

Lower birth weight associated with proximity of mother's home to gas wells

June 3 2015



Pregnant women living close to a high density of natural gas wells drilled with hydraulic fracturing were more likely to have babies with lower birth weights than women living farther from such wells, according to a University of Pittsburgh Graduate School of Public Health analysis of southwestern Pennsylvania birth records.

The finding does not prove that the proximity to the wells caused the lower birth weights, but it is a concerning association that warrants further investigation, the researchers concluded. The study was funded by The Heinz Endowments and published in the current issue of *PLOS ONE*.

"Our work is a first for our region and supports previous research linking unconventional gas development and adverse health outcomes," said co-author Bruce Pitt, Ph.D., chair of Pitt Public Health's Department of Environmental and Occupational Health. "These findings cannot be ignored. There is a clear need for studies in larger populations with better estimates of exposure and more in-depth medical records."

Unconventional gas development includes horizontal drilling and high volume [hydraulic fracturing](#), known as "fracking." It allows access to large amounts of natural gas trapped in shale deposits. Prior to 2007, only 44 wells were known to be drilled in Pennsylvania's Marcellus Shale with such technology. From 2007 to 2010, that expanded to 2,864 wells.

The Pitt Public Health research team cross-referenced birth outcomes for 15,451 babies born in Washington, Westmoreland and Butler counties from 2007 through 2010 with the proximity of the mother's home to wells drilled using unconventional gas development. They divided the data into four groups, depending on the number and proximity of wells within a 10-mile radius of the mothers' homes.

Mothers whose homes fell in the top group for proximity to a high density of such wells were 34 percent more likely to have babies who were "small for gestational age" than mothers whose homes fell in the bottom 25 percent. Small for gestational age refers to babies whose birth weight ranks them below the smallest 10 percent when compared to their peers.

The researchers took into account many factors that could influence a newborn's weight - including whether the mother smoked, her prenatal care, race, education, age and whether she'd had previous babies, as well as the gender of the baby - and the finding still held.

"Developing fetuses are particularly sensitive to the effects of

environmental pollutants," said Dr. Pitt. "We know that fine particulate air pollution, exposure to heavy metals and benzene, and maternal stress all are associated with lower [birth weight](#)."

In southwestern Pennsylvania, the waste fluids produced through hydrofracturing, called "flowback," can contain benzene. Unconventional gas development also creates an opportunity for air pollution through flaring of methane gas at the well heads and controlled burning of [natural gas](#) that releases volatile organic compounds, including benzene, toluene, ethylbenzene and xylene. Increased truck traffic and diesel-operated compressors also can contribute to air and noise pollution.

"It is important to stress that our study does not say that these pollutants caused the lower birth weights," said Dr. Pitt. "Unconventional [gas development](#) is dynamic and varies from site to site, changing the potential for human exposure. To draw firm conclusions, we need studies that thoroughly assess the exposure of a very large number of [pregnant women](#) to not just the gas [wells](#), but other potential pollutants."

Provided by University of Pittsburgh Schools of the Health Sciences

Citation: Lower birth weight associated with proximity of mother's home to gas wells (2015, June 3) retrieved 25 April 2024 from <https://medicalxpress.com/news/2015-06-birth-weight-proximity-mother-home.html>

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