Multilevel Factors and Immunotherapy Use Among Patients with Triple Negative Breast Cancer in California: A Population-Based Study

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Background

- Immunotherapy with immune checkpoint inhibitors (ICI) is available for triple negative breast cancer (TNBC).
  - ICI approved for metastatic TNBC in 2019. ICI approved for local TNBC in 2021.
- Uptake of ICI may be affected by access to care, facility level factors, insurance type and individual demographic factors such as race/ethnicity and age.

Study Aim

To identify predictors of ICI use among women with TNBC in the California Cancer Registry (CCR).

Methods

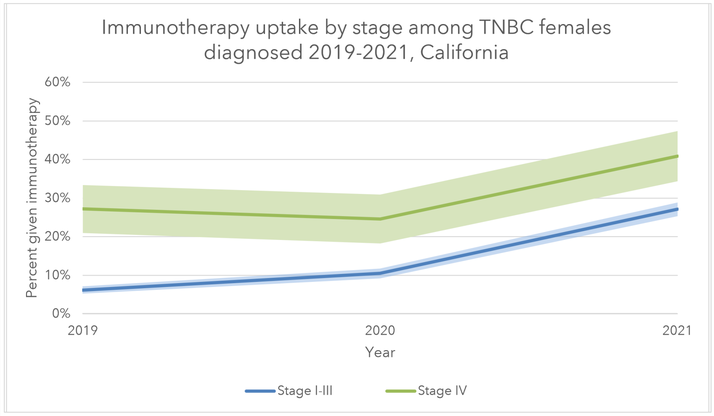
- 7,458 patients were selected from the CCR with inclusion criteria of malignant breast cancer diagnosed from January 1, 2019-December 31, 2021, ages 18 years and older, and microscopically confirmed with TNBC.
- Logistic regression assessed predictors of immunotherapy use while adjusting for the following covariates: race/ethnicity, year of diagnosis, age, facility-level insurance status, NCI cancer center designation, facility- and census tract-level socioeconomic status (SES) at statewide quintiles.
- Outcome is if immunotherapy use was given as a first treatment at facilities.
- Disease variables were used to define stage: Stages 1-3 were categorized as non-metastatic and Stage 4 as metastatic.

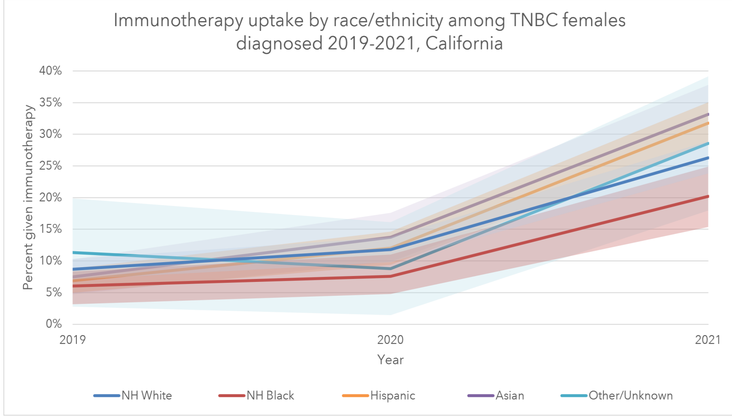
Results

Logistic Regression Models Comparing Predictors of Immunotherapy Use By Stage in California from 2019-2021, Ages 18 and Over in Females with TNBC

	Non-Metastatic				Metastatic			
			Unadjusted	Fully Adjusted*			Unadjusted	Fully Adjusted*
Race/Ethnicity	**N**	**% Immunotherapy**	**Odds Ratio, 95% CI**	**Odds Ratio, 95% CI**	**N**	**% Immunotherapy**	**Odds Ratio, 95% CI**	**Odds Ratio, 95% CI**
Non-Hispanic White	3,071	14.2	1.00	1.00	267	34.5	1.00	1.00
Non-Hispanic Black	799	10.5	**0.71, [0.56-0.91]**	0.87, [0.65-1.16]	78	15.4	**0.34, [0.19-0.64]**	**0.33, [0.17-0.64]**
Hispanic	1,856	16.4	1.19, [0.99-1.44]	1, [0.82-1.21]	156	32.7	0.92, [0.58-1.45]	0.86, [0.50-1.48]
Asian	983	17.7	**1.31, [1.06-1.63]**	1.07, [0.84-1.35]	68	38.2	1.2, [0.66-2.17]	0.99, [0.53-1.85]
Other/Unknown (includes NHPI/AIAN)	155	16.1	1.18, [0.72-1.93]	1.08, [0.61-1.90]	25	24.0	0.6, [0.23-1.55]	0.68, [0.23-2.02]
Year of Diagnosis								
2019	2,319	6.1	1.00	1.00	195	27.2	1.00	1.00
2020	2,101	10.4	**1.76, [1.39-2.23]**	**1.67, [1.29-2.15]**	179	24.6	0.87, [0.55-1.38]	0.78, [0.48-1.26]
2021	2,444	27.2	**5.74, [4.62-7.13]**	**6.27, [4.96-7.94]**	220	40.9	**1.88, [1.24-2.86]**	**1.66, [1.06-2.59]**
Age at diagnosis								
70+	1,935	8.0	1.00	1.00	193	26.4	1.00	1.00
60-69	1,669	14.0	**1.88, [1.55-2.29]**	**1.83, [1.48-2.25]**	139	27.3	1.04, [0.62-1.74]	1.19, [0.68-2.09]
50-59	1,570	16.9	**2.34, [1.86-2.94]**	**2.48, [1.94-3.17]**	131	35.1	1.51, [0.94-2.44]	**2.05, [1.22-3.46]**
40-49	1,022	20.5	**2.99, [2.36-3.79]**	**3.26, [2.51-4.23]**	89	39.3	**1.79, [1.03-3.11]**	**2.06, [1.16-3.64]**
<40	668	24.0	**3.63, [2.85-4.63]**	**3.69, [2.82-4.81]**	42	40.5	1.88, [0.93-3.80]	**2.48, [1.05-5.85]**
NCI facility								
No	5,718	12.7	1.00	1.00	495	29.7	1.00	1.00
Yes	1,137	26.3	**2.46, [1.98-3.06]**	**2.21, [1.76-2.77]**	97	41.2	**1.66, [1.01-2.73]**	1.51, [0.84-2.69]
Facility-level SES status								
High	2,819	16.7	1.00	1.00	220	39.5	1.00	1.00
Medium	2,657	13.4	0.77, [0.58-1.03]	**0.71, [0.55-0.92]**	242	28.9	**0.62, [0.42-0.93]**	0.69, [0.43-1.12]
Low	1,345	14.1	0.81, [0.61-1.08]	0.74, [0.52-1.04]	128	23.4	**0.47, [0.28-0.77]**	0.65, [0.32-1.34]
Facility-Level Insurance Status								
Predominantly private or Medicare/Medicare+private	4,074	13.3	1.00	1.00	309	36.9	1.00	1.00
Mixed	1,915	17.9	**1.43, [1.11-1.85]**	**1.57, [1.27-1.95]**	183	27.9	0.66, [0.44-1.00]	0.67, [0.39-1.16]
Predominantly Medicaid/Military/Other Public	832	16.2	1.27, [0.91-1.78]	**1.63, [1.20-2.22]**	98	22.4	**0.50, [0.29-0.85]**	**0.44, [0.22-0.88]**
Neighborhood SES Quintiles								
Q5 - highest	1,395	18.0	1.00	1.00	113	39.8	1.00	1.00
Q4	1,503	14.0	**0.74, [0.62-0.89]**	0.86, [0.70-1.06]	109	33.0	0.76, [0.43-1.34]	0.86, [0.47-1.56]
Q3	1,409	15.5	0.84, [0.69-1.03]	0.92, [0.74-1.14]	119	29.4	0.64, [0.38-1.07]	0.83, [0.47-1.45]
Q2	1,268	14.2	**0.76, [0.60-0.96]**	0.86, [0.67-1.12]	107	25.2	**0.51, [0.30-0.86]**	0.72, [0.41-1.29]
Q1 - lowest	936	11.3	**0.59, [0.44-0.78]**	**0.58, [0.42-0.80]**	112	29.5	0.63, [0.37-1.07]	1.22, [0.65-2.29]

*Covariates used for fully adjusted model: race/ethnicity, year of diagnosis, age at diagnosis, chemotherapy summary, radiation summary, surgery summary, NCI facility, facility-level SES and neighborhood SES.





Conclusions

Use of ICI was lower for:

- Non-Hispanic Black patients in metastatic group.
- Year 2020 in metastatic group.
- Ages 60-69.
- Non-NCI designated cancer centers.
- Low SES Facility-Level status.
- Medicaid, military and other public insurance types.
- Lowest quintile for neighborhood SES.

Future Directions:

- Investigate patient and provider interactions qualitatively surrounding treatment decision making.
- Investigate how to promote implementation programs to improve early adoption of ICI.
- Determine factors contributing towards diminished ICI uptake in Black women.
- Evaluate region specific differences within California for ICI uptake.

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