Treatment Characteristics of Breast Cancer Patients per HER2/HR Status in the United States: A Surveillance, Epidemiology, and End Results (SEER) 2018-2022 Database Analysis

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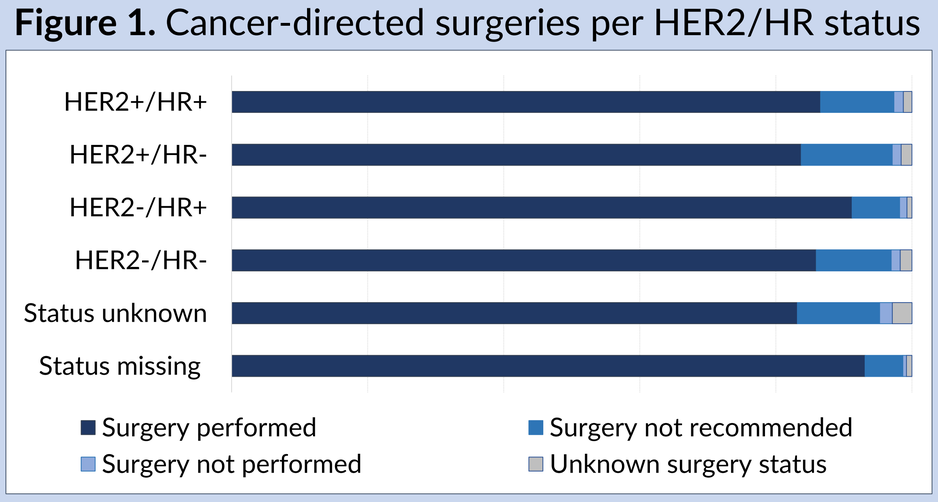
KEY FINDINGS

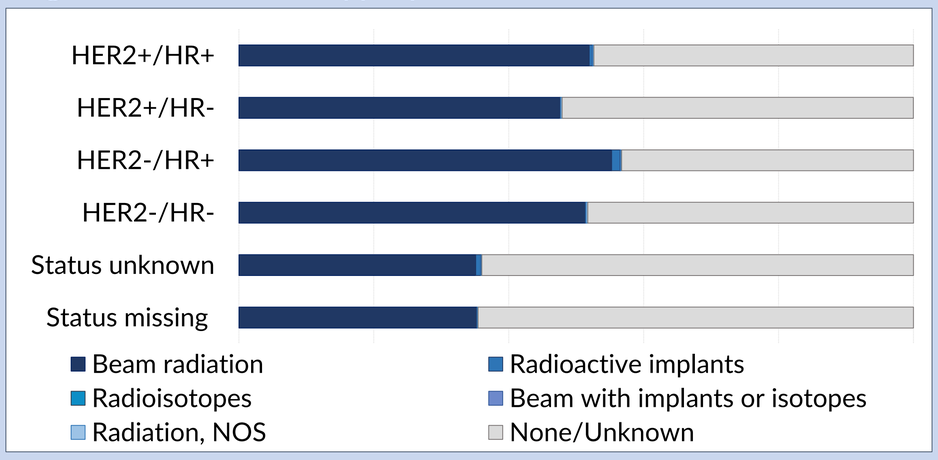
- Most breast cancer patients had HER2-/HR+ status (59.49%) and localized cancer stage (53.51%)
- Most participants were between 20-64 years old (55.23%), female (99.21%), non-Hispanic White (62.29%), married (55.21%), metropolitan area residents (90.38%), and had $65,000-90,000 annual household income (43.93%)
- Cancer-directed surgeries were performed in 88.48% of the sample. The lowest surgery rate per HER2/HR status (Figure 1) was reported in the group with unknown status (83.16%), mainly because the procedure was not recommended (12.09%)

Figure 1. Cancer-directed surgeries per HER2/HR status



- Around half of the population reported receiving radiation treatment (51.37%), of whom 97.72% received beam radiation
- The lowest rate of receiving radiation was observed in patients with unknown HER2/HR status (36.01%) and in HER2+/HR- (47.92%) among those with the known status (Figure 2)
- If combined with surgery, radiation was most frequently administered after the surgical procedure (49.52%)
- Only 30.18% of the total sample received chemotherapy
- Systemic therapy (any type) and surgery were administered to 68.60% of patients, mostly after surgery (54.35%)

Figure 2. Radiation type per HER2/HR status



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BACKGROUND

- Breast cancer is a heterogeneous disease with distinct subtypes characterized by unique epidemiological patterns [1]
- Evidence suggests that optimal diagnosis and treatment models tailored to individual patient risk and expected subtypes are crucial, supporting the era of precision oncology for breast cancer [2]
- Globally, breast cancer accounts for approximately one-third of all malignancies in women, with a rising mortality rate [3]
- Based on the American Cancer Society data, about 316,950 new cases of invasive breast cancer will be diagnosed and about 42,170 women will die from breast cancer in 2025 in US [4]

OBJECTIVES

- The Surveillance, Epidemiology, and End Results (SEER) data were used to investigate treatment characteristics of US breast cancer patients stratified by HER2/HR status
- Additionally, variables reflecting social determinants of health were explored among breast cancer patients using the most recent SEER data

METHODS

- The SEER registries collect data on patient demographics, primary tumor site, tumor morphology, stage at diagnosis, first course of treatment, and follow up with patients for vital status [5]
- The SEER includes cancer incidence data from the population-based cancer registries covering ~45.9% of the US population [5]
- The data (SEER Research Database, available since April 2025) from the 17 US cancer registries (last 5 years of data, 2018-2022) was analyzed using SEER*Stat software
- The target population included malignant breast cancer patients identified with morphology site codes related to the breast and further stratified by the presence of human epidermal growth 2 protein and hormone receptors (HER2/HR) status
- The main study outcomes included treatment patterns and treatment characteristics among breast cancer patients

CONCLUSIONS

- Surgery was more frequently combined with systemic therapy than radiation, mainly after the procedure
- Study findings may indicate that the majority of breast cancer patients were detected relatively early, as most of them had localized cancer and underwent surgery

FUNDING

- This research did not receive any funding

DISCLOSURE

- FS, DG, and VZ are employees of ZRx Outcomes Research Inc.

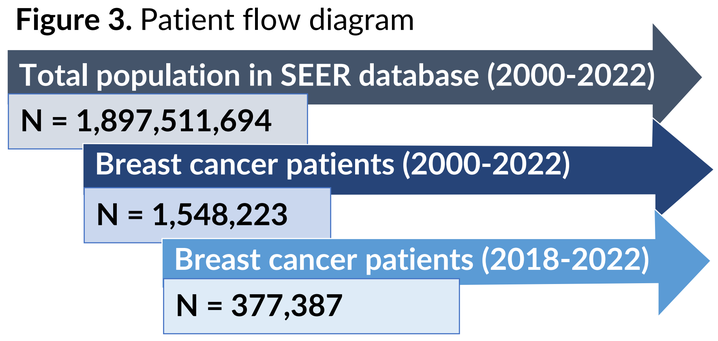
REFERENCES

1. *Wu et al. CACA Guidelines for Holistic Integrative Management of Breast Cancer. DOI: 10.1007/s44178-022-00007-8.*
2. *Xiong et al. Breast cancer: pathogenesis and treatments. DOI: 10.1038/s41392-024-02108-4.*
3. *Xu et al. Global trends and forecasts of breast cancer incidence and deaths. DOI: 10.1038/s41597-023-02253-5.*
4. *American Cancer Society. Available at: https://www.cancer.org/cancer/types/breast-cancer/about/how-common-is-breast-cancer.html*
5. *The Surveillance, Epidemiology, and End Results (SEER). Available at: https://seer.cancer.gov/data/*

RESULTS

- There were 377,387 breast cancer patients in US diagnosed between 2018 and 2022 (Figure 3)

Figure 3. Patient flow diagram



- The distributions of patients across the social determinants of health groups available in the SEER database (age, gender, race, marital status, rural area status, and annual household income) (Figures 4a-4d)

Figure 4a. Stratification by race

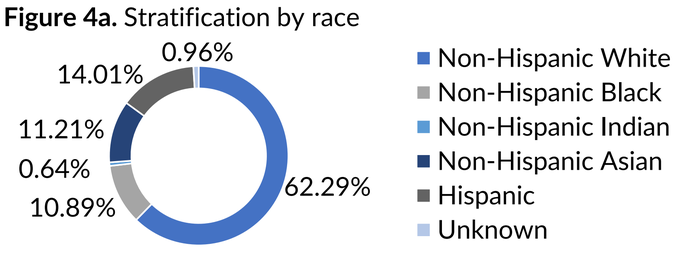


Figure 4b. Stratification by rural area status

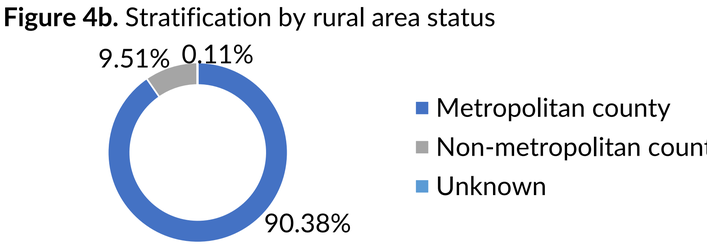


Figure 4c. Stratification by marital status

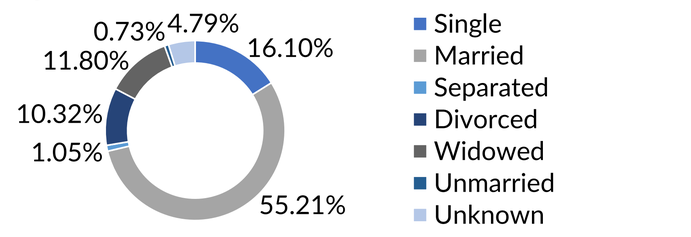
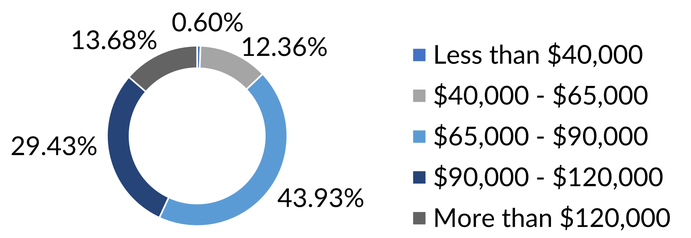


Figure 4d. Stratification by annual household income



Demographics

- Almost all breast cancer patients were females (99.21%), with a rare occurrence among males (0.79%). The highest proportion of patients were females with HER2 -/HR + status (58.91%)
- Regarding age distribution, 0.01% of patients were <20 years old, 55.23% were 20-64 years old, and 44.76% were older than 64 years. It was noted that 30.64% of patients were 20-64 years old with HER2 -/HR + status and 28.86% were aged ≥65 years with HER2 -/HR + status

Radiation Therapy

- It was observed that 49.51% of breast cancer patients did not have radiation and/or surgery, while 49.52% had radiation after surgery
- The highest proportion of patients who received radiation after surgery was noted in HER2-/HR+ category (54.69%), while the lowest in patients with HER2/HR missing status (33.99%)

Chemotherapy

- Most breast cancer patients did not have chemotherapy (69.82%)
- The lowest chemotherapy administration rate was reported in breast cancer patients with unknown HER2/HR status (2.62%)
- Among those with known status, the lowest chemotherapy administration rate was observed in HER2-/HR+ (24.61%), while other subgroups had much higher chemotherapy administration rates (74.06% in HER2+/HR+, 77.92% in HER2+/HR-, 77.56% in HER2-/HR-)