

Cancer Slope Factor and Unit Risk Factor

What are they?

A *cancer slope factor* gives the percent increase in the risk of getting cancer associated with a dose of a toxin (in mg of toxin per kg of body weight) every day for a lifetime.

A *unit risk factor* is based on the slope factor, but is specific to air (and sometimes water). The inhalation unit risk factor answers, “How many more cancer cases per million people would I expect to see for every microgram of this toxin per cubic meter of air?” For water, it’s for every microgram of toxin per liter of drinking water.

How are they used?

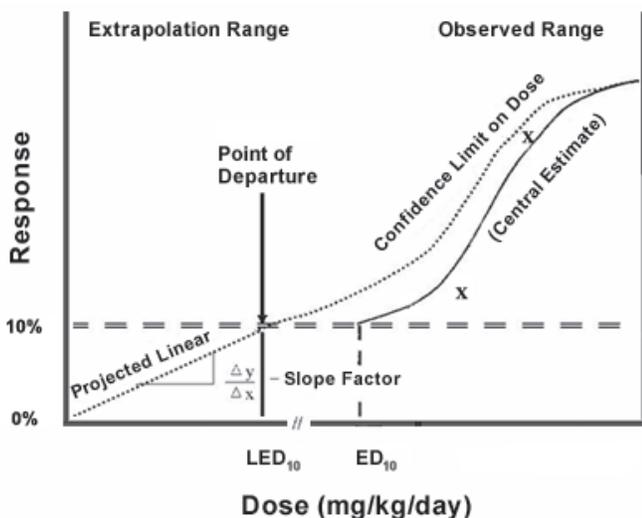
A risk assessor will apply cancer slope factors and unit risks to test results to calculate how many more cancer cases a population might be likely to see if that population had a lifetime of exposure to that amount of a toxin. Slope factor is general, while unit risk is specific to air or water.

How are they determined?

Cancer slope factors and unit risks are usually based on tests on laboratory animals. Sometimes (but rarely) they are based on human health studies from accidental exposure. Calculations for people assume a 70-kg adult, exposed to the toxin for 70 years by breathing 20 m³ of air (or drinking 2 L of water) per day.

How are they related to human health?

There are no ‘safe’ levels for carcinogens, because damage to a single cell can cause cancer. However, lower levels of a carcinogen will cause fewer additional cancer cases. If studies show that a certain level of a carcinogen isn’t likely to cause one new cancer case out of one million people, officials may decide that it is ‘acceptable’, even if it is not technically risk-free.



Scientists look at data from experiments and find the relationship between the dose (how much toxin is consumed) and the response (health effects). If they know what dose affects one in ten lab animals, and what dose affects one in a hundred lab animals, they can calculate the dose that would affect one in a million.

For More

epa.gov/iris/subst ...or check your state’s environmental agency.