



TOXICOLOGY

OCCUPATIONAL HAZARDS



CHEMICAL

PHYSICAL

ERGONOMIC

PSYCHOLOGIC

BIOLOGIC

❑ Toxicology:

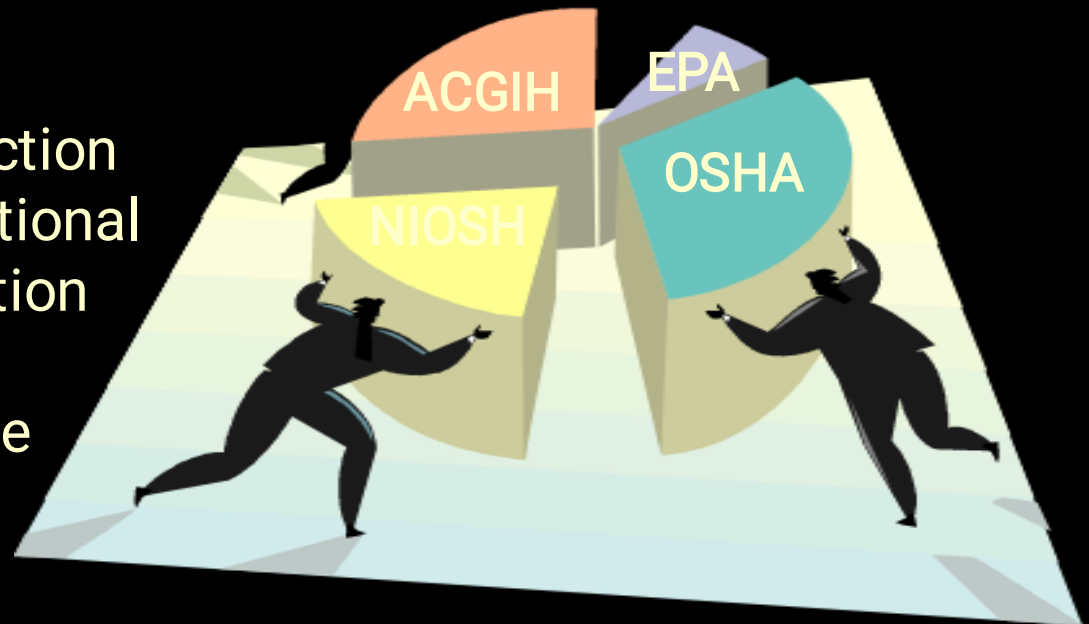
The study of the **adverse effects** of chemicals on living organisms & the assessment of the probability of their occurrence.

❑ Hazard:

When a chemical is used in a closed space without appropriate protection.

The National Institute for Occupational Safety and Health (**NIOSH**) and the American Conference of Governmental Industrial Hygienists (**ACGIH**) are organizations that sponsor chemical hazard research and recommend occupational exposure limits.

The U.S. Environmental Protection Agency (**EPA**) and the Occupational Safety and Health Administration (**OSHA**) set and enforce permissible chemical exposure limits.



AIRBORN CHEMICALS



GASES & VAPORS

AEROSOLS

- * DUST**
- * MIST**
- * FUME**
- * SMOKE**

AIRBORN CHEMICALS

GASES & VAPORS



AEROSOLS



FACTORS AFFECTING CLINICAL RESPONSE TO A TOXIC AGENT



- Duration of exposure
- Frequency of exposure
- Route of exposure
- Environmental Factors
- Individual Factors

CHEMICAL AGENTS IN WORKPLACE



- **Gases**
- **Metals**
- **Solvents**
- **Pesticides**
- **Plastics**
- **Rubber**
- **Others**

OCCUPATIONAL EXPOSURE LIMIT STANDARDS



Threshold Limit Value (TLV)

- Threshold Limit Value - Time Weighted Average (TLV - TWA)
- Threshold Limit Value - Short Time Exposure Limit (TLV - STEL)
- Threshold Limit Value - Ceiling (TLV-C)

- Short-Term Exposure Limit (STEL) understood to be a 15-minute average unless stated otherwise.
- Ceiling (C) - a level that should never be exceeded

LD₅₀ values are reported in milligrams toxin administered to the test animal per kilogram of body weight. A lower LD₅₀ value means that it takes less material to induce a toxic effect, that is, the toxin is potentially more harmful.

LC₅₀ values are reported in milligrams toxin per cubic meter of air (mg/m³) or in parts per million (ppm). As with LD₅₀ values, a lower LC₅₀ means that the material has a higher toxicity.



Acute Toxicity Hazard Levels

| Toxicity Rating | Oral LD ₅₀ (Rats, per kg) | Skin contact LD ₅₀ (Rabbits, per kg) | Inhalation LC ₅₀ (Rats, ppm, 1 hr) | Inhalation LC ₅₀ (Rats, mg/m ³ , 1 hr) |
|-----------------|---|--|--|---|
| high | <50mg | <200mg | <200 | <2,000 |
| medium | 50-500mg | 200-1,000mg | 200-2,000 | 2,000-20,000 |
| low | 500-5,000mg | 1-5g | 2,000-20,000 | 20,000-200,000 |