United States
Environmental Protection
Agency

Office of Health and
Environmental Assessment
Washington DC 20460

Research and Development

EPA/600/S8-91/042 July 1991

EPA

Project Summary

Updated Health Effects Assessment Documents

An updated series of Health Effects Assessment (HEA) documents were prepared by the Environmental Criteria and Assessment Office, Cincinnati, OH, for the Office of Emergency and Remedial Response. These documents update 15 of the 1984 HEAs and are brief, summary assessments of potential adverse health effects following either oral or inhalation exposure for the purpose of remedial actions.

This Project Summary was developed by EPA's Environmental Criteria and Assessment Office, Cincinnati, OH, to announce key findings of the research project that is fully documented in separate reports (see Project Report ordering information at back).

Introduction

These reports summarize and evaluate information relevant to a preliminary interim assessment of adverse health effects associated with specific chemicals and compounds. All estimates of acceptable intakes and carcinogenic potency presented in this document should be considered as preliminary and reflect limited resources allocated to this project. Pertinent toxicologic and environmental data were located through on-line literature searches of the TOXLINE, CANCERLINE and the CHEMFATE/DATALOG data bases. Secondary sources of information have also been relied upon in the preparation of these reports and represent large-scale health assessment efforts that entail extensive peer and Agency review.

Discussion

The intent in these assessments is to suggest acceptable exposure levels whenever sufficient data were available. Values were not derived or larger uncertainty factors were employed when the variable data were limited in scope tending to generate conservative (i.e., protective) estimates. Nevertheless, the interim values presented reflect the relative degree of hazard associated with exposure or risk to the chemical(s) addressed.

Whenever possible, two categories of values have been estimated for systemic toxicants (toxicants for which cancer is not the endpoint of concern). The first, RfD_s (formerly AIS—Acceptable Intake Subchronic) or subchronic reference dose, is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs during a limited time interval (i.e., for an interval that does not constitute a significant portion of the lifespan). This type of exposure estimate has not been extensively used, or rigorously defined, as previous risk assessment efforts have been primarily directed towards exposures from toxicants in ambient air or water where lifetime exposure is assumed. Animal data used for RfD_s estimates generally include exposures with durations of 30-90 days. Subchronic human data are rarely available. Reported exposures are usually from chronic occupational exposure situations or from reports of acute accidental exposure. These values are developed for both inhalation (RfD_{si}) and oral (RfD_{so}) exposures.

The RfD (formerly AIC - Acceptable Intake Chronic) is similar in concept and addresses chronic exposure. It is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs for a significant portion of the lifespan. The RfD is route-specific and estimates acceptable exposure for either oral (RfD_o) or inhalation (RfD_i) with the implicit assumption that exposure by other routes is insignificant.

Composite scores (CSs) for noncarcinogens have also been calculated where data permitted. These values are used for ranking reportable quantities.

For compounds for which there is sufficient evidence of carcinogenicity, RfD_s and RfD values are not derived. Since the Agency's cancer policy assumes a process that is not characterized by a threshold, any exposure contributes an increment of risk. Consequently, derivation of these values would be inappropriate. For carcinogens, q_1*s have been computed based on oral and/or inhalation data if available. The q_1* represents an upper-bound estimate on lifetime cancer risk as estimated by the multi-stage model.

Inhalation values (RfD_{si}, RfD_i, and q_1*) have been developed for purposes of inhalation exposure evaluations only. These values do not reflect differential absorption assumptions appropriate for route-to-route extrapolation. These estimates have been developed to be readily transposable to units of air concentration and have incorporated an assumption that exposure concentration will be relatively stable across a 24-hour period.

The primary focus of the brief literature summaries presented in the HEAs is literature directly relevant to hazard assessment, primarily mammalian toxicologic evaluations of subchronic or chronic duration conducted utilizing oral or inhalation exposure protocols. The HEAs generally reflect secondary sources of information when available in the form of more extensive agency documentation.

Conclusion

Table 1 summarizes the risk assessments developed in each document. IMPORTANT REMINDER! **These assessments were prepared in 1988-1989 and may have been superseded by more recent documentation. Please refer to the following references for the most current information.**

- U.S. EPA Health Effects Assessment Summary Table. Available from the National Technical Information Service, Springfield, VA, at 703/489-4807. Order Number PB91-921100. (This Table is updated quarterly, every three months.)
- U.S. EPA Integrated Risk Information System (IRIS). Available online from the National Library of Medicine's Toxicology Data Network (TOXNET) and from the National Technical Information Service, Springfield, VA, at 703/489-4807. Order Number PB90-591330. (This data base is updated quarterly, every three months.)

Table 1. Summary of Risk Assessments

Chemical(s)	*RfD_{so} (mg/day)*	*RfD_o (mg/day)*	*RfD_{si} (mg/day)*	*RfD_i (mg/day)*	*CS*	*q_1* (mg/kg/day)$^{-1}$*	*Cancer Group*
Acetone	*70*	*7*	*ID*	*ID*	*6.5*	*ID*	*D*
Benzene	*ND*	*ND*	*ND*	*ND*	*ND*	*2.9×10^{-2}-oral 2.9×10^{-2}-inhal.*	*A*
Cadmium	*NA*	*0.04*	*ND*	*ND*	*ND*	*6.1-inhal.*	*B1*
Carbon Tetrachloride	*0.5[a]*	*0.05[a]*	*ND*	*ND*	*ND*	*1.3×10^{-1}-oral 5.2×10^{-2}-inhal.*	*B2*
Chlordane	*ND*	*ND*	*ND*	*ND*	*ND*	*1.3-oral 1.3-inhal.*	*B2*
Chlorobenzene	*14*	*1.4*	*3*	*0.3*	*8*	*ID*	*D*
Chloroform	*ND*	*ND*	*ND*	*ND*	*ND*	*6.1×10^{-3}-oral 8.1×10^{-2}-inhal.*	*B2*
DDT	*ND*	*ND*	*ND*	*ND*	*ND*	*0.34-oral*	*B2*
Methylene Chloride	*ND*	*ND*	*ND*	*ND*	*ND*	*7.5×10^{-3}-oral 1.4×10^{-2}-inhal.*	*B2*
Methyl Ethyl Ketone	*32*	*3*	*64*	*6*	*9.6*	*ID*	*D*
Naphthalene	*29*	*29*	*ID*	*ID*	*13.2*	*ID*	*D*
Phenol	*42*	*42*	*ID*	*ID*	*44*	*ID*	*D*
Tetrachloroethylene	*ND*	*ND*	*ND*	*ND*	*ND*	*5.1×10^{-2}-oral 2.85×10^{-7} to 9.47×10^{-7}-inhal.*	*B2*
Trichloroethylene	*ND*	*ND*	*ND*	*ND*	*ND*	*1.1×10^{-2}-oral 6×10^{-3}-inhal.*	*B2*
Xylene	*250*	*126*	*6[b]*	*6[b]*	*10*	*ID*	*D*

[a] = *Calculated 7×10^{-3} mg/kg/day x 70 = 0.5 mg/day and 7×10^{-4} mg/kg/day x 70 = 0.05 mg/day*
[b] = *Calculated 0.3 mg/m^3 x 20 = 6 mg/day*
ID = *Insufficient Data*
ND = *Not Derived (Carcinogen)*
NA = *Not Applicable*

☆U.S. GOVERNMENT PRINTING OFFICE: 1991 - 548-028/40032

This Project Summary was prepared by staff of the Environmental Criteria and Assessment Office, USEPA, Cincinnati, OH 45268.
***Deb McKean** is the EPA Project Officer, (see below).*
This Project Summary covers 15 separate reports. entitiled, "Updated Health Effectrs Assessment for..."
Acetone (Order No. PB90-142373/AS; Cost $15.00)
Benzene (Order No. PB90-142381/AS; Cost $17.00)
Cadmium (Order No. PB90-142399/AS; Cost $17.00)
Carbon Tetrachloride (Order No. PB90-142407/AS; Cost $17.00)
Chlordane (Order No. PB90-142415/AS; Cost $15.00)
Chlorobenzene (Order No. PB90-142514/AS; Cost $15.00)
Chloroform (Order No. PB90-142423/AS; Cost $15.00)
DDT (Order No. PB90-142431/AS; Cost $17.00)
Methyl Ethyl Ketone (Order No. PB90-142456/AS; Cost $15.00)
Methylene Chloride (Order No. PB90-142449/AS; Cost $17.00)
Naphthalene (Order No. PB90-142464/AS; Cost $15.00)
Phenol (Order No. PB90-142472/AS; Cost $15.00)
Tetrachloroethylene (Order No. PB90-142480/AS; Cost $17.00)
Trichloroethylene (Order No. PB90-142498/AS; Cost $17.00)
Xylenes (Order No. PB90-142506/AS; Cost $17.00)
(All costs are subject to change)

The above reports will be available only from:
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650
The EPA Project Officer can be contacted at:
Environmental Criteria and Assessment Office
U. S. Environmental Protection Agency
Cincinnati, OH 45268

United States
Environmental Protection
Agency

Center for Environmental Research
Information
Cincinnati, OH 45268

BULK RATE
POSTAGE & FEES PAID
EPA PERMIT NO. G-35

Official Business
Penalty for Private Use $300

EPA/600/S8-91/042