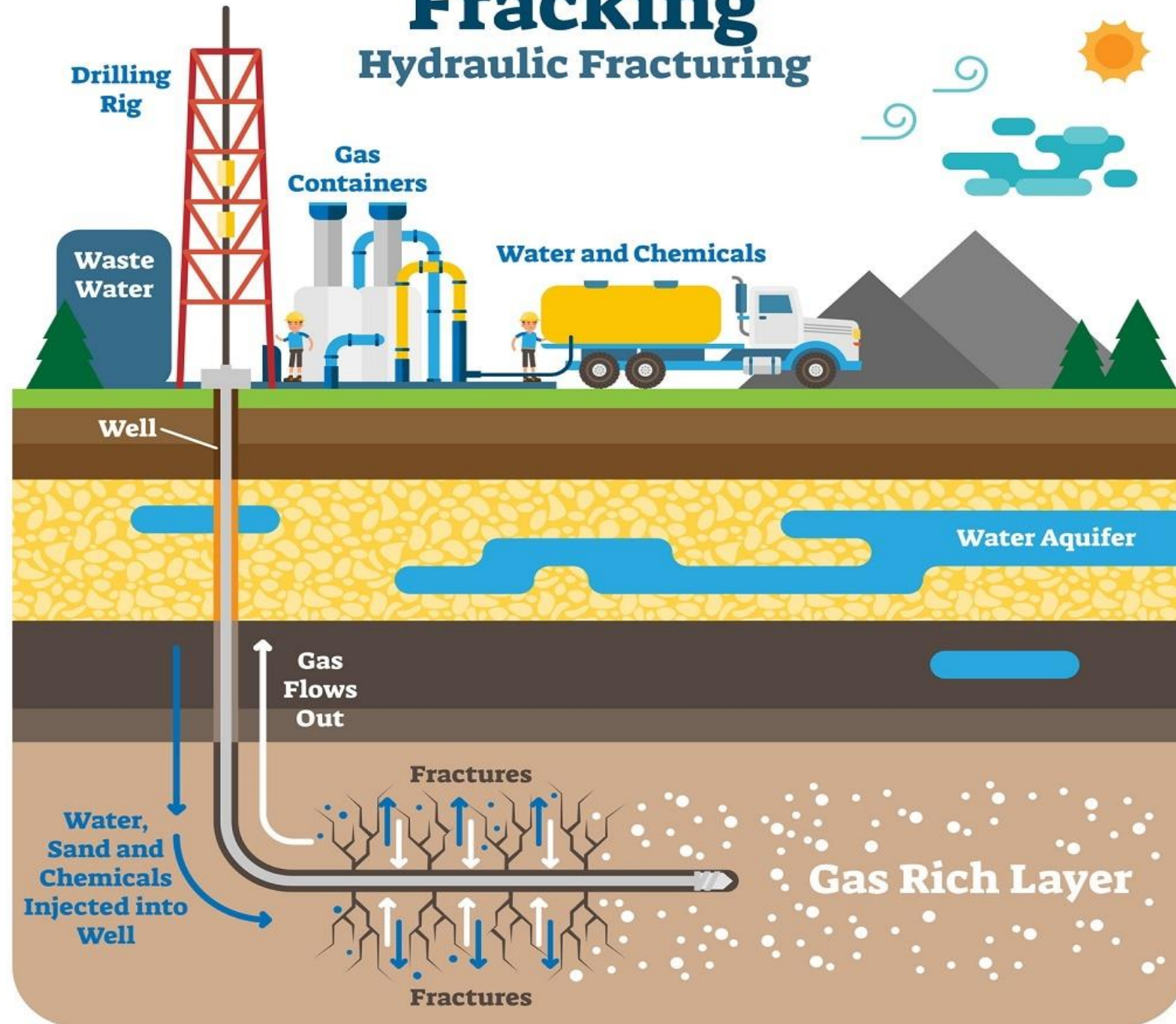


Review:  
Unconventional Natural Gas Production  
and Human Health

Pitt GSPH Study for PA Dept of Health  
2020-2023

# Fracking

## Hydraulic Fracturing



### Unconventional Natural Gas Development

- Deep wells (10,00-12,000 ft)
- Hydraulic fracturing
- Directional/ horizontal drilling

# Purposes

- Explore relationships between unconventional natural gas development activities and 3 health issues
- Assess associations between distance from unconventional natural gas sites and specific recorded health issues
  - Does living near an unconventional natural gas well increase risks of specific health issues?

# Specific Health Issues Studied

- **Childhood Cancers**

- Leukemia
- Lymphoma
- CNS tumors
- Bone cancer ( including Ewing's)

- **Asthma**

- Severe exacerbations
- Emergency dept. visits
- Hospitalizations

- **Birth Outcomes**

- Small for gestational age (SGA)
- Preterm birth (22-36 weeks)
- Term birthweight (in grams, 37-41 weeks)

# Methodology

- **Observational Epidemiological Study**
  - Health records 1990-2020
  - Eight SW PA Counties:  
Allegheny; Armstrong; Beaver; Butler; Fayette;  
Greene; Washington ; Westmoreland; Allegheny  
(only for portions permitting UNGD activity)

# Methodology (cont.)

- **Review of existing health records**
- Childhood Cancer
  - PA Cancer Registry ;507 children; 2010-2019
- Asthma
  - University of Pittsburgh Medical Center records ;46,676 patients;2011-2020
- Birth Outcomes
  - PA birth records; 185,849 births;2010-2020

## Methodology (cont.)

- Identified locations of unconventional natural gas wells, including well sites, compressor stations; impoundment ponds and waste disposal sites
  - Considered ever living within 5 miles of a site to be “exposed”
  - Beyond 5 miles, unexposed
- No specific medical or environmental testing

# Previous Studies ( by others)

- 3 Examples:
- Living within 1 km of gas extraction sites associated with:
  - 5% increase in gestational hypertension and
  - 26% increase in eclampsia among pregnant women
    - Associations reported to dissipate beyond 1 km
- Medicare beneficiaries living closest to drilling sites had a 2.5% higher mortality rate than people elsewhere
- McKenzie (, 2016, Colorado) noted for ages 5-24 Leukemia cases were 4.3 times as likely to be in the highest exposure category compared to controls



## Results: Childhood Cancers

- Leukemia; CNS Brain tumors; Bone Cancer  
( including Ewing's family of tumors)
  - No associations
- Lymphoma
  - Children within 1 mile had approximately 5 to 7 x chance of developing lymphoma compared with unexposed ( >5 miles) children
  - Average US incidence of childhood lymphoma=0.0012%

## Results: Asthma

- Severe exacerbations; Emergency dept. visits ; Hospitalizations
  - Strong correlation with production phase
    - 4-5 x greater chance of asthma attack if within 10 miles
- No such link during well preparation, drilling or fracking phases

# Results: Birth Outcomes

- Birthweight
  - ~ 1-ounce smaller babies at birth if living near wells during production phase;
  - or near compressor stations or waste sites
  - “in most cases, poses little health risk”
- Small for gestational age
  - Mothers living near active wells more likely to have babies small for gestational age
- Premature births
  - Not specifically associated with natural gas development

# Open Issues

- Specific cause(s) of correlations
  - Water quality?
  - Air quality?
  - Something else?
- Specific pollutants/concentrations
  - PM?
  - VOC's ?
  - Other?
- Specific sources
  - Wells themselves?
  - Stationary equipment ( compressors;pumps;pipelines;etc)?
  - Mobile equipment ?
- AQTAC Role?

# Website for Complete Pitt/PA Dept of Health Report

- [www.health.pa.gov](http://www.health.pa.gov)
- Look for the Pitt Study under Environmental Health