

Regarding the study:

“Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado”

By Lisa McKenzie, PhD MPH, Colorado School of Public Health, Research Associate
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Statements from:

Dr. Larry Wolk, Chief Medical Officer and Executive Director of the Colorado Department of Public Health and Environment

It is difficult to draw conclusions from this study, due to its design and limitations. We appreciate continuing research about possible public health implications that may be associated with oil and gas operations in Colorado. With regard to this particular study, people should not rush to judgment. Here are some reasons why.

- As the authors noted, they used all existing wells but did not distinguish between *active* wells and *inactive* wells. Similarly, the study does not identify the type of wells, such as conventional (vertical), horizontal, oil or natural gas wells. The study also did not look at air quality or water quality. This makes it difficult to draw conclusions on the actual exposure people may have had.
- For birth outcomes with very few cases, such as neural tube defects, the authors did not consider the effect that other risk factors may have played (examples: smoking, drinking, mother’s folic acid intake during pregnancy, access to prenatal care, etc). For these rare outcomes, such as neural tube defects, they only considered the effect of elevation. The personal behaviors of the mothers are very important risk factors for all birth defects. Without considering the effect of these personal risk factors, as well as the role of genetic factors, it is very difficult to draw conclusions from this study.
- The study showed *decreased* risk of pre-term birth with greater exposure. This seems counterintuitive, and again, makes the study difficult to interpret. (Example: The study data showed that the nearer the mother lived to a well, the less likely the mother was to give birth prematurely or to have a low-birth-weight baby.)
- We find it difficult to interpret the way risk of Congenital Heart Disease was presented.
- As the authors noted, they don’t necessarily know where the mother lived at the time of conception or during the first trimester of pregnancy, when most birth defects occur. This makes interpretation of their study difficult.
- Colorado’s oil and gas rules are the most stringent in the country when it comes to protecting public health and the environment. Colorado is currently updating its rules to further minimize air emissions from oil and gas operations.
- Lastly, the authors cite nearly three pages of “limitations” to their findings (pages 14-16). And, the findings showed only association, not causation, and the statistical differences in birth defects were miniscule.

Overall, we feel this study highlights interesting areas for further research and investigation, but is not conclusive in itself. We agree there is public concern about the effects of oil and gas

operations on health, including birth outcomes. While this paper was an attempt to address those concerns, we disagree with many of the specific associations with the occurrence of birth defects noted within the study. Therefore, a reader of the study could easily be misled to become overly concerned.

As Chief Medical Officer, I would tell pregnant women and mothers who live, or who at-the-time-of-their-pregnancy lived, in proximity to a gas well not to rely on this study as an explanation of why one of their children might have had a birth defect. Many factors known to contribute to birth defects were ignored in this study.

While the study was based on data provided by CDPHE, the authors note on page 1, the department specifically disclaimed responsibility for any analyses, interpretations or conclusions drawn by the authors.