

Practice Skill III:

Knowledge of Key Health Principles

Content

III-1. Demonstrate key principles of environmental/occupational health, epidemiology, and population-based health.

- Understand determinants of persons, location, and time related to exposures:
 - ▶ Humans differ markedly in their responses dependent on genetics, metabolism, age, gender, size, co-exposure, behavior factors, routes of exposure (dermal, inhalation, ingestion).
 - ▶ Location of exposure includes workplace, home, community, and recreational sites. Understand sources of exposure, routes of exposure, clusters of cases.
 - ▶ Know the relationship of time, duration, and frequency of exposure to health outcomes, change in symptoms during the workday, week, weekends, vacation, etc.
 - ▶ Recognize that the effects of environmental exposures vary with a number of factors, including rate, type, concentration, and frequency of exposure.
- Be aware of sentinel health events that are unusual patterns of illnesses occurring in persons or community groups that can also act as a "red flag" for wider environmental health problems, such as pesticide poisoning.
- Recognize that many environmental diseases are related to a number of causes interacting together:
 - ▶ Understand the type and nature of exposure.
 - ▶ Acquire information about possible interactions including tobacco and alcohol.
 - ▶ Consider other health conditions that could be aggravated, such as asthma.
- Know exposure hazards (biological, chemical, enviromechanical, physical, psychosocial):
 - ▶ Biological/infectious hazards are caused by infectious/biological agents, such as bacteria, viruses, fungi, or parasites that may be transmitted via contact with infected patients or contaminated body secretions/fluids, contamination of drinking water supplies (improper sewage treatment and solid waste disposal), and through the air (enhanced by improperly cleaned heating and cooling systems).
 - ▶ Chemical hazards are various forms of chemicals that are potentially toxic or irritating to the body system, including medications, solutions, and gases. They include pesticides, (herbicides, fungicides, insecticides, etc.) and other household and industrial chemicals. Insecticides and herbicides used in large scale agriculture as well as in households, yards, and gardens, bring about numerous health effects ranging from nausea to long term neurological problems. Not only are many insecticides and herbicides acutely toxic, but some are highly suspect carcinogens.

- ▶ Enviromechanical hazards are factors encountered in the work environment that cause or potentiate accidents, injuries, strain, or discomfort (e.g., poor equipment or lifting devices, slippery floors).
 - ▶ Physical hazards are agents within the work environment, such as radiation, electricity, extreme temperatures, and noise that can cause tissue trauma.
 - ▶ Psychosocial hazards are factors and situations encountered or associated with one's job or work environment and personal life experiences that create or potentiate stress, emotional stress, and/or interpersonal problems.
- Consider the impact of hazardous substances on reproductive events (pre-conception, fetal), lactation, and developmental milestones in children (newborn, infant/toddler, and school age).
 - Recognize that others may be ill (work, family) and get timeline of health problems for these or consult public health authorities for help in evaluating exposures.

III-2. Understand the dose-response relationship.

- Assess recent and past exposures to toxic agents.
- Review interpretation of exposure monitoring data done by a professional (e.g., industrial hygienist).
- Recognize that in a dose-response relationship, as the dose increases, the severity of effect increases and could be fatal with pesticides.
- Understand that high dose exposures may manifest signs and symptoms almost immediately, making causal relationships more easily identified.
- Understand that low dose exposures over a period of time may manifest effects over a long latency period, often months or years (e.g., cancer, chemical sensitivity, neuropathy).

III-3. Understand measures of morbidity/mortality and study designs.

- Know incidence rates (i.e., number of new cases of illness/injury in the at-risk population during a defined period) and prevalence rates (i.e., all cases of illness/injury in the population at a point in time) of exposure and morbidity related to the home and community.
- Know the different types of study designs that can be utilized in investigations.
- Support or conduct investigations:
 - ▶ Differentiate study designs (case-control, cohort, cross-sectional studies) and when each is appropriate to use.
 - ▶ Understand ethical issues in using experimental designs or clinical trials in research.
 - ▶ Participate in study efforts as able.
 - ▶ Be alert to possible clustering of pesticide exposure cases through case identification, examination of dose-response relationships, and population disease rate increases.
 - ▶ Use epidemiologic data to link exposure and effect.

- ▶ Initiate opportunities for investigation of disease outbreaks through collaboration with public health, academic, governmental bodies (CDC, EPA, etc.).

Resources

LaDou J, ed. *Occupational and Environmental Medicine*, 2nd ed. Stamford, CT: Appleton & Lange; 1997.

Levy B, Wegmon D. *Occupational Health*. Boston, MA; 2000.

Rosenstock L, Cullen MR, eds. *Textbook of Clinical Occupational and Environmental Medicine*. Philadelphia, PA: W.B. Saunders Company; 1994.