Racial and Socioeconomic Disparities in Patterns of Metastatic Disease Presentation and Treatment Among Patients with *de novo* Metastatic HR-Positive, HER2-Negative Breast Cancer

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Introduction

- Hormone receptor-positive (HR+) breast cancer is the most common form of metastatic breast cancer in the US, and recent therapeutic advances have substantially improved outcomes.[1]
- Despite these advances, Black and Hispanic patients continue to fare worse than other racial and ethnic groups.[2,3]
- Limited data exist on how patterns of presentation and timing of treatment initiation vary by race and socioeconomic status, specifically in patients with *de novo* metastatic HR+/HER2- breast cancer.

Methods

- Patients diagnosed with *de novo* metastatic HR+/HER2− breast cancer between 2010 and 2022 were identified using the National Cancer Database (NCDB).
- Sociodemographic and clinical characteristics were compared across racial/ethnic groups. Pattern of metastatic spread at diagnosis and time from diagnosis to initiation of **endocrine therapy (ET), chemotherapy (chemo)**, and **radiation therapy (RT)** were assessed.
  - Of note, CDK 4/6i are not coded specifically in NCBD and were categorized as chemo.
- Multivariable linear regression was used to examine differences in time (in days) to treatment by race/ethnicity, insurance status, area-level income and education, and facility type, adjusting for relevant clinical covariates. Regression coefficients (β) and 95% CIs were calculated to determine differences in treatment timing.

Results

- 72,874 patients were identified with *de novo* metastatic HR+/HER2− breast cancer. Mean age was 63.4 yrs (SD 13.8); 74.2% were White, 15.1% Black, 6.2% Hispanic, 3.5% Asian/Pacific Islander (API).
- At diagnosis, 5.9% presented with brain metastases, 64.4% with bone-only disease, and 38.1% with visceral disease.

Table 1: Treatment Patterns and Time to Initiation by Race/Ethnicity in *de novo* Metastatic HR+ Breast Cancer

	White	Black	API	Hispanic	Other	P Value
ET Received	42300 (80.1%)	7794 (73.3%)	1926 (78.7%)	3367 (76.8%)	613 (77.4%)	<.001
No. of days between diagnosis and start of ET						
Mean (SD)	59.9 (74.5)	71.2 (89.7)	68.8 (82.2)	75.8 (86.9)	66.3 (88.1)	<.001
Median (IQR)	34.0 (17.0, 68.0)	39.0 (20.0, 84.0)	36.0 (18.0, 81.0)	42.0 (22.0, 92.0)	36.0 (18.0, 75.0)	<.001
Chemo Received	30776 (57.7%)	6566 (60.7%)	1622 (65.4%)	2898 (65.3%)	439 (54.7%)	<.001
No. of days between diagnosis and start of chemotherapy						
Mean (SD)	53.4 (63.3)	58.2 (69.9)	58.0 (88.6)	64.7 (89.1)	56.5 (60.2)	<.001
Median (IQR)	40.0 (24.0, 64.0)	43.0 (26.0, 70.0)	42.0 (24.0, 67.0)	47.0 (28.0, 77.0)	41.0 (24.0, 71.5)	<.001
RT Received	16989 (32.9)	3164 (30.3)	813 (33.7)	1425 (33.4)	254 (32.8)	<.001
No. of days between diagnosis and start of radiation therapy						
Mean (SD)	92.6 (113.5)	106.6 (141.4)	119.9 (149.7)	118.5 (127.6)	110.3 (116.2)	<.001
Median (IQR)	46.0 (20.0, 123.0)	53.0 (19.0, 160.0)	66.0 (29.0, 189.0)	66.0 (29.0, 191.0)	67.0 (26.0, 170.0)	<.001

Figure 1: Metastatic Site Distribution at Diagnosis by Race/Ethnicity in *de novo* Metastatic HR+ Breast Cancer

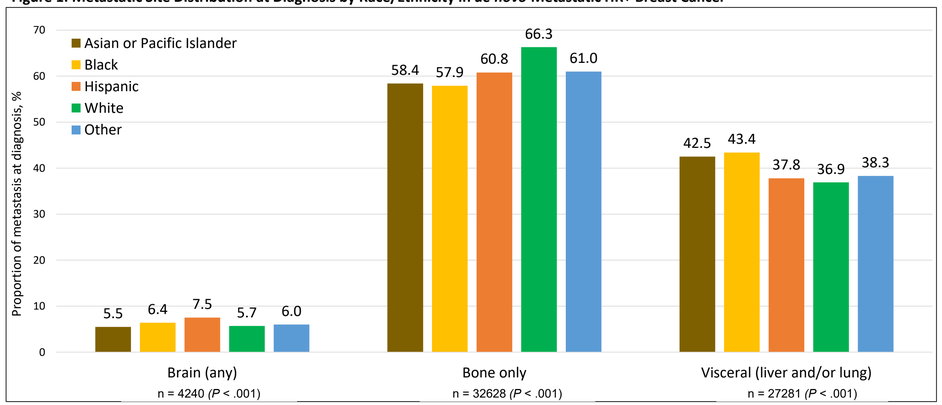


Table 2: Factors Associated with Treatment Initiation in *de novo* Metastatic HR+ Breast Cancer

	No. of days between diagnosis and ET start	No. of days between diagnosis and chemo start	No. of days between diagnosis and RT start
	β (95% CI)	β (95% CI)	β (95% CI)
	on average, number of days to initiate treatment		
Age at Diagnosis	**-11.5 (-12.3, -10.7)**	0.6 (-0.3, 1.5)	**-16.3 (-18.2, -14.3)**
Race/Ethnicity			
Black	**6.6 (4.5, 8.8)**	**3.6 (1.4, 5.8)**	**11.3 (5.9, 16.7)**
API	3.0 (-1.0, 7.0)	**7.0 (3.0, 11.1)**	**21.3 (11.6, 31.0)**
Hispanic	**8.3 (5.2, 11.5)**	**12.3 (9.2, 15.5)**	**18.6 (11.0, 26.2)**
Other	2.0 (-4.8, 8.8)	3.3 (-4.2, 10.8)	7.3 (-9.2, 23.8)
White	0 [ref.]	0 [ref.]	0 [ref.]
Charlson-Deyo Comorbidity Index			
0	**4.1 (1.3, 6.9)**	0 [ref.]	0 [ref.]
1	3.2 (-0.1, 6.4)	-0.3 (-2.5, 2.0)	**8.8 (1.2, 16.3)**
≥2	0 [ref.]	2.4 (-0.8, 5.7)	**9.0 (0.4, 17.7)**
Primary payer at diagnosis			
Uninsured	**-8.6 (-12.5, -4.8)**	-0.1 (-3.9, 3.8)	**-25.5 (-34.3, -16.8)**
Private	0 [ref.]	0 [ref.]	0 [ref.]
Medicaid	**-4.5 (-6.9, -2.0)**	**4.2 (1.7, 6.7)**	**-18.7 (-24.3, -13.0)**
Medicare	-1.9 (-3.9, 0.1)	**2.9 (0.8, 5.1)**	-2.3 (-7.3, 2.6)
Other	1.4 (-6.5, 9.3)	-2.1 (-10.2, 6.0)	-1.7 (-19.7, 16.4)
Percent no high school degree quartiles			
≥ 15.3	**4.4 (1.7, 7.1)**	0.9 (-2.0, 3.8)	**8.4 (1.8, 15.1)**
9.1-15.2	2.1 (-0.15, 4.39)	0.5 (-2.0, 3.0)	2.3 (-3.3, 8.0)
5.0-9.0	1.6 (-0.4, 3.7)	1.4 (-0.8, 3.6)	1.4 (-3.7, 6.5)
< 5.0	0 [ref.]	0 [ref.]	0 [ref.]
Median income quartiles			
< $46,277	**2.7 (0.1, 5.2)**	2.4 (-0.4, 5.1)	**-9.0 (-15.3, -2.7)**
$46,227-$57,856	**2.8 (0.6, 4.9)**	0.7 (-1.6, 3.1)	-4.2 (-9.5, 1.1)
$57,857-$74,062	1.8 (-0.1, 3.8)	0.1 (-2.1, 2.2)	**-5.4 (-10.2, -0.7)**
≥ $74,063	0 [ref.]	0 [ref.]	0 [ref.]
Facility type/cancer program			
Community	**5.9 (3.2, 8.7)**	**-5.1 (-8.0, -2.2)**	3.6 (-3.2, 10.3)
Comp. community	**5.5 (3.9, 7.1)**	**-6.1 (-7.9, -4.4)**	-0.1 (-4.1, 4.0)
Academic/research	0 [ref.]	0 [ref.]	0 [ref.]
Integrated network	**2.2 (0.3, 4.2)**	**-5.8 (-7.9, -3.6)**	-4.3 (-9.2, 0.6)

Discussion

- Racial and socioeconomic disparities were evident in both metastatic disease patterns and time to treatment initiation among patients with *de novo* metastatic HR+/HER2− breast cancer.
- Bone-only metastases, associated with more favorable outcomes,[4] were more frequent in White patients, while Black and Hispanic patients presented with visceral or brain metastases and experienced longer delays to treatment, even after adjusting for clinical and system-level factors.
- These results align with prior population-based analyses demonstrating persistent disparities in access to systemic therapies which may contribute to worse patient outcomes.[5]
- Insurance status emerged as a key determinant of timely treatment initiation, with public or no insurance linked to significant delays.

Limitations: Retrospective design; absence of data on other factors which can influence outcomes (e.g., genomics, lifestyle and behavioral factors); NCDB lacks details on specific regimens (e.g., CDK4/6is) and reasons for treatment delay.

Conclusion

In conclusion, the findings of this retrospective study highlight persistent inequities in access to timely cancer care across racial/ethnic settings in the US.

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