

## **Environmental Hazards and Human Health**

### **Chapter Seventeen**

#### **Risk Analysis**

- Risk analysis
  - involves identifying \_\_\_\_\_ and evaluating their associated risks (risk assessment)
  - ranking risks (comparative risk analysis)
  - determining option and making decisions about reducing or eliminating risks (risk \_\_\_\_\_)
  - informing decision makers and the public about risks (risk communication)

#### **Risk & Hazards**

- Risk is the possibility of suffering harm from a hazard that can cause injury, disease, economic loss, or environmental damage.
- Risk is expressed in terms of \_\_\_\_\_.
- Major types of hazards:
  - \_\_\_\_\_: poor diet, drugs, driving, assault
  - Chemical: harmful chemicals in the air, water, soil and food
  - \_\_\_\_\_: fire, weather, radiation
  - Biological: pathogens, allergens and animals

#### **Chemical Hazards**

- A \_\_\_\_\_ chemical is one that can cause temporary or permanent harm or death.
- Hazardous chemicals are
  - Flammable or \_\_\_\_\_
  - Irritating or damaging to the skin or lungs
  - Interfering with oxygen uptake
  - Inducing allergic reactions
- Mutagens cause random \_\_\_\_\_ in DNA
- Carcinogens promote growth of malignant tumors

#### **Biological Magnification**

- One major problem with some chemical hazards, particularly heavy metals and \_\_\_\_\_ pollutants (POPs) is bioaccumulation and biomagnification.
  - Bioaccumulation is an increase in the concentration of a chemical in specific organs or tissues over time.
  - Biomagnification is an increase in concentration of chemicals in organisms at successively higher trophic levels.

#### **Minamata Disease**

- Minamata Disease is not a disease, but refers to the neurological effects from \_\_\_\_\_ poisoning. It was first discovered in 1956 in Minamata, Japan, where methyl mercury from industrial wastewater bioaccumulated in the \_\_\_\_\_ and shellfish that people ate.

#### **Determining Toxicity**

- The median lethal dose (\_\_\_\_\_) is the amount of chemical received in one dose that kills exactly 50% of the subjects in a test population.
- A \_\_\_\_\_ is a chemical that has an LD<sub>50</sub> of 50 mg or less per kilogram of body weight.
- The threshold level of toxicity is the dose below which no toxic effects are observed and/or above which the toxic effects are apparent.

#### **Physical Hazards**

- Earthquakes resulting in loss of life and property
- Volcanoes resulting in loss of life and property
- \_\_\_\_\_ Radiation in the form of X-rays, radiation from nuclear sources, and ultraviolet radiation from the sun or sun lamps

### **Biological Hazards**

- Nontransmissible diseases are not caused by living organisms and do not spread from one person to another
  - diabetes, bronchitis, malnutrition, \_\_\_\_\_
- Transmissible diseases are caused by living organisms and can be spread from one person to another. The infectious agent is called a pathogen.
  - tuberculosis, HIV, West Nile virus, \_\_\_\_\_, malaria, dysentery, SARS, MERS
  -

### **Seven Deadliest Infectious Diseases**

- Number of Deaths Worldwide per year (in millions) (World Health Organization, 2015)
  - 3.2 - \_\_\_\_\_ and \_\_\_\_\_
  - 1.7 - Tuberculosis
  - 1.5 – Diarrheal diseases
  - 1.1 – HIV/AIDS
  - 0.9 – Hepatitis B
  - 0.5 - Malaria
  - 0.2 – Measles

### **Zika!**

- The Zika virus, first identified in Africa in 1947, is spread primarily through mosquitoes. Zika can cause \_\_\_\_\_ and has no cure, though only one in five infected people die. It has been spreading faster in recent years, with a notable outbreak in 2016, in part due to warming global temperature.

### **Ebola!**

- Ebola has killed one person in the U.S. and that person had just returned from Liberia where he contracted the disease. In comparison, an American dies every 33 seconds from Heart Disease.
- In 2014, the worst Ebola outbreak, about \_\_\_\_\_ died, mostly in West Africa.

### **Preventable Causes of Death**

- Preventable Causes of Death
  - #1 – obesity/ \_\_\_\_\_
  - #2 – \_\_\_\_\_
  - #3 – lung disease
  - #4 – stroke
  - #5 – drugs & alcohol
  - #6 – accidents/vehicles
  - #7 – firearms
  - #8 – STD's

### **Epidemiological Transition**

- As a country industrializes, it usually makes an epidemiological transition, where chronic diseases overtake childhood infectious diseases in mortality
  - Phase one is characterized by extremely high death rates with peaks due to epidemics, famines, and wars
  - Phase two is characterized by less frequent epidemic peaks and a dropping death rate due to \_\_\_\_\_ advances
  - Phase three is characterized by a leveling off of death rate with most death occurring from \_\_\_\_\_ diseases associated with aging
  - Phase four continues with a level death rate and shows an increasing average life span due to medical advances
  - Phase five (proposed) shows an increase in \_\_\_\_\_ rate due to the reemergence of new infectious diseases due to urbanization and the overuse of antibiotics and pesticides