

# Facts on Fracking:

What legislators need to know



This overview was created by the Alliance of Nurses for Healthy Environments (enviRN.org) and was generously supported by the Coming Clean Collaborative. For detailed information on the health effects of fracking go to:

[www.frackingandhealth.org](http://www.frackingandhealth.org)

## What is fracking?

High Volume Hydraulic Fracturing or “fracking”, is a process used to obtain natural gas trapped in dense shale rock located thousands of feet underground. In this method of extracting natural gas, a well is drilled vertically deep into rock, and then drilling turns horizontally to create a fracturing path as long as one mile underground. Millions of gallons of water, mixed with sand, salts and up to 300 tons of chemicals are then pumped into the well at high pressure to create fissures in the rock and release the gas.

## Fracking and Communities

Fracking operations are occurring throughout the United States and across the world. The impacts of fracking don't stay underground. Adverse health, economic, and environmental effects are being experienced by families, communities, and states.

## Risks to Health from Contaminated Drinking Water

There have been numerous incidents of drinking water contamination from drilling and fracking operations, mostly involving households using private drinking-water wells. There have been reports of nosebleeds, headaches, and skin lesions in residents living near or drinking well water from near fracking facilities. Drinking water can be contaminated through:

- **Methane migration:** A 2011 study found that private drinking-water wells had on average methane levels **17 times higher** near drilling sites, compared to those in non-drilling sites.<sup>1</sup> High levels of methane in drinking water can create risks for household explosions and asphyxiation.

- **Spills and leaks of fracking chemicals and fluids:**

Water contamination has occurred from methane migration, chemical spills, leaks from wastewater holding pits, and spilt fuel used by drilling equipment. Fracking wastewater is made up of very high levels of salts, chemicals and radioactive gas. Through groundwater contamination, well water can become polluted with fracking liquids as well as methane.<sup>2</sup> These chemicals have been linked to health problems such as cancer, neurological problems, and problems with pregnancy.<sup>3</sup> There have also been documented reports of nosebleeds, headaches, and skin rashes in people drinking well water or living near fracking sites.

- **Radiation:** Naturally occurring radioactive particles, such as radium, barium, and radon, may be brought to the surface in fracking wastewater. Wastewater tests in Pennsylvania and New York found levels 3,600 times more radioactive than federal limits for drinking water and 300 times more radioactive than Nuclear Regulatory Agency limits for nuclear plant discharge.<sup>4</sup> Radiation is a known carcinogen.

**Fracking Wastewater:** Land, streams, and rivers can become polluted by fracking liquid spills and leaks. Wastewater from fracking operations contains hydrocarbons, heavy metals, salts, and naturally occurring radioactive material. Wastewater may also be reused in another well, re-injected underground, stored in holding pits, or transported to a treatment facility. Each of these activities carries its own inherent risks, including spills, leaks, earthquakes (in the case of underground injection) and threats to groundwater and surface water. Municipal water treatment facilities are not equipped to handle fracking wastewater.

**Water consumption:** Large volumes of water used in fracking, up to 5 million gallons per well, can depleted local water supplies. Contaminated by salts, chemicals and radiation, much of the water is permanently removed from the ecosystem when it is

Using fresh water for fracking is a tragic waste of our most valuable natural resource.

injected into deep wells or housed in huge wastewater holding pits for disposal. At a time when much of the U.S. is experiencing drought conditions, this is a tragic waste of our most valuable natural resource.



### Risks to Health from Poor Air Quality

Emissions from shale drilling, gas processing, gas escapes, and diesel exhaust negatively impact air quality. Toxic air emissions include methane, hydrogen sulfide, VOC's (ozone precursors) such as benzene, ethylbenzene, toluene, mixed xylenes, elevated particulate matter (PM 2.5) and increased ground level ozone.<sup>5</sup> Please see the table below for some of the common pollutants found in the air near fracking sites and how they may impact health.

### Economics - The Boom/Bust Effect

A large influx of gas field workers can overwhelm local infrastructure and services. Despite promises, the vast majority of fracking jobs usually go to workers who are not part of the community and often from out of state. Communities experiencing fracking have reported:

- Increasingly high rates of violent crime, drug/alcohol abuse, and sexually transmitted infections
- Increased truck traffic, motor vehicle accidents, and need for costly road maintenance

**Table 1. Select pollutants associated with fracking and health effects**

Pollutant	What is it?	Health Effect
Methane	Natural gas, can leak out of wells into the air and water, has no odor	When trapped in a house, can cause explosion & asphyxiation.
Hydrogen Sulfide	May be found in natural gas and can leak out during fracking process, has a rotten egg odor at low levels in the air	Low levels= lung irritation - coughing, tears from the eyes, skin irritation, dizziness, headache. High levels= odor goes away, difficulty breathing, unconsciousness, and even death.
Volatile Organic Compounds (VOC's)	Are found in the fluids used for fracking and can leak out during fracking process. These include chemicals such as benzene, ethylbenzene, toluene, & mixed xylenes.	Respiratory issues, eye and skin irritation, nausea, vomiting, dizziness. VOC's can mix with diesel fumes to make ozone (see below).
Particulate matter (PM 2.5)	PM 2.5 are small pieces of pollution in the air that can be found near roads, dusty areas, or in smoke.	When these are breathed in, they can get stuck in the lungs and cause problems. These include asthma, heart disease, chronic obstructive pulmonary disease (COPD), premature death and cancer. It can also increase the chance of babies being born too early or too small.
Ground level ozone (smog)	Ozone is made when VOCs mix with nitrogen oxide (a chemical found near fracking operations and in diesel exhaust).	When ozone is breathed in, it can cause problems breathing and worsen asthma and emphysema. Children and pregnant women are at greatest risk for having problems.



- Increased noise and light pollution from drilling operations 24 hours a day, 7 days a week
- Disruption in rural communities, permanently altering their way of life
- Lack of affordable housing for residents
- Loss of property values - banks will not approve mortgages and insurance companies will not insure property close to fracking operations

In addition, communities hosting fracking operations experience an influx of patients in to the medical system, overwhelming health care resources. **A hospital in Pennsylvania reported a net operating loss in 2012, attributed to the substantial amount of care provided to uninsured gas field workers.**<sup>6</sup>

## Fracking and Health

As noted above, fracking operations can increase air and water pollution, leading to a variety of symptoms and illnesses. Residents in communities with fracking experience increased incidence of the following symptoms:

Healthcare providers and patients have a right to know about chemicals used in fracking operations.

- **Respiratory:** Worsening asthma, cough and lung irritation
- **Nervous system:** Dizziness, fainting, headaches, fatigue, numbness in the limbs, muscle tremors, irritability
- **Skin:** Inflammation, rashes, lesions
- **Generalized symptoms:** Hearing loss, sleep disturbance, nose bleeds, increased blood pressure, decreased mental performance

In some states a 'gag rule' prevents healthcare providers from sharing information about fracking chemicals. Chemicals used in fracking are a proprietary mixture so data on specific chemicals used at a particular location may be difficult to obtain. Providers can request a list of chemicals used

at the gas operation that the patient may have been exposed to, but the "gag rule" may prevent them from sharing that information with the patient or other healthcare providers. This interferes with the patient-provider relationship and impedes medical care.

Federal law does not require the disclosure of chemicals used in fracking operations. The fracking industry is exempt from several federal regulations, including the Clean Air Act and the Clean Water Act.

## Jurisdictions with a Fracking Ban or Moratorium

Due to health and environmental concerns, fracking operations are limited by many countries, states, and municipalities. (Sample regulations, as of March 2013).<sup>7</sup>

France, Bulgaria, Romania, Northern Ireland, Vermont, New York state, Maryland, Fort Collins, CO; Mountain Lake Park, MD; Cresson, PA; Washington Township, PA; Baldwin Borough, PA; Wellsville, WV; Lewisburg, WV; Morgantown, WV.

## Recommendations for Legislators

### Health professionals call for caution

Organizations representing health professionals have issued statements about the impact of natural gas extraction on the public's health. In 2011, the Pediatric Environmental Health Specialty Units issued information statements to health professionals and to parents.<sup>8</sup>

The **American Nurses Association** passed a Resolution in 2012, calling for nurses to :

*"Collaborate with others in calling for a national moratorium on new permits for unconventional oil and natural gas extraction (fracking) throughout the country until human and ecological safety can be ensured."*<sup>9</sup>

The **American Public Health Association** recently issued a position statement on fracking that reviews risks and makes recommendations. Among them is the recommendation for:

*"Federal, state, and local environment, health, and development agencies should adopt a precautionary and adaptive approach in the face of uncertainty regarding the long-term environmental health impacts of high-volume hydraulic fracturing (HVHF)."*

## Opportunities to Protect the Public

Legislators are charged with protecting the public's health and acting in their best interest. The most protective measures related to fracking call for :

- **Health studies:** Impacts on health should be studied prior to fracking taking place. Once fracking occurs, the health of citizens should be monitored and protective action taken if health impacts are identified.
- **Air and water monitoring:** This should occur prior to fracking, and while operations are in place.
- **Strict regulation of drilling processes:** preventing the release of chemicals, gas, salts, and radioactive material
- **Enforcement of regulations:** adhering to local, state and federal laws
- **Social impacts:** Assessing and addressing these impacts on communities

Defending a healthy way of life in our communities is essential. Elected officials must take proactive measures to protect citizens' well-being.

*Because states have regulatory primacy on fracking, state legislators should enact legislation that:*

- is genuinely comprehensive, transparent, and accessible to the public. In many states, there are too many obstacles to the information
- requires public disclosure of all chemicals used in all stages of exploration, drilling, and production stages
- includes authentic opportunities for greater citizen participation in environmental decision making, including location of facilities and pipelines
- requires use of best practices, comprehensive regulation, communication, and adequate staffing across government agencies for the maximum protection of public health and environment
- encourages employment opportunities at the local level but not at the expense of tourism related to natural recreation areas
- extends timelines and parameters for testing water supplies
- requires casing, well spacing, setback, water withdrawal, flowback, waste regulation requirements, and other measures to protect water resources
- increases the accountability of the industry
- reduces environmental injustices
- assesses and addresses social impacts on communities

## Resources

For a complete list of resources including online databases of fracking chemicals, assessment tools, peer-reviewed references, and more go to: [www.frackingandhealth.org](http://www.frackingandhealth.org)

- Southwest Pennsylvania Environmental Health Project (SWPA-EHP): <http://bit.ly/ZiR0Zv/>
- APHA Policy Statement: Hydraulic Fracturing of Unconventional Gas Reserves: <http://bit.ly/TYv13W>
- ANA House of Delegates Resolution: Nurses' Role in Recognizing, Educating and Advocating for Healthy Energy Choices: <http://bit.ly/10v193L>

## References

1. Osborn, S. G., Vengosh, A., Warner, N. R., & Jackson, R. B. (2011). Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing. *Proceedings of the National Academy of Sciences*, 108(20), 8172-8176.
2. DiGiulio, Dominic C., et al. "Investigation of ground water contamination near Pavillion, Wyoming." *US Environmental Protection Agency Report* (2011). Retrieved from [http://www.epa.gov/region8/superfund/wy/pavillion/EPA\\_ReportOnPavillion\\_Dec-8-2011.pdf](http://www.epa.gov/region8/superfund/wy/pavillion/EPA_ReportOnPavillion_Dec-8-2011.pdf)
3. Agency for Toxic Substances and Disease Registry. (1999). Toxicological profile for total petroleum hydrocarbons (TPH). Retrieved from [www.atsdr.cdc.gov/toxprofiles/tp123.pdf](http://www.atsdr.cdc.gov/toxprofiles/tp123.pdf); Agency for Toxic Substances and Disease Registry. (2007a). Toxicological profile for benzene. Retrieved from <http://www.atsdr.cdc.gov/toxprofiles/tp3.pdf>; Agency for Toxic Substances and Disease Registry. (2007b). Toxicological profile for xylene. Retrieved from <http://www.atsdr.cdc.gov/toxprofiles/tp71.pdf>
4. Rowan, E., Engle, M., Kirby, C., & Kraemer, T. (2011). Radium content of oil-and gas-field produced waters in the Northern Appalachian basin (USA)—Summary and discussion of data. *US Geological Survey Scientific Investigations Report 2011*, 5135, 31.
5. Weinhold, B. (2012). The future of fracking: new rules target air emissions for cleaner natural gas production. *Environmental health perspectives*, 120(7), a272.
6. Reuther, M. (December 23, 2012). Hospital moving ahead, despite loss. *Williamsport Sun Gazette*. Retrieved from [http://www.sungazette.com/page/content\\_detail/id/587201/Hospital-moving-ahead-despite-operating-loss.html?nav=5002](http://www.sungazette.com/page/content_detail/id/587201/Hospital-moving-ahead-despite-operating-loss.html?nav=5002)
7. Keep Tap Water Safe. List of bans worldwide. Retrieved from <http://keeptapwatersafe.org/global-bans-on-fracking/>
8. Pediatric Environmental Health Specialty Units. (2011). PEHSU Information on Natural Gas Extraction and Hydraulic Fracturing for Parents and Community Members. Retrieved from: [http://aoec.org/pehsu/documents/hydraulic\\_fracturing\\_2011\\_parents\\_comm.pdf](http://aoec.org/pehsu/documents/hydraulic_fracturing_2011_parents_comm.pdf); Pediatric Environmental Health Specialty Units. (2011). PEHSU Information on Natural Gas Extraction and Hydraulic Fracturing for Health Professionals. Retrieved from [http://www.aoec.org/pehsu/documents/hydraulic\\_fracturing\\_and\\_children\\_2011\\_health\\_prof.pdf](http://www.aoec.org/pehsu/documents/hydraulic_fracturing_and_children_2011_health_prof.pdf).