

Exposure Assessment: Then, Now, and Quantum Leaps in the Future

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Health risk assessments have become so widely accepted in the United States that their conclusions are a major factor in many environmental decisions. Although the risk assessment paradigm is 10 years old, the basic risk assessment process has been used by certain regulatory agencies for nearly 40 years. Each of the four components of the paradigm has undergone significant refinements, particularly during the last 5 years. A recent step in the development of the exposure assessment component can be found in the 1992 EPA *Guidelines for Exposure Assessment*. Rather than assuming worst-case or hypothetical maximum exposures, these guidelines are designed to lead to an accurate characterization, making use of a number of scientific advances. Many exposure parameters have become better defined, and more sensitive techniques now exist for measuring concentrations of contaminants in the environment. Statistical procedures for characterizing variability, using Monte Carlo or similar approaches, eliminate the need to select point estimates for all individual exposure parameters. These probabilistic models can more accurately characterize the full range of exposures that may potentially be encountered by a given population at a particular site, reducing the need to select highly conservative values to account for this form of uncertainty in the exposure estimate. Lastly, our awareness of the uncertainties in the exposure assessment as well as our knowledge as to how best to characterize them will almost certainly provide evaluations that will be more credible and, therein, more useful to risk managers. If these refinements are incorporated into future exposure assessments, it is likely that our resources will be devoted to problems that, when resolved, will yield the largest improvement in public health.

KEY WORDS: Exposure assessment; exposure guidance; exposure guidelines; Monte Carlo analysis.