Living with Pennsylvania’s Gas Boom: Voices from the Community

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Background

- 7,788 active gas wells using fracking methods in Pennsylvania (StateImpact PA, n.d.)
- 60,000 new wells in the next twenty years (StateImpact PA, n.d.).
- Also gathering lines, pipelines, pig launchers, dehydration stations, compressor stations, metering stations, processing plants and silica transfer stations.
Rural areas & proximity to homes
Large fleet of trucks
Miles of pipeline
Compression Station
Dehydration Station
Silica Transfer Station
Drinking Water

- Methane migration into drinking water wells (Osborn et al., 2011).

- Contamination of drinking water from leaking fracking fluids (McKenzie et al., 2012).

- Higher concentrations of the hydrocarbons, methane (six times higher), ethane (23 times higher), and propane (traces) in their drinking water (Jackson et al., 2013).
Air Quality

- Ground level ozone, particulate matter, and aromatic volatile compounds such as BTEX: (benzene, toluene, ethylbenzene, and xylenes) (Wyoming Department of Environmental Quality Air Quality Division, 2009)

- Ambient polycyclic aromatic hydrocarbons (PAH), benzo(a)pyrene and phenanthrene, both known human carcinogens (Paulik et al., 2015)
Air Quality beyond the wells

- Compressor Stations: Benzene, formaldehyde, and methylene chloride (Southwest Pennsylvania Environmental Health Project, 2015).

- Increase in radon levels in Pennsylvania (Casey et al, 2015).

- Methane leaks, silica exposures, and the overall industrialization of rural communities (McKenzie et al., 2012).
Symptoms & Illness

- Fatigue, nasal and throat irritation, sinus problems, burning eyes, shortness of breath, joint and muscle pain, severe headaches, sleep disturbances, forgetfulness, irritation, nausea, skin irritation and rashes, depression, anxiety, and dizziness (Steinzor et al., 2013).

- The number and the density of wells (number of wells within a square mile) Increases hospitalizations (Jemielita et al., 2015).
Health Risks: The developing fetus

Increased congenital heart & neural tube defects (McKenzie, et al., 2014).

Low birth weight & low APGAR scores, unrelated to water source (Hill, 2013)

Pre-term birth, low APGAR scores, low birth weight and high risk pregnancy (Casey, et al. 2015)
Community Impact

- Disrupting quality of life (Perry, 2013).
- More noises and dust, new odors, changes in appearance of water and new people in town (Perry, 2013).
- Feeling powerless and mistrust of the gas industry, local government, and regulatory agencies (Resick et al., 2013).
- Rising rents, increases in substance abuse, motor vehicle crashes, and sexually transmitted disease (Institute of Medicine, 2014).
Study Aims

1) Describe the environmental health concerns of residents of an UNGD community.

2) Identify methods that public health nurses can best disseminate accurate health information to the community residents.
Wyoming County, PA
Methods

- Qualitative descriptive approach
- 5 Focus groups
- Recruited through community leaders
- Content analysis of verbatim transcripts
- Summary of findings confirmed by participants
Participants: Wyoming County, PA  
Population 28,000

<table>
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<th>Gender</th>
<th>Highest Education</th>
<th>Annual Household Income $</th>
<th>Signed lease for UNG well</th>
<th>Distance from home to nearest well</th>
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Findings

- Two themes related to the environmental health concerns
  - Changing Community
  - Powerlessness

- Health information & Learning Needs
Changing Community: Legacy
Changing Community: Industry
Changing Community: Stress
Changing Community: Air
Changing Community: Air
Changing Community: Children
Powerlessness
Powerlessness
Powerlessness
Powerlessness
Powerlessness
Physiologic Impacts of Chronic Stress

- Elevated cortisol levels
  - Atherosclerotic changes (Troxler et al., 1977)
  - Cognitive impairment & dementia (Lara et al., 2013)
  - Susceptibility to infections & osteoporosis (Schoorlemmer et al., 2009)

- Increases in cytokines (pro inflammatory cytokines)
  - CVD, Type 2 DM, Alzheimer’s Disease (Tabas & Glass, 2013)

- Epigenetic Changes
Health Information & Learning Needs
Health Information & Learning Needs
Recommendations

- Education of environmental risks
  - Water quality
  - Air quality
  - Radon
  - Social Changes
  - Strategies to address stress & anxiety
- Promote dissemination of accurate information
  - Websites for public & health professionals
- Public Health professionals at the policy table
- Community advocates partnering with advocacy organizations and PH professionals
Resources

- Alliance of Nurses for Healthy Environments
- Southwest Pennsylvania Environmental Health Project
- Physicians for Social Responsibility
- Pennsylvania Health Professionals for a Livable Future
- Physicians Scientist & ENgineers for Healthy Energy
Questions?

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