Update #2 – Public Health

New studies continue to associate a wide range of health problems with the extraction of shale gas. Many indicate that it is air pollution from the industry, rather than water contamination, that may be the main threat to human health. They also suggest that the regulations that we have for the distances we put between gas wells and people are inadequate to keep people safe.

Of particular concern is that the unborn and newly born are at especially increased risk. Public health scientists had already pointed out that prior studies have linked the presence of chemicals released during natural gas extraction, such as sulfur dioxide, nitrogen dioxide, and benzene, to birth defects.

All the reports cited below have been released in 2014. Each is followed by an Internet link to an article that explains the studies findings for the public. After each is a citation to the actual study.

- A new study conducted in Colorado by public health scientists from the Colorado School of Public Health and Brown University found **a strong correlation between a pregnant woman's exposure to fracking wells and congenital heart defects.** As the number and nearness of wells to a pregnant woman's home went up, so did the likelihood that her baby would develop a heart problem.
  http://ecowatch.com/2014/01/30/study-fracking-birth-defects/

  Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado. *Lisa M. McKenzie,[1] Ruixin Guo,[2] Roxana Z. Witter,[1] David A. Savitz,[3] Lee S. Newman,[1] and John L. Adgate[1], Colorado School of Public Health and Brown University.*
  Environ Health Perspect; DOI:10.1289/ehp.1306722

- A study in Pennsylvania, another state rich in natural gas, had different but worrisome findings. (Authored by researchers from Princeton, Columbia, and the Massachusetts Institute of Technology, it is not yet peer-reviewed or publicly available but was presented in **January**.) They found that **close exposure to fracking increased the likelihood of low birth weight by more than half**. The chances of a low Apgar score (a summary measure of the health of newborn children) roughly doubled.
  http://ecowatch.com/2014/01/06/research-links-fracking-and-low-birth-weight-newborns/

  Low Birth Weight Study*, Janet Currie of Princeton University, Katherine Meckel of Columbia University, and John Deutch and Michael Greenstone of the Massachusetts Institute of Technology*

- University of Missouri researchers have found greater hormone-disrupting properties in water located near hydraulic fracturing drilling sites than in areas without drilling. The researchers also found that 11 chemicals commonly used in the controversial "fracking" method of drilling for oil and natural gas are endocrine disruptors. (Endocrine disruptors interfere with the body's endocrine

system, which controls numerous body functions with hormones such as the female hormone estrogen and the male hormone androgen.) Exposure to endocrine-disrupting chemicals, such as those studied in the MU research, have has been linked by other research to cancer, birth defects and infertility.

Susan Nagel, PhD, associate professor of obstetrics, gynecology and women's health at the MU School of Medicine said, "With fracking on the rise, populations may face greater health risks from increased endocrine-disrupting **chemical exposure… raising the risk of reproductive, metabolic, neurological and other diseases, especially in children who are exposed to endocrine-disrupting chemicals**."
http://www.sciencedaily.com/releases/2013/12/131216140428.htm

"Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region," Susan Nagel, PhD. *Missouri University School of Medicine, Endocrinology*

All of these studies share two things in common. The show that there may be serious human health risks associated with shale gas extraction, and they all call for more long-term study.

- A University of Colorado study examined **all** the research done to date on the health aspects of shale gas and found this:

"Despite broad public concern, no comprehensive population-based studies of the public health effects of UNG (unconventional natural gas) operations exist. Major uncertainties are the unknown frequency and duration of human exposure, future extent of development, potential emission control and mitigation strategies, and a paucity of baseline data to enable substantive before and after comparisons for affected populations and environmental media. **Overall, the current literature suggests that research needs to address these uncertainties BEFORE we can reasonably quantify the likelihood of occurrence or magnitude of adverse health effects associated with UNG production in workers and communities."** (bolded emphasis added)
http://pubs.acs.org/doi/abs/10.1021/es404621d

Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development, *John L. Adgate, Bernard D. Goldstein ‡, and Lisa M. McKenzie*
Colorado School of Public Health, University of Colorado Denver, 13001 E. 17th Place, Campus Box B119, Aurora, Colorado 80045, United States, Graduate School of Public Health, University of Pittsburgh, 130 DeSoto Street, A710 Crabtree Hall, Pittsburgh, Pennsylvania 15261, United States, Environ. Sci. Technol., Article ASAP, ***DOI:*** *10.1021/es404621d, Publication Date (Web):* ***February 24, 2014*** *Copyright © 2014 American Chemical Society*

Even our ability to measure and understand the new airborne pollution from this industry has been called into question. People exhibit similar symptoms everywhere shale gas is

extracted, but are told nothing is wrong when later testing shows no air pollution. There are no tests or standards for dealing with episodic or temporary outbursts of pollution that occur during different activities of the shale gas extraction process. A study released in early April 2014 concluded:

- "Exposures are highly variable and can be difficult to monitor. Moreover**, current monitoring efforts and health standards do not adequately track these events**, though health reports from persons living near these sites are consistent with episodic exposure."
  http://www.publicintegrity.org/2014/04/03/14514/air-monitoring-fracking-areas-fails-detect-spikes-toxic-emissions-new-study-says

  Understanding exposure from natural gas drilling puts current air standards to the test
  David Brown / Beth Weinberger / Celia Lewis / Heather Bonaparte
  [1]Southwest Pennsylvania Environmental Health Project, McMurray, PA, USA
  Citation Information: Reviews on Environmental Health. Volume 0, Issue 0, ISSN (Online) 2191-0308, ISSN (Print) 0048-7554, ***DOI****: 10.1515/reveh-2014-0002,* ***March 2014***

The calls for more study, and funding for it, echo the voice of NB's Chief Medical Officer for Health, Dr. Eilish Cleary, who in her award winning report on shale gas also pointed out the lack of baseline data and population based studies in the face of the serious threats to public health that may accompany shale gas development.

All of this, of course, should lead to the logical conclusion of halting the extraction of shale gas until we actually know its health effects. To do otherwise is to volunteer to be a guinea pig.