Oncology Rehabilitation Referral and Enrollment Patterns among Breast Cancer Patients

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Background

- Supervised exercise interventions are known to improve chemotherapy-related side effects, cardiorespiratory fitness and quality of life in cancer patients.
- Oncology rehabilitation (OR) offers supervised and tailored exercise interventions and are routinely available and recommended for cancer patients. However, these programs may be underutilized.
- More research is needed to understand referral and participation patterns among breast cancer (BC) patients, as well as program efficacy.

Objective

Assess patterns of OR referral, enrollment, and clinical benefits among BC patients.

Methods

- Retrospective cross-sectional analysis of 53,972 BC patients seen within the Providence St. Joseph Health System between October 2015 and March 2025.
- Referral was defined as a physical therapy (PT) or OR referral in a patient's electronic medical record or visit to PT/OR following cancer diagnosis.
- Enrollment was defined as attending at least one PT/OR session following referral as defined above.
- Metrics of OR efficacy included the change in cardiorespiratory fitness, measured as peak oxygen consumption (VO2peak) estimated from a 30-sec sit-to-stand and/or six-minute walk test using validated equations.
  - Six-minute walk: VO2peak = 4.948 + (0.023 * 6MWD in m)[2]
  - Sit-to-stand: VO2peak=22.61 + [0.347 (#reps)] - [0.127 *(wt in Kg)][3]
- Random-intercept multilevel logistic regression models, including region (AL, WA, OR, and CA) as a random effect, were used to assess predictors of PT/OR referral and enrollment.
  - Benjamini-Hochberg was used to control for false discovery rate at 5%.
  - Statistical significance was considered at p<.05.

Results

Table 1. Patient Characteristics by referral and enrollment status

	Referred (N=22,061)	Not Referred (N=31,911)	Enrolled (N=13,059)	Not Enrolled (N=9,002)
Age, mean (sd)	62.0 (12.8)*	63.2 (13.2)	61.5 (12.7)*	62.7 (12.9)
BMI, mean (sd)	29.4 (7.1)*	28.6 (7)	29.6 (7.2)*	29.1 (6.9)
Race (% White)	79%	80%	81%	79%
Insurance				
Private	46%*	42%	47%	45%
Medicare	40%*	44%	39%*	42%
Medicaid	10%	10%	11%	10%
Other	4%	4%	3%	3%
Comorbidities				
Hypercholesterolemia	31%*	24%	30%*	32%
Hypertension	30%*	25%	29%	30%
Cardiac arrhythmia	14%*	12%	14%	14%
Diabetes	12%*	10%	12%	13%
ASCVD	11%	10%	10%	11%
CHF	3%	4%	3%	4%
Residence (Urban)	87%*	84%	86%*	88%
Cancer Treatment				
Chemotherapy	78%*	69%	78%	79%
Surgery	58%*	51%	62%*	54%
Lumpectomy	44%*	56%	42%*	47%
Mastectomy	51%*	40%	53%*	48%
Concomitant Chemotherapy	24%*	16%	26%*	21%
Radiation	14%*	10%	14%	14%
HER2 Therapy	9%*	6%	10%*	8%
Concomitant Immunotherapy	2.6%*	3.2%	3.4%	2.9%

Data presented as n (%) or mean (SD)
* Indicates a statistically significant difference between BC patients referred or enrolled to PT/OR versus those not referred or enrolled at p < 0.05, adjusted using the Bonferroni method

- 41% of BC patients were referred to OR (n=22,061). Among those referred, 59% participated (n=13,059), with an average of 16 appts; 25% attending ≥ 20 sessions.

Figure 2. Multivariable logistic regression model predicting OR enrollment

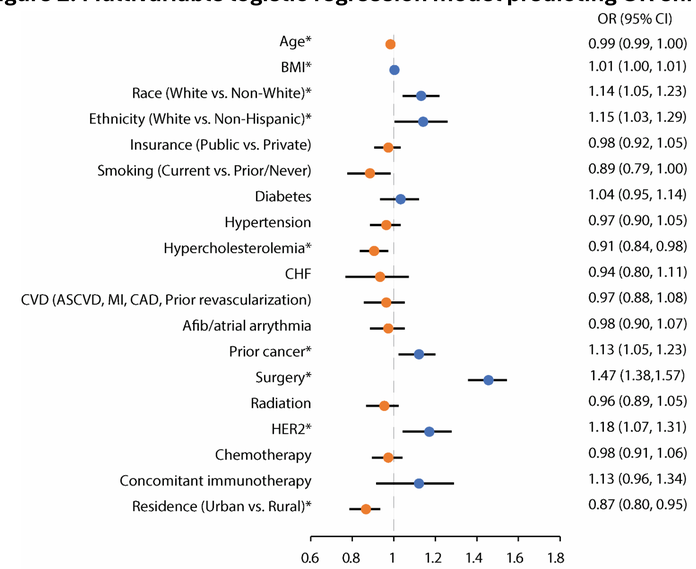
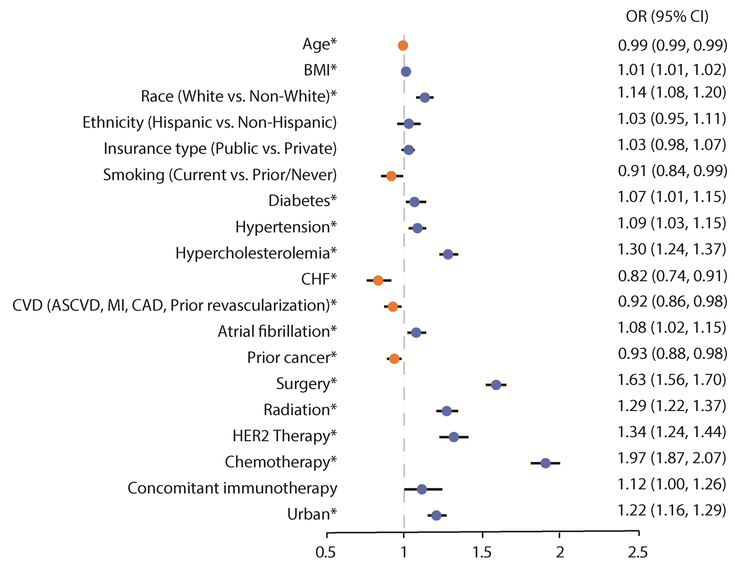
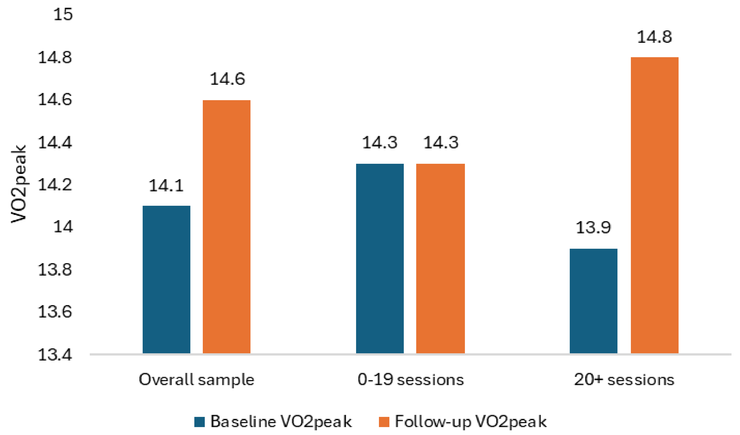


Figure 1. Multivariable logistic regression model predicting OR referral



- 5.0% of the variability in the referral rate is accounted by the hospital.

Figure 3. Change in Aerobic Capacity by Number of Sessions Completed



- Patients attending ≥ 20 sessions showed greatest VO2peak improvements.
- OR helped to maintain and even slightly improve VO2peak in patients with BC.

Conclusions

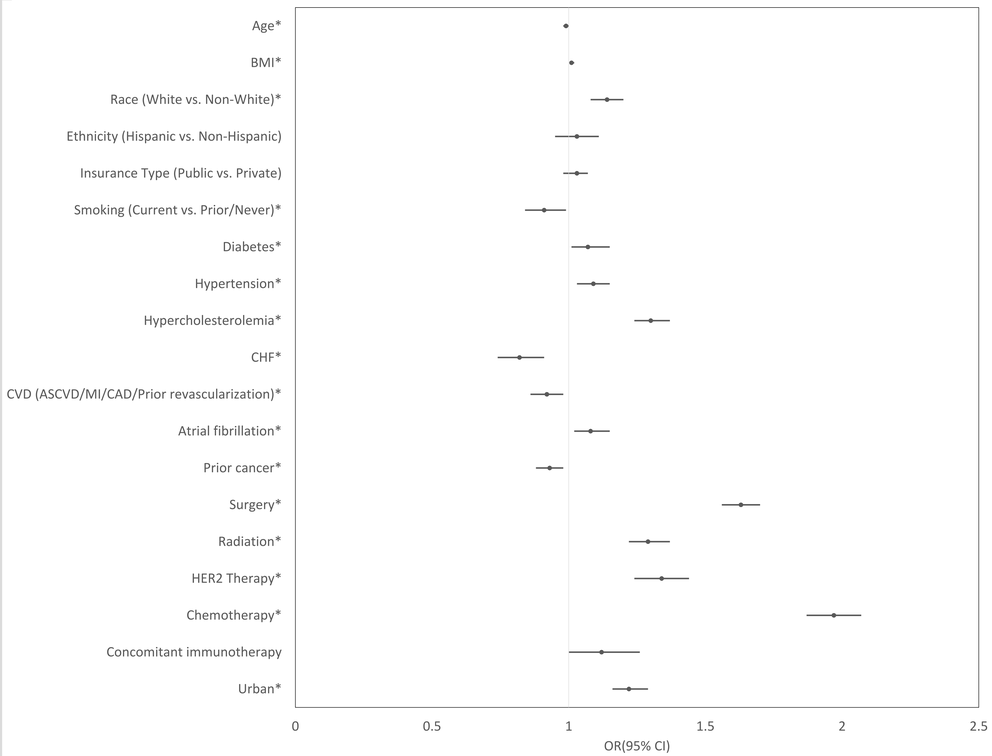
- OR is routinely available via PT/OR referral but underutilized by BC patients.
- OR has the potential to improve physical fitness, quality of life, and potentially clinical outcomes of BC patients.
- Additional patient advocacy and research is required to increase OR utilization, determine best practices, and elucidate the benefits of OR.

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Disclosures: None

References
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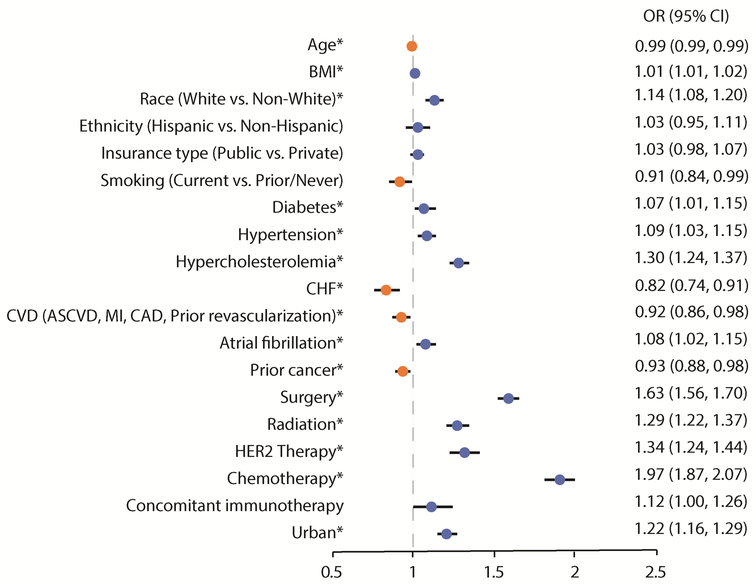


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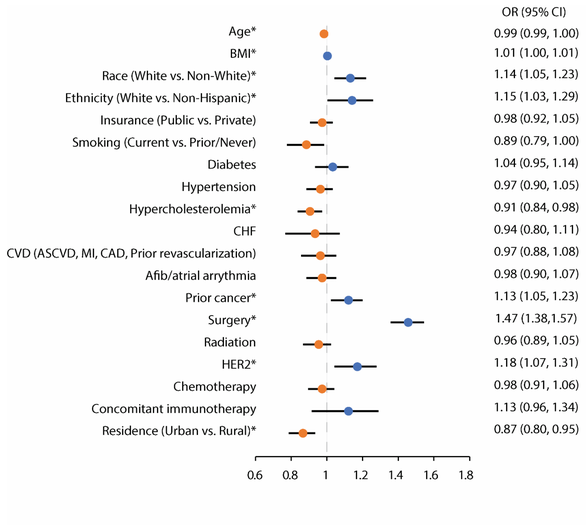
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Odds Ratio: Referred



Odds Ratio: Enrolled



Characteristic	**OR**	95% CI	p-value
Age	0.99	0.99, 1.0	<0.001
BMI	1.01	1.00, 1.01	0.002
Race (White vs. Non-White)	1.14	1.05, 1.23	0.001
Ethnicity, (Hispanic vs. Non-Hispanic)	1.15	1.03, 1.29	0.013
Insurance (Public vs. Private)	0.98	0.92, 1.05	0.538
Smoking (Current vs. Prior/Never)	0.89	0.79, 1.00	0.059
Diabetes (yes)	1.04	0.95, 1.14	0.422
Hypertension (yes)	0.97	0.90, 1.05	0.441
Hypercholesterolemia (yes)	0.91	0.84, 0.98	0.01
CHF	0.94	0.80, 1.11	0.442
CVD	0.97	0.88, 1.08	0.588
Afib/atrial arrhythmia	0.98	0.90, 1.07	0.67
Prior cancer	1.13	1.05, 1.23	0.002
Surgery	1.47	1.38, 1.57	<0.001
Radiation	0.96	0.89, 1.05	0.392
HER2	1.18	1.07, 1.31	0.002
Chemotherapy	0.98	0.91, 1.06	0.673
Concomitant immunotherapy	1.13	0.96, 1.34	0.147
Residence (Urban)	0.87	0.80, 0.95	0.003

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