Category III. Breast Disease Diagnosis and Management

Category III-A. Diagnostic Imaging

Category III-A.1. Screening and Diagnostic Mammography

Integrating Genetic Testing, Combined Polygenic Risk, and Family History Assessment to Improve High-Risk Breast Cancer Identification in a Community Breast Imaging Center

Tami Hudson[1], Shayna Giardina Leggett[1], Tammy McKamie[2], Laura Brzeskiewicz[2]

[1]*Singing River Health System, Mississippi, USA*
[2]*Myriad Genetics, Utah, USA*

Objective: This initiative evaluated whether the Tyrer-Cuzick (TC) v8 model alone is sufficient for breast cancer (BC) risk assessment compared to a comprehensive strategy incorporating detailed family history intake, germline multigene panel testing, and a combined risk score (CRS) that integrates TC with a polygenic score validated for all ancestries. The aim was to determine whether this integrated approach more accurately identifies individuals at increased risk for breast and other cancers in a community breast imaging center and better supports personalized screening and management decisions.

Materials and Methods: Beginning in November 2020, Singing River Health System implemented a comprehensive breast risk assessment program that combined TC modeling, multigene germline testing, and CRS into its breast imaging program. During routine mammography, patients completed TC and were screened for genetic testing eligibility based on NCCN guidelines. Eligible patients received a telephone-based family history review and genetic education, followed by same day blood sample collection after consenting to testing. Testing included a germline multigene panel and CRS to determine individualized BC risk. After results were available, a nurse navigator reviewed results and guideline-based recommendations with patients. Program outcomes were analyzed to determine clinical management implications and to identify individuals who would not have met high-risk criteria using TC alone.

Results: From November 2020 through December 2025, TC results were determined for 3,017 patients; eligible patients underwent germline genetic testing and CRS. Among these, 895 (30%) required changes in medical management despite having a TC-estimated lifetime BC risk <20% as follows:

- 75 (8.3%) carried a pathogenic variant.
- 186 (20.7%) had lifetime BC risk >20% based on CRS.
- 634 (70%) required modified management after expanded family history was obtained during counseling.

Downstream clinical actions that have the potential for meaningful impact on breast cancer outcomes included:

- 175 risk-reduction counseling visits.
- 103 breast MRIs for patients whose CRS revealed a lifetime BC risk >20%.
- 63 gastroenterology consults resulting in 26 colonoscopies.

Conclusion: A multifaceted risk assessment program integrating TC with CRS and germline genetic testing identified substantially more individuals requiring high-risk management than TC alone. This approach revealed patients who benefited from guideline recommended surveillance, preventive interventions, and specialty referrals, many of whom would have been missed using TC as a standalone assessment. These findings support the value of integrated genetic, polygenic, and family history-based evaluation within community imaging centers.

Keywords: Genetic testing; high-risk