

# ATSDR Dose Calculator

## What is the ATSDR Dose Calculator?

The ATSDR Dose Calculator is a computer program that allows users to compute the amount of a toxic substance an individual may be exposed to (dose).

## What are some of the features of the ATSDR Dose Calculator?

A survey of local health departments indicated a need for a system to:

- Save and retrieve exposure doses.
- Select from 4 scenarios: air, soil, water, fish consumption.
- Allows users to customize exposure parameters (e.g., age of people exposed, quantity of soil/ water/fish ingested, number of days exposed, and limbs exposed (arms, legs, feet, hands, arms, torso, head)).
- Incorporates sophisticated computational algorithms to calculate exposure doses for skin contact scenarios.
- Calculates cancer risk estimations for chemicals containing cancer risk factors.
- Displays ATSDR and EPA health comparison values.

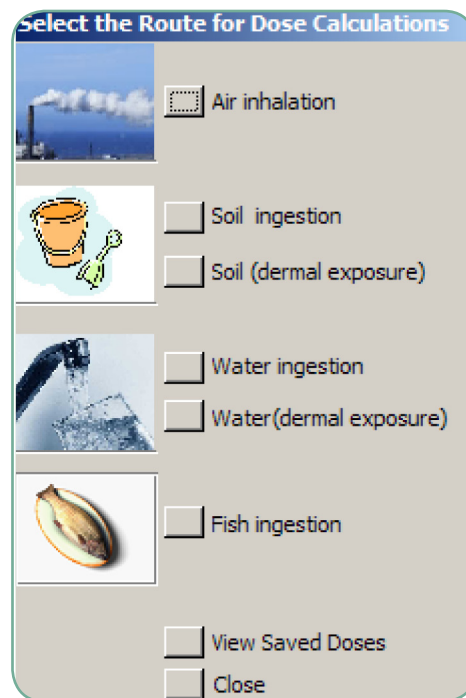
**Assists reviewers of Brownfields/ Land Reuse data**

## What entities are using the ATSDR Dose Calculator?

- Health Departments (from local to state level).
- Development Community.
- Regulatory Agencies.
- Planners.
- Environmental Health Professionals.

## Who Are We?

Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency headquartered in Atlanta, Georgia. ATSDR is responsible for evaluating and protecting community health from the effects of exposure to hazardous substances in the environment.



# ATSDR Dose Calculator

**Exposure Dose Calculator**

Air Exposure Dose Equation:  $ED = [C \times IR \times EF \times CF] / BW$  \*\* Equation and all default values are taken from ATSDR's Public Health Assessment Guidance Manual.

Exposure Dose Calculator will automatically convert units to standard units.

Contaminant: 1,3-BUTADIENE Mol Wt.: 54.1 g/mol  
 Synonym: Value Source: Maximum  
 CASN: Save Dose

Exposure Dose Calculation | Health Comparison Values | Cancer Classification | Alternative Comparison Values

Air Inhalation Exposure Dose Equation (choose one):  
☒ Direct Comparison to CVs (ED-CV)  
☐ Calculate Using Exposure Factors  $ED = [C \times IR \times EF \times CF] / BW$

C-Contaminant Concentration: 25 ppb  
 IR = Intake Rate of Contaminated Air: Specify Amount of Air Inhaled Per Day  
☒ Use Standard Intake Rate

EF = Exposure Factor (unitless): 1  
 CF = Conversion Factor: 2.2E+03  $\frac{ppb \times \frac{m^3}{24.45} \times \frac{kg}{m^3}}{ppb} = \frac{m^3}{24.45}$ , ending units =  $\frac{kg}{m^3}$

BW = Body Weight: Specify body weight: kg  
☒ Standard body weight: 00070.8 kg

**Results for 1,3-BUTADIENE**

Calculate Exposure Dose: ED = Exposure Dose: 7.74E-01 mg/m<sup>3</sup>  
 ED = Exposure Dose: 3.50E-01 ppb

Cancer Risk (Optional) CR = ED x Unit Risk Factor \* (Exposure Years / 70)  
 ED = Exposure Duration (in years): 5 Calculate Cancer Risk Ca risk: 1.88E-04

**Exposure Dose Calculator**

Soil Dermal Exposure Dose Equation:  $ED = [C \times A \times AF \times EF \times CF] / BW$  \*\* Equation and all default values are taken from ATSDR's Public Health Assessment Guidance Manual.

Exposure Dose Calculator will automatically convert units to standard units.

Contaminant: POLYCHLORINATED BIPHENYLS Mol Wt.: 189.64 g/mol  
 Synonym: Value Source: 95% UCL  
 CASN: Save Dose

Exposure Dose Calculation | Health Comparison Values | Cancer Classification

C-Contaminant Concentration: 50 ppm  
 EF = Exposure Factor (unitless): 35 days/year 4 years 14 beginning at this age  
☐ Enter Exposure Factor

AF = Bioavailability Factor (unitless): 0.1  $\frac{mg \times kg}{kg \times 1 \times 10^{-3} mg}$ , CF = 1x10<sup>-3</sup>  
 CF = Conversion Factor: 1.00E-03  
 Absorption Fraction: 1.0  
 BW = Body Weight: Adolescents Ages 12-17 50 kg

A = Total Soil Adhered (mg) = Exposed Skin Area x Soil Adherence Concentration  
☐ Head ☐ Torso ☒ Arms ☐ Hands ☐ Legs ☐ Feet  
 A = Exposed Skin Area: 8624.4167 x Soil Adherence Concentration: 0.3  
 A = 1784.88334

**Results for POLYCHLORINATED BIPHENYLS**

Calculate Exposure Dose: ED = Exposure Dose: 1.59E-05 (mg/kg/day)  
 Daily Intake: 0.46E-04 (mg/day)

Cancer Risk (Optional) CR = ED x Oral Slope Factor \* (Exposure Years / 70)  
 ED = Exposure Duration (in years): 4 Calculate Cancer Risk Ca risk: 1.83E-06

**Exposure Dose Calculator**

Fish Ingestion Exposure Dose Equation:  $ED = [C \times IR \times AF \times EF \times CF] / BW$  \*\* Equation and all default values are taken from ATSDR's Public Health Assessment Guidance Manual.

Exposure Dose Calculator will automatically convert units to standard units.

Contaminant: MERCURY Mol Wt.: 439.04 g/mol  
 Synonym: Value Source: Geometric mean  
 CASN: Save Dose

Exposure Dose Calculation | Health Comparison Values | Cancer Classification | Alternative Comparison Values

C-Contaminant Concentration: 100 ppm  
 IR = Intake Rate of Contaminated Fish:  
☒ Calculate Rate Based on Amount of Fish Per Day Consumed Over Time  
 6 ounces/day for 100 days/year over 10 years  
☐ Calculate Rate Based on Fish Meals Per Week Consumed Over Time  
☐ Use Standard Intake Rate

EF = Exposure Factor (unitless): 0.29  $\frac{mg \times kg}{kg \times 1 \times 10^{-3} mg}$ , CF = 1x10<sup>-3</sup>  
 AF = Bioavailability Factor (unitless): 0.1  
 CF = Conversion Factor: 1.00E-03

BW = Body Weight: Specify body weight: kg  
☒ Standard body weight: Adults - 70 kg

**Results for MERCURY**

Calculate Exposure Dose: ED = Exposure Dose: 9.10E-02 (mg/kg/day)  
 Daily Intake: 6.37E-01 (mg/day)

Cancer Risk (Optional) CR = ED x Oral Slope Factor \* (Exposure Years / 70)  
 ED = Exposure Duration (in years): 10 Calculate Cancer Risk Ca risk: 1.83E-06

**Exposure Dose Calculator**

Water Ingestion Exposure Dose Equation:  $ED = [C \times IR \times EF \times CF] / BW$  \*\* Equation and all default values are taken from ATSDR's Public Health Assessment Guidance Manual.

Exposure Dose Calculator will automatically convert units to standard units.

Contaminant: BENZENE Mol Wt.: 78.12 g/mol  
 Synonym: Value Source: 95% UCL  
 CASN: Save Dose

Exposure Dose Calculation | Health Comparison Values | Cancer Classification | Alternative Comparison Values

C-Contaminant Concentration: 80 ppm  
 IR = Intake Rate of Contaminated Water:  
☐ Specify Water Ingested  
☒ Standard Intake Rate  
 2 L/day - Adults

EF = Exposure Factor (unitless): 1  
 CF = Conversion Factor: 1.0E-03  $\frac{\mu g \times mg}{L \times 1,000 \mu g}$ , CF = 1x10<sup>-3</sup>

BW = Body Weight: Specify body weight: kg  
☒ Standard body weight: Children (1-6 yrs) - 16 kg

**Results for BENZENE**

Calculate Exposure Dose: ED = Exposure Dose: 1.00E-02 (mg/kg/day)  
 Daily Intake: 1.60E-01 (mg/day)

Cancer Risk (Optional) CR = ED x Oral Slope Factor \* (Exposure Years / 70)  
 ED = Exposure Duration (in years): 5 Calculate Cancer Risk Ca risk: 5.50E-04

## To learn more about the ATSDR Dose Calculator:

To learn more contact Laurel Berman, at (312) 886-7476, Leann Bing, at (404)-562-1784, or Gary Perlman at (617) 918-1492 or e-mail us at [atsdr.landreuse@cdc.gov](mailto:atsdr.landreuse@cdc.gov).