



Lower Birth Weight Associated with Proximity of Mother's Home to Gas Wells

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 *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 McGowan Institute for Regenerative Medicine affiliated faculty member [Bruce Pitt, PhD](#), 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.”

Shaina L. Stacy, PhD, a recent graduate of Pitt Public Health, is lead author on this research, and Evelyn Talbott, DrPH, epidemiology professor at the school, is senior author. Additional authors are LuAnn L. Brink, PhD, and Bernard D. Goldstein, MD, both of Pitt Public Health; and Jacob C. Larkin, MD, and Yoel Sadovsky, MD, both of Magee-Womens Research Institute and Pitt School of Medicine.

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[Abstract](#) (Perinatal outcomes and unconventional natural gas operations in southwest Pennsylvania. Shaina L. Stacy, LuAnn L. Brink, Jacob C. Larkin, Yoel Sadovsky, Bernard D. Goldstein, Bruce R. Pitt, Evelyn O. Talbott. PLOS One; published: June 3, 2015.)

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