

The Practice Of Health Risk Assessment In The United States (1975-1995): How the U.S. and Other Countries Can Benefit From That Experience

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ABSTRACT

The process of quantitatively predicting the likelihood of an adverse response in humans or wildlife due to exposure to one or more chemicals is collectively known as environmental risk assessment. Quantitative risk assessment has been practiced in the United States and Canada for nearly 20 years and is the basis for most environmental and many occupational health regulations in North America. However, only since 1990 has it begun to receive serious consideration in Europe, Australia, Asia, and other regions. This paper reviews the historical evolution of health risk assessment in the United States and the scientific shortcomings in the process that have been introduced due to various regulatory policies. Despite these limitations and the reluctance of some countries to implement risk-based policies, risk assessment will undoubtedly grow in importance within the international arena as other countries search for an ideal balance between cost and risk reduction. With the emergence of risk analysis as an international tool for understanding environmental issues, several improvements to the risk assessment process are recommended here that the United States and other countries could immediately incorporate into hazard identification, dose-response and exposure assessments, and risk characterization. Examples of these improvements include use of a weight-of-evidence approach, physiologically-based pharmacokinetic (PB-PK) modelling, Monte Carlo techniques, and uncertainty analyses. These recommendations could, if coupled with an understanding of the historical experience in the United States, lead to superior environmental risk assessment policies for all countries as they enter the 21st century.