INDUSTRIAL HYGIENE CONTROL

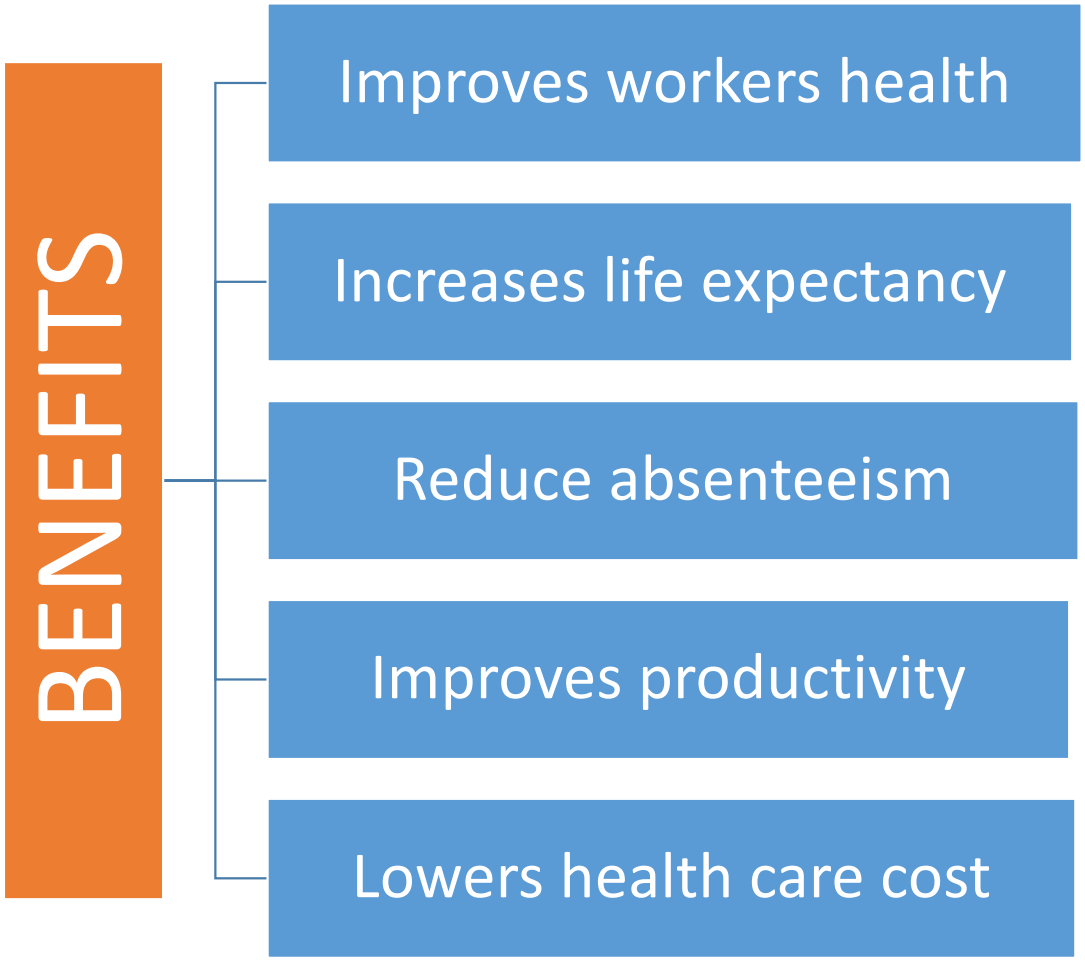
(Environmental Health)

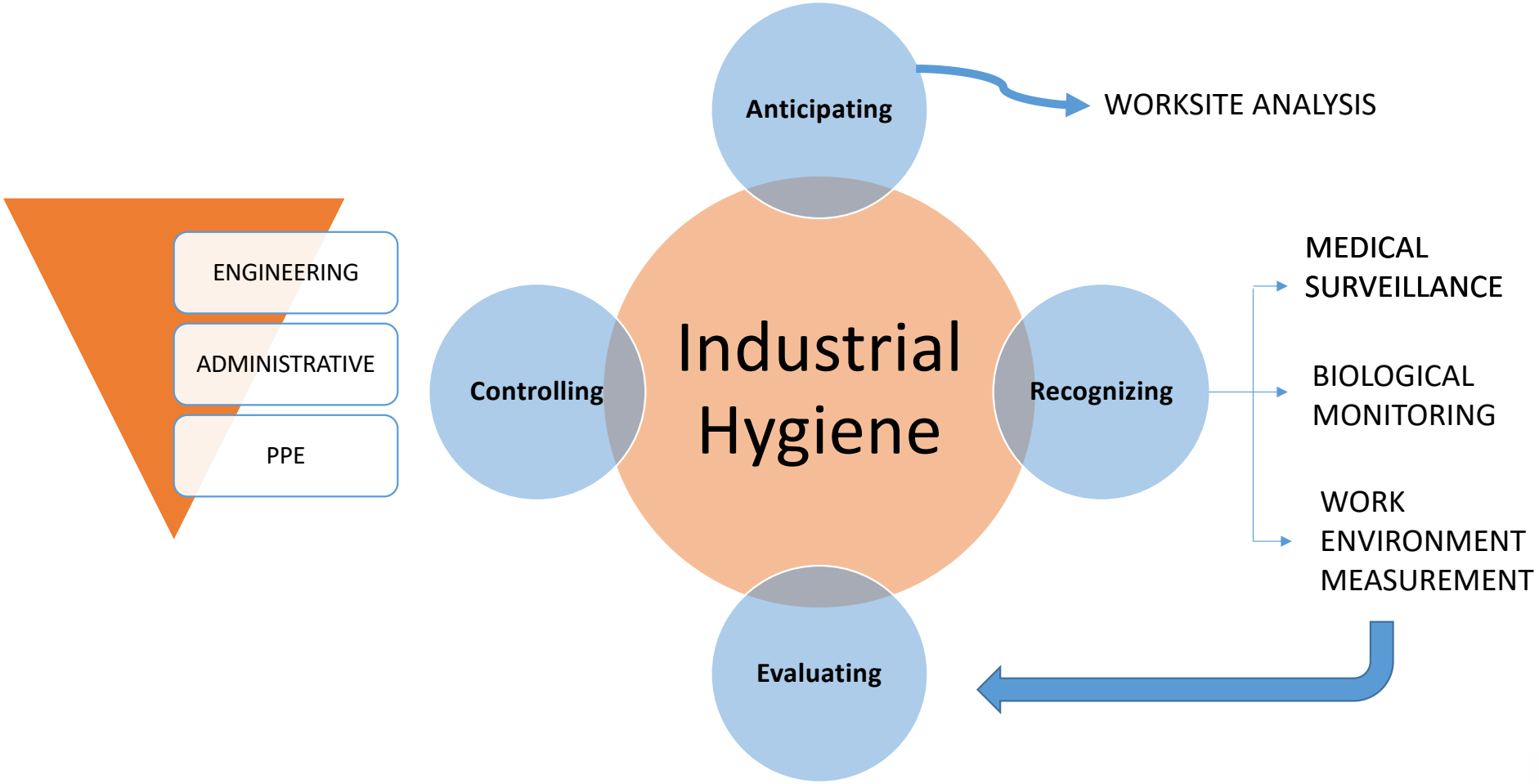
LOSS CONTROL PROGRAM

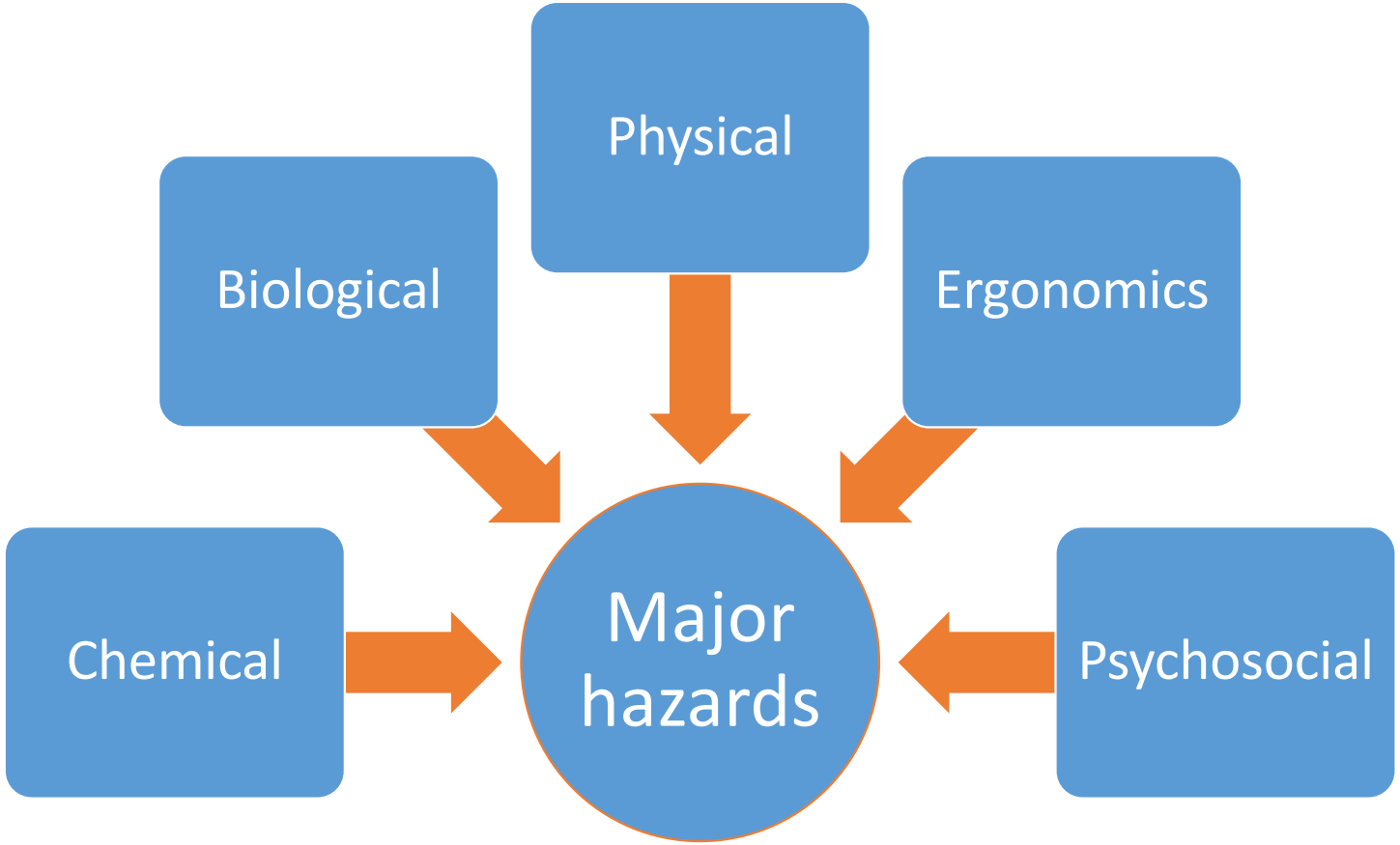
assists a company in developing ways to protect from special hazards like

INDUSTRIAL HYGIENE

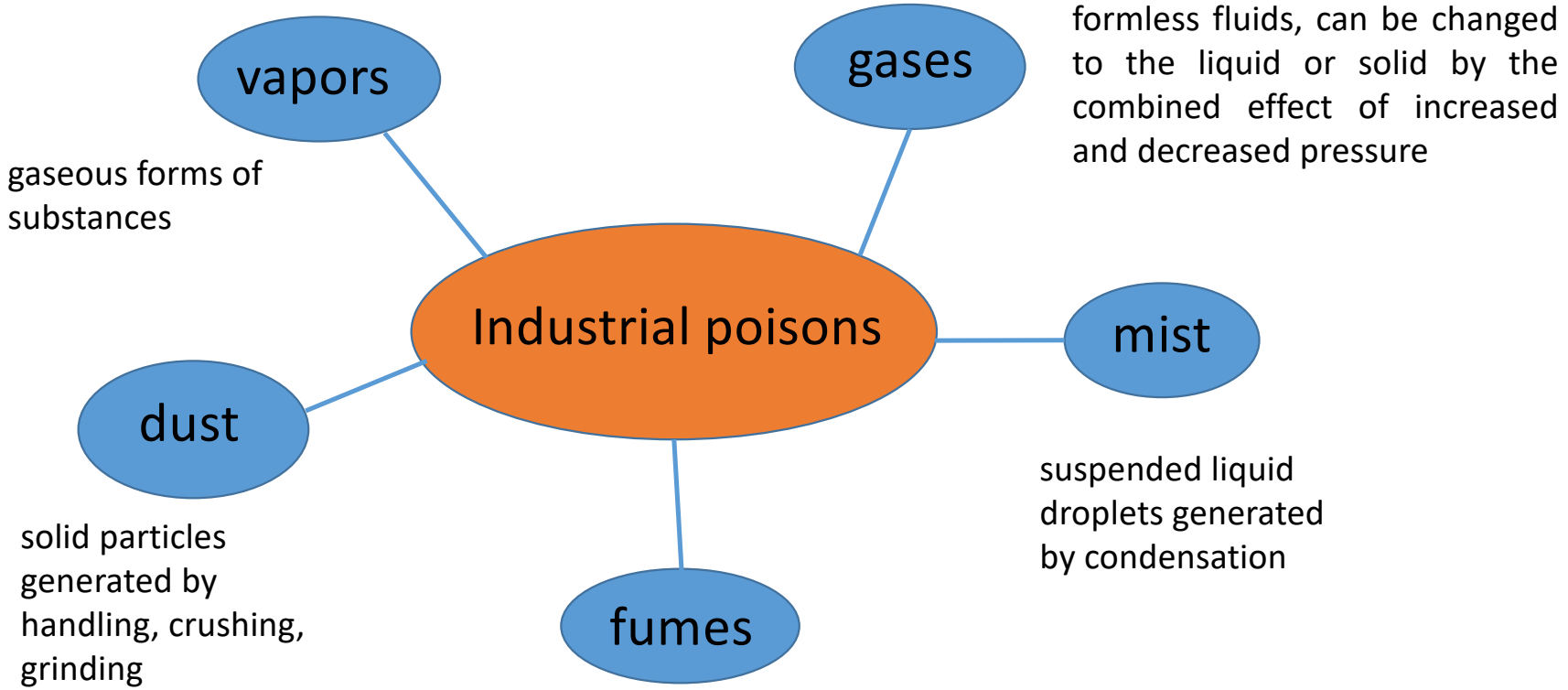
1. The science of protecting and enhancing the health and safety of people at work.
2. Health and safety hazards cover a wide range of chemical, physical, biological and ergonomic stressors.
3. Involves anticipating, recognizing, evaluating and controlling hazards.
4. Professionals dedicated to this are called industrial hygienists.


BENEFITS
Improves workers health
Increases life expectancy
Reduce absenteeism
Improves productivity
Lowers health care cost


Anticipating
WORKSITE ANALYSIS
ENGINEERING
ADMINISTRATIVE
PPE
Controlling
Industrial Hygiene
Recognizing
MEDICAL SURVEILLANCE
BIOLOGICAL MONITORING
WORK ENVIRONMENT MEASUREMENT
Evaluating


Physical
Biological
Ergonomics
Chemical
Major hazards
Psychosocial

Chemical (Contaminants)



Toxic substances, effects on health of workers

1. Irritants

inflame the
surfaces of the
parts of the body

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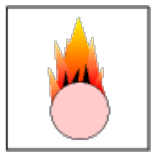
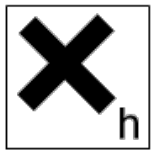
affect the skin, upper
respiratory tract,
upper respiratory tract


Oxidising



Harmful


Highly
Flammable


Corrosive


Toxic

Irritant

Toxic substances, effects on health of workers

2. Systemic Poisons

more insidious than the irritants

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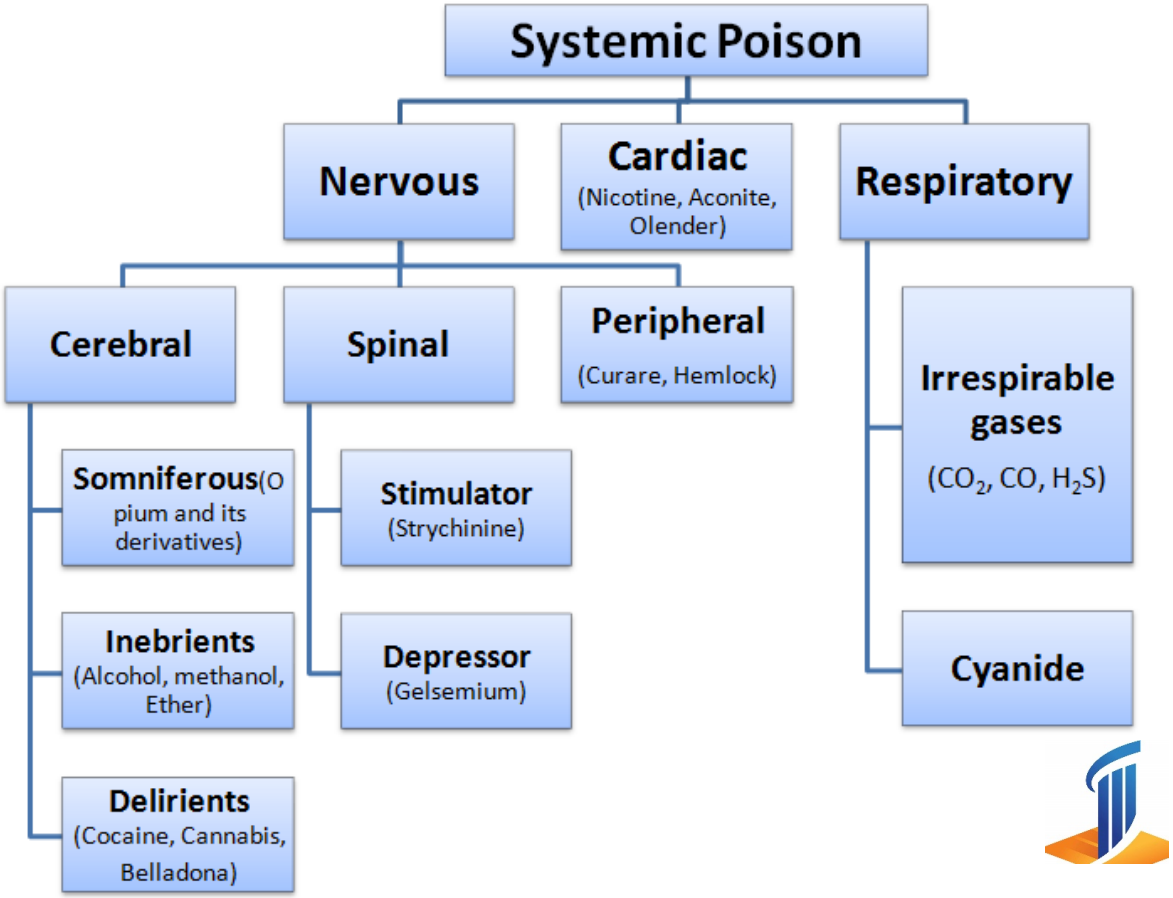
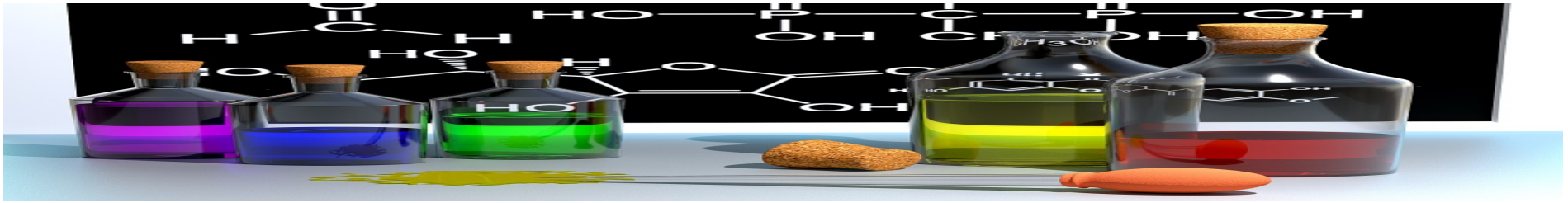
attack the vital organs or systems of organs



Toxic substances, effects on health of workers

2. Systemic Poisons

lead	→	attacks the blood, digestive system, and the central nervous system, brain
methanol	→	central nervous system
chlorinated hydrocarbons	→	blamed for liver damage



Acute and Chronic Poisoning

Types of Poisoning

1. Acute Poisoning
   - Excessive single dose, or several smaller doses of a poison taken over a short interval of time
2. Chronic Poisoning
   - Smaller doses over a period of time, resulting in gradual worsening eg. Arsenic, Phosphorus, Antimony, etc…

Toxic substances, effects on health of workers

3. Depressants

affects the central nervous system

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most common:

ethyl alcohol

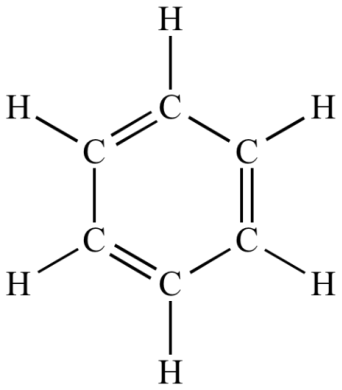
benzene

Toxic substances, effects on health of workers

4. Asphyxiants

prevent oxygen from reaching the body cells
Most common: Carbon dioxide (CO2)

5. Carcinogens



substances that are known to cause cancer
Most common: benzene and vinyl chloride

Toxic substances, effects on health of workers

6. Teratogens

Affect the fetus, so their toxic is indirect. They do their damage after conception but before birth.

7. Mutagens

Substances that attack the chromosomes and thus the species, instead of the individual. They do their damage before conception, and they affect the chromosomes of either the potential father or the potential mother.

Expressions for concentrations of substances in air

parts of the contaminant per million parts of air (ppm)

*****

milligrams (mg) of the contaminant per liter (I) of air

*****

percentage by volume of the contaminant in air

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milligrams of the contaminant per cubic meter of air, more common for indicating the concentration of solids (e.g., dusts) in air

Expressions for concentrations of substances in air

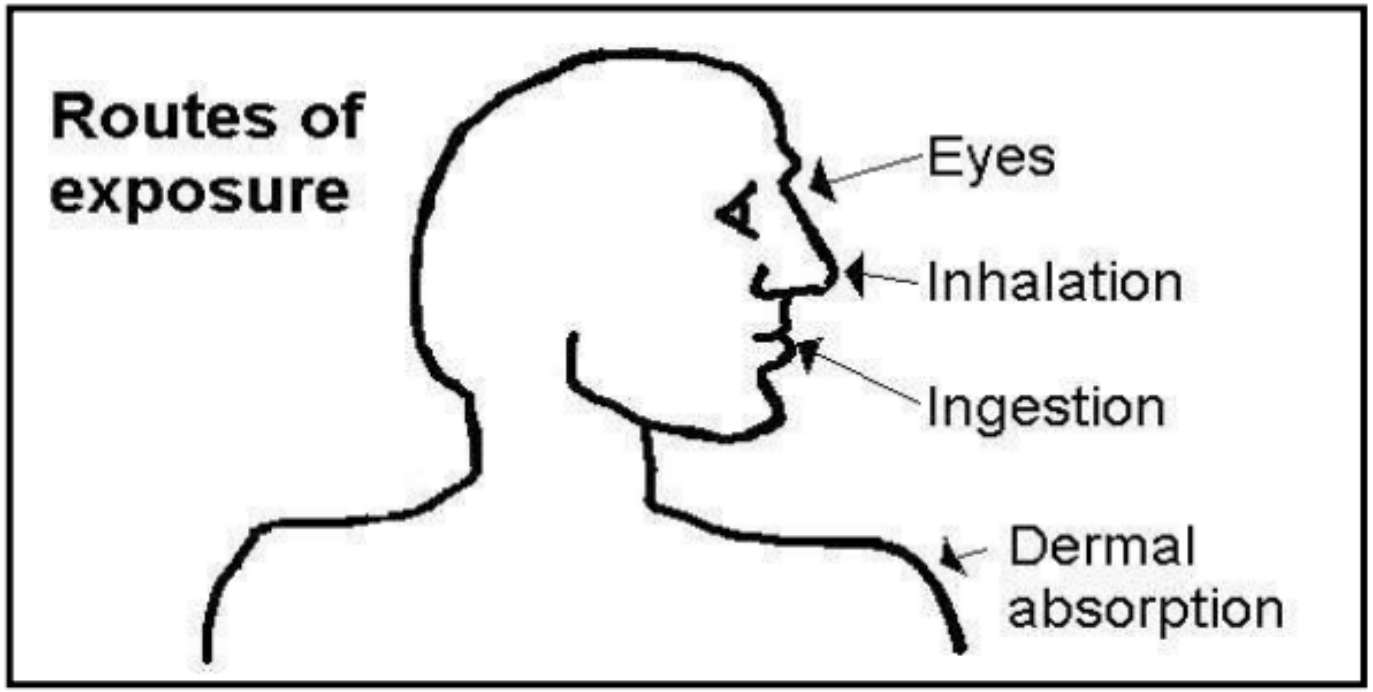
Example:

To relate % by volume to parts per million, use: **% by vol. x 10,000 = ppm**

To relate ppm and mg. / liter at approximate room temperatures and standard atmospheric pressure, use:

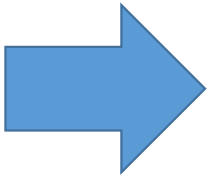
$$\text{ppm} = \frac{24{,}450 \times \text{mg.}}{M}$$ (Where M = molecular wt. of contaminant)

To relate ppm to mg/cm3, use: $$\text{ppm} = \frac{24{,}450 \times \text{mg.}}{M \times 1{,}000}$$


Routes of exposure
Eyes
Inhalation
Ingestion
Dermal absorption

Biological Hazards

- bacteria
- viruses
- fungi
- other living organisms



enter the body either directly or through breaks in the skin

cause acute and chronic infections

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Who are exposed?

- occupations that deal with plants or animals or their products
- food and food processing workers
- laboratory and medical personnel
- occupations that result in contact with bodily fluids

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Prevention & Control

- proper ventilation
- personal hygiene
- adequate infectious waste disposal systems
- proper personal protective equipment
- isolation (contagious diseases e.g. Covid-19)

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Physical Hazards

Excessive levels of:

Electromagnetic radiation	Some forms of cancer, infertility
Noise	Temporary and permanent hearing loss
Vibration	HAVS, Spinal disorders
Illumination	Eye problems, headaches
Temperature	Dehydration, elevated blood pressure

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Prevention & Control

Radiation

Time

"the shorter the time of exposure the lesser the danger"

Distance

"the farther from the source the lesser the danger"

Shielding

"the greater the protective mass the lower the exposure"

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Prevention & Control

Noise

Engineering
"enclosing or shielding"

Administrative
"limit exposure through time and distance"

PPE
"ear muffs and ear plugs "

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Prevention & Control

Vibration	Limit time of exposure
	Mechanical Isolation
	Maintenance
	Vibration dumping seats

https://www.osha.gov/Publications/OSHA3143/OSHA3143.htm

Prevention & Control

Illumination	Clean regularly
	Add more lights; use local lightings
	Use light paintings in walls
	Avoid or eliminate shadows

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Prevention & Control

Temperature	Liquid intake
	Limit exposure
	Protective clothing
	Acclimatization

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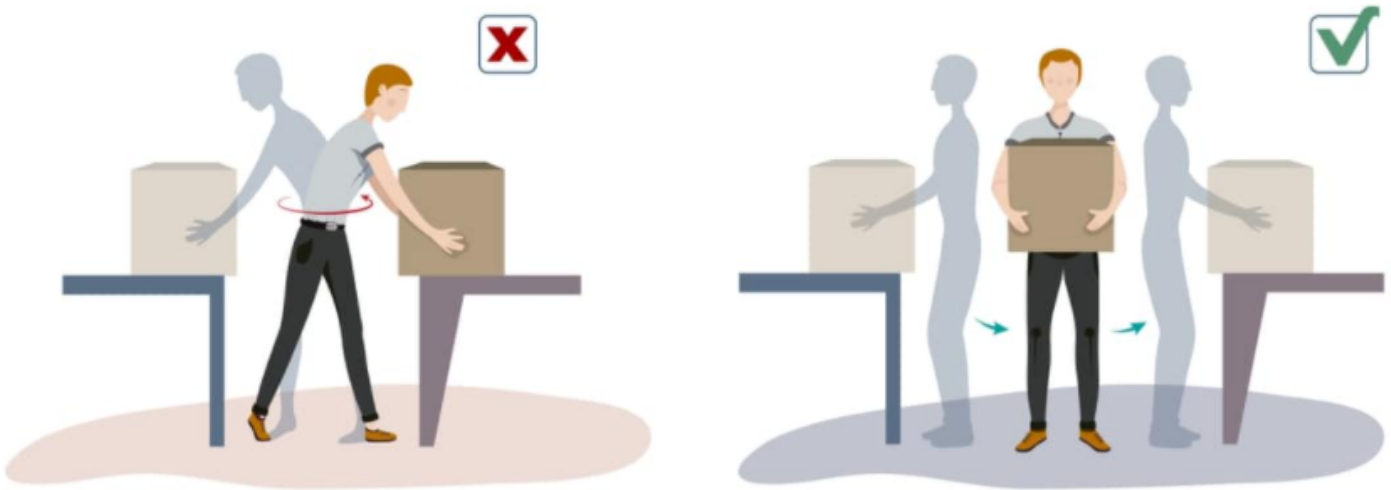
Ergonomic Hazards

The science of ergonomics studies and evaluates a full range of tasks:

- lifting
- holding
- pushing
- walking
- reaching



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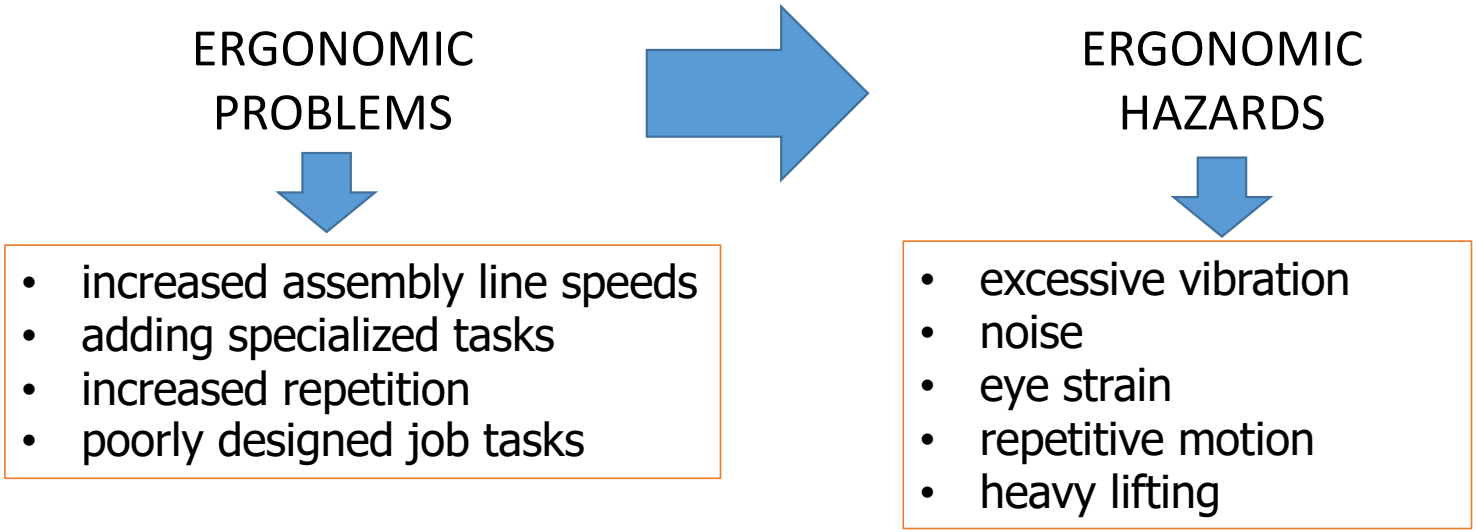
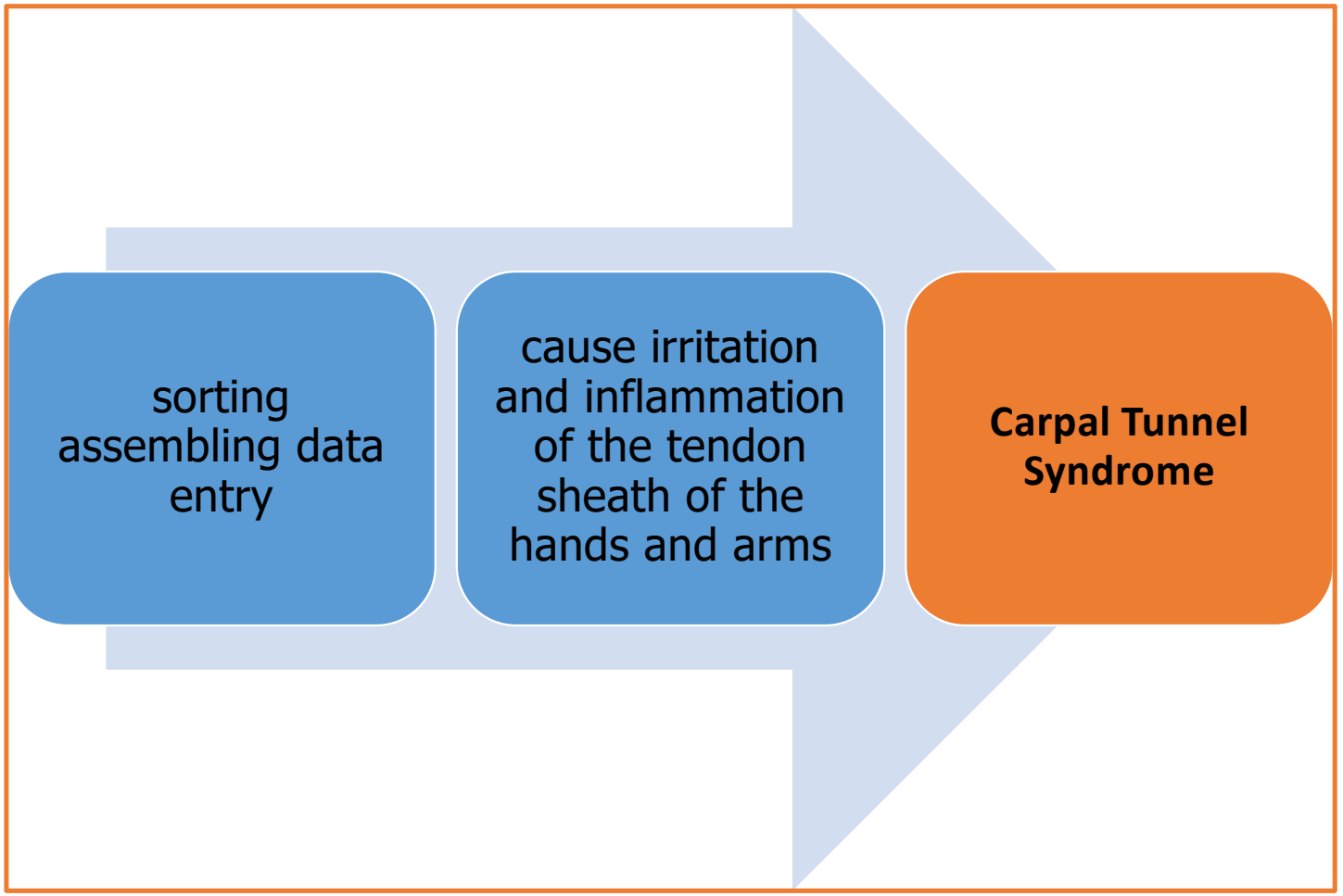
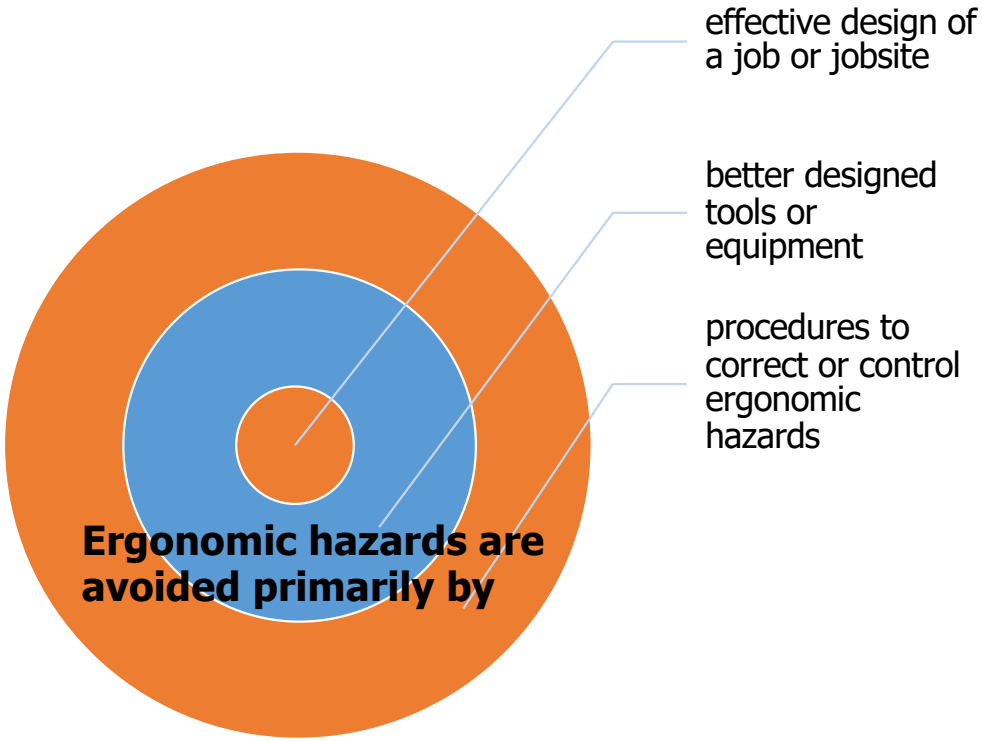

ERGONOMIC PROBLEMS
• increased assembly line speeds
• adding specialized tasks
• increased repetition
• poorly designed job tasks
ERGONOMIC HAZARDS
• excessive vibration
• noise
• eye strain
• repetitive motion
• heavy lifting


sorting assembling data entry
cause irritation and inflammation of the tendon sheath of the hands and arms
Carpal Tunnel Syndrome

Prevention & Control



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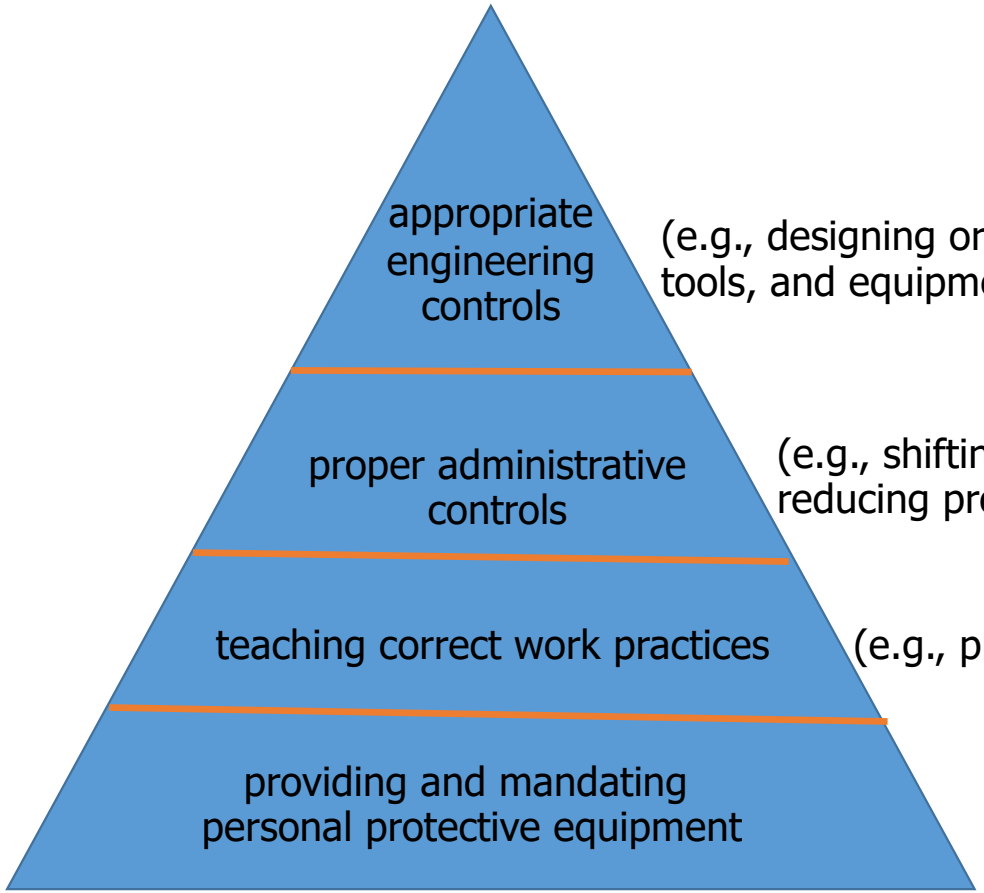
Prevention & Control



(e.g., designing or re-designing work stations, lighting, tools, and equipment)

(e.g., shifting workers among several different tasks, reducing production demand, and increasing rest breaks);

(e.g., proper lifting methods)

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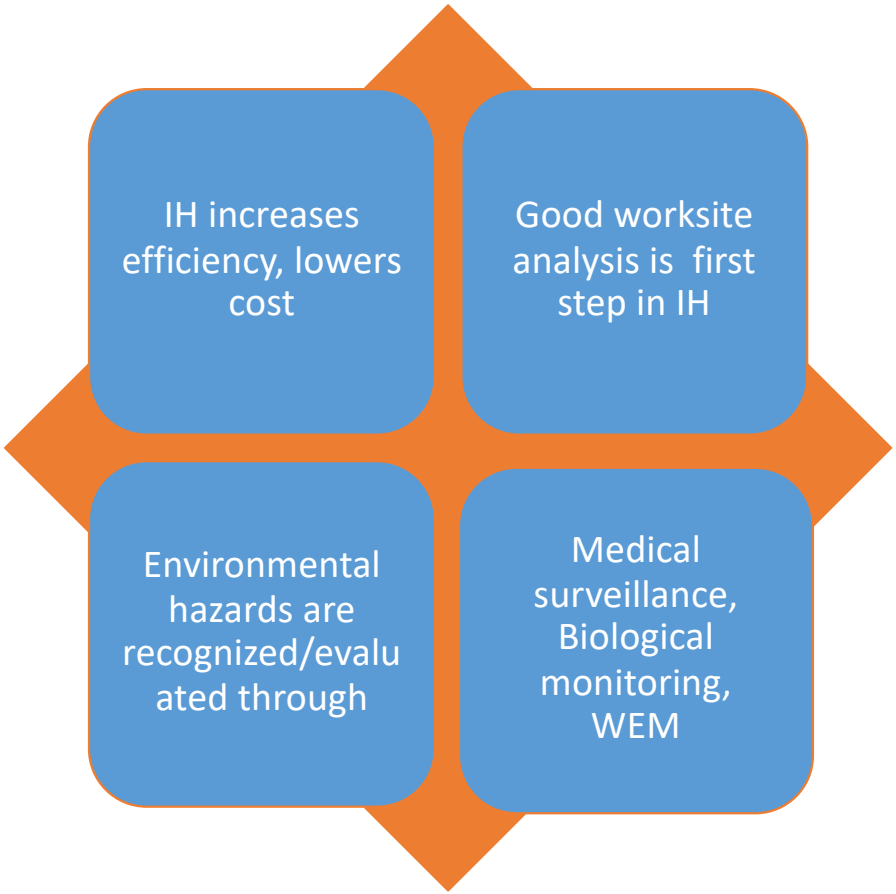
KEY POINTS


IH increases efficiency, lowers cost
Good worksite analysis is first step in IH
Environmental hazards are recognized/evaluated through
Medical surveillance, Biological monitoring, WEM


Questions
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Answers
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