
DOSE AND EXPOSURE CHARACTERIZATIONS

SYSTEMIC, ORAL, INTRAVENOUS, AND INTRAPERITONEAL EXPOSURES

Systemic, oral, intravenous, and intraperitoneal exposures are commonly expressed in terms of the weight of the agent (milligrams or micrograms) per kilogram of the weight of the organism dosed.

CUTANEOUS EXPOSURES

Cutaneous exposures may be expressed in terms of a total dose or in terms of the weight of the agent (milligrams or micrograms) per square centimeter times the total area exposed.

The lethal dose (LD) for the organism in question is expressed in one of two ways:

- **LD₅₀** represents the dose that produces 50-percent mortality in the exposed population of interest.
- **LD₁₀** represents the dose that produces 10-percent mortality in exposed population of interest.

The incapacitating dose (ID) for the organism in question is similarly expressed:

- **ID₅₀** is the dose that incapacitates 50 percent of the population of interest.
- **ID₁₀** is the dose that incapacitates 10 percent of the population of interest.

Incapacitation can vary from moderate (unable to see, breathless) to severe (convulsions).

RESPIRATORY EXPOSURES

Respiratory exposures are expressed in terms of the product of the concentration (C) of the vapor or aerosol, usually expressed as milligrams (or micro-

grams) per cubic meter (or liter), e.g., 35 mg-min/m³ or 0.13 µg-min/l, and the length of the exposure (T). The resulting value is known as the CT.

Note that CT is an expression of exposure, not the amount inhaled or deposited. The same CT can be produced by varying concentration or exposure time. The effect of a given CT may or may not be the same if T is varied from a few minutes to several hours. For example, a CT of 5 can be obtained by exposure to 0.05 mg/m³ for 100 minutes or to 5 mg/m³ for 1 minute. The generalization is not reliable for very short exposures (during which breath might be held) or very long exposures (during which metabolic detoxification may operate).

As above, certain key dosages are of interest¹:

- **LCT₅₀** is the CT required to produce 50-percent mortality in the exposed population.
- **ICT₅₀** is the CT required to incapacitate 50 percent of the exposed population.

¹These definitions are also used for vapor or aerosol effects on the skin.