EXPOSURE SCIENCE

At its simplest, chemical risk assessment evaluates both the potential hazard of a chemical or a mixture of chemicals and the likelihood of exposure in order to determine potential risks. A very hazardous chemical may not be a problem if exposure to it is limited, while a chemical with low hazard potential may be a problem if exposure is widespread.

Scientific techniques to measure exposure have become far more sophisticated over the past decade, so much so that in 2012 the National Research Council commissioned a report, "Exposure Science in the 21st Century", which set out a vision and a strategy to use exposure science to inform science-based regulatory decision making.

As noted in the report, exposure science addresses the intensity and duration of contact of humans or other organisms with those agents (defined as chemical, physical, or biologic stressors) and their fate in living systems. Exposure assessment, an application of this field of science, has been instrumental in helping to forecast, prevent, and mitigate exposures that lead to adverse human health or ecologic outcomes; to identify populations that have high exposures; to assess and manage human health and ecosystem risks; and to protect vulnerable and susceptible populations. Exposure science has applications in public health and the protection of ecosystems.

To make the most of this emerging but diverse field, it will be important that a multi-disciplinary approach is taken, and that research efforts are shared widely across all of the relevant Federal Agencies with input both from academia and industrial scientists. As the report concludes, exposure information is crucial for predicting, preventing, and reducing human health and ecosystem risks. Exposure science has historically been limited by the availability of methods, technologies, and resources, but recent advances present an unprecedented opportunity to develop more rapid, cost effective, and relevant exposure assessments. Research supported by such federal agencies as EPA and NIEHS has provided valuable partnership opportunities for building capacity to develop the technologies, resources, and educational structure that will be needed to achieve the committee's vision for exposure science in the 21st century.

References

- National Research Council, Exposure Science in the 21 Century: A vision and a strategy. The National Academies Press, Washington DC, 2012

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