

Research Project Overview



CARIB-CARE's research project focuses on understanding how extreme weather events (such as hurricanes, floods, droughts, and heatwaves), environmental inequalities (like uneven pollution distribution), and social vulnerability (demographic and socioeconomic factors) collectively impact cancer risk and disrupt the [cancer control continuum](#) in Puerto Rico and the U.S. Virgin Islands.

The cancer control continuum is a framework that covers the entire process of reducing cancer burden, from understanding causes to end-of-life support. It includes etiology, prevention, early detection, diagnosis, treatment, survivorship, and end-of-life care. This framework guides researchers, clinicians, and public health officials in their approach to cancer.

The project aims to develop research-based strategies that improve resilience across the cancer control continuum and tackle disparities in underserved island communities. By generating evidence and practical recommendations, CARIB-CARES will support better adaptation to extreme weather, disaster preparedness, and cancer control planning in these regions, offering valuable insights for national efforts to protect Caribbean populations.

Using a multidisciplinary approach, the project combines spatial analyses, epidemiological studies, and community assessments to evaluate cancer risk in Puerto Rico and the U.S. Virgin Islands, considering vulnerabilities related to extreme weather events along with social and environmental health disparities. It also involves analyzing cancer incidence and mortality to understand how weather-related stressors and environmental burdens affect cancer outcomes across different populations. Additionally, qualitative research with key informants and focus groups will identify stakeholder needs, priorities, and capacities, including cancer survivors and residents, regarding adaptation to weather-related challenges and the cancer control continuum.

The goal is to produce recommendations that bolster resilience and enhance the effectiveness of the cancer control continuum. These insights will help shape interventions and planning efforts to respond to and adapt to weather-related vulnerabilities. The findings will support government planning and intervention strategies, including mitigation, adaptation, disaster preparedness, and cancer control plans for Puerto Rico and the U.S. Virgin Islands.

Research Population

Puerto Rico

Cancer is one of the leading causes of death in PR. In 2022, it accounted for 15.2% of all deaths in PR.³⁰ For the period 2014-2018, the most common types of cancer in terms of mortality in men were prostate (16.7%) colon and rectum (13.6%), and lung and bronchus (12.3%). On the other hand, among women, the most common types were breast (18.9%), colon and rectum (13.3%), and lung and bronchus cancer (9.2%) (Departamento de Salud, 2023). In 2018, the number of Puerto Ricans living with cancer was estimated to be approximately 67,176 people (Gonzalez-Mercado, 2018). According to the Puerto Rico Central Cancer Registry (PRCCR), approximately 73,135 people in PR were diagnosed with invasive cancer between 2014 and 2018 (Departamento de Salud, 2023). In addition, 26,041 cancer deaths were reported during the same period (Departamento de Salud, 2023).

US Virgin Islands

According to the USVI Department of Health, cancer is the second leading cause of death among residents in that. In 2017, there were 115 cancer related deaths reported. The top three cancers among men were prostate (49%), colon and rectum (8.8%), and hematopoietic (6.9%). Meanwhile, the most common cancers among women were breast (39.9%), uterus (9.8%) and colon and rectum (CRC) (7.7%) (US Virgin Islands, 2023).

Environmental Exposures and Cancer

Contaminated sites, such as Superfund Sites, Toxic Release Inventory Sites (TRI), and other hazardous waste sites contain high amounts of known carcinogens, such as arsenic, benzene, radon, and trichloroethylene. These chemicals can leach into the soil, water and air and affect human and environmental health (Friedrich, 2017). As of 2023, 19 places have been designated as active superfund sites and 121 facilities have reported the release of toxic chemicals across the archipelago of PR (Perez Pintado 2023; US EPA Villalba, Salinas, Fajardo, Añasco, 2023; Kumar, 2013; Sanderson, 2017). In USVI, two places have been designated as superfund sites (in separated islands) and seven industries have reported toxic chemicals as part of their releases to the environment (US EPA 2020 Factsheet). A spatial study of Superfund sites and associated cancer risk found that there was a positive association between overall cancer rates and elevated cancer risk and Superfund density (Kirpich, 2017). Increased county-level high Hazardous Ranking Score (HRS), a score that ranges from 0 to 100 developed by the US Environmental Protection Agency (EPA) to communicate the potential health hazards to people and the environment, was associated with higher rates of cancer incidence in Florida adults (Kirpich, 2017). In Kentucky, those who lived near the Superfund sites had a higher incidence of non-Hodgkin lymphoma (NHL). As the distance between residence and Superfund sites increased, the cumulative incidence of this type of cancer decreased (Press, 2016). Moreover, counties with higher TRI discharges had higher rates of cancer-related hospitalization (Webber, 2017). However, some studies have not found significant associations between proximity to Superfund sites and cancer (Press, 2016; Logue, 1986).