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EE403

Cost-effectiveness Analysis of PET-guided De-escalation for HER2 Positive Early Breast Cancer in the United States

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PET-guided de-escalation increased modeled lifetime costs without improving QALYs

+$254,454
per patient

-0.27
QALYs

Dominated
by TCHP

BACKGROUND & OBJECTIVE

• PET-guided treatment adaptation may reduce chemotherapy exposure in HER2-positive early breast cancer. Its long-term economic value remains uncertain.

• We compared a PET-guided, pCR-adapted strategy with standard TCHP from a **US healthcare sector perspective.**

METHODS

• Hybrid decision tree and Markov model.

• Population: adults with HER2-positive early breast cancer, informed by PHERGain.

• Lifetime horizon: **50 years**, starting at age 50. Annual cycles. Costs and QALYs discounted at 3% per year.

• Costs: 2025 US dollars. WTP threshold: **$150,000 per QALY.**

• Uncertainty: 10,000 PSA iterations and scenario analyses.

TREATMENT STRATEGIES

• **TCHP:** six neoadjuvant cycles before surgery.

• **PET-guided:** two cycles of HP, followed by PET response assessment. Subsequent treatment depends on PET response and pCR at surgery.

MODEL STRUCTURE

• **Initial treatment decision tree:** PET response and pCR determine treatment pathways, initial costs and treatment-period QALYs.

• **Long-term Markov model:** recurrence risks depend on pCR status. Model assumptions link short-term response to long-term outcomes.

Health state	Role in model
iDFS	Initial state after treatment
Nonmetastatic recurrence	Tunnel state, up to 1 year
Remission	After nonmetastatic recurrence
First-line mBC	Metastatic treatment
Second/later-line mBC	Subsequent metastatic treatment
Death	Absorbing state

CONCLUSION & LIMITATIONS

PET-guided de-escalation was **dominated under the model's current assumptions.** Interpretation depends on long-term extrapolation, pCR-linked recurrence risks and utility assumptions.

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BASE-CASE RESULTS

Outcome	TCHP	PET-guided
Total cost	$287,723	$542,177
Total QALYs	26.93	26.65

Incremental results use PET-guided minus TCHP.

Short-term vs lifetime: initial treatment-phase reported ICER ≈ $39,539/QALY. Over a lifetime, costs were higher and QALYs lower; the model projects additional downstream disease costs.

FIGURES

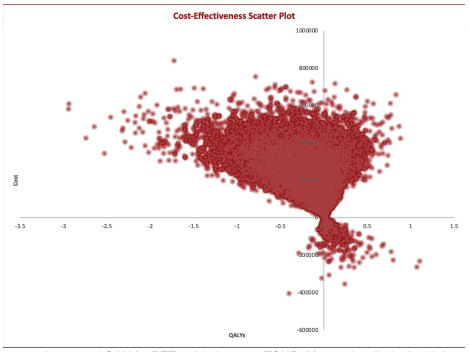


Figure 1. Incremental cost and QALYs, PET-guided versus TCHP. Most points lie in the higher-cost, lower-QALY quadrant.

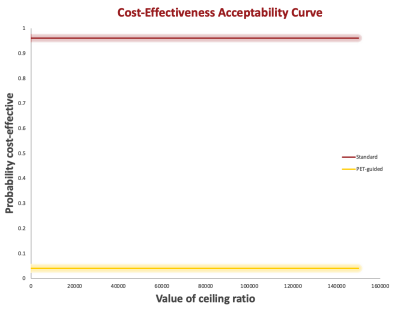


Figure 2. The supplied CEAC shows a low probability of cost-effectiveness for PET-guided treatment across the plotted WTP range.

UNCERTAINTY & SCENARIOS

Approximately **96% of PSA simulations favored TCHP** in the supplied reports.

Scenario	Reported result
5-year horizon	ICER $2.70 million/QALY
10- and 20-year horizons	PET-guided dominated
PET responders only	PET-guided dominated
End-of-life costs included	PET-guided dominated