Compliance with NCCN Guidelines for the Utilization of the Breast Cancer Index Test and its Role in the Quality of Cancer Care at Community Centers

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Introduction

The Breast Cancer Index® (BCI™ test) is a genomic test for early-stage, hormone receptor-positive (HR+), HER2-negative breast cancer patients to help decide the benefit of extended endocrine therapy.[1,2] BCI analyzes two key aspects: the HOXB13:IL17BR ratio (H/I) assesses how well the cancer is likely to respond to continued hormone therapy; and the molecular grade index (MGI) predicts the likelihood of recurrence.[1,2] This combination of features helps inform the appropriate duration of endocrine therapy beyond traditional tests. Importantly, the BCI test is effective for both lymph node-negative and lymph node-positive patients. The BCI test was incorporated into the NCCN Clinical Practice Guidelines in Oncology (NCCN® Guidelines) in January 2021. Additionally, City of Hope (COH) Epic® medical record software was updated in April 2024 to allow users to order the BCI test at all sites. We examined the frequency of BCI test orders as a quality improvement metric, both at the main campus of the City of Hope Cancer Center and our community network. Enhancing guidelines for Breast Cancer Index testing and improvement is essential for elevating its quality and effectiveness in clinical settings.

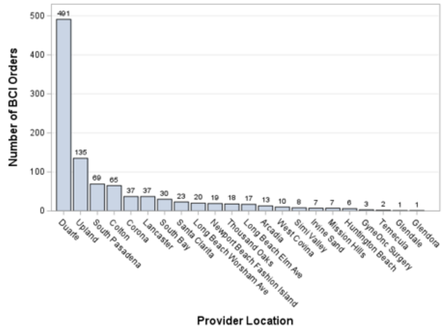


Figure 2. BCI orders at COH Duarte and community sites.

Methods and Materials

- Data was obtained from the Biotheranostics Breast Cancer Index database for all City of Hope sites in California for the period January 2020 through May 2025.
- We analyzed BCI testing rates and the numbers of physicians ordering the test before NCCN guideline inclusion, after NCCN guideline inclusion, and post-Epic EMR integration
  - Pre-NCCN guidelines: 01 January 2020 – 31 January 2021 (13 months)
  - Post-NCCN guidelines: 01 Feb 2021 – 31 May 2025 (52 months)
  - Post-EMR: 01 June 2024 – 31 May 2025 (12 months)

Results

- Following the NCCN Guidelines update in January 2021, there was a notable increase in adoption of testing with the BCI test, with utilization increasing 4.35 vs. 20.3 tests per month (p-value < 0.01, t-test).
- Increased utilization of the BCI test was comparable at the main campus and our community network.
- The test was ordered for all age groups, LN- and LN+ disease, HER2- and HER2+ patients, and pre- and post-menopausal status.
- The Epic software enhancement, implemented in April 2024 resulted in an increase in test ordering; however, the results were not significant.

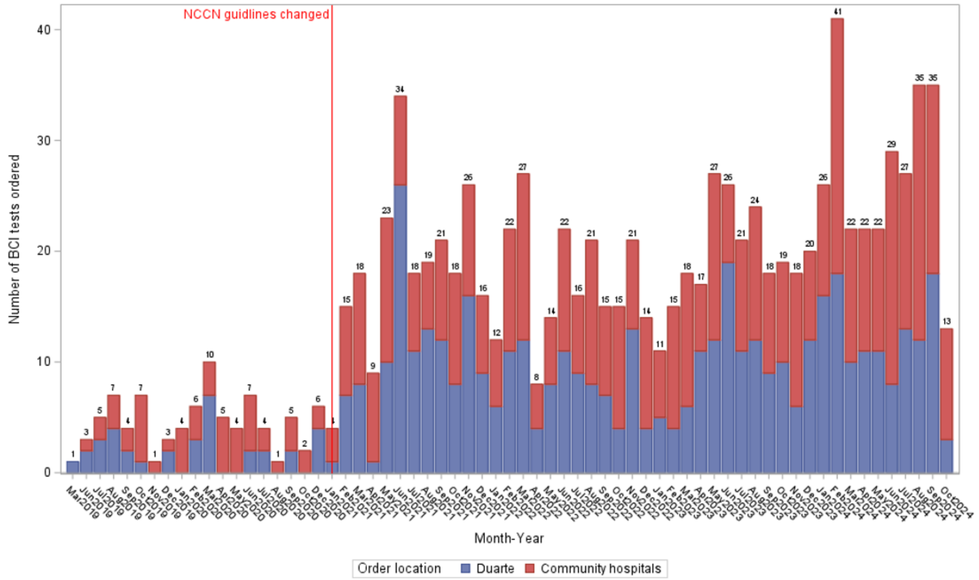


Figure 1. Number of BCI tests ordered per month pre- and post-NCCN guidelines by ordering location.

Discussion

- BCI utilization was similar at the City of Hope main campus in Duarte compared to the combined Community sites in California.
- Addition of BCI to the NCCN guidelines lead to a significant increase in BCI test utilization from City of Hope sites of practice.
- This is the first integration of BCI into an EMR system. EMR enhancements at other institutions will likely increase patient access to BCI testing in a similar manner.
- The increase in BCI orders is due to implementation of the NCCN guidelines and integration into EMR enhancement.
- Existing and new physicians subsequently have shown increased utilization of BCI testing in the clinic setting.
- Although the observed increase in BCI test ordering following Epic software integration did not reach statistical significance, it may confer meaningful quality gains. Standardized prompts likely reduce inter-operator variability, minimizing false negatives and drift from NCCN guidelines.

Table 1. Average BCI tests per month pre- and post-NCCN guidelines change for HR+HER2- BC patients (p-value < 0.01, t-test).

nccn	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
Pre NCCN guidelines		4.3500	3.2313	5.4687	2.3902	1.8177	3.4911
Post NCCN guidelines		20.2609	18.0515	22.4703	7.4399	6.1710	9.3708
Diff (1-2)	Pooled	-15.9109	-19.3209	-12.5008	6.3731	5.4348	7.7058
Diff (1-2)	Satterthwaite	-15.9109	-18.3511	-13.4707			

Conclusions

The updates to the NCCN led to a significant increase in utilization of the BCI test at City of Hope sites of practice.

We anticipate that the Epic software enhancement will lead to further utilization of the BCI test. Software enhancements at other institutions may increase patient access to testing in a similar manner.

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References
[1] Noordhoek, Treuner et al., Clin Cancer Res. 2021;27(1):311-9.
[2] Bartlett, Sgroi et al., Clinical Cancer Res. 2022;28(9):1871-80.

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