Computer models fill critical knowledge gaps to help reduce cancer disparities and advance health equity

November 8 2023

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Reducing health disparities in incidence and mortality for major types of cancers can be aided by sophisticated computer modeling efforts,

according to new, wide-ranging perspectives from researchers at Georgetown University's Lombardi Comprehensive Cancer Center and colleagues around the country. The collection of articles appears in the November 8, 2023, special issue of *JNCI: Journal of the National Cancer Institute* and is devoted to outlining a path forward in cancer disparities modeling.

The issue was edited by Georgetown Lombardi's Jeanne Mandelblatt, MD, MPH; Amy Trentham Dietz, Ph.D., professor of Population Health Sciences at the University of Wisconsin, Madison; and Rafael Meza, Ph.D., adjunct professor at the School of Population and Public Health at the University of British Columbia, Canada, and comprises articles by dozens of co-authors.

The studies in *JNCI* used modeling to synthesize data specifically for the overall U.S. population compared to the U.S. Black population to quantify the contributions of different aspects of cancer care to the impact on disparities in cancer mortality.

Given the high cost and long time periods needed to obtain results from clinical trials looking at interventions to prevent and treat many cancers and the chronic lack of sufficient enrollment of Black people in these trials, simulating cancer outcomes in diverse populations with sophisticated computer modeling tools is recommended by the National Academy of Sciences and others as a high-quality alternative assessment method.

The Cancer Intervention and Surveillance Modeling Network (CISNET) studies in this issue of *JNCI* considered an antiracism framework that aims to identify strategies to advance health equity among Black people and other populations underrepresented in medical research. The authors define health equity as "the absence of unfair, avoidable or remediable differences in health outcomes so that no one is disadvantaged by

socioeconomics or other factors."

"We have framed systemic racism as the root cause of inequity that can exert significant effects on cancer incidence and mortality and competing comorbidities," says Mandelblatt, director of the Georgetown Lombardi Institute for Cancer and Aging Research as well as a professor of oncology and medicine at the Georgetown University School of Medicine. "Because of these research efforts, we hope that we have provided a framework to support the next generation of cancer population simulation models."

Significantly, the researchers were able to confirm that CISNET modeled incidence and mortality rates closely matched observed cancer statistical trends over time, lending validity to the modeling approach.

The racial group-specific modeling in this issue is the first collaborative effort from virtually the entire CISNET Consortium addressing a single research question designed to identify leverage points that could be targeted to increase equity in cancer burden among Black populations. The resulting body of research illustrates how population simulation modeling can be applied to address critical public health issues.

Taken together, the results of the modeling analyses included several notable patterns:

- In cancers with widely used screening procedures but persistently large gaps in racial incidence, better access to screening by racial minorities could play a larger role in helping reduce those disparities.
- High-quality therapies (those in accordance with treatment recommendations from professional organizations with treatment guidelines delivered promptly after diagnosis, with all planned cycles completed and no or minimal dose reductions) could have

a very positive impact on mortality disparities between Black people compared to the overall population, especially as new and more effective therapeutic options evolve.

The researchers hope that future models can better capture relationships between systemic racism and cancer outcomes and replace or extend single-level race variables with measures that capture structural, interpersonal, and internalized racism.

More information: *JNCI: Journal of the National Cancer Institute* (2023)

Provided by Georgetown University Medical Center