

**A 21-gene RT-PCR assay in lymph node negative (LN-), estrogen receptor positive (ER+) early-stage breast cancer (ESBC): an age-specific economic analysis.** Lyman GH, Cosler L, Hornberger J: University of Rochester, Rochester, NY, Albany College of Pharmacy, Albany, NY, Stanford University, Stanford, CA, USA

**Background:** Guidelines for LN-, ER+ ESBC adjuvant therapy recommend chemotherapy (CT) plus tamoxifen (Tam) for women at high risk for recurrence and Tam alone in women with a low risk of recurrence, although age also may influence treatment decisions based on risk-benefit considerations. An RT-PCR assay based a 21-gene panel and recurrence score (RS) algorithm has been validated in 668 evaluable LN-, ER+ ESBC patients receiving Tam (Paik et al, SBC 2003). An economic analysis is presented based on the age-specific RS test performance.

**Material and Methods:** Based on the RS, women with LN-, ER+ ESBC treated with Tam on NSABP B-14 were classified as having a high- (31-100; 27%), intermediate- (18-30; 22%) or low- (0-17; 51%) risk of recurrence at 10 years. Risk estimates of distant recurrence at 10 years were derived from NSABP B-14, measures of adjuvant chemotherapy efficacy from NSABP B-20 and costs of cancer care from HCFA data and published literature. RS assay cost = \$3460. Thresholds (break-even point of two strategies), incremental costs (\$), life-years (LYs), quality-adjusted LYs (QALYs) and cost-effectiveness (C/E; cost per LY gained) were estimated for: Tam alone (T), Tam plus CT (T&CT) and treatment guided by the RS (RSGT).

**Results:** Distant recurrence occurred in 45 (23%) women <50 years (N=194) and 64 (14%) women ≥ 50 (N=474). Distant recurrence was observed at 10 years in 7%, 36% and 34% of RS low-, intermediate- and high-risk patients < 50 and in 9%, 11% and 29% in patients ≥ 50. Treatment assignment based on RS were optimized by grouping intermediate risk patients < 50 with high risk patients and those ≥ 50 with low risk patients; patients deemed low risk were assigned to T and those classified high-risk to T&CT. Expected QALYs favor RSGT over T&CT for decreased utility >.02-.03 (Table). Direct costs favor RSGT over T&CT for cost >\$5,943. For reasonable utility and direct cost assumptions, RSGT is favored over T&CT. At a utility of 1, the incremental C/E compared to T is \$5,124 for RSGT and \$12,923 for T&CT with the greatest cost savings per LY gained in those ≥50. RSGT is increasingly favored over T&CT as assumed utility decreases and direct CT costs increase.

| Age Group | Thresholds              |             |                        |             | Incremental Analyses        |      |         |       |
|-----------|-------------------------|-------------|------------------------|-------------|-----------------------------|------|---------|-------|
|           | Utility (0-1) with T&CT |             | Direct Cost of CT (\$) |             | Utility (QALYs) RSGT v T&CT |      | CE (\$) |       |
|           | T / RSGT                | RSGT / T&CT | T&CT / T               | T&CT / RSGT | 1.0                         | 0.9  | RSGT    | T&CT  |
| <50       | 0.85                    | 0.97        | 3,699                  | 9,588       | -0.49                       | 1.12 | 6,128   | 6,301 |
| ≥50       | 0.90                    | 0.98        | 1,413                  | 5,172       | -0.31                       | 1.23 | 4,676   | 8,587 |
| All       | 0.87                    | 0.98        | 2,076                  | 5,943       | -0.30                       | 1.19 | 5,097   | 7,924 |

**Discussion:** RS based on a multi-gene, RT-PCR assay is a well validated tool for guiding CT treatment decisions in patients with LN-, ER+ ESBC. Regardless of age, the C/E of this assay is well within quoted acceptable ranges for cost-effectiveness.