PENNSYLVANIA DEPARTMENT OF HEALTH
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Pennsylvania Department of Health

Resources for Health Care Professionals on Health Effects of Environmental Exposures

DATE:	1/13/2025
TO:	Health Alert Network
FROM:	Debra L. Bogen, M.D., FAAP, Secretary of Health
SUBJECT:	**Resources for Health Care Professionals on Health Effects of Environmental Exposures**
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This transmission is a "Health Advisory" which provides important information for a specific incident or situation; may not require immediate action.

HOSPITALS: PLEASE SHARE WITH ALL MEDICAL, PEDIATRIC, NURSING AND LABORATORY STAFF IN YOUR HOSPITAL**; EMS COUNCILS:** PLEASE DISTRIBUTE AS APPROPRIATE; **FQHCs:** PLEASE DISTRIBUTE AS APPROPRIATE **LOCAL HEALTH JURISDICTIONS**: PLEASE DISTRIBUTE AS APPROPRIATE; **PROFESSIONAL ORGANIZATIONS:** PLEASE DISTRIBUTE TO YOUR MEMBERSHIP; **LONG-TERM CARE FACILITIES:** PLEASE SHARE WITH ALL MEDICAL, INFECTION CONTROL, AND NURSING STAFF IN YOUR FACILITY

Summary

- Environmental exposures can cause a variety of health effects depending on exposure type, source, duration, and individual sensitivity.
- Exposure routes for environmental contaminants can include contact, inhalation, ingestion, radiation, and transplacental.
- Certain groups, such as older adults, children, people of color, immigrants, pregnant women, people with disabilities, and people living below the poverty line are more likely to experience negative health impacts due to environmental exposures.
- The Pennsylvania Department of Health has compiled a list of trainings and resources from academic and governmental organizations that can help health care providers assess environmental exposures and respond to patient concerns.
- Contact the Division of Environmental Health Epidemiology with questions at **DEHE@pa.gov** or **717-787-3350**. To document a formal health concern with the Department use our online form.

Background

The World Health Organization (WHO) recently found that environmental risks account for a large portion of the global disease burden. While the total number of environmental deaths are similar to those observed two decades ago, the percentage of deaths attributable to the environment by noncommunicable diseases (cancer, cardiovascular disease, respiratory disease) has increased.[1]

[1] World Health Organization. (2016). Preventing disease through healthy environments: A global assessment of the burden of disease from environmental risks.

People can be exposed to harmful contaminants from the environment in many ways, such as the air they breathe, the water they drink, the food they eat, and the soil they touch. Pennsylvania has diverse industries that can create and release pollutants, including but not limited to steelmaking, mining and smelting, oil and gas development, agriculture, health care, and transportation. However, industrial sources are not the only environmental health exposure risks; social factors and behaviors, such as smoking tobacco and naturally occurring phenomena can also cause or exacerbate environmental exposures and resulting health effects. Exposure to environmental contaminants has been linked to a wide range of health impacts such as gastrointestinal upset, respiratory disease, adverse birth outcomes, various types of cancers, and more. Types of environmental exposures contributing to various cancers, cardiovascular diseases, and/or respiratory diseases include, but are not limited to, outdoor air pollution, indoor air pollution, tobacco smoke, lead, radon, and occupational exposures to particulates and/or chemicals.

Many groups of Pennsylvanians are disproportionately impacted by, or more susceptible to, adverse health outcomes due to poor environmental conditions, including older adults, people of color, immigrants, pregnant women, people with disabilities, children, and people living below the poverty line. These groups are at increased risk for many reasons, including the siting of industrial facilities in lower income communities, biological sensitivity, and limited access to information and resources that can protect them from environmental exposures (e.g., radon mitigation, water treatment systems, etc.).

It is important that health care providers understand how to identify, discuss, and address patient concerns related to environmental exposures.

Health Impacts

Risks associated with environmental exposures vary depending on exposure source, duration, and intensity of exposure. Exposure routes may include contact, ingestion, inhalation, radiation, and transplacental. Scientific studies have found that residing near sources of environmental contamination may be associated with an increase in the following:

- Respiratory effects such as asthma exacerbation and pediatric asthma hospitalizations.[2,3]
- Cardiovascular effects such as acute myocardial infarction hospitalizations and mortality and increased risk of hospitalization for heart failure and other cardiovascular diseases.[4]
- Some types of cancer such as lymphoma, acute lymphoblastic leukemia, and lung cancer.[5,6]
- Adverse birth outcomes such as decreased birth weight, small for gestational age, preterm birth, high-risk pregnancy, miscarriage, and early infant death.[7,8]
- Mental health effects such as depressive symptoms and new onset internalizing disorders.[9]

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[2] Chatkin, J., Correa, L., & Santos, U. (2022). External environmental pollution as a risk factor for asthma. *Clinical Reviews in Allergy & Immunology, 62*(1)*, 72-89.* https://doi.org/10.1007/s12016-020-08830-5

[3] Willis, M. D., Jusko, T. A., Halterman, J. S., & Hill, E. L. (2018). Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania. *Environmental Research, 166*, *402-408.* https://doi.org/10.1016/j.envres.2018.06.022

[4] Cosselman, K. E., Navas-Acien, A., & Kaufman, J. D. (2015). *Environmental factors in cardiovascular disease*. *Nature Reviews Cardiology, 12*, 627-642. https://doi.org/10.1038/nrcardio.2015.152

[5] Sethi, T. K., El-Ghamry, M. N., & Kloecker, G. H. (2012). Radon and lung cancer. *Clinical Advances in Hematology & Oncology, 10*(3), *157-164*.

[6] Lombardi, C., Thompson, S., Ritz, B., Cockburn, M., & Heck, J. E. (2021). Residential proximity to pesticide application as a risk factor for childhood central nervous system tumors. *Environmental Research, 197*. https://doi.org/10.1016/j.envres.2021.111078

[7] Bekkar B, Pacheco S, Basu R, & DeNicola N. (2020) Association of air pollution and heat exposure with preterm birth, low birth weight, and stillbirth in the US: A systematic review. *JAMA Network Open.* 3(6):e208243. doi:10.1001/jamanetworkopen.2020.8243

[8] Balise, V., Meng, C.X., Cornelius-Green, J.N., Kassotis, C.D., Kennedy, R., & Nagel, S.C. (2016) Systematic review of the association between oil and natural gas extraction processes and human reproduction. *Fertility and Sterility, 106(4), 795-819*

[9] Reuben, A., Manczak, E.M., Cabrera, L.Y., Alegria, M., Bucher, M.L., Freeman, E.C., Miller, G.W., Soloman, G.M., & Perry, M.J. (2022). The interplay of environmental exposures and mental health: Setting an agenda. *Environmental Health Perspectives. 130(2).* https://doi.org/10.1289/EHP9889

It is important to note that many environmental-related diseases present with non-specific symptoms and may be difficult to discern from other common medical conditions. It can be difficult to identify the cause of these symptoms without having an accurate and detailed exposure history which will aid in diagnosis, treatment, and exposure reduction or elimination. More information about taking an exposure history can be found in this Agency for Toxic Substances and Disease Registry (ATSDR) case study.

Trainings and Resources available for Health Care Providers

- The Centers for Disease Control and Prevention (CDC) offers free Environmental Public Health Online Courses through a partnership with Tulane University. They also have a communication hub known as Environmental Health Nexus where information and webinars are posted.
- ATSDR has compiled many resources for health professionals. Their Environmental Medicine Education Resources include a case study of taking an exposure history.
- Hospital administrative staff may be interested in the Federal Emergency Management Agency's (FEMA) 5-day course that covers the skills needed to respond to incidents of natural- or human-caused disaster. The course is titled Environmental Health Training in Emergency Response Operations.
- The PA Department of Health regularly shares free webinars to health care professionals on the Train PA website. A couple of examples include Climate-informed Public Health Training and Unconventional Oil & Gas Development ("Fracking") and Health: A Resource for Healthcare Professionals.
- The Penn State Clinical and Translational Science Institute's Environmental Determinants of Health ECHO series will have live virtual presentations throughout 2025 discussing health impacts from sources such as the oil and gas industry, extreme cold, air pollution, and more. One CME credit will be offered for each presentation. More information about Project ECHO can be found on their website.
- Columbia University Irving Medical Center has numerous online environmental health courses available for providers. For example, there is a six-session series for clinicians on air quality, rising temperatures, vector-borne diseases, and extreme weather.
- Harvard School of Public Health has many events ranging from seminars to journal clubs focusing on environmental health. Heat and The Health of Mothers and Children: Impacts and Resilience in Action is an upcoming webinar of note.
- The Mid-Atlantic Center for Children's Health and the Environment specializes in children's and reproductive environmental health. They are available for consultation on environmental hazards for health providers.

Recommendations for Health Care Providers

- Participate in environmental health trainings, such as those offered through the CDC, FEMA, Train PA, and Project ECHO.
- Consider potential environmental health risks for patient populations while addressing their concerns.
- Inquire about household water sources. If well water is the primary water source, ask about the last time the water was tested. More information on well water testing can be found in our well water guide.
- Complete an environmental exposure history for patients with health concerns related to possible environmental exposures.
- Use the appropriate ICD-10-CM codes (ex: Z77.1) in the health record when a patient's health

symptoms or conditions are diagnosed to be a result of, or linked to, environmental exposures and other social determinants of health.

- Refer the patient to an environmental health physician as needed. Many environmental health physicians can be found on the American College of Occupational and Environmental Medicine website.
- PA DOH reminds providers they can refer patients to the Division of Environmental Health Epidemiology to formally document their environmental health concern. Please note that the Department can provide information and document concerns but cannot provide health advice.
- PA DOH publishes environmental health factsheets on our website. Health care providers can request additional factsheets from the Division of Environmental Health Epidemiology.

Recommendations for the Public

- For households reliant on well water, ensure well water quality is tested regularly. More information on well water testing and interpretation can be found in the EPA home testing guide and the PA DOH water testing guide. Free courses on well care can be found on The Private Well Class website.
- Close windows and consider using an air purifier on days with poor air quality. AirNow.gov is a great resource for checking local air quality. The EPA color-codes air quality from green (good air quality) to purple and maroon (extremely harmful).
- Call PA DEP Emergency Response Program at 1-800-541-2050 if there is a suspected spill that may impact the environment.
- Report environmental health concerns to PA DOH via our online form. Please note that the Department can provide information and document concerns but cannot provide health advice.

Resources

- AHCCCS Social Determinants of Health ICD-10-CM Code List
- American College of Obstetricians and Gynecologists Reducing Prenatal Exposure to Toxic Environmental Agents
- ATSDR Taking an Exposure History
- CDC Breastfeeding Special Circumstances – Environmental Exposures
- CDC Well Water Testing
- EPA Home Water Testing
- PA DOH Adult Blood Lead Epidemiology and Surveillance Dashboard
- PA DOH Environmental Health Fact Sheets
- PA DOH How to Interpret Water Test Results: A Guide for the Public
- Penn State Extension Drinking and Residential Water
- The Private Well Class

For questions, please call your local health department or DOH at 1-877-PA-HEALTH (877-724-3258).

Individuals interested in receiving future PA-HANs can register at: https://ondemand.mir3.com/han-pa-gov/login/.

Categories of Health Alert messages:
Health Alert: conveys the highest level of importance; warrants immediate action or attention.
Health Advisory: provides important information for a specific incident or situation; may not require immediate action.
Health Update: provides updated information regarding an incident or situation; unlikely to require immediate action.

This information is current as of January 13, 2025, but may be modified in the future. We will continue to post updated information regarding the most common questions about this subject.