Multi-Center Analysis of the Effects of Structural Racism on Health Disparities in Acute Myeloid Leukemia Outcomes
Led by the University of Illinois Cancer Center

Research Highlights:

Structural racism assessed by census tract variables accounts for nearly all disparities in acute myeloid leukemia (AML) survival for Black or Hispanic patients.

- This multicenter discrete survival analysis is the first study to formally test mediators of the observed disparities in AML survival. Research on racial and socioeconomic differences in hematological cancers is limited. In this study, researchers operationalize analysis of structural racism using a composite variable incorporating racial segregation, disadvantage, and affluence at the census tract level.

- Data suggests structural racism accounts for outcome disparities more than tumor biology, comorbidities, healthcare access, and treatment modalities. Non-Hispanic Black (NHB) patients were less likely to receive a transplant and had a higher mortality rate. Hispanic patients had more healthcare access issues and treatment complications than the other groups.

- There is a need for interventions to reduce disparities for AML patients, particularly among racial and ethnic groups. Academic-community partnerships can bridge gaps in care, providing the best resources for patients across the transplant journey.

Objectives and Rationale:

Research is limited on the impact of race and socioeconomic factors contributing to outcome disparities for AML patients. The term structural racism refers to systematic disadvantage experienced by certain groups of people. The primary objective of this study was to operationalize analysis of structural racism using a composite variable incorporating racial segregation, disadvantage, and affluence at the census tract level and examine it as a determinant of leukemia outcome inequities.

Design and Methods:

The study was a multi-center, discrete survival analysis of adult patients diagnosed with AML between January 2012 through January 2018. Patients were broken into 4 categories based on race/ethnicity. Individual survival models for each risk factor were estimated. Baseline and mediated models were adjusted for age at diagnosis, sex, and diagnosing hospital. Mediation analysis of the hazard of leukemia death between groups was examined across 6 composite variables:

- Structural racism (census tract disadvantage, affluence, and segregation)
- Tumor biology (European Leukemia Network risk and secondary leukemia)
- Health care access (insurance and clinical trial enrollment)
- Comorbidities
- Treatment patterns (induction intensity and transplant utilization)
- Intensive care unit (ICU) admission during induction chemotherapy

Tract disadvantage as part of the structural racism variable included the following:

- Proportion of families with incomes below the poverty line
- Proportion of families receiving public assistance
- Proportion of adults that were unemployed
- Proportion of households that were female-headed households with children

Another component of structural racism, tract affluence, was defined as follows:

- Proportion of families with incomes greater than $75,000
- Proportion of adults with at least a college education
- Proportion of adults employed in professional or managerial occupations

Results:

N=822 diagnosed with AML between January 2012 and January 2018 (median age overall and interquartile range=62 years old, 51-71); N=126 NHB, N=117 Hispanic, N=497 Non-Hispanic White (NHW), N=92 other racial/ethnic groups

The mediation analysis of racial/ethnic disparities in survival showed that variables intended to serve as proxies for structural racism (tract disadvantage, tract affluence, tract segregation) appeared to mediate nearly all of the survival disparity, as shown in Figure 1. Variables representing tumor biology (ELN prognostic score and secondary leukemia) did not appear to mediate racial/ethnic disparities in leukemia death, either individually or when modeled together. Health care access variables accounted for 22% of the Hispanic-NHW disparity but not in other groups.

- Patient characteristics: NHW patients reside in more affluent census tracts and are more likely to have private insurance. NHB and Hispanic patients were more likely to live in more disadvantaged areas and less likely to have private insurance (NHW 50%, NHB 25%, Hispanic 37%, Other patients 41%).

- **Disease Characteristics:** NHB patients had higher-risk molecular disease features such as TP53 mutations. Hispanic patients were more likely to have favorable risk disease.
- **Treatment Patterns:** NHB patients were less likely than all groups to have a transplant (22% compared to NHW 47% and Hispanic 44%).
- **Outcomes:** NHB patients had the lowest 2-year overall survival rates (53%) and highest primary refractory disease rate compared to the other groups (20% NHB, 16% NHW, 12% Hispanic patients). Complete remission rates were highest in Hispanic patients (74%).
- **Survival:** The hazard of leukemia death was significantly greater for NHB patients (HR 1.59; 95% confidence interval [CI]: 1.15, 2.22) and marginally greater for Hispanic patients (HR 1.25; 95% CI: 0.88, 1.79) and patients of other race/ ethnicities (HR 1.34; 95% CI: 0.89, 2.0). HR was higher for patients: residing in more disadvantaged areas, less affluent tracts, and in tracts with a greater proportion of NHB residents; with higher risk disease; and those admitted to the ICU following induction chemotherapy. HR was lower for patients: residing in tracts with a greater proportion of NHW residents; who underwent a transplant.
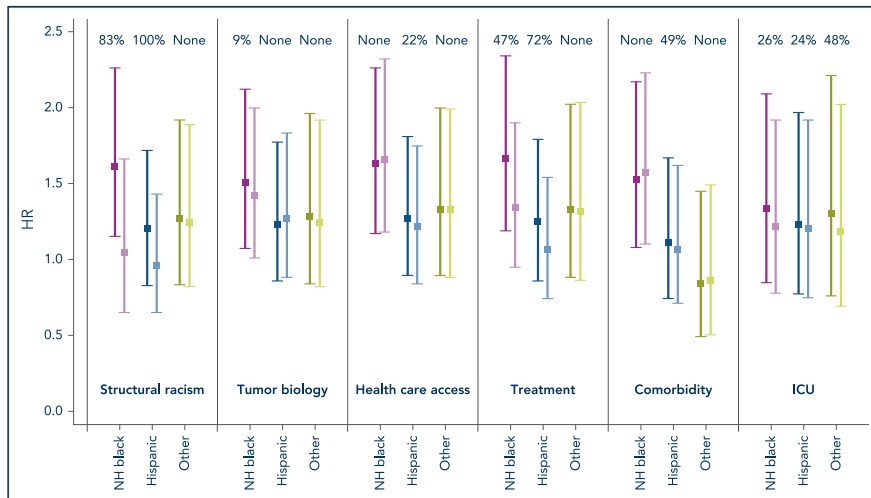

FIGURE 1. Hazard ratios of disparity in leukemia death before (solid bars) and after (faded bars) adjustment for mediating variables.

ACCESS FREE HLA TYPING FOR YOUR PATIENTS

HLA typing at diagnosis can increase the likelihood your patient with AML will receive treatment at the optimal time and ensure access to transplant options. Our HLA Today program removes barriers to patient and family member HLA typing.

There is no cost to you or your patient—and no insurance paperwork to file.

Learn how you can make HLA Today part of your community oncology practice:

BeTheMatchClinical.org/HLAToday

Conclusions:

- **Structural racism as constituted by census tract measures accounts for nearly all NHB and Hispanic-White disparity in AML survival.** In addition, healthcare access variables accounted for 22% of the disparity in Hispanic-NHW.
- **The structural racism variable was a stronger mediator of AML survival disparities than tumor biology, comorbidities, healthcare access, and treatment.** Developing and validating measures of structural racism and exploring their additive value to existing prognostic tools could improve precision based approaches to leukemia treatment.

Advancing Practice and Improving Access:

NMDP^{SM} alongside the CIBMTR (Center for International Blood and Marrow Research) is committed to expanding access to all patients needing HCT. The impact of structural racism can be lessened by taking a proactive approach. Engaged communication between community practices and transplant teams is a necessary first step toward collaboration in identifying barriers. In addition, developing interventions from a broad approach across the entire transplant journey can help expand measures of structural racism to examine their contribution to disease prognosis, utilize programs to limit access issues and barriers to transplant, foster policy changes to reduce socioeconomic limitations, and bring awareness to more patients and communities.

You can support this journey for your patient from pre- to post-transplant care by:

- Performing HLA typing at the time of diagnosis to start the donor search early for all patients
- Referring early for a consult to discuss not just transplant, but options for the patient to reduce barriers to care
- Coordinate care between community practices and transplant centers to optimize available resources

References

Full study citation: Abraham IE, Rauscher GH, Patel AA, et al. Structural racism is a mediator of disparities in acute myeloid leukemia outcomes. Blood. 2022;139(14): 2212-2226. DOI: 10.1182/blood.2021012830

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