University of Pittsburgh and Pennsylvania Department of Health Release Studies Exploring the Relationships Between Unconventional Natural Gas Development and Specific Health Issues in Southwestern Pennsylvania

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In August 2023, the University of Pittsburgh School of Public Health and the Pennsylvania Department of Health (DOH) released three "observational epidemiological" studies presenting findings of potential health impacts from human exposure to unconventional natural gas development (UNGD) activities. The studies, which were conducted in eight counties in southwestern Pennsylvania, excluding the City of Pittsburgh, focused on three specific health issues: (1) asthma, (2) birth outcomes, and (3) certain childhood cancers.

In the Asthma Study, researchers reviewed medical treatment for asthma (categorized by severity), as well as how close the patient lived to UNGD activities (considering the number of wells, production volume, and the phase of well development, i.e., preparation, drilling, hydraulic fracturing, and production). The study found no relationship between asthma exacerbations and proximity to wells during the well pad preparation, drilling, or hydraulic fracturing phases, but found an increase during the production phase. The increases were fairly consistent in the lower, moderate, and higher exposure groups and therefore, the expected dose/response relationship (i.e., more asthma exacerbations with more exposure) was not found. *See* Univ. of Pittsburgh Sch. of Pub. Health, "Hydraulic Fracturing Epidemiology Research Studies: Asthma Outcomes" (July 31, 2023); DOH, "PA Health and Environment Study: Asthma" (Aug. 15, 2023).

For the Birth Outcomes Study, researchers reviewed birth records and the distance mothers lived from UNGD activities and other industrial activities. Researchers for the Birth Outcomes Study considered the number of wells, production volume, and the phase of well development, in addition to potential exposure from certain facilities, i.e., impoundment ponds, facilities accepting oil and gas waste, compressor stations, Superfund sites, and industrial sites with a toxic release inventory. Additionally, the study looked at exposure to fine particulate matter ($PM_{2.5}$) and birth outcomes. The study found next to no statistically significant association for small for gestational age (SGA) births and preterm births. The study reported a one-ounce decrease in birthweight associated with proximity to wells during the production phase and proximity to compressor stations, which they acknowledge presented little health risk. Although there were some increased risks for SGA in exposed groups, the results were inconsistent among exposure groups and did not support the expected dose/response relationship. The study found no association between exposure to $PM_{2.5}$ (from any source) and SGA or decreased birthweight, but found a statistically significant increased risk of preterm birth. These findings for $PM_{2.5}$ are inconsistent with the findings for proximity to wells and to other facilities. *See* Univ. of Pittsburgh Sch. of Pub. Health, "Hydraulic Fracturing Epidemiology Research Studies: Birth Outcomes" (July 31, 2023); DOH, "PA Health and Environment Study: Birth Outcomes" (Aug. 15, 2023).

The Childhood Cancer Study included a review of health records of children diagnosed with leukemia, lymphoma, central nervous system tumors, and bone cancers (including Ewing sarcoma). The study looked at associations between proximity to UNGD activities, Superfund sites, industrial facilities, and uranium tailing sites and these cancers in a group of persons who were surveyed to determine their proximity to the sites, and in a group of persons whose residence information was compiled from the birth addresses from their medical records. For the medical record group, no information about subsequent addresses was used in the study and the birth addresses were assumed to be their addresses through the date of cancer diagnosis. The study found no association between well

proximity and leukemia, central nervous system cancers, or malignant bone tumors, including Ewing sarcoma. The study also found no association between compressor stations, impoundments, Superfund sites, industrial facilities, and waste facilities and these cancers. On the other hand, an association between uranium tailings sites and central nervous system tumors was found, but with a wide confidence interval. The study found an association between proximity to wells and rare childhood lymphomas (which risk was increased from 0.0012% to between 0.006% and 0.0084% for children living within one mile of a well) only in the group whose birth address was used and not in the group where more specific address information was obtained from surveys. *See* Univ. of Pittsburgh Sch. of Pub. Health, "Hydraulic Fracturing Epidemiology Research Studies: Childhood Cancer Case-Control Study" (Aug. 3, 2023); DOH, "PA Health and Environment Study: Childhood Cancer" (Aug. 15, 2023).

Critics of the studies have alleged methodological flaws, e.g., focusing on proximity instead of identifying actual exposure pathways, and highlighted that the reports did not demonstrate causation from UNGD activities to any of the studied health risks. *See, e.g.*, "Pitt Studies Contain Serious Methodological Flaws," *Marcellus Shale Coal. Blog* (Aug. 25, 2023). After release of the studies, DOH posted an online form allowing citizens to confidentially contact the agency about environmental health concerns (including concerns beyond the scope of the three studies).