COST-UTILITY ANALYSIS OF THE GERMLINE BRCA TESTING IN WOMEN WITH EPITHELIAL OVARIAN CANCER WITHOUT FAMILY HISTORY IN SPAIN

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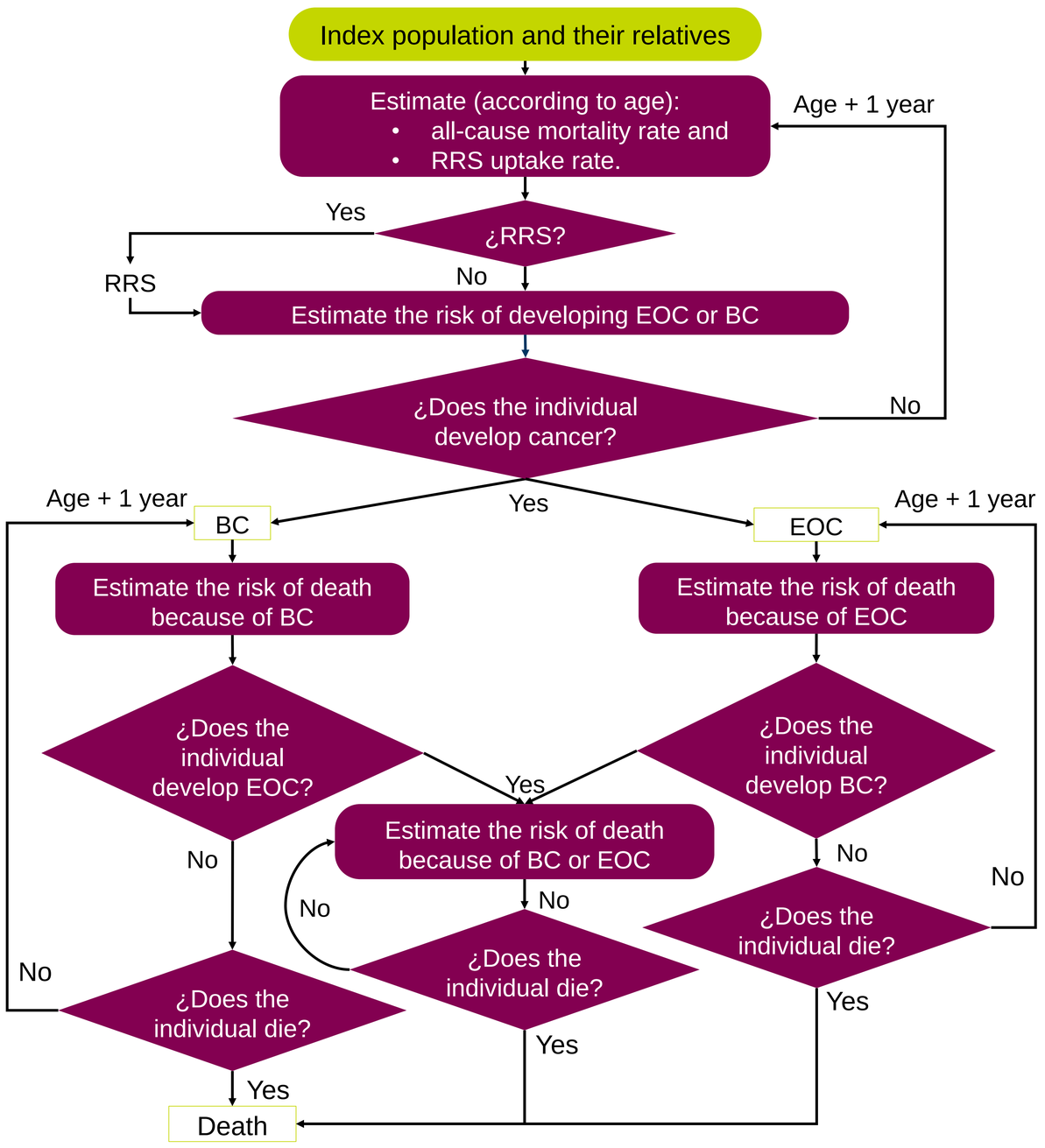
Objetive

- In Spain, ovarian caner (OC) is the fifth most common neoplasia among women, with an annual incidence of 3,417 women in 2017[1]. Germline mutations in BRCA1 and BRCA2 genes (gBRCA1/2m) are associated with an increase of OC and breast cancer (BC) risk[2].
- This study estimates the long-term efficiency of providing **germline BRCA testing (gBRCAt)** in women with high grade epithelial non-mucinous OC (HGEOC) without family history of EOC or BC in Spain and the subsequent testing and management of their relatives who have a gBRCA1/2m.

Methods

- A simulation with annual cycles was developed in those patients with gBRCA1/2m **(index population)** and in their relatives over a 50-year time horizon (Figure 1), from the the Spanish National Health Service perspective.
- The **risk of epithelial OC (EOC) and BC** was estimated based on age, the efficacy of risk-reducing surgeries (RRS) and patients' acceptance to undergo these procedures (bilateral salpingo-oophorectomy and/or bilateral mastectomy).

Figure 1. Simulation diagram.



- Two **scenarios** were compared on the simulated population (index population and their relatives):
  - **gBRCAt**: includes cancer management (treatment, follow-up tests, hospitalizations and emergency visits) and palliative care.
  - **No-gBRCAt**: accounts for genetic counselling, surveillance (according to SEOM2015[3]), cancer management and palliative care.
- Cancer resource use was estimated for patients and those relatives who developed OC and/or BC.
- Mortality rates, costs and quality-adjusted life year (QALYs) were estimated in both scenarios. A discount rate of 3% was applied to future costs and QALYs, being 2017 the base year[4].
- A **probabilistic sensitivity analysis** with five thousand simulations was conducted. Values were varied ±25% of the corresponding base-case value.

References:
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Results

- The costs of providing germline BRCA1/2 testing were estimated in €13,437,897.43, while the "no-gBRCAt" scenario accounted for €12,053,291.17. The difference between providing both scenarios was **€1,384,606.26** (Table 1).
- The simulation estimated 2,107.8 and 2,064.0 QALYs in the first and the second scenario, respectively. The simulation estimated an increase in patients' relatives **QALYs of 43.8** (Table 1).
- Therefore, the ICUR was **€31,621.33/QALY** (Table 1)**.**

Table 1. Results of the simulated population (base case).

Parameters	No-gBRCAt	gBRCAt	Difference
Genetic counselling	€ 0.00	€1,000,560.64	€1,000,560.64
RRS	€ 0.00	€396,130.74	€396,130.74
Surveillance	€ 0.00	€291,974.47	€291,974.47
EOC and BC management	€11,599,031.03	€11,314,827.86	€-284,203.19
Palliative care	€454,260.13	€434,403.73	€-19,856.40
Total costs	€12,053,291.17	€13,437,897.43	€1,384,606.26
QALY	2,064	2,107.8	43.8
ICUR	**€31,621.33/QALY**		

Probabilistic sensitivity analysis

- All simulations were located in the right-upper quadrant of the cost-effectiveness plane. Therefore, although providing gBRCAt implies a higher cost, this screening test **improves the quality of life outcomes** of the study population.
- The ICUR ranged from €17,366.59/QALY to €291,254.29/QALY (Figure 2).
- The cost-utility thresholds used in Europe for screening tests range from €35,000/QALY to €50,000/QALY[5-8].
- Our results showed that **52.52%** of the simulations were below the **€35,000/QALY** threshold; **60.56%** were below the **€37,000/QALY** threshold and **89.12%** were below the **€50,000/QALY** threshold (Figures 2 y 3).

Figure 2. Cost-effectiveness plane.

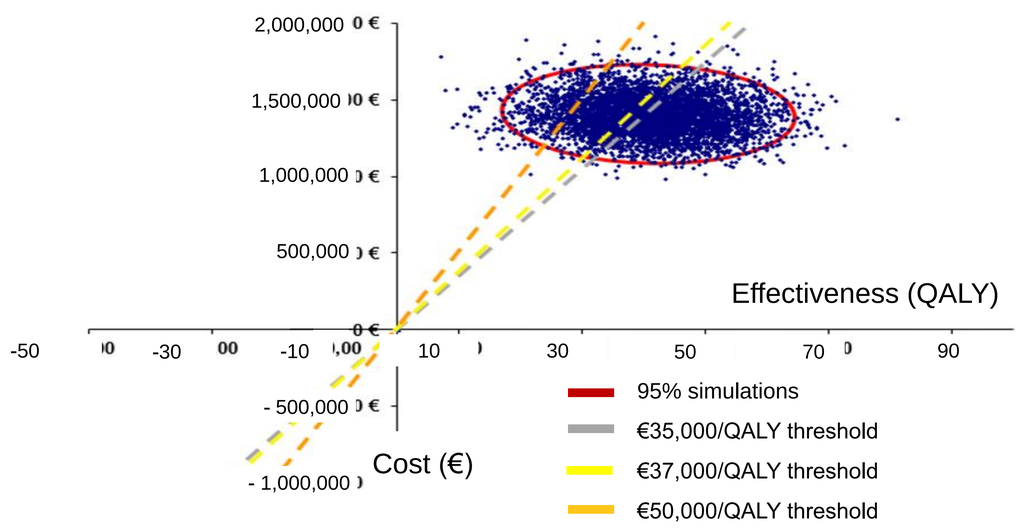
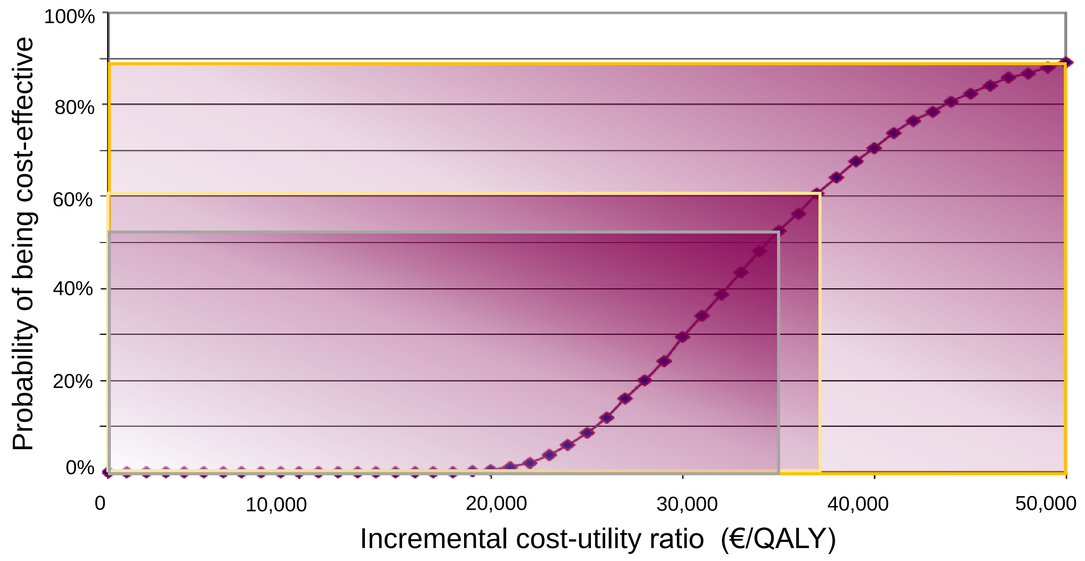


Figure 3. Acceptability curve.



Conclusions

- Implementing gBRCAt in women with non-mucinous HGEOC regardless of family history of OC or BC is cost-effective in Spain.
- Investment in early diagnosis techniques that reduce the new cases of EOC or BC would **decrease the cost of the illness management** in subsequent years and **improve quality of life** outcomes.

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