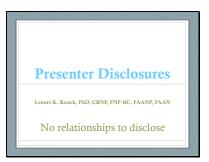
Public Health Nursing-Environmental
Health: Lessons Learned Regarding
Emerging Health Issues Related to
Unconventional Natural Gas Drilling

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SWPA-EHP

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Environmental Health Project

- The Southwest Pennsylvania Environmental Health Project (EHP) is a nonprofit environmental health organization created to assist and support Washington County residents who believe their health has been, or could be, impacted by unconventional natural gas development (UNGD).
- Since the beginning of the project, EHP has grown to assist a wider region than Washington County, PA.

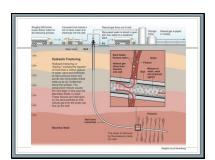
Acknowledgments

- The data analysis of the cases reviewed in this presentation was completed by members of EHP's Connecticut and Maine teams including David Brown, Beth Weinberger, Celia Lewis and Leslie Walleigh.
- Health assessment data were gathered by EHP's past family nurse practitioners, Suann Davison and Denise DeJohn.
- Portions of the slides were developed by Ryan Grode.

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Objectives

- Discuss the most common symptoms and physical findings of individuals living in and near communities experiencing the proliferation of unconventional natural gas development (UNGD)
- Describe five lessons learned by a nurse practitioner working with individuals living near UNGD activities





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	Xylene	Formaldehyde	SOx (Sulfur Oxides)	PM2.5
Exposure Route	Inhalation, Skin Absorption, Ingestion, Skin & Eyes Contact	Inhalation, Skin & Eyes Contact	Inhalation, Skin & Eyes Contact	Inhalation, Skin & Eyes Contact
Symptom	Irritated ENT, Dizziness, Drowsy, Unbalanced, Nausea, Vomit, Abdominal Pain, Derm.	Irritated ENT, Resp. System, Cough, Wheeze	Irritated ENT, Cough, frostbite	Irritated Eyes, Skin, Throat and Upper Resp.
Target Organ	Eyes, Skin, Resp. System, CNS, GI, Blood, Liver, Kidney	Eyes, Resp. System (nasal cancer)	Eyes, Skin, Resp. System	Eyes, Skin, Resp. System

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Environmental Health Project

Our mission is to respond to individuals' and communities' need for access to accurate, timely and trusted public health information and health services associated with natural gas extraction.

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EHP Outreach

Primary purpose:

- Respond to clients in need
 Assess individual health issues
 Identify pathways of environmental exposure
 Conduct air and water quality monitoring
- Monitor soil impacts
- 2. Work with clients to manage and improve their health and wellbeing

EHP Outreach

Communities that reach out to us:

- Regional watershed groups
- Clients/groups concerned about the placement of UNGD in their communities
- Clients/groups specifically concerned about the placement of UNGD near schools

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EHP Health Assessments Include:

- · Full health history of client;
- · Recording of vital signs and symptoms;
- Documentation of occupational and household exposures; and
- Recommendations for further medical consultations and/or steps to cut off pathways of exposure (air, water, or soil).

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EHP Data Collection

- With residents/community permission, EHP collects aggregate data on health, air, and water impacts.
- EHP seeks to establish strong associations between the presence of surrogate chemicals, particulate matter (PM) and health impacts that are associated with the chemicals identified as part of UNGD.

What EHP Knows About Health

- Activities associated with UNGD predictably result in air emissions and sometimes result in water contamination.
- Even brief exposures can precipitate symptoms.
- The potential health effects of many of the chemicals emitted from UNGD are known from studies in other settings where individuals experienced environmental exposures.

Slide 17





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Episodic Air Exposures

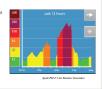
Residents experience symptoms that come and go (e.g. respiratory problems, headaches, nausea, skin rashes, etc.). Factors that might contribute to this include:

- Variable emission:
- Homes surrounded by multiple sites
- Weather causing further patterns of variability

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Review of Reported Symptoms

- Symptoms might be persistent, transient, or intermittent. These variations in symptom presentation are consistent with the changing and episodic* nature of exposures.
- Cases are based on concern of a resident or evidence of exposure potential, not a random survey of all residents in Washington County.



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Symptoms temporally related to the onset of UNGD activities within 1 kilometer (.6 miles) and are not potentially explained by other exposures or medical conditions.

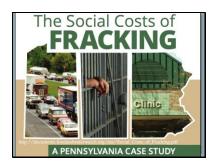
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Type of Symptoms	Predominate Symptoms Reported	Percentage of Cases with Symptoms
Respiratory		70%
* Upper Respiratory	Sore or irritated throat, sinus symptoms	57%
* Lower Respiratory	Cough, shortness of breath	50%
Neurological	Headache, dizziness	57%
Dermatological	Rash, itching	48%
Eye Symptoms	Burning, itching	46%
Gustro-intestinal	Nausea, abdominal pain	41%
Mental Health/Behavioral Health	Sleep disturbance, anxiety	52%

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What About Long Term Exposure? • More time and studies are needed to determine the actual emission and exposure levels in order to quantify the risk of long term health. Little is known about the health effects of low levels of chronic exposure to the chemicals used in UNGID. • Birth outcomes studies have been done in Colorado (McKenzie et al., 2014), and in Pennsylvania (Hill, 2012), and Southwest Pennsylvania (Stacey et al., 2015).



Lessons Learned

- Both chemical and non-chemical exposures pose health risks to human and animal residents of gas production areas.
- Rapid change introduced into rural communities carries risk of social disruption and mental health consequences.



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Lessons Learned

- Individuals living near UNGD activities are at risk for undiagnosed conditions related to environmental exposures.
- Health care providers need to be aware of potential for emerging environmental health issues in their communities.

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Lessons Learned

- Nurses play a vital role in the health of individuals and communities experiencing a proliferation of UNGD
 - Clinical Practice
 - Research
 - Advocacy

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