

Assessing the Risk of Chemical Contaminants in the Environment

Default Exposure Assumptions		Child	Adult
Body Weight		10kg	70kg
Water Ingestion Rate		1 liter/day	2 liters/day
Soil Ingestion Rate		5,000 mg/day	100 mg/day
Cancer Classes	IARC	EPA	
	1	A	Carcinogenic to humans (sufficient human evidence)
	2A	B1	Probable human carcinogen (limited human; sufficient evidence in animals)
		B2	Probable human carcinogen (inadequate human, sufficient animal studies)
	2B	C	Possible human carcinogen (limited human; less than sufficient evidence in animals)
	3	D	Not classifiable
4	E	Probably not carcinogenic to humans, (evidence of noncarcinogenicity in humans)	
<p>MRLs Minimal Risk Levels (mg/kg/day) Estimate of daily human exposure likely to be without appreciable risk of adverse health effects Derived for acute (1-14 days), intermediate (15-365 days), and chronic (365 days and longer) durations Only on non-carcinogenic effects. Screening values only, not indicators of health effects. Exposures to substances at doses > MRLs will not necessarily cause adverse health effects and should be further evaluated.</p>			
$MRL = \frac{NOAEL(or\ LOAEL)}{UF}$		NOAEL = no-observed-adverse-effect level (mg/kg/day) LOAEL = lowest-observed-adverse-effect level (mg/kg/day) UF = uncertainty factor (unit less)	
<p>EMEGs Environmental Media Evaluation Guides (EMEGs) Concentrations of substances in water, soil, and air to which humans may be exposed during a specified period of time (acute, intermediate or chronic) without experiencing adverse health effects. Derived from substance toxicity (MRLs) and default exposure assumptions</p>			
<p>Water EMEGs for home potable water</p> $EMEG_w = \frac{MRL \times BW}{IR} \text{ (mg/L)}$		MRL = minimal risk level (mg/kg/day) BW = body weight (kg) IR = ingestion rate (L/day)	
<p>Soil for soil that is ingested</p> $EMEG_s = \frac{MRL \times BW}{IR \times CF} \text{ (mg/kg)}$		MRL = minimal risk level (mg/kg/day) BW = body weight (kg) IR = soil ingestion rate (mg/day) CF = conversion factor of 10 ⁻⁶ (kg/mg)	
<p>Air EMEG for inhalation exposures</p>		expressed in concentration units of micrograms/cubic meter (µg/m ³) or parts per billion (ppb).	
<p>RMEGs Reference Dose Media Evaluation Guides If no MRL is available to derive an EMEG, ATSDR develops RMEGs using EPA's reference doses (RfDs)</p>			
<p>CREGs media-specific comparison values that are used to identify concentrations of cancer-causing substances that are unlikely to result in an increase of cancer rates in an exposed population</p>			