Researchers use environmental data to assess prostate cancer diagnosis factors

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Environmental quality is associated with advanced-stage prostate cancer at diagnosis, according to a new study by University of Illinois Chicago researchers.

Prostate cancer is up to 57% heritable, with the remainder attributed to environmental exposures. However, studies on those environmental factors and prostate cancer aggressiveness have previously been limited. For their study, "Association between environmental quality and prostate cancer at diagnosis," published in the journal *Prostate Cancer and Prostatic Disease*, researchers paired data from the environmental quality index, or EQI, and the Surveillance, Epidemiology and End Results Program, or SEER.

Study co-author Dr. Michael Abern, associate professor and director of urologic oncology at University of Illinois College of Medicine, said by combining the data from SEER and EQI, researchers found that lower environmental quality was associated with advanced-stage prostate cancer diagnosis.

The EQI combines data from multiple sources and reports an overall quality index, as well as five subdomains: air, water, land, built and sociodemographic. The data is collected from sources such as Environmental Protection Agency air quality monitoring.

"When we drilled down further into the subdomains of the EQI, we found that some of the associations were stronger than others. Specifically, the land, water and sociodemographic domains seem to be driving the association more than air or built domains," Abern said.

Additionally, areas with low-quality land, water and sociodemographic variables showed the strongest association with prostate cancer being diagnosed at a later stage, which can mean poorer treatment outcomes.

The study also found that race was an independent predictor of metastatic prostate cancer—cancer that has spread—at diagnosis, with Black men at higher risk. That risk is elevated more when coupled with living in an area with low environmental quality.

According to the study, there were more than 174,000 newly diagnosed prostate cancer cases and more than 31,000 prostate cancer deaths in the United States in 2019, making it the most common non-cutaneous (skin) malignancy in men. When diagnosed early, prostate cancer has a nearly 100% five-year survival rate.

Though there have been other studies that explore environmental exposures, they often compare a single agent and individual exposure. Using the EQI and SEER offers a more comprehensive ecologic analysis to better represent environmental exposures and the relationship to advanced prostate cancer, the study states. Because the EQI also looks at sociodemographic variables, it takes health equity into account.

"They are actually measuring infrastructure and barriers to getting healthcare," Abern said.

Abern said the study provides the ability to make hypotheses as to why late-state prostate cancer diagnoses are higher in certain areas, and then drill down into the components of the environmental variables to try to find solutions such as environmental policy changes.

It is well established that age and Black race are risk factors to develop prostate cancer in addition to genetic risk factors including family history. An important distinction can be drawn between incidence and aggressiveness, Abern said, and this study focuses on the aggressiveness of prostate

cancer.

"When I see a patient with prostate cancer, they assume maybe they got it because of something they did. It is probably not. Not a lot is known about personal lifestyle choices that lead to prostate cancer. Diet, exercise and smoking have never had a very strong association with prostate cancer ," Abern said. "Seeing a doctor and getting screened is still the most important thing about getting diagnosed."

More information: Hari T. Vigneswaran et al, Association between environmental quality and prostate cancer stage at diagnosis, *Prostate Cancer and Prostatic Diseases* (2021). DOI: 10.1038/s41391-021-00370-z

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