The Effect of Living Near a Combined Coal Ash/Nuclear Waste Pond on Certain Cancer Measures and Health Conditions in Hartsville, South Carolina

Marazzo, Luke

An unlined waste pond in Hartsville, SC holds 4 million tons of coal ash. In the 1980s, low-level nuclear waste containing cobalt-60 was added to the pond. In 2014, water below the pond showed arsenic levels 100 times higher than considered safe. The purpose of this experiment was to determine if residing near this waste pond would result in an increase in certain cancer measures and health conditions. The control was Union, S.C. Populations in 5, 10 and 15 mile radiuses around Hartsville and Union were defined. Expected and observed incidences and deaths for thirteen cancers over a 15 year period were examined. Chi-Square was used to determine significance at a 95% CI. Certain measures of infant mortality, heart disease and asthma were also examined using a one tailed, 2-sample z-test to compare proportions at a 95% CI. It was hypothesized that observed cancer incidences or deaths would be significantly higher than expected in Hartsville but not the control, and that heart disease, asthma, and infant mortality rates would be significantly higher in Hartsville than the control. The hypothesis was supported in one measure but rejected in the others. At a 5-mile radius from the Hartsville pond, observed prostate cancer and adult leukemia deaths were significantly higher than expected; in the control population they were not. A second, proportional test found no statistically significant difference. For heart disease, asthma, and infant mortality, no significant statistical differences were identified between the Hartsville and control populations at 5, 10 or 15 miles. Therefore, although initial results revealed significant differences in observed deaths from prostate cancer and adult leukemia at a 5 mile radius, no other results were statistically significant.

Awards Won: