

A Second Look at the Impacts of Hydraulic Fracturing

[music] Anne Johnson: Welcome to Environmental Health Chat, a podcast about how the environment affects our health, from the National Institute of Environmental Health Sciences Division of Extramural Research and Training. I'm your host Anne Johnson.

When we started this podcast nearly two years ago, one of the first topics we tackled was the health impacts of hydraulic fracturing, or fracking.

It was a hot issue then and it still is today. Despite continued research and debate, many questions remain unanswered. Today's episode is an update on the latest research findings and trends.

First, a quick primer: fracking is a method of extracting natural gas that's currently used in 21 states in the U.S. Hydraulic fracturing refers to the actual drilling process, in which water, sand, and a mix of chemicals is forced into horizontally drilled wells. This causes deep rock layers to crack and release natural gas. Fracking is one part of the broader process known as "unconventional natural gas development," which refers to the entire suite of operations associated with fracked wells, all the way from well construction to the transport of gas and oil products off the site.

Today we're joined by two experts. Kathleen Gray is the director of the Community Outreach and Engagement Core in the Center for Environmental Health and Susceptibility at the University of North Carolina. Dr. Trevor Penning is director of the Center of Excellence in Environmental Toxicology at the Environmental Health Sciences Core Center at the University of Pennsylvania.

Trevor will start us off with some context about fracking and environmental health.

Trevor Penning: The real issue that we're faced with is risk assessment. Risk assessment has many components. One is risk identification, which is to identify the hazards that may cause health problems. And, although I think we have a fair understanding of what the air pollutants might be and the kinds of illnesses we might expect to see from those air pollutants, we know even less about the hydraulic fracturing fluid. This is a mix of many chemicals—can be as many as 80 different chemicals per well site—and we don't even know, in every instance, what those constituents are. And so we're lacking fundamental knowledge on the hydraulic fracturing fluid and the toxicity of the individual components, let alone how they might act in a mixture.

Anne Johnson: Though we still don't know a lot about the chemicals used in fracking, researchers have recently done a lot of work documenting a broad range of potential health concerns. Some of the strongest research focuses on the people who work at well sites. Their main risks seem to be exposure to chemical spills and inhalation of fine particles of silica sand, which can cause lung diseases.

There have been fewer studies on how fracking sites impact the residents in nearby communities. The most well-documented effects are those related to the sudden influx of a transient workforce and resulting changes to community character. There's less conclusive evidence about issues like air and water pollution. Kathleen and others have been studying residents' opinions and concerns.

Kathleen Gray: There's quite a lot of polarization around the issue of unconventional natural gas drilling because there are some benefits to communities as well as potential health risks. There's a whole range of issues for which we don't have much data, and people are very concerned about how those changes in their communities will impact their health in the near term and over decades. Potentially, residents could be exposed more than workers, because at least workers are on a shift and coming in and out but if operations are ongoing, there is potential for longer term exposure to residents who are quite close to operations.

Anne Johnson: Some residents are concerned that pollutants could potentially persist in their communities long after the wells are tapped out.

Kathleen Gray: There are clearly expressed concerns in communities about long-term effects that we may not see for years. So in particular related to water pollution, people are concerned that there will be contaminants getting into drinking water aquifers that will persist and that could cause problems down the road.

Anne Johnson: Although several water quality studies are ongoing, we currently know very little about the impacts of fracking on water supplies.

How can we learn more? What studies are needed, and how should they be carried out? The NIEHS Environmental Health Sciences Core Centers formed a working group to answer those questions. Kathleen and Trevor are both members of that group. In a recent report, they concluded that there's a real potential for water and air pollution related to unconventional natural gas development and that there's an urgent need for research about exposures and health outcomes in people living near fracking sites.

But they don't just want research done by universities, government, and industry. They say it's critical that community members be active partners, an approach known as community-based participatory research.

Trevor Penning: The community has to be engaged in design and the scope of the study. They can even become involved in collecting data, which could be very important because this drilling process is episodic. And also, because they're in the front line and they're the individuals exposed, they should be engaged in a bidirectional communication effort so that the study if necessary can change over time and they would also be the first to hear of data that is trustworthy.

Anne Johnson: Being the first to know about findings also puts residents in a better position to influence decision making that might affect operations in their area.

Kathleen Gray: People who are directly impacted have a right to participate in research that may ultimately change the way they're impacted. So, there is sort of a justice perspective to involving people who may be bearing an undue burden, you have a right to participate in the processes that are looking at how to mitigate risks.

Anne Johnson: The approach is not always easy, but the working group says it's worth it.

Kathleen Gray: I have seen plenty of residents who have worked with researchers and been disappointed, either at the pace of study or inconclusive findings. But there are also plenty of examples where such partnerships have really enriched both the resources available to communities in terms of taking the actions they desire and also to the researchers in terms of giving them more nuanced information that can make their work more meaningful and have greater impact.

Anne Johnson: There are some studies underway now. For example, one study is looking at patterns of health problems in communities near drilling sites. Another looks at drinking water quality. And some researchers are studying how some of the fracking chemicals might affect living things at the cellular level.

Trevor and Kathleen said the bottom line is that unconventional natural gas development is here to stay. For the best interests of everyone, industry, government, researchers, and communities need to work together to assess the risks and develop and enforce appropriate ways to mitigate them.

Thanks to today's guests, Trevor Penning of the University of Pennsylvania and Kathleen Gray of the University of North Carolina.

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