Tigerlily Foundation
Beauty. Strength. Transformation.
Tigerlily Foundation POWER Center
RESEARCH BRIEF 2026

Barriers to Biomarker Testing Among Black Women With HR+/HER2− Metastatic Breast Cancer

Amanda Nengel, MPH

Abstract

Biomarker testing plays a critical role in guiding treatment decisions for metastatic breast cancer (MBC), particularly for hormone receptor–positive/human epidermal growth factor receptor 2–negative (HR+/HER2−) subtypes. However, Black women face significant disparities in access to biomarker testing, including testing for PIK3CA mutations, contributing to poorer clinical outcomes. This research brief examines structural, healthcare system, and patient-level barriers that limit access to testing. Key barriers include medical bias, inadequate insurance coverage, medical mistrust, and limited health literacy. Evidence-based interventions, including patient navigation, culturally competent care, targeted education, and diversification of the oncology workforce, offer promising strategies for improving access and reducing disparities.

Keywords: biomarker testing, metastatic breast cancer, disparities, Black women, PIK3CA, patient navigation

Introduction

Biomarker testing is essential in identifying cancer subtypes and actionable genetic mutations that inform treatment strategies for metastatic breast cancer (MBC). Hormone receptor–positive/human epidermal growth factor receptor 2–negative (HR+/HER2−) MBC accounts for approximately 70% of cases, and nearly 40% of these cases involve mutations in the PIK3CA gene, which drives tumor growth (André et al., 2019). Despite advancements in targeted therapies, Black women with MBC experience systemic barriers that limit access to biomarker testing and precision oncology treatments. These disparities contribute to higher mortality rates and poorer outcomes compared to other populations. Understanding these barriers is essential for developing interventions that improve access and equity in cancer care.

Author Note *Amanda Nengel received her Master of Public Health degree from Brown University. She is a Tigerlily Foundation intern. Her research interests include health disparities, oncology care, and equitable access to cancer treatment services.*

Role of Biomarker Testing in MBC

Biomarker testing identifies tumor subtype, guides initial diagnosis, informs prognosis, and supports the selection of targeted therapies. It also enables monitoring of treatment response and assessment of recurrence risk (Lopez-Gonzalez et al., 2024). Standard biomarker testing evaluates:

- Hormone receptor (HR) status
- Human epidermal growth factor receptor 2 (HER2) status

Additional testing can identify specific mutations, such as PIK3CA, that allow for the use of targeted therapies. Advances in biomarker discovery have improved overall prognosis for many patients with MBC, although access to these innovations remains uneven across populations.

HR+/HER2− MBC and PIK3CA Mutation

HR+/HER2− tumors depend on estrogen or progesterone signaling for growth and are typically treated with endocrine therapy and CDK4/6 inhibitors (Landin et al., 2025). However, resistance to endocrine therapy is common. Approximately 40% of HR+/HER2− MBC cases harbor PIK3CA mutations, which lead to overactivation of the PI3K pathway and promote cancer cell proliferation (André et al., 2019). These mutations are associated with resistance to endocrine therapy and poorer survival outcomes (Farrokhi et al., 2026). PI3K inhibitors represent an important targeted therapy for patients with PIK3CA-mutated tumors, but access depends on appropriate biomarker testing.

Disparities in Outcomes and Testing

Although MBC outcomes have improved, these gains are not equally distributed. Race and ethnicity remain strong predictors of mortality (Stringer-Reasor et al., 2021).
Black women face:

- Higher mortality rates (approximately 40% higher than White women)
- Greater likelihood of late-stage diagnosis
- Lower participation in clinical trials
- Reduced access to targeted therapies (Podany et al., 2025)

Even for HR+/HER2− MBC, considered a less aggressive subtype, Black women experience disproportionately higher mortality. One study found that Black women were 76% more likely to die

from HR+/HER2− MBC than White women (Warner et al., 2015). Disparities in biomarker testing contribute to these differences. Black patients are less likely to receive testing for PIK3CA mutations and are less likely to receive first-line targeted therapies such as CDK4/6 inhibitors (Farrokhi et al., 2026). These inequities persist even after controlling for socioeconomic and insurance factors.

Barriers to Biomarker Testing

Multiple, intersecting barriers at the healthcare system, provider, and patient levels contribute to inequitable access to biomarker testing among Black women with metastatic breast cancer.

- Healthcare Delivery Barriers-Structural and provider-level factors significantly impact access to biomarker testing. Implicit bias among healthcare providers can influence clinical decision-making, including whether to recommend diagnostic testing or clinical trial participation. Studies show that Black patients often receive less patient-centered communication and may encounter assumptions regarding adherence, financial capacity, and health behaviors (Garrett et al., 2023). Limited cultural competency training and lack of diversity among oncology professionals further exacerbate these issues (Butler et al., 2019).

- Insurance and Cost Barriers-Financial constraints are a major obstacle to biomarker testing. Advanced diagnostic technologies and targeted therapies are costly, and inadequate insurance coverage limits access. Black women are more likely to experience gaps in insurance coverage and are disproportionately enrolled in Medicaid, which may restrict access to specialized services (Jatoi et al., 2022; Farrokhi et al., 2026). Additionally, interpretation of biomarker results requires specialized expertise, increasing overall costs (Lopez-Gonzalez et al., 2024).

- Patient-Level Barriers-Medical mistrust—rooted in historical and ongoing systemic inequities—plays a significant role in limiting healthcare utilization. Experiences of discrimination can reduce trust in providers and discourage engagement with the healthcare system (Stringer-Reasor et al., 2021). Lower health literacy regarding biomarker testing and treatment options further limits patients' ability to make informed decisions. Structural inequities contribute to these gaps, particularly among women of color (Moore & Hayes, 2023).

Strategies to Improve Access

Evidence-based interventions can reduce disparities in biomarker testing:

- Patient Navigation-Patient navigation programs improve access to cancer screening, diagnosis, and treatment. Navigators assist patients in understanding testing options, coordinating care, and overcoming logistical and financial barriers (Marshall et al., 2015; Hoffman et al., 2012).

- Culturally Tailored Education-Culturally appropriate educational interventions—including videos and community-based resources—have been shown to improve knowledge, attitudes, and engagement with clinical care (Dadha et al., 2026; Robinson et al., 2017).

- Workforce Diversity-Increasing the number of Black oncology professionals can improve patient-provider communication, enhance cultural understanding, and encourage research focused on underserved populations (Butler et al., 2019; Garcia et al., 2017).

- Provider Training-Cultural competency training can improve provider awareness of implicit bias and enhance communication with diverse patient populations. Training programs that specifically address disparities in biomarker testing may promote more equitable care (Thompson et al., 2025).

- Clinical Trial Inclusion-Increasing representation of Black women in clinical trials is essential for advancing equitable treatment outcomes and improving the evidence base for targeted therapies (Stringer-Reasor et al., 2021).

Gaps and Limitations

A key limitation in existing research is the narrow focus on comparisons between Black and White populations, often excluding other racial and ethnic groups due to small sample sizes. This approach limits generalizability and obscures differences within populations. Additionally, the use of broad racial categories fails to capture heterogeneity within groups. For example, outcomes among Asian populations vary significantly by country of origin and other factors (Warner et al., 2015). Underrepresentation of Native American and multiracial populations further highlights the need for more inclusive research designs.

Conclusion

Disparities in biomarker testing among Black women with HR+/HER2− metastatic breast cancer reflect broader structural inequities in healthcare. Barriers at the provider, system, and patient levels contribute to reduced access to precision oncology and poorer outcomes.

Addressing these disparities requires coordinated efforts, including expanded patient navigation services, culturally competent care, improved provider training, and increased workforce diversity. Enhancing access to biomarker testing is a critical step toward achieving equity in cancer treatment and outcomes.

References

American Cancer Society. (2024). *Breast cancer facts & figures 2024–2025.*

André, F., et al. (2019). Alpelisib for PIK3CA-mutated breast cancer. *New England Journal of Medicine, 380*(20), 1929–1940.

Butler, S. S., et al. (2019). Racial disparities in cultural competency. *JAMA Oncology, 6*(1), 152–160.

Dadha, P., et al. (2026). Culturally tailored education interventions. *PEC Innovation, 8*, 100470.
Farrokhi, P., et al. (2026). Racial differences in MBC outcomes. *NPJ Breast Cancer, 12*(1).

Garrett, E., et al. (2023). Experiences of racial bias in cancer care. *JNCI Journal of the National Cancer Institute, 116*(2), 258–263.

Jatoi, I., et al. (2022). Racial disparities in breast cancer mortality. *New England Journal of Medicine, 386*(25), 2349–2352.

Lopez-Gonzalez, L., et al. (2024). Biomarkers in breast cancer. *Medicina, 60*(1), 168.

Marshall, J. K., et al. (2015). Patient navigation and screening. *Journal of General Internal Medicine, 31*(1), 68–76.

Moore, L., & Hayes, A. E. (2023). Health literacy in Black women. *Clinical Journal of Oncology Nursing, 27*(5), 507–513.

Podany, E. L., et al. (2025). Racial differences in targeted therapies. *JAMA Network Open, 8*(2).

Robinson, B. N., et al. (2017). Video interventions and trial participation. *NPJ Breast Cancer, 3*(1).

Stringer-Reasor, E. M., et al. (2021). Breast cancer disparities. *ASCO Educational Book, 41*, e29–e46.

Warner, E. T., et al. (2015). Racial differences in breast cancer survival. *Journal of Clinical Oncology, 33*(20), 2254–2261.