

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 LD₅₀ 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 - _____
 - 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.

CoronaVirus!

- CoronaVirus (COVID-19) originated in China and was declared an outbreak of international concern by the World Health Organization in January of 2020. COVID-19 is considered relatively mild for the majority of the population, but the death rate is much higher in elderly people with underlying health issues. As of _____, COVID-19 killed _____ Americans.
- In comparison, 61,000 people died in the U.S. from the seasonal flu during the 2018-2019 season.

Leading Causes of Death in the U.S.

- Leading Causes of Death in the US (CDC, 2017)
 - #1 – _____
 - #2 – cancer
 - #3 – accidents (falls/vehicles)
 - #4 – respiratory disease
 - #5 – stroke
 - #6 – Alzheimer’s disease
 - #7 – _____
 - #8 – influenza & pneumonia
 - #9 – kidney disease
 - #10 - suicide

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