

COLUMBUS STATE COMMUNITY COLLEGE

ESSH 1101 - Introduction to Environmental Science, Safety & Health

Name: David Kershner

Due Date: 11/05/2019

Homework 7 – Environmental Hazards and Human Health

Environmental Science, 16th Ed. by Tyler and Spoolman – Chapter 14

1. Define and distinguish among the terms *risk*, *risk assessment* and *risk management*.
 - **Risk is the probability of suffering harm from a hazard while risk assessment is a statistical method for determining how much harm a specific hazard can cause. Risk management involves the decision making process for determining whether or how to reduce a particular risk** to a certain level and at what cost.
2. Give an example of a risk or something that could cause disease from each of the following:
 - Biological hazards – hazards found in nearly 1,400 pathogens like bacteria, viruses, and parasites
 - Chemical hazards – hazards found in the air, soil, water, and human made products
 - Natural hazards – hazards found in the natural environment like fires, earthquakes, floods, and tornados
 - Life-style choices – hazards derived from poor choices like smoking, unprotected sex, drug use, and lack of exercise
3. Define and distinguish between *transmissible disease* and *nontransmissible disease*. Give an example of each.
 - **Transmissible disease is an infectious disease that can be transmitted from one person to another.** Examples are tuberculosis, ear infections, and gonorrhea.
 - **Nontransmissible disease is caused by something other than a living organism and does not spread from person to person.** Examples are cardiovascular disease, cancer, asthma, and diabetes.
4. Define and distinguish between *carcinogens*, *mutagens* and *teratogens*.
 - **Carcinogens are chemicals, some types of radiation, and certain viruses. These cause or promote cancer.**
 - **Mutagens are a second major type of toxic substance. These are chemicals or forms of radiation that cause a mutation.**
 - **Teratogens are a third type of toxic substance. These are chemicals that harm an unborn child and cause birth defects.**

5. Explain why children and infants are more susceptible to the effects of toxic chemicals than are adults.
 - Children and infants are more susceptible because their immune systems are not fully developed and cannot ward off the potential effects of toxic chemicals that an adult with a full developed immune system can.
6. Distinguish between the terms *acute effect* and *chronic effect*.
 - Acute effect is the immediate effect (headaches, dizziness, death) while chronic effect is the long lasting effects (aches, pains, internal organ damage).
7. Explain why the *dose-response curve* is a useful tool in the study of toxicity.
 - The dose response curve is a means for scientists to plot the estimated toxicity of chemicals of varying doses. Dosage plus exposure helps the scientific community determine the lethal dose, median lethal dose, and levels safe for humans.
8. Define the following acronyms, and provide one example of each:
 - POP – Persistent organic pollutants are highly toxic chemicals that cause cancer, birth defects, and compromise immune systems.
 - HAA – Hormonally active agents disrupt the endocrine system by preventing androgens from attaching to their receptors.
9. What is the *precautionary principle*? How can the precautionary principle be applied to environmental exposures?
 - The precautionary principle is a strategy for pollution prevention. The principle states that if there is substantial preliminary evidence that something is causing harm, then decision makers should act then and not wait until more conclusive scientific evidence is available.

Personal Note

This principle is problematic for a variety of reasons and is more akin to a knee jerk reaction to initial results than to true scientific study. The science is NOT settled until actual verifiable repeatable conclusions are available and peer reviewed. This includes the removal of all manipulated data used to support preconceived/predetermined conclusions. This precautionary principle concept would allow any kook with a computer to spin wild tales while governments and economies fell into ruin. Whoever came up with this principle likely had an ulterior motive.

10. Provide at least two reasons why it can be very difficult to determine toxic levels from environmental pollutants.

- Toxicologists know a great deal about a few chemicals, a little about many, and next to nothing about most.
- Lack of data and the high costs make regulation difficult.

11. What are four guidelines for evaluating and reducing risk in a human's life?

- Compare risks
- Determine how much risk you are willing to accept
- Evaluate the actual risk involved
- Concentrate on evaluating and carefully making important lifestyle choices