April 12, 2005

Additional Risk Assessment Figures for Particulate Matter (PM) Staff Paper

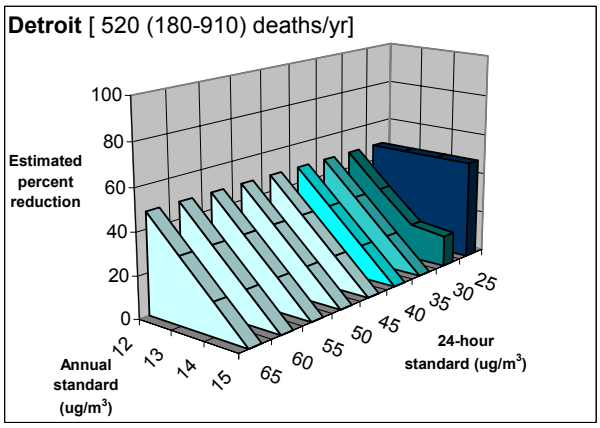
Based on the recommendation of the Clean Air Scientific Advisory Committee (CASAC) PM Panel at their April 6-7, 2005 meeting to review the January 2005 draft PM Staff Paper, EPA staff has prepared a series of figures that present the data in Tables 5-2 and 5-4 of that document in 3-dimensional graphical form.

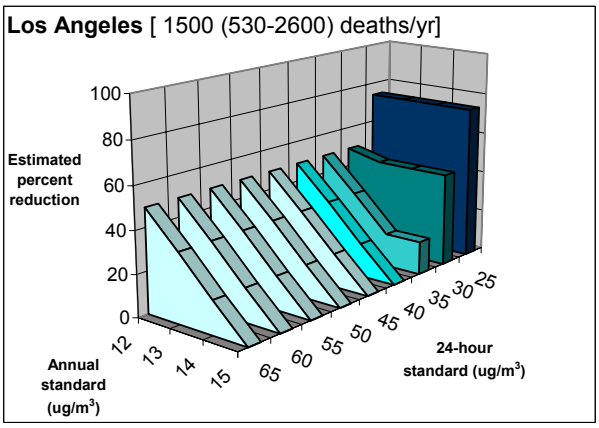
The first two sets of figures are labeled Figures 5-1(a) and 5-1(b) -- these figures (derived from Table 5-2 of the January 2005 draft PM Staff Paper) show the estimated percent reductions in $PM_{2.5}$-related long-term mortality risk for alternative standards relative to risk estimated for meeting the current standards, for the 98th and 99th percentile forms of alternative 24-hour standards, respectively. The last two sets of figures are labeled Figures 5-2(a) and 5-2(b) -- these figures (derived from Table 5-4 of the January 2005 draft PM Staff Paper) show the estimated percent reductions in $PM_{2.5}$-related short-term mortality risk for alternative standards relative to risk estimated for meeting the current standards, for the 98th and 99th percentile forms of alternative 24-hour standards, respectively. All four sets of figures include the ranges of assumed hypothetical thresholds that are presented in the original tables. The estimated $PM_{2.5}$-related mortality (with 90 percent confidence intervals) associated with meeting current standards are shown next to the city name in each figure.

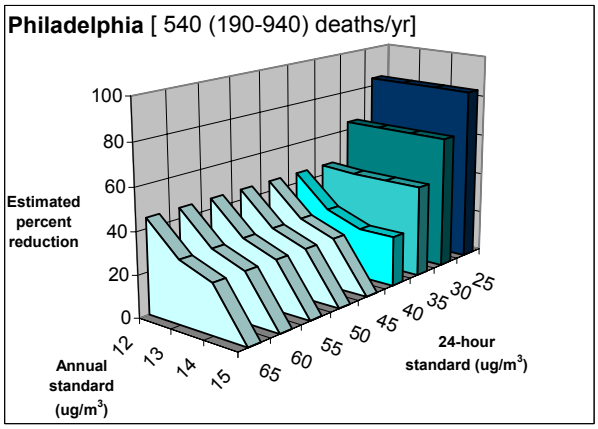
As shown in the original tables, staff estimated risk reductions for various combinations of alternative standards that included annual standards of 15, 14, 13, and 12 $\mu g/m^3$ and 24-hour standards of 65, 40, 35, 30, and 25 $\mu g/m^3$. Since in most cases the estimated risk reductions were the same or nearly so for alternative 24-hour standards of 65 and 40 $\mu g/m^3$, EPA staff filled in the interim points between these two levels so as to better depict the 3-dimensional surface of risk reductions. In the few cases where there were appreciable differences in the estimated risk reductions between alternative 24-standards of 65 and 40 $\mu g/m^3$, staff did not fill in the interim points, since the shape of the surface between these points has not been calculated.

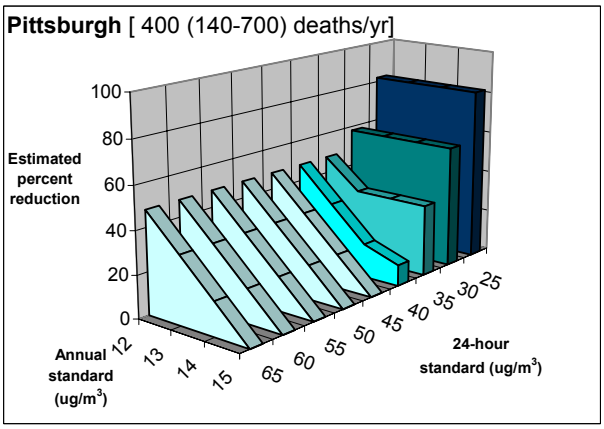
Figure 5-1(a) Estimated Percent Reduction in $PM_{2.5}$-related Long-term Mortality Risk (ACS Extended Study) for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards
(Estimated mortality associated with meeting current standards is shown.)

(i) Base case: assumed hypothetical threshold = lowest measured level of *7.5 μg/m³*









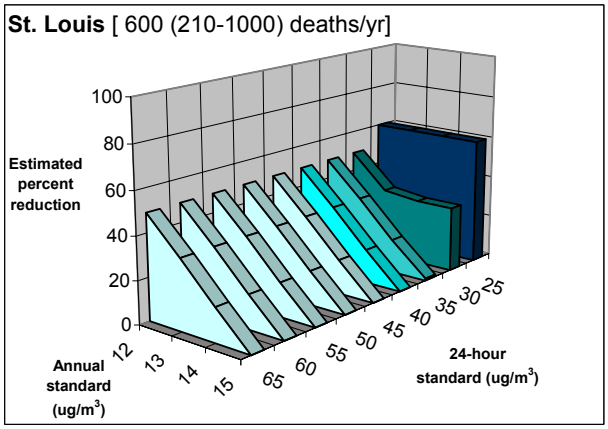
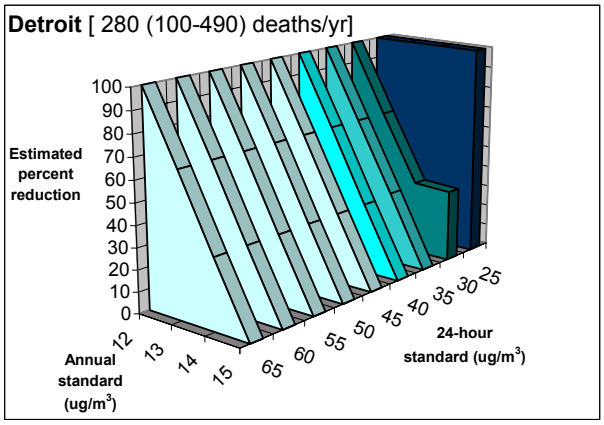
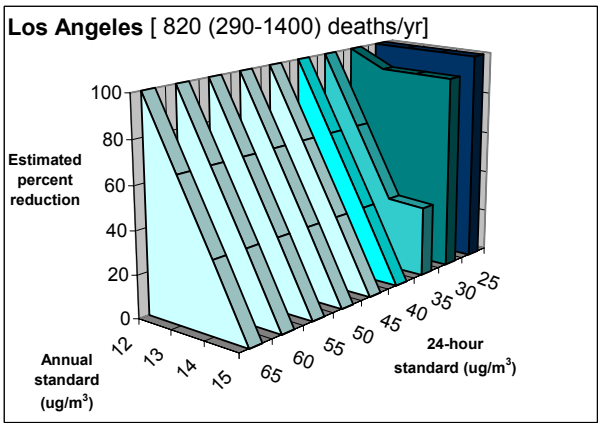
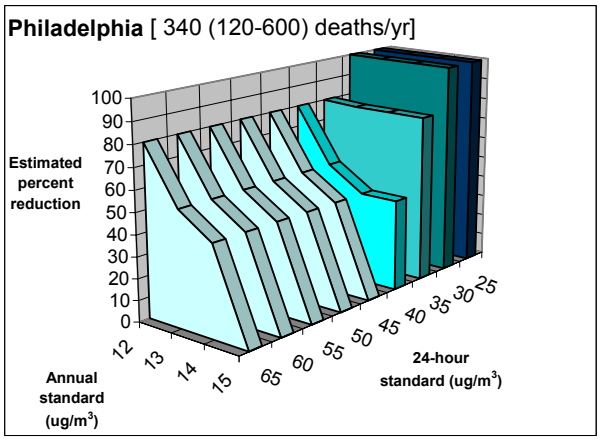


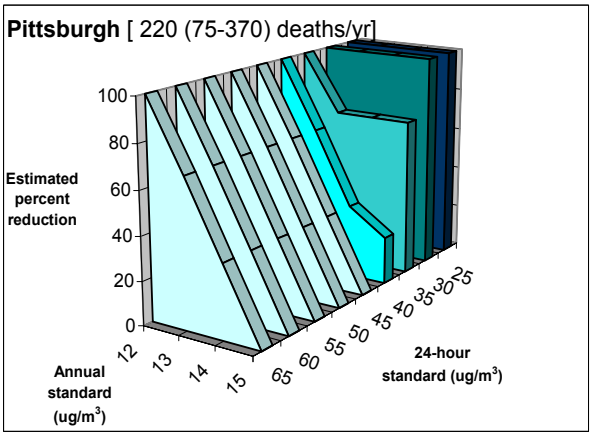
Figure 5-1(a) Estimated Percent Reduction in $PM_{2.5}$-related Long-term Mortality Risk (ACS Extended Study) for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(ii) Assumed Hypothetical Threshold = *10 µg/m³*









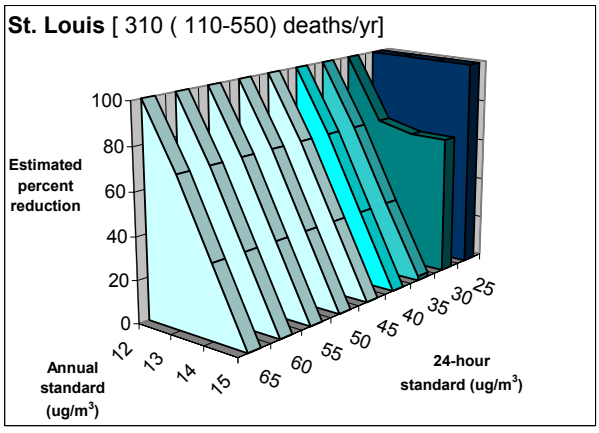


Figure 5-1(a) Estimated Percent Reduction in $PM_{2.5}$-related Long-term Mortality Risk (ACS Extended Study) for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(iii) Assumed Hypothetical Threshold = *12 µg/m³*

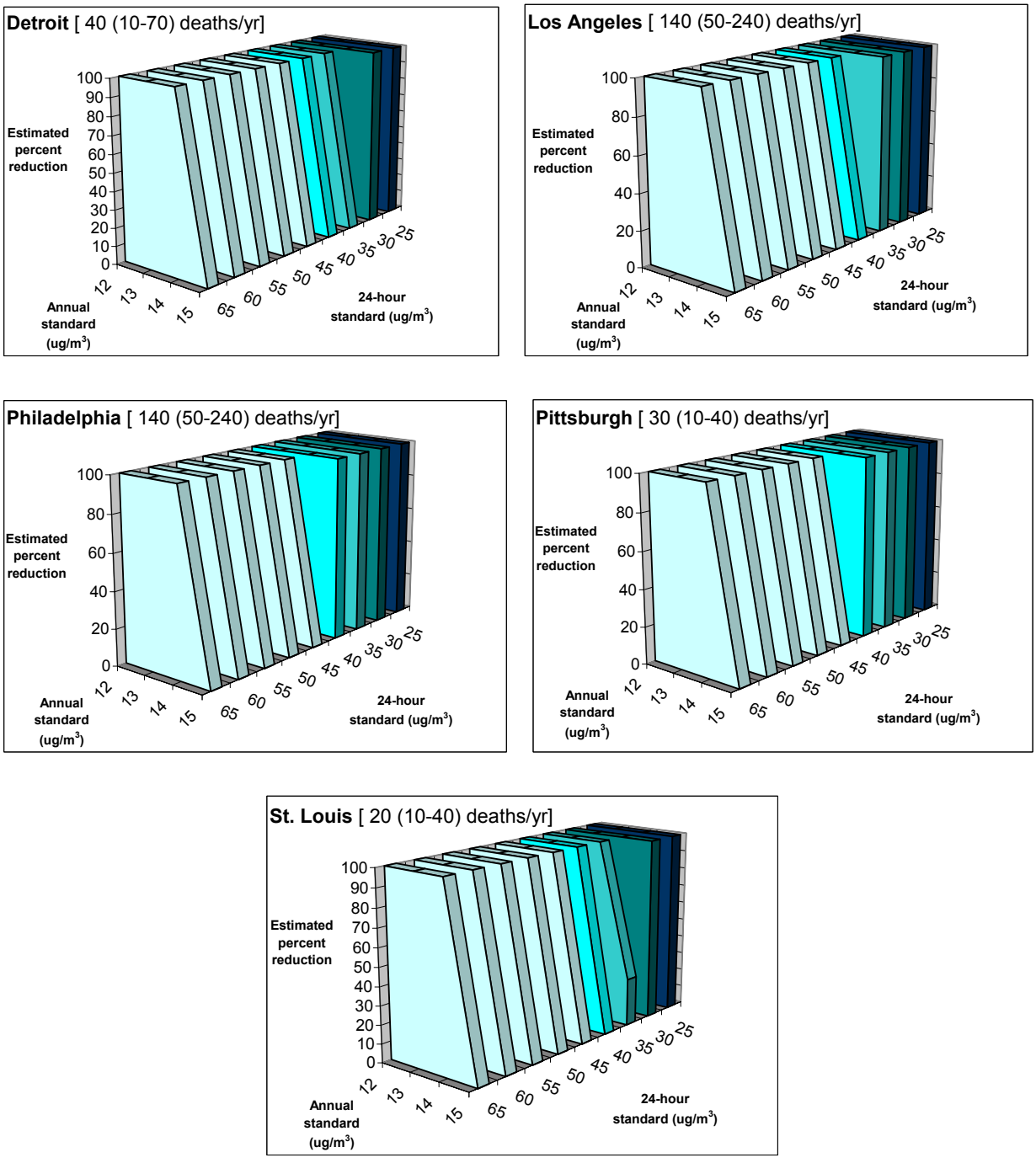
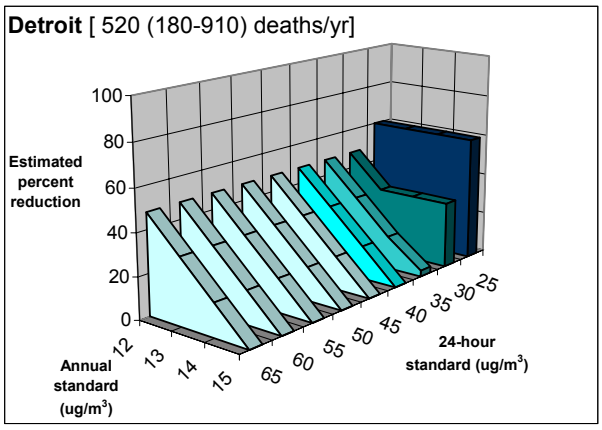
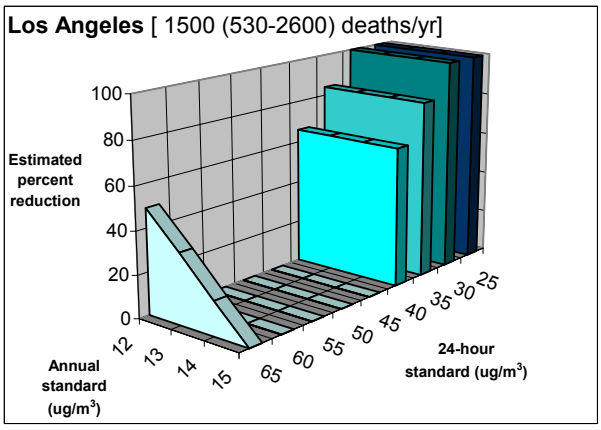
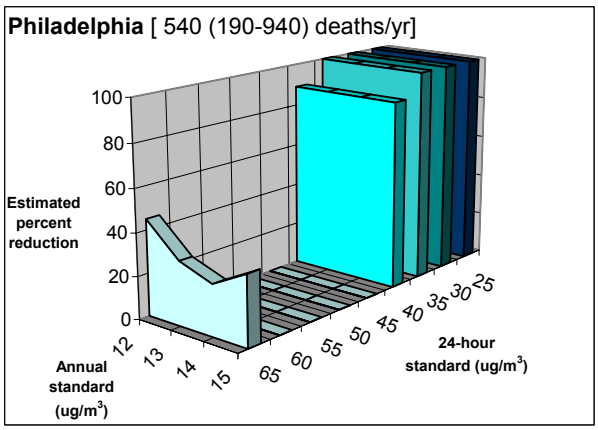


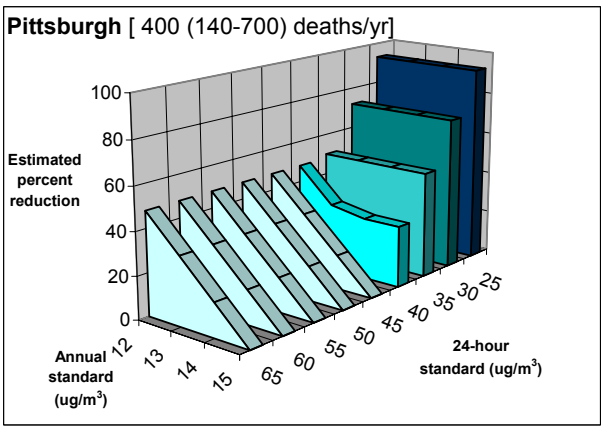
Figure 5-1(b) Estimated Percent Reduction in $PM_{2.5}$-related Long-term Mortality Risk (ACS Extended Study) for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards
(Estimated mortality associated with meeting current standards is shown.)

(i) Base case: assumed hypothetical threshold = lowest measured level of *7.5 μg/m³*









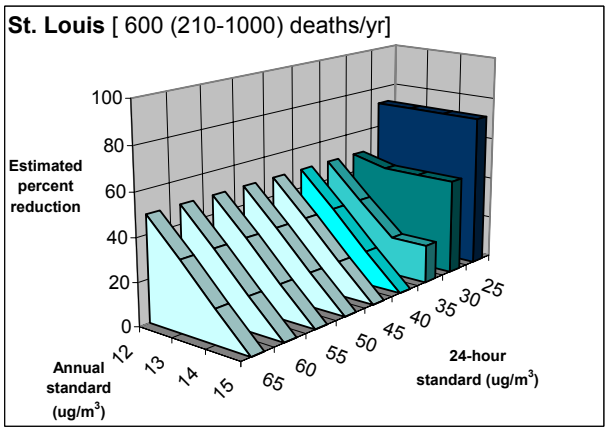
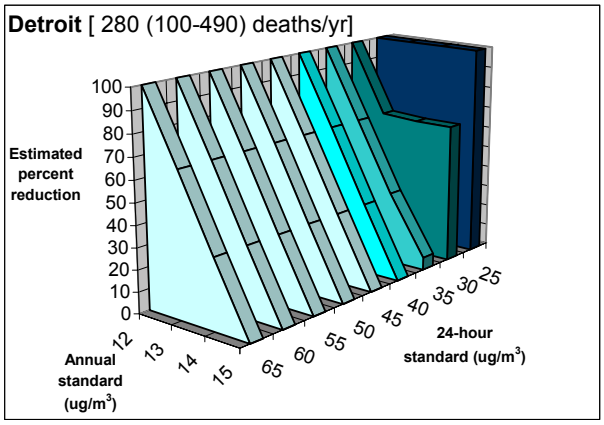
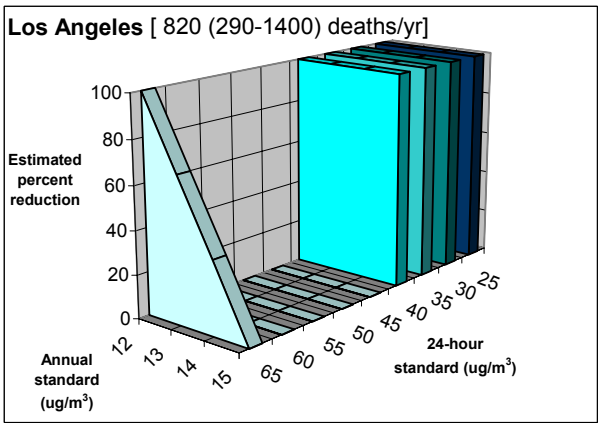
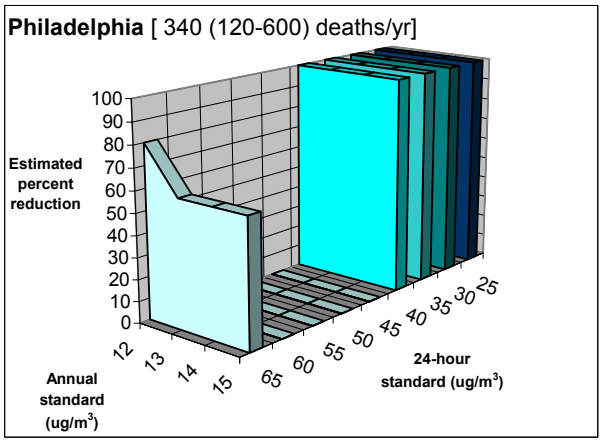


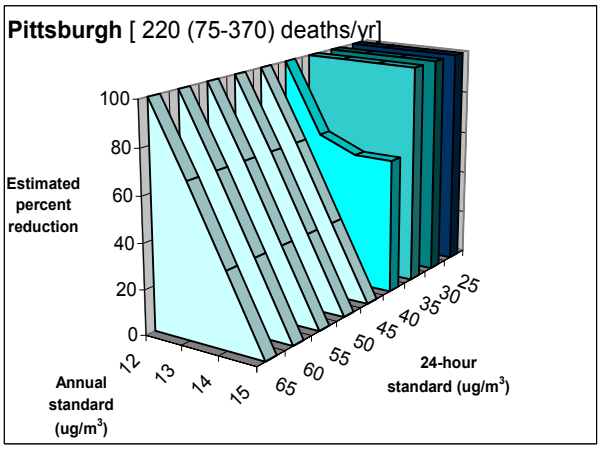
Figure 5-1(b) Estimated Percent Reduction in $PM_{2.5}$-related Long-term Mortality Risk (ACS Extended Study) for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(ii) Assumed Hypothetical Threshold = *10 μg/m³*









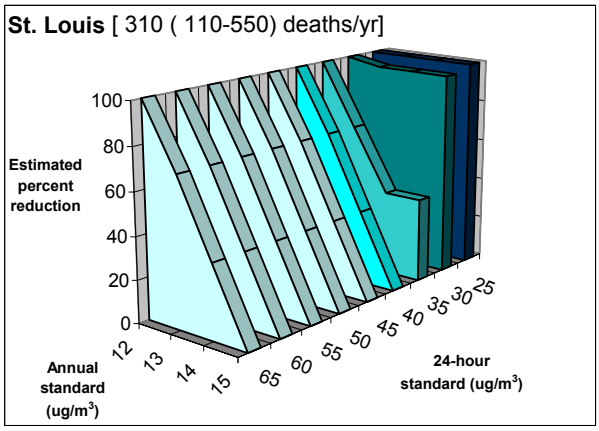
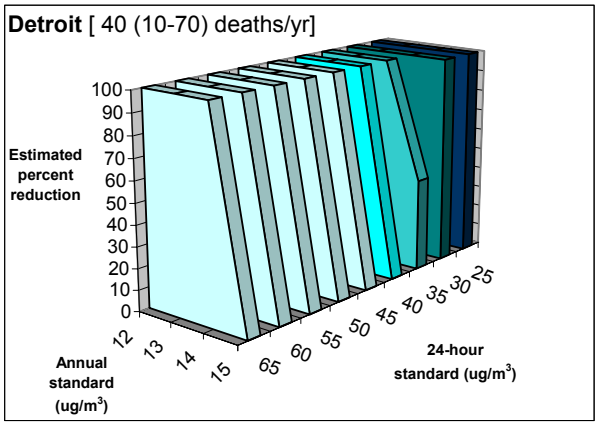
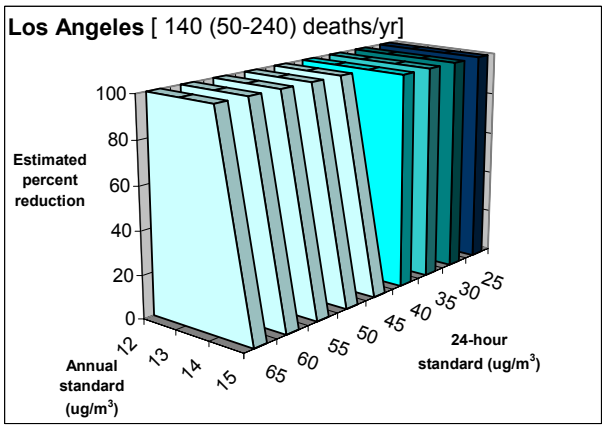
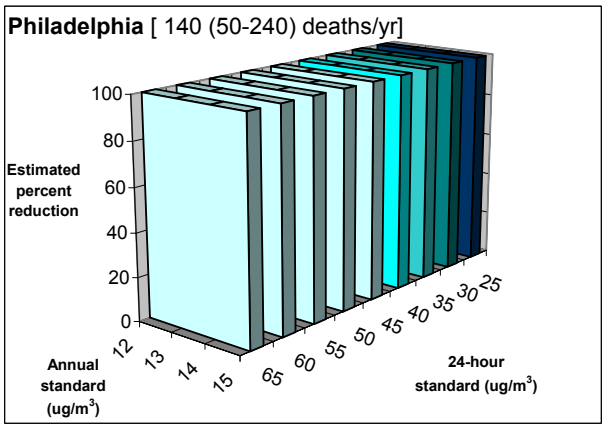


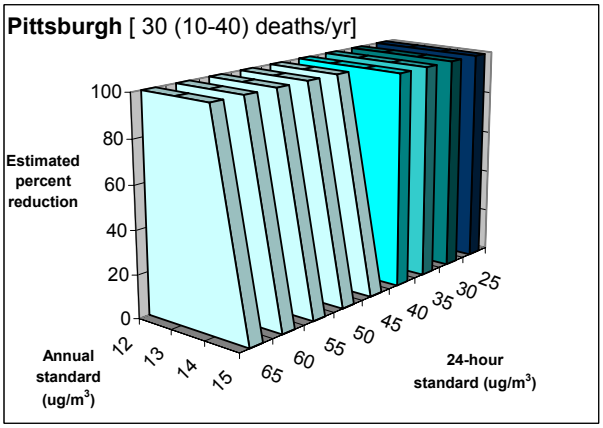
Figure 5-1(b) Estimated Percent Reduction in $PM_{2.5}$-related Long-term Mortality Risk (ACS Extended Study) for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(iii) Assumed Hypothetical Threshold = *12 µg/m³*









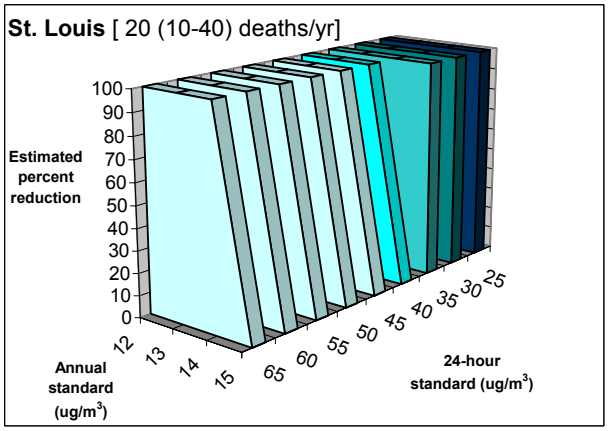


Figure 5-2(a) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards
(Estimated mortality associated with meeting current standards is shown.)

(i) Base case: assumed hypothetical threshold = background or lowest measured level

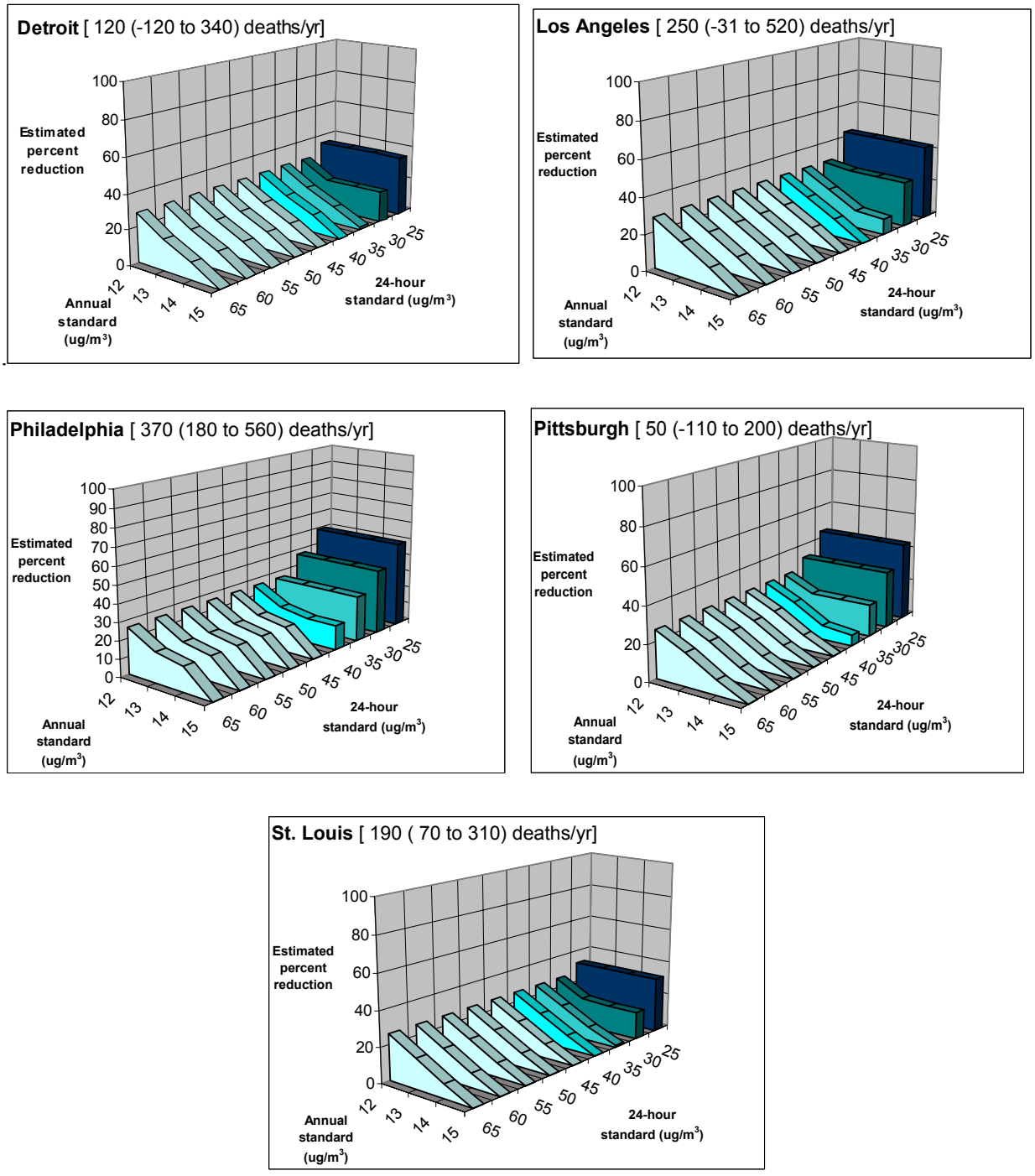
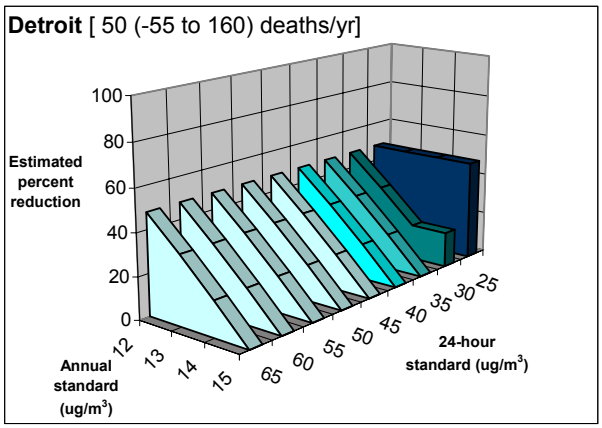
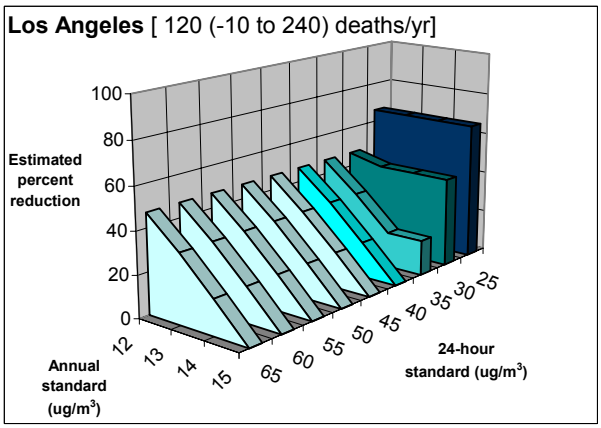
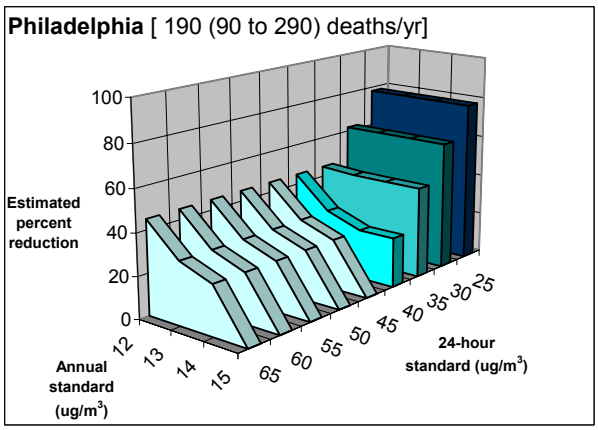


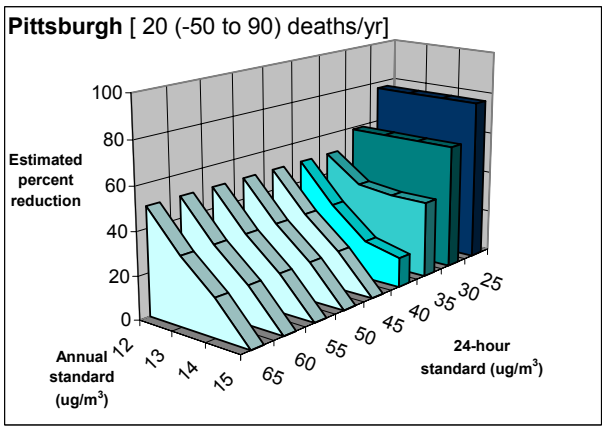
Figure 5-2(a) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(ii) Assumed Hypothetical Threshold = *10 µg/m³*









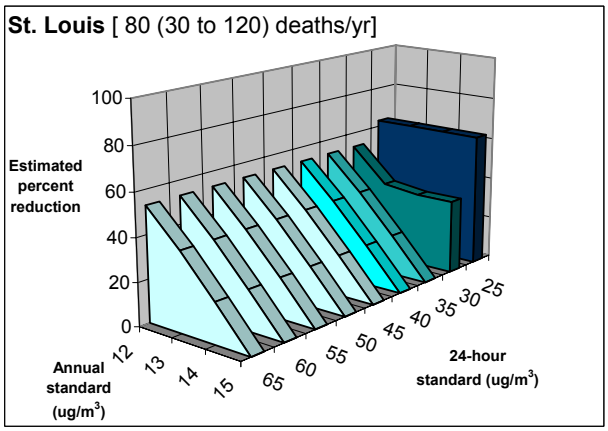


Figure 5-2(a) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(iii) Assumed Hypothetical Threshold = 15 $\mu g/m^3$

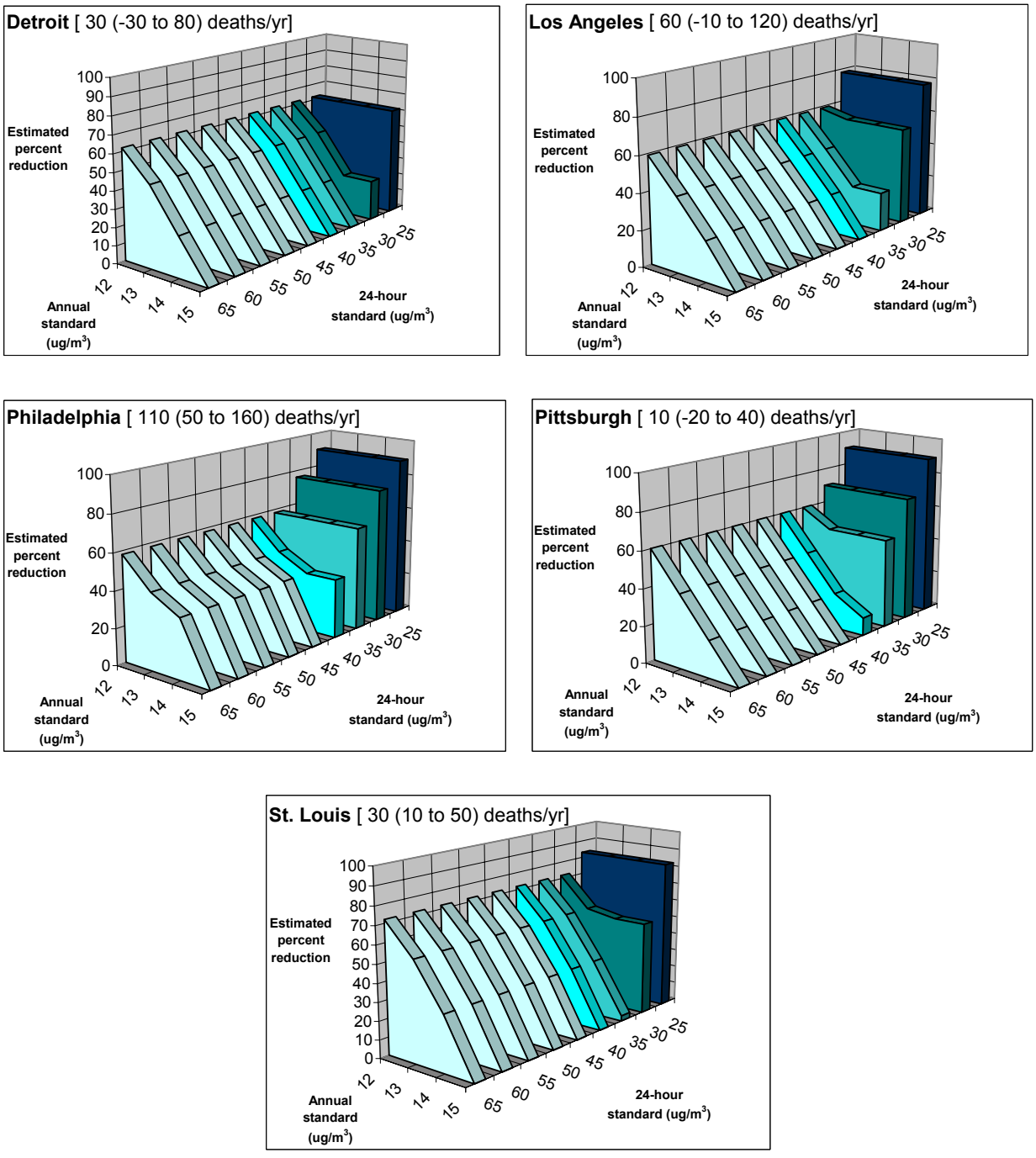


Figure 5-2(a) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(98th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(iv) Assumed Hypothetical Threshold = 20 $\mu g/m^3$

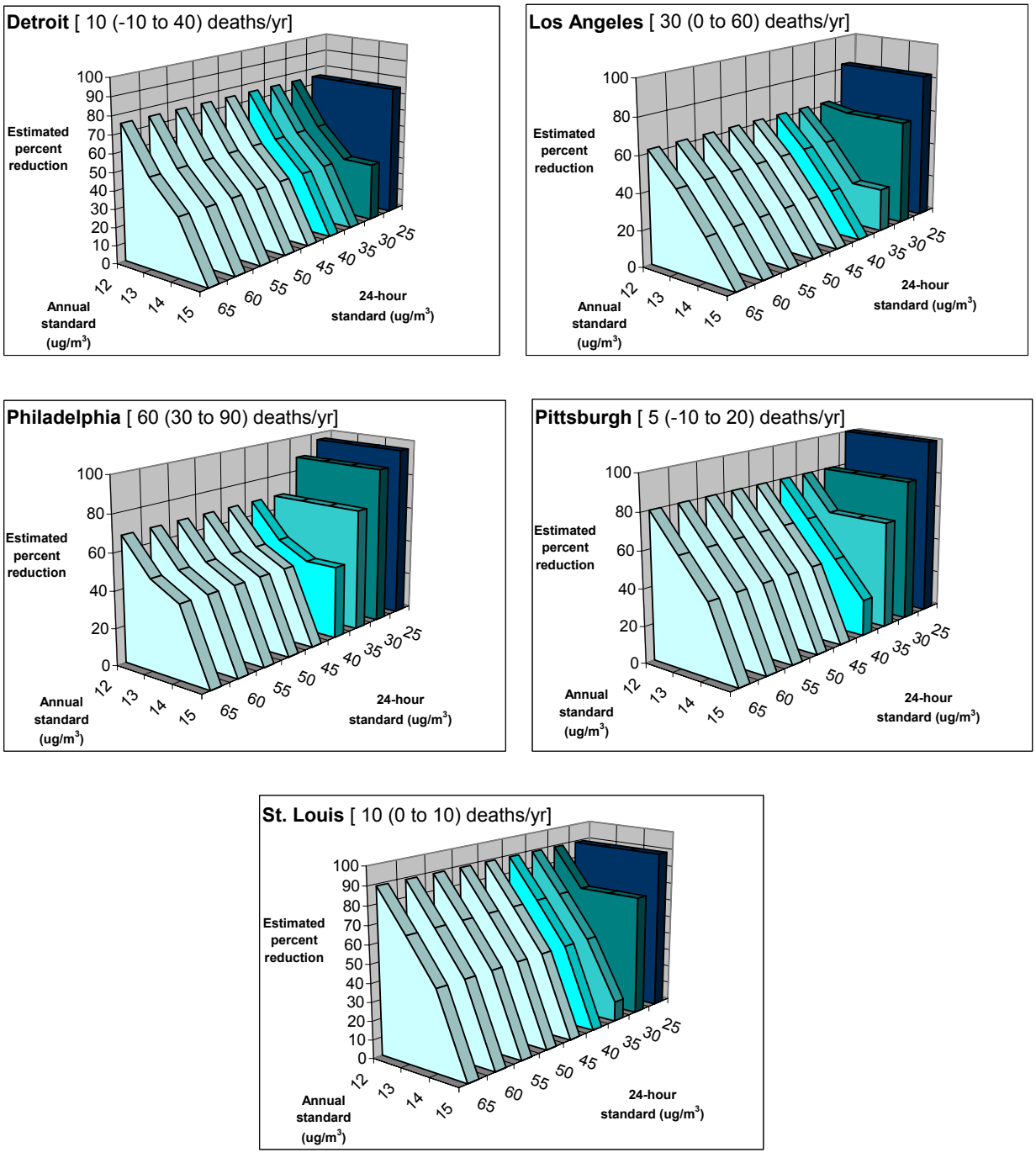


Figure 5-2(b) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards
(Estimated mortality associated with meeting current standards is shown.)

(i) Base case: assumed hypothetical threshold = background or lowest measured level

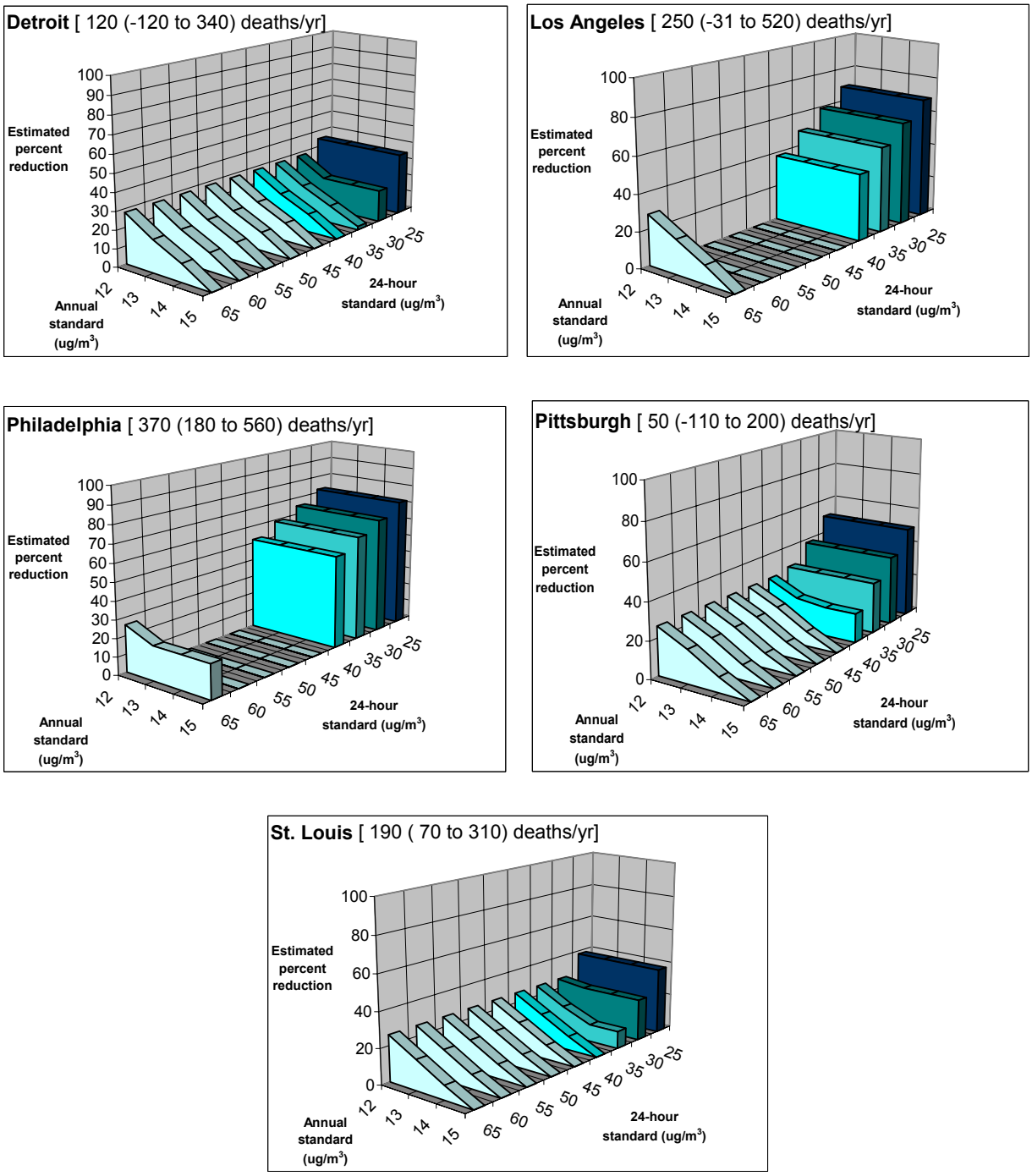
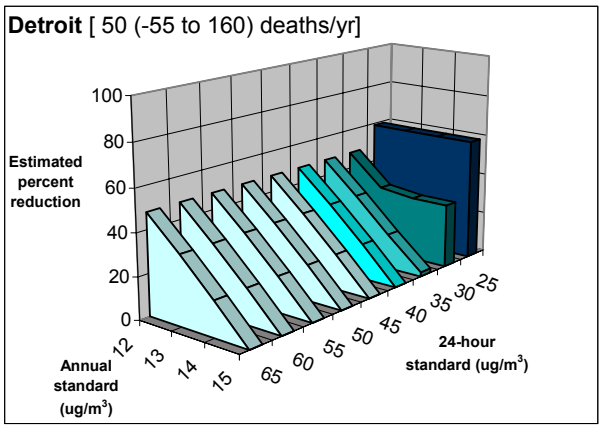
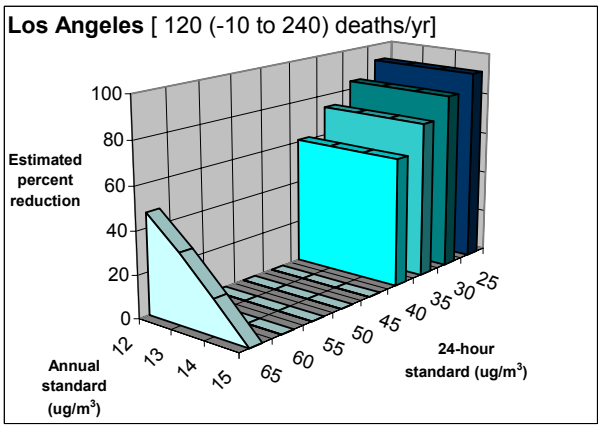
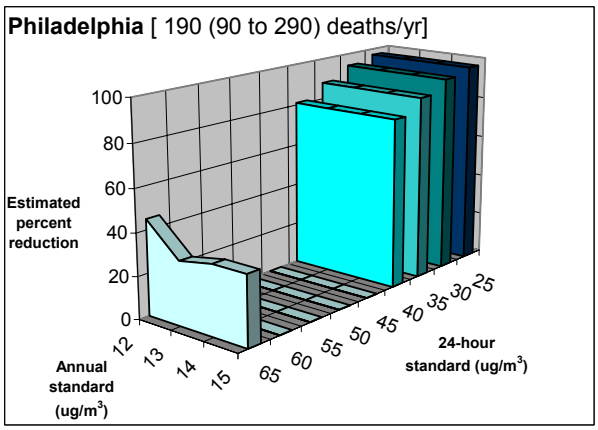


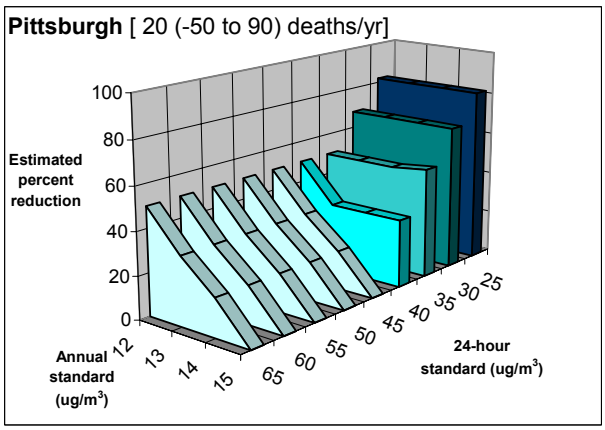
Figure 5-2(b) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(ii) Assumed Hypothetical Threshold = *10 µg/m³*









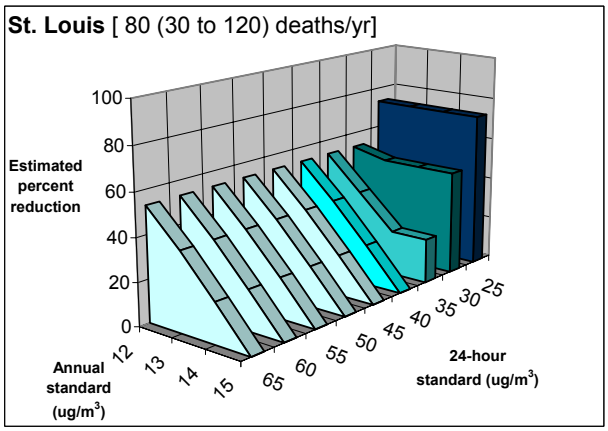


Figure 5-2(b) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(iii) Assumed Hypothetical Threshold = 15 $\mu g/m^3$

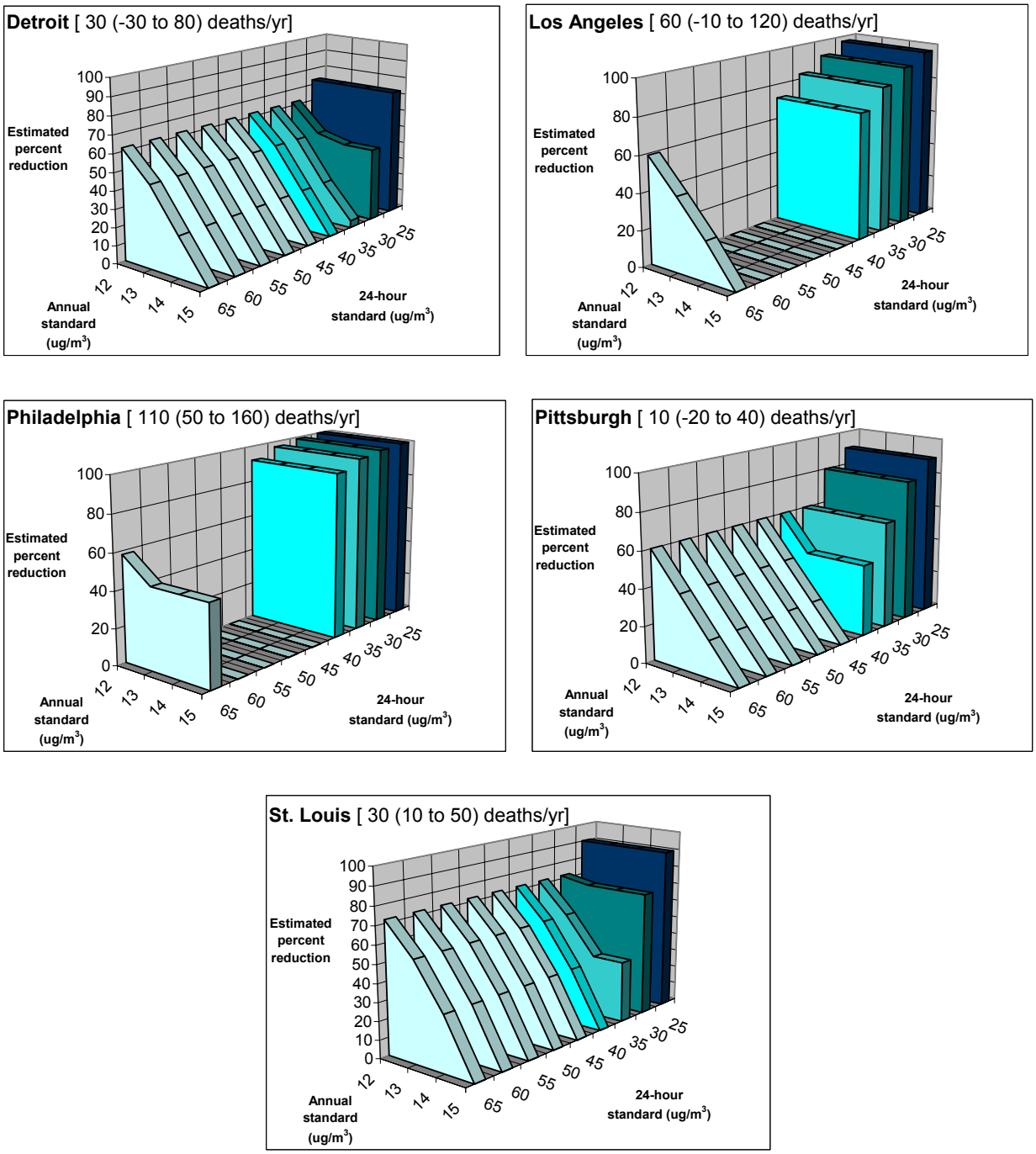


Figure 5-2(b) Estimated Percent Reduction in $PM_{2.5}$-related Short-term Mortality Risk for Alternative Standards *(99th Percentile Form)* Relative to Risk Estimated for Current Standards (cont.)
(Estimated mortality associated with meeting current standards is shown.)

(iv) Assumed Hypothetical Threshold = 20 $\mu g/m^3$