

ACC Science and Research Highlights

Making Sense of Human Biomonitoring Results: understanding these exposure data in the context of potential human health risks



Biomonitoring Studies - What can they tell us?

Scientists have long recognized that our bodies can absorb, metabolize and excrete chemical substances in our environment. Today, thanks to advances in analytical technology, it is possible to detect and measure incredibly small concentrations of natural and manmade substances within the human body.

Biomonitoring studies such as the CDC's National Report on Human Exposure to Environmental Chemicals can provide valuable, powerful data on the presence of trace levels of chemicals in human blood or urine. Determining the presence of a chemical, however, is not enough to establish the potential risk to human health.

When looking at biomonitoring results, some may be tempted to draw immediate conclusions and make assumptions about what the results mean. But, to be most useful to the public and policy-makers, the results must be placed in a public health risk context. Without such context, biomonitoring data are of limited value in efforts to protect public health.

“The presence of a chemical does not imply disease. The levels or concentrations of the chemical are more important determinants of the relation to disease, when established in appropriate research studies, than the detection or presence of a chemical” (CDC, 2005).



A Biomonitoring Equivalent (BE) is defined as the concentration of a chemical in blood or urine that corresponds to an allowable exposure guidance value, such as a reference dose (RfD) or tolerable daily intake (TDI), considered safe by regulatory agencies.

Biomonitoring Equivalents – Scientific tools for understanding the data in a risk context.

Acting upon the recommendations of the National Research Council's report, Human Biomonitoring for Environmental Chemicals (2006), ACC's Regulatory and Technical Affairs supported the development of the Biomonitoring Equivalents (BEs) method to understand population-based biomonitoring results in a public health risk context. BEs are tools that allow agencies, lawmakers and the public to have a better understanding of what biomonitoring levels actually mean.

Although the science can be complicated, the basic approach for deriving BEs is straight forward. It entails converting the exposure guidance value, the “safe” daily intake in mg/kg-day, into the corresponding concentration in urine or blood that would be expected to be seen in a person exposed to that intake amount. These scientific conversions are compound specific, since the absorption, distribution, metabolism and excretion processes and rates vary for each substance.

