9 (-0.3 - 2)	0.8 (-0.3 - 1.9)	0.8 (-0.3 - 1.9)	0.7 (-0.3 - 1.8)	0.7 (-0.3 - 1.7)	0.7 (-0.3 - 1.6)	0.7 (-0.3 - 1.6)	0.6 (-0.2 - 1.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.6 (0 - 1.2)	0.6 (0 - 1.1)	0.6 (0 - 1.1)	0.5 (0 - 1)	0.5 (0 - 1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-48. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	1.3% (0.8% - 1.8%)	1.3% (0.8% - 1.7%)	1.3% (0.8% - 1.7%)	1.2% (0.7% - 1.6%)	1.1% (0.7% - 1.5%)	1.1% (0.7% - 1.5%)	1.1% (0.7% - 1.4%)	0.9% (0.6% - 1.3%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO <sub>2</sub>	1.3% (0.6% - 2%)	1.2% (0.6% - 1.9%)	1.2% (0.6% - 1.9%)	1.1% (0.5% - 1.7%)	1.1% (0.5% - 1.7%)	1.1% (0.5% - 1.6%)	1% (0.5% - 1.6%)	0.9% (0.4% - 1.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1.4% (0.1% - 2.8%)	1.4% (0.1% - 2.6%)	1.4% (0.1% - 2.6%)	1.2% (0.1% - 2.4%)	1.2% (0.1% - 2.4%)	1.2% (0.1% - 2.2%)	1.1% (0.1% - 2.2%)	1% (0% - 2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.2% (0.5% - 1.9%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.8%)	1% (0.4% - 1.7%)	1% (0.4% - 1.6%)	1% (0.4% - 1.5%)	0.9% (0.4% - 1.5%)	0.8% (0.3% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO <sub>2</sub>	0.6% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM <sub>10</sub>	0.7% (-0.3% - 1.7%)	0.7% (-0.3% - 1.6%)	0.7% (-0.3% - 1.6%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO <sub>2</sub>	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.5% (0% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-49. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	8 (-25 - 42)	8 (-25 - 41)	8 (-23 - 39)	7 (-21 - 35)	7 (-21 - 34)	7 (-20 - 34)	6 (-19 - 31)	5 (-16 - 26)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 21)	12 (4 - 20)	11 (4 - 19)	10 (4 - 17)	10 (3 - 17)	10 (3 - 17)	9 (3 - 15)	8 (3 - 13)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-50. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.7 (-2.1 - 3.4)	0.7 (-2 - 3.3)	0.6 (-1.9 - 3.1)	0.6 (-1.8 - 2.9)	0.6 (-1.7 - 2.8)	0.5 (-1.7 - 2.7)	0.5 (-1.5 - 2.5)	0.4 (-1.3 - 2.2)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1.1)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-51. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (-0.6% - 1%)	0.2% (-0.6% - 1%)	0.2% (-0.6% - 0.9%)	0.2% (-0.5% - 0.8%)	0.2% (-0.5% - 0.8%)	0.2% (-0.5% - 0.8%)	0.1% (-0.5% - 0.7%)	0.1% (-0.4% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-52. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	12 (-37 - 60)	12 (-36 - 58)	11 (-35 - 57)	11 (-32 - 53)	10 (-32 - 52)	10 (-31 - 50)	10 (-30 - 49)	9 (-27 - 44)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	18 (6 - 30)	17 (6 - 29)	17 (6 - 28)	16 (5 - 26)	15 (5 - 26)	15 (5 - 25)	14 (5 - 24)	13 (4 - 22)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-53. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1 (-3 - 4.9)	1 (-2.9 - 4.8)	0.9 (-2.8 - 4.6)	0.9 (-2.6 - 4.3)	0.9 (-2.6 - 4.2)	0.8 (-2.5 - 4.1)	0.8 (-2.4 - 4)	0.7 (-2.2 - 3.6)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.5 (0.5 - 2.4)	1.4 (0.5 - 2.4)	1.4 (0.5 - 2.3)	1.3 (0.4 - 2.1)	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.2 (0.4 - 2)	1.1 (0.4 - 1.8)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-54. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.9% - 1.4%)	0.3% (-0.8% - 1.4%)	0.3% (-0.8% - 1.3%)	0.3% (-0.8% - 1.3%)	0.2% (-0.8% - 1.2%)	0.2% (-0.7% - 1.2%)	0.2% (-0.7% - 1.2%)	0.2% (-0.6% - 1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-55. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	3 (-4 - 9)	2 (-4 - 8)	2 (-4 - 8)	2 (-3 - 6)	2 (-3 - 6)	1 (-2 - 5)	1 (-2 - 5)	1 (-1 - 3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2 (1 - 4)	2 (1 - 3)	2 (1 - 3)	2 (1 - 3)	1 (0 - 2)	1 (0 - 2)	1 (0 - 2)	1 (0 - 1)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-56. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.7 (-1.2 - 2.7)	0.7 (-1.1 - 2.4)	0.6 (-1 - 2.3)	0.5 (-0.8 - 1.8)	0.5 (-0.8 - 1.7)	0.4 (-0.7 - 1.5)	0.4 (-0.6 - 1.3)	0.2 (-0.4 - 0.9)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-57. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.1% (-0.2% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-58. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	5 (-9 - 20)	5 (-9 - 19)	5 (-8 - 18)	4 (-8 - 16)	4 (-7 - 15)	4 (-7 - 15)	4 (-6 - 14)	3 (-5 - 12)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	5 (2 - 8)	5 (2 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-59. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1.6 (-2.6 - 5.6)	1.5 (-2.5 - 5.4)	1.4 (-2.4 - 5.2)	1.3 (-2.2 - 4.7)	1.2 (-2.1 - 4.5)	1.2 (-2 - 4.3)	1.1 (-1.8 - 4)	0.9 (-1.5 - 3.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.4 (0.5 - 2.3)	1.3 (0.4 - 2.2)	1.3 (0.4 - 2.1)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1.1 (0.4 - 1.8)	1 (0.3 - 1.6)	0.8 (0.3 - 1.4)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-60. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.5% - 1%)	0.3% (-0.4% - 0.9%)	0.2% (-0.4% - 0.9%)	0.2% (-0.4% - 0.8%)	0.2% (-0.4% - 0.8%)	0.2% (-0.3% - 0.7%)	0.2% (-0.3% - 0.7%)	0.2% (-0.3% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-61. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	7 (2 - 12)	6 (2 - 10)	6 (2 - 11)	6 (2 - 9)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	4 (1 - 7)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-62. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.2 (0.4 - 2.1)	1 (0.3 - 1.7)	1.1 (0.4 - 1.9)	1 (0.3 - 1.6)	1 (0.3 - 1.6)	0.8 (0.3 - 1.4)	0.9 (0.3 - 1.5)	0.7 (0.2 - 1.2)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-63. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2004 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)				

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-64. Estimated Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 23)	12 (4 - 20)	13 (4 - 21)	12 (4 - 19)	12 (4 - 19)	10 (3 - 17)	11 (4 - 18)	10 (3 - 16)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-65. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2.4 (0.8 - 3.9)	2.1 (0.7 - 3.5)	2.2 (0.8 - 3.7)	2 (0.7 - 3.4)	2 (0.7 - 3.4)	1.8 (0.6 - 3)	1.9 (0.6 - 3.2)	1.7 (0.6 - 2.9)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

**Table D-66. Estimated Percent of Total Incidence of Health Risks Associated with O<sub>3</sub> Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2002 O<sub>3</sub> Concentrations**

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O <sub>3</sub> Concentrations that Just Meet the Current and Alternative O <sub>3</sub> Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.7%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)

\*Health effects are associated with short-term exposures to O<sub>3</sub>.

\*\*Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

\*\*\*An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average using the current rounding convention.

\*\*\*\*This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O<sub>3</sub> coefficient.

## **Appendix E: Calculation of Risk Above Policy Relevant Background**

## Appendix E: Calculation of Risk Above Policy Relevant Background

The estimated policy relevant background (PRB) ozone concentrations that we are using are derived from GEOS-CHEM model predictions, and the measured ambient ozone concentrations are sometimes lower than these PRB values. There is a question of how to best treat this in our estimation of risk above PRB.

Let  $x_0$  denote the “as is” (ambient)  $O_3$  level, and  $y_0$  denote the corresponding baseline incidence rate. The difference in health effects incidence,  $\Delta y = y_0 - y$ , corresponding to a given difference in ambient  $O_3$  levels,  $\Delta x = (x_0 - x) > 0$  can be calculated for log-linear concentration-response functions by:

$$\Delta y = y_0[1 - e^{-\beta\Delta x}] . \quad (1)$$

If we let  $\Delta x = c - b$ , where  $c$  is the “as is”  $O_3$  concentration and  $b$  = the PRB  $O_3$  concentration, the risk above background ( $\Delta y = y_0 - y_b$  = the difference in health effects incidence rates from the as-is concentration incidence rate,  $y_0$ , to the PRB concentration incidence rate,  $y_b$ ) can similarly be calculated for log-linear concentration-response functions by equation 1 (where now  $\Delta y = y_0 - y_b$  and  $\Delta x = c - b$ ).

Without loss of generality we can take the baseline incidence rate  $y_0$  to be 1. Then

$$\Delta y = [1 - e^{-\beta\Delta x}] . \quad (2)$$

Now we consider the implications of different ways of calculating risk above background. To simplify this analysis, we use the approximation to equation (2), valid for  $\beta \approx 0$ ,

$$\Delta y = \beta \Delta x = \beta (c - b) . \quad (3)$$

Let  $c_t$  be the measured concentrations ( $t=1$  to  $N$ ),  $b_t$  the true background concentrations, and  $B$  the estimated background concentration. Then the overall bias,  $\theta$ , in the estimated background is given by

$$\theta = B - \frac{1}{N} \sum_t b_t \quad (4)$$

The true risk above background,  $R$ , is

$$R = \sum_t \Delta y = \beta \sum_t \Delta x = \beta \sum_t (c_t - b_t) \quad (5)$$

If the measured concentrations  $c_t$  are always greater than the estimated background  $B$ , then equation 3 (approximating equation 2) gives an estimated risk above background of

$$\hat{R} = \beta \sum_t (c_t - B) = \beta \sum_t c_t - \beta B \quad (6)$$

and the error  $E$  of this estimate is

$$E = R - \hat{R} = \beta \sum_t (c_t - b_t) - \beta \sum_t (c_t - B) = \beta \sum_t (B - b_t) = \beta N \theta \quad (7)$$

However, the measured concentrations are sometimes smaller than the estimated background. In these cases we cannot use equation 6 since it is not physically realizable. The error  $E$  of our risk estimate will depend on how we calculate risk in this situation.

**Method I.** When  $c_t < B$  we set the risk to zero in equation 6, with the rationale that, since ambient concentrations cannot go below background, we lower the estimated background concentrations in these cases down to the ambient concentration  $c_t$ .

Then the estimate of risk above background is

$$\beta \sum_{t|c_t > B} (c_t - B) \quad (8)$$

where  $t|c_t > B$  indicates the summation over all times  $t$  when  $c_t > B$ .

The error  $E$  of this estimate is

$$E = \beta \sum_t (c_t - b_t) - \beta \sum_{t|c_t > B} (c_t - B) = \beta N \theta + \beta \sum_{t|c_t \leq B} (c_t - B) \quad (9)$$

since

$$\beta \sum_t (c_t - b_t) - \beta \sum_t (c_t - B) = \beta N \theta \quad (10)$$

$$\beta \sum_t (c_t - b_t) - \beta \sum_{t|c_t > B} (c_t - B) - \beta \sum_{t|c_t \leq B} (c_t - B) = \beta N \theta \quad (11)$$

$$\beta \sum_t (c_t - b_t) - \beta \sum_{t|c_t > B} (c_t - B) = \beta N \theta + \beta \sum_{t|c_t \leq B} (c_t - B) \quad (12)$$

**Method II.** When  $c_t < B$  we set the background for that day equal to  $c_t$  and increase  $B$  on other days to yield the original monthly average background concentration, or use some other method of adjusting  $b_t$  to use daily varying background concentrations  $B_t$  that are always less than the measured concentrations and whose average is the original monthly average background concentration  $B$ . This approach places more credence on the average estimated background than on the estimated background values for individual hours. The error of this estimate of risk above background is given by

$$E = \beta \sum_t (B_t - b_t) = \beta (N B - \sum_t b_t) = \beta N \theta \quad (13)$$

## Discussion

To recap, the error of the estimate of risk if we use method I is:

$$E_I = \beta N \theta + \beta \sum_{t|c_t \leq B} (c_t - B)$$

and the error of the estimate of risk if we use method II is:

$$E_{II} = \beta N \theta .$$

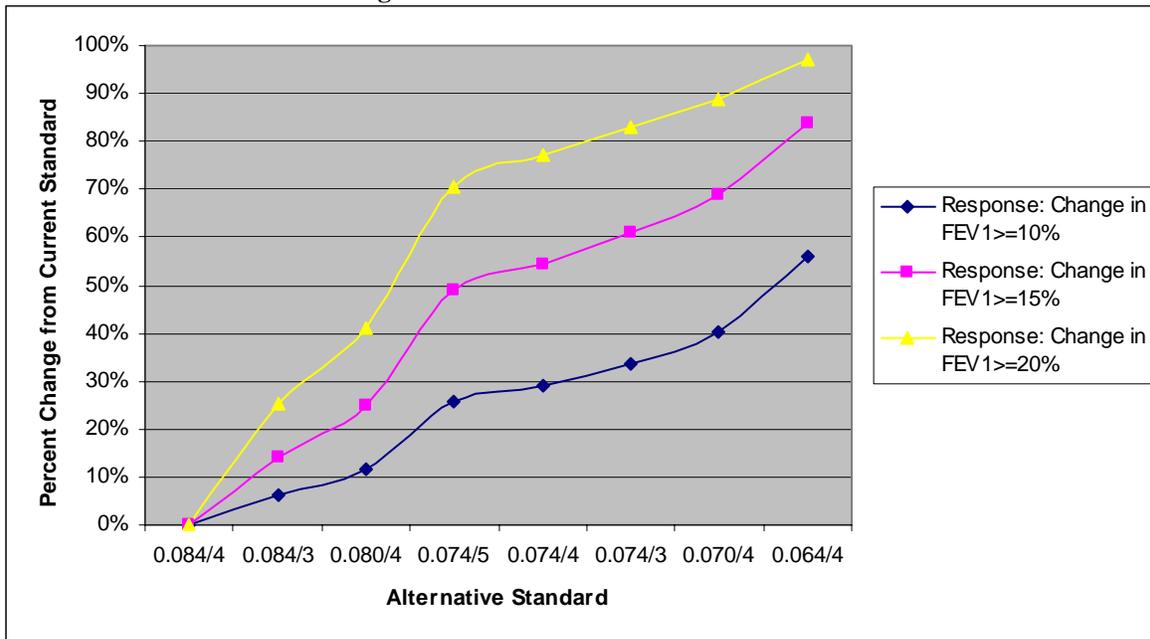
If we have overestimated background,  $\theta > 0$ , and  $E_{II} > 0$ . Since the second term in  $E_I$ ,  $\beta \sum_{t|c_t \leq B} (c_t - B)$ , must be  $\leq 0$ ,  $E_I \leq E_{II}$ . If, as is likely,  $\beta \sum_{t|c_t \leq B} (c_t - B)$  is smaller in absolute value than  $\beta N \theta$ , then  $0 \leq E_I \leq E_{II}$ .

If we have overestimated background, then, the first method would be preferable; if background is underestimated, then the second method would be more accurate. Since we believe that we have overestimated background in cases where the observed concentration is lower than the estimates background obtained from the GEOS-CHEM model, we have applied the first method in estimating risks in this draft report.

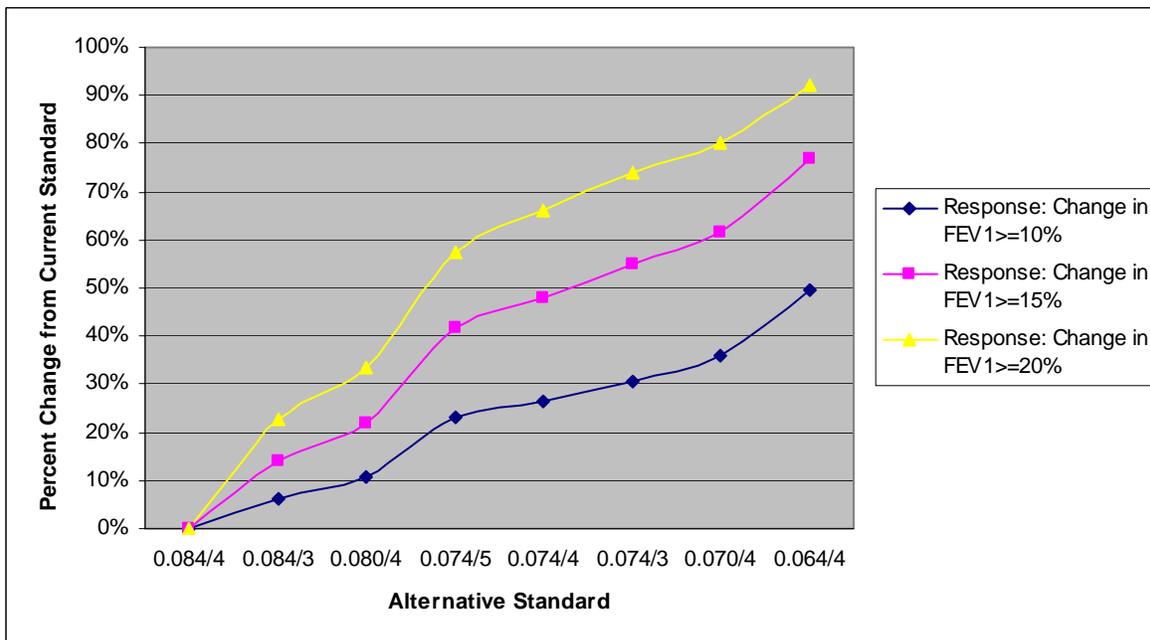
**Appendix F: Percent Changes in Numbers of Occurrences and in Numbers of All School Age Children Experiencing at Least One Occurrence of Lung Function Response when O<sub>3</sub> Concentrations are Reduced From Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard**

**Figure F-1. Percent Changes in Aggregate Numbers (Across All Locations) of Occurrences of Lung Function Response Among All School Age Children when O<sub>3</sub> Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response**

**Figure F-1a. Based on 2004 Data**

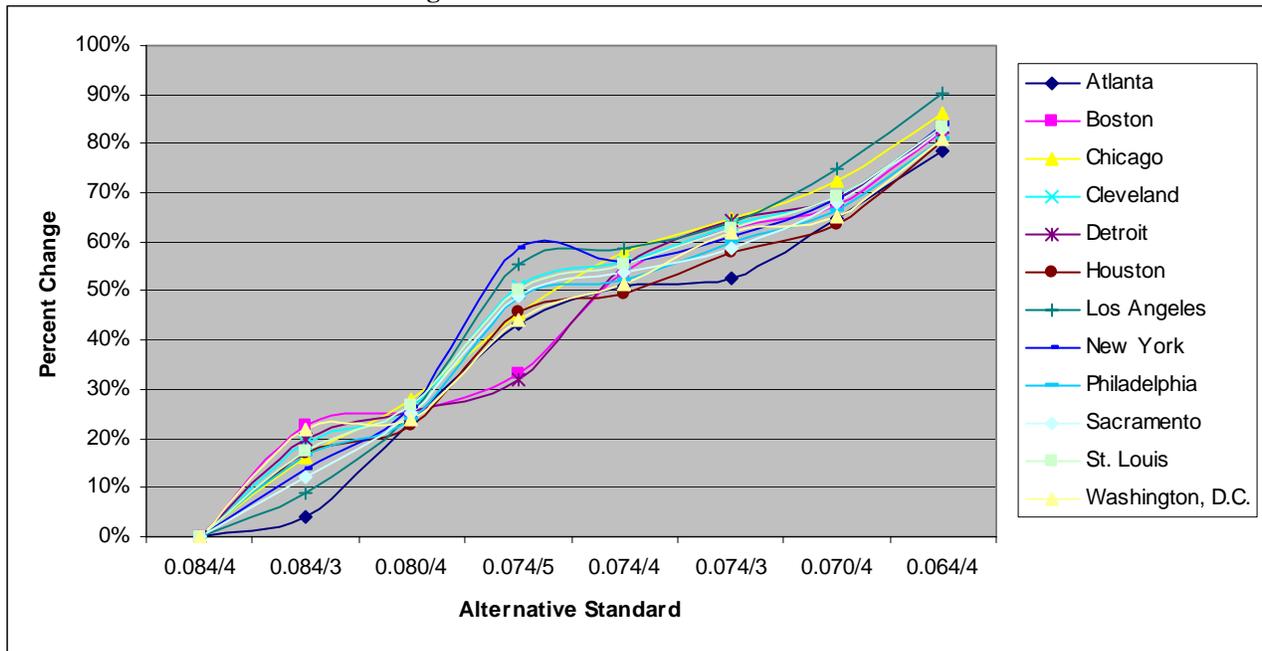


**Figure F-1b. Based on 2002 Data**

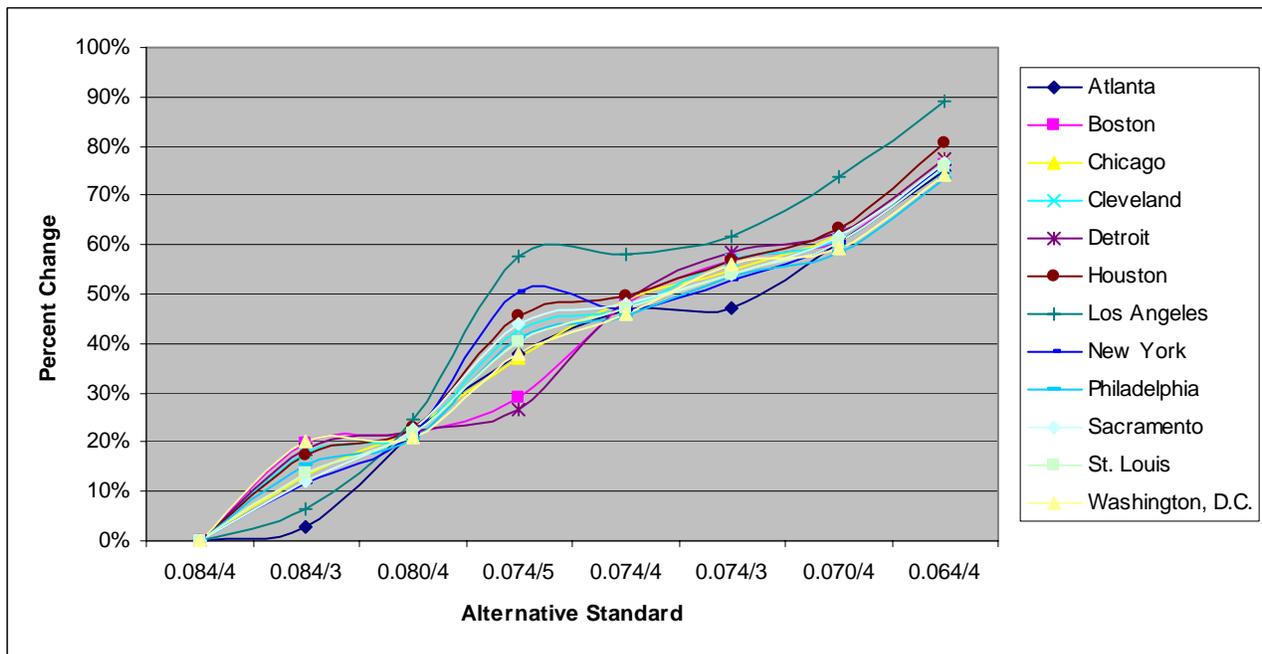


**Figure F-2. Percent Changes of Occurrences of Decrement in FEV<sub>1</sub> ≥15% Among All School Age Children when O<sub>3</sub> Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location**

**Figure F-2a. Based on 2004 Data**

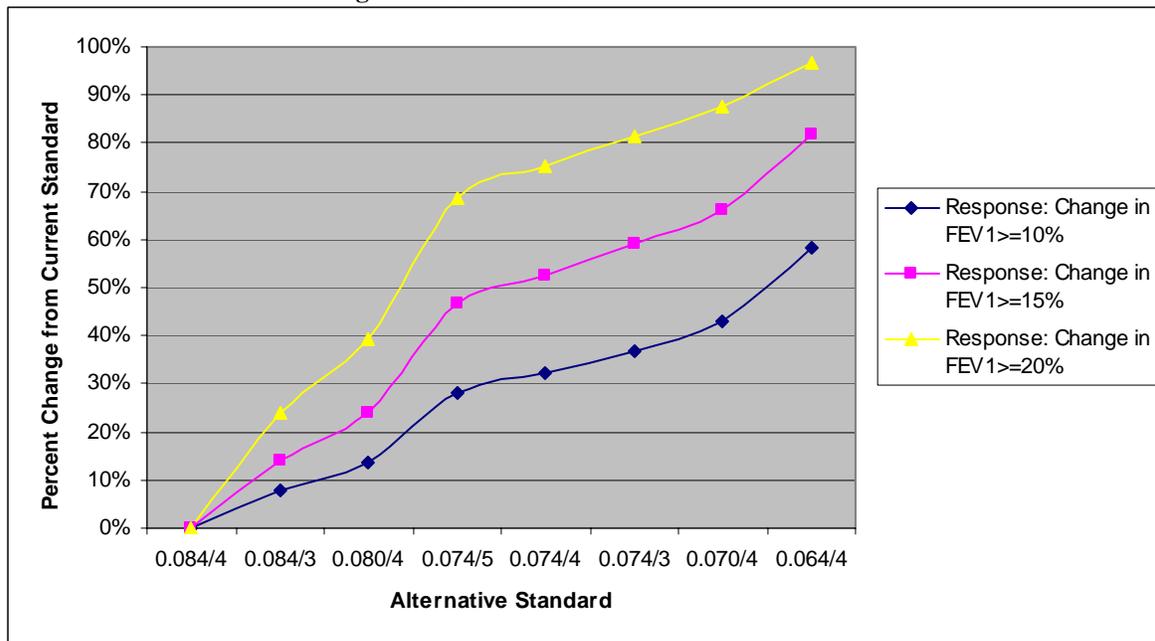


**Figure F-2b. Based on 2002 Data**

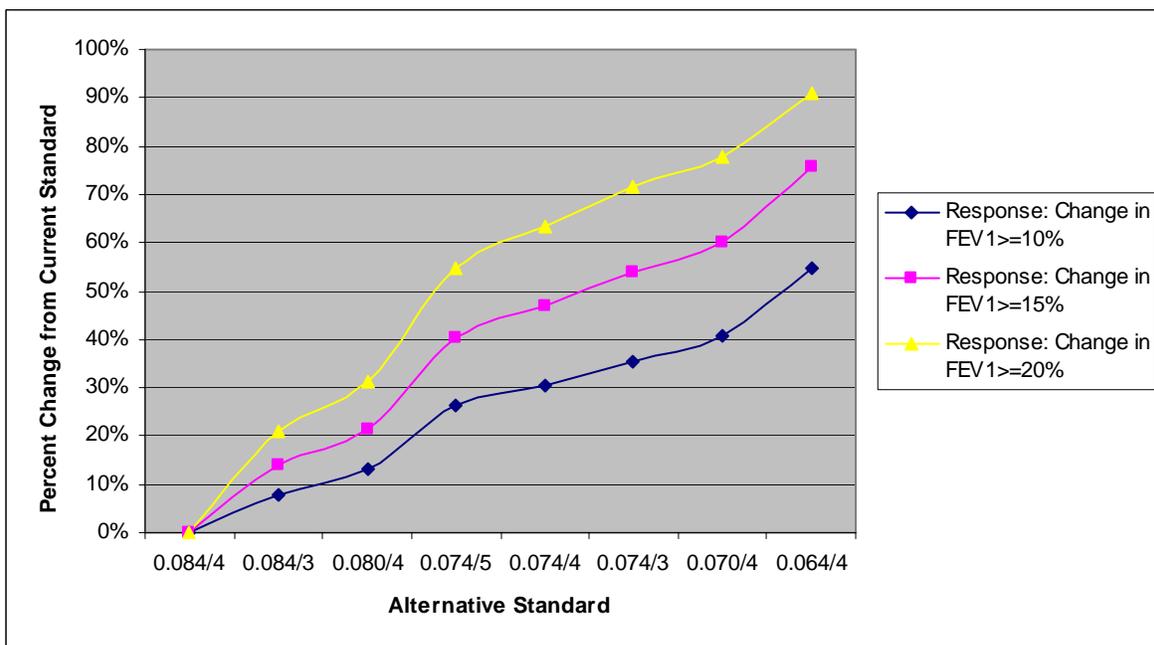


**Figure F-3. Percent Changes in Aggregate Numbers (Across All Locations) of All School Age Children Experiencing at Least One Occurrence of Lung Function Response when O<sub>3</sub> Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response**

**Figure F-3a. Based on 2004 Data**

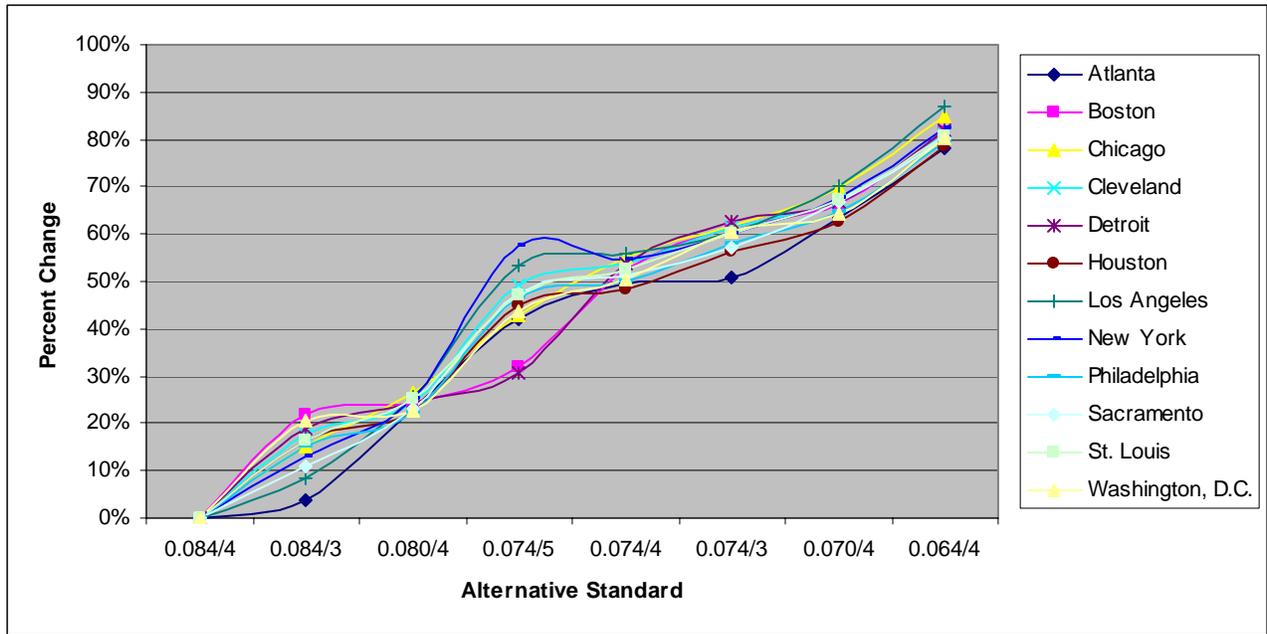


**Figure F-3b. Based on 2002 Data**

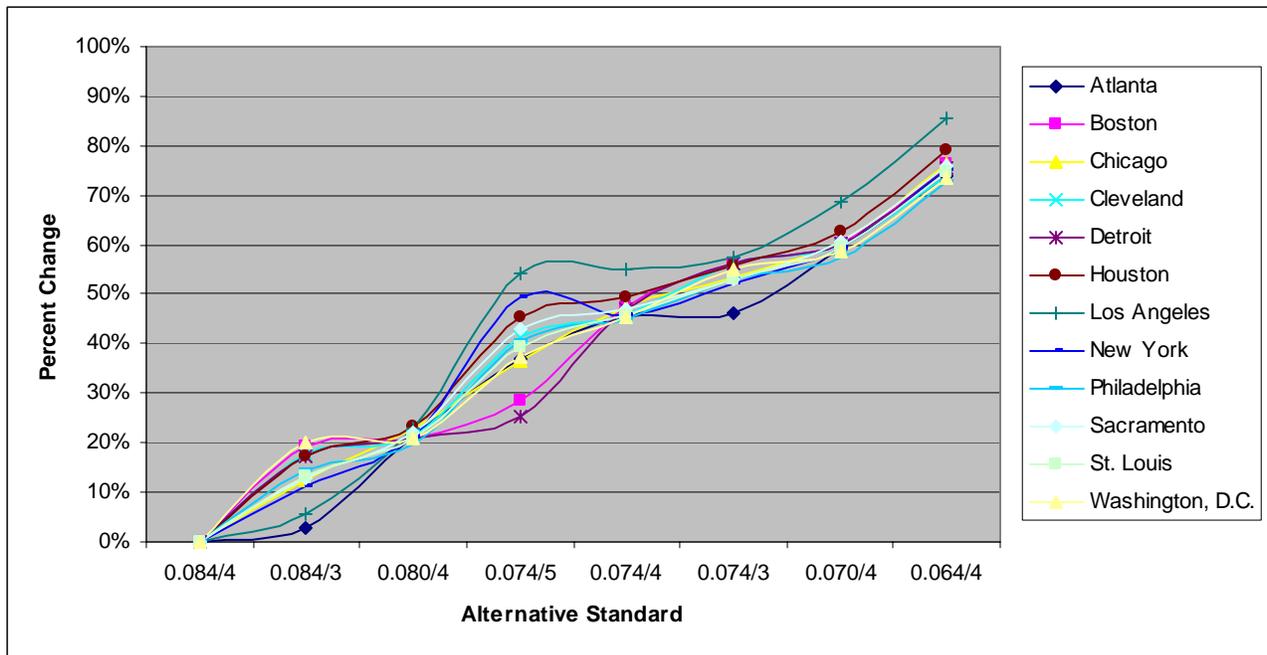


**Figure F-4. Percent Changes in Numbers of All School Age Children Experiencing at Least One Decrement in  $FEV_1 \geq 15\%$  when  $O_3$  Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location**

**Figure F-4a. Based on 2004 Data**



**Figure F-4b. Based on 2002 Data**



**Appendix G: Explanation of How a Distributed Lag Model Can Be Used in the Risk Assessment**

A linear concentration-response (C-R) function with a distributed lag has the following form:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \dots + \beta_n x_{t-n}$$

Without loss of generality, we illustrate the application of a distributed lag model to a risk assessment letting  $n=2$  – i.e., with a model in which today's mortality is a function of today's pollutant concentration,  $x_t$ , yesterday's pollutant concentration,  $x_{t-1}$ , and the day before yesterday's pollutant concentration,  $x_{t-2}$ . The model is:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} .$$

Given this model, the following three equations hold:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2}$$

$$y_{t+1} = \alpha + \beta_0 x_{t+1} + \beta_1 x_t + \beta_2 x_{t-1}$$

$$y_{t+2} = \alpha + \beta_0 x_{t+2} + \beta_1 x_{t+1} + \beta_2 x_t$$

Summing these three equations and collecting terms yields:

$$\sum_{i=t}^{t+2} y_i = 3\alpha + \beta_0 x_{t+2} + \left( \sum_{i=0}^1 \beta_i \right) x_{t+1} + \left( \sum_{i=0}^2 \beta_i \right) x_t + \left( \sum_{i=1}^2 \beta_i \right) x_{t-1} + \beta_2 x_{t-2} .$$

Thus a change in the pollutant concentration on day  $t$  (i.e., a change in  $x_t$ ) results in a change in the *sum* of mortality cases on days  $t$ ,  $t+1$ , and  $t+2$ . In particular, if we let  $z_t$  denote  $\sum_{i=t}^{t+2} y_i$ , then

$$\frac{\partial z_t}{\partial x_t} = \sum_{i=0}^2 \beta_i .$$

Thus, the change in the sum of mortality incidence on the same day, next day, and day after that equals the *sum* of the coefficients for the pollutant concentration on the same day, the previous day, and the day before that. Note that the application of a distributed lag model in a risk assessment thus does not require any assumption that the decreases on all the days in the model are the same. It does require that the distributed lag C-R function is linear. Because the log-linear functions used in the risk assessment are almost linear, the above is a good approximation.