

## **ABSTRACT - International Gynecologic Cancer Society (IGCS) – RIO Sept 2019**

### **Category Breast**

#### **Title - SHOULD WE OFFER MULTI-GENE TESTING TO ALL PATIENTS WITH BREAST CANCER: A COST-EFFECTIVENESS ANALYSIS**

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#### **ABSTRACT**

**Objectives:** To estimate incremental lifetime-effects, costs, cost-effectiveness and population impact of multigene-testing all BC patients compared to current practice of family-history/clinical-criteria based genetic (*BRCA*)-testing.

**Methods:** Cost-effectiveness microsimulation modelling study comparing lifetime costs-&-effects of *BRCA1/BRCA2/PALB2* (multigene) testing all unselected BC-cases (Strategy-A) with family-history/clinical-criteria based *BRCA1/BRCA2*-testing (Strategy-B) in both UK and US populations. Data obtained from 11,836 population-based BC-patients (regardless of family-history) recruited to four large research studies in the UK (Predicting-Risk-of-Breast-Cancer-at-Screening (PROCAS: 1389 out of 57,000 women) & Prospective-Outcomes-in-Sporadic-versus-Hereditary-breast-cancer (POSH: 2885) studies); US (Kaiser-Permanente Washington Breast-Cancer-Surveillance-Consortium (BCSC) registry: 5892 out of 132,139 women) and Australia (Population-based BC-cases of the Australian-Breast-Cancer-Family-Study (ABCFS: 1670 women)). The main outcome measure was the incremental cost per quality-adjusted life-year (QALY) gained with a 3.5% annual discount. Parameter uncertainty was explored using one-way and probabilistic sensitivity analyses.

**Results:** Compared with current clinical-criteria/family-history-based *BRCA*-testing, (*BRCA1/BRCA2/PALB2*) multigene-testing for all BC-patients would cost £10,470/QALY (UK) or \$58,702/QALY (US) gained, well below UK/NICE and US cost-effectiveness thresholds of £30,000/QALY & \$100,000/QALY. Probabilistic sensitivity-analysis shows unselected multigene-testing remains cost-effective for 98% UK/ 77% US health-system simulations. One year's unselected panel-genetic testing can prevent 1,776 BC/OC-cases and 557 deaths in the UK; and 8,258 BC/OC-cases and 2,143 deaths in the US. Correspondingly, 7 UK/32 US excess heart-disease deaths occur annually.

**Conclusions:** Unselected multigene-testing for all BC patients is extremely cost-effective compared with family-history/clinical-criteria testing for UK and US health-systems. It prevents thousands more BC/OC cases and deaths. We recommend changing current policy to expand genetic-testing to all BC patients.