

# Occupational Health Clinics for Ontario Workers, Inc.

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# Presentation Outline

- Toxicology
- Occupational Health Issues
- Environmental Health Issues
- Community Exposure
- Air Quality Ontario
- Air Quality Index



# Toxicology

- Definiton (Society of Toxicology)

Toxicology is the study of the adverse effects of chemical, physical or biological agents on living organisms and the ecosystem, including the prevention and amelioration (improvement) of such adverse effects.

# Toxicology

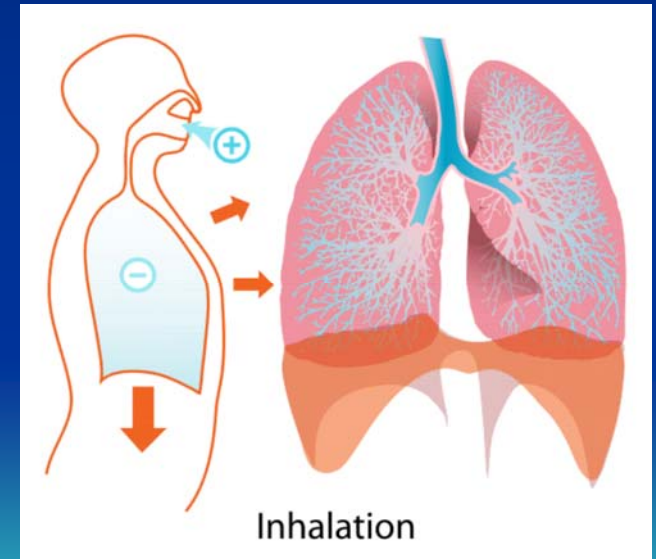
- Toxicity Endpoints
  - Mortality (death)
  - Teratogenicity (ability to cause birth defects)
  - Carcinogenicity (ability to cause cancer)
  - Mutagenicity (ability to cause change in the DNA)

# Toxicology

- **Chemical Agents**
  - Lead, Benzene, Arsenic, Nitrogen Dioxide
- **Physical Agents**
  - Noise, Radiation
- **Biological Agents**
  - Mould, bacteria

# Toxicology

- How Exposures Occur
  - Inhalation\*
  - Absorption
  - Ingestion



# Occupational Health

## Definition of Occupational Health (WHO)

*The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations – total health of all at work*

# Occupational Hazard

- Definition

Source or situation with a potential for harm in terms of injury or ill health, damage to property, damage to the workplace environment, or a combination of these.



# Occupational Health Issues

- Carcinogens in the workplace
  - Confirmed/suspected/animal\*
- Multiple Chemical exposures
  - Limited data regarding health effects

# Occupational Health Issues

- Climate changes
  - Working in the heat\*
- Extended work shifts/weeks
  - Exposures occur for longer periods in a day or week

# Occupational Health Issues

- Indoor Air Quality - vs – Outdoor Air
- Insufficient knowledge of health effects related to materials

# Environmental Health

- WHO
  - Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours.
  - The assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments.

# Environmental Health

- Environmental health concerns
  - Air quality
  - Climate change
  - Hazardous materials
  - Noise pollution
  - Occupational health
  - Water pollution
  - Solid waste

# Community Exposure

- **Atmospheric dispersion modeling**
  - Mathematical simulation of how air pollutants disperse in the ambient atmosphere



# Community Exposure

## Stack Plumes

Understand at what conditions there will be higher concentrations at ground level

## Some examples

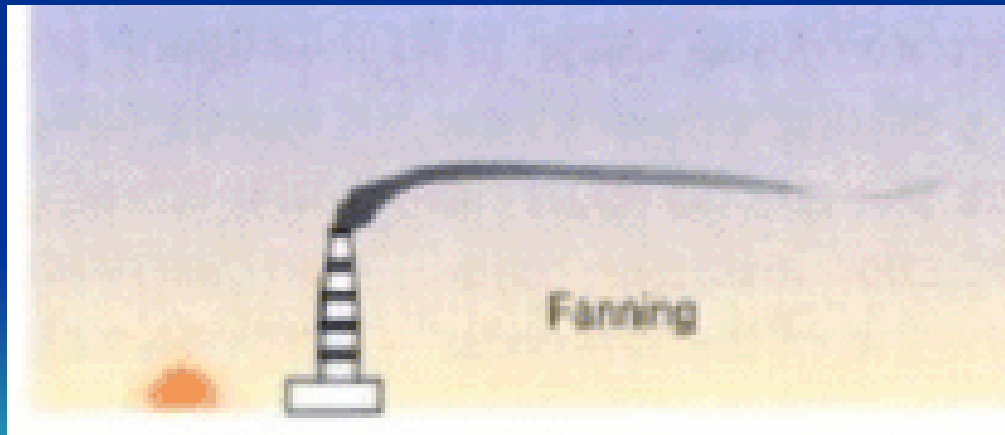
fanning

fumigation

looping

# Community Exposure

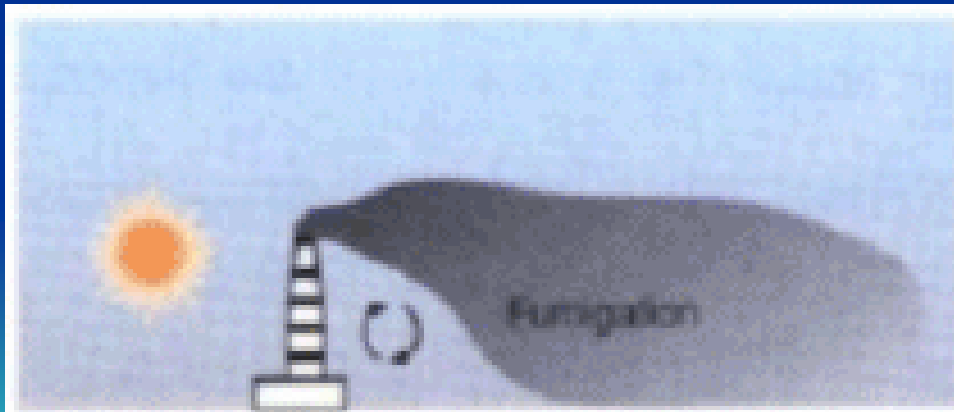
- Fanning
  - Depends on plume density, If similar to air then it will travel at the same elevation





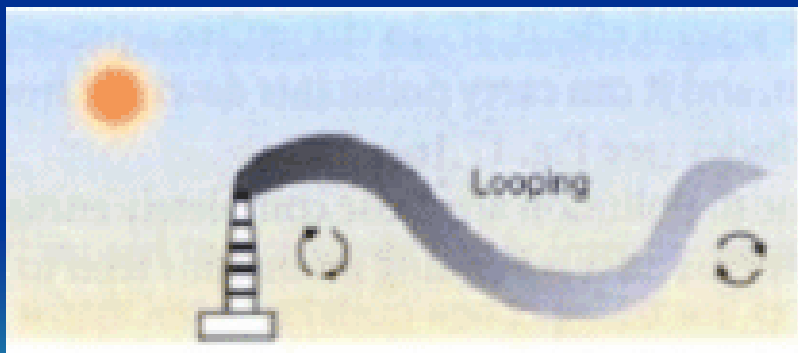
# Community Exposure

- Fumigation
  - Contaminants travel to ground level
  - Occurs when there is unstable conditions below the plume



# Community Exposure

- Looping
  - Can have high concentration at ground level
  - Occurs when there is unstable atmospheric conditions

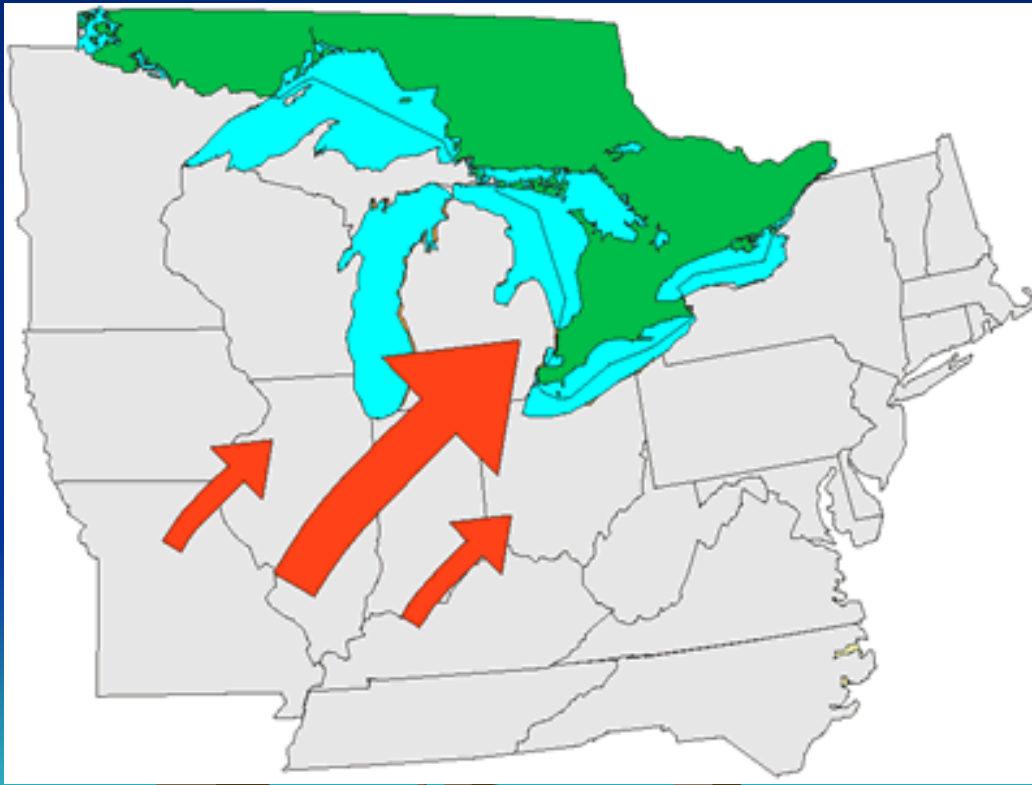


# Air Quality Ontario

- Smog in Ontario is usually the result of the migration of pollutants from the United States combining with unfavourable weather patterns
- Ground-level ozone and fine particulate matter are key components of smog.
- <http://www.airqualityontario.com>

# Air Quality Ontario

- Migration of pollutants from the US



# Monitoring Air Quality

- The Air Quality Index (AQI) is a rating scale for outdoor air in Ontario
  - Ozone
  - Fine particulate matter
  - Nitrogen dioxide
  - Carbon monoxide
  - Total reduced sulphur compounds

# Air Quality Index

- The AQI reading is below 16, the air quality is in the very good category.
- If the AQI reading is in the range of 16 to 31, the air quality is in the good category.
- If the AQI reading is in the range of 32 to 49, the air quality is in the moderate category, and there may be some adverse effects for very sensitive people.



# Air Quality Index

- If the AQI reading is in the range of 50 to 99, the air quality is in the poor category, and may have adverse effects for sensitive members of human and animal populations, and may cause significant damage to vegetation and property.
- If the AQI reading is above 99, the air quality is in the very poor category, and may have adverse effects for a large proportion of those exposed.



# Any Questions?



Occupational Health  
Clinics for Ontario  
Workers Inc.