

Uncovering Disparities in Early-Onset Hematologic Malignancies: A Data-Driven Approach to Inform Precision Public Health

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1. Background

Hematologic malignancies (HMs) are generally considered sporadic cancers, driven by genetic errors without clear environmental influences. However, the emergence of geospatial patterns in early-onset hematologic malignancies (EOHMs) challenges this notion and suggests that environmental factors may contribute to the observed disparities. Despite the availability of comprehensive cancer surveillance data, it remains underutilized by cancer centers to guide precision public health interventions.

2. Goals

This study leverages publicly available cancer data to identify and prioritize geographic areas and populations for targeted intervention. We aim to go beyond simply identifying disparities to pinpoint where public health resources should be focused to address these disparities effectively.

3. Solutions and Methods

We utilized data from the U.S. Cancer Statistics Public Use Research Database (2016–2020) to analyze six HM subtypes. Our approach begins by identifying national-level disparities: non-Hispanic Black males are shown to have a higher burden of EOHMs compared to other populations, and females are disproportionately impacted by early onset compared to late onset. Building on these national findings, we then analyze which states perform worse for these specific populations. We compare within race and within sex to identify states where disparities are more pronounced than the national average for these already vulnerable groups. This method goes beyond simply identifying disparities to prioritizing locations that require targeted public health interventions, focusing resources on areas where high-risk populations are experiencing the most significant disparities.

4. Outcomes

Our analysis confirmed that non-Hispanic Black males have a higher burden of EOHMs nationally, and that females are more affected by early- than late-onset disease. By mapping geospatial patterns, we identified high-burden states, such as Florida and New York, where these disparities are amplified. The presence of consistent geospatial disparities suggests potential environmental drivers that warrant further investigation. This method provides cancer centers with actionable data to inform precision public health efforts.

5. Lessons Learned and Future Directions

We recommend that cancer centers harness publicly available surveillance data to guide interventions and explore potential environmental drivers of EOHMs. Our approach offers a replicable model for identifying and prioritizing areas for resource allocation and intervention. Lessons learned include the importance of geospatial analysis in uncovering patterns previously assumed to be sporadic. Next steps include collaborating with local stakeholders to design and implement effective interventions, addressing both genetic and environmental factors contributing to these disparities.

Figure

Step 2: States with High Incidence of EOHC Among Minoritized Race/Ethnic Populations

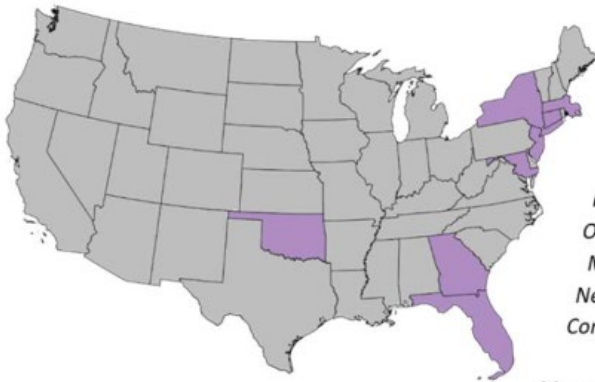


Table 3: Incidence Rate Ratios (IRR) Comparing State to Nation within Race/Ethnic Group

	NHB	NHAIAN	NHAPI	Hispanic
Florida	1.1727			1.3325
New York	1.1355		1.1648	1.3166
Oklahoma		1.2659		
Maryland			1.2642	
New Jersey			1.206	1.2807
Connecticut				1.2525
Georgia				1.1365
Massachusetts				1.1392