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National-Scale Air Toxics Assessment
Limitations in the 1996 National-Scale Air Toxics Assessment: Variability

Variability: ***Do these results apply to an individual such as myself?***

This section provides information on how EPA conducted the variability analysis, displays results, and helps in the interpretation of those results. This page is a non-technical summary. You can find a more detailed discussion through the links at the bottom of this page.

The national-scale assessment focused on the variation of ambient air concentration, exposure and risk between geographic areas of the U.S. This included variations due to:

- the location and strength of emissions from different sources;
- variations in the movement and fate of air toxics compounds within the atmosphere in different parts of the country; and
- variations in the daily activities in which different populations participate.

The smallest geographic area considered was a census tract, which can be quite small in densely populated areas but may cover appreciable distances in sparsely populated areas of the country. The assessment did not consider variation in the ambient air concentration within a census tract, using instead a typical ambient air concentration from the center of the tract. It also did not consider variations in the susceptibility and sensitivity of people within a census tract, since the focus was on a comparison of typical exposures and risks in different tracts. As a result, it is possible that your individual exposure and/or risk can differ from the one found on this site by perhaps a factor of 10 in either direction; you should interpret the exposure and/or risk as being a typical one for the geographic area in which you live.

You can find three kinds of results on this site, organized into three geographic scales:

County level (What is the variation in typical ambient air concentrations and exposures across different counties within a state?). EPA averaged the results from all census tracts in a county to provide estimates of a typical ambient air concentration, exposure in each county (risks are considered only at the national scale discussed below). This provides an understanding of how these quantities vary between counties. As an example, consider the map of the variation of the ambient air concentration of benzene throughout the counties of North Carolina. To reach this map, click here and then select Benzene and North Carolina in the options boxes. Note that the counties near the eastern coast generally have lower values of this ambient air concentration (below 0.65 micrograms per cubic meter) than do counties near the middle of that state (where the values are between 0.81 and 4.75 micrograms per cubic meter). Separate maps are available to view the variability of ambient air concentration, exposure and risk across the counties in each state.

State level (What is the variation in typical ambient air concentrations and exposures across different census tracts within a state and between different states?). The results from separate census tracts in a state show the variation in a typical ambient air concentration and exposure between different census tracts in that state (risks are considered only at the national scale discussed below). As an example, consider the chart produced for variation in the exposure to benzene throughout the census tracts of North Carolina. To reach this map, click here and then select Benzene in the options box for Statewide Estimates. The resulting bar chart shows the variation in exposures to benzene across different census tracts throughout the state. It may be seen that the 25th percentile is slightly below 0.7 micrograms per cubic meter. This means that 25% of the census tracts in North Carolina are characterized by a typical level of exposure below 0.7 micrograms per cubic meter. Separate charts are available to view the variability of ambient air concentration, exposure and risk within each state. These charts show the range of values in a state, but do not allow you to identify which census tracts are at the high or low ends. This is a deliberate feature of the assessment, as discussed in the section on Limitations.

National level (What is the variation in typical ambient air concentrations, exposures and risks across different census tracts within the U.S.?). The results from separate census tracts throughout the U.S. show the variation in a typical ambient air concentration, exposure and risk between different census tracts in the U.S. These results are presented as bar charts showing part of the variation in each value across different census tracts in the Nation for each air toxics compound. As an example, consider the chart produced for the variation of the cancer risk from exposure to benzene throughout the census tracts of the U.S. To reach this chart, click here and then select All in the options box for Cancer Risks Associated With... (which will show the risks from all sources of benzene combined). It may be seen that the median (50th percentile) is slightly below 10 in a million. This means that 50% of the census tracts in the U.S. are characterized by a typical cancer risk of less than approximately 10 in a million. Similar bar charts are available on the same page for noncancer risks and for cumulative risk (i.e. the risk from all air toxics compounds combined). Separate charts are available to view the variability of ambient air concentration, exposure and risk across the census tracts in the U.S. These charts are the same as those described in the section on State Level above; simply examine the "National" bars in those charts rather than the bar for an individual state. These charts show part of the variation in values throughout the census tracts of the U.S., but do not allow you to identify which census tracts are at the high or low ends. This is a deliberate feature of the assessment, as discussed in the section on Limitations.

In summary, the results of the national-scale assessment do not allow a comparison of ambient air concentration, exposure and/or risk between two individuals or even between two specific census tracts, but they do allow you to understand the variation in typical values for these quantities between counties or states, and to a lesser degree between census tracts (although specific tracts cannot be identified in the results). Your value, however, may differ by as much as a factor of at least 10 in either direction compared to the typical value for your county or state due to several factors. You might live in a part of the geographic area that has a higher or lower than typical value; you might have a different activity pattern that causes a higher or lower exposure than is typical; or you might be more or less susceptible or sensitive than the typical person used in this assessment. In addition, bear in mind that the State and National bar

charts discussed in the second and third bullets above cannot be used to identify the specific census tracts that are above or below the averages for that geographic region. They simply show part of the variation in values across census tracts in these geographic regions.

To learn more about the variability analysis, please select from any of the questions below. They provide greater technical detail.

What are the components of variability?
Which components of variability did the national-scale assessment include?
How was the variability analysis conducted?
What are the results of the variability analysis
How can these results be interpreted?

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