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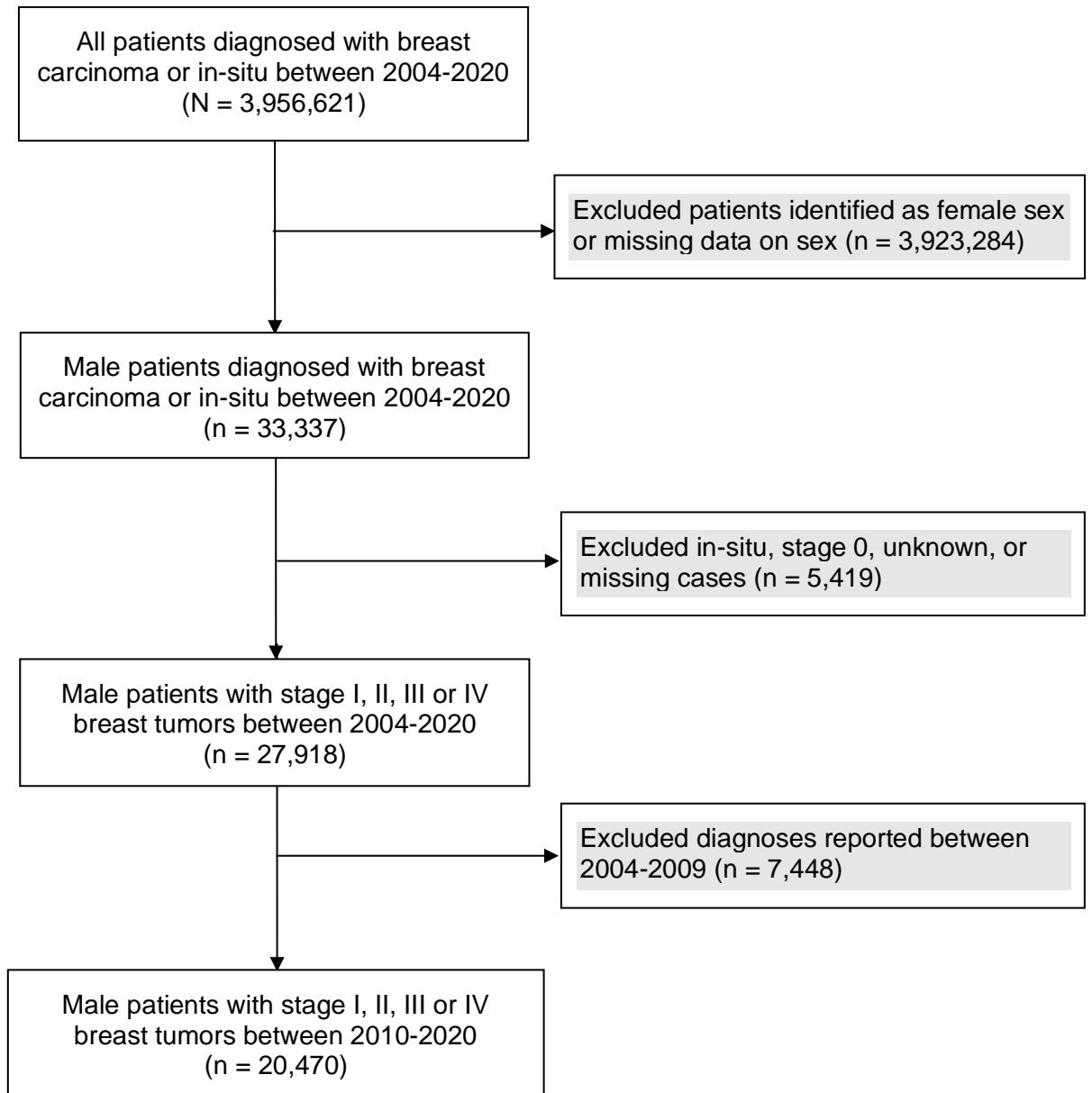
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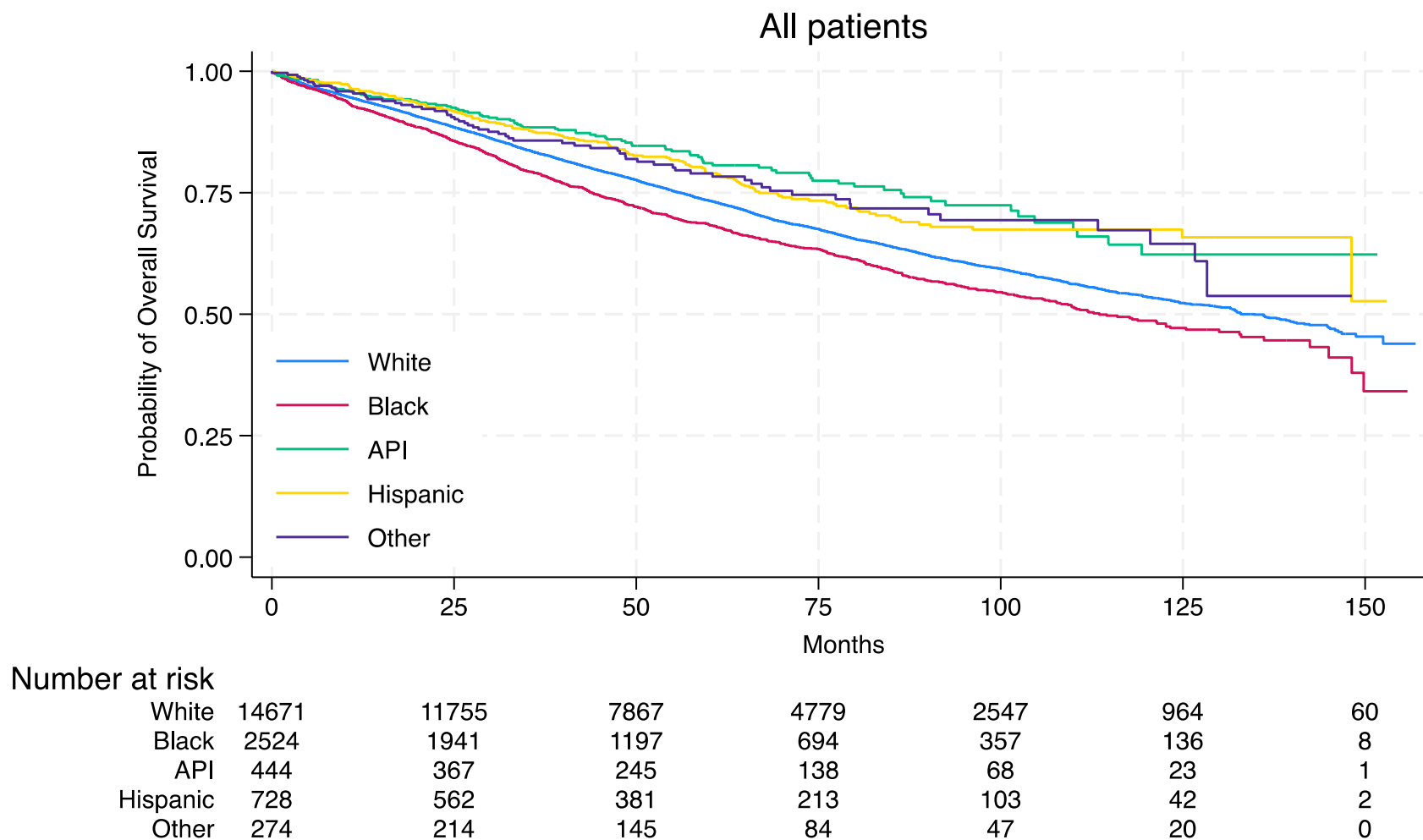
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Supplementary Figure 1. CONSORT Diagram of Cohort Selection of Male Patients with Breast Cancer in the National Cancer Database

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┌─────────────────────────────────┐
│   All patients diagnosed with    │
│ breast carcinoma or in-situ      │
│ between 2004-2020                │        ┌───────────────────────────────┐
│   (N = 3,956,621)                │───────▶│ Excluded patients identified  │
└─────────────────────────────────┘        │ as female sex or missing data │
                 │                          │ on sex (n = 3,923,284)        │
                 ▼                          └───────────────────────────────┘
┌─────────────────────────────────┐
│ Male patients diagnosed with     │
│ breast carcinoma or in-situ      │
│ between 2004-2020                │        ┌───────────────────────────────┐
│   (n = 33,337)                   │───────▶│ Excluded in-situ, stage 0,    │
└─────────────────────────────────┘        │ unknown, or missing cases     │
                 │                          │ (n = 5,419)                   │
                 ▼                          └───────────────────────────────┘
┌─────────────────────────────────┐
│ Male patients with stage I, II,  │
│ III or IV breast tumors between  │
│ 2004-2020                        │        ┌───────────────────────────────┐
│   (n = 27,918)                   │───────▶│ Excluded diagnoses reported   │
└─────────────────────────────────┘        │ between 2004-2009 (n = 7,448) │
                 │                          └───────────────────────────────┘
                 ▼
┌─────────────────────────────────┐
│ Male patients with stage I, II,  │
│ III or IV breast tumors between  │
│ 2010-2020                        │
│   (n = 20,470)                   │
└─────────────────────────────────┘
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Supplementary Figure 2. Kaplan-Meier Curves for Overall Survival of Male Patients with Breast Cancer, Overall

All patients

Number at risk							
White	14671	11755	7867	4779	2547	964	60
Black	2524	1941	1197	694	357	136	8
API	444	367	245	138	68	23	1
Hispanic	728	562	381	213	103	42	2
Other	274	214	145	84	47	20	0

Abbreviations: API, Asian or Pacific Islander; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer.

Supplementary Table 1. Number of Events and Estimated Median Survival Time among Male Patients with Breast Cancer, Overall and Stratified by Tumor Stage and Molecular Subtype

		Race/Ethnicity	No. of subjects	No. of events	Median survival time in months (95% CI)	*P* value [a]
Overall		White	14671	4526	134.77 (131.48, 140.22)	<0.001
		Black	2524	860	113 (106.68, 129.97)	
		API	444	89	NR	
		Hispanic	728	156	NR	
		Other	274	63	NR	
Tumor stage	**Stage I**					
		White	6711	1283	NR	0.002
		Black	918	169	145.02 (132.99, 149.82)	
		API	208	19	NR	
		Hispanic	309	37	NR	
		Other	114	16	NR	
	Stage II					
		White	4902	1634	132.83 (127.80, 140.62)	<0.001
		Black	878	285	129.97 (112.07, -)	
		API	141	30	NR	
		Hispanic	244	49	148.14 (148.14, -)	
		Other	100	22	NR	
	Stage III					
		White	1911	801	92.65 (84.34, 105.00)	0.012
		Black	418	193	82.23 (62.06, 103.39)	
		API	54	15	NR	
		Hispanic	110	34	NR	
		Other	32	11	NR	
	Stage IV					
		White	1147	808	29.37 (27.01, 31.70)	0.119
		Black	310	213	28.52 (22.57, 34.50)	
		API	41	25	33.28 (22.54, 59.24)	

		Hispanic	65	36	42.84 (25.10, 57.53)	
		ther	28	14	48.49 (20.6, -)	
Molecular subtype						
	HR+/HER2-					
		White	11534	3370	136.8 (132.11, 145.91)	<0.001
		Black	1816	579	122.68 (110.39, 145.02)	
		API	346	64	NR	
		Hispanic	549	107	148.14 (148.14, -)	
		Other	213	45	NR	
	HR+/HER2+					
		White	1527	498	122.05 (114.50, -)	0.413
		Black	313	105	109.77 (85.09, -)	
		API	41	<10	NR	
		Hispanic	67	18	NR	
		Other	20	<10	NR	
	HR-/HER2+					
		White	147	43	NR	0.123
		Black	36	14	NR	
		API	10	<10	NR	
		Hispanic	<10	<10	NR	
		Other	<10	<10	NR	
	TNBC					
		White	488	182	NR	0.035
		Black	148	65	63.7 (43.66, -)	
		API	18	11	43.7 (24.57, -)	
		Hispanic	39	<10	NR	
		Other	14	<10	NR	

Abbreviations: API, Asian or Pacific Islander; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer; CI, confidence interval, NR, not reached.

[a] P values were calculated using the stratified log-rank test.

Supplementary Table 2. Estimated 3-Year, 5-Year, and 10-Year Overall Survival Rates for Male Breast Cancer, Overall and Stratified by Tumor Stage and Molecular Subtype

		Race/Ethnicity	3-Year survival, % (95% CI)	5-Year survival, % (95% CI)	10-Year survival, % (95% CI)
Overall					
		White	83.4 (82.7, 84.0)	73.4 (72.6, 74.2)	53.6 (52.3, 54.8)
		Black	79.1 (77.3, 80.7)	68.4 (66.3, 70.3)	48.7 (45.5, 51.8)
		API	88.5 (84.9, 91.2)	81.1 (76.5, 84.9)	62.3 (52.9, 70.3)
		Hispanic	87.5 (84.7, 89.8)	79.0 (75.3, 82.2)	67.4 (62.4, 71.9)
		Other	85.7 (80.7, 89.6)	79.0 (72.8, 83.9)	67.3 (58.5, 74.7)
Tumor stage					
	Stage I	White	90.2 (89.4, 90.9)	83.3 (82.2, 84.3)	64.9 (62.9, 66.9)
		Black	90.9 (88.7, 92.7)	83.7 (80.6, 86.4)	64.8 (58.9, 70.1)
		API	96.3 (92.3, 98.2)	92.1 (86.1, 95.5)	75.1 (58.1, 86.0)
		Hispanic	94. 3 (90.7, 96.6)	89.5 (84.3, 93.0)	76.1 (67.5, 82.7)
		Other	94.0 (87.2, 97.3)	87.2 (76.9, 93.1)	74.1 (56.4, 85.5)
	Stage II	White	85.2 (84.2, 96.2)	74.9 (73.6, 76.2)	53.9 (51.9, 55.9)
		Black	83.7 (81.0, 86.1)	73.7 (70.4, 76.6)	52.8 (47.8, 57,6)
		API	90.4 (84.1, 94.3)	82.7 (74.5, 88.5)	57.5 (39.2, 72.1)
		Hispanic	88.9 (83.9, 92.3)	81.3 (75.2, 86.0)	74.5 (66.9, 80.6)
		Other	89.5 (81.3, 94.2)	84.4 (74.9, 90.5)	73.0 (60.4, 82.2)
	Stage III	White	79.2 (77.2, 81.0)	64.9 (62.5, 67.2)	43.0 (39.8, 46.2)
		Black	71.4 (66.6, 75.6)	56.8 (51.5, 61.8)	36.5 (29.2, 43.9)
		API	84.2 (70.8, 91.8)	73.7 (57.8, 84.3)	61.8 (43.1, 75.9)
		Hispanic	85.8 (77.1, 91.3)	72.2 (61.1, 80.6)	52.4 (38.8, 64.4)
		Other	77.7 (56.5, 89.4)	63.9 (41.4, 79.6)	50.3 (26.6, 70.0)
	Stage IV	White	42.9 (39.9, 45.9)	27.0 (24.1, 29.9)	10.7 (7.7, 14.3)
		Black	41.7 (35.8, 47.5)	26.4 (20.8, 32.3)	10.1 (4.8, 17.8)

		API	46.2 (28.8, 61.9)	29.9 (14.5, 47.1)	18.7 (5.9, 37.0)
		Hispanic	53.7 (39.8, 65.7)	33.7 (19.7, 48.3)	20.2 (6.7, 38.8)
		Other	50.8 (30.6, 67.8)	45.7 (25.7, 63.6)	——
Molecular subtype					
	HR+/HER2-	White	85.3 (84.6, 85.9)	75.0 (74.1, 75.9)	54.3 (52.9, 55.7)
		Black	81.0 (79.1, 82.9)	70.1 (67.6, 72.4)	51.2 (47.5, 54.9)
		API	90.8 (87.1, 93.6)	82.7 (77.5, 86.8)	62.1 (51.0, 71.4)
		Hispanic	89.1 (86.0, 91.6)	81.3 (77.1, 84.8)	69.3 (63.4, 74.4)
		Other	87.1 (81.5, 91.1)	82.8 (76.3, 87.7)	69.9 (59.5, 78.2)
	HR+/HER2+	White	81.3 (79.2, 83.2)	70.8 (68.2, 73.2)	51.0 (46.8, 55.2)
		Black	80.3 (75.3, 84.5)	71.2 (65.2, 76.3)	44.0 (34.1, 53.4)
		API	86.4 (70.3, 94.1)	86.4 (70.3, 94.1)	69.9 (41.3, 86.5)
		Hispanic	84.8 (72.7, 91.8)	73.0 (58.2, 83.3)	58.9 (40.7, 73.2)
		Other	77.4 (49.8, 91.0)	61.0 (31.4, 80.9)	50.8 (21.6, 74.1)
	HR-/HER2+	White	76.3 (68.2, 82.5)	72.5 (64.0, 79.4)	62.7 (51.7, 71.9)
		Black	68.4 (48.9, 81.8)	57.4 (37.7, 72.9)	53.6 (34.1, 69.7)
		API	——	——	——
		Hispanic	——	83.3 (27.3, 97.5)	——
		Other	——	——	——
	TNBC	White	67.7 (63.2, 71.8)	62.0 (57.2, 66.5)	56.4 (50.9, 61.5)
		Black	64.0 (55.3, 71.5)	52.3 (43.0, 60.8)	47.3 (37.7, 56.3)
		API	54.6 (29.2, 74.2)	28.3 (6.5, 55.7)	28.3 (6.5, 55.7)
		Hispanic	86.8 (71.2, 94.3)	76.4 (57.9, 87.6)	76.4 (57.9, 87.6)
		Other	83.3 (48.2, 95.6)	60.8 (25.0, 83.6)	——

Abbreviations: API, Asian or Pacific Islander; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer; CI, confidence interval.

Supplementary Table 3. Racial/Ethnic Differences in Overall Survival of Male Patients with Breast Cancer: Cox Proportional Hazards Regression

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	1.62 (1.59, 1.67)	<0.001	1.71 (1.67, 1.76)	<0.001	1.74 (1.67, 1.80)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.44 (1.34, 1.55)	<0.001	1.22 (1.12, 1.32)	<0.001	1.09 (0.99, 1.21)	0.075
API	0.77 (0.62, 0.95)	0.013	0.69 (0.54, 0.88)	0.003	0.70 (0.54, 0.90)	0.006
Hispanic	0.94 (0.80, 1.10)	0.430	0.88 (0.74, 1.06)	0.183	0.76 (0.62, 0.94)	0.010
Other	0.83 (0.65, 1.06)	0.136	0.85 (0.65, 1.11)	0.234	0.86 (0.65, 1.15)	0.313
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			0.95 (0.78, 1.15)	0.595	0.94 (0.76, 1.15)	0.527
Ductal and lobular			0.88 (0.71, 1.08)	0.225	0.94 (0.75, 1.19)	0.629
Other			1.03 (0.92, 1.15)	0.568	1.01 (0.89, 1.14)	0.910
AJCC stage group						
I			1.0 (reference)		1.0 (reference)	
II			1.48 (1.38, 1.60)	<0.001	1.46 (1.35, 1.58)	<0.001
III			2.12 (1.95, 2.32)	<0.001	2.07 (1.88, 2.28)	<0.001
IV			7.69 (6.99, 8.45)	<0.001	7.65 (6.89, 8.50)	<0.001
Molecular subtype						
HR+/HER2-			0.55 (0.48, 0.64)	<0.001	0.56 (0.48, 0.66)	<0.001
HR+/HER2+			0.62 (0.53, 0.72)	<0.001	0.62 (0.52, 0.74)	<0.001
HR-/HER2+			0.52 (0.38, 0.72)	<0.001	0.52 (0.36, 0.75)	0.001
TNBC			1.0 (reference)		1.0 (reference)	
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.12 (1.02, 1.23)	0.027	1.10 (0.99, 1.23)	0.079
3			1.37 (1.24, 1.52)	<0.001	1.32 (1.18, 1.48)	<0.001
Charlson-Deyo comorbidity score						

			AHR (95% CI)	p	AHR (95% CI)	p
0			1.0 (reference)		1.0 (reference)	
1			1.29 (1.20, 1.39)	<0.001	1.29 (1.20, 1.40)	<0.001
≥2			2.03 (1.86, 2.22)	<0.001	2.04 (1.85, 2.24)	<0.001
Percent no high school degree quartiles [a]						
≥17.6%					1.07 (0.74, 1.22)	0.277
10.9-17.5%					1.09 (0.98, 1.21)	0.118
6.3-10.8%					1.15 (1.05, 1.26)	0.003
<6.3%					1.0 (reference)	
Median household income quartiles [b]						
<$40,227					1.0 (reference)	
$40,227–$50,353					0.89 (0.80, 0.99)	0.038
$50,354–$63,332					0.85 (0.76, 0.96)	0.006
≥$63,333					0.76 (0.67, 0.86)	<0.001
Type of health insurance						
Uninsured					1.79 (1.42, 2.26)	<0.001
Private/managed care					1.0 (reference)	
Medicaid					1.60 (1.35, 1.89)	<0.001
Medicare					1.19 (1.09, 1.30)	<0.001
Other government/unknown					1.24 (1.02, 1.52)	0.033
Rural-urban area						
Metro					1.0 (reference)	
Urban					1.05 (0.95, 1.16)	0.337
Rural					1.08 (0.82, 1.41)	0.593
Facility type/cancer program						
Community					1.0 (reference)	
Comprehensive community					1.10 (0.98, 1.24)	0.106
Academic/research					1.05 (0.92, 1.19)	0.486
Integrated network					1.07 (0.94, 1.22)	0.302

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; AJCC, American Joint Committee on Cancer; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 4. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with Stage I Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	2.30 (2.18, 2.42)	<0.001	2.30 (2.17, 2.44)	<0.001	2.24 (2.09, 2.41)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.38 (1.17, 1.62)	<0.001	1.26 (1.05, 1.51)	0.011	1.12 (0.91, 1.38)	0.281
API	0.65 (0.41, 1.02)	0.064	0.64 (0.40, 1.04)	0.071	0.65 (0.38, 1.11)	0.117
Hispanic	0.996 (0.72, 1.38)	0.985	0.77 (0.52, 1.14)	0.190	0.69 (0.44, 1.08)	0.102
Other	1.01 (0.61, 1.65)	0.979	0.97 (0.58, 1.62)	0.920	1.06 (0.62, 1.81)	0.824
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			0.94 (0.66, 1.35)	0.746	0.91 (0.61, 1.35)	0.640
Ductal and lobular			0.62 (0.38, 1.01)	0.057	0.62 (0.36, 1.05)	0.074
Other			0.89 (0.71, 1.11)	0.286	0.85 (0.67, 1.09)	0.198
Molecular subtype						
HR+/HER2-			0.81 (0.59, 1.12)	0.202	0.97 (0.67, 1.41)	0.881
HR+/HER2+			0.98 (0.68, 1.40)	0.908	1.10 (0.73, 1.66)	0.659
HR-/HER2+			0.61 (0.24, 1.55)	0.300	0.45 (0.14, 1.48)	0.188
TNBC			1.0 (reference)		1.0 (reference)	
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.24 (1.07, 1.44)	0.004	1.25 (1.07, 1.46)	0.006
3			1.41 (1.18, 1.68)	<0.001	1.42 (1.17, 1.72)	<0.001
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.39 (1.21, 1.60)	<0.001	1.41 (1.21, 1.65)	<0.001
≥2			2.15 (1.83, 2.52)	<0.001	2.12 (1.77, 2.53)	<0.001
Percent no high school degree quartiles [a]						
≥17.6%					1.19 (0.93, 1.52)	0.157

					AHR (95% CI)	p-value
10.9-17.5%					1.04 (0.85, 1.27)	0.725
6.3-10.8%					1.15 (0.98, 1.37)	0.094
<6.3%					1.0 (reference)	
Median household income quartiles [b]						
<$40,227					1.0 (reference)	
$40,227–$50,353					0.85 (0.68, 1.05)	0.127
$50,354–$63,332					0.89 (0.72, 1.12)	0.325
≥$63,333					0.73 (0.58, 0.93)	0.012
Type of health insurance						
Uninsured					1.11 (0.52, 2.37)	0.782
Private/managed care					1.0 (reference)	
Medicaid					1.72 (1.16, 2.57)	0.007
Medicare					1.15 (0.97, 1.37)	0.111
Other government/unknown					1.34 (0.91, 1.99)	0.138
Rural-urban area						
Metro					1.0 (reference)	
Urban					1.22 (1.01, 1.47)	0.037
Rural					1.27 (0.74, 2.16)	0.385
Facility type/cancer program						
Community					1.0 (reference)	
Comprehensive community					1.17 (0.94, 1.45)	0.152
Academic/research					1.13 (0.90, 1.42)	0.304
Integrated network					1.11 (0.87, 1.41)	0.399

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 5. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with Stage II Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	1.79 (1.72, 1.86)	<0.001	1.75 (1.68, 1.83)	<0.001	1.75 (1.65, 1.86)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.28 (1.13, 1.45)	<0.001	1.15 (1.004, 1.33)	0.044	1.03 (0.87, 1.21)	0.758
API	0.79 (0.55, 1.13)	0.196	0.73 (0.50, 1.08)	0.120	0.77 (0.51, 1.17)	0.227
Hispanic	0.84 (0.63, 1.11)	0.223	0.77 (0.56, 1.06)	0.113	0.70 (0.50, 0.99)	0.042
Other	0.63 (0.42, 0.97)	0.034	0.71 (0.46, 1.09)	0.113	0.70 (0.45, 1.11)	0.130
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			0.93 (0.66, 1.30)	0.670	0.93 (0.65, 1.34)	0.712
Ductal and lobular			0.87 (0.61, 1.24)	0.438	0.89 (0.60, 1.32)	0.566
Other			0.96 (0.78, 1.18)	0.698	1.03 (0.83, 1.28)	0.761
Molecular subtype						
HR+/HER2-			0.56 (0.44, 0.71)	<0.001	0.52 (0.41, 0.67)	<0.001
HR+/HER2+			0.62 (0.48, 0.81)	<0.001	0.56 (0.43, 0.75)	<0.001
HR-/HER2+			0.48 (0.25, 0.94)	0.031	0.29 (0.12, 0.73)	0.008
TNBC			1.0 (reference)		1.0 (reference)	
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.01 (0.85, 1.19)	0.912	1.02 (0.85, 1.22)	0.864
3			1.21 (1.02, 1.44)	0.028	1.18 (0.98, 1.42)	0.089
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.26 (1.12, 1.42)	<0.001	1.21 (1.06, 1.37)	0.004
≥2			2.28 (1.98, 2.62)	<0.001	2.19 (1.88, 2.56)	<0.001
Percent no high school degree quartiles [a]						
≥17.6%					0.999 (0.81, 1.23)	0.995

10.9-17.5%				1.08 (0.92, 1.28)	0.353
6.3-10.8%				1.04 (0.90, 1.20)	0.599
<6.3%				1.0 (reference)	
Median household income quartiles [b]					
<$40,227				1.0 (reference)	
$40,227–$50,353				0.87 (0.73, 1.04)	0.126
$50,354–$63,332				0.87 (0.73, 1.05)	0.140
≥$63,333				0.72 (0.59, 0.88)	0.001
Type of health insurance					
Uninsured				1.97 (1.34, 2.91)	0.001
Private/managed care				1.0 (reference)	
Medicaid				1.28 (0.92, 1.78)	0.136
Medicare				1.18 (1.02, 1.36)	0.028
Other government/unknown				1.54 (1.14, 2.08)	0.005
Rural-urban area					
Metro				1.0 (reference)	
Urban				0.91 (0.77, 1.08)	0.273
Rural				0.91 (0.54, 1.53)	0.723
Facility type/cancer program					
Community				1.0 (reference)	
Comprehensive community				1.09 (0.88, 1.34)	0.439
Academic/research				1.04 (0.83, 1.29)	0.758
Integrated network				1.07 (0.85, 1.34)	0.558

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 6. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with Stage III Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	1.52 (1.44, 1.60)	<0.001	1.54 (1.45, 1.64)	<0.001	1.55 (1.42, 1.68)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.39 (1.19, 1.63)	<0.001	1.33 (1.12, 1.58)	0.001	1.18 (0.95, 1.46)	0.132
API	0.71 (0.42, 1.18)	0.182	0.65 (0.37, 1.16)	0.145	0.59 (0.30, 1.15)	0.122
Hispanic	0.91 (0.65, 1.29)	0.599	0.89 (0.61, 1.28)	0.516	0.80 (0.53, 1.21)	0.297
Other	1.02 (0.56, 1.85)	0.949	1.26 (0.67, 2.35)	0.472	1.09 (0.54, 2.22)	0.808
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			1.49 (0.98, 2.24)	0.060	1.55 (0.98, 2.45)	0.063
Ductal and lobular			1.07 (0.70, 1.66)	0.748	1.16 (0.73, 1.84)	0.526
Other			1.14 (0.90, 1.43)	0.271	1.04 (0.80, 1.34)	0.786
Molecular subtype						
HR+/HER2-			0.82 (0.58, 1.16)	0.262	0.87 (0.58, 1.31)	0.510
HR+/HER2+			0.87 (0.59, 1.28)	0.473	0.90 (0.58, 1.42)	0.660
HR-/HER2+			0.70 (0.37, 1.33)	0.278	0.90 (0.45, 1.79)	0.757
TNBC			1.0 (reference)		1.0 (reference)	
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.08 (0.80, 1.45)	0.628	1.05 (0.76, 1.46)	0.752
3			1.50 (1.11, 2.02)	0.008	1.50 (1.08, 2.09)	0.015
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.25 (1.07, 1.48)	0.006	1.40 (1.17, 1.67)	<0.001
≥2			1.93 (1.58, 2.35)	<0.001	2.03 (1.63, 2.54)	<0.001
Percent no high school degree quartiles [a]						
≥17.6%					1.09 (0.80, 1.47)	0.592

					AHR (CI)	p-value
10.9-17.5%					1.18 (0.92, 1.53)	0.198
6.3-10.8%					1.39 (1.12, 1.74)	0.003
<6.3%					1.0 (reference)	
Median household income quartiles [b]						
<$40,227					1.0 (reference)	
$40,227–$50,353					0.96 (0.76, 1.22)	0.754
$50,354–$63,332					0.77 (0.59, 1.003)	0.053
≥$63,333					0.80 (1.12, 1.74)	0.129
Type of health insurance						
Uninsured					1.12 (0.67, 1.87)	0.655
Private/managed care					1.0 (reference)	
Medicaid					1.52 (1.08, 2.15)	0.016
Medicare					1.13 (0.92, 1.40)	0.253
Other government/unknown					1.17 (0.76, 1.81)	0.469
Rural-urban area						
Metro					1.0 (reference)	
Urban					1.13 (0.91, 1.42)	0.274
Rural					0.91 (0.49, 1.69)	0.771
Facility type/cancer program						
Community					1.0 (reference)	
Comprehensive community					0.99 (0.76, 1.29)	0.967
Academic/research					0.91 (0.68, 1.20)	0.495
Integrated network					1.07 (0.80, 1.44)	0.634

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 7. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with Stage IV Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	1.19 (1.13, 1.25)	<0.001	1.20 (1.12, 1.28)	<0.001	1.24 (1.13, 1.36)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.10 (0.95, 1.29)	0.201	1.12 (0.93, 1.36)	0.233	1.16 (0.92, 1.47)	0.200
API	0.81 (0.54, 1.20)	0.290	0.79 (0.45, 1.37)	0.399	0.85 (0.48, 1.49)	0.565
Hispanic	0.87 (0.62, 1.22)	0.411	1.18 (0.79, 1.76)	0.411	1.15 (0.70, 1.88)	0.591
Other	0.61 (0.36, 1.03)	0.066	0.76 (0.36, 1.61)	0.477	0.88 (0.39, 2.02)	0.771
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			0.70 (0.42, 1.15)	0.160	0.65 (0.38, 1.10)	0.110
Ductal and lobular			1.32 (0.82, 2.12)	0.261	1.82 (1.03, 3.23)	0.040
Other			1.07 (0.83, 1.38)	0.609	1.04 (0.78, 1.38)	0.785
Molecular subtype						
HR+/HER2-			0.23 (0.17, 0.30)	<0.001	0.23 (0.17, 0.31)	<0.001
HR+/HER2+			0.23 (0.17, 0.32)	<0.001	0.23 (0.16, 0.33)	<0.001
HR-/HER2+			0.30 (0.17, 0.52)	<0.001	0.33 (0.18, 0.63)	0.001
TNBC			1.0 (reference)		1.0 (reference)	
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.05 (0.74, 1.48)	0.791	0.84 (0.57, 1.24)	0.375
3			1.28 (0.91, 1.82)	0.160	1.04 (0.70, 1.53)	0.848
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.24 (1.03, 1.51)	0.026	1.19 (0.96, 1.47)	0.118
≥2			1.53 (1.20, 1.95)	0.001	1.52 (1.15, 2.00)	0.003
Percent no high school degree quartiles [a]						
≥17.6%					1.21 (0.86, 1.71)	0.272

10.9-17.5%				1.08 (0.81, 1.44)	0.604
6.3-10.8%				1.12 (0.88, 1.43)	0.365
<6.3%				1.0 (reference)	
Median household income quartiles [b]					
<$40,227				1.0 (reference)	
$40,227–$50,353				1.13 (0.84, 1.51)	0.417
$50,354–$63,332				1.07 (0.79, 1.45)	0.659
≥$63,333				1.16 (0.82, 1.63)	0.406
Type of health insurance					
Uninsured				1.94 (1.27, 2.96)	0.002
Private/managed care				1.0 (reference)	
Medicaid				1.41 (1.03, 1.92)	0.033
Medicare				1.26 (1.004, 1.57)	0.046
Other government/unknown				0.56 (0.27, 1.17)	0.123
Rural-urban area					
Metro				1.0 (reference)	
Urban				1.09 (0.84, 1.42)	0.508
Rural				1.63 (0.96, 2.80)	0.072
Facility type/cancer program					
Community				1.0 (reference)	
Comprehensive community				0.98 (0.73, 1.32)	0.889
Academic/research				0.89 (0.65, 1.22)	0.474
Integrated network				0.81 (0.58, 1.12)	0.199

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple-negative breast cancer.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 8. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with HR-Positive/HER2-Negative Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	1.69 (1.64, 1.74)	<0.001	1.74 (1.69, 1.80)	<0.001		
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.46 (1.33, 1.59)	<0.001	1.23 (1.12, 1.35)	<0.001	1.09 (0.98, 1.22)	0.111
API	0.73 (0.57, 0.94)	0.014	0.63 (0.48, 0.82)	0.001	0.65 (0.48, 0.86)	0.003
Hispanic	0.92 (0.76, 1.12)	0.408	0.85 (0.70, 1.05)	0.135	0.76 (0.61, 0.95)	0.017
Other	0.77 (0.58, 1.04)	0.089	0.79 (0.58, 1.07)	0.131	0.84 (0.61, 1.16)	0.292
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			1.02 (0.83, 1.25)	0.873	0.98 (0.79, 1.22)	0.868
Ductal and lobular			0.83 (0.66, 1.06)	0.131	0.91 (0.71, 1.18)	0.499
Other			1.05 (0.93, 1.19)	0.427	1.03 (0.90, 1.18)	0.650
AJCC stage group						
I			1.0 (reference)		1.0 (reference)	
II			1.45 (1.34, 1.57)	<0.001	1.42 (1.30, 1.54)	<0.001
III			2.11 (1.91, 2.32)	<0.001	2.03 (1.83, 2.26)	<0.001
IV			7.16 (6.43, 7.97)	<0.001	7.01 (6.22, 7.90)	<0.001
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.13 (1.02, 1.25)	0.021	1.12 (1.001, 1.25)	0.049
3			1.40 (1.26, 1.57)	<0.001	1.36 (1.21, 1.54)	<0.001
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.33 (1.23, 1.44)	<0.001	1.35 (1.24, 1.47)	<0.001
≥2			2.12 (1.93, 2.33)	<0.001	2.13 (1.92, 2.37)	<0.001
Percent no high school degree quartiles [a]						
≥17.6%					1.06 (0.92, 1.22)	0.442

				AHR (95% CI)	P value
10.9-17.5%					1.05 (0.94, 1.18)	0.401
6.3-10.8%					1.11 (1.004, 1.22)	0.041
<6.3%					1.0 (reference)	
Median household income quartiles [b]						
<$40,227					1.0 (reference)	
$40,227–$50,353					0.89 (0.79, 1.01)	0.067
$50,354–$63,332					0.86 (0.76, 0.98)	0.019
≥$63,333					0.73 (0.64, 0.84)	<0.001
Type of health insurance						
Uninsured					1.68 (1.29, 2.19)	<0.001
Private/managed care					1.0 (reference)	
Medicaid					1.73 (1.43, 2.09)	<0.001
Medicare					1.21 (1.10, 1.33)	<0.001
Other government/unknown					1.23 (0.99, 1.54)	0.060
Rural-urban area						
Metro					1.0 (reference)	
Urban					1.05 (0.94, 1.17)	0.400
Rural					1.04 (0.77, 1.41)	0.777
Facility type/cancer program						
Community					1.0 (reference)	
Comprehensive community					1.12 (0.98, 1.27)	0.096
Academic/research					1.05 (0.91, 1.20)	0.517
Integrated network					1.08 (0.93, 1.24)	0.315

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; AJCC, American Joint Committee on Cancer; HR, hormone receptor; HER2, human epidermal growth factor receptor 2.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 9. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with HER2-Positive Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	*P* value	**AHR (95% CI)**	*P* value	**AHR (95% CI)**	*P* value
Age at diagnosis (per 10-year increase)	1.51 (1.42, 1.61)	<0.001	1.64 (1.52, 1.76)	<0.001	1.65 (1.48, 1.83)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.28 (1.05, 1.56)	0.016	1.13 (0.91, 1.41)	0.261	1.08 (0.82, 1.42)	0.579
API	0.52 (0.25, 1.10)	0.087	0.43 (0.16, 1.16)	0.097	0.53 (0.19, 1.43)	0.208
Hispanic	1.02 (0.66, 1.60)	0.915	1.14 (0.72, 1.80)	0.583	0.79 (0.43, 1.42)	0.424
Other	1.12 (0.56, 2.25)	0.750	1.11 (0.52, 2.35)	0.790	0.97 (0.39, 2.40)	0.953
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			0.51 (0.22, 1.16)	0.107	0.48 (0.19, 1.21)	0.119
Ductal and lobular			1.22 (0.71, 2.09)	0.471	1.29 (0.71, 2.31)	0.401
Other			1.04 (0.74, 1.45)	0.829	1.04 (0.73, 1.49)	0.821
AJCC stage group						
I			1.0 (reference)		1.0 (reference)	
II			1.41 (1.13, 1.75)	0.002	1.40 (1.09, 1.78)	0.007
III			1.998 (1.56, 2.57)	<0.001	2.04 (1.55, 2.69)	<0.001
IV			7.01 (5.47, 8.98)	<0.001	7.30 (5.49, 9.70)	<0.001
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			0.98 (0.66, 1.45)	0.914	1.03 (0.67, 1.58)	0.889
3			1.17 (0.79, 1.74)	0.422	1.22 (0.80, 1.87)	0.362
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.13 (0.92, 1.40)	0.249	1.08 (0.84, 1.37)	0.555
≥2			1.88 (1.46, 2.43)	<0.001	2.07 (1.56, 2.73)	<0.001
Percent no high school degree quartiles [a]						
≥17.6%					0.998 (0.69, 1.45)	0.991

				AHR (95% CI)	p
10.9-17.5%				1.20 (0.87, 1.65)	0.269
6.3-10.8%				1.21 (0.92, 1.59)	0.165
<6.3%				1.0 (reference)	
Median household income quartiles [b]					
<$40,227				1.0 (reference)	
$40,227–$50,353				0.82 (0.60, 1.11)	0.200
$50,354–$63,332				0.89 (0.65, 1.21)	0.450
≥$63,333				0.89 (0.62, 1.27)	0.512
Type of health insurance					
Uninsured				2.47 (1.28, 4.75)	0.007
Private/managed care				1.0 (reference)	
Medicaid				1.23 (0.78, 1.94)	0.376
Medicare				1.29 (0.996, 1.67)	0.054
Other government/unknown				1.13 (0.61, 2.11)	0.697
Rural-urban area					
Metro				1.0 (reference)	
Urban				1.16 (0.89, 1.52)	0.271
Rural				2.23 (1.12, 4.42)	0.022
Facility type/cancer program					
Community				1.0 (reference)	
Comprehensive community				0.95 (0.68, 1.33)	0.773
Academic/research				0.92 (0.65, 1.30)	0.620
Integrated network				0.96 (0.67, 1.39)	0.831

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; AJCC, American Joint Committee on Cancer; HER2, human epidermal growth factor receptor 2.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.

Supplementary Table 10. Cox Proportional Hazards Regression: Racial/Ethnic Differences in Overall Survival of Male Patients with Triple-Negative Breast Cancer

	Model 1		Model 2		Model 3	
	AHR (95% CI)	***P* value**	**AHR (95% CI)**	***P* value**	**AHR (95% CI)**	***P* value**
Age at diagnosis (per 10-year increase)	1.45 (1.31, 1.59)	<0.001	1.48 (1.32, 1.65)	<0.001	1.82 (1.54, 2.16)	<0.001
Race/Ethnicity						
White	1.0 (reference)		1.0 (reference)		1.0 (reference)	
Black	1.44 (1.08, 1.91)	0.014	1.23 (0.89, 1.69)	0.206	1.09 (0.74, 1.61)	0.650
API	1.85 (1.01, 3.41)	0.047	2.35 (1.21, 4.55)	0.011	2.14 (0.92, 4.99)	0.078
Hispanic	0.65 (0.32, 1.32)	0.234	0.83 (0.36, 1.90)	0.657	0.79 (0.31, 2.01)	0.623
Other	0.92 (0.34, 2.49)	0.874	1.36 (0.50, 3.71)	0.545	1.20 (0.37, 3.92)	0.764
Histologic type						
Ductal			1.0 (reference)		1.0 (reference)	
Lobular			0.53 (0.21, 1.33)	0.175	0.62 (0.20, 1.89)	0.400
Ductal and lobular			1.32 (0.32, 5.49)	0.700	0.82 (0.11, 6.45)	0.853
Other			0.83 (0.58, 1.19)	0.308	0.85 (0.57, 1.29)	0.448
AJCC stage group						
I			1.0 (reference)		1.0 (reference)	
II			2.04 (1.39, 3.00)	<0.001	2.82 (1.79, 4.45)	<0.001
III			2.61 (1.64, 4.13)	<0.001	3.10 (1.76, 5.45)	<0.001
IV			21.10 (13.58, 32.79)	<0.001	26.75 (15.52, 46.11)	<0.001
Tumor grade						
1			1.0 (reference)		1.0 (reference)	
2			1.72 (0.77, 3.83)	0.188	0.77 (0.29, 2.04)	0.603
3			1.71 (0.79, 3.71)	0.175	0.92 (0.36, 2.34)	0.863
Charlson-Deyo comorbidity score						
0			1.0 (reference)		1.0 (reference)	
1			1.20 (0.82, 1.75)	0.339	1.06 (0.69, 1.62)	0.804
≥2			1.27 (0.77, 2.09)	0.351	1.15 (0.65, 2.04)	0.635
Percent no high school degree quartiles [a]						
≥17.6%					1.85 (0.98, 3.49)	0.058

				AHR (95% CI)	P
10.9-17.5%				1.55 (0.89, 2.67)	0.118
6.3-10.8%				1.64 (0.97, 2.76)	0.064
<6.3%				1.0 (reference)	
Median household income quartiles [b]					
<$40,227				1.0 (reference)	
$40,227–$50,353				1.13 (0.69, 1.86)	0.621
$50,354–$63,332				0.81 (0.47, 1.38)	0.434
≥$63,333				0.95 (0.53, 1.68)	0.858
Type of health insurance					
Uninsured				2.08 (0.94, 4.59)	0.071
Private/managed care				1.0 (reference)	
Medicaid				0.97 (0.51, 1.83)	0.915
Medicare				0.72 (0.47, 1.10)	0.125
Other government/unknown				2.44 (1.10, 5.41)	0.028
Rural-urban area					
Metro				1.0 (reference)	
Urban				0.82 (0.48, 1.38)	0.447
Rural				0.43 (0.10, 1.83)	0.250
Facility type/cancer program					
Community				1.0 (reference)	
Comprehensive community				1.20 (0.68, 2.14)	0.525
Academic/research				1.22 (0.66, 2.25)	0.529
Integrated network				0.84 (0.45, 1.58)	0.592

Abbreviations: API, Asian or Pacific Islander; AHR, adjusted hazard ratio; CI, confidence interval; AJCC, American Joint Committee on Cancer.

[a] Defined as education attainment for patient residence areas and measured by matching the zip code of the patient recorded at the time of diagnosis against files derived from the 2016 American Community Survey data.

[b] Based on the 2016 American Community Survey data, spanning years 2012–2016 and adjusted for 2016 inflation.