Pure & Appl. Chem., Vol. 65, No. 9, pp. 2003–2122, 1993.
Printed in Great Britain.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

CLINICAL CHEMISTRY DIVISION
COMMISSION ON TOXICOLOGY*

GLOSSARY FOR CHEMISTS OF TERMS USED IN TOXICOLOGY

(IUPAC Recommendations 1993)

Prepared for publication by

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Glossary for chemists of terms used in toxicology (IUPAC Recommendations 1993)

Synopsis. **The glossary contains definitions and explanatory notes, if needed, for over 1200 terms frequently used in the multidisciplinary field of toxicology. The glossary is compiled primarily for chemists who now find themselves working in toxicology or requiring a knowledge of the subject, especially for hazard and risk assessment. Many medical terms are included because of their frequent occurrence in the toxicological literature and because chemists would not normally be expected to be familiar with them. There are two annexes, one containing a list of abbreviations used in toxicology and and one containing a list of abbreviations used by international bodies and by legislation relevant to toxicology and chemical safety.**

CONTENTS

PREFACE

The International Union of Pure and Applied Chemistry (IUPAC) established a Commission on Toxicology, within the framework of the Clinical Chemistry Section, in 1973. Like other IUPAC bodies, the Commission was concerned to promote world-wide "regulation, standardization, or codification" in relevant areas of chemistry. Over the years, toxicology has grown rapidly. A need has been recognized for globally acceptable definitions of terms used in toxicology and ecotoxicology and this glossary was commissioned with the objective of fulfilling that need.

The glossary is compiled primarily for chemists who now find themselves working in toxicology or requiring a knowledge of the subject. Faced with an extensive literature and terms that are not always defined in accessible dictionaries, newcomers to the subject can have great difficulty in obtaining the background knowledge essential for their work. Further, many toxicologists, whose previous experience has been limited to clinical and experimental toxicology, now have to assess possible environmental effects of chemicals

and need to understand terms used in ecotoxicology. Equally, specialists in ecotoxicology often lack knowledge of the terms used in clinical and experimental toxicology. There are also regulators and managers who have to interpret toxicological information and therefore need ready access to internationally accepted definitions of relevant terms in common use.

Satisfying the requirements of the various groups now concerned with the generation or use of toxicological knowledge is a wide remit and hence the terms to be included in this glossary have come from a wide range of disciplines. Many medical terms are included because of their frequent occurrence in the toxicological literature and because chemists would not normally be expected to be familiar with them. Major epidemiological terms are included for the same reason. Specialists in these and other areas may believe that such terms can be omitted because they are well defined elsewhere. While this glossary may err on the side of including peripheral terms, it is believed that some redundancy of content is preferable to the difficulties currently presented to a newcomer to toxicology in having to consult several dictionaries in order to make a start with the subject.

The definitions given in this glossary are believed to reflect current usage and no attempt has been made to introduce new or "preferred" definitions. Obsolete terms such as "cytochrome P448" have been included because they are to be found in scientific articles which still have relevance. For some of the entries, alternative definitions are given because significant differences in usage have been recognized between disciplines or even between different languages where similar words to the English terms are used.

More people than we can name in the Acknowledgments have contributed to this glossary and we are grateful for all the contributions that have helped to improve each version that has been produced. Inevitably there will still be flaws but we hope that the final version will be sufficiently close to achieving the original objectives to justify the very widespread support that this Working Party has enjoyed.

Acknowledgements

The active collaboration of Professor Paolo Preziosi, President of the International Union for Toxicology (IUTOX) and of Professor Norman Aldridge, together with the support of IUTOX in the compilation of this glossary, has been particularly welcome and greatly appreciated by the Working Party.

The Working Party was fortunate in having scientific support from the International Programme on Chemical Safety, the International Register of Potentially Toxic Chemicals and the United Nations Environment Programme which allowed IUPAC to use published and unpublished material. The Working Party acknowledges the support of The Royal Society of Chemistry, London, GBR, in permitting the use in the original drafts of definitions from its books, "Toxic Hazard Assessment of Chemicals", and "Risk Assessment of Chemicals in the Environment", both edited by M.L. Richardson. The Regional Office for Europe of the World Health Organization also generously permitted incorporation of definitions from Environmental Health Publication 10, "Environmental Toxicology and Ecotoxicology", edited by J.H. Duffus. We are particularly grateful to Professor J.M. Last, the International Epidemiological Association, and Oxford University Press for permission to quote definitions from "A Dictionary of Epidemiology", Second Edition. We are also grateful to the Association of Clinical Biochemists Scientific Committee who kindly reviewed a draft of the glossary and annotated it with their suggestions.

The Working Party exchanged information with the IUPAC Commission on Biotechnology and a number of terms are found in both this glossary and the "Glossary of Terms Used in Biotechnology" prepared by that Commission. In addition, helpful comments were received from the Commission on Agricultural Chemistry and from other Commissions, such as the Commission on Water Chemistry.

For the first draft, the Working Party received financial assistance from the European Community Directorate General XI, and from Ashton-Tate Ltd. in the form of a gift of software. IUPAC made funds available for the second and third drafts.

For the preparation of the second draft, grants were received from the National Rivers Authority - Thames Region, and from Albright & Wilson (European Headquarters).

For the preparation of the third draft and assistance in travelling and subsistence, the Working Party is indebted to the IUPAC Committee on Chemical Industry (COCI) for their support. Additionally, support, both financial and moral was given by the member companies CIBA-GEIGY, Lonza, Hoffman-La Roche, and Sandoz, and the permanent staff of ECETOC. General thanks for financial support are due to Betz, Procter and Gamble - Belgium, ICI Agro-chemicals, Houseman Speciality Chemicals, Monsanto, and Rohm & Haas Italia.

Finally, the preparation of the glossary would not have been feasible without the efforts of Pauline Sim, Principal of Gascoigne Secretarial Services, High Wycombe, GB, who typed the first 3 draft copies, was responsible for the original compilation in alphabetical order of terms from many sources, and typed the several hundred letters needed to get the project started.

NOTES FOR THE USER OF THIS GLOSSARY

In compiling this glossary, it became clear that toxicologists have not conformed to the rules laid down by IUPAC in their current practice. For example, one of the IUPAC rules about abbreviations is that they should not be used as symbols for physical quantities but by long tradition toxicologists have used the abbreviation LD_{50} and related abbreviations in just this way. The compilers of this glossary have accepted the prevailing toxicological usage but this is not to be taken as an indication that it has their approval and they recommend that some attempt should be made to improve on current usage to bring it into line with IUPAC rules. Similarly, the compilers recommend that, contrary to much current usage, toxic components (like other chemically definable components) in doses, dosages and exposures should be expressed as amounts-of-substance, substance concentration, substance content or a time integral of one of these. Thus, for example, a pesticide should be expressed as amount-of-substance, not as its mass including binding agents and other ingredients, nor its volume including solvent.

There is a need for translations of such terms as "absolute lethal concentration" into the recommended format for clinical chemistry with component, system, and kind-of-quantity with parenthetic specifications of each as necessary. Thus, "absolute lethal concentration in air" might become ambient-air-toxicant substance concentration (number fraction of organisms killed = 1).

There is also a need for a careful revision of symbolic practices to bring them into line with ISO-31 (for example c (d killed = 1) for absolute lethal concentration in stead of LC_{100}).

ALPHABETICAL ENTRIES

Throughout the glossary the following abbreviations are used to indicate the relationships between terms.

AN antonym, opposite
BT broader term
NT narrower term
PS partial synonym
RT related term
SN exact synonym

abiological See SN **abiotic**

abiotic Not associated with living organisms.
SN **abiological.**

abiotic transformation Process in which a substance in the environment is modified by non-biological mechanisms.
RT **biotransformation.**
IPCS, 1987

absolute lethal concentration (LC_{100}) Lowest concentration of a substance in an environmental medium which kills 100 % of test organisms or species under defined conditions. This value is dependent on the number of organisms used in its assessment.
WHO, 1979

absolute lethal dose (LD_{100}) Lowest amount of a substance which kills 100 % of test animals under defined conditions. This value is dependent on the number of organisms used in its assessment.

absorbed dose (of a substance) Amount of a substance absorbed into an organism or into organs and tissues of interest.

absorbed dose (of radiation) Energy imparted to matter in a suitably small element of volume by ionizing radiation divided by the mass of that element of volume. The SI unit for absorbed dose is joule per kilogram ($J\ kg^{-1}$) and its special name is gray (Gy).
ISO, 1972
RT **ionizing radiation.**

absorption (biological) Process of active or passive transport of a substance into an organism: in the case of a mammal or human being, this is usually through the lungs, gastrointestinal tract, or skin.

absorption (in colloid and surface chemistry) Process whereby, when two phases are brought into contact, a particular component is transferred from one phase to the other.
PAC, 1972

absorption (of radiation) Phenomenon in which radiation transfers some or all of its energy to matter which it traverses.
ISO, 1972

absorption coefficient (in biology) Ratio of the absorbed amount (uptake) of a substance to the administered amount (intake): for exposure by way of the respiratory tract, the coefficient is the ratio of the absorbed amount to the amount of the substance (usually particles) deposited (adsorbed) in the lungs.
RT **absorbed dose.**
SN **absorption factor.**
IRPTC, 1982

abuse (of drugs, substances, solvents etc.) Improper use of drugs or other substances.
RT **"glue sniffing", solvent abuse, "solvent sniffing".**

acaricide Substance intended to kill mites, ticks or other Acaridae.

acceptable daily intake (ADI) Estimate of the amount of a substance in food or drinking water, expressed on a body mass basis (usually mg/kg body weight), which can be ingested daily over a lifetime by humans without appreciable health risk. For calculation of the daily intake per person, a standard body mass of 60 kg is used. ADI is normally used for food additives (tolerable daily intake is used for contaminants).
WHO, 1991
RT **tolerable daily intake.**

acceptable daily intake (ADI) not allocated See SN **no acceptable daily intake allocated.**

acceptable residue level of an antibiotic Acceptable concentration of a residue which has been established for an antibiotic found in human or animal foods.

acceptable risk Probability of suffering disease or injury which is considered to be sufficiently small to be "negligible".
PS **tolerable risk.**
RT **accepted risk, negligible risk, risk *de minimis*.**

accepted risk Probability of suffering disease or injury which is accepted by an individual.

accidental exposure Unintended contact with a substance or change in the physical environment (including for example radiation) resulting from an accident.

acclimatization (biological)
1. Processes, including selection and adaptation, by which a population of micro-organisms develops the ability to degrade a substance, or develops a tolerance to it.
2. In animal tests - allowing an animal to adjust to its environment prior to undertaking a study.

accumulation Successive additions of a substance to a target organism, or organ, or to

part of the environment, resulting in an increasing amount or concentration of the substance in the organism, organ, or environment.
WHO, 1989a

accuracy Quantity referring to the differences between the mean of a set of results or an individual result and the value which is accepted as the true or correct value for the quantity measured.
Gold, Loening, McNaught and Sehmi, 1987
RT **precision.**

acidosis Pathological condition in which the hydrogen ion substance concentration of body fluids is above normal and hence the pH of blood falls below the reference interval.
AN **alkalosis.**

action level
1. Concentration of a substance in air, soil, water or other defined medium at which specified emergency counter-measures, such as the seizure and destruction of contaminated materials, evacuation of the local population or closing down the sources of pollution, are to be taken.
2. Concentration of a pollutant in air, soil, water or other defined medium at which some kind of preventive action (not necessarily of an emergency nature) is to be taken.

activation See NT **bioactivation.**

acute
1. Short-term, in relation to exposure or effect. In experimental toxicology, "acute" refers to studies of two weeks or less in duration (often less than 24 h).
   AN **chronic**
2. In clinical medicine, sudden and severe, having a rapid onset.

acute effect Effect of short duration and occurring rapidly (usually in the first 24 h or up to 14 d) following a single dose or short exposure to a substance or radiation.

acute toxicity
1. Adverse effects occurring within a short time (usually up to 14 d) after administration of a single dose (or exposure to a given concentration) of a test substance or after multiple doses (exposures), usually within 24 h.
2. Ability of a substance to cause adverse effects within a short time of dosing or exposure.

AN **chronic toxicity.**

acute toxicity test Experimental animal study to determine what adverse effects occur in a short time (usually up to 14 d) after a single dose of a substance or after multiple doses given in up to 24h.
RT **limit test, median lethal dose (LD_{50}).**

adaptation
1. Change in an organism, in response to changing conditions of the environment (specifically chemical), which takes place without any irreversible disruptions of the given biological system and without exceeding normal (homeostatic) capacities of its response.

2. Process by which an organism stabilizes its physiological condition after an environmental change.

RT **acclimatization.**

added risk Difference between the incidence of an adverse effect in a treated group (of organisms or a group of exposed humans) and a control group (of the same organisms or the spontaneous incidence in humans).
IRIS, 1986

addiction Surrender and devotion to the regular use of a medicinal or pleasurable substance for the sake of relief, comfort, stimulation, or exhilaration which it affords; often with craving when the drug is absent.
PS **dependence.**

additive effect Consequence which follows exposure to two or more physico-chemical agents which act jointly but do not interact: commonly, the total effect is the simple sum of the effects of separate exposure to the agents under the same conditions. Substances of simple similar action may show dose or concentration addition.
RT **antagonism, combined effect of poisons, potentiation, synergism.**

adduct New chemical species AB, each molecular entity of which is formed by direct combination of two separate molecular entities A and B in such a way that there is no change in connectivity of atoms within their moieties A and B. Stoichiometries other than 1:1 are also possible. An intramolecular adduct can be formed when A and B are groups contained within the same molecular entity.
Gold, Loening, McNaught and Sehmi, 1987

adenocarcinoma Malignant tumour originating in glandular epithelium or forming recognizable glandular structures.
RT **adenoma.**

adenoma Benign tumour occurring in glandular epithelium or forming recognizable glandular structures.
RT **adenocarcinoma.**

adjuvant

1. In pharmacology, a substance added to a drug to speed or increase the action of the main component.
2. In immunology, a substance (such as aluminium hydroxide) or an organism (such as bovine tuberculosis bacillus) which increases the response to an antigen.

administration (of a substance) Application of a known amount of a substance to an organism in a reproducible manner and by a defined route.

adrenergic See SN ***sympathomimetic***

adsorption Enrichment (positive adsorption, or briefly adsorption) of one or more components in an interfacial layer.
Gold, Loening, McNaught and Sehmi, 1987

adverse effect Change in morphology, physiology, growth, development or lifespan of an organism which results in impairment of functional capacity or impairment of

capacity to compensate for additional stress or increase in susceptibility to the harmful effects of other environmental influences.
After IPCS, 1978

adverse event Occurrence which causes an adverse effect.

aerobe Organism which needs molecular oxygen for respiration and hence for growth and life.
After Nagel *et al.* (eds), 1991

aerobic Requiring molecular oxygen.

aerodynamic diameter (of a particle) Diameter of a spherical particle of unit density which has the same settling velocity in air as the particle in question.
IPCS, 1987

aerosol Dispersion of liquid or solid material in a gas.
Gold, Loening, McNaught and Sehmi, 1987

aetiology
1. Science dealing with the cause or origin of disease.
2. In individuals, the cause or origin of disease.

RT **epidemiology.**

after-effect of a poison Ability of a poison to produce a change in an organism after cessation of contact .

age sensitivity Quantitative and qualitative age dependence of an effect.
IRPTC, 1982

agonist Substance which binds to cell receptors normally responding to naturally occurring substances and which produces a response of its own.
AN **antagonist.**

air pollution Presence of substances in the atmosphere resulting either from human activity or natural processes, in sufficient concentration, for a sufficient time and under circumstances such as to interfere with comfort, health or welfare of persons or to harm the environment.
ISO, 1980
BT **pollution.**

air pollution control system
1. Network of organizations which monitor air pollution.
2. Group of measures or processes used to minimize or prevent air pollution.

RT **air pollution, pollution.**

albuminuria Presence of albumin, derived from plasma, in the urine.
RT **microalbuminuria, proteinuria.**

algicide Substance intended to kill algae.

alkalosis Pathological condition in which the hydrogen ion substance concentration of body fluids is below normal and hence the pH of blood rises above the reference interval.
AN **acidosis.**

alkylating agent Substance which introduces an alkyl substituent into a compound.

allele One of several alternate forms of a gene which occur at the same relative position (locus) on homologous chromosomes and which become separated during meiosis and can be recombined following fusion of gametes
RT **gametes, meiosis**
Nagel *et al.* (eds), 1991

allergen Antigenic substance capable of producing immediate hypersensitivity.
RT **allergy, antigen, hypersensitivity.**

allergy Symptoms or signs occurring in sensitized individuals following exposure to a previously encountered substance (allergen) which would otherwise not cause such symptoms or signs in non-sensitized individuals. The most common forms of allergy are rhinitis, urticaria, asthma, and contact dermatitis.
RT **immune response, hypersensitivity.**

all-or-none effect See SN **quantal effect.**
RT **stochastic effect.**

alopecia Baldness; absence or thinning of hair from areas of skin where it is usually present.

alveol/us (pulmonary), -i pl., **-ar** adj. Terminal air sac of the lung where gas exchange occurs.

ambient Surrounding (applied to environmental media such as air, water, sediment or soil).

ambient monitoring Continuous or repeated measurement of agents in the environment to evaluate ambient exposure and health risk by comparison with appropriate reference values based on knowledge of the probable relationship between exposure and resultant adverse health effects.
After Berlin, Yodaiken, and Henman, 1984
RT **biological monitoring, environmental monitoring, monitoring.**

ambient standard See SN **environmental quality standard.**

Ames test *In vitro* test for mutagenicity using mutant strains of the bacterium *Salmonella typhimurium* which cannot grow in a given histidine-deficient medium: mutagens can cause reverse mutations which enable the bacterium to grow on the medium. The test can be carried out in the presence of a given microsomal fraction (S-9) from rat liver to allow metabolic transformation of mutagen precursors to active derivatives.

amplification (of genes) See **gene amplification.**

anabolism Biochemical processes by which smaller molecules are joined to make larger molecules.
AN **catabolism.**

anaemia Condition in which there is a reduction in the number of red blood cells or amount of haemoglobin per unit volume of blood below the reference interval for a similar individual of the species under consideration, often causing pallor and fatigue.

anaerobe Organism which does not need molecular oxygen for life. Obligate (strict) anaerobes grow only in the absence of oxygen. Facultative anaerobes can grow either in the presence or in the absence of molecular oxygen.
Nagel *et al.* (eds), 1991
AN **aerobe.**

anaerobic Not requiring molecular oxygen.

anaesthetic Substance which produces loss of feeling or sensation: general anaesthetic produces loss of consciousness; local or regional anaesthetic renders a specific area insensible to pain.

analgesic Substance which relieves pain, without causing loss of consciousness.

analogue metabolism Process by which a normally non-biodegradable compound is biodegraded in the presence of a structurally similar compound which can induce the necessary enzymes.

analytic study (in epidemiology) Hypothesis-testing method of investigating the association between a given disease or health state or other dependent variable and possible causative factors. In an analytic study, individuals in the study population are classified according to absence or presence (or future development) of specific disease and according to attributes which may influence disease occurrence. Attributes may include age, race, sex, other disease(s), genetic, biochemical, and physiological characteristics, economic status, occupation, residence, and various aspects of the environment or personal behaviour. Three types of analytic study are: cross-sectional (prevalence), cohort (prospective), and case control (retrospective).
Last, 1988

anaphylaxis Severe allergic reaction occurring in a person or animal exposed to an antigen or hapten to which they have previously been sensitized.
RT **antigen, hapten.**

anaplasia Loss of normal cell differentiation, a feature characteristic of most malignancies.
RT **malignancy.**

anemia See **anaemia.**

aneuploid Cell or organism with missing or extra chromosomes or parts of chromosomes.

anoxia Strictly total absence of oxygen but sometimes used to mean decreased oxygen supply in tissues.

antagonism Combined effect of two or more factors which is smaller than the solitary effect of any one of those factors. In bioassays, the term may be used when a specified response is produced by exposure to either of two factors but not by exposure to both together.
RT **synergism.**

antagonist
1. Substance that reverses or reduces the effect induced by an agonist.
2. Substance that attaches to and blocks cell receptors that normally bind naturally occurring substances

AN **agonist.**

anthelmint(h)ic Substance intended to kill parasitic intestinal worms, such as helminths.
SN **antihelminth.**

anthracosis (coal miners' pneumoconiosis) Form of pneumoconiosis caused by accumulation of carbon deposits in the lungs due to inhalation of smoke or coal dust.

anthropogenic Caused by or influenced by human activities.

anti-adrenergic See SN **sympatholytic**

antibiotic Substance produced by, and obtained from, certain living cells (especially bacteria, yeasts and moulds), or an equivalent synthetic substance, which is biostatic or biocidal at low concentrations to some other form of life, especially pathogenic or noxious organisms.

antibody Protein molecule produced by the immune system (an immunoglobulin molecule) which can bind specifically to the molecule (antigen or hapten) which induced its synthesis.
RT **antigen, hapten, immunoglobulin.**

anticholinergic
1. adj., Preventing transmission of parasympathetic nerve impulses.
2. n., Substance which prevents transmission of parasympathetic nerve impulses.

anticholinesterase See SN **cholinesterase inhibitor.**

anticoagulant Substance which prevents clotting.

antidote Substance capable of specifically counteracting or reducing the effect of a potentially toxic substance in an organism by a relatively specific chemical or pharmacological action.

antigen Substance or a structural part of a substance which causes the immune system to produce specific antibody or specific cells and which combines with specific binding sites (epitopes) on the antibody or cells.
After Nagel *et al.* (eds), 1991
RT **antibody, epitope.**

antihelminth See SN **anthelmint(h)ic.**

antimetabolite Substance, structurally similar to a metabolite, which competes with it or replaces it, and so prevents or reduces its normal utilization.

antimycotic Substance used to kill a fungus or to inhibit its growth.
SN **fungicide.**

antipyretic Substance which relieves or reduces fever.

antiresistant Substance used as an additive to a pesticide formulation in order to reduce the resistance of insects to the pesticide.
IRPTC, 1982

antiserum Serum containing antibodies to a particular antigen either because of immunization or after an infectious disease.

aphasia Loss or impairment of the power of speech or writing, or of the ability to understand written or spoken language or signs, due to a brain injury or disease.

aphicide Substance intended to kill aphids.
BT **insecticide.**

aphid Common name for a harmful plant parasite in the family Aphididae: some species are vectors of plant virus diseases.

aplasia Lack of development of an organ or tissue, or of the cellular products from an organ or tissue.

apoptosis Physiological process of programmed tissue death (and disintegration) associated with normal development in animals.
RT **necrosis.**

arboricide Substance intended to kill trees and shrubs.

area source Widespread origin of emissions.
RT **point source.**

argyria Pathological condition characterized by grey-bluish or black pigmentation of tissues (such as skin, retina, mucous membranes, internal organs) caused by the accumulation of metallic silver, due to reduction of a silver compound which has entered the organism during (prolonged) administration or exposure.
SN **argyrosis.**

argyrosis See SN **argyria.**

arrhythmia Any variation from the normal rhythm of the heartbeat.

artefact Finding or product of experimental or observational techniques that is not properly associated with the system being studied.

arteriosclerosis Hardening and thickening of the walls of the arteries.

arthralgia Pain in a joint.

arthralgia saturnia Pain in a joint resulting from lead poisoning.

arthritis Inflammation of a joint, usually accompanied by pain and often by changes in structure.

asbestosis Form of pneumoconiosis caused by inhalation of asbestos fibres.
BT **pneumoconiosis**.

ascaricide Substance intended to kill roundworms (Ascaridae).

asphyxia Condition resulting from insufficient intake of oxygen: symptoms include breathing difficulty, impairment of senses, and, in extreme, convulsions, unconsciousness and death.

asphyxiant Substance that blocks the transport or use of oxygen by living organisms.

assay
1. Process of quantitative or qualitative analysis of a component of a sample.
2. Results of a quantitative or qualitative analysis of a component of a sample.

assessment of exposure See NT **biological assessment of exposure**.

asthenia Weakness; lack or loss of strength.

asthma Chronic respiratory disease characterised by bronchoconstriction, excessive mucus secretion and oedema of the pulmonary alveoli, resulting in difficulty in breathing out, wheezing, and cough.

astringent
1. Adj. Causing contraction, usually locally after topical application.
2. N. Substance causing cells to shrink, thus causing tissue contraction or stoppage of secretions and discharges; such substances may be applied to skin to harden and protect it.

ataxia Unsteady or irregular manner of walking or movement caused by loss or failure of muscular co-ordination.

atherosclerosis Pathological condition in which there is thickening, hardening, and loss of elasticity of the walls of blood vessels, characterized by a variable combination of changes of the innermost layer consisting of local accumulation of lipids, complex carbohydrates, blood and blood components, fibrous tissue and calcium deposits. In addition, the outer layer becomes thickened and there is fatty degeneration of the middle layer.

atrophy Wasting away of the body or of an organ or tissue.

attenuation (in genetics) Regulation of gene expression in bacteria by premature termination of transcription of a biosynthetic operon.

attractant Substance used to attract animals with the aim of killing or sterilizing them.
BT **pheromone.**

attributable risk Difference between the risk of exhibiting a certain adverse effect in the presence of a substance and the same risk in the absence of the substance.
BT **risk.**
Last, 1988

autoimmune disease Pathological condition resulting when an organism produces antibodies or specific cells which bind to constituents of its own tissues (autoantigens) and cause tissue injury: examples of such disease may include rheumatoid arthritis, myasthenia gravis, and scleroderma.
RT **allergy, antibody, antigen, hypersensitivity, immune response.**

autophagosome Membrane-bound body (secondary lysosome) in which parts of the cell are digested.

autopsy Post-mortem examination of the organs and body tissue to determine cause of death or pathological condition.
RT **biopsy.**
SN **necropsy.**

auxotroph Organism unable to synthesize an organic molecule which is required for its growth: when the compound is given to the organism with the other nutrients it requires, growth of the organism may occur.

auxotrophy Inability of a micro-organism to synthesize a particular organic compound required for its growth.
Nagel *et al.* (eds), 1989

avicide Substance intended to kill birds.

axenic animal See SN **germ free animal.**

back-mutation Process which reverses the effect of a mutation which had inactivated a gene; thus it restores the wild phenotype.
RT **phenotype.**

bactericide Substance intended to kill bacteria.

bagassosis Lung disease caused by the inhalation of dust from sugar-cane residues.

base pairing Linking of the complementary pair of polynucleotide chains of nucleic acids by means of hydrogen bonds between complementary purine and pyrimidine bases, adenine with thymine or uracil, cytosine with guanine.

B-cell See **B lymphocyte.**

benefit Advantage to or improvement in condition of an individual or a population.

benign
1. Of a disease, producing no persisting harmful effects.

2. Tumour which does not invade other tissues (metastasize), having lost growth control but not positional control.

AN **malignant**

berylliosis See SN **beryllium disease**

beryllium disease Serious and usually permanent lung damage resulting from chronic inhalation of beryllium.

bias Deviation of results or inferences from the truth, or processes leading to such deviation. Any trend in the collection, analysis, interpretation, publication, or review of data which can lead to conclusions which are systematically different from the truth. Among the ways in which deviation from the truth can occur are the following:

1. Systematic (one-sided) variation of measurements from the true values
   SN **systematic error.**
2. Variation of statistical summary measures (means, rates, measures of association, etc.) from their true values as a result of systematic variation of measurements, other flaws in data collection, or flaws in study design or analysis.
3. Deviation of inferences from the truth as a result of flaws in study design, data collection, or the analysis or interpretation of results.
4. A tendency of procedures (in study design, data collection, analysis, interpretation, review or publication) to yield results or conclusions which depart from the truth.
5. Prejudice leading to the conscious or unconscious selection of study procedures which depart from the truth in a particular direction, or to one-sidedness in the interpretation of results.

Last, 1988

biased sample Any sample which is not a random sample.
AN **random sample.**
BT **sample.**
RT **stratified sample, systematic sample.**

bilirubin Orange-yellow pigment ($C_{33}H_{36}O_6N_4$), a breakdown product of haem-containing proteins (haemoglobin, myoglobin, cytochromes), which circulates in the blood plasma bound to albumin or as water soluble glucuronides, and is excreted in the bile by the liver.

bioaccumulation Progressive increase in the amount of a substance in an organism or part of an organism which occurs because the rate of intake exceeds the organism's ability to remove the substance from the body.
PS **bioconcentration, biomagnification.**

bioaccumulation potential Ability of living organisms to concentrate a substance obtained either directly from the environment or indirectly through its food.
IPCS, 1987

bioactivation Any metabolic conversion of a xenobiotic to a more toxic derivative.
PS **activation.**
BT **biotransformation.**

bioassay Procedure for estimating the concentration or biological activity of a substance (vitamin, hormone, plant growth factor, antibiotic etc.) by measuring its effect on an organism compared to an appropriate standard preparation.
Nagel *et al.* (eds), 1991
BT **assay.**

bioavailability
1. Extent to which a substance to which the body is exposed (by ingestion, inhalation, injection, or skin contact) reaches the systemic circulation, and the rate at which this occurs.
   SN **biological availability, physiological availability.**
2. Pharmacokinetic term relating systemic exposure from extravascular exposure (ev) to that following intravenous exposure (iv) by the equation:
   $$F = AUC_{ev} * Div \ / \ AUCiv * Dev$$
   where F is the bioavailability, AUC_{ev} and AUC_{iv} are the areas under the plasma concentration time curve following extravascular and intravenous administration and D_{ev} and D_{iv} are the administered extravascular and intravenous doses.

biochemical mechanism Reaction or series of reactions, usually enzyme-catalysed, associated with a specific physiological event in a living organism.

biochemical (biological) oxygen demand (BOD) Substance concentration of oxygen taken up through the respiratory activity of micro-organisms growing on organic compounds present when incubated at a specified temperature (usually 20 ^{o} C) for a fixed period (usually 5 days). It is regarded as a measure of that organic pollution of water which can be degraded biologically but includes the oxidation of inorganic material such as sulfide and iron(II). The empirical test used in the laboratory to determine BOD also measures the oxygen used to oxidize reduced forms of nitrogen unless their oxidation is prevented by an inhibitor such as allyl thiourea.
RT **chemical oxygen demand.**
Nagel *et al.* (eds), 1991

biocid/e n., **-al** adj. Substance intended to kill living organisms.

bioconcentration Process leading to a higher concentration of a substance in an organism than in environmental media to which it is exposed.
PS **bioaccumulation, biomagnification.**
After WHO, 1979

bioconcentration factor (BCF) Measure of the tendency for a substance in water to accumulate in fish tissue or in tissues of other organisms. The equilibrium concentration of a substance in fish can be estimated by multiplying the concentration of the substance in the surrounding water by the fish bioconcentration factor for that chemical. This parameter is an important determinant for human intake by the aquatic food ingestion route.
After USEPA, 1986

bioconversion See SN **biotransformation.**

biodegradation Breakdown of a substance catalysed by enzymes *in vitro* or *in vivo*. This may be characterized for purposes of hazard assessment as:

1. Primary. Alteration of the chemical structure of a substance resulting in loss of a specific property of that substance.
2. Environmentally acceptable. Biodegradation to such an extent as to remove undesirable properties of the compound. This often corresponds to primary biodegradation but it depends on the circumstances under which the products are discharged into the environment.
3. Ultimate. Complete breakdown of a compound to either fully oxidised or reduced simple molecules (such as carbon dioxide/methane, nitrate/ammonium, and water.

It should be noted that the products of biodegradation can be more harmful than the substance degraded.
RT **biotransformation.**

bio-elimination Removal, usually from the aqueous phase, of a test substance in the presence of living organisms by biological processes supplemented by physico-chemical reactions.

bio-equivalen/ce n., **-t** adj. Relationship between two preparations of the same drug in the same dosage form that have a similar bioavailability.

biological absorption See **absorption, biological.**

biological acclimatization See **acclimatization, biological.**

biological assessment of exposure

1. Assessment of exposure to a substance by the analysis of specimens taken in the environment such as foodstuffs, plants, animals, biological material in air or water samples, or biological material from exposed subjects. When human samples are analysed, they are usually urine and blood; other possible samples include expired air, faeces, saliva, bile, hair, and biopsy or autopsy material. When other organisms are being considered, the whole organism may be analysed as well as selected tissues such as fat in pigs or birds. In these samples, the content(s) of the substance(s) or metabolite(s) is determined and, on this basis, the exposure level (concentration in the air, absorbed amount of the substance) or the probability of health impairment due to exposure are derived.
2. Biochemical changes in the components of an organism, such as changes in enzyme activity or in the excretion of metabolic intermediates, can also be used for this purpose if they show a relationship to the exposure.

BT **biological monitoring, monitoring.**

biological cycle Complete circulatory process through which a substance passes in the biosphere. It may involve transport through the various media (air, water, soil), followed by environmental transformation, and carriage through various ecosystems.
WHO, 1979
RT **biosphere, ecosystem.**

biological effect monitoring (BEM) Continuous or repeated measurement of early biological effects of exposure to a substance to evaluate ambient exposure and health risk by comparison with appropriate reference values based on knowledge of the probable relationship between ambient exposure and biological effects.
BT **biological monitoring, environmental monitoring.**

biological half-life or half-time($t1/2$) Time required for the amount of a substance in a biological system to be reduced to one-half, predominantly by biological processes, when the rate of removal is approximately exponential.
Gold, Loening, McNaught and Sehmi, 1987

biological monitoring Continuous or repeated measurement of potentially toxic substances or their metabolites or biochemical effects in tissues, secreta, excreta, expired air or any combination of these in order to evaluate occupational or environmental exposure and health risk by comparison with appropriate reference values based on knowledge of the probable relationship between ambient exposure and resultant adverse health effects.
NT **biological effect monitoring**
BT **environmental monitoring, monitoring.**
RT **biological assessment of exposure.**

biological oxygen demand See SN **biochemical oxygen demand.**

biological preparation Compound derived from living organisms and their products for use in medicine or as a pesticide etc.
SN **biological, biopreparation.**

biological specimen
1. Organ, tissue (including blood), secretion or excretion product taken from an organism as a sample reflecting the state of the whole organism.
2. Organism taken as a sample reflecting the state of a population or their environment.

biomagnification Sequence of processes in an ecosystem by which higher concentrations are attained in organisms at higher trophic levels (at higher levels in the food web); at its simplest, a process leading to a higher concentration of a substance in an organism than in its food.
SN **ecological magnification.**
RT **bioaccumulation, bioconcentration.**

biomarker
1. Parameter that can be used to identify a toxic effect in an individual organism and can be used in extrapolation between species.
2. Indicator signalling an event or condition in a biological system or sample and giving a measure of exposure, effect, or susceptibility.

biomass
1. Total amount of biotic material, usually expressed per unit surface area or volume, in a medium such as water.
   WHO, 1979
2. Material produced by the growth of micro-organisms, plants or animals.
   Nagel *et al.* (eds), 1991

biomineralization Complete conversion of organic substances to inorganic derivatives by living organisms, especially micro-organisms.

biomonitoring See SN **biological monitoring.**

biopsy Excision of a small piece of living tissue for microscopic or biochemical examination; usually performed to establish a diagnosis.
RT **autopsy**.

biosphere Portion of the planet earth which supports and includes life.

biostatic Arresting the growth or multiplication of living organisms.

biota All living organisms as a totality.

biotransformation Any chemical conversion of substances that is mediated by living organisms or enzyme preparations derived therefrom.
Nagel *et al.* (eds), 1991

blood substitution See SN **exchange transfusion.**

B lymphocyte Type of lymphocyte which synthesizes and secretes antibodies in response to the presence of a foreign substance or one identified by it as foreign. The protective effect can be mediated to a certain extent by the antibody alone (contrast T lymphocyte).
RT **immune response, lymphocyte, T lymphocyte.**

body burden Total amount of substance of a chemical present in an organism at a given time.

bolus
1. Single dose of a substance, originally a large pill.
2. Dose of a substance administered by a single rapid intravenous injection.
3. Concentrated mass of food ready to be swallowed.

brady- Prefix meaning slow as in bradycardia or bradypnoea.

bradycardia Abnormal slowness of the heartbeat.
AN **tachycardia.**

bradypnoea Abnormally slow breathing.
AN **tachypnoea.**

breathing zone Space within a radius of 0.5 m from a person's face.
IRPTC, 1982

British anti-Lewisite (BAL) See SN **2,3-dimercaptopropan-1-ol.**

bronchoconstriction Narrowing of the air passages through the bronchi of the lungs.
AN **bronchodilation.**

bronchodilation Expansion of the air passages through the bronchi of the lungs.
AN **bronchoconstriction.**

bronchospasm Intermittent violent contraction of the air passages of the lungs.

builder Material which enhances or maintains the cleaning efficiency of a surfactant, in a detergent, principally by inactivating water hardness; complex phosphates (especially sodium tripolyphosphate, i.e. pentasodium triphosphate), sodium carbonate, and sodium silicate are the builders most commonly used.

byssinosis Pneumoconiosis caused by inhalation of dust and associated microbial contaminants and observed in cotton, flax, and hemp workers. .

bystander exposure Liability of members of the general public to come in contact with substances arising from operations or processes carried out by other individuals in their vicinity.

calcification Process in which organic tissue becomes hardened by deposition of calcium salts within its substance.

calibration material See SN **reference material.**

cancer Disease resulting from the development of a malignancy.
RT **carcinogen, carcinogenesis, carcinogenic, carcinogenicity, carcinoma, malignant, malignancy.**

carboxyhaemoglobin Compound which is formed between carbon monoxide and haemoglobin in the blood of animals and which is incapable of transporting oxygen.

carcinogen n., **-ic** adj. Agent (chemical, physical or biological) which is capable of increasing the incidence of malignant neoplasms; the induction of benign neoplasms may in some circumstances contribute to the judgement that an agent is carcinogenic.
IARC, 1987

carcinogen/esis n., **-etic** adj. Induction, by chemical, physical, or biological agents, of malignant neoplasms.
WHO, 1989a

carcinogenicity Process of induction of malignant neoplasms by chemical, physical or biological agents.

carcinogenicity, classification according to IARC Classification based on the weight of the evidence and not on potency as follows.

1. Sufficient evidence. Causal relationship has been established between exposure to the agent and human cancer: a positive relationship has been observed between exposure to the agent and cancer in studies in which chance, bias and confounding could be ruled out with reasonable confidence.
2. Limited evidence. Positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence.
3. Inadequate evidence. Available studies are of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of a causal association.
4. Evidence suggesting lack of carcinogenicity. There are several adequate studies covering the full range of doses to which human beings are known to be exposed, which are mutually consistent in not showing a positive association between exposure to the agent and any studied cancer at any observed level of exposure. A

conclusion of "evidence suggesting lack of carcinogenicity" is inevitably limited to the cancer sites, circumstances and doses of exposure and length of observation covered by the available studies. In addition, the possibility of a very small risk at the levels of exposure studied can never be excluded.

5. Overall evaluation. Total body of evidence is taken into account; the agent is described according to the wording of one of the following categories, and the designated group is given. The categorization of an agent is a matter of scientific judgement, reflecting the strength of the evidence derived from studies in humans and in experimental animals and from other relevant data.

Group 1 - The agent is carcinogenic to humans.
This category is used only when there is sufficient evidence of carcinogenicity in humans.

Group 2 - This category includes agents for which, at one extreme, the degree of evidence of carcinogenicity in humans is almost sufficient, as well as agents for which, at the other extreme, there are no human data but for which there is experimental evidence of carcinogenicity. Agents are assigned to either 2A (probably carcinogenic) or 2B (possibly carcinogenic) on the basis of epidemiological, experimental and other relevant data.

Group 2A - The agent is probably carcinogenic to humans.
This category is used when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. Exceptionally, an agent may be classified into this category solely on the basis of limited evidence of carcinogenicity in humans or of sufficient evidence of carcinogenicity in experimental animals strengthened by supporting evidence from other relevant data.

Group 2B - The agent is possibly carcinogenic to humans.
This category is generally used for agents for which there is limited evidence in humans in the absence of sufficient evidence in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in humans or when human data are nonexistent but there is sufficient evidence of carcinogenicity in experimental animals. In some instances, an agent for which there is inadequate evidence or no data in humans but limited evidence of carcinogenicity in experimental animals together with supporting evidence from other relevant data may be placed in this group.

Group 3 - The agent is not classifiable as to its carcinogenicity to humans.
Agents are placed in this category when they do not fall into any other group.

Group 4 - The agent is probably not carcinogenic to humans.
This category is used for agents which there is evidence suggesting lack of carcinogenicity in humans together with evidence suggesting lack of carcinogenicity in experimental animals. In some circumstances, agents for which there is inadequate evidence of or no data on carcinogenicity in humans but evidence suggesting lack of carcinogenicity in experimental animals, consistently and strongly supported by a broad range of other relevant data, may be classified in this group.

IARC, 1987

carcinogenicity test Long term (chronic) test designed to detect any possible carcinogenic effect of a test substance.

carcinoma Malignant tumour of an epithelial cell.
SN **epithelioma.**

cardiotoxic Chemically harmful to the cells of the heart.

carry-over
1. Transfer in farming and agricultural processing of a component from one system such as soil or feed to another system such as a plant, animal or human being: carry-over is expressed as the concentration of a component in the second system divided by the concentration in the first.
2. Process in analytical studies by which materials are carried into a reaction mixture in which they do not belong.

case control study A study which starts with the identification of persons with the disease (or other outcome variable) of interest, and a suitable control (comparison, reference) group of persons without the disease. The relationship of an attribute to the disease is examined by comparing the diseased and non-diseased with regard to how frequently the attribute is present or, if quantitative, the levels of the attribute, in the two groups.
SN **case comparison study, case history study, case referent study, retrospective study.**
Last, 1988

catabolism
1. Reactions involving the oxidation of organic substrates to provide chemically available energy (for example ATP) and to generate metabolic intermediates. Nagel *et al.* (eds), 1990
2. Generally, process of breakdown of complex molecules into simpler ones, often providing biologically available energy.

AN **anabolism.**

catatonia Schizophrenia marked by excessive, and sometimes violent, motor activity and excitement, or by generalised inhibition.

cathartic See SN **laxative.**
SN **purgative.**

ceiling value (CV) U.S. term in occupational exposure indicating the airborne concentration of a potentially toxic substance which should never be exceeded in a worker's breathing zone.

cell line Defined unique population of cells obtained by culture from a primary implant through numerous generations.

cell-mediated hypersensitivity State in which an individual reacts with allergic effects caused by the reaction of antigen-specific T-lymphocytes following exposure to a certain substance (allergen) after having been exposed previously to the same substance or chemical group.
RT **allergy, antigen, immunoglobulin E-mediated hypersensitivity.**

cell-mediated immunity Immune response mediated by antigen-specific T-lymphocytes.

cell strain Cells having specific properties or markers derived from a primary culture or cell line.

censored data Sample observations for which the complete distribution is not known: for example, a cohort study in which some persons cannot be followed to the predetermined end of the study ("right-censored data") or environmental assay data in which some results are less than the sample detection limit ("left-censored data").
After Last, 1988

certified reference material Reference material provided by a certifying body such as a National Standards Organization or Metrological Laboratory or by an international body which confirms its purity and analytical values by technically valid procedures and provides a certificate detailing the relevant information.
BT **reference material.**

chain of custody Sequence of responsibility for a substance from the manufacturer to the distributor, to the user, or to the person(s) ultimately responsible for waste disposal. This term is also used in controlled transmission of samples from collection to analysis, especially of samples of materials used for medico-legal or forensic purposes.

chelation therapy Treatment with a chelating agent to enhance the elimination or reduce the toxicity of a metal ion.

chemical aetiologic agent See SN **toxic substance.**

chemical conversion Change from one state or chemical structure to another.
PS **conversion.**

chemical etiologic agent See SN **toxic substance.**

chemical oxygen demand (COD) Substance concentration of available oxygen (derived from a chemical oxidizing agent) required to oxidize the organic (and inorganic) matter in waste water.
After Nagel *et al.* (eds), 1991
RT **biochemical oxygen demand.**

chemical safety Practical certainty that there will be no exposure of organisms to toxic amounts of any substance or group of substances: this implies attaining an acceptably low risk of exposure to potentially toxic substances.
Duffus, 1986
RT **practical certainty.**

chemical species Set of chemically identical atomic or molecular structural units in a solid array or of chemically identical molecular entities that can explore the same set of molecular energy levels on the time scale of the experiment. For example, two conformational isomers may interconvert sufficiently slowly to be detectable by separate nuclear magnetic resonance spectra and hence be considered to be separate chemical species on a time scale governed by the radiofrequency of the spectrometer used. On the other hand, in a slow chemical reaction the same mixture of conformers may behave as a single chemical species, i.e., there is a virtually complete equilibrium population of the total set of molecular energy levels belonging to the two conformers. Except where the context requires otherwise, the term is taken to refer to a set of molecular entities containing isotopes in their natural abundance. The wording of the definition given is intended to embrace both cases such as graphite, sodium chloride, or a surface oxide

where the basic structural units are not capable of a separate existence as well as those cases where they are.
Gold, Loening, McNaught and Sehmi, 1987

chemical toxicology See BT **toxicology.**

chemobiokinetics See NT **toxicokinetics.**

chemophobia Irrational fear of chemicals.

chemosis Chemically induced swelling around the eye caused by oedema of the conjunctiva

chemosterilizer Substance used to sterilize mites, insects, rodents or other animals.

chloracne Acne-like eruption caused by exposure to certain chlorinated organic substances such as polychlorinated biphenyls or 2,3,7,8-tetrachlorodibenzo-*p*-dioxin.

cholinomimetic See SN **parasympathomimetic.**

cholinesterase inhibitor Substance which inhibits the action of acetylcholinesterase (EC 3.1.1.7) and related enzymes which catalyse the hydrolysis of choline esters: such a substance causes hyperactivity in parasympathetic nerves.

chromatid Either of two filaments joined at the centromere which make up a chromosome.

chromatin Stainable complex of DNA and proteins present in the nucleus of a eukaryotic cell.
RT **eukaryote.**

chromosomal aberration Abnormality of chromosome number or structure.

chromosome Self-replicating structure consisting of DNA complexed with various proteins and involved in the storage and transmission of genetic information; the physical structure that contains the genes.
Nagel *et al.* (eds), 1991
RT **chromatid.**

chronic effect Consequence which develops slowly and has a long-lasting course (often but not always irreversible).
After WHO, 1979
AN **acute effect.**

chronic exposure Continued exposures occurring over an extended period of time, or a significant fraction of the test species' or of the group of individuals', or of the population's life-time.
AN **acute exposure.**

chronic toxicity
1. Adverse effects following chronic exposure.
2. Effects which persist over a long period of time whether or not they occur

immediately upon exposure or are delayed.
IRIS, 1986
AN **acute toxicity**.

chronic toxicity test Study in which organisms are observed during the greater part of the life span and in which exposure to the test agent takes place over the whole observation time or a substantial part thereof.
WHO, 1978a
AN **acute toxicity test**.
SN **long term test**.

chronotoxicology Study of the influence of biological rhythms on the toxicity of substances.

circulation of substances in the environment Movement of xenobiotic substances in the environment with air flow, river current, soil, water, etc.
RT **biological cycle**.
IRPTC, 1982

cirrhosis
1. Liver disease defined by histological examination and characterized by increased fibrous tissue, abnormal physiological changes such as loss of functional liver cells, and increased resistance to blood flow through the liver (portal hypertension).
2. Interstitial fibrosis of an organ.

clastogen Agent causing chromosome breakage and/or consequent gain, loss or rearrangement of pieces of chromosomes.

clastogenesis Occurrence of chromosomal breaks and/or consequent gain, loss or rearrangement of pieces of chromosomes.

clearance
1. Volume of blood or plasma or mass of an organ effectively cleared of a substance by elimination (metabolism and excretion) in a given time interval: clearance is expressed in units of volume or mass per unit of time. Total clearance for a component is the sum of the clearances of each eliminating organ or tissue for that component.
2. In pulmonary toxicology, clearance refers specifically to removal of any inhaled substance which deposits on the lining surface of the lung: lung clearance is expressed in volume or mass of lung cleared per unit time.
3. In renal toxicology, clearance refers to the quantification of the removal of a substance by the kidneys by the processes of filtration and secretion: clearance is calculated by relating the rate of renal excretion to the plasma concentration.

RT **elimination**.

clon/e n., **-al** adj.
1. Population of genetically identical cells or organisms having a common ancestor.
2. To produce such a population.
3. Recombinant DNA molecules all carrying the same inserted sequence.

Nagel *et al.* (eds), 1991

clonic Pertaining to alternate muscular contraction and relaxation in rapid succession.
RT **tonic.**
IRIS, 1986

cluster sampling
1. A method of sampling in which the population is divided into aggregates (or clusters) of items bound together in a certain manner. A sample of these clusters is taken at random and all the items which constitute them are included in the sample.
2. A sampling method in which each unit selected is a group of persons (all persons in a city block, a family, etc.) rather than an individual.

WHO, 1989a

cocarcinogen Chemical, physical or biological factor which intensifies the effect of a carcinogen.

Codex Alimentarius Collection of internationally adopted food standards drawn up by the Codex Alimentarius Commission, the principal body implementing the joint FAO/WHO Food Standards Programme.
IPCS, 1987

cohort Component of the population born during a particular period and identified by period of birth so that its characteristics (such as causes of death and numbers still living) can be ascertained as it enters successive time and age periods. The term "cohort" has broadened to describe any designated group of persons followed or traced over a period of time, as in the term cohort study (prospective study).
Last, 1988

cohort analysis Tabulation and analysis of morbidity or mortality rates in relationship to the ages of a specific group of people (cohort), identified by their birth period, and followed as they pass through different ages during part or all of their life span. In certain circumstances such as studies of migrant populations, cohort analysis may be performed according to duration of residence in a country rather than year of birth, in order to relate health or mortality experience to duration of exposure.
Last, 1988

cohort study Method of epidemiological study in which subsets of a defined population can be identified who are, have been, or in the future may be exposed or not exposed, or exposed in different degrees, to a factor or factors hypothesized to influence the probability of occurrence of a given disease or other outcome. Alternative terms for such a study - follow-up, longitudinal, and prospective study - describe an essential feature of the method, observation of the population for a sufficient number of person-years to generate reliable incidence or mortality rates in the population subsets. This generally means studying a large population, study for a prolonged period (years), or both.
SN **concurrent study, follow-up study, incidence study, longitudinal study, prospective study.**
Last, 1988

combined effect of poisons Simultaneous or successive effect of two or more

poisons on the organism by the same route of exposure.
RT **additive effect, antagonism, independent effects of poisons, potentiation, summation, synergism.**
IRPTC, 1982

cometabolism Process by which a normally non-biodegradable substance is biodegraded only in the presence of an additional carbon source.
RT **analogue metabolism.**

comparison group See SN **control group.**

compartment Part of the body considered as an independent system for purposes of assessment of distribution and clearance of a substance. The body is composed of a large number of organs, tissues, cells, cell organelles and fluids, any one of which could be referred to as a compartment. In kinetic considerations, a compartment often refers collectively to the organs, tissues, cells, and fluids for which the rates of uptake and subsequent distribution and elimination are sufficiently similar to preclude kinetic resolution.
After WHO, 1979

compensation Adaptation of an organism to changing conditions of the environment (especially chemical) is accompanied by the emergence of stresses in biochemical systems which exceed the limits of normal (homeostatic) mechanisms. Compensation is a temporary concealed pathology which later on can be manifested in the form of explicit pathological changes (decompensation).
SN **pseudoadaptation.**
RT **acclimatization, adaptation.**

competent authority In the context of European Communities Directive 79/831/EEC, the Sixth Amendment to the European Community's Directive 67/548/EEC relating to the Classification, Packaging and Labelling of Dangerous Substances, official government organization or group receiving and evaluating notifications of new substances.

competent bacteria Culture of bacteria (or yeast) treated in such a way that their ability to take up DNA molecules without transduction or conjugation has been enhanced.

complete mineralization Complete breakdown of a complex organic compound to carbon dioxide, water, oxides and oxidative inorganic products such as nitrate or sulfate.

comprehensive effect of poisons Simultaneous or successive effect made on an organism by poisons entering from different media, from air, from water, from food or through the skin.

concentration (amount-of-substance concentration) $c = n/v$ Derived kind-of-quantity defined as the amount of substance (n) of a component specified by an elementary entity divided by the volume (V) of the system containing the component. The fundamental unit is mol m^{-3} but practical units are mol dm^{-3} or mol L^{-1} (not molarity).
After Gold, Loening, McNaught and Sehmi, 1987.
RT **absolute lethal concentration, lethal concentration, maximum tolerable concentration, median effective concentration, median lethal concentration,**

median narcotic concentration, minimum lethal concentration, threshold concentration.

concentration-effect curve Graph of the relation between exposure concentration and the magnitude of the resultant biological change.
RT **dose-effect curve.**
SN **exposure effect curve.**

concentration-effect relationship Association between exposure concentration and the magnitude of the resultant continuously graded change, either in an individual or in a population.
RT **dose-effect relationship.**

concentration-response curve Graph of the relation between exposure concentration and the proportion of individuals in a population responding with a quantal effect.
RT **dose-response curve, response.**

concentration-response relationship Association between exposure concentration and the incidence of a defined biological effect in an exposed population.
RT **dose-response relationship, response.**

concord/ance n., **-ant** adj. Pairs or groups of individuals of identical phenotype: in twin studies, a condition in which both twins exhibit or fail to exhibit a trait under investigation.
Last, 1988
RT **phenotype.**

concurrent study See SN **cohort study.**

concurrent validity Measurement and its criterion refer to the same point in time: an example would be a visual inspection of a wound for evidence of infection validated against bacteriological examination of a specimen taken at the same time.
Last, 1988

confounding
1. Situation in which the effects of two processes are not distinguishable from one another: the distortion of the apparent effect of an exposure on risk brought about by the association of other factors which can influence the outcome.
2. Relationship between the effects of two or more causal factors as observed in a set of data, such that it is not logically possible to separate the contribution which any single causal factor has made to an effect.
3. Situation in which a measure of the effect of an exposure on risk is distorted because of the association of exposure with other factor(s) which influence the outcome under study.

Last, 1988

confounding variable Changing factor that can cause or prevent the outcome of interest, is not an intermediate variable, and is not associated with the factor under investigation: such a variable must be controlled in order to obtain an undistorted estimate of the effect of the study factor on risk.
SN **confounder.**
Last, 1988

congener Substance which by structure, function or origin is similar to another.

conjugate
1. Derivative of a substance formed by its combination with compounds such as acetic acid, glucuronic acid, glutathione, glycine, sulfuric acid etc.
   RT **phase 2 reaction.**
2. Material produced by attaching two or more substances together, for example - conjugates of antibody with fluorochromes, radio-isotopes or enzymes.

conjunctiva Mucous membrane which covers the eyeball and lines the under-surface of the eyelid.

conjunctivitis Inflammation of the conjunctiva.

conservative assessment of risk Assessment of risk which assumes the worst possible case scenario and therefore gives the highest possible value for risk: risk management decisions based on this value will maximize safety.

construct validity Extent to which the measurement corresponds to theoretical concepts (constructs) concerning the phenomenon under study; for example, if on theoretical grounds, the phenomenon should change with age, a measurement with construct validity would reflect such a change.
Last, 1988

contact dermatitis Inflammatory condition of the skin resulting from dermal exposure to an allergen (sensitizer) or an irritating (corrosive, defatting) substance.

containment Process by which possible release, discharge or spill of a toxic substance during normal use or after an accident is prevented by appropriate action.

contaminant
1. Minor impurity present in a substance.
2. Extraneous material inadvertently added to a sample prior to or during chemical or biological analysis
3. In some contexts, as in relation to gas cleaning equipment, used as a synonym for "pollutant", especially on a small scale.
4. Unintended component in food that may pose a hazard to the consumer.

PS **pollutant.**

content validity Extent to which the measurement incorporates the domain of the phenomenon under study; for example, a measurement of functional health status should embrace activities of daily living, occupational, family, and social functioning, etc.
Last, 1988

contraindication Any condition which renders some particular line of treatment improper or undesirable.

control group Selected group, identified as a rule before a study is done, which comprises humans, animals, or other species who do not have the disease, intervention,

procedure or whatever is being studied, but in all other respects is as nearly identical to the test group as possible.
After Last, 1988
SN **comparison group.**

control, matched Control (individual or group or case) selected to be similar to a study individual or group, or case, in specific characteristics: some commonly used matching variables are age, sex, race and socio-economic status.
After WHO, 1989a

conversion See NT **chemical conversion, biotransformation.**

core grade Quality rating, based on standard evaluation criteria established by the US Office of Pesticide Programs regulatory agencies, given to toxicological studies after submission by registrants.
IRIS, 1986

corrosive Causing a surface-destructive effect on contact; in toxicology, this normally means causing visible destruction of the skin, eyes, or the lining of the respiratory tract or the gastrointestinal tract.

count mean diameter Mean of the diameters of all particles in a population.
WHO, 1989a

count median diameter Calculated diameter in a population of particles in a gas or liquid phase above which there are as many particles with larger diameters as there are particles below it with smaller diameters.
WHO, 1989a

crackles See SN **crepitations.**

crepitations Abnormal respiratory sounds heard on auscultation of the chest, produced by passage of air through passages which contain secretion or exudate or which are constricted by spasm or a thickening of their walls; more usually referred to as crepitations or rhonchi (auscultation is the process of listening for sounds within the body by ear unassisted or using a stethoscope).
SN **crackles, râles.**

criterion Validated set of data used as a basis for judgement.
WHO, 1989a

criterion validity Extent to which the measurement correlates with an external criterion of the phenomenon under study.
Last, 1988

critical concentration (for a cell or organ) Concentration of a potentially toxic substance at which undesirable (or adverse) functional changes, reversible or irreversible, occur in the cell or organ.

critical effect For deterministic effects, the first adverse effect which appears when the threshold (critical) concentration or dose is reached in the critical organ. Adverse

effects, such as cancer, with no defined threshold concentration are often regarded as critical. Decision on whether an effect is critical is a matter of expert judgment.
After WHO, 1989a

critical end-point Toxic effect used by the USEPA as the basis for a reference dose.
RT **reference dose.**
Barnes and Dourson, 1988

critical group Part of a target population most in need of protection because it is most susceptible to a given toxicant.
WHO, 1979

critical organ
1. In toxicology. Organ which first attains the critical concentration (of a potentially toxic substance) under specified circumstances of exposure and for a given population.
2. In radiation biology. Organ the damage of which (by radiation) results in the greatest injury to the individual (or his/her descendants). The injury may result from inherent radiosensitivity or indispensability of the organ, or from high dose, or from a combination of all three.
ICRP, 1965

critical organ concentration (of a substance) Mean concentration in the critical organ at the time the most sensitive type of cell reaches the critical concentration.
RT **critical concentration, critical organ.**

critical period (of development) Stage of development of an organism that is of particular importance in the life cycle if the normal full development of some anatomical, physiological, metabolic, or psychological structure or function is to be attained: such a period may be associated with very high susceptibility to specific potentially toxic substances.

critical study Investigation yielding the no-observed adverse effect level that is used by the USEPA as the basis of the reference dose.
Barnes and Dourson, 1988
RT **reference dose.**

cross-product ratio See SN **odds ratio.**

cross-sectional study (of disease prevalence and associations) Study which examines the relationship between diseases (or other health-related characteristics) and other variables of interest as they exist in a defined population at one particular time. Disease prevalence rather than incidence is normally recorded in a cross-sectional study and the temporal sequence of cause and effect cannot necessarily be determined.
SN **disease frequency survey, prevalence study.**
RT **morbidity survey.**
After Last, 1988.

cumulative effect Overall adverse change which occurs when repeated doses of a harmful substance or radiation have biological consequences which are mutually enhancing.
SN **functional accumulation.**

cumulative incidence, cumulative incidence rate Number and proportion of a group of people who experience the onset of a health-related event during a specified time interval; this interval is generally for all members of the group, but, as in lifetime incidence, it may vary from person to person without reference to age.
Last, 1988

cumulative incidence ratio Value obtained by dividing the cumulative incidence rate in the exposed population by the cumulative incidence rate in the unexposed population.
Last, 1988

cumulative median lethal dose Estimate of the total administered amount of a substance which is associated with the death of half a population of animals when the substance is administered repeatedly in doses which are generally fractions of the median lethal dose. The estimate may vary with the chosen size of the fraction (0.1, 0.2 etc.) and with the period of time over which effects are observed. It is a calculated quantity generally obtained by interpolation of available dose-response data relating the total administered amount to the response in the corresponding group of experimental animals.
BT **median lethal dose**

cutaneous Pertaining to the skin.
SN **dermal.**

cyanogenic Compounds able to produce cyanide; examples are the cyanogenic glycosides such as amygdalin in peach and apricot stones.

cyanosis Bluish coloration, especially of the skin and mucous membranes and fingernail beds, caused by abnormally large amounts of reduced haemoglobin in the blood vessels as a result of deficient oxygenation.

cytochrome Haemoprotein whose characteristic mode of action involves transfer of reducing equivalents associated with a reversible change in oxidation state of the haem prosthetic group: strictly, the cytochrome P450 family are not cytochromes but haem-thiolate proteins.
Park and Reedijk, 1991

cytochrome P-420 Inactive derivative of cytochrome P-450 found in microsomal preparations.
RT **cytochrome P-448, cytochrome P-450, endoplasmic reticulum, microsome, mono-oxygenase, phase 1 reactions.**

cytochrome P-448 Obsolete term for cytochrome P-450 I, A1, and A2, one of the major families of the cytochromes P-450 haemoproteins. During the mono-oxygenation of certain substances, often a detoxification process, these iso-enzymes may produce intermediates which initiate mutations, chemical carcinogenesis, immunotoxic reactions and other forms of chemical toxicity.
RT **cytochrome P-420, cytochrome P-450, endoplasmic reticulum, microsome, mono-oxygenase, phase 1 reactions.**

cytochrome P-450 Haemoproteins which form the major part of the enzymes concerned with the mono-oxygenation of many endogenous and exogenous substrates. The term includes a large number of iso-enzymes which are coded for by a superfamily

of genes. Endogenous substrates of these enzymes include cholesterol, steroid hormones and the eicosenoids; the exogenous substrates are xenobiotics. Strictly, the cytochrome P450 family are not cytochromes but are haem-thiolate proteins.
SN **mixed-function oxidase.**
RT **cytochrome P-420, cytochrome P-448, endoplasmic reticulum, microsome, mono-oxygenase, phase 1 reactions, xenobiotics.**
Guengerich, 1988

cytogenetics Branch of genetics which correlates the structure and number of chromosomes as seen in isolated cells with variation in genotype and phenotype.
RT **phenotype.**

cytoplasm Fundamental substance or matrix of the cell (within the plasma membrane) which surrounds the nucleus, endoplasmic reticulum, mitochondria and other organelles.

cytotoxic Causing damage to cell structure or function.

death rate Estimate of the proportion of a population which dies during a specified period. The numerator is the number of persons dying during the period; the denominator is the size of the population, usually estimated as the mid-year population. The death rate in a population is generally calculated by the formula:

10^n (Number of deaths during a specified period) / (Number of persons at risk of dying during the period)

This rate is an estimate of the person-time death rate, the death rate per 10^n person-years: usually $n = 3$. If the rate is low, it is also a good estimate of the cumulative death rate. This rate is also called the crude death rate.
Last, 1988
PS **mortality, mortality rate.**

decompensation Explicit pathophysiological changes following compensation for adverse effects.

decontamination Process of rendering harmless (by neutralization, elimination, removal etc.) a potentially toxic substance in the natural environment, laboratory areas, the workplace, other indoor areas, clothes, food, water, sewage etc.

defoliant Substance used for removal of leaves by its toxic action on living plants.

dehydrogenase Enzyme which catalyses oxidation of compounds by removing hydrogen.

delayed effect Consequence occurring after a latent period following the end of exposure to a toxic substance or other harmful environmental factor.
SN **latent effect.**

denaturation
1. Addition of methanol or acetone to alcohol to make it unfit for drinking.
2. Change in molecular structure of proteins so that they cannot function normally, often caused by splitting of hydrogen bonds following exposure to reactive substances or heat.

denitrification Reduction of nitrates to nitrites, nitrous oxides or dinitrogen (N_2) catalysed by facultative aerobic soil bacteria under anaerobic conditions.
Nagel *et al.* (eds),1990

dental fluorosis Variety of tooth enamel malformations due to excessive fluoride exposure during dental development.

deoxyribonucleic acid (DNA) Constituent of chromosomes which stores the hereditary information of an organism in the form of a sequence of purine and pyrimidine bases: this information relates to the synthesis of proteins and hence it is a determinant of all physical and functional activities of the cell, and consequently of the whole organism.
RT **ribonucleic acid (RNA).**

dependence
1. A psychic craving for a drug or other substance which may or may not be accompanied by a physical dependency.
2. Reliance on a drug or other substance to maintain health.

PS **addiction.**

depilatory Substance causing loss of hair.

deposition
1. Process by which a substance arrives at a particular organ or tissue site, for example the deposition of particles on the ciliated epithelium of the bronchial airways.
2. Process by which a substance sediments out of the atmosphere or water and settles in a certain place.

PS **accumulation.**

dermal Pertaining to the skin.
SN **cutaneous.**

dermal irritation Skin reaction resulting from a single or multiple exposure to a physical or chemical entity at the same site, characterised by the presence of inflammation; it may result in cell death.

dermatitis Inflammation of the skin: contact dermatitis is due to local exposure and may be caused by irritation, allergy or infection.

descriptive epidemiology Study of the occurrence of disease or other health-related characteristics in populations, including general observations concerning the relationship of disease to basic characteristics such as age, sex, race, occupation, and social class; it may also be concerned with geographic location. The major characteristics in descriptive epidemiology can be classified under the headings: individuals, time and place.
IPCS, 1987

desensitization Suppression of sensitivity of an organism to an allergen to which the organism has been exposed previously.

desiccant
1. Drying agent.

2. In agriculture, a substance used for drying up plants and facilitating their mechanical harvesting.

desorption Opposite of adsorption; a decrease in the amount of adsorbed substance.
Gold, Loening, McNaught and Sehmi, 1987

desquamation Shedding of an outer layer of skin in scales or shreds.

detoxification
1. Process, or processes, of chemical modification which make a toxic molecule less toxic.
2. Treatment of patients suffering from poisoning in such a way as to promote physiological processes which reduce the probability or severity of harmful effects.

detoxification by haemosorption perfusion Passage of a patient's blood through a set of columns filled with a haemosorbent (activated charcoal, ion-exchange resin, etc.): the purpose of the operation is to remove a toxic substance from the organism, particularly in an emergency.
RT **haemoperfusion, haemosorption.**

detriment Estimated measure of the expected harm or loss associated with an adverse event, usually in a manner chosen to facilitate meaningful addition over different events. It is generally the integrated product of arbitrary values of risk and hazard and is often expressed in terms such as costs in US dollars, loss in expected years of life or loss in productivity, and is needed for numerical exercises such as cost-benefit analysis.

developmental toxicity Adverse effects on the developing organism (including structural abnormality, altered growth, or functional deficiency or death) resulting from exposure prior to conception (in either parent), during prenatal development, or postnatally up to the time of sexual maturation.
IRIS, 1986
RT **embryotoxicity, teratogenicity.**

diaphoresis Profuse perspiration.

diaphoretic Causing profuse perspiration.
SN **sudorific.**

2,3-dimercaptopropan-1-ol Metal chelator which has been used in the treatment of arsenic, antimony, gold, mercury and lead poisoning.
SN **British anti-Lewisite, dimercaprol.**

dimercaprol See SN **2,3-dimercaptopropan-1-ol.**

diploid Chromosome state in which the chromosomes are present in homologous pairs. Normal human somatic (non-reproductive) cells are diploid (they have 46 chromosomes), whereas reproductive cells, with 23 chromosomes, are haploid.
RT **haploid, meiosis, mitosis.**

discharge See SN **emission.**

discharge (effluent, emission) standard or release limit Maximum amount of a pollutant released from a given source to a specified medium which is acceptable under specified circumstances.
WHO, 1979

discordance (genetic) Any difference in a character between individuals due to genetic differences such as may occur in dizygotic twins, or between matched pairs in a case cohort study.
AN **concordance.**

disease Literally, *dis-ease*, lack of *ease*; pathological condition that presents a group of symptoms peculiar to it and which establishes the condition as an abnormal entity different from other normal or pathological body states.

discontinuous effect See SN **intermittent effect**

disposition Natural tendency shown by an individual or group of individuals, including any tendency to acquisition of specific diseases, often due to hereditary factors.

dissipation Reduction in the amount of a pesticide or other compound which has been applied to plants, soil etc. (used when it is not clear whether this is by mineralization degradation, binding, or leaching).

distributed source See SN **area source.**
RT **point source.**

distribution
1. Dispersal of a substance and its derivatives throughout the natural environment.
2. Dispersal of a substance within an organism, including metabolism, storage and excretion.
3. Final location of a substance within an organism after dispersal.

diuresis Excretion of urine, especially in excess.

diuretic Agent which increases urine production.
SN **micturitic.**

dosage Dose expressed as a function of the organism being dosed and time, for example mg/(kg body weight)/day.
See **dose.**

dose Total amount of a substance administered to, taken or absorbed by an organism.
NT **absolute lethal dose, cumulative median lethal dose, lethal dose, maximum tolerable dose, maximum tolerated dose, median effective dose, median lethal dose, median narcotic dose, minimum lethal dose, non-effective dose, organ dose, threshold dose, toxic dose.**

dose-effect curve Graph of the relation between dose and the magnitude of the biological change produced measured in appropriate units.
RT **concentration-effect curve.**

dose-effect relationship Association between dose and the magnitude of a continuously graded effect, either in an individual or in a population or in experimental animals.
RT **concentration-effect relationship.**

dose-related effect Situation in which the magnitude of a biological change is related to the dose.
AN **non-dose-related effect.**

dose-response curve Graph of the relation between dose and the proportion of individuals in a population responding with an all-or-none effect.
RT **concentration-response curve, response.**

dose-response relationship Association between dose and the incidence of a defined biological effect in an exposed population.
RT **concentration-response relationship, response.**

Draize test Evaluation of materials for their potential to cause dermal or ocular irritation and corrosion following local exposure; generally using the rabbit model (almost exclusively the New Zealand White) although other animal species have been used.

drug Any substance which when absorbed into a living organism may modify one or more of its functions. The term is generally accepted for a substance taken for a therapeutic purpose, but is also commonly used for abused substances.
SN **medicine, pharmaceutical.**
After WHO, 1978a

duplicate portion sampling method (diet/food) Method frequently used for the same purposes as the total diet study technique. Test persons consume their ordinary diet but for each meal, they prepare for subsequent analysis a duplicate portion of all food as prepared, served and consumed.
SN **duplicate diet study.**

duplicate (replicate) samples (in chemistry) Two (or multiple) samples taken under the same or comparable conditions.
PAC, 1990

dysarthria Imperfect articulation of speech due to neuromuscular damage.

dysfunction Abnormal, impaired, or incomplete functioning of an organism, organ, tissue or cell.

dysplasia Abnormal development of an organ or tissue identified by morphological examination.

dyspnoea Difficult or laboured breathing.

ecogenetics Study of the influence of hereditary factors on the effects of xenobiotics on individual organisms.
PS **pharmacogenetics, toxicogenetics.**
RT **polymorphism.**

ecology Branch of biology which studies the interactions between living organisms and all factors (including other organisms) in their environment: such interactions encompass environmental factors which determine the distributions of living organisms.
IPCS, 1987

ecosystem Grouping of organisms (micro-organisms, plants, animals) interacting together, with and through their physical and chemical environments, to form a functional entity.
IPCS, 1987

ecotoxicology Study of the toxic effects of chemical and physical agents on all living organisms, especially on populations and communities within defined ecosystems; it includes transfer pathways of these agents and their interactions with the environment.

ectohormone See SN **pheromone.**

ectoparasiticide Substance intended to kill parasites living on the exterior of the host.
IRIS, 1986

eczema Acute or chronic skin inflammation with erythema, papules, vesicles, pustules, scales, crusts or scabs, alone or in combination, of varied aetiology.

edema See SN **oedema.**

effective concentration (EC) Concentration of a substance that causes a defined magnitude of response in a given system: EC_{50} is the median concentration that causes 50 % of maximal response.
RT **lethal concentration.**

effective dose (ED) Dose of a substance that causes a defined magnitude of response in a given system: ED_{50} is the median dose that causes 50 % of maximal response.
BT **dose.**
RT **lethal dose.**

effluent Fluid, solid or gas discharged from a given source into the external environment.
RT **emission.**

elimination Expulsion of a substance or other material from an organism (or a defined part thereof), usually by a process of extrusion or exclusion, sometimes after metabolic transformation.
RT **clearance.**
WHO, 1979

elimination half-life or half time Period taken for the plasma concentration of a substance to decrease by half.
BT **biological half-life or half-time($t_{1/2}$).**

eliminator (of a poison) Substance that contributes to the elimination of a poison from an organism.

embryo
1. Stage in the developing mammal at which the characteristic organs and organ systems are being formed: for humans, this involves the stages of development from the second to the eighth week (inclusive post conception).
2. In birds, the stage of development from the fertilization of the ovum up to hatching.
3. In plants, the stage of development within the seed.

embryotoxicity
1. Production by a substance of toxic effects in progeny in the first period of pregnancy between conception and the fetal stage.
2. Any toxic effect on the conceptus as a result of prenatal exposure during the embryonic stages of development: these effects may include malformations and variations, malfunctions, altered growth, prenatal death, and altered postnatal function.

   After USEPA, 1989

RT **developmental toxicity, teratogenicity.**

embryotropic effect Change in the embryo and the regulation of its development.

emesis Vomiting.

emission Release of a substance from a source, including discharges to the wider environment.
SN **discharge, effluent, release.**
RT **immission.**

emission and exposure control Technical and administrative procedures and specifications applied for the monitoring, reduction or elimination of emissions from a source or exposure to a target.
After WHO, 1989a

emission standard Quantitative limit on the emission or discharge of a substance from a source, usually expressed in terms of a time-weighted average concentration or a ceiling value.
PS **discharge standard.**
RT **limit value.**

endemic Present in a community or among a group of people; said of a disease prevailing continually in a region.

endocrine Pertaining to hormones or to the glands that secrete hormones directly into the bloodstream.

endoplasmic reticulum Intracellular complex of membranes in which proteins and lipids, as well as molecules for export, are synthesized and in which the biotransformation reactions of the mono-oxygenase enzyme systems occur: may be isolated as microsomes following cell fractionation procedures.
RT **cytochrome P-420, cytochrome P-448, cytochrome P-450, microsome, mono-oxygenase, phase 1 reactions.**

endothelial Pertaining to the layer of flat cells lining the inner surface of blood and lymphatic vessels, and the surface lining of serous and synovial membranes.

enteritis Intestinal inflammation.

enterohepatic circulation Cyclical process involving intestinal re-absorption of a substance that has been excreted through the bile followed by transfer back to the liver, making it available for biliary excretion again.
After WHO, 1979

environment Aggregate, at a given moment, of all external conditions and influences to which a system under study is subjected.
ISO, 1975

environmental damage Adverse effects to the natural environment.

environmental exposure level (EEL) Level (concentration or amount or a time integral of either) of a substance to which an organism or other component of the environment is exposed in its natural surroundings.

environmental fate Destiny of a chemical or biological pollutant after release into the natural environment.

environmental health Human welfare and its influence by the environment, including technical and administrative measures for improving the human environment from a health point of view.
PS **environmental medicine, environmental hygiene.**
RT **occupational hygiene.**
After WHO, 1989a

environmental health impact assessment Estimate of the adverse health effects or risks likely to follow from a proposed or expected environmental change or development.

environmental health criteria documents Critical publications of IPCS containing reviews of methodologies and existing knowledge - expressed, if possible, in quantitative terms - of selected substances (or groups of substances) on identifiable, immediate, and long-term effects on human health and welfare.
IPCS, 1987

environmental hygiene Practical control measures used to improve the basic environmental conditions affecting human health, for example clean water supply, human and animal waste disposal, protection of food from biological contamination, and housing conditions, all of which are concerned with the quality of the human environment.
After WHO, 1979
SN **environmental sanitation.**

environmental impact assessment (EIA) Appraisal of the possible environmental consequences of a past, ongoing, or planned action, resulting in the production of an environmental impact statement or "finding of no significant impact (FONSI)".
RT **environmental impact statement.**

environmental impact statement (EIS) Report resulting from an environmental impact assessment.
RT **environmental impact assessment.**

environmental monitoring Continuous or repeated measurement of agents in the environment to evaluate environmental exposure and possible damage by comparison with appropriate reference values based on knowledge of the probable relationship between ambient exposure and resultant adverse effects.
RT **biological effect monitoring, biological monitoring, reference value.**

environmental protection
1. Actions taken to prevent or minimize adverse effects to the natural environment.
2. Complex of measures including monitoring of environmental pollution, development and practice of environmental protection principles (legal, technical, and hygienic), including risk assessment, risk management and risk communication.

environmental quality objective (EQO) Overall state to be aimed for in a particular aspect of the natural environment, for example, "water in an estuary such that shellfish populations survive in good health". Unlike an environmental quality standard, the EQO is usually expressed in qualitative and not quantitative terms.
RT **environmental quality standard.**

environmental quality standard (EQS) Amount concentration or mass concentration of a substance that should not be exceeded in an environmental system, often expressed as a time-weighted average measurement over a defined period.
SN **ambient standard.**
RT **limit value.**

environmental sanitation See SN **environmental hygiene.**

environmental transformation Chemical transformation of substances resulting from interactions in the environment.

enzootic Present in a community or among a group of animals; said of a disease prevailing continually in a region.

epidemiology Study of the distribution and determinants of health-related states or events in populations and the application of this study to control of health problems.
Låst, 1988

epigastric Pertaining to the upper-middle region of the abdomen.

epigen/esis n., **-etic** adj. Changes in an organism brought about by alterations in the expression of genetic information without any change in the genome itself: the genotype is unaffected by such a change but the phenotype is altered.
RT **mutation, phenotype, transformation, tumour.**

epileptiform Occurring in severe or sudden spasms, as in convulsion or epilepsy.

epithelioma Any tumour derived from epithelium.
NT **carcinoma.**

epithelium Cells covering the internal and external surfaces of the body.

epitope Any part of a molecule that acts as an antigenic determinant: a macromolecule can contain many different epitopes each capable of stimulating production of a different specific antibody.
Nagel *et al.* (eds), 1991

equivalent diameter (of a particle) Diameter of a spherical particle of the same density as a particle under investigation that, relative to a given phenomenon or property, would behave in the same way as the particle under investigation.
RT **aerodynamic diameter.**
ISO, 1979

erythema Redness of the skin produced by congestion of the capillaries.

eschar Slough or dry scab on an area of skin that has been burnt.

estimated daily intake (EDI) Prediction of the daily intake of a residue of a potentially harmful agent based on the most realistic estimation of the residue levels in food and the best available food consumption data for a specific population: residue levels are estimated taking into account known uses of the agent, the range of contaminated commodities, the proportion of a commodity treated, and the quantity of home-grown or imported commodities. The EDI is expressed in mg residue per person.
WHO, 1989b

estimated exposure concentration (EEC) Measured or calculated amount or mass concentration of a substance to which an organism is likely to be exposed, considering exposure by all sources and routes.

estimated exposure dose (EED) Measured or calculated dose of a substance to which an organism is likely to be exposed, considering exposure by all sources and routes.
IRIS, 1986

estimated maximum daily intake (EMDI) Prediction of the maximum daily intake of a residue of a potentially harmful agent based on assumptions of average food consumption per person and maximum residues in the edible portion of a commodity, corrected for the reduction or increase in residues resulting from preparation, cooking, or commercial processing. The EMDI is expressed in mg residue per person.
WHO, 1989b

etiology See **aetiology.**

eukaryote Cell or organism with the genetic material packed in a membrane-surrounded structurally discrete nucleus and with well-developed cell organelles. The term includes all organisms except archaebacteria, eubacteria and cyanobacteria (until recently classified as cyanophyta or blue-green algae).
AN **prokaryote.**
Nagel *et al.* (eds), 1991

European Inventory of Existing Chemical Substances (EINECS) List of all substances supplied either singly or as components in preparations to persons in a

Member State of the European Community on any occasion between 1 January 1971 and 18 September 1981.

eutrophic Describes a body of water with a high concentration of nutrient salts and a high or excessive rate of biological production.

eutrophication Adverse change in the chemical and biological status of a body of water following depletion of the oxygen content caused by decay of organic matter resulting from high primary production as a result of enhanced input of nutrients.

excess lifetime risk Additional or excess risk incurred over the lifetime of an individual by exposure to a toxic substance.
BT **risk.**
RT **hazard.**
IRIS, 1986

excess rate See SN **rate difference.**

exchange transfusion Method of active artificial elimination of toxicity consisting in complete replacement of blood of the patient by donor blood.

excipient Any more or less inert substance added to a drug to give suitable consistency or form to the drug.
RT **vehicle.**

excretion Discharge or elimination of an absorbed or endogenous substance, or of a waste product, and/or their metabolites, through some tissue of the body and its appearance in urine, faeces, or other products normally leaving the body. Excretion of chemical compounds from the body occurs mainly through the kidney and the gut. Volatile compounds may be largely eliminated by exhalation. Excretion by perspiration and through hair and nails may also occur. Excretion by the gastrointestinal tract may take place by various routes such as the bile, the shedding of intestinal cells and transport through the intestinal mucosa.
After WHO, 1989a
RT **clearance, elimination.**

excretion rate Amount of substance (and/or its metabolites) or fraction that is excreted per unit time. It should be noted that according to this definition excretion does not include the passing of a substance through the intestine without absorption. When discussing the total amount of a substance in faeces (including the unabsorbed part), it is preferable to speak about faecal substance content (mol/kg) or mass content (kg/kg).

exogenous Resulting from causes or derived from materials external to an organism.
AN **endogenous.**

exogenous substance See SN **xenobiotic.**

experimental model ecosystem See SN **microcosm.**

explant Living tissue removed from its normal environment and transferred to an artificial medium for growth.

exposed Subject to a factor that is under study in the environment, for instance an environmental hazard.
AN **non-exposed, unexposed.**

exposed group (sometimes abbreviated to **exposed) in epidemiology** Group whose members have been exposed to a supposed cause of a disease or health state of interest, or possess a characteristic that is a determinant of the health outcome of interest.
Last, 1988

exposure
1. Concentration, amount or intensity of a particular physical or chemical agent or environmental agent that reaches the target population, organism, organ, tissue or cell, usually expressed in numerical terms of substance concentration, duration, and frequency (for chemical agents and micro-organisms) or intensity (for physical agents such as radiation).
2. Process by which a substance becomes available for absorption by the target population, organism, organ, tissue or cell, by any route.

exposure assessment Process of measuring or estimating concentration (or intensity), duration and frequency of exposures to an agent present in the environment or, if estimating hypothetical exposures, that might arise from the release of a substance, or radionuclide, into the environment.
RT **risk assessment.**

exposure control See BT **emission and exposure control.**

exposure-effect relationship See NT **concentration-effect relationship, dose-effect relationship.**

exposure limit General term defining an administrative substance concentration or intensity of exposure that should not be exceeded.
IPCS, 1987
RT **discharge limit.**

exposure ratio In a case control study, value obtained by dividing the rate at which persons in the case group are exposed to the risk factor (or to the protective factor) by the rate at which persons in the control group are exposed to the risk factor (or to the protective factor) of interest.
After Last, 1988

exposure-response relationship See RT **concentration-response relationship, dose-response relationship.**

exposure test Determination of the level, concentration or uptake of a potentially toxic compound and/or its metabolite(s) in biological samples from an organism (blood, urine, hair etc.) and the interpretation of the results to estimate the absorbed dose or degree of environmental pollution; or the measuring of biochemical effects, usually not direct adverse effects of the substance, and relating them to the quantity of substance absorbed, or to its concentration in the environment.
RT **biological monitoring, biological assessment of exposure.**
IRPTC, 1982

external validity Generalizability of the results of a particular study, beyond the limits of the population actually studied.
BT **validity.**
IPCS, 1987

extra risk Probability that an agent produces an observed response, as distinguished from the probability that the response is caused by a spontaneous event unrelated to the agent.
IRIS, 1986
BT **risk.**

extraneous residue limit (ERL) Refers to a pesticide residue or contaminant arising from environmental sources (including former agricultural uses) other than the use of a pesticide or contaminant substance directly or indirectly on the commodity. It is the maximum concentration of a pesticide residue or contaminant that is recommended by the Codex Alimentarius Commission to be legally permitted or recognized as acceptable in or on food, agricultural commodity or animal feed. The mass content is expressed in milligrams of pesticide residue or contaminant per kilogram of commodity.
After Codex Alimentarius Commission, 1986

extrapolation Calculation, based on quantitative observations in exposed test species or *in vitro* test systems, of predicted dose-effect and dose-response relationships for a substance in humans and other biota including interspecies extrapolations and extrapolation to susceptible groups of individuals: the term may also be used for qualitative information applied to species or conditions that are different from the ones in which the original investigations were carried out.

fecundity
1. Ability to produce offspring frequently and in large numbers.
2. In demography, the physiological ability to reproduce.

PS **fertility.**

feromone See SN **pheromone.**

fertility Ability to conceive and to produce offspring: for litter-bearing species the number of offspring per litter is used as a measure of fertility. Reduced fertility is sometimes referred to as subfertility.
USEPA, 1989
RT **fecundity**

fertility toxicant Produces abnormalities of male or female reproductive functions or impairs reproductive capacity.
RT **developmental toxicity, reproductive toxicant.**
USEPA, 1986

fertilizer Substance applied to soil or hydroponic systems for improving the root nutrition of plants with the aim of increasing crop yields and/or controlling production.

fetotoxicity Toxicity to the fetus.
RT **embryotoxicity, teratogenicity.**

fetus (often incorrectly foetus) Young mammal within the uterus of the mother from the visible completion of characteristic organogenesis until birth: in humans, this period is usually defined as from the third month after fertilisation until birth (prior to this, the young mammal is referred to as an embryo).
RT **embryo.**
Oxford English Dictionary, 1991

fibrosis Abnormal formation of fibrous tissue.

fiducial limit Form of confidence limit given as a stated probability, for example $P = 0.95$: in toxicology the terms fiducial limits and confidence limits are generally considered to be synonymous.
Brown, 1988

first-pass effect Biotransformation of a substance in the liver after absorption from the intestine and before it reaches the systemic circulation.

fixed dose procedure Acute toxicity test in which a substance is tested initially at a small number (3 or 4) predefined doses to identify which produces evident toxicity without lethality: the test may be repeated at one or more higher or lower defined discriminating doses to satisfy the criteria.
NT **limit test.**

fluorosis Adverse effects of fluoride, as in dental or skeletal fluorosis.

foci (singular **focus**) Small groups of cells distinguishable, in appearance or histochemically, from the surrounding tissue: indicative of an early stage of a lesion that may lead to the formation of a neoplastic nodule.

foetus See **fetus.**

follow-up study Investigation in which individuals or populations, selected on the basis of whether they have been exposed to risk, have received a specified preventive or therapeutic procedure, or possess a certain characteristic, are followed to assess the outcome of exposure, the procedure, or effect of the characteristic, for example, occurrence of disease.
SN **cohort study.**
Last, 1988

food additive Any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly) in it or its byproducts becoming a component of or otherwise affecting the characteristics of such foods. The term does not include "contaminants" or substances added to food for maintaining or improving nutritional qualities.
Codex Alimentarius Commission, 1983

food allergy Hypersensitivity reaction to substances in the diet to which an individual

has previously been sensitised.
BT **allergy, hypersensitivity.**
RCP, 1984

food chain Sequence of transfer of matter and energy in the form of food from organism to organism in ascending or descending trophic levels.
WHO, 1979

food intolerance Physiologically based reproducible, unpleasant (adverse) reaction to a specific food or food ingredient that is not immunologically based.
RCP, 1984
RT **food allergy.**

food web Network of food chains.

forced diuresis Method of stimulating diuresis based on performing hydrational therapy, sometimes with parallel introduction of diuretics, with the aim of achieving increased clearance of a toxic substance in urine.

foreign substance (foreign compound) See SN **xenobiotic.**

frame-shift mutation Point mutation involving either the deletion or insertion of one or two nucleotides in a gene: by the frame shift mutation, the normal reading frame used when decoding nucleotide triplets in the gene is altered.
After Nagel *et al.* (eds), 1991

fumigant Substance that is vaporized in order to kill or repel pests.

fungicide Substance intended to kill fungi.

fungus preparation Substance obtained from fungi that has an insecticidal effect reflecting the pathogenicity of the fungi for insects.
IRPTC, 1982

gamete Reproductive cell (either sperm or egg) containing a haploid set of chromosomes.
RT **zygote.**

gametocide Substance intended to kill gametes.

gastrointestinal Pertaining or communicating with the stomach and intestine.

gavage Administration of materials directly into the stomach by oesophageal intubation.

gene Structurally a basic unit of hereditary material; an ordered sequence of nucleotide bases that encodes one polypeptide chain (following transcription to mRNA).
SN **cistron.**

gene amplification Production of extra copies of a chromosomal sequence found either as intra- or extra-chromosomal DNA; with respect to a plasmid, it refers to the

increase in the number of plasmid copies per cell induced by a specific treatment of transformed cells.

genetic polymorphism Condition in which a genetic character occurs in more than one form, resulting in the coexistence of more than one morphological type in a given population.

genetic toxicology Study of substances that can produce adverse heritable changes.

genome Complete set of chromosomal and extrachromosomal genes of an organism, a cell, an organelle, or a virus: complete DNA component of an organism.
Nagel *et al.* (eds), 1991

genotoxicity Ability to cause damage to genetic material. Such damage may be mutagenic and/or carcinogenic.

genotype Genetic constitution of an organism as revealed by genetic or molecular analysis; the complete set of genes, both dominant and recessive possessed by a particular organism, cell, organelle or virus.
After Nagel *et al.* (eds), 1991

germ-free animal Animal grown under sterile conditions in the period of postnatal development: such animals are usually obtained by Caesarean operation and kept in special sterile boxes in which there are no viable micro-organisms (sterile air, food and water are supplied).
SN **axenic animal.**
BT **gnotobiont, gnotobiote.**
IRPTC, 1982

germinal aplasia Complete failure of gonad development.

glomerular Pertaining to a tuft or cluster, as of a plexus of capillary blood vessels or nerve fibres, especially referring to the capillaries of the glomeruli of the kidney.

"glue sniffing" Solvent abuse using plastic cement or other solvent-based adhesives.
BT **"solvent sniffing".**
RT **addiction, dependence, solvent abuse.**

gnotobiont See SN **gnotobiote.**
NT **germ-free animal.**

gnotobiota Specifically and entirely known microfauna and microflora of a specially reared laboratory animal.
RT **gnotobiote.**

gnotobiot/e n., **-ic** adj. Specially reared laboratory animal whose microflora and microfauna are specifically known in their entirety.
NT **germ-free animal.**

gonadotropic Pertaining to effects on sex glands and on the systems that regulate them.

good agricultural practice (GAP) in the use of pesticides Nationally authorised safe uses of pesticides under actual conditions necessary for effective and reliable pest control. It encompasses a range of levels of pesticide applications up to the highest authorised use, applied in a manner that leaves a residue which is the smallest amount practicable. Authorised safe uses include nationally registered or recommended uses, that take into account public and occupational health and environmental safety considerations. Actual conditions include any stage in the production, storage, transport, distribution, and processing of food commodities and animal feed.
Codex Alimentarius Commission, 1989

good laboratory practice (GLP) principles Fundamental rules incorporated in national regulations concerned with the process of effective organization and the conditions under which laboratory studies are properly planned, performed, monitored, recorded, and reported.
RT **quality assurance, quality control.**

good manufacturing practice (GMP) principles Fundamental rules incorporated in national regulations concerned with the process of effective organization of production and ensuring standards of defined quality at all stages of production, distribution and marketing; minimization of waste and its proper disposal are part of this process.

graded effect Consequence that can be measured on a graded scale of intensity or severity and its magnitude related directly to the dose or concentration of the substance producing it.
After WHO, 1989a
AN **all-or-none effect, quantal effect.**
RT **stochastic effect.**

granuloma Granular growth or tumour, usually of lymphoid and epithelial cells.

ground treatment of plants Dusting or spraying of plants with pesticides by hand, by special machines, or by apparatus fixed to tractors or driven by them.
IRPTC, 1982

guideline for exposure limits Scientifically judged quantitative value (a concentration or number) of an environmental constituent that ensures aesthetically pleasing air, water or food and from which no adverse effect is expected concerning noncarcinogenic endpoints, or that gives an acceptably low estimate of lifetime cancer risk from those substances which are proven human carcinogens or carcinogens with at least limited evidence of human carcinogenicity.

guideline value Quantitative measure (a concentration or a number) of a constituent of an environmental medium that ensures aesthetically pleasing air, water, or food and does not result in a significant risk to the user.

guides to air quality Sets of atmospheric concentrations and exposure times that are associated with specific effects of varying degrees of pollution on man, animals, vegetation, and the environment in general.
WHO, 1979

guides to environmental quality Sets of concentrations, numbers and exposure times that are associated with the specific effects of factors in environmental media on man, animals, vegetation, and the environment in general.
After WHO, 1979

guinea-pig maximisation test (Magnusson and Kligman test) Widely used skin test for screening possible contact allergens: considered to be a useful method to identify likely moderate and strong sensitizers in humans.

haematemesis Vomiting of blood.

haematoma Localised accumulation of blood, usually clotted, in an organ, space, or tissue, due to a failure of the wall of a blood vessel.

haematuria Presence of blood in the urine.

haemodialysis Use of an artificial kidney to remove toxic compounds from the blood by passing it through a tube of semipermeable membrane. The tube is bathed in a dialysing solution to restore the normal chemical composition of the blood while permitting diffusion of toxic substances from the blood.

haemoglobinuria Presence of free haemoglobin in the urine.

haemolysin Substance that damages the membrane of erythrocytes causing the release of haemoglobin.

haemolysis Release of haemoglobin from erythrocytes, and its appearance in the plasma.

haemoperfusion Passing blood through a column of charcoal or adsorbent resin for the removal of drugs or toxins.

haemosiderin Iron-containing pigment that is formed from haemoglobin released during the disintegration of red blood cells and that accumulates in individuals who have ingested excess iron.

half-life (half-time) ($t_{1/2}$) Time in which the concentration of a substance will be reduced by half, assuming a first order elimination process or radioactive decay.

haploid (monoploid) State in which a cell contains only one set of chromosomes.
RT **diploid, gamete, meiosis.**

hapten Low-molecular-weight molecule that contains an antigenic determinant (epitope) that may bind to a specific antibody but which is not itself antigenic unless complexed with an antigenic carrier such as a protein or cell; once bound it can cause the sensitization of lymphocytes, possibly leading to allergy or cell-mediated hypersensitivity.
After Nagel *et al.* (eds), 1991
RT **allergy, antigen, antibody, cell-mediated hypersensitivity, epitope.**

harm Damage or adverse effect to a population, species, individual organism, organ, tissue or cell.
SN **adverse effect.**

harmful occupational factor Component of the work environment the effect of which on a worker under certain conditions leads to ill health or reduction of working ability.

harmful substance Substance that, following contact with an organism can cause ill health or adverse effects either at the time of exposure or later in the life of the present and future generations.
SN **noxious substance.**

hazard Set of inherent properties of a substance, mixture of substances or a process involving substances that, under production, usage or disposal conditions, make it capable of causing adverse effects to organisms or the environment, depending on the degree of exposure; in other words, it is a source of danger.
RT **risk.**

hazard assessment Determination of factors controlling the likely effects of a hazard such as the dose-effect and dose-response relationships, variations in target susceptibility, and mechanism of toxicity.
RT **exposure assessment, hazard evaluation, hazard identification, risk assessment, risk characterization, risk estimation, risk evaluation, risk identification, risk perception.**

hazard communication standard US OSHA standard requiring all employers to inform employees of the hazard of substances in the workplace and the steps necessary to avoid harm.

hazard evaluation Establishment of a qualitative or quantitative relationship between hazard and benefit, involving the complex process of determining the significance of the identified hazard and balancing this against identifiable benefit: this may subsequently be developed into a risk evaluation.
RT **exposure evaluation, hazard assessment, hazard identification, risk assessment, risk characterization, risk estimation, risk evaluation, risk identification, risk perception.**

hazard identification Determination of substances of concern, their adverse effects, target populations, and conditions of exposure, taking into account toxicity data and knowledge of effects on human health, other organisms and their environment.
WHO, 1988

hazard quotient (HQ) Ratio of toxicant exposure (estimated or measured) to a reference value regarded as corresponding to a threshold of toxicity: if the total hazard quotient from all toxicants to a target exceeds unity, the combination of toxicants may produce (will produce under assumptions of additivity) an adverse effect.
RT **hazard, pollutant, toxic substance.**

hazardous production factor Production factor the effect of which on a worker under certain conditions results in injury or some impairment of health.
SN **hazard at work, hazardous occupational factor.**
IRPTC, 1982

health

1. State of complete physical, mental and social well-being, and not merely the absence of disease or infirmity.
   WHO, 1978b
2. State of dynamic balance in which an individual's or a group's capacity to cope with the circumstances of living is at an optimal level.
3. State characterized by anatomical, physiological and psychological integrity, ability to perform personally valued family, work and community roles; ability to deal with physical, biological, psychological and social stress; a feeling of wellbeing; and freedom from the risk of disease and untimely death.
   Last, 1988

health-based exposure limit Maximum concentration or intensity of exposure that can be tolerated without significant effect (based on only scientific and not economic evidence concerning exposure levels and associated health effects).
de Koning, 1987, ACGIH 1975

health hazard Any factor or exposure that may adversely affect health.
Last, 1988

health surveillance Periodic medico-physiological examinations of exposed workers with the objective of protecting health and preventing occupationally related disease.
Berlin, Yodaiken, and Henman, 1984
RT **biological monitoring, biomarker, monitoring,**

healthy worker effect Epidemiological phenomenon observed initially in studies of occupational diseases: workers usually exhibit lower overall disease and death rates than the general population, due to the fact that the old, severely ill and disabled are ordinarily excluded from employment. Death rates in the general population may be inappropriate for comparison, if this effect is not taken into account.
WHO, 1989a

hepatic Pertaining to the liver.

hepatotoxic Poisonous to liver cells.

Henry's law constant At constant temperature and pressure, the ratio of the partial pressure of a gas above a liquid to its molal solubility in the liquid and therefore a measure of its partition between the gas phase and the solute phase.

herbicide Substance intended to kill plants.

histogenic origin Germ cell layer of the embryo from which a given adult tissue develops.

histology Study (usually microscopic) of the anatomy of tissues and their cellular and subcellular structure.

histopathology Microscopic pathological study of the anatomy and cell structure of tissues in disease to reveal abnormal or adverse structural changes.

homeostasis Normal, internal stability in an organism maintained by co-ordinated responses of the organ systems that automatically compensate for environmental changes.

homology Degree of identity existing between the nucleotide sequences of two related but not complementary DNA or RNA molecules; 70 % homology means that on the average 70 out of every 100 nucleotides are identical in a given sequence. The same term is used in comparing the amino acid sequences of related proteins.

hormesis Stimulatory effect of small doses of a potentially toxic substance that is inhibitory in larger doses.

hormone Substance formed in one organ or part of the body and carried in the blood to another organ or part where it selectively alters functional activity.

human ecology Interrelationship between humans and the entire environment - physical, biological, socio-economic, and cultural, including the interrelationships between individual humans or groups of humans and other human groups or groups of other species.

human equivalent dose Human dose of an agent that is believed to induce the same magnitude of a toxic effect that the known animal dose has induced.
IRIS, 1986

hydrophilic/ adj., **-ity** n. Describing the character of a molecule or atomic group which has an affinity for water.

hydrophobic/ adj., **-ity** n. Describing the character of a molecule or atomic group which is insoluble in water, or resistant to wetting or hydration.

hygiene Science of health and its preservation.

hyper- Prefix meaning above or excessive: when used with the suffix "-aemia" refers to blood and with the suffix "-uria" refers to urine, for example “hyperbilirubinaemia”.

hyperaemia Excessive amount of blood in any part of the body.

hyperalimentation Ingestion or administration of nutrients in excess of optimal amounts.

hyperbilirubinaemia Excessive concentration of bilirubin in the blood.

hypercalcaemia Excessive concentration of calcium in the blood.

hyperglycaemia Excessive concentration of glucose in the blood.

hyperkalaemia Excessive concentration of potassium in the blood.

hypernatraemia Excessive concentration of sodium in the blood.

hyperparathyroidism Abnormally increased parathyroid gland activity that affects, and is affected by, plasma calcium concentration.

hyperplasia Abnormal multiplication or increase in the number of normal cells in a tissue or organ.
RT **hypertrophy, neoplasia.**

hyper-reactivity Term used to describe the responses of (effects on) an individual to (of) an agent when they are qualitatively those expected, but quantitatively increased.

hyper-reflexia Exaggeration of reflexes.

hypersensitivity State in which an individual reacts with allergic effects following exposure to a certain substance (allergen) after having been exposed previously to the same substance.
PS **allergy.**
RT **cell-mediated hypersensitivity, sensitization.**

hypersusceptibility Excessive reaction following exposure to a given amount or concentration of a substance as compared with the large majority of other exposed subjects.
RT **idiosyncrasy.**

hypertension Persistently high blood pressure in the arteries or in a circuit, for example pulmonary hypertension or hepatic portal hypertension.

hypertrophy Excessive growth in bulk of a tissue or organ through increase in size but not in number of the constituent cells.
RT **hyperplasia.**

hypervitaminosis Condition resulting from the ingestion of an excess of one or more vitamins.

hypo- Prefix meaning under, deficient: when used with the suffix "-aemia" refers to blood and with the suffix "-uria" refers to urine, for example "hypocalcaemia".

hypocalcaemia Abnormally low calcium concentration in the blood.

hypokalaemia Abnormally low potassium concentration in the blood.

hyponatraemia Abnormally low sodium concentration in the blood.

hypovolaemic Pertaining to an abnormally decreased volume of circulating fluid (plasma) in the body.

hypoxaemia Deficient oxygenation of the blood.

hypoxia
1. Abnormally low oxygen content or tension.
2. Deficiency of oxygen in the inspired air, in blood or in tissues, short of anoxia.

iatrogenic Any adverse condition resulting from medical treatment.
NT **nosocomial.**

icterus Excess of bile pigment in the blood and consequent deposition and retention of bile pigment in the skin and the sclera.
RT **hyperbilirubinaemia, jaundice.**

idiosyncrasy Genetically based unusually high sensitivity of an organism to the effect of certain substances.
RT **hypersusceptibility, pharmacogenetics.**

immediately-dangerous-to-life-or-health-concentration (IDLHC) According to the US NIOSH, the maximum exposure concentration from which one could escape within thirty minutes without any escape-impairing symptoms or any irreversible health effects.

immission Environmental concentration of a pollutant resulting from a combination of emissions and dispersals (often synonymous with exposure).

immune complex Product of an antigen-antibody reaction that may also contain components of the complement system.
Roitt *et al* 1989

immune response Selective reaction of the body to substances that are foreign to it, or that the immune system identifies as foreign, shown by the production of antibodies and antibody-bearing cells or by a cell-mediated hypersensitivity reaction.
RT **antibody, autoimmune disease, cell-mediated hypersensitivity.**

immunochemistry Study of biochemical and molecular aspects of immunology, especially the nature of antibodies, antigens and their interactions.

immunogen See SN **antigen.**

immunoglobulin Family of closely related glycoproteins capable of acting as antibodies and present in plasma and tissue fluids; immunoglobulin E is the source of antibody in many hypersensitivity (allergic) reactions.
RT **allergy, antibody, hypersensitivity.**

immunoglobulin E-mediated hypersensitivity State in which an individual reacts with allergic effects caused fundamentally by the reaction of antigen-specific immunoglobulin E following exposure to a certain substance (allergen) after having been exposed previously to the same substance.
RT **allergy, antibody, antigen, cell-mediated hypersensitivity, hypersensitivity, immunoglobulin.**

immunopotentiation Enhancement of the capacity of the immune system to produce an effective response.

immunosuppression Reduction in the functional capacity of the immune response; may be due to:
1. Inhibition of the normal response of the immune system to an antigen.

2. Prevention, by chemical or biological means, of the production of an antibody to an antigen by inhibition of the processes of transcription, translation or formation of tertiary structure.

immunosurveillance Mechanisms by which the immune system is able to recognize and destroy malignant cells before the formation of an overt tumour.

immunotoxic Poisonous to the immune system.

incidence Number of occurrences of illness commencing, or of persons falling ill, during a given period in a specific population: usually expressed as a rate, the denominator being the average number of persons in the specified population during a defined period or the estimated number of persons at the mid-point of that period. The basic distinction between "incidence" and "prevalence" is that whereas incidence refers only to new cases, prevalence refers to all cases, irrespective of whether they are new or old. When the terms incidence and prevalence are used, it should be stated clearly whether the data represent the numbers of instances of the disease recorded or the numbers of persons ill.
WHO, 1989a

incidence rate Measure of the frequency with which new events occur in a population. Value obtained by dividing the number of new events that occur in a defined period by the population at risk of experiencing the event during this period, sometimes expressed as person-time.
After Last, 1988

incremental unit risk estimate For an air pollutant, this is the additional lifetime cancer risk occurring in a hypothetical population in which all individuals are exposed continuously from birth throughout their lifetimes to a concentration of 1 microgram per cubic metre (mg/m^3) of the pollutant in the air they breathe.
WHO, 1987

indirect exposure
1. Exposure to a substance in a medium or vehicle other than the one originally receiving the substance.
2. Exposure of people to a substance by contact with a person directly exposed.

RT **bystander exposure, para-occupational exposure.**

individual monitor See SN **personal sampler.**

individual protective device (IPD) Device for individual use for protection of the whole body, eyes, respiratory pathways or skin of workers against hazardous and harmful production factors.
SN **personal protective device (PPD), personal protective equipment (PPE).**
IRPTC, 1982

individual risk Probability that an individual person will experience an adverse effect.

inducer Substance that causes induction.
RT **induction.**

induction Increase in the rate of synthesis of an enzyme in response to the action of an inducer or environmental conditions: often the substrate of the induced enzyme or a structurally similar substance (gratuitous inducer) that is not metabolized.
After Nagel *et al.* (eds), 1991

induction period Time from the onset of exposure to the appearance of signs of disease.
SN **latent period.**

inhalation Act of drawing in of air, vapour or gas and any suspended particulates into the lung.

inherently biodegradable Class of compounds for which there is unequivocal evidence of biodegradation (primary or ultimate) in any test of biodegradability.
RT **biodegradation.**

inhibitory concentration (IC) Concentration of a substance that causes a defined inhibition of a given system: IC_{50} is the median concentration that causes 50 % inhibition.
RT **effective concentration, lethal concentration.**

inhibitory dose (ID) Dose of a substance that causes a defined inhibition of a given system: ID_{50} is the median dose that causes 50 % inhibition.
RT **effective dose, lethal dose.**

initiator
1. Agent that induces a change in a chromosome or gene that leads to the induction of tumours after a second agent, called a promoter, is administered to the tissue.
   RT **promoter.**
2. Substance that starts a chain reaction; an initiator is consumed in a reaction, in contrast to a catalyst.
   Gold, Loening, McNaught and Sehmi, 1987

insecticide Substance intended to kill insects.

intake Amount of a substance that is taken into the body, regardless of whether or not it is absorbed: the total daily intake is the sum of the daily intake by an individual from food, drinking-water, and inhaled air.

integral indicator of toxic effect Parameter (such as body weight or temperature) characterising the overall changes in the general state of the organism exposed to a toxic substance.
IRPTC, 1982

interfacial layer Region of space comprising and adjoining the phase boundary within which properties of matter are significantly different from the values in the adjoining bulk phases.
PS **surface layer.**

intermittent effect Biological change that comes and goes at intervals.
SN **discontinuous effect.**

internal validity Selection and comparison of index and comparison groups in such a manner that, apart from sampling error, the observed differences between these groups with respect to dependent variables under study may be attributed only to the hypothesized effect under investigation.
IPCS, 1987

interpretation (of data or findings) Evaluation of the observations from an investigation or study in order to determine their significance for human health, for the environment or for both.

interspecies dose conversion Process of extrapolating from the doses of one animal species to another, for example from rodent dose to human equivalent.

interstitial pneumonia Chronic form of pneumonia involving increase of the interstitial tissue and decrease of the functional lung tissue.

intervention study Epidemiological investigation designed to test a hypothesized cause-effect relationship by modifying a supposed causal factor in a population.
Last, 1988

intestinal reabsorption Absorption further down the intestinal tract of a substance or substances that have been absorbed before and subsequently excreted into the intestinal tract, usually through the bile.
WHO, 1979

intoxication
1. Poisoning: pathological process with clinical signs and symptoms caused by a substance of exogenous or endogenous origin.
   RT **exogenous, endogenous.**
2. Drunkenness following consumption of beverages containing ethanol or other compounds affecting the central nervous system.

in vitro In glass, referring to a study in the laboratory usually involving isolated organ, tissue, cell, or biochemical systems.
AN ***in vivo*** .

in vivo In the living body, referring to a study performed on a living organism.
AN ***in vitro*** .

ionizing radiation Any radiation consisting of directly or indirectly ionizing particles or a mixture of both or photons with energy higher than the energy of photons of ultraviolet light or a mixture of both such particles and photons.
Gold, Loening, McNaught and Sehmi, 1987

irreversible alteration Change from normal structure or function that persists or progresses after cessation of exposure of the organism.

irritant
1. n., Substance that causes inflammation following immediate, prolonged or repeated contact with skin, mucous membrane, or other biological material. A substance capable of causing inflammation on first contact is called a primary irritant.

2. adj., Causing inflammation following immediate, prolonged or repeated contact with skin, mucous membrane or other tissues.

ischaemia Local deficiency of blood supply and hence oxygen to an organ or tissue owing to constriction of the blood vessels or to obstruction.

isotonic Denoting a fluid exerting the same osmotic pressure or water potential as another fluid with which it is being compared.

itai-itai disease Illness observed in Japan possibly resulting from the ingestion of cadmium-contaminated rice: damage occurred to the renal and skeleto-articular systems, the latter being very painful ("itai" means pain in Japanese).

jaundice Pathological condition characterized by deposition of bile pigment in the skin and mucous membranes, including the conjunctivae, resulting in yellow appearance of the patient or animal.
RT **hyperbilirubinaemia, icterus.**

joint effect Simultaneous or successive effect of factors of diverse types (chemical, physical, biological) on an organism.
RT **additive effect, antagonism, combined effect of poisons, potentiation, synergism.**

lachrymator See **lacrimator**

lacrimator Substance that irritates the eyes and causes the production of tears or increases the flow of tears.

larvicide Substance intended to kill larvae.

laryngospasm Reflex spasmodic closure of the sphincter of the larynx, particularly the glottic sphincter.

larynx Main organ of voice production, the part of the respiratory tract between the pharynx and the trachea.

lassitude Weakness; exhaustion.

latent effect See SN **delayed effect.**

latent period Delay between exposure to a disease-causing agent and the appearance of manifestations of the disease: also defined as the period from disease initiation to disease detection.
SN **latency.**
Last, 1988

lavage Irrigation or washing out of a hollow organ or cavity such as the stomach, intestine or the lungs.

laxative Substance that causes evacuation of the intestinal contents.
SN **cathartic, purgative.**

lesion
1. Area of pathologically altered tissue.
2. Injury or wound.
3. Infected patch of skin.

lethal Deadly; fatal; causing death.

lethal concentration Concentration of a potentially toxic substance in an environmental medium that causes death following a certain period of exposure (denoted by LC).
WHO, 1979
RT **effective concentration, lethal dose.**

lethal dose Amount of a substance or physical agent (radiation) that causes death when taken into the body by a single absorption (denoted by LD).
RT **effective dose, lethal concentration.**

lethal synthesis Metabolic formation of a highly toxic compound from one that is relatively non-toxic (bioactivation), often leading to death of affected cells.
SN **suicide metabolism.**

leukaemia Progressive, malignant disease of the blood-forming organs, characterized by distorted proliferation and development of leucocytes and their precursors in the bone marrow and blood .

leukopenia Reduced concentration of leukocytes in the blood.

lg*K*OW See SN **lgP_{ow}.**

lgP_{ow} Logarithm of base 10 of the partition coefficient of a substance between octan-1-ol and water: as an empirical measure for lipophilicity used for calculating bioaccumulation, fish toxicity, membrane adsorption and penetration etc.
RT **lipophilicity, octanol-water partition coefficient, partition coefficient.**
SN **lg*K*OW.**

life-long exposure Subjection to a potentially toxic substance during the whole lifetime.

limacide Substance intended to kill mollusca including the gastropod mollusc, *Limax.*

limit recommended See **recommended limit.**

limit test Acute toxicity test in which, if no ill-effects occur at a pre-selected maximum dose, no further testing at greater exposure levels is required.
Brown, 1988
RT **fixed dose test.**

limit value (LV) Limit concentration at or below which Member States of the European Community must set their environmental quality standard and emission standard for a particular substance according to Community Directives.
NT **threshold limit value.**

limited evidence According to the US EPA's guidelines for Carcinogen Risk Assessment, "limited evidence" is a collection of facts and accepted scientific inferences that suggests that an agent may be causing an effect, but this suggestion is not strong enough to be considered established fact.
IRIS, 1986
RT **carcinogenicity, classification according to IARC.**

linearized multistage model Sequence of steps in which (a) a multistage model is fitted to tumour incidence data; (b) the maximum linear term consistent with the data is calculated; (c) the low-dose slope of the dose-response function is equated to the coefficient of the maximum linear term; and (d) the resulting slope is then equated to the upper bound of potency.
BT **multistage model.**

lipophilic/ adj., **-ity** n. Having an affinity for fat and high lipid solubility: a physicochemical property which describes a partitioning equilibrium of solute molecules between water and an immiscible organic solvent, favouring the latter, and which correlates with bioaccumulation.
RT **bioaccumulation, bioaccumulation factor, bioconcentration, octanol-water partition coefficient.**
SN **hydrophobicity.**
AN **hydrophilicity, lipophobicity.**

lipophobic/ adj., **-ity** n. Having a low affinity for fat and a high affinity for water.
RT **bioaccumulation, bioaccumulation factor, bioconcentration, octanol-water partition coefficient.**
SN **hydrophilicity.**
AN **hydrophobicity, lipophilicity.**

liposome Originally a lipid droplet in the endoplasmic reticulum of a fatty liver. Now applied to an artificially formed lipid droplet, small enough to form a relatively stable suspension in aqueous media and with potential use in drug delivery.

local effect Circumscribed change occurring at the site of contact between an organism and a toxicant.
RT **systemic effect.**

logit transformation Mathematical transformation that relates response to a stated dose or concentration of a toxicant to the response in the absence of the toxicant by the formula:

$$\text{Logit} = \lg [B/(B0-B)]$$

where B is the response to the stated dose or concentration and $B0$ is the response in the absence of the toxicant. Plotting the logit function against the logarithm of base 10 of the dose or concentration usually gives a linear relationship.

long-term effect See SN **chronic effect**

long-term exposure Continuous or repeated exposure to a substance over a long

period of time, usually of several years in man, and of the greater part of the total life-span in animals or plants.
IRPTC, 1982
SN **chronic exposure.**

lowest lethal concentration found See SN **minimum lethal concentration.**

lowest-observed-adverse-effect-level (LOAEL) Lowest concentration or amount of a substance, found by experiment or observation, which causes an adverse alteration of morphology, functional capacity, growth, development, or life span of a target organism distinguishable from normal (control) organisms of the same species and strain under defined conditions of exposure.
RT **adverse effect, lowest-observed-effect-level, no-observed-adverse-effect-level, no-observed-effect-level.**

lowest-observed-effect-level (LOEL) Lowest concentration or amount of a substance, found by experiment or observation, that causes any alteration in morphology, functional capacity, growth, development, or life span of target organisms distinguishable from normal (control) organisms of the same species and strain under the same defined conditions of exposure .
RT **adverse effect, lowest-observed-adverse-effect-level, no-observed-adverse-effect-level, no-observed-effect-level.**

lymphocyte Animal cell that interacts with a foreign substance or organism, or one which it identifies as foreign, and initiates an immune response against the substance or organism. There are two groups of lymphocytes, B lymphocytes and T lymphocytes.
NT **B lymphocyte, immune response, T lymphocyte.**

lymphoma General term comprising tumours and conditions allied to tumours arising from some or all of the cells of lymphoid tissue.

lysimeter Laboratory column of selected representative soil or a protected monolith of undisturbed field soil with which it is possible to sample and monitor the movement of water and substances.

lysosome Membrane-bound cytoplasmic organelle containing hydrolytic enzymes.

macrophage Large (10-20 mm diameter) amoeboid and phagocytic cell found in many tissues, especially in areas of inflammation; macrophages are derived from blood monocytes and play an important role in host defence mechanisms.

macroscopic (gross) pathology Study of changes associated with disease that are visible to the naked eye without the need for a microscope.

Mad Hatter syndrome See SN **mercurialism.**

Magnusson and Kligman test See SN **guinea-pig maximisation test.**

mainstream smoke (tobacco smoking) Smoke that is inhaled.
WHO, 1989a
RT **sidestream smoke.**

malaise Vague feeling of bodily discomfort.

malignancy Population of cells showing both uncontrolled growth and a tendency to invade and destroy other tissues; a malignancy is life-threatening.
RT **cancer, metastasis, tumour.**

malignant
1. Tending to become progressively worse and to result in death if not treated.
2. In cancer, cells showing both uncontrolled growth and a tendency to invade and destroy other tissues.

AN **benign.**

mania Emotional disorder (mental illness) characterized by an expansive and elated state (euphoria), rapid speech, flight of ideas, decreased need for sleep, distractability, grandiosity, poor judgement and increased motor activity.

margin of exposure (MOE), margin of safety (MOS) Ratio of the no-observed-adverse-effect level (NOAEL) to the theoretical or estimated exposure dose (EED) or concentration (EEC).
RT **therapeutic index.**

mass mean diameter Diameter of a particle with a mass equal to the mean mass of all the particles in a population.

mass median diameter Diameter of a particle with the median mass of all the particles in a population.
IAEA, 1978

material safety data sheet (MSDS) Compilation of information required under the US OSHA Hazard Communication Standard on the identity of hazardous substances, health and physical hazards, exposure limits, and precautions.
PS **hazard communication standard, safety data sheet.**

maximum allowable (admissible, acceptable) concentration (MAC) Regulatory value defining the concentration that if inhaled daily (in the case of work people for 8 hours with a working week of 40 hours, in the case of the general population 24 hours) does not, in the present state of knowledge, appear capable of causing appreciable harm, however long delayed during the working life or during subsequent life or in subsequent generations.
RT **permissible exposure limit, threshold limit value.**

maximum average daily concentration of an atmospheric pollutant Highest of the average daily concentrations recorded at a definite point of measurement during a certain period of observation.
SN **peak daily average concentration of an air pollutant.**
IRPTC, 1982

maximum contaminant level (MCL) Under the Safe Drinking Water Act (USA), primary MCL is a regulatory concentration for drinking water which takes into account both adverse effects (including sensitive populations) and technological feasibility (including natural background levels): secondary MCL is a regulatory concentration based on "welfare", such as taste and staining, rather than health, but also takes into

account technical feasibility. MCL Goals (MCLG) under the Safe Drinking Water Act do not consider feasibility and are zero for all human and animal carcinogens.

maximum exposure limit (MEL) Occupational exposure limit legally defined in GB under COSHH as the maximum concentration of an airborne substance, averaged over a reference period, to which employees may be exposed by inhalation under any circumstances, and set on the advice of the HSC Advisory Committee on Toxic Substances.
RT **ceiling value.**

maximum permissible concentration (MPC) See SN **maximum allowable concentration**

maximum permissible daily dose Maximum daily dose of substance whose penetration into a human body during a lifetime will not cause diseases or health hazards that can be detected by current investigation methods and will not adversely affect future generations.

maximum permissible level (MPL) Level, usually a combination of time and concentration, beyond which any exposure of humans to a chemical or physical agent in their immediate environment is unsafe.
RT **maximum allowable concentration.**

maximum residue limit (MRL) for pesticide residues Maximum contents of a pesticide residue (expressed as mg/kg fresh weight) recommended by the Codex Alimentarius Commission to be legally permitted in or on food commodities and animal feeds. MRL's are based on data obtained following good agricultural practice and foods derived from commodities that comply with the respective MRL's are intended to be toxicologically acceptable.
Codex Alimentarius Commission, 1989

maximum residue limit (MRL) for veterinary drugs Maximum contents of a drug residue (expressed as mg/kg or μg/kg fresh weight) recommended by the Codex Alimentarius Commission to be legally permitted or recognized as acceptable in or on food commodities and animal feeds. The MRL is based on the type and amount of residue considered to be without any toxicological hazard for human health as expressed by the acceptable daily intake (ADI) or on the basis of a temporary ADI that uses an additional uncertainty factor, It also takes into account other relevant public health risks as well as food technological aspects.
Codex Alimentarius Commission, 1989

maximum tolerable concentration (MTC) Highest concentration of a substance in an environmental medium that does not cause death of test organisms or species (denoted by LC_0).
WHO, 1979

maximum tolerable dose (MTD) Highest amount of a substance that, when introduced into the body, does not kill test animals (denoted by LD_0).

maximum tolerable exposure level (MTEL) Maximum amount or concentration of a substance to which an organism can be exposed without leading to an adverse effect after prolonged exposure time.

maximum tolerated dose (MTD) High dose used in chronic toxicity testing that is expected on the basis of an adequate subchronic study to produce limited toxicity when administered for the duration of the test period. It should not induce (*a*) overt toxicity, for example appreciable death of cells or organ dysfunction, or (*b*) toxic manifestations that are predicted materially to reduce the life span of the animals except as the result of neoplastic development or (*c*) 10 % or greater retardation of body weight gain as compared with control animals. In some studies, toxicity that could interfere with a carcinogenic effect is specifically excluded from consideration.

mean life Average lifetime of a molecular, atomic, or nuclear system in a specified state. For an exponentially decaying system, it is the average time for the number of molecules, atoms or nuclei in a specified state to decrease by a factor of e, the base of natural logarithms.
SN **mean time.**
RT **turnover time.**
ISO, 1972

mean time See SN **mean life.**

median effective concentration (EC_{50}) Statistically derived concentration of a substance in an environmental medium expected to produce a certain effect in 50 % of test organisms in a given population under a defined set of conditions.

median effective dose (ED_{50}) Statistically derived dose of a chemical or physical agent (radiation) expected to produce a certain effect in 50 % of test organisms in a given population or to produce a half-maximal effect in a biological system under a defined set of conditions.

median lethal concentration (LC_{50}) Statistically derived concentration of a substance in an environmental medium expected to kill 50 % of organisms in a given population under a defined set of conditions.

median lethal dose (LD_{50}) Statistically derived dose of a chemical or physical agent (radiation) expected to kill 50 % of organisms in a given population under a defined set of conditions.

median lethal time (TL_{50}) Statistically derived average time interval during which 50 % of a given population may be expected to die following acute administration of a chemical or physical agent (radiation) at a given concentration under a defined set of conditions.

median narcotic concentration (NC_{50}) Statistically derived concentration of a substance in an environmental medium expected to cause narcotic conditions in 50 % of a given population under a defined set of conditions.

median narcotic dose (ND_{50}) Statistically derived dose of a substance expected to cause narcosis in 50 % of test animals under a defined set of conditions.

meiosis
1. Process of "reductive" cell division, occurring in the production of gametes, by means of which each daughter nucleus receives half the number of chromosomes characteristic of the somatic cells of the species.
   RT **chromosome, diploid, gamete, haploid.**
2. See **miosis.**

mercurialism Chronic poisoning caused by the excessive use of mercury, by breathing its vapour, or by exposure in mining or smelting processes.
SN **Mad Hatter syndrome.**

mesocosm See RT **microcosm.**

mesothelioma Malignant tumour of the mesothelium of the pleura, pericardium or peritoneum, that may be caused by exposure to asbestos fibres and some other fibres.
BT **tumour.**
RT **malignant.**

metabolic activation Biotransformation of a substance of relatively low toxicity to a more toxic derivative.
BT **activation, biotransformation.**
NT **lethal synthesis.**
SN **bioactivation.**

metabolic half-life (half-time) Time required for one half of the quantity of a substance in the body to be metabolically transformed into a derivative or to be eliminated.
SN **metabolic half-time.**
RT **clearance, elimination.**

metabolic model Analysis and theoretical reconstruction of the way in which the body deals with a specific substance, showing the proportion of the intake that is absorbed, the proportion that is stored and in what tissues, the rate of breakdown in the body and the subsequent fate of the metabolic products, and the rate at which it is eliminated by different organs as unchanged substance or metabolites.
WHO, 1989a

metabolic transformation Biochemical transformation of a substance that takes place within an organism.
SN **biotransformation.**

metabolism Sum total of all physical and chemical processes that take place within an organism; in a narrower sense, the physical and chemical changes that take place in a given substance within an organism. It includes the uptake and distribution within the body of chemical compounds, the changes (biotransformation) undergone by such substances, and the elimination of the compounds and of their metabolites.
WHO, 1989a
RT **biotransformation.**

metabolite Any intermediate or product resulting from metabolism.
After Nagel *et al.* (eds), 1991
RT **biotransformation.**

metaplasia Abnormal transformation of an adult, fully differentiated tissue of one kind into a differentiated tissue of another kind.
RT **hyperplasia, neoplasia.**

metastasis
1. Movement of bacteria or body cells, especially cancer cells, from one part of the body to another, resulting in change in location of a disease or of its symptoms from one part of the body to another.
2. Growth of pathogenic micro-organisms or of abnormal cells distant from the sie of their origin in the body.

methaemoglobinaemia Presence of methaemoglobin (oxidized haemoglobin) in the blood in greater than normal proportion.

methaemoglobin-forming substance Substance capable of oxidising directly or indirectly the iron(II) in haemoglobin to iron(III) to form methaemoglobin, a derivative of haemoglobin that cannot transport oxygen.

microalbuminuria Chronic presence of albumin in slight excess in urine.

microcosm Artificial test system that simulates major characteristics of the natural environment for the purposes of ecotoxicological assessment: such a system would commonly have a terrestrial phase, with substrate, plants and herbivores, and an aquatic phase, with vertebrates, invertebrates and plankton. The term "mesocosm" implies a more complex and larger system than the term "microcosm" but the distinction is not clearly defined.
SN **experimental model ecosystem.**

micromercurialism Effects of exposure to mercury detected at the lowest exposure levels producing a measurable reaction.
RT **mercurialism.**

microsome Artefactual spherical particle, not present in the living cell, derived from pieces of the endoplasmic reticulum present in homogenates of tissues or cells: microsomes sediment from such homogenates when centrifuged at *100 000 g* and higher: the microsomal fraction obtained in this way is often used as a source of mono-oxygenase enzymes.
RT **cytochrome P-420, cytochrome P-448, cytochrome P-450, endoplasmic reticulum, mono-oxygenase, phase 1 reactions.**

micturitic See SN **diuretic.**

Minamata disease Neurological disease caused by ingestion of methylmercury-contaminated fish, first seen at Minamata Bay in Japan.

mineralization Complete conversion of organic substances to inorganic derivatives.

minimum lethal concentration (LC_{min}) Lowest concentration of a toxic substance in an environmental medium that kills individual organisms or test species under a defined set of conditions.
SN **lowest lethal concentration found.**
WHO, 1979

minimum lethal dose (LD_{min}) Lowest amount of a substance that, when introduced into the body, may cause death to individual species of test animals under a defined set of conditions.

miosis Abnormal contraction of the pupil of the eye to less than 2 mm.
Alternative spelling (obsolete): meiosis.

miscible Liquid substances capable of mixing without separation into two phases; refers to liquid mixtures.

mitochondri/on (pl **-a**) Eukaryote cytoplasmic organelle that is bounded by an outer membrane and an inner membrane; the inner membrane has folds called cristae that are the centre of ATP synthesis in oxidative phosphorylation in the animal cell and supplement ATP synthesis by the chloroplasts in photosynthetic cells. The mitochondrial matrix within the inner membrane contains ribosomes, many oxidative enzymes, and a circular DNA molecule that carries the genetic information for a number of these enzymes.

mitogen Substance that induces lymphocyte transformation or, more generally, mitosis and cell proliferation.
RT **transformation.**

mitosis Process by which a cell nucleus divides into two daughter nuclei, each having the same genetic complement as the parent cell: nuclear division is usually followed by cell division.
After Nagel *et al.* (eds), 1991

mixed function oxidase See SN **mono-oxygenase.**

modifying factor (MF) As used by the USEPA, uncertainty factor that is greater than zero and less than, or equal to 10; the magnitude of the factor depends upon the professional assessment of scientific uncertainties of a study or database not explicitly treated with the standard uncertainty factors (for example the completeness of the overall database and the number of animals tested); the default value for the factor is 1.
BT **uncertainty factor.**
IRIS, 1986

molluscicide Substance intended to kill molluscs.
SN **limacide.**

monitoring Continuous or repeated observation, measurement, and evaluation of health and/or environmental or technical data for defined purposes, according to prearranged schedules in space and time, using comparable methods for sensing and data collection. Evaluation requires comparison with appropriate reference values based on

knowledge of the probable relationship between ambient exposure and adverse effects.
NT **ambient monitoring, biological effect monitoring, biological monitoring, environmental monitoring, health surveillance, personal monitoring.**
After Berlin, Yodaiken, and Henman,1984WHO, 1980Zielhuis and Henderson, 1986

monoclonal Pertaining to a specific protein from a single clone of cells, all molecules of this protein being the same.

monoclonal antibody Antibody produced by cloned cells derived from a single lymphocyte.
BT **antibody.**
RT **polyclonal antibody.**

mono-oxygenase Enzyme that catalyses reactions between an organic compound and molecular oxygen in which one atom of the oxygen molecule is incorporated into the organic compound and one atom is reduced to water; involved in the metabolism of many natural and foreign compounds giving both unreactive products and products of different or increased toxicity from that of the parent compound: such enzymes are the main catalysts of phase 1 reactions in the metabolism of xenobiotics by the endoplasmic reticulum or by preparations of microsomes.
SN **mixed function oxidase.**
RT **cytochrome P-420, cytochrome P-448, cytochrome P-450, endoplasmic reticulum, microsome, phase 1 reactions.**

morbidity Any departure, subjective or objective, from a state of physiological or psychological well-being: in this sense, "sickness", "illness", and "morbid condition" are similarly defined and synonymous .
The WHO Expert Committee on Health Statistics noted in its Sixth Report (1959) that morbidity could be measured in terms of three units:
1. Proportion of persons who were ill.
2. The illnesses (periods or spells of illnesses) that these persons experienced.
3. The duration (days, weeks, etc.) of these illnesses.

NT **disease.**
Last, 1988

morbidity rate Term used loosely to refer to incidence or prevalence rates of disease.
IPCS, 1987

morbidity survey Method for the estimation of the prevalence and/or incidence of a disease or diseases in a population: a morbidity survey is usually designed simply to ascertain the facts as to disease distribution, and not to test a hypothesis.
Last, 1988

mordant Substance that fixes a dyestuff in or on a material by combining with the dye to form an insoluble compound, used to fix or intensify stains in a tissue or cell preparation.

mortality Death as studied in a given population or subpopulation. The word mortality is often used incorrectly instead of mortality rate.
IPCS, 1987

mortality rate See SN **death rate.**

mortality study Investigation dealing with death rates or proportion of deaths attributed to specific causes as a measure of response.
IPCS, 1987

multigeneration study
1. Toxicity test in which two to three generations of the test organism are exposed to the substance being assessed.
2. Toxicity test in which only one generation is exposed and effects on subsequent generations are assessed.

multiple (or multiphasic) screening Procedure that has evolved by combining single screening tests, and is the logical corollary of mass screening. Where much time and effort have been spent by a population in attending for a single test such as mass radiography, it is natural to consider the economy of offering other tests at the same time. Multiple (or multiphasic) screening implies the administration of a number of tests, in combination, to large groups of people.
BT **screening.**
WHO, 1989a

multistage cluster sampling Cluster sampling with more than two stages, each sampling being made on aggregates (or clusters) in which the clusters already obtained by the preceding sampling have been divided.
ISO, 1977

multistage model Dose-response model for cancer death estimation of the form

$$P(d) = 1 - \exp[-(q_0 + q_1 d^1 + q_2 d^2 + \ldots\ldots\ldots + q_{(k)} d^k)]$$

where $P(d)$ is the probability of cancer death from a continuous dose rate, d, the q's are constants, and k is the number of dose groups (or, if less than the number of dose groups, k is the number of biological stages believed to be required in the carcinogenesis process). With the multistage model, it is assumed that cancer is initiated by cell mutations in a finite series of steps. A one-stage model is equivalent to a one-hit model.

multistage sampling Type of sampling in which the sample is selected by stages, the sampling units at each stage being subsampled from the larger units chosen at the previous stage.
ISO, 1977

murine Of or belonging to the family of rats and mice (*Muridae*).

mutagen Any substance that can induce heritable changes (mutations) of the genotype in a cell as a consequence of alterations or loss of genes or chromosomes (or parts thereof).

mutagenesis Introduction of heritable changes (mutations) of the genotype in a cell as a consequence of alterations or loss of genes or chromosomes (or parts thereof).
After Nagel *et al.* (eds), 1991

mutagenicity Ability of a physical, chemical, or biological agent to induce heritable changes (mutations) in the genotype in a cell as a consequence of alterations or loss of genes or chromosomes (or parts thereof).

mutation Any relatively stable heritable change in genetic material that may be a chemical transformation of an individual gene (gene or point mutation), altering its function, or a rearrangement, gain or loss of part of a chromosome, that may be microscopically visible (chromosomal mutation); mutation can be either germinal and inherited by subsequent generations, or somatic and passed through cell lineage by cell division.
RT **chromosome, gene.**
RT **clastogenesis, genotoxicity.**

myasthenia Muscular weakness.

mycotoxin Toxin produced by a fungus.

mydriasis Extreme dilation of the pupil of the eye, either as a result of normal physiological response or in response to a chemical exposure.

myelosuppression Reduction of bone marrow activity leading to a lower concentration of platelets, red cells and white cells in the blood.

narcotic
1. Nonspecific usage - an agent that produces insensibility or stupor.
2. Specific usage - an opioid, any natural or synthetic drug that has morphine-like actions.

natriuretic Substance increasing the rate of excretion of sodium ion in the urine.

natural occurrence Presence of a substance in nature, as distinct from presence resulting from inputs from human activities. The contamination of the natural environment by some man-made compounds may be so widespread that it is practically impossible to get access to biota with a truly natural level; only "normal" levels can be measured, those which are usually prevalent in places where there is no obvious local contamination.

necropsy See SN **autopsy.**
RT **biopsy.**

necrosis
1. Mass death of areas of tissue or bone surrounded by healthy areas.
2. Morphological changes that follow cell death, characterized most frequently by nuclear changes.

negligible risk
1. Probability of adverse effects occurring that can reasonably be described as trivial.
2. Probability of adverse effects occurring that is so low that it cannot be reduced appreciably by increased regulation or investment of resources.

RT **acceptable risk, accepted risk, risk *de minimis*.**

nematocide Substance intended to kill nematodes.

neonat/e n., **-al** adj. Infant during the first 4 weeks of postnatal life; for statistical purposes some scientists have defined the period as the first 7 days.

neoplas/ia, -m New and abnormal formation of tissue as a tumour or growth by cell proliferation that is faster than normal and continues after the initial stimulus (i) that initiated the proliferation has ceased.
PS **tumour.**
RT **hyperplasia, metaplasia.**

nephritis Inflammation of the kidney, leading to kidney failure, usually accompanied by proteinuria, haematuria, oedema, and hypertension.

nephrotoxic Chemically harmful to the cells of the kidney.

neural Pertaining to a nerve or to the nerves.

neuron(e) Nerve cell, the morphological and functional unit of the central and peripheral nervous systems.

neuropathy Any disease of the central or peripheral nervous system.

neurotoxic/ adj., **-ity** n. Able to produce chemically an adverse effect on the nervous system: such effects may be subdivided into two types.
1. Central nervous system effects (including transient effects on mood or performance and pre-senile dementia such as Alzheimer's disease).
2. Peripheral nervous system effects (such as the inhibitory effects of organophosphorus compounds on synaptic transmission).

nitrification Sequential oxidation of ammonium salts to nitrite and nitrate by micro-organisms.

no acceptable daily intake allocated This expression is applicable to a substance for which the available information is not sufficient to establish its safety, or when the specifications for identity and purity are not adequate, or when the available data show that the substance is hazardous and should not be used: the basis for the use of the expression should be determined before action is taken; in the first two cases above, not being able to allocate an ADI does not mean that the substance is unsafe.
RT **acceptable daily intake.**

***n*-octanol-water partition coefficient** See SN **octanol-water partition coefficient.**

nodule Small node or boss that is solid and can be detected by touch.

no effect level (NEL) Maximum dose (of a substance) that produces no detectable changes under defined conditions of exposure. At present, this term tends to be substituted by no-observed-adverse-effect-level (NOAEL) or no-observed-effect-level (NOEL).
RT **adverse effect, no-observed-adverse-effect-level (NOAEL), no-observed-effect-level (NOEL).**

non-bioenvironmental transformation Change in the chemical or physical nature of a substance occurring as a result of physicochemical conditions and independent of any biological system.

non-effective dose Amount of a substance that has no effect on the organism. It is lower than the threshold of harmful effect and is estimated while establishing the threshold of harmful effect.
SN **subthreshold dose.**
RT **threshold.**

non-occupational exposure Environmental exposure outside the workplace to substances that are otherwise associated with particular work environments and/or activities and processes that occur there.

non-target organism Organism affected by a pesticide although not the intended object of its use.

no-observed-adverse-effect-level (NOAEL) Greatest concentration or amount of a substance, found by experiment or observation, which causes no detectable adverse alteration of morphology, functional capacity, growth, development, or life span of the target organism under defined conditions of exposure.
WHO, 1979
RT **adverse effect.**

no-observed-effect-level (NOEL) Greatest concentration or amount of a substance, found by experiment or observation, that causes no alterations of morphology, functional capacity, growth, development, or life span of target organisms distinguishable from those observed in normal (control) organisms of the same species and strain under the same defined conditions of exposure .
RT **adverse effect.**

no-response level Maximum dose of a substance at which no specified response is observed in a defined population and under defined conditions of exposure.
IRPTC, 1982

nosocomial Associated with a hospital or infirmary, especially used of diseases that may result from treatment in such an institution.
BT **iatrogenic.**

noxious substance See SN **harmful substance.**

nuisance threshold Lowest concentration of an air pollutant that can be considered objectionable.
RT **odour threshold, pollutant.**
IRPTC, 1982

nutritional table method Procedure for evaluating the dietary intake of a large number of people. The accuracy of the method depends on the accuracy with which records of the food consumption can be established and the accuracy of the nutritional tables specifying the concentration of various nutrients, vitamins, essential, and non-essential substances including pesticide residues. For each record of quantity of food

consumed during a certain time period, the daily intake of the substance in question is calculated by multiplying the substance concentration in the food item (as obtained from the nutritional table) by the quantity of food consumed and dividing by the time of observation.
WHO, 1979

nystagmus Involuntary, rapid, rhythmic movement (horizontal, vertical, rotary, mixed) of the eyeball, usually caused by a disorder of the labyrynth of the inner ear or a malfunction of the central nervous system.

objective environment Actual physical, chemical, and social environment as described by objective measurements, such as noise levels in decibels and concentrations of air pollutants.
WHO, 1979

occupational environment Surrounding conditions at a workplace.

occupational exposure Experience of substances, intensities of radiation etc. or other conditions while at work.

occupational exposure limit (OEL) Regulatory level of exposure to substances, intensities of radiation etc. or other conditions , specified appropriately in relevant government legislation or related codes of practice.

occupational exposure standard (OES)
1. Level of exposure to substances, intensities of radiation etc. or other conditions considered to represent specified good practice and a realistic criterion for the control of exposure by appropriate plant design, engineering controls, and, if necessary, the addition and use of personal protective clothing.
2. In GBR, health-based exposure limit defined under COSHH Regulations as the concentration of any airborne substance, averaged over a reference period, at which, according to current knowledge, there is no evidence that it is likely to be injurious to employees, if they are exposed by inhalation, day after day, to that concentration, and set on the advice of the HSE Advisory Committee on Toxic Substances.

occupational hygiene Identification, assessment and control of physicochemical and biological factors in the workplace that may affect the health or well-being of those at work and in the surrounding community.

octanol-water partition coefficient (P_{OW}, K_{OW}) Measure of lipophilicity by determination of the equilibrium distribution between octan-1-ol and water, as used in pharmacological studies and in the assessment of environmental fate and transport of organic chemicals.
RT **lipophilicity**, **lg10 K_{OW}**, **lg10 P_{OW}**.

ocular Pertaining to the eye.

odds Ratio of the probability of occurrence of an event to that of non-occurrence, or the ratio of the probability that something is so, to the probability that it is not so.
Last, 1988

odds ratio Quotient obtained by dividing one set of odds by another. The term "odds" or "odds ratio" is defined differently according to the situation under discussion. Consider the following notation for the distribution of a binary exposure and a disease in a population or a sample.

	Exposed	Nonexposed
Disease	*a*	*b*
No disease	*c*	*d*

The odds ratio (cross-product ratio) is $ad/(bc)$.

Notes:

1. The exposure-odds ratio for a set of case control data is the ratio of the odds in favour of exposure among the cases (a/b) to the odds in favour of exposure among non-cases (c/d). This reduces to $ad/(bc)$. With incident cases, unbiased subject selection, and a "rare" disease (say, under 2 % cumulative incidence rate over the study period), $ad/(bc)$ is an approximate estimate of the risk ratio. With incident cases, unbiased subject selection, and density sampling of controls, $ad/(bc)$ is an estimate of the ratio of the person-time incidence rates (forces of morbidity) in the exposed and unexposed. No rarity assumption is required.
2. The disease-odds (rate-odds) ratio for a cohort or cross section is the ratio of the odds in favour of disease among the exposed population (a/c) to the odds in favour of disease among the unexposed (b/d). This reduces to $ad/(bc)$ and hence is equal to the exposure-odds ratio for the cohort or cross section.
3. The prevalence-odds refers to an odds ratio derived cross sectionally, as, for example, an odds ratio derived from studies of prevalent (rather than incident) cases.
4. The risk-odds ratio is the ratio of the odds in favour of getting disease, if exposed, to the odds in favour of getting disease if not exposed. The odds ratio derived from a cohort study is an estimate.

SN **cross-product ratio, relative odds.**
Last, 1988

odour threshold In principle, the lowest concentration of an odorant that can be detected by a human being: in practice, a panel of "sniffers" is used, and the threshold taken as the concentration at which 50 % of the panel can detect the odorant (although some workers have also used 100 % thresholds).

oedema Presence of abnormally large amounts of fluid in intercellular spaces of body tissues.

olfactometer Apparatus for testing the power of the sense of smell.

oliguria Excretion of a diminished amount of urine in relation to fluid intake.

oncogene Gene that can cause neoplastic transformation of a cell; oncogenes are slightly changed equivalents of normal genes known as proto-oncogenes.
RT **transformation.**

oncogenesis Production or causation of tumours.

one-hit model Dose-response model of the form

$$P(d) = 1 - \exp(-bd)$$

where $P(d)$ is the probability of cancer death from a continuous dose rate (d) and b is a constant. The one-hit model is based on the concept that a tumour can be induced after a

single susceptible target or receptor has been exposed to a single effective dose unit of an agent.
IRIS, 1986

onycholysis Loosening or detachment of the nail from the nailbed following some destructive process.

oogenesis Process of formation of the ovum (plural ova), the female gamete.

operon Complete unit of gene expression and regulation, including structural genes, regulator gene(s) and control elements in DNA recognized by regulator gene product(s).

ophthalmic Pertaining to the eye.

organ dose Amount of a substance or physical agent (radiation) absorbed by an organ.

organelle Microstructure or separated compartment within a cell that has a specialized function, for example ribosome, peroxisome, lysosome, Golgi apparatus, mitochondrion, nucleolus, nucleus.
After Nagel *et al.* (eds), 1991

organic carbon partition coefficient (K_{OC}) Measure of the tendency for organic substances to be adsorbed by soil and sediment, expressed as:

$$K_{OC} = \frac{\text{(mg substance adsorbed)/(kg organic carbon)}}{\text{(mg substance dissolved)/(litre of solution)}}$$

The K_{OC} is substance-specific and is largely independent of soil properties.
EPA, 1986

organoleptic Involving an organ, especially a sense organ as of taste, smell or sight.

osteo- Prefix meaning pertaining to bone.

osteodystrophy Abnormal development of bone.

osteogenesis Formation or development of bone.

osteoporosis Significant decrease in bone mass with increased porosity and increased tendency to fracture.

ovicide Substance intended to kill eggs.

palpitation
1. Unduly rapid or throbbing heartbeat that is noted by a patient; it may be regular or irregular.
2. Undue awareness by a patient of a heartbeat that is otherwise normal.

paraesthesia Abnormal sensation, as burning or prickling.

paralysis Loss or impairment of motor function.

para-occupational exposure
1 Exposure of a worker's family to substances carried from the workplace to the home.
2. Exposure of visitors to substances in the workplace.

parasympatholytic Producing effects resembling those caused by interruption of the parasympathetic nerve; also called anticholinergic.

parasympathomimetic Producing effects resembling those caused by stimulation of the parasympathetic nervous system; also called cholinomimetic.

parenteral dosage Method of introducing substances into an organism avoiding the gastrointestinal tract (subcutaneously, intravenously, intramuscularly etc.).

paresis Slight or incomplete paralysis.

partition coefficient Ratio of the distribution of a substance between two phases when the heterogeneous system (of two phases) is in equilibrium; the ratio of concentrations (or, strictly speaking, activities) of the same molecular species in the two phases is constant at constant temperature. The partition coefficients most frequently used in acute toxicology are lipid/water and octan-1-ol/water distributions.
RT **lg P_{ow}.**

passive smoking Inhalation of sidestream smoke by people who do not smoke themselves.
See RT **sidestream smoke.**

peak daily average concentration of an air pollutant See SN **maximum average daily concentration of an atmospheric pollutant.**

perceived environment or risk See SN **subjective environment.**
RT **risk perception.**

percutaneous Through the skin following application on the skin.

perinatal Relating to the period shortly before and after birth; from the twentieth to the twenty-ninth week of gestation to one to four weeks after birth.

peritoneal dialysis Method of artificial detoxication in which a toxic substance from the body is transferred into liquid that is instilled into the peritoneum. Thus, the employment of the peritoneum surrounding the abdominal cavity as a dialysing membrane for the purpose of removing waste products or toxins accumulated as a result of renal failure.

permissible exposure limit (PEL) Recommendation by US OSHA for TWA concentration that must not be exceeded during any 8-hour work shift of a 40h working week.
RT **maximum allowable concentration, threshold limit value, time weighted average concentration (TWAC), exposure limit.**

peroxisome Organelle, similar to a lysosome, characterized by its content of catalase (EC 1.11.1.6), peroxidase (EC 1.11.1.7) and other oxidative enzymes.

persistence Attribute of a substance that describes the length of time that the substance remains in a particular environment before it is physically removed or chemically or biologically transformed.
IRPTC, 1982
RT **recalcitrance.**

personal monitoring Type of environmental monitoring in which an individual's exposure to a substance is measured and evaluated: this is normally carried out using a personal sampler.
BT **monitoring.**
RT **personal sampler.**

personal protective device (PPD) See SN **personal protective equipment (PPE).**
SN **individual protective device (IPD).**

personal protective equipment (PPE) Equipment (clothing, gloves, hard hat, respirator and so on) worn by an individual to prevent exposure to a potentially toxic substance
SN **individual protective device (IPD), personal protective device (PPD).**

personal sampler Compact, portable instrument for individual air sampling, measuring, or both, the content of a harmful substance in the respiration zone of a working person.
SN **individual monitor.**
IRPTC, 1982

pest Organism that may harm public health, that attacks food and other materials essential to mankind, or otherwise affects human beings adversely.

pesticide Strictly a substance intended to kill pests: in common usage, any substance used for controlling, preventing, or destroying animal, microbiological or plant pests.
NT **fungicide, herbicide, insecticide.**

pesticide residue Pesticide residue is any substance or mixture of substances in food for man or animals resulting from the use of a pesticide and includes any specified derivatives, such as degradation and conversion products, metabolites, reaction products and impurities considered to be of toxicological significance.

phagocytosis Engulfing and digestion of micro-organisms, other cells, and foreign particles by cells such as phagocytes.
RT **macrophage.**

pharmaceuticals Drugs, medical products, medicines, or medicaments.

pharmacodynamics Process of interaction of pharmacologically active substances with target sites, and the biochemical and physiological consequences leading to therapeutic or adverse effects.
RT **adverse effect, target, toxicodynamics.**

pharmacogenetics Study of the influence of hereditary factors on the effects of drugs on individual organisms.
PS **toxicogenetics.**
RT **ecogenetics, polymorphism.**

pharmacokinetics Process of the uptake of drugs by the body, the biotransformation they undergo, the distribution of the drugs and their metabolites in the tissues, and the elimination of the drugs and their metabolites from the body. Both the amounts and the concentrations of the drugs and their metabolites are studied. The term has essentially the same meaning as toxicokinetics, but the latter term should be restricted to the study of substances other than drugs.
BT **chemobiokinetics.**
PS **toxicokinetics**
RT **biotransformation, pharmacokinetics.**

pharynx Throat, the part of the digestive tract between the oesophagus below and the mouth and nasal cavities above and in front.

phase 1 reaction (of biotransformation) Enzymic modification of a substance by oxidation, reduction, hydrolysis, hydration, dehydrochlorination or other reactions catalysed by enzymes of the cytosol, of the endoplasmic reticulum (microsomal enzymes) or of other cell organelles.
BT **biotransformation.**
RT **cytochrome P420, cytochrome P448, cytochrome P450, microsome, phase 2 reaction, phase 3 reaction.**

phase 2 reaction (of biotransformation) Binding of a substance, or its metabolites from a phase 1 reaction, with endogenous molecules (conjugation), making more water-soluble derivatives that may be excreted in the urine or bile.
BT **biotransformation.**
RT **conjugate, phase 1 reaction, phase 3 reaction.**

phase 3 reaction (of biotransformation) Further metabolism of conjugated metabolites produced by phase 2 reactions: it may result in the production of toxic derivatives.
BT **biotransformation.**
RT **conjugate, phase 1 reaction, phase 2 reaction.**

phenotype The observable structural and functional characteristics of an organism determined by its genotype and modulated by its environment.
Nagel *et al.* (eds), 1991
RT **genotype.**

pheromone Substance used in olfactory communication between organisms of the same species eliciting a change in sexual or social behaviour.
SN **ectohormone, fermone.**

photo-irritation Inflammation of the skin caused exposure to light, especially that due to metabolites formed in the skin by photolysis.
RT **photosensitization, phototoxicity.**

photo-oxidant Substance able to cause oxidation when exposed to light of the appropriate wavelength.

photophobia Abnormal visual intolerance of light.

photosensitization Allergic reaction due to a metabolite formed by the influence of light.

phototoxicity Adverse effects produced by exposure to light energy, especially those produced in the skin.

phytotoxic Poisonous to plants; inhibiting plant growth.

piscicide Substance intended to kill fish.

plasma
1. Fluid component of blood in which the blood cells and platelets are suspended.
   SN **blood plasma.**
2. Fluid component of semen produced by the accessory glands, the seminal vesicles, the prostate, and the bulbo-urethral glands.
3. Cell substance outside the nucleus.
   SN **cytoplasm.**

plasma half-life See SN **elimination half-life.**

plasmapheresis Removal of blood from the body and centrifuging it to obtain plasma and packed red blood cells: the blood cells are resuspended in a physiologically compatible solution (usually type-specific fresh frozen plasma or albumin) and returned to the donor or injected into a patient who requires blood cells rather than whole blood.

plasmid Autonomous self-replicating extra-chromosomal circular DNA molecule.

pleura Lining of the lung.

ploidy Term indicating the number of sets of chromosomes present in an organism.
RT **diploid, haploid.**

plumbism Chronic poisoning caused by absorption of lead or lead salts.
SN **saturnism.**

pneumoconiosis Usually fibrosis of the lungs that develops owing to (prolonged) inhalation of inorganic or organic dusts.
Cause-specific types of pneumoconiosis:
1. **anthracosis** From coal dust.
2. **asbestosis** From asbestos dust.
3. **byssinosis** From cotton dust.
4. **siderosis** From iron dust.
5. **silicosis** From silica dust.
6. **stannosis** From tin dust.

IRPTC, 1982, Parkes, 1982

pneumonitis Inflammation of the lung.

po *Per os* - Latin for by mouth.

point mutation Reaction that changes a single base pair in DNA.

point source Single emission source in a defined location.
RT **area source.**

poison Substance that, taken into or formed within the organism, impairs the health of the organism and may kill it.
SN **toxic substance.**

poison-bearing Containing a poison.

poisoning Morbid condition produced by a poison
SN **intoxication.**

pollutant Any undesirable solid, liquid or gaseous matter in a solid, liquid or gaseous environmental medium: "undesirability" is often concentration-dependent, low concentrations of most substances being tolerable or even essential in many cases. For the meaning of "undesirable" in air pollution contexts, see "pollution". A primary pollutant is one emitted into the atmosphere, water, sediments or soil from an identifiable source. A secondary pollutant is a pollutant formed by chemical reaction in the atmosphere, water, sediments, or soil.
PS **contaminant.**
RT **pollution, secondary pollutant.**
After WHO, 1980

pollution Introduction of pollutants into a solid, liquid, or gaseous environmental medium, the presence of pollutants in a solid, liquid, or gaseous environmental medium, or any undesirable modification of the composition of a solid, liquid or gaseous environmental medium . In the context of air pollution, an undesirable modification is one that has injurious or deleterious effects.
RT **contaminant, pollutant.**
ISO, 1979 WHO, 1989a

polyclonal antibody Antibody produced by a number of different cell types.
BT **antibody.**
RT **monoclonal antibody.**

polydipsia Chronic excessive thirst.

polymorphism (polymorphia) in metabolism Interindividual variations in metabolism of endo- and exogenous compounds due to genetic influences, leading to enhanced side effects or toxicity of drugs (for example, poor versus fast metabolizers) or to different clinical effects (metabolism of steroid hormones).
RT **ecogenetics, pharmacogenetics, toxicogenetics.**

polyuria Excessive production and discharge of urine.

population In statistics, the totality of items under consideration. A clearly defined part of a population is called a subpopulation. In the case of a random variable, the

probability distribution is considered as defining the population of that variable. The term "population segment" is sometimes used as a synonym for subpopulation.
WHO, 1989a

population at risk Number of persons who can and may develop an adverse health effect and who are potentially exposed to a risk factor under study: for example, all people in a population who have not developed immunity to an infectious disease are at risk of developing that disease if they are exposed to it. People already having chronic disease are excluded from the population at risk in studies of the incidence of the disease.
After WHO, 1979

population critical concentration (PCC) Concentration of a substance in the critical organ at which a specified percentage of the exposed population has reached the individual critical organ concentration. The percentage indicated by PCC-10 for 10 %, PCC-50 for 50 % etc. (similar to the use of the term LD_{50}).
Kjellström *et al.*, 1984

population effect Absolute number or incidence rate of cases occurring in a group of people.

population risk See SN **societal risk**

porphyria Disturbance of porphyrin metabolism characterized by increased formation, accumulation, and excretion of porphyrins and their precursors.

posology Study of dose in relation to the physiological factors that may influence response such as age of the exposed organisms.
Brown, 1988

potency Expression of chemical or medicinal activity of a substance as compared to a given or implied standard or reference.

potentiation Dependent action in which a substance or physical agent at a concentration or dose that does not itself have an adverse effect enhances the harm done by another substance or physical agent.
RT **additive effect, antagonism, synergism.**

practical certainty (of safety) Numerically specified low risk of exposure to a potentially toxic substance (for example, 1 in 10^6) or socially acceptable low risk of adverse effects from such an exposure applied to decision making in regard to chemical safety.
RT **risk, safety.**
After Duffus, 1986

precision Measure for the reproducibility of measurements within a set, that is, of the scatter or dispersion of a set about its central value.
Gold, Loening, McNaught and Sehmi,1987.

precordial Pertaining to the region over the heart and lower thorax.

precursor Substance from which another, usually more biologically active, substance is formed.

predictive validity Reliability of a measurement expressed in terms of its ability to predict the criterion: an example would be an academic aptitude test that was validated against subsequent academic performance.
Last, 1988

predictive value Percentage of positive results that are true positives or of negative results that are true negatives.
Galen and Gambino, 1975
RT **sensitivity, specificity.**

preneoplastic Before the formation of a tumour.

prevalence Number of instances of existing cases of a given disease or other condition in a given population at a designated time; sometimes used to mean prevalence rate. When used without qualification, the term usually refers to the situation at a specified point in time (point prevalence).
Last, 1988
RT **incidence.**

prevalence rate (ratio) Total number of individuals who have an attribute or disease at a particular time (or during a particular period) divided by the population at risk of having the attribute or disease at this point in time or midway through the period.
Last, 1988
RT **population at risk.**

primary pollutant See BT **pollutant.**

primary protection standard Accepted maximum level of a pollutant (or its indicator) in the target organism, or some part thereof, or an accepted maximum intake of a pollutant or nuisance into the target under specified circumstances.
WHO, 1989a

probit Probability unit obtained by adding 5 to the normal deviates of a standardized normal distribution of results from a dose response study: addition of 5 removes the complication of handling negative values. A plot of probit against the logarithm of dose or concentration gives a linear plot if the distribution of response is a logarithmic normal one. Estimates of the LD_{50} and ED_{50} (or LC_{50} and EC_{50}) can be obtained from this plot.

procarcinogen Substance that has to be metabolized before it can induce malignant tumours.

prokaryote Unicellular organism, characterised by the absence of a membrane-enclosed nucleus. Prokaryotes include bacteria, blue-green algae and mycoplasmas.
RT **eukaryote.**
After Nagel *et al.* (eds), 1991

promoter (in oncology) Agent that induces cancer when administered to an animal or human being who has been exposed to a cancer initiator.
RT **initiator.**

prophage Latent state of a phage genome in a lysogenic bacterium.
Nagel *et al.* (eds), 1991

proportional mortality rate (ratio) (PMR) Number of deaths from a given cause in a specified time period, per 100 or per 1000 total deaths in the same time period: can give rise to misleading conclusions if used to compare mortality experience of populations with different causes of death.
Last, 1988

prospective cohort study See BT **cohort study.**

proteinuria Excretion of excessive amounts of protein (derived from blood plasma or kidney tubules) in the urine.

pseudoadaptation Apparent adaptation of an organism to changing conditions of the environment (especially chemical) associated with stresses in biochemical systems that exceed the limits of normal (homeostatic) mechanisms: essentially there is a temporary concealed pathology that later on can be manifested in the form of explicit pathological changes sometimes referred to as "decompensation."
RT **compensation.**

psychosis Any major mental disorder characterized by derangement of the personality and loss of contact with reality.

psychotropic Exerting an effect upon the mind; capable of modifying mental activity.

public health impact assessment Applying risk assessment to a specific target population of known size, giving as the end product a quantitative statement about the number of people likely to be affected in a particular population.
BT **risk assessment.**

pulmonary Pertaining to the lungs.

purgative See SN **cathartic, laxative.**

pyrexia Condition in which the temperature of a human being or mammal is above normal.

pyrogen Any substance that produces fever.

quality assurance All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.
ISO 8402, 1986.
RT **good laboratory practice, quality control.**

quality control
1 Operational techniques and activities that are used to fulfil requirements for quality.
ISO 8402, 1986.
2. In toxicology, procedures incorporated in experimental protocols to reduce the possibility of error, especially human error: this is a requirement of good laboratory practice.
RT **good laboratory practice, quality assurance.**

quantal effect Condition that can be expressed only as "occurring" or "not occurring," such as death or occurrence of a tumour.
AN **graded effect.**
RT **stochastic effect.**
SN **all-or-none effect.**

quantitative structure-activity relationship (QSAR) Quantitative association between the physicochemical properties of a substance and/or the properties of its molecular substructures and its biological properties including its toxicity.
RT **surrogate.**

râles See SN **crepitations.**

random sample Subset of a population that is arrived at by selecting units such that each possible unit has a fixed and determinate probability of selection.
After Last, 1988.
AN **biased sample.**
BT **sample.**

rate Measure of the frequency of a phenomenon: an expression of the frequency with which an event occurs in a defined population during a specified time interval.
Last, 1988

rate difference (RD) Absolute difference between two rates, for example, the difference in incidence rate between a population group exposed to a causal factor and a population group not exposed to the factor: in comparisons of exposed and unexposed groups, the term "excess rate" may be used as a synonym for rate difference.
Last, 1988

rate ratio (RR) In epidemiology, the value obtained by dividing the rate in an exposed population by the rate in an unexposed population.
After Last, 1988

ratticide Substance intended to kill rats.
RT **rodenticide.**

readily biodegradable Arbitrary classification of substances that have passed certain specified screening tests for ultimate biodegradability; these tests are so stringent that such compounds will be rapidly and completely biodegraded in a wide variety of aerobic environments.

reasonable maximum exposure (RME) Highest exposure that is reasonably expected to occur: typically the 95% upper confidence limit of the toxicant distribution is

used: if only a few data points (6-10) are available, the maximum detected concentration is used.
USEPA, 1989

recalcitrance Ability of a substance to remain in a particular environment in an unchanged form.
Nagel *et al.* (eds), 1991
RT **persistence.**

receptor High affinity binding site for a particular toxicant.
BT **target, target organ.**

recovery
1. Process leading to partial or complete restoration of a cell, tissue, organ or organism following its damage from exposure to a harmful substance or agent.
2. Term used in analytical and preparative chemistry to denote the fraction of the total quantity of a substance recoverable following a chemical procedure.
   RT **recovery factor.**

recovery factor Fraction or percentage of the total quantity of a substance extracted under specified conditions.
Gold, Loening, McNaught and Sehmi, 1987

recycling (of waste) Process or method allowing for the recovery of some value from a waste, either as re-usable material or as energy.

reference concentration Term used for an estimate of air exposure concentration to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime.
USEPA, 1989
RT **acceptable daily intake.**
BT **dose.**

reference distribution Statistical distribution of reference values.
Solberg, 1987

reference dose Term used for an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime.
Barnes and Dourson, 1988
RT **acceptable daily intake.**
BT **dose.**

reference group See SN **reference sample group.**

reference individual Person selected with the use of defined criteria for comparative purposes in a clinical study.
Solberg, 1987

reference interval Area between and including two reference limits, for example the percentiles 2.5 and 97.5.
Solberg, 1987

reference limit Boundary value defined so that a stated fraction of the reference values is less than or exceeds that boundary value with a stated probability.
Solberg, 1987

reference material Substance for which one or more properties are sufficiently well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to other substances.
SN **calibration material, standard material.**
Solberg, 1987

reference population Group of all reference individuals used to establish criteria against which a population that is being studied can be compared.
Solberg, 1987

reference sample group Selected reference individuals, statistically adequate numerically to represent the reference population.
Solberg, 1987

reference value According to IFCC, measured value of a property in a reference individual or sample from a reference individual.
Solberg, 1987

regulatory dose Term used by the USEPA to describe the expected dose resulting from human exposure to a substance at the level at which it is regulated in the environment.
Barnes and Dourson, 1988

relative odds See SN **odds ratio.**

relative risk
1. Ratio of the risk of disease or death among the exposed to that among the unexposed.
   SN **risk ratio.**
2. Ratio of the cumulative incidence rate in the exposed to the cumulative incidence rate in the unexposed; the cumulative incidence ratio.

Last, 1988

renal Pertaining to the kidneys.

repellent Substance used mainly to repel blood sucking insects in order to protect man and animals: also used to repel mammals, birds, rodents, mites, plant pests, etc.

replicate sampling Act of taking multiple samples concurrently under comparable conditions; may be accomplished by taking samples adjacent in time or space.
PAC, 1990

replication
1. Duplicated or repeated performance of an experiment under similar (controlled) conditions to reduce to a minimum the error, and to estimate the variations and thus obtain a more precise result: each determination, including the first is called a replicate.
2. Process whereby the genetic material is duplicated.

reproducibility Closeness of agreement between test results obtained under reproducibility conditions (see below).
ISO 5725, 1986.
RT **reproducibility conditions.**

reproducibility conditions Situation where test results are obtained with the same method on identical test material in different laboratories with different operators using different equipment.
ISO 5725, 1986.

reproductive toxicant Substance or preparation that produces non-heritable harmful effects on the progeny and/or an impairment of male and female reproductive function or capacity.
USEPA, 1986
RT **teratogen.**

reproductive toxicology Study of the adverse effects of substances on the embryo, fetus, neonate and prepubertal mammal and the adult reproductive and neuro-endocrine systems.
RT **embryo, fetus, neonate.**

reserve capacity Physiological or biochemical capacity that may be available to maintain homeostasis when the body or an organism is exposed to an environmental change.

resistance (in toxicology) Ability to withstand the effect of various factors including potentially toxic substances.

resorptive effect Action of a substance after its resorption from the gut into the blood. IRPTC, 1982

response
1. Proportion of an exposed population with a defined effect or the proportion of a group of individuals that demonstrate a defined effect in a given time at a given dose rate.
   RT **dose-response relationship.**
2. Reaction of an organism or part of an organism (such as a muscle) to a stimulus.

retention
1. Holding back within the body or within an organ, tissue or cell of matter that is normally eliminated.
   AN **elimination.**
2. Holding in memory of what has been learned for later use as recall, recognition or relearning.
3. Amount of a substance that is left from the total absorbed after a certain time

following exposure: if the retention follows a course in relation to time that is a first order process,
it may be described in terms of biological half-life (half-time).
RT **half-life.**

retrospective study Research design used to test aetiological hypotheses in which inferences about exposure to the putative causal factor(s) are derived from data relating to characteristics of the persons or organisms under study or to events or experiences in their past: the essential feature is that some of the persons under study have the disease or other outcome condition of interest, and their characteristics and past experiences are compared with those of other, unaffected persons. Persons who differ in the severity of the disease may also be compared.
RT **case control study.**
Last, 1988

returned effect of poisons Enhancement of the dose-effect relationship for a poison following repeated exposure to decreasing doses.

reverse transcription Process by which an RNA molecule is used as a template to make a single-stranded DNA copy.

reversible alteration Change from normal structure or function, induced by a substance or other agent(s), that returns to normal status or within normal limits after cessation of exposure.

rhabdomyolysis Acute, fulminating, potentially lethal disease of skeletal muscle that causes disintegration of striated muscle fibres as evidenced by myoglobin in the blood and urine.

rhinitis Inflammation of the nasal mucosa.

rhonch/us (pl **-i**) Harsh crepitation in the throat, often resembling snoring.
BT **crepitations.**

ribonucleic acid Linear, usually single stranded, polymer of ribonucleotides, each containing the sugar ribose in association with a phosphate group and one of 4 nitrogenous bases: adenine, guanine, cytosine, or uracil: it encodes the information for the sequence of amino-acids in proteins synthesized using it as a template.
RT **deoxyribonucleic acid.**

risk
1. Possibility that a harmful event (death, injury or loss) arising from exposure to a chemical or physical agent may occur under specific conditions.
2. Expected frequency of occurrence of a harmful event (death, injury or loss) arising from exposure to a chemical or physical agent under specific conditions.

RT **hazard.**

risk acceptance Decision that the risk associated with a given chemical exposure or an event leading to such exposure is low enough to be tolerated in order to gain associated benefits.
RT **acceptable risk.**

risk assessment Identification and quantification of the risk resulting from a specific use or occurrence of a chemical or physical agent, taking into account possible harmful effects on individual people or society of using the chemical or physical agent in the amount and manner proposed and all the possible routes of exposure. Quantification ideally requires the establishment of dose-effect and dose-response relationships in likely target individuals and populations.
RT **exposure assessment, hazard identification, risk characterization, risk estimation, risk evaluation, risk identification, risk management, risk perception.**

risk assessment management process Global term for the whole process from hazard identification to risk management.
WHO, 1988
RT **hazard identification, risk management.**

risk associated with a life time exposure Probability of the occurrence of a specified undesirable event following exposure of an individual person from a given population to a specified substance at a defined level for the expected lifetime of the average member of that population.

risk aversion Term used to describe the tendency of an individual person to avoid risk.

risk characterization Outcome of hazard identification and risk estimation applied to a specific use of a substance or occurrence of an environmental health hazard: the assessment requires quantitative data on the exposure of organisms or people at risk in the specific situation. The end product is a quantitative statement about the proportion of organisms or people affected in a target population.
After WHO, 1979
RT **hazard identification, risk estimation.**

risk communication Interpretation and communication of risk assessments in terms that are comprehensible to the general public or to others without specialist knowledge.

risk *de minimis* Risk that is negligible and too small to be of societal concern (usually assumed to be a probability below 10^{-5} or 10^{-6}); can also mean 'virtually safe'. In the USA, this is a legal term used to mean "negligible risk to the individual".
SN **negligible risk.**

risk estimation Assessment, with or without mathematical modelling, of the probability and nature of effects of exposure to a substance based on quantification of dose-effect and dose-response relationships for that substance and the population(s) and environmental components likely to be exposed and on assessment of the levels of potential exposure of people, organisms and environment at risk.
RT **risk evaluation.**
RT **exposure assessment, hazard identification.**

risk evaluation Establishment of a qualitative or quantitative relationship between risks and benefits, involving the complex process of determining the significance of the identified hazards and estimated risks to those organisms or people concerned with or affected by them.

RT **exposure evaluation, hazard identification, risk assessment, risk characterization, risk estimation, risk identification, risk perception.**

risk identification Recognition of a potential hazard and definition of the factors required to assess the probability of exposure of organisms or people to that hazard and of harm resulting from such exposure.

risk indicator See SN **risk marker.**

risk management Decision-making process involving considerations of political, social, economic, and engineering factors with relevant risk assessments relating to a potential hazard so as to develop, analyse, and compare regulatory options and to select the optimal regulatory response for safety from that hazard. Essentially risk management is the combination of three steps: risk evaluation; emission and exposure control; risk monitoring.
RT **emission and exposure control, risk evaluation, risk monitoring.**

risk marker Attribute that is associated with an increased probability of occurrence of a disease or other specified outcome and that can be used as an indicator of this increased risk: not necessarily a causal or pathogenic factor.
SN **risk indicator.**
Last, 1988

risk monitoring Process of following up the decisions and actions within risk management in order to check whether the aims of reduced exposure and risk are achieved.
BT **monitoring.**
RT **risk management.**
WHO, 1988

risk perception Subjective perception of the gravity or importance of the risk based on a person's knowledge of different risks and the moral, economic, and political judgement of their implications.
RT **risk evaluation.**
WHO, 1988

risk phrases Word groups identifying potential health or environmental hazards required under CPL Directives (European Community); may be incorporated into Safety Data Sheets.
RT **material safety data sheet, safety data sheet.**

risk ratio Value obtained by dividing the probability of occurrence of a specific effect in one group by the probability of occurrence of the same effect in another group, or the value obtained by dividing the probability of occurrence of one potentially hazardous event by the probability of occurrence of another. Calculation of such ratios is used in choosing between options in risk management.
RT **risk management.**

risk-specific dose Amount of exposure corresponding to a specified level of risk.
USEPA, 1989

rodenticide Substance intended to kill rodents.

route of exposure Means by which a toxic agent gains access to an organism by administration through the gastrointestinal tract (ingestion), lungs (inhalation), skin (topical), or by other routes such as intravenous, subcutaneous, intramuscular or intraperitoneal routes.

safety Reciprocal of risk: practical certainty that injury will not result from a hazard under defined conditions.

1. Safety of a drug or other substance in the context of human health: the extent to which a substance may be used in the amount necessary for the intended purpose with a minimum risk of adverse health effects.
2. Safety (toxicological): The high probability that injury will not result from exposure to a substance under defined conditions of quantity and manner of use, ideally controlled to minimize exposure.

RT **practical certainty, risk.**

safety data sheet Single page giving toxicological and other safety advice, usually associated with a particular preparation, substance or process.

safety factor See SN **uncertainty factor.**

saluretic See SN **natriuretic.**

sample

1. In statistics, a group of individuals often taken at random from a population for research purposes
2. One or more items taken from a population or a process and intended to provide information on the population or process.
3. Portion of material selected from a larger quantity in some manner chosen so that the portion is representative of the whole.
   PAC, 1990

RT **biased sample, random sample, stratified sample, systematic sample.**

sampling Procedure used to obtain or constitute a sample.
RT **sample**

sampling error Part of the total estimation error of a parameter (or value of a property, such as concentration) caused by the random nature of the sample.
ISO, 1977
RT **sample, sampling.**

sarcoma Malignant tumour arising in a connective tissue and composed primarily of anaplastic cells resembling supportive tissue.

saturnism Intoxication caused by lead.
SN **plumbism.**

scotoma Area of depressed vision within the visual field, surrounded by an area of less depressed or normal vision.

sclerosis Hardening of an organ or tissue, especially that due to excessive growth of fibrous tissue.

screening
1. Carrying out of a test or tests, examination(s) or procedure(s) in order to expose undetected abnormalities, unrecognized (incipient) diseases, or defects: examples are mass X-rays and cervical smears.
2. Pharmacological or toxicological screening consists of a specified set of procedures to which a series of compounds is subjected to characterize pharmacological and toxicological properties and to establish dose-effect and dose-response relationships.

screening level Decision limit or cut-off point at which a screening test is regarded as positive.
Last, 1988

secondary metabolite Product of biochemical processes other than the normal metabolic pathways, mostly produced in micro-organisms or plants after the phase of active growth and under conditions of nutrient deficiency.
After Nagel *et al.* (eds), 1991

secondary pollutant See BT **pollutant.**

secondhand smoke See SN **sidestream smoke.**

secretion
1. Process by which a substance such as a hormone or enzyme produced in a cell is passed through a plasma membrane to the outside, for example the intestinal lumen or the blood (internal secretion).
2. Solid, liquid or gaseous material passed from the inside of a cell through a plasma membrane to the outside as a result of cell activity.

sedative Substance that exerts a soothing or tranquillising effect.
RT **anaesthetic, narcotic.**

self-cleaning of water (in a reservoir) Water purification by natural biological and physico-chemical processes.

self-purification of the atmosphere Purification of the atmosphere from contaminants by natural biological and physico-chemical processes.
RT **contaminant.**

semichronic See SN **subchronic.**

sensibilization See SN **sensitization.**

sensitivity (in analytical chemistry) Extent to which a small change in concentration of an analyte can cause a large change in the related measurement.
Gold, Loening, McNaught and Sehmi, 1987

sensitivity (of a screening test) Extent (usually expressed as a percentage) to which a method gives results that are free from false negatives; the fewer the false negatives, the

greater the sensitivity. Quantitatively, sensitivity is the proportion of truly diseased persons in the screened population who are identified as diseased by the screening test.
Galen and Gambino, 1975
RT **specificity (of a screening test)**

sensitization Immune process whereby individuals become hypersensitive to substances, pollen, dandruff, or other agents that make them develop a potentially harmful allergy when they are subsequently exposed to the sensitizing material (allergen).
RT **allergy, hypersensitivity.**

sensory effect level
1. Intensity, where the detection threshold level is defined as the lower limit of the perceived intensity range (by convention the lowest concentration that can be detected in 50 % of the cases in which it is present).
2. Quality, where the recognition threshold level is defined as the lowest concentration at which the sensory effect can be recognized correctly in 50 % of the cases.
3. Acceptability and annoyance, where the nuisance threshold level is defined as the concentration at which not more than a small proportion of the population, less than 5 %, experiences annoyance for a small part of the time, less than 2 %; since annoyance will be influenced by a number of factors, a nuisance threshold level cannot be set on the basis of concentration alone.
   RT **nuisance threshold.**

WHO, 1987

serum
1. Watery proteinaceous portion of the blood that remains after clotting.
   SN **blood serum.**
2. Clear watery fluid especially that moistening the surface of serous membranes or that exuded through inflammation of any of these membranes.

short term effect See SN **acute effect.**

short term exposure limit (STEL) As used by US NIOSH, unless noted otherwise, the 15 minute time weighted average exposure that should not be exceeded at any time during a work day.

side-effect Action of a drug other than that desired for beneficial pharmacological effect.

siderosis
1. Pneumoconiosis resulting from the inhalation of iron dust.
   BT **pneumoconiosis.**
2. Excess of iron in the urine, blood or tissues, characterized by haemosiderin granules in urine and iron deposits in tissues..

sidestream smoke Cloud of small particles and gases that is given off from the end of a burning tobacco product (cigarette, pipe, cigar) between puffs and is not directly inhaled by the smoker; the smoke that gives rise to passive inhalation on the part of bystanders.
SN **secondhand smoke.**
RT **mainstream smoke.**

sign Objective evidence of a disease, deformity or an effect induced by an agent, perceptible to an examining physician.

silicosis Pneumoconiosis resulting from inhalation of silica dust.
BT **pneumoconiosis.**

simulation test Procedure designed to predict the rate of biodegradation of a compound under relevant environmental conditions.

sink In environmental chemistry, an area or part of the environment in which, or a process by which, one or more pollutants is removed from the medium in which it is dispersed; for example - moist ground acts as a sink for sulfur dioxide in the air.

sister chromatid exchange (SCE) Reciprocal exchange of chromatin between two replicated chromosomes that remain attached to each other until anaphase of mitosis; used as a measure of mutagenicity of substances that produce this effect.
RT **mitosis.**

skeletal fluorosis Osteosclerosis due to fluoride.

slimicide Substance intended to kill slime-producing organisms (used on paper stock, water cooling systems, paving stones etc.).

slope factor Value, in inverse concentration or dose units, derived from the slope of a dose-response curve; in practice, limited to carcinogenic effects with the curve assumed to be linear at low concentrations or doses. The product of the slope factor and the exposure is taken to reflect the probability of producing the related effect.
RT **concentration-effect curve, concentration-response curve, dose, dose-effect curve, dose-response curve.**

societal risk Total probability of harm to a human population including also the probability of adverse health effects to descendants and the probability of disruption resulting from loss of services such as industrial plant or loss of material goods and electricity.

solvent abuse Deliberate inhalation (or drinking) of volatile solvents, in order to become intoxicated.
SN **"solvent sniffing".**
NT **"glue sniffing".**

"solvent sniffing" See SN **solvent abuse.**
NT **"glue sniffing".**

somatic
1. Pertaining to the body as opposed to the mind.
2. Pertaining to nonreproductive cells or tissues.
3. Pertaining to the framework of the body as opposed to the viscera.

soporific Substance producing sleep.
RT **anaesthetic, narcotic, sedative.**

sorption Noncommittal term used instead of adsorption or absorption when it is difficult to discriminate experimentally between these two processes.
Gold, Loening, McNaught and Sehmi, 1987

speciation Determination of the exact chemical form or compound in which an element occurs in a sample, for instance - determination of whether arsenic occurs in the form of trivalent or pentavalent ions or as part of an organic molecule, and the quantitative distribution of the different chemical forms that may coexist.

species
1. In biological systematics, group of organisms of common ancestry that are able to reproduce only among themselves and that are usually geographically distinct.
2. See NT **chemical species.**

species differences in sensitivity Quantitative or qualitative differences of response to the action(s) of a potentially toxic substance on various species of living organisms.
RT **species-specific sensitivity.**

species-specific sensitivity Quantitative and qualitative features of response to the action(s) of a potentially toxic substance that are characteristic for particular species of living organism.
RT **species differences in sensitivity.**

specific death rate Death rate computed for a subpopulation of individual organisms or people having a specified characteristic or attribute, and named accordingly (for example, age-specific death rate, the number of deaths of persons of a specified age during a given period of time, divided by the total number of persons of that age in the population during that time).
IPCS, 1987

specificity (of a screening test) Proportion of truly non-diseased persons who are identified by the screening test.

specific pathogen free (SPF) Describing an animal removed from its mother under sterile conditions just prior to term and subsequently reared and kept under sterile conditions.
RT **germ-free animal.**

specimen Specifically selected portion of any substance, material, organism (specifically tissue, blood, urine or faeces) or environmental medium assumed to be representative of the parent substance etc. at the time it is taken for the purpose of diagnosis, identification, study or demonstration.
PAC, 1990

spreader Agent used in some pesticide formulations to extend the even disposition of the active ingredient.

stability half-life (half-time) Time required for the amount of a substance in a formulation to decrease, for any reason, by one-half (50 %).
Brown, 1988

standard
1. That which is established as a measure or model to which others of a similar nature should conform.
2. Technical specification, usually in the form of a document available to the public, drawn up with the consensus or general approval of all interests affected by it, based on the consolidated results of science, technology and experience, aimed at the promotion of optimum community benefits and approved by a body recognized on the national, regional or international level.
   SN **technical directive.**
3. Reference substance.
   SN **standard material.**

standardization
1. Making any substance, drug or other preparation conform to type or precisely defined characteristics.
2. Establishment of precisely defined characteristics, or precisely defined methods, for future reference.
3. Definition of precise procedures for administering, scoring and evaluating the results of a new method that is under development.

standard material (in analytical chemistry)
1. Reference material (or calibration material) for which, for specified element concentrations, values are recommended by some official body.
   Gold, Loening, McNaught and Sehmi, 1987
2. Substance sufficiently well defined to be used for calibration and quality control of measurement techniques.
   PS **reference material.**

standard(ized) mortality (morbidity) ratio (SMR) Ratio of the number of events observed in the study group or population to the number of deaths expected if the study population had the same specific rates as the standard population, multiplied by 100.
Last, 1988

stannosis Pneumoconiosis resulting from inhalation of tin dust.

stochastic Of, pertaining to or arising from chance and hence involving probability and obeying the laws of probability.

stochastic effect Consequence for which the probability of occurrence depends on the absorbed dose: hereditary effects and cancer induced by radiation are considered to be stochastic effects. The term "stochastic" indicates that the occurrence of effects so named, would be random. This means that, even for an individual, there is no threshold of dose below which the effect will not appear, and the chance of experiencing the effect increases with increasing dose.
WHO, 1989a
RT **all-or-none effect, quantal effect.**

stratification (in epidemiology) Process of or result of separating a sample into several subsamples according to specified criteria such as age groups, socio-economic status, etc.
Last, 1988

stratified sample Subset of a population selected according to some important characteristic.
RT **stratification.**

structure-activity relationship (SAR) Association between the physicochemical properties of a substance and/or the properties of its molecular substructures and its biological properties including its toxicity.
PS **quantitative structure-activity relation (QSAR).**

subacute Term used to describe a form of repeated exposure or administration usually occurring over about 21 days, not long enough to be called "long-term" or "chronic".
PS **subchronic.**
RT **subacute effect, subchronic effect, subchronic toxicity, subchronic toxicity test.**

subacute (sometimes called subchronic) effect Biological change resulting from multiple or continuous exposures usually occurring over about 21 days. Sometimes the term is used synonymously with subchronic effect and care should be taken to check the usage any particular case.
PS **subchronic effect.**
RT **subchronic toxicity, subchronic toxicity test.**

subchronic Related to repeated dose exposure over a short period, usually about 10 % of the life span; an imprecise term used to describe exposures of intermediate duration.
PS **subacute.**
RT **subacute effect, subchronic effect, subchronic toxicity, subchronic toxicity test.**
SN **semichronic.**

subchronic (sometimes called subacute) effect Biological change resulting from an environmental alteration lasting about 10 % of the lifetime of the test organism . In practice with experimental animals, such an effect is usually identified as resulting from multiple or continuous exposures occurring over 3 months (90 days). Sometimes a subchronic effect is distinguished from a subacute effect on the basis of its lasting for a much longer time.
PS **subacute effect.**
RT **subchronic toxicity, subchronic toxicity test.**

subchronic toxicity
1. Adverse effects resulting from repeated dosage or exposure to a substance over a short period, usually about 10 % of the life span.
2. The capacity to produce adverse effects following subchronic exposure.

RT **subacute, subchronic, subchronic effect, subchronic toxicity test.**

subchronic (sometimes called subacute) toxicity test Animal experiment serving to study the effects produced by the test material when administered in repeated doses (or continually in food, drinking-water, air) over a period of up to about 90 days.
WHO, 1979
SN **semichronic toxicity test.**

subclinical effect Biological change following exposure to an agent known to cause disease either before symptoms of the disease occur or when they are absent.

subjective environment Surrounding conditions as perceived by persons living in these conditions.
SN **perceived environment.**
After WHO, 1979

subthreshold dose See SN **non-effective dose**

sudorific Substance that causes sweating.

sufficient evidence According to the USEPA's Guidelines for Carcinogen Risk Assessment, sufficient evidence is a collection of facts and scientific references that is definite enough to establish that an adverse effect is caused by the agent in question.
RT **carcinogenicity, classification according to IARC, limited evidence.**

suggested no adverse response level (SNARL) Maximum dose or concentration that on current understanding is likely to be tolerated by an exposed organism without producing any harm.

summary sheet Two-to-four page summary of a risk assessment.
IRIS, 1986

summation (in neurophysiology) Process of addition of separate postsynaptic responses caused by stimuli that are adjacent in time and space. Excitation of a synapse evokes a graded potential change in the postsynaptic membrane that may be below the threshold required to trigger an impulse. If two or more such potentials are caused either nearly simultaneously, at different synapses on the same neurone (spatial summation), or in rapid succession at the same synapse (temporal summation), the summed response may be sufficient to trigger a postsynaptic impulse. Summation may occur between excitatory potentials, inhibitory potentials, or between an excitatory and an inhibitory potential.

Superfund Federal authority, established by the US Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980, to respond directly to releases or threatened releases (such as from dumps) of hazardous substances that may endanger health or welfare.
IRIS, 1986

super-threshold dose See PS **toxic dose.**

surface layer Region of space comprising and adjoining the phase boundary between a solid and liquid phase, between a solid and gas phase, or between a liquid and gas phase within which properties of matter are significantly different from the values in the adjoining bulk phases.
PS **interfacial layer.**

surrogate Relatively well studied toxicant whose properties are assumed to apply to an entire chemically and toxicologically related class; for example, benzo(a)pyrene data may be used as toxicologically equivalent to that for all carcinogenic polynuclear aromatic hydrocarbons.
RT **quantitative structure-activity relationship.**

surveillance Ongoing scrutiny, generally using methods distinguished by their practicability and uniformity, and frequently by their rapidity, rather than by complete accuracy. Its main purpose is to detect changes in trend or distribution in order to initiate investigative or control measures.
Last, 1988

susceptibility Condition of lacking the power to resist a particular disease or infection; thus in susceptible people "normal expected" results occur but with a lower exposure (or dose) than in the rest of the population.

sympatholytic
1. adj., Blocking transmission of impulses from the adrenergic (sympathetic) postganglionic fibres to effector organs or tissues.
2. n., Agent that blocks transmission of impulses from the adrenergic (sympathetic) postganglionic fibres to effector organs or tissues.

SN **antiadrenergic.**

sympathomimetic
1. adj., Producing effects resembling those of impulses transmitted by the postganglionic fibres of the sympathetic nervous system.
2. n., Agent that produces effects resembling those of impulses transmitted by the postganglionic fibres of the sympathetic nervous system.

SN **adrenergic.**

symptom Any subjective evidence of a disease or an effect induced by a substance as perceived by the affected subject.

symptomatology General description of all of the signs and symptoms of exposure to a toxicant: signs are the overt (observable) responses associated with exposure (such as convulsions, death, etc.) whereas symptoms are covert (subjective) responses (such as nausea, headache, etc.).
Brown, 1988

synapse Functional junction between two neurones, where a nerve impulse is transmitted from one neurone to another.

synaptic transmission See RT **synapse.**

syndrome Set of signs and symptoms occurring together and often characterizing a particular disease-like state.

synergism Pharmacological or toxicological interaction in which the combined biological effect of two or more substances is greater than expected on the basis of the simple summation of the toxicity of each of the individual substances.

synergistic effect Biological effect following exposure simultaneously to two or more substances that is greater than the simple sum of the effects that occur following exposure to the substances separately.
RT **additive effect, antagonism, potentiation.**

systematic sample Subset selected according to some simple rule such as specified date or alphabetic classification.
RT **biased sample, stratified sample.**

systemic Relating to the body as a whole

systemic effect Consequence that is of either a generalized nature or that occurs at a site distant from the point of entry of a substance: a systemic effect requires absorption and distribution of the substance in the body.

tachy- Prefix meaning rapid as in tachycardia and tachypnoea.

tachycardia Abnormally fast heartbeat.
AN **bradycardia.**

tachypnoea Abnormally fast breathing.
AN **bradypnoea.**

taeniacide Substance intended to kill tapeworms.

target (biological) Any organism, organ, tissue, cell or cell constituent that is subject to the action of a pollutant or other chemical, physical, or biological agent.
WHO, 1979
RT **receptor.**

target (of environmental pollution) Human being or any organism, organ tissue, cell, resource, or any constituent of the environment, living or not, that is subject to the activity of a pollutant or other chemical or physical activity or other agent.
WHO, 1979
RT **receptor.**

target organ(s) Organ(s) in which the toxic injury manifests itself in terms of dysfunction or overt disease.
WHO, 1979
RT **receptor.**

target population (epidemiology)
1. Collection of individuals, items, measurements, etc. about which we want to make inferences: the term is sometimes used to indicate the population from which a sample is drawn and sometimes to denote any reference population about which inferences are required.
2. Group of persons for whom an intervention is planned.

Last, 1988

T cell See **T lymphocyte.**

technical directive See RT **standard.**

temporary acceptable daily intake Value for the acceptable daily intake proposed for guidance when data are sufficient to conclude that use of the substance is safe over the relatively short period of time required to generate and evaluate further safety data, but are insufficient to conclude that use of the substance is safe over a lifetime. A higher-

than-normal safety factor is used when establishing a temporary ADI and an expiration date is established by which time appropriate data to resolve the safety issue should be available.
RT **acceptable daily intake.**
After de Koning, 1987

temporary maximum residue limit Temporary maximum residue limit is established for a specified, limited period when:
1. Only a temporary acceptable daily intake has been established for the pesticide concerned.
2. Although an acceptable daily intake has been established, the residue data are inadequate for firm maximum residue recommendations.

WHO, 1976

teratogen Agent that, when administered prenatally (to the mother), induces permanent structural malformations or defects in the offspring.

teratogenicity Potential to cause or the production of structural malformations or defects in offspring.
After WHO, 1987
RT **developmental toxicity, embryotoxicity.**

testing of chemicals
1. In toxicology, evaluation of the therapeutic and potentially toxic effects of substances by their application through relevant routes of exposure with appropriate organisms or biological systems so as to relate effects to dose following application.
2. In chemistry, qualitative or quantitative analysis by the application of one or more fixed methods and comparison of the results with established standards.

tetanic Pertaining to tetanus, characterized by tonic muscle spasm.

therapeutic index Ratio between toxic and therapeutic doses (the higher the ratio, the greater the safety of the therapeutic dose).

threshold Dose or exposure concentration below which an effect is not expected.

threshold limit value (TLV) Concentration in air of a substance to which it is believed that most workers can be exposed daily without adverse effect (the threshold between safe and dangerous concentrations). These values are established (and revised annually) by the American Conference of Governmental Industrial Hygienists) and are time-weighted concentrations for a 7 or 8 hour workday and a 40 hour workweek. For most substances the value may be exceeded, to a certain extent, provided there are compensatory periods of exposure below the value during the workday (or in some cases the week). For a few substances (mainly those that produce a rapid response) the limit is given as a ceiling concentration (maximum permissible concentration - designated by "C") that should never be exceeded.

thrombocytopenia Decrease in the number of blood platelets (thrombocytes).

tidal volume Quantity of air or test gas that is inhaled and exhaled during one respiratory cycle.

time-weighted average exposure (TWAE) or concentration (TWAC) Concentration in the exposure medium at each measured time interval multiplied by that time interval and divided by the total time of observation: for occupational exposure a working shift of eight hours is commonly used as the averaging time.
WHO, 1979

tinnitus Continual noise in the ears, such as ringing, buzzing, roaring, or clicking.

tissue dose Amount of a substance or physical agent (radiation) absorbed by a tissue.

T lymphocyte Animal cell which possesses specific cell surface receptors through which it binds to foreign substances or organisms, or those which it identifies as foreign, and which initiates immune responses.
RT **B lymphocyte, immune response, lymphocyte.**

tolerable daily intake (TDI) Regulatory value equivalent to the acceptable daily intake established by the European Commission Scientific Committee on Food. Unlike the ADI, the TDI is expressed in mg/person, assuming a body weight of 60 kg. TDI is normally used for food contaminants.
RT **acceptable daily intake.**

tolerable risk Probability of suffering disease or injury that can, for the time being, be tolerated, taking into account the associated benefits, and assuming that the risk is minimized by appropriate control procedures.
PS **acceptable risk.**

tolerance
1. Adaptive state characterized by diminished effects of a particular dose of a substance: the process leading to tolerance is called "adaptation."
2. In food toxicology, dose that an individual can tolerate without showing an effect.
3. Ability to experience exposure to potentially harmful amounts of a substance without showing an adverse effect.
4. Ability of an organism to survive in the presence of a toxic substance: increased tolerance may be acquired by adaptation to constant exposure.
5. In immunology, state of specific immunological unresponsiveness.

tonic
1. Characterised by tension, especially muscular tension.
2. Medical preparation that increases or restores normal muscular tension.

topical Pertaining to a particular area, as in a topical effect that involves only the area to which the causative substance has been applied.

total diet study
1. Study designed to establish the pattern of pesticide residue intake by a person consuming a defined diet.
   WHO, 1976.
2. Study undertaken to show the range and amount of various foodstuffs in the typical diet or to estimate the total amount of a specific substance in a typical diet.
   After WHO, 1989a

toxic Able to cause injury to living organisms as a result of physicochemical interaction.

toxicant See SN **toxic substance.**

toxic chemical See SN **toxic substance.**

toxic dose Amount of a substance which produces intoxication without lethal outcome. SN **super-threshold dose.**

toxicity

1. Capacity to cause injury to a living organism defined with reference to the quantity of substance administered or absorbed, the way in which the substance is administered (inhalation, ingestion, topical application, injection) and distributed in time (single or repeated doses), the type and severity of injury, the time needed to produce the injury, the nature of the organism(s) affected and other relevant conditions.
2. Adverse effects of a substance on a living organism defined with reference to the quantity of substance administered or absorbed, the way in which the substance is administered (inhalation, ingestion, topical application, injection) and distributed in time (single or repeated doses), the type and severity of injury, the time needed to produce the injury, the nature of the organism(s) affected, and other relevant conditions.
3. Measure of incompatibility of a substance with life: this quantity may be expressed as the reciprocal of the absolute value of median lethal dose ($1/LD_{50}$) or concentration ($1/LC_{50}$).

RT **acute toxicity, chronic toxicity, subacute toxicity, subchronic toxicity.**

toxicity equivalency factor (TEF) Factor used in risk assessment to estimate the toxicity of a complex mixture, most commonly a mixture of chlorinated dibenzo-*p*-dioxins, furans and biphenyls: in this case, TEF is based on relative toxicity to 2,3,7,8 -tetrachlorodibenzo-*p*-dioxin (TEF = 1).

toxicity equivalent (TEQ) Contribution of a specified component (or components) to the toxicity of a mixture of related substances. The amount-of-substance (or substance concentration) of total toxicity equivalent is the sum of that for the components B, C.....N:

$S\ n(\mathrm{TEQ}) = n(\mathrm{TEQ})_B + n(\mathrm{TEQ})_C + \ldots\ n(\mathrm{TEQ})_N$

Toxicity equivalent is most commonly used in relation to the reference toxicant 2,3,7,8-tetrachlorodibenzo-p-dioxin, 2,3,7,8-TCDD by means of the toxicity equivalency factor (TEF, f) which is 1 for the reference substance, hence:

$S\ n(\mathrm{TEQ}) = f_B n_B + f_C n_C + \ldots f_N n_N$

toxicity test Experimental study of the adverse effects of exposure of a living organism to a substance for a defined duration under defined conditions.

RT **acute toxicity test, carcinogenicity test, chronic toxicity test, subchronic toxicity test.**

toxic material See SN **toxic substance.**

toxicodynamics Process of interaction of potentially toxic substances with target sites, and the biochemical and physiological consequences leading to adverse effects.
RT **adverse effect, pharmacodynamics, target.**

toxicogenetics Study of the influence of hereditary factors on the effects of potentially toxic substances on individual organisms.
RT **ecogenetics, pharmacogenetics, polymorphism.**

toxicokinetics Process of the uptake of potentially toxic substances by the body, the biotransformation they undergo, the distribution of the substances and their metabolites in the tissues, and the elimination of the substances and their metabolites from the body. Both the amounts and the concentrations of the substances and their metabolites are studied. The term has essentially the same meaning as pharmacokinetics, but the latter term should be restricted to the study of pharmaceutical substances.
BT **chemobiokinetics.**
RT **biotransformation, pharmacokinetics.**
WHO, 1979

toxicological data sheet Document that gives in a uniform manner data relating to the toxicology of a substance, its production and application, properties and methods of identification; the data sheet may also include recommendations on protective measures.
PS **toxicological profile, toxicological dossier.**
IRPTC, 1982

toxicology Scientific discipline involving the study of the actual or potential danger presented by the harmful effects of substances (poisons) on living organisms and ecosystems, of the relationship of such harmful effects to exposure, and of the mechanisms of action, diagnosis, prevention and treatment of intoxications.
NT **chemical toxicology.**

toxicometry Term sometimes used to indicate a combination of investigative methods and techniques for making a quantitative assessment of toxicity and the hazards of potentially toxic substances.

toxicophobia Morbid dread of poisons.
RT **chemophobia.**

toxicophoric (toxophoric) group Structural moiety that upon metabolic activation exerts toxic effects: the presence of a toxicophoric group indicates only potential and not necessarily actual toxicity of a drug or other substances.
SN **toxogenic group.**

toxicovigilance Active process of identification, investigation, and evaluation of various toxic effects in the community with a view to taking measures to reduce or control exposure(s) involving the substance(s) which produces these effects.

toxic substance Material causing injury to living organisms as a result of physicochemical interactions.
SN **chemical etiologic agent, poison, toxicant, toxic chemical, toxic material.**

toxification Metabolic conversion of a potentially toxic substance to a product that is more toxic.

toxin Poisonous substance produced by a biological organism such as a microbe, animal or plant.
PS **venom.**

toxinology Scientific discipline involving the study of the chemistry, biochemistry, pharmacology and toxicology of toxins.
RT **toxicology, toxin.**

toxogenic group See SN **toxicophoric group.**

tracer
1. Means by which something may be followed; for example a radioactive isotope may replace a stable chemical element in a toxic compound enabling the toxicokinetics to be followed.
2. Labelled member of a population used to measure certain properties of that population.
   Gold, Loening, McNaught and Sehmi, 1987

transcription Process by which the genetic information encoded in a linear sequence of nucleotides in one strand of DNA is copied into an exactly complementary sequence of RNA.
RT **reverse transcription.**

transformation
1. Alteration of a cell by incorporation of foreign genetic material and its subsequent expression in a new phenotype.
   RT **phenotype.**
2. Conversion of cells growing normally to a state of rapid division in culture resembling that of a tumour.
3. Chemical modification of substances in the environment.

transgenic Adjective used to describe animals carrying a gene introduced by micro-injecting DNA into the nucleus of the fertilized egg.

treatability In relation to waste water, the amenability of substances to removal without adversely affecting the normal operation of biological treatment processes (such as a sewage treatment plant).

triage Assessment of sick, wounded and injured persons following a disaster to determine priority needs for efficient use of available medical facilities.

trophic level Amount of energy in terms of food that an organism needs: organisms not needing organic food, such as plants, are said to be on a low trophic level, whereas predator species needing food of high energy content are said to be on a high trophic level. The trophic level indicates the level of the organism in the food chain.
WHO, 1979

tumorigenic Able to cause tumours.

tumour
1. Any abnormal swelling or growth of tissue, whether benign or malignant.

2. An abnormal growth, in rate and structure, that arises from normal tissue, but serves no physiological function.
SN **neoplasm.**

tumour progression Sequence of changes by which a benign tumour develops from the initial lesion to a malignant stage.

turnover time See SN **mean life.**

ulcer Defect, often associated with inflammation, occurring locally or at the surface of an organ or tissue owing to sloughing of necrotic tissue.

uncertainty factor
1. In assay methodology, confidence interval or fiducial limit used to assess the probable precision of an estimate.
2. In toxicology, value used in extrapolation from experimental animals to man (assuming that man may be more sensitive) or from selected individuals to the general population: for example, a value applied to the no-observed effect level (NOEL) or no-observed adverse effect level (NOAEL) to derive an acceptable daily intake or reference dose (RfD) (the NOEL or NOAEL is divided by the value to calculate the acceptable daily intake or RfD). The value depends on the nature of the toxic effect, the size and type of population to be protected, and the quality of the toxicological information available.
SN **safety factor.**

RT **modifying factor, no-observed-effect-level, no-observed-adverse-effect-level, reference dose.**

unit risk (as used by the USEPA) Incremental upper-boundary lifetime risk estimated to result from lifetime exposure to an agent if it is in air at a concentration of 1 mg/m^3 or in the water at a concentration of 1 mg/L.
IRIS, 1986

upper boundary Estimate of the plausible upper limit to the true value of a quantity: this is usually not a statistical confidence limit.
IRIS, 1986

uptake Entry of a substance into the body, into an organ, into a tissue, into a cell, or into the body fluids by passage through a membrane or by other means.
PS **absorption.**

urticaria Vascular reaction of the skin marked by the transient appearance of smooth, slightly elevated patches (wheals, hives) that are redder or paler than the surrounding skin and often attended by severe itching.

vacuole Membrane-bound cavity within a cell.

validity (of a measurement) Expression of the degree to which a measurement measures what it purports to measure.
NT **concurrent validity, construct validity, content validity, criterion validity, predictive validity.**
Last, 1988

validity of a study Degree to which the inferences drawn from a study, especially generalizations extending beyond the study sample, are warranted when account is taken of the study methods, the representativeness of the study sample, and the nature of the population from which it is drawn.
Last, 1988
NT **external validity, internal validity.**

vasoconstriction Decrease of the calibre of the blood vessels leading to a decreased blood flow.
AN **vasodilation.**

vasodilation Increase in the calibre of the blood vessels, leading to an increased blood flow.
AN **vasoconstriction.**

vehicle Substance(s) used to formulate active ingredients for administration or use (general term for solvents, suspending agents, etc.).
Brown, 1988
RT **excipient.**

venom Animal toxin generally used for self-defence or predation and usually delivered by a bite or sting.
PS **toxin.**

ventilation
1. Process of supplying a building or room with fresh air.
2. Process of exchange of air between the ambient atmosphere and the lungs.
3. In physiology, the amount of air inhaled per day.
4. Oxygenation of blood.

ventricular fibrillation Irregular heartbeat characterized by uncoordinated contractions of the ventricle.

vermicide Substance intended to kill worms.

vermifuge Substance that causes the expulsion of intestinal worms.

vertigo Dizziness; an illusion of movement as if the external world were revolving around an individual or as if the individual were revolving in space.

vesicant
1. adj., Producing blisters on the skin.
2. n., Substance that causes blisters on the skin.

vesicle
1. Small sac or bladder containing fluid.
2. Blisterlike elevation on the skin containing serous fluid.

volume of distribution Apparent (hypothetical) volume of fluid required to contain the total amount of a substance in the body at the same concentration as that present in the plasma assuming equilibrium has been attained.
RT **plasma.**

waste Anything that is discarded deliberately or otherwise disposed of on the assumption that it is of no further use to the primary user.

wasting syndrome Disease marked by weight loss and atrophy of muscular and other connective tissues that is not directly related to a decrease in food and water consumption.

Weibull model Dose-response model of the form

$$P(d) = 1 - \exp(-bd^m)$$

Where $P(d)$ is the probability of cancer death due to a continuous dose rate, d, b and m are constants.
IRIS, 1986

weight-of-evidence for toxicity Extent to which the available biomedical data support the hypothesis that a substance causes a defined toxic effect such as cancer in humans.
IRIS, 1986

withdrawal effect Adverse event following withdrawal from a person or animal of a drug to which they have been chronically exposed or on which they have become dependent.

working zone Space measuring up to 2 m over the level of the floor or platform that contains a worker's permanent or temporary station.
IRPTC, 1982

x-disease Hyperkeratotic disease in cattle following exposure to chlorinated dibenzo-*p*-dioxins, naphthalenes and related compounds.

xenobiotic
1. Strictly, any substance interacting with an organism that is not a natural component of that organism.
   SN **exogenous substance, foreign substance or compound.**
2. Man-made compounds with chemical structures foreign to a given organism.
   Nagel *et al.* (eds), 1991
   SN **anthropogenic substance.**

zoocide Substance intended to kill animals.

zygote
1. Cell such as a fertilized egg resulting from the fusion of two gametes.
2. Cell obtained as a result of complete or partial fusion of cells produced by meiosis.
   Nagel *et al.* (eds), 1991

ANNEX 1. ABBREVIATIONS USED IN TOXICOLOGY

ADI	Acceptable daily intake
ALARA(P)	As low as reasonably achievable (practicable) In GBR regulations relating to worker exposure In USA goal of risk management (USNRC regulations)
ATP	Adenosine triphosphate
BAL	British anti-Lewisite
BATNEEC	Best available technology not entailing excessive cost In GBR regulations relating to environmental discharges
BCF	Bioconcentration factor
BEM	Biological effect monitoring
BOD	Biochemical oxygen demand
BPEO	Best practicable environmental option (GBR)
b.w.	Body weight
CLn	See **LC**
COD	Chemical oxygen demand
DEn	See **EDn**
DNA	Deoxyribonucleic acid
DNn	See **NDn**
EC	Enzyme classification number or effective concentration
ECn	Median effective concentration to *n* % of a population
EDI	Estimated daily intake
EDn	Median effective dose to *n* % of a population
EEC	Estimated exposure concentration
EED	Estimated exposure dose
EEL	Environmental exposure level
EMDI	Estimated maximum daily intake
EQO	Environmental quality objective

EQS	Environmental quality standard
ERL	Extraneous Residue Limit
ETS	Environmental tobacco smoke
GAP	Good agricultural practice
GLP	Good laboratory practice
GMP	Good manufacturing practice
HSG	Health and Safety Guide (IPCS)
HQ	Hazard quotient
IC	Inhibitory concentration
IDLHC	Immediately dangerous to life or health concentration
i.m.	Intramuscular
inhl	By inhalation
i.p.	Intraperitoneal
IPD	Individual protective devices
I-TEF	International Toxicity Equivalency Factor
i.v.	Intravenous
K_{oc}	Organic carbon partition coefficient
K_{ow}	Octanol water partition coefficient
LC_n	Median concentration lethal to *n* % of a test population
LD_n	Median dose lethal to *n* % of a test population
LEL	Lowest effect level, same as **LOEL**
LOEL	Lowest observed effect level
LOAEL	Lowest observed adverse effect level
LTn	Median time for death of *n* % of a test population
LV	Limit value
MCL	Maximum contaminant level (USA - Safe Drinking Water Act)

MCLG	Maximum contaminant level goal (USA - Safe Drinking Water Act)
MAC	Maximum allowable concentration
MEL	Maximum exposure limit
MF	Modifying factor
MOE	Margin of exposure
MRL	Maximum residue limit
mRNA	Messenger ribonucleic acid
MSDS	Material safety data sheet
MTC	Maximum tolerable concentration
MTD	Maximum tolerable dose, Maximum tolerated dose
MTEL	Maximum tolerable exposure level
NADP(H)	Nicotinamide adenine dinucleotide phosphate (reduced)
$\mathbf{ND_n}$	Median dose narcotic to n % of a population
NEL	No effect level, same as **NOEL**
NOAEL	No observed adverse effect level
NOEL	No observed effect level
OEL	Occupational exposure limit
OES	Occupational exposure standard
PEL	Permissible exposure limit
PMR	Proportionate mortality rate, ratio
p.c.	*Per cutim* (Latin) = Through the skin
p.o.	*Per os* (Latin) = By mouth
P**OW**	Octanol water partition coefficient
PPD	Personal protective device
PPE	Personal protective equipment
PTWI	Provisional tolerable weekly intake

QSAR	Quantitative structure activity relationship
RD	Rate difference
RfC	Reference concentration
RfD	Reference dose
RME	Reasonable maximum exposure (USEPA)
RNA	Ribonucleic acid
RR	Rate ratio
SAR	Structure-activity relationship
s.c.	Subcutaneous
SCE	Sister chromatid exchange
SMR	Standard mortality ratio
SNARL	Suggested no adverse response level
STEL	Short term exposure limit
***t*1/2**	Half-life
TCDD	2,3,7,8-tetrachlorodibenzo-*p*-dioxin
TDI	Tolerable daily intake
TEF	Toxicity equivalency factor
TEQ	Toxicity equivalent
TL_n	See **LT_n**
TLV	Threshold limit value
TMDI	Theoretical maximum daily intake
TSEL	Tentative safe exposure level
TWA	Time-weighted average
TWAC	Time-weighted average concentration
TWAE	Time-weighted average exposure
UF	Uncertainty factor

ANNEX 2. ABBREVIATIONS OF INTERNATIONAL BODIES AND LEGISLATION

ACGIH	American Conference of Governmental Industrial Hygienists
ACTS	HSE Advisory Committee on Toxic Substances (GBR)
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers (USA)
BCR	Bureau Communautaire de Référence (Bruxelles)
BIBRA	British Industrial Biological Research Association
CCFA	Codex Committee on Food Additives
CCPR	Codex Committee on Pesticide Residues
CDC	Cancer Detection Centre
CEC	Commission of the European Communities
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (USA)
CHIP	Classification, Hazard Information and Packaging (GBR)
COC	Committee on Carcinogenicity (GBR)
COM	Committee on Mutagenicity (GBR)
COPR	Control of Pesticides Regulations (GBR
COSHH	Control of Substances Hazardous to Health Regulations (GBR)
COT	Committee on Toxicity (GBR)
CPL	Classification, Packaging and Labelling
CSM	Committee on Safety of Medicines (GBR)
EC	European Community, European Commission
EEC	European Economic Community
EIA	Environmental Impact Assessment
EINECS	European Inventory of Existing Chemical Substances
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (USA), same as USEPA

FAC	MAFF Foods Advisory Committee (GBR)
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration (USA)
FONSI	Finding of No Significant Impact (USA)
FSC	Food Safety Council, Washington DC (USA)
GEMS	Global Environmental Monitoring System
HSC	Health and Safety Commission (GBR)
HSE	Health and Safety Executive (GBR)
IAEA	International Atomic Energy Agency
IARC	International Agency for Research on Cancer
ICRP	International Commission on Radiological Protection
ICSU	International Council of Scientific Unions
IFCC	International Federation of Clinical Chemists
ILO	International Labour Office
IPCS	International Programme on Chemical Safety
IRIS	Integrated Risk Information System (USA)
IRPTC	International Register of Potentially Toxic Chemicals
ISO	International Organization for Standardization
IUTOX	International Union for Toxicology
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
MAFF	Ministry of Agriculture, Fisheries and Food (GBR)
MARC	Monitoring and Risk Assessment Centre (GBR)
NBS	National Bureau of Standards (USA), now NIST
NIH	National Institutes of Health (USA)
NIOSH	National Institute of Occupational Safety & Health (USA)

NIST	National Institute of Standards and Technology (USA), formerly NBS
NRC	National Research Council (USA)
OECD	Organization for Economic Cooperation and Development
OMS	Organisation Mondiale de la Santé, same as WHO
OSHA	Occupational Safety and Health Administration (USA and/or GBR)
PSPS	Pesticides Safety Precautions Scheme (GBR)
RSC	The Royal Society of Chemistry (GBR)
RCRA	Resource Concentration and Recovery Act (USA)
SCOPE	Scientific Committee on Problems of the Environment (ICSU)
UNEP	United Nations Environment Programme
USEPA	United States Environmental Protection Agency, same as EPA
USNRC	US National Research Council
WHO	World Health Organization, same as OMS

ANNEX 3. SOURCES

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