Economic impact of a genomic companion diagnostic test for breast cancer patients in French private hospitals

Vataire AL¹, Aballéa S¹, Katz G²,³
¹Creativ-CEutical, Paris, France; ²ESSEC Business School, Paris-Singapore; ³Fondation Générale de Santé, Paris, France

BACKGROUND
- Breast cancer is the second most common cancer in the world, and, for the most frequent cancer among women with an estimated 1.67 million new cancer cases diagnosed in 2012 (292,000 deaths), which represents 25% of all deaths. [1] About 54,000 new cases were diagnosed in France in 2012, [2] representing 33% of all newly diagnosed women with cancer.
- Several multigene prognostic and predictive tests have recently been launched.

METHODS
- Collection of data
A multicentre retrospective study was conducted in seven French private hospitals, all part of the Générale de Santé group, to estimate the cost of adjuvant chemotherapy from societal and national insurance perspectives.
- Resource data were extracted from medical records of female patients who have undergone surgery for breast cancer from January 2008 to January 2013.
- The inclusion criteria were:
  - Women who received all cycles of chemotherapy within the same private hospital
  - Women with E                                             vs. non-HR status and no node involvement
  - Patients were followed from the start (including the pre-chemotherapy period) to the end of adjuvant chemotherapy.
- Patients characteristics and pre-chemotherapy tests and biological procedures information were collected.
- Data on chemotherapy regimen, prophylactic agents, side effects visits, hospitalizations, laboratory tests, home care, treatment and sick-leave were collected at each chemotherapy cycle.

RESULTS
- Cost-effectiveness analysis
The cost of the chemotherapy resulting from the cost study was used as an input of a Markov model to assess the cost-effectiveness of the 21-gene assay from the French collective perspective.
- The model included three health states: survival without recurrence, metastatic recurrence and death.
- All patients started simulation in the state "without recurrence" (Figure 1). The model cycle length was one year, with a non-time horizon of 30 years.
- The considered health outcomes were life-years and quality-adjusted life-years (QALYs). To calculate QALYs, utility decrements (-0.07) were applied for patients undergoing chemotherapy and after recurrence. [3] Future costs and clinical benefits were discounted at 4% per annum.
- Other model inputs were the same as in a previous cost-effectiveness model of the 21-gene assay in France. [4]

Cost components
- Payer perspective
- Societal perspective

<table>
<thead>
<tr>
<th>Cost component</th>
<th>Payer perspective</th>
<th>Societal perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration chemotherapy</td>
<td>€1,550 (38%)</td>
<td>€1,550 (38%)</td>
</tr>
<tr>
<td>Chemotherapy drug</td>
<td>€303 (84%)</td>
<td>€303 (84%)</td>
</tr>
<tr>
<td>Pathologic prescription</td>
<td>€244 (60%)</td>
<td>€244 (60%)</td>
</tr>
<tr>
<td>Side effect management</td>
<td>€682 (19%)</td>
<td>€682 (19%)</td>
</tr>
<tr>
<td>Monitoring</td>
<td>€617 (47%)</td>
<td>€617 (47%)</td>
</tr>
<tr>
<td>Transport</td>
<td>€620 (15%)</td>
<td>€620 (15%)</td>
</tr>
<tr>
<td>Abstention</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>€8,218 (37%)</td>
<td>€8,218 (37%)</td>
</tr>
</tbody>
</table>

- Cost-effectiveness results
- The use of a 21-gene assay was associated with an incremental cost of €52 per patient, in comparison with standard care (including productivity costs), from collective perspective.
- The test acquisition cost €3,180 was partly offset by reductions in chemotherapy costs, estimated at €1,508 on average per patient, and costs related to recurrences €1,319.
- When productivity costs were included, using the 21-gene assay was associated with an overall cost saving of €602 per patient (Table 2).
- On average, patients using the 21-gene assay have a higher life expectancy than those without the test (+1.18 years).
- The difference in QALYs between the two strategies was 0.17, supporting the use of the test. It considered a gain of 0.15 QALYs relative to the negative effects of chemotherapy on quality of life.

CONCLUSIONS
- Providing the 21-gene assay in French private hospitals would be cost-effective in the short term.
- In the absence of reimbursement from primary payers, private hospitals may cover the costs of companion diagnostics to improve their attractiveness.
- Due to budget constraints, the test will likely remain underused, thus depriving patients from a technology that could improve their quality of life and using resources that could be freed up for other patients.

REFERENCES