ASSESSING SOCIO-ENVIRONMENTAL FACTORS FOR CHILDHOOD LEUKEMIA CLUSTER IN CLEBURNE COUNTY, ALABAMA

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This research investigated the socio-environmental factors connecting to recent alarming spike of children leukemia in the rural Fruithurst-Muscadine community in Cleburne County, Alabama. This leukemia cluster rests upon Heflin Phyllite, a Piedmont metamorphic rock that can potentially produce high levels of radon (222Rn). Our research suggests that the patients may have been exposed to radon, heavy metals, and semi-volatile organic compounds in groundwater and sediments. Radon concentrations measured in well water range from tens to thousands of pCi/L; those levels warrant a long-term radiation test. The current source of Fruithurst drinking water comes from a cold spring connected to the Knox carbonate aquifer in Calhoun County, near two superfund sites. The ICP-MS results show that the level of trace metals in current municipal water are below EPA's MCLs, thus ruling out the potential connection of leukemia to trace metal contamination from current drinking water. However some rural families still use well water as their main water supplies. Fruithurst's city wells were shut down in the late 1990s due to concern of exposure to radon and other contaminants.

Our research found heavy metals (arsenic, zinc, barium, chromium, lead, nickel) and semi-volatile organic compounds (Bis(2-ethylhexyl) phthalate, or DEHP) in a soil sample near the Problend Rubber Plant. Zinc content in the soil sample analyzed (3,000 mg/kg) is higher than the level recommended by U.S. EPA Clean Water act (2,800 mg/kg). Historical records from the Alabama Department of Environmental Management show heavy metals in discharge runoff from Problend substantially above the EPA recommended levels: up to 42,222 times higher for zinc, 183 times higher for lead, and 940 times higher for chromium. Seven well water samples have been tested from patients' houses. Some well water contains low levels of DEHP; the source and level of DEHP in the study area requires further investigations. The presence of barium in most well water used by leukemia patients suggests common source(s) either from bedrocks or contaminants. Preliminary water table measurements of wells suggest that the water level in the Fruithurst City Well 1 (an artesian well) near Problend is higher than other wells in the study area.