Glossary

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Absorbed radiation dose
The amount of energy in joules (J) imparted by ionizing radiation to a unit mass (e.g., 1 kg) of matter such as human tissue. The unit for the absorbed radiation dose is the gray (*Gy*) where 1 *Gy* is equal to one joule per kilogram.

Acceptable daily intake (ADI)
The daily intake of a substance from all sources during a person's entire lifetime that should not cause an appreciable risk to health on the basis of all known facts. It is usually calculated from toxicity experiments with laboratory animals and is expressed in milligrams of chemical per kilogram of body weight per day (mg/kg/day).

Acceptable level of risk
When it is not possible to completely eliminate human exposure to a hazardous chemical or agent, a decision must be made as to how large a risk can be accepted in order to allow the use of that chemical or agent. Depending on circumstances, acceptable levels of risk vary from one extra death per year per 10 000 (1×10^{-4}) people exposed to the contaminant, to one extra cancer death per year per million people exposed (1×10^{-6}).

Additive effect
When two or more substances act together and the combined effect is equal to the sum of the individual effects (e.g., 2 + 2 = 4).

Antagonistic effect
When two or more substances interact and one or more of these substances partially or fully counteract the other(s). The combined effect is less than the sum of the individual effects (e.g., 2 + 2 < 4).

Association
Association is the relationship between an exposure and a disease. Such a relationship is not necessarily a cause-effect relationship.

Bioaccumulation
Some pollutants are excreted more slowly than they are absorbed and are stored in the body for long periods of time. Total pollutants in the body (the "body burden") may build up if the organism is exposed to a bioaccumulating substance for a long period of time.

Biomagnification
Pollutants "biomagnify" when their concentration increases as animals eat plants or each other. For example, when pollutants in plants are passed on to animals feeding on the plants, the animals may accumulate higher levels of contaminants than are found in the plants. This is because the animals eat many plants and do not excrete most of the absorbed amount of pollutants.

By-stander exposure
When people are unintentionally exposed to chemical environmental contaminants as a result of the use of a chemical.

Carcinogen
A carcinogen is a substance (e.g., a chemical) or an agent (e.g., ionizing radiation) that causes cancer.

Confounding factor
A confounding factor is an unknown or overlooked cause of disease that is not taken into consideration, and which distorts the cause-effect relationship under study.

Congener
A congener is a certain configuration of a chemical consisting of several kinds of atoms, such as dioxins, where some of the atoms can occupy different positions in the molecule.

Contaminants
Substances foreign to a natural system or present at unnatural concentrations are called contaminants. They are unwanted substances that have entered the air, food, water, or soil. They may be chemicals, living things, such as bacteria or viruses, or the products of radioactivity. Some contaminants are created by human (e.g., industrial) activities while others are the result of natural processes.

Control group
In an experimental or follow-up study, the control group is comprised of animals or people being observed who have not been exposed to a disease-causing agent in order to allow a comparison of affected and unaffected animals or people. In a case-control study, the control group is made up of people without the disease under study, for comparison with a group who have the disease. (See Epidemiological studies in Chapter 5. "Dose and Response for Chemicals.")

Demography
Demography is the study of populations, especially their density, fertility, mortality, growth, age distribution, migration and vital statistics, and the interaction of all these factors with social and economic conditions.

Detection limit
The lowest concentration of a substance that can be detected with certainty by the measuring technique being used.

Disease cluster
A disease cluster is a series of cases of disease or other health effects that all occur around the same time and/or in the same place.

Dose
The dose is the amount of a chemical or agent given to a test animal, or which is absorbed by a person. It is usually expressed as the weight (g, mg) of the substance given per unit of body weight (e.g., mg/kg).

Dose-response curve
The dose-response curve shows the mathematical relationship between exposure to a toxic chemical, and some health effect (end point). Often, higher doses will produce larger numbers of adverse affects, or more severe reactions. For example, the more alcoholic beverage a person consumes, the more likely he is to show signs of intoxication. Since there is a mathematical relationship between the amount of exposure (the dose) and the effects observed (the response), the relationship can be shown on a graph or "curve."

Epidemiology
Studies statistical relationships between patterns of disease and possible causal or contributing factors.

Equivalent radiation dose
This is the absorbed dose multiplied by the appropriate radiation weighting factor to allow for the differences between gamma, beta and alpha radiation in causing harm to tissue. The equivalent dose unit is the sievert (*Sv*).

Estimated daily intake (EDI)
The estimated total amount of a substance absorbed daily by a person. The estimated daily intake is usually expressed in milligrams of contaminant per kilogram of body weight per day (mg/kg/day).

Eutrophication
This is the enrichment of water with nutrients (especially phosphates and nitrates), either from a natural source or as a form of pollution. This leads to an increase in aquatic plants and algal blooms, and to a deterioration of water quality.

Excess risk
Excess risk is the increased risk of disease above the normal or background rate.

Exposure
Exposure is any contact between a substance or agent and an individual who has touched, breathed or swallowed it. It is expressed as the amount of the agent available for absorption at the body surfaces (e.g., skin, lungs, digestive tract) or the amount absorbed.

Exposure assessment
This assessment measures or estimates the magnitude, frequency, duration and route of exposure of individuals or populations to substances in the environment.

Exposure pathway
This is the pathway a contaminant may take to reach humans or other living organisms.

Exposure routes
The means by which contaminants enter the body, such as by ingestion (swallowing), by inhalation (breathing), and by dermal contact (touching).

Food chain
The food chain is a series of organisms, each eating the organism below them in the chain, and being eaten by the next higher organism. At the bottom of every food chain are green plants that convert sunlight into food (chemical) energy for use by the rest of the food chain. Because each organism at each level uses up most of the energy it consumes, much energy is lost at each level of the chain, thus limiting the length of the chain. In nature, food chains usually combine with other chains to form food webs.

Food web
Found in any natural community, a food web contains many interlinked food chains. Humans are at the highest level of many food webs.

Formulants
Formulants are chemicals used in pesticide or drug manufacture in addition to the active ingredient(s).

Guideline
A guideline is a recommended limit for a substance or an agent intended to protect human health or the environment that is not legally enforceable.

Half-life or half-time (chemical)
The time it takes for half of a particular substance to change to another chemical form in the environment so that only half of the amount of the original substance is left in the environment. The symbol for half-life or half-time is $t_{1/2}$.

Half-life or half-time (radiation)
The time it takes for the radiation emitted by a radionuclide to decline by half, as a result of radioactive decay. The symbol for half-life or half-time is $t_{1/2}$.

Hereditary effect
Hereditary effect is the effect of offspring inheriting traits from its parent(s).

Incidence
The number of new cases of a disease occurring in a defined population, within a specified period of time is known as the incidence. It is frequently presented as the number of new cases per 1000 or 100 000 people per year. The incidence rate can provide a direct estimate of the risk of developing a disease during a specified time period.

Inorganic chemicals
Inorganic chemicals do not contain carbon. Examples of inorganic substances are lead, cadmium, mercury, salt and asbestos.

Ionization
Ionization is the process by which a neutral atom or molecule acquires or loses an electric charge leading to the production of ions.

Latency period
The period of time between exposure to a disease-causing agent and the first appearance of signs or symptoms of the disease is called the latency period.

Lethal dose-50 (LD_{50})
The LD_{50} is the dose of a substance that will kill 50 percent of a group of test animals. LD stands for lethal dose.

Lowest observed adverse effect level (LOAEL)
The LOAEL is the lowest dose of a chemical, in studies on laboratory animals, that produces an observable adverse effect in the exposed group.

Maximum acceptable concentration (MAC)
MAC is the concentration of a substance that, if consumed daily for a lifetime, should not cause appreciable harm to the consumers.

Metabolism
Metabolism is the complex biochemical reactions that maintain life. Metabolism involves many processes, including the conversion of one compound into another, the building of large molecules from smaller ones (anabolism), and the breakdown of compounds (catabolism) to release life-sustaining energy.

Metabolite
Any substance that is involved in or is a product of metabolism is called a metabolite.

Minimal risk level (MRL)
An MRL is an estimate of daily human exposure to a chemical or agent that should not cause an appreciable risk of adverse health effects over a specified duration of exposure.

Mutagen
A mutagen is a substance or agent that can alter the genetic material (DNA or RNA), usually resulting in harmful changes that may cause disease and that may be inherited.

Non-point sources
A non-point source is a combination of scattered sources of small amounts of environmental contaminants. Examples of non-point sources include pesticide and fertilizer run-off from farms and air pollution from burning of gasoline by cars.

No observed adverse effect level (NOAEL)
The NOAEL is the dose of a chemical at which there are no statistically or biologically significant increases in the frequency or severity of the adverse effects seen in experimentally exposed laboratory animals. Biologic effects, such as cell enlargement, may be produced at this dose, but they are not considered to be adverse.

Objective
The objective is a preferred or desired low level of a substance or an agent in the environment, often set at zero or the detection limit.

Organic chemicals
Organic chemicals contain carbon, usually combined with hydrogen and other elements such as oxygen, nitrogen, or chlorine. Vegetable matter, petroleum, and plastics are examples of organic materials, as are PCBs, DDT, and polyvinyl chloride.

Persistent pollutant
A persistent pollutant is one that remains a long time in the environment. Under the Great Lakes Water Quality Agreement, a persistent pollutant is one with a half-life of eight weeks or longer.

Point sources
Point sources of pollution are single, easily identifiable sources such as smokestacks and discharge pipes.

Pollutant
A pollutant is a contaminant whose presence is damaging to human health or to the environment. Pollutants may be useful substances that have escaped into the environment where they are harmful instead of useful (e.g., DDT, PCBs) or they are waste products that have been inadequately disposed of or contained (e.g., carbon dioxide, fly ash).

Prevalence
Prevalence is the number of existing cases of a given disease or other condition in a given population at a designated point in time.

Radiation activity
The rate at which the atoms of a radioactive substance disintegrate and release radiation energy. The unit is the becquerel (*Bq*) where 1 *Bq* is equal to 1 atomic disintegration per second.

Radioactive decay
Some atoms (radionuclides) are unstable and undergo spontaneous disintegration known as radioactive decay. During the decay, radionuclides release energy (**radioactivity**) and their fragments form lighter atoms. Over time the rate of decay and the amount of radioactivity in a substance will decrease.

Radionuclide
A radionuclide is an unstable atom that undergoes spontaneous radioactive decay into smaller elements and emits ionizing radiation as it does so.

Risk
Risk is the measure of both the hazard to health from exposure to a substance and the probability of its occurrence.

Risk assessment
Risk assessment employs techniques for measuring and estimating the likely health impacts, and other adverse results of releasing or discharging specified amounts of pollutants.

Risk management
Risk management is the selection and implementation of strategies to control health risks, followed by monitoring and evaluation of the effectiveness of that strategy. Strategies can be regulatory or non-regulatory.

Risk-specific dose (RsD)
The RsD is the daily dose of a carcinogen that will not exceed the acceptable risk of cancer. It is usually expressed in milligrams of chemical per kilogram of body weight per day (mg/kg/day).

Serum (blood)
Serum is the clear liquid that separates from the blood when it is allowed to clot.

Somatic effect
A somatic effect affects the non-reproductive cells, as distinct from reproductive cells, and likely will not be passed on from parent to offspring. Changes to nucleic acids in mitochondria are passed from mothers to their offspring.

Standard
A standard is a legally enforceable limit for a substance or an agent intended to protect human health or the environment. Exceeding the standard could result in unacceptable harm.

Synergistic action
Synergistic action occurs when two or more chemicals re-enforce each other's effects, i.e., their combined effect surpasses (exceeds) 1. their additive effect; and 2. their individual effect.

Teratogen
A teratogen is a substance or agent that can cause structural or functional birth defects in the offspring of exposed adults.

Tolerable daily intake (TDI)
This is the total daily intake of a substance during a person's lifetime that should not cause appreciable risk to health on the basis of all known facts. It is usually expressed in milligrams of chemical per kilogram of body weight per day (mg/kg/day).

Toxicology
Toxicology is the study of the effects of poisons on humans, animals, or other organisms.

Toxic substances
A substance capable of causing harm to humans, animals or other living things is known as a toxic substance. In common usage, the term refers to chemical substances that are capable of causing harm at very low levels of exposure, while providing little or no benefit.

Volatile organic compounds (VOCs)
VOCs are organic gases and vapours in the air whose sources include the burning of fuels, dry cleaning operations, and the evaporation of organic compounds from solvents, paints, and other coatings.