Environmental Health Nursing Case Studies
Study #2: Air Pollution

Observed Indications of Potential Problems

In the town of Millsville, there are three factories with smoke stack emissions and one medical waste incinerator. Millsville is located within 50 miles of two cities and on hot summer days, the air is laden with smog. One out of every 6 children in the grammar school has asthma. The school is old (built around 1960), and the windows have flaking paint. In winter, there are moldy/ mildewy smells in the school, and pesticides are used to control pest problems. Last year, new carpets were installed in the kindergartens, and a number of students and teachers complained of headaches, nausea and being light-headed.

Concerns Expressed by Community Members

- Is air pollution causing asthma?
- The community members have learned that the medical waste incinerator is producing dioxin, but they don't know about the health effects of dioxin.
- Can the air pollution be causing cancer?
- Are the mold and mildew in the school causing illness? What about the pesticides?
- Why did people get sick when new carpets were installed in the school?
- Community members are aware that children can get sick from lead-based paint that was used in old buildings. Since the school is old, could there be a problem for their children with lead-based paint?

Assessment

What information about potential health risks are you able to find from the resources cited below, or other resources? (When necessary, use your own zip code to practice using the database.) What information is missing? What would be possible approaches to obtaining further information?

For the purposes of this project, assume that you have determined that the smoke stacks are emitting vinyl chloride, 1,2,3-trichloropropane, and 1,3-butadiene. The pesticide being used in the school is permethrin.

Planning and Intervention

Based on your research and assessment, write a brief report for the community members. Explain the basic concepts of risk and risk assessment. Give them the information that you have found related to their concerns, citing and describing your sources. You'll have to be a little creative to do this; for example: "The Toxics Release Inventory, a computer database of the federal Environmental Protection Agency, was consulted and revealed that vinyl chloride was being emitted from the smoke stacks from this plant…" Make suggestions to them for next steps. What further information do you think they need, and how can they get it? What steps do they need to take to protect their health? How would they approach these issues? Who in the community might be of assistance?

Internet Resources

Note: Any research should include a literature search of professional journals. You may wish to use PubMed and other resources at www.toxnet.nlm.nih.gov, or perform a search at your school library.

Local sources of pollution:

- Environmental Protection Agency – www.epa.gov (see "Where You Live")
- Environmental Protection Agency – Toxics Release Inventory): www.epa.gov/tri
- Agency for Toxic Substances and Disease Registry (ATSDR): www.atsdr.cdc.gov (see "Hazardous Waste Sites")

Specific chemicals:

- Agency for Toxic Substances and Disease Registry (ATSDR): www.atsdr.cdc.gov (see "ToxFAQ's" and "Toxicological Profiles")
- National Library of Medicine – TOXNET: www.toxnet.nlm.nih.gov
- National Institute of Environmental Health Sciences (NIEHS): www.niehs.nih.gov → National Toxicology Program → Chemical Health and Safety Information

Risk assessment:

- Environmental Protection Agency (EPA) – Integrated Risk Information System (IRIS): www.epa.gov/IRIS (see "Introduction")
- National Library of Medicine – Toxicology Tutorial: www.sis.nlm.nih.gov

Medical Waste (incineration):

- Health Care Without Harm: www.hcwh.org

Carcinogens (cancer-causing agents):

- National Institute of Environmental Health Science (NIEHS): www.niehs.nih.gov → National Toxicology Program → Report on Carcinogens

Indoor Air Pollution (including related asthma):

- Environmental Protection Agency: www.epa.gov/iaq (see "Introduction" for links)
- American Lung Association: www.lungusa.org (see "Air Quality" and "Asthma")
- Consumer Product Safety Commission (CPSC): www.cpsc.gov → publications → air quality (includes new carpeting)

Pesticides:

- See above: sources for indoor air pollution and specific chemicals
- National Pesticide Information Center and Extoxnet: www.ace.orst.edu

Lead:

- See above: Consumer Product Safety Commission and sources for specific chemicals
- Alliance to End Childhood Lead Poisoning: www.aeclp.org

This case is from the Kellogg Faculty Development in Environmental Health Workshop materials. The case study was developed at the Environmental Health Education Center of the University of Maryland School of Nursing. For more information, see envirn.umaryland.edu.