

What is occupational health and safety (OHS)?

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OHS

- Promote and maintain physical and mental wellbeing of workers
- Prevent adverse health effects (injury, illness and death) caused by work processes, work practices and working conditions

OHS

- Safety and health are not the same
- Safety associated to immediate injuries
- Health associated with immediate and long term illnesses
- A “safe” workplace can still be an “unhealthy” workplace

Basic concepts

- Forms of chemicals
 - Solid, liquid, gas/vapor
- Routes of entry
 - Inhalation, ingestion, skin absorption
 - Transport and deposit within body
- Acute and chronic effects
- Local and systemic effects

Basic concepts

- Toxicity
 - Inherent characteristics; physical state; route of exposure
- “The dose makes the poison”
 - Concentration of chemical
 - Duration of exposure

Basic concepts

- Health effects can affect specific or multiple body systems, can be simultaneous, overlapping or sequential

Questions on Concepts?

What is a hazard?

- “Any source of *potential* damage, harm or adverse health effects”
- Types of hazards:
 - **Chemical** – solid, liquid, gas/vapor; odor threshold
 - **Biological** – bacteria, virus, mold, animals
 - **Physical** – noise, temperature, vibration, radiation

Hazards

- Types of hazards:
 - **Safety** – machines, vehicles, electricity, lighting, lighting, working surfaces
 - **Ergonomics** – repetition, force, awkward posture, direct pressure, vibration, temperature
 - **Social** – harassment, violence, chronic stress, work organization

Hazard v. Risk

- **Risk** = likelihood/probability of adverse health effects if exposed to a hazard
- Risk factors for chemicals, for example:
 - Toxicity of chemical
 - Physical state and route of entry
 - Concentration of exposure
 - Duration of exposure

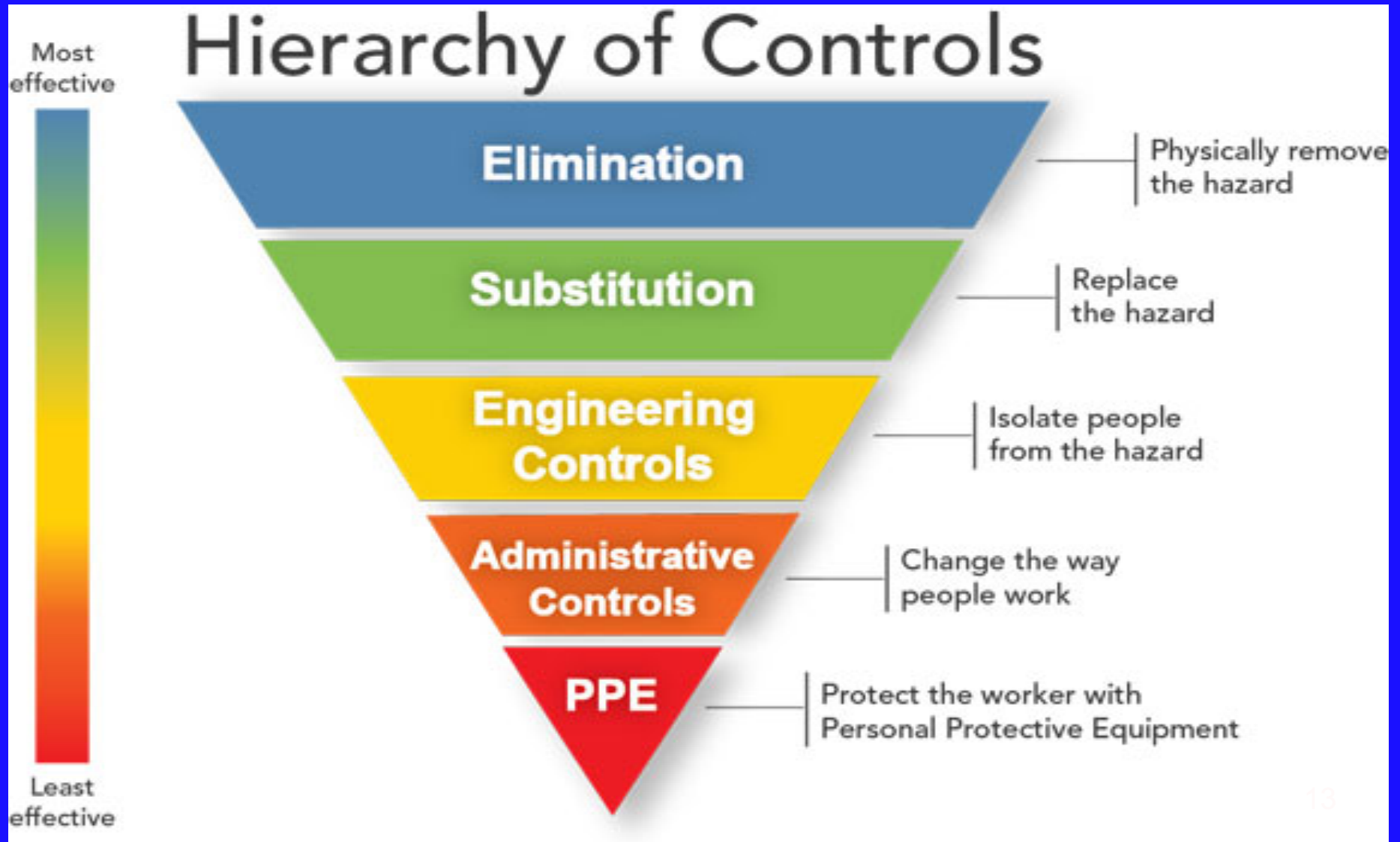
Risk Factors

- Risk factors for chemicals:
 - Amount actually entering body and threshold of adverse effects
 - Exposures to other chemicals – additive or symbiotic – multiple chemicals always present
 - Personal factors of exposed workers – pregnancy, sensitivities

Hazard Control Priorities

- Priorities for hazard control
 - Exposures with the highest risk of causing injury, illness or death
 - Exposures that affect many workers
 - Exposures that can be easily controlled
 - Exposures of great concern to workers
 - Exposures that violate regulations and standards

Controlling Hazards



Hierarchy

- “Engineering Controls”
 - Substitute materials or “design out” hazard
 - Redesign equipment or the process
 - Mechanize the process
 - Isolate the process
 - Ventilate the process
- The **first priority** for controls

Hierarchy

- “Administrative Controls”
 - Rotate personnel – assign more workers
 - Change schedule or time of work
 - Increase number of breaks
 - Housekeeping and hygiene facilities
 - Worker training
- Does **not** eliminate hazard – reduces **time** of exposure

Hierarchy

- “Personal Protective Equipment”
- The **last resort** – only puts a barrier between worker and hazard, only reduces the **amount** of exposure
- Workers often do not want to use PPE – discomfort, weight, lack of proper sizes for actual workforce, slows production

PPE

- **Only** protects workers if:
 - Right PPE for hazard; properly fitted; worn all the time; regularly cleaned; regularly replaced; workers are properly trained
- **Causes** other hazards:
 - Increase heat burden; restricts vision, hearing, motion and grip; restricts communication

Questions on hazards and controls?

Key = “control the hazard, not the worker”

OELs

- Occupational Exposure Limits
- Can be either legally binding “Permissible Exposure Limits” (PELs) or voluntary guidelines such as the ACGIH’s “Threshold Limit Values” (TLVs)

OELs

- Assumes exposures of no more than 8 hours/day and 40 hours/week
- “Time Weighted Averages” (TWA) that average highs and lows during work day
- Types: PEL, STEL, CL

OEL Problems

- Safe exposures for “most” workers – not all – constant reduction over time
- Covers only ~800 of 60,000 chemicals in industrial use
- Individual chemicals – not mixtures
- Not correlated with odor thresholds
- **BUT:** better than nothing; useful for estimating relative hazard

Questions?

- Before Part II – available resources

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