An Epidemiological Study Quantifying Differences in Thyroid Cancer Risk across Birth Cohorts and I-131 Exposure Levels

Habib, Anisa (School: West High School)
Agarwal, Tejita (School: West High School)

The 2.4-fold increase in thyroid cancer over recent decades and variation across regions indicate that environmental factors may be influencers, including I-131 released during nuclear testing. Our goal was to test the hypothesis that exposure to I-131 increases thyroid cancer risk. We collected incident thyroid cancer cases selected by diagnosis year, state, and sex from the Surveillance, Epidemiology, and End Results Program; information about screening innovations; smoking data from the Behavioral Risk Factor Surveillance System; and migration data from the US Census. State-level I-131 exposure data was obtained from the National Cancer Institute. We used Poisson regression to test for variation in thyroid cancer rates by birth cohort and exposure. We used an interaction term to test birth-cohort specific differences in exposure-based risk. Compared to the lowest exposure category, medium-level exposure to I-131 was associated with higher estimates of thyroid cancer rates (p-value: <2e-16). High-level exposure to I-131 was also associated with higher estimates (p-value: <2e-16). A trend analysis found a significant slope for both females and males [0.15 (p-value: <2e-16)]. We found evidence that exposure to I-131 may lead to an increased risk of developing thyroid cancer and that the association may be dose-dependent. This suggests increases may not be solely due to screening developments and that populations exposed to I-131 may require additional health screenings aimed at detecting thyroid cancers.

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