Long-term medical costs of postmenopausal breast cancer therapy

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Introduction

The overall incidence of breast cancer is on the increase given that breast cancer incidence increases with age and the average life expectancy is increasing [1]. The average mortality from female breast cancer above the age of 50 years was 114.6 per 100000 in 1994, accounting for 87% of all breast cancer-related deaths in women [2]. These observations have stimulated an awareness both in the population and of health professionals, and has led to efforts being made towards prevention of breast cancer, particularly in the higher age groups.

Prevention programs can be expected to have a large economic impact on the health care system. To optimize their effect, they can be applied in high-risk populations; for example, in women aged 50–70 years.

From a health economic point of view, in addition to the efficacy in terms of the number of cases prevented, one is also interested in the costs saved by disease prevention.

Patients and methods

Methodology

A Markov state transition model was developed reproducing the natural history of breast cancer (excluding carcinoma in situ) as from diagnosis, for a hypothetical cohort of 1000 patients [3, 4]. The model was developed using the software DATA™ 3.5 (TreeAge Software Inc., Williamstown, MA, USA), and consists of mutually exclusive health states and 10 fixed time periods (‘stages’) of 1 year. We have chosen this relatively short analysis period since a lifetime prediction is subject to more uncertainty about future treatment options.

The model starts at the time of breast cancer diagnosis. Based on epidemiological data in the literature, 13% of breast cancer patients enter the model in the state ‘treatment of metastatic breast cancer’ [5]. Of the remaining patients, 40% start in ‘treatment of node-positive early breast cancer’ and 60% in ‘treatment of node-negative early breast cancer’ [6]. After treatment, all patients with early breast cancer can move to follow-up, have locoregional relapse, develop metastatic disease or die.

If a patient experiences locoregional relapse, they move to ‘treatment of locoregional relapse’, and subsequently either to follow-up after locoregional relapse, metastatic disease or death. Once patients have developed metastatic disease, they enter the state ‘treatment of metastatic disease’. Thereafter, patients can move to ‘follow-up after metastatic breast cancer’ or ‘death’. At any time during the 10 year period, each patient starting in the model is allocated to one of the health states. Probabilities of disease progression in the different cancer stages were based on literature data with currently used treatment patterns.

To each health state a cost was then attributed. These cost data were based on a multicenter retrospective chart review performed in 119 women with different disease stages at breast cancer diagnosis and at different points of disease progression. By attributing to each state the probability of a patient being in that state at each annual cycle and the average annual cost of being in that state, the average accumulated 10 year costs of postmenopausal breast cancer was calculated.

Clinical data input

Calculation method. Annual rates of disease progression (transition probabilities) were calculated from published risks [4]. All figures are reported in Table 1 and explained hereafter.
Probability of breast cancer recurrence and metastasis. For patients with early breast cancer, the Early Breast Cancer Trialists Collaborative Group (EBCTCG) has collected detailed information on any woman randomized before 1990 in a clinical trial evaluating systemic treatment. From studies evaluating endocrine therapy, EBCTCG obtained information on 37000 women comprising ∼87% of the worldwide evidence [7]. From trials evaluating chemotherapy, EBCTCG collected information on 30000 women [8]. The overall recurrence rates reported by the EBCTCG were applied in the model for endocrine and chemotherapy treated women, respectively. It must hereby be noted that in the chemotherapy analysis 68% of women above the age of 50 years were receiving tamoxifen in addition to the chemotherapy studied [8]. Therefore, the model may underestimate the recurrence rates in the case of chemotherapy alone. Nevertheless, we applied the EBCTCG results for chemotherapy because the continuous improvements of chemotherapy regimens with time insinuate further reductions of recurrence rates. Furthermore, from an economic point of view, this is a conservative approach since the management of metastatic breast cancer is very costly compared with follow-up of uncomplicated early breast cancer.

Since an additional reduction in recurrence rates from combination therapy as opposed to chemotherapy or endocrine therapy alone has not been quantified, combined treatment was attributed the lowest of both risks reported by the EBCTCG. The EBCTCG total recurrence rates include contralateral breast cancer and locoregional breast cancer, as well as metastatic relapse. Therefore, the local and contralateral relapse rates were subtracted in order to obtain specific rates of metastatic relapse (Table 1).

### Probability of contralateral breast cancer

The EBCTCG reported an annual risk of 0.30% in women receiving endocrine treatment and estimated an annual risk of 0.43% with adjuvant chemotherapy [7, 8].

### Probability of locoregional recurrence

The 10-year cumulative incidence of ipsilateral locoregional recurrence after endocrine treatment in patients with node negative early breast cancer is ∼4% [9]. This figure is based on a relatively small study (150 patients) but the risk in patients not receiving systemic therapy was comparable with the control risk in the very large study by Fisher et al. [10]. Although the risk of locoregional relapse after chemotherapy in node negative patients has been shown to depend on the type of chemotherapy [cyclophosphamide, methotrexate and fluorouracil (CMF) versus methotrexate and fluorouracil (MF)], this difference was less apparent in the age group >50 years. Therefore we used the average reported risk of 0.2% [11]. The annual risk for locoregional recurrence in node positive postmenopausal patients was equal for endocrine therapy and for chemotherapy (0.4%) [10, 12].

### Probability of disease progression after locoregional relapse

A retrospective analysis of 756 patients with low risk (node negative) breast cancer observed a relationship between local and distant recurrence rates [13]. It was concluded

<table>
<thead>
<tr>
<th>References</th>
<th>Treatment</th>
<th>Reported rate</th>
<th>Risk (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisher et al. [11]</td>
<td>Chemo</td>
<td>2.6% in 8 years</td>
<td>0.2%</td>
</tr>
<tr>
<td>Dalberg et al. [9]</td>
<td>Endocrine</td>
<td>4% in 10 years</td>
<td>0.4%</td>
</tr>
<tr>
<td>EBCTCG [8]</td>
<td>Chemo</td>
<td>34.4% in 10 years</td>
<td>3.5%</td>
</tr>
<tr>
<td>EBCTCG [7]</td>
<td>Endocrine</td>
<td>30.9% in 10 years*</td>
<td>3.0%</td>
</tr>
<tr>
<td>EBCTCG [7, 8]</td>
<td>Both</td>
<td>30.9% in 10 years</td>
<td>3.0%</td>
</tr>
<tr>
<td>Fisher et al. [10]</td>
<td>Chemo</td>
<td>5% in 12.5 years</td>
<td>0.4%</td>
</tr>
<tr>
<td>Wils et al. [12]</td>
<td>Endocrine</td>
<td>2.33% in 5.7 years</td>
<td>0.4%</td>
</tr>
<tr>
<td>EBCTCG [8]</td>
<td>Chemo</td>
<td>56.6% in 10 years</td>
<td>7.2%</td>
</tr>
<tr>
<td>EBCTCG [7]</td>
<td>Endocrine</td>
<td>44% in 10 years</td>
<td>4.9%</td>
</tr>
<tr>
<td>EBCTCG [7, 8]</td>
<td>Both</td>
<td>44% in 10 years</td>
<td>4.9%</td>
</tr>
<tr>
<td>EBCTCG 98 [8]</td>
<td>Chemo</td>
<td>168/39 100 years at risk</td>
<td>0.4%</td>
</tr>
<tr>
<td>EBCTCG 98 [7]</td>
<td>Endocrine</td>
<td>3% in 10 years</td>
<td>0.3%</td>
</tr>
<tr>
<td>Ackland et al. [17]</td>
<td>All</td>
<td>50% in 8.9 months</td>
<td>60.7%</td>
</tr>
<tr>
<td>Ackland et al. [17]</td>
<td>All</td>
<td>50% in 20.1 months</td>
<td>33.9%</td>
</tr>
</tbody>
</table>

*Overall recurrence weighed average for ER+ and ER− women, assuming no effect of endocrine therapy in ER− women.

N−, node-negative; N+, node-positive; EBCTCG, Early Breast Cancer Trialists' Collaborative Group; ER−, estrogen receptor negative, ER+, estrogen receptor positive.
that the incidence of distant recurrence was increased 4.4-fold in patients having shown a locoregional relapse. Other studies in broader patient groups confirm this relationship by a significantly shorter median time to metastasis after local relapse [13, 14].

Disease progression after relapse was also shown to depend on initial lymph node status, the risk being significantly higher in node-positive patients compared with node-negative patients [15]. The calculations of transition probabilities show an annual risk of progression to metastatic disease of 13.6% for initially node-negative patients and 27.6% for initially node-positive patients.

**Mortality in primary early breast cancer and locoregional relapse.** Patients who die from breast cancer die from metastatic disease and the few women recorded in clinical trials as having died from breast cancer or from an unknown cause without any record of recurrence (2% of breast cancer-related deaths) are assumed to have had recurrence just before they died [8]. Therefore, the overall probability of death within health states related to early breast cancer is considered equal to the probability of non-breast cancer-related death. Based on the rates of death as first event (prior to progression) in clinical trial populations with early breast cancer (0.6% per year according to EBCTCG 1998 based on data from 44 300 women-years), this mortality rate can be assumed to be equal to the natural mortality for the age and sex matched general population (average age in model = 64 years). This is 0.92% per year at the start of the model and 1.48% per year as from year 6 [16].

**Remission, reactivation and mortality in metastatic breast cancer.** In a randomized multinational study comparing cyclophosphamide, epirubicin and 5-fluorouracil (CEF) with CMF in 460 metastatic breast cancer patients, median overall survival was comparable in both groups: 20.1 and 18.2 months, respectively. However, CEF showed significantly better response rates with a median remission duration (average age in model = 64 years). This is 0.92% per year at the start of the model and 1.48% per year as from year 6 [16].

The cost of supplementary treatment episodes in case of metastatic recurrence has been included in the follow-up state of metastatic breast cancer.

**Cost data input**

**Retrospective chart review.** A total of 118 patient charts from seven regionally spread Belgian centers were reviewed. In each center a random selection of patient files was made based on listings of ICD9 codes for breast cancer and metastatic breast cancer (174 or 198.9, respectively) in 1997. Patients were included based on the following criteria:

1. Age >50 years or postmenopausal at breast cancer diagnosis; AND
2. Disease status at study entry was (i) primary treatment of breast cancer, or (ii) treatment of locoregional relapse (including breast, axillary or thoracic recurrences), or (iii) treatment of metastatic disease.

Charts were reviewed by two independent physicians for a duration of 1 year, or until the occurrence of relapse or further progression, because after progression the data were no longer representative of the health state in which the patient entered the study. The cost of treating disease progression was obtained from a separate patient sample included at the time of progression. All resources directly or indirectly related to breast cancer diagnosis were recorded during the study period. Allocation of resources to breast cancer was based on the physicians notes and other documentation in the patient charts. In case of doubt with regard to allocation the treating physician was consulted.

At the end of the 1-year study period, the planned follow-up schedule or, if available, the actual follow-up during the subsequent year was recorded. Thus, we measured the costs during the actual treatment period and the costs of follow-up. Ambulatory costs were measured only if mentioned in the hospital files. Therefore, it is likely that some costs at the general practitioners level went undetected. No attempt was made to estimate an average cost of breast cancer-related resource use at the general practitioner level.

One hundred and eighteen patients with an average age of 64 years were included. Nineteen per cent were aged <55 years, 39% between 55 and 65 years and 42% 65 years. Disease stages were distributed as follows: 25 patients with node-negative disease; 28 with node-positive disease; 12 patients with locoregional relapse; and 45 patients were included with metastatic breast cancer. Ten additional patients had "end-stage" metastatic disease.

Of 43 patients with metastatic disease, 16 patients had their first diagnosis of metastatic progression, 16 had a metastatic relapse after previous remission and 11 patients had metastatic lesions at the moment of breast cancer diagnosis.

**Unit costs.** Costs were calculated by multiplying for each procedure the number of procedures with the respective unit cost for 1998. The unit cost for hospital or day clinic was the average cost per day recorded in the patient invoices. The cost per procedure for interventions, diagnostic investigations and medical visits were derived from the official listings of the Belgian Health Insurance INAMI/RIZIV.

Medication costs were based either on patient invoices or on unit costs derived from the official listings by the Belgian Center for Pharmacotherapeutic Information.

**Sensitivity analysis.** Sensitivity analyses were conducted whereby input variables in the model were varied over a range of possible values in order to assess their impact on the final outcomes. All transition variables were relatively increased or decreased by 20%; all costs related to locoregional relapse and advanced disease were increased or decreased by 20% as well; the probability of having metastasis at diagnosis was varied from 0% to double that of the baseline value. This methodology of simultaneous variation of model variables by 20% to test robustness of outcomes was applied previously [21]. The extent of variation chosen (20%) is very likely to cover the confidence intervals surrounding transition probabilities which include variations around 10% [8, 17]. For example, Ackland et al. [17] reported a median survival rate in metastatic cancer patients of 20.1 months [95% confidence interval (CI) 18–23 months], from which an annual mortality rate of 33.9% was calculated with a 95% CI from 30.4% to 37.0%, a variation of up to 10.5%.

**Results**

**Results from the retrospective chart review**

The costs attributed to the different health states include the actual treatment costs observed between entering the state and complete recovery of any treatment-related adverse events, as well as the follow-up costs until the end of the year, resulting in the total 1-year cycle cost. The calculated costs are shown in Table 2 and are separated into different cost categories.

The average costs of surgery and radiotherapy within the patient population with metastatic disease were significantly different for patients with metastasis at breast cancer diagnosis compared with patients with treatment of metastatic relapse. The costs measured in the latter group are shown in the footnote to Table 2.

In the subgroup of patients with locoregional relapse the sample size for measuring resource use during follow-up was very small. Therefore, the costs were assumed to be equal to those incurred by follow-up of node-positive breast cancer.

In the chart review there was no significant difference in total follow-up costs between the second and first treatment episode of metastatic breast cancer; therefore, all metastatic patients were pooled. The results of calculating follow-up costs are shown in Tables 3 and 4. Table 5 shows the cost calculations for hospitaliza-
tion, day clinic and physician visits as an illustration of methods. Details on cost calculations for other items of resource use can be provided upon request.

For those patients who died during the study period a separate analysis estimated the average cost of the final stage prior to death. This cost was equal to €14267.

Ten year cost prediction as from diagnosis

The Markov model was run to estimate the costs of breast cancer from diagnosis over a period of 10 years, thereby discounting at an annual rate of 3%.

This resulted in a total cumulative cost estimate at 10 years of €31774. Via Monte Carlo simulation for 1000 patients diagnosed with breast cancer we calculated a 95% CI of €30536–€33012 [4].

In order to simplify the reporting of results, a regrouping of costs was performed, resulting in seven main cost categories: tests; radio/chemotherapy and surgery; endocrine treatment; hospital stay; visits; and day clinic and terminal care. The overall cost consists mainly of treatment costs (radio/chemotherapy and surgery) and costs associated with hospital stay (Figure 1). The evolution of these costs over time for an average patient shows a decreasing slope that can be explained by the increasing number of patients dying, and by discounting future costs (Figure 2).

Table 2. Average cost (and standard error) of breast cancer treatment at different disease stages (€)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Prim N–</th>
<th>Prim N+</th>
<th>Relapse</th>
<th>Metastatic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SE</td>
<td>Mean</td>
<td>SE</td>
</tr>
<tr>
<td>Surgery</td>
<td>489</td>
<td>45</td>
<td>603</td>
<td>60</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>935</td>
<td>131</td>
<td>1198</td>
<td>89</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>933</td>
<td>396</td>
<td>3300</td>
<td>968</td>
</tr>
<tr>
<td>Endocrine</td>
<td>286</td>
<td>85</td>
<td>272</td>
<td>43</td>
</tr>
<tr>
<td>Other treatment</td>
<td>38</td>
<td>10</td>
<td>318</td>
<td>164</td>
</tr>
<tr>
<td>Other drugs</td>
<td>83</td>
<td>19</td>
<td>1084</td>
<td>602</td>
</tr>
<tr>
<td>Imaging</td>
<td>481</td>
<td>82</td>
<td>738</td>
<td>105</td>
</tr>
<tr>
<td>Pathology</td>
<td>208</td>
<td>23</td>
<td>231</td>
<td>24</td>
</tr>
<tr>
<td>Markers</td>
<td>23</td>
<td>4</td>
<td>37</td>
<td>7</td>
</tr>
<tr>
<td>Other tests</td>
<td>110</td>
<td>20</td>
<td>250</td>
<td>82</td>
</tr>
<tr>
<td>Visits</td>
<td>332</td>
<td>52</td>
<td>605</td>
<td>67</td>
</tr>
<tr>
<td>Day clinic</td>
<td>471</td>
<td>130</td>
<td>693</td>
<td>116</td>
</tr>
<tr>
<td>Hospital</td>
<td>2504</td>
<td>233</td>
<td>4354</td>
<td>610</td>
</tr>
<tr>
<td>Totals</td>
<td>6893</td>
<td>1238</td>
<td>13684</td>
<td>2945</td>
</tr>
</tbody>
</table>

Table 3. Average cost of follow-up during the remaining year after treatment (€)

<table>
<thead>
<tr>
<th>Follow-up (year 1)</th>
<th>Average cost of follow-up (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prim N– Mean</td>
</tr>
<tr>
<td>Other treatment</td>
<td>3</td>
</tr>
<tr>
<td>Other drugs</td>
<td>100</td>
</tr>
<tr>
<td>Imaging</td>
<td>138</td>
</tr>
<tr>
<td>Markers</td>
<td>14</td>
</tr>
<tr>
<td>Other tests</td>
<td>26</td>
</tr>
<tr>
<td>Visits</td>
<td>69</td>
</tr>
<tr>
<td>Day clinic</td>
<td>29</td>
</tr>
<tr>
<td>Hospital</td>
<td>446</td>
</tr>
<tr>
<td>Totals</td>
<td>824</td>
</tr>
</tbody>
</table>

*Visits include oncological consults in hospital and ambulatory consults and honoraria and nursing care.
The model results are very robust with regard to the applied transition probabilities. This was shown by the sensitivity analysis. If for instance all transition variables are relatively increased by 20%, 10 year costs only change by 4%. The results are also relatively stable with regard to the stage at breast cancer diagnosis. Assuming that all patients are diagnosed at the stage of early breast cancer, before metastatic disease, the total costs are calculated at €28292. If on the other hand the probability of metastasis at diagnosis is doubled compared with the basic analysis, the total cost becomes €35255.

The model predicts a 10-year overall mortality of 42.4%. The absolute divergence from the observed overall 10-year mortality from breast cancer in Europe (45% [22]) is only 2.6%, suggesting good model validity.

### Discussion

Based on a multicenter retrospective chart review in postmenopausal breast cancer patients, we collected current direct medical costs of managing different breast cancer stages in Belgium, taking the perspective of the health care payers. Applying these data in an analytical model built on the basis of long-term epidemiological data from clinical literature allowed a prediction of the estimated long-term costs of postmenopausal breast cancer in Belgium. Although it has been stated that indirect costs of breast cancer, related to loss of productivity due to morbidity and mortality, represent a large proportion of the total costs and may even exceed the direct costs of breast cancer, these were not included in our analysis [23]. When considering the population studied here, i.e. postmenopausal women, it is very difficult to quantify the costs of productivity loss, because these women are often retired or house wives, and for this population there is no general consensus as to the method for calculating costs of productivity loss [24].

Furthermore, in order to safeguard the current generalized health insurance system, the direct medical costs, in particular, associated with highly prevalent diseases, such as breast cancer, are of primary interest to the public payer.

We neither collected data at the general practitioner level nor looked at the patient’s own contributions. Therefore, the current analysis probably represents the lower limit of the actual average medical cost of managing postmenopausal breast cancer.

To our knowledge, very few cost-of-illness studies related to female breast cancer have been conducted in Europe. Most reports are related to the costs of acute treatment of specific cancer stages. For example, Bercez et al. [25] published data with regard to the treatment costs for metastatic recurrence and local breast cancer recurrence in France. The average cost of treatment, based on retrospective data analysis in 146 patients, was FF 175168 (€26704) for metastatic recurrence and FF 115705 (€17639) for local recurrence. In our sample, based on a 1-year observation, the respective costs were 40% and 30% lower. However, Bercez et al. [25] also included non-medical costs, such as patient transportation.

### Table 4. Average cost of follow-up as from the second year (€)

<table>
<thead>
<tr>
<th></th>
<th>Prim N−</th>
<th>Prim N+</th>
<th>Metastatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endocrine</td>
<td>335</td>
<td>413</td>
<td>335</td>
</tr>
<tr>
<td>Other treatment</td>
<td>2</td>
<td>25</td>
<td>166</td>
</tr>
<tr>
<td>Drugs</td>
<td>77</td>
<td>122</td>
<td>290</td>
</tr>
<tr>
<td>Imaging</td>
<td>161</td>
<td>301</td>
<td>1055</td>
</tr>
<tr>
<td>Markers</td>
<td>16</td>
<td>19</td>
<td>75</td>
</tr>
<tr>
<td>Other tests</td>
<td>28</td>
<td>41</td>
<td>215</td>
</tr>
<tr>
<td>Fixed hospital</td>
<td>18</td>
<td>29</td>
<td>213</td>
</tr>
<tr>
<td>Specialist</td>
<td>49</td>
<td>69</td>
<td>118</td>
</tr>
<tr>
<td>Day clinic</td>
<td>22</td>
<td>86</td>
<td>131</td>
</tr>
<tr>
<td>Hospital</td>
<td>185</td>
<td>185</td>
<td>2334</td>
</tr>
<tr>
<td>Totals</td>
<td>893</td>
<td>1289</td>
<td>4932</td>
</tr>
</tbody>
</table>

*These costs were calculated as the average between the first year follow-up and the planned subsequent follow-up. The follow-up costs after locoregional relapse were estimated similar to node-positive breast cancer. Only endocrine costs were slightly different: on average €465/year.

### Table 5. Cost calculations for hospital stay, day clinic and physician visits (€)

<table>
<thead>
<tr>
<th></th>
<th>Breast cancer treatment costs (€)</th>
<th>Follow-up remaining year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prim N−</td>
<td>Prim N+</td>
</tr>
<tr>
<td>Hospital stay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit cost/day</td>
<td>253</td>
<td>253</td>
</tr>
<tr>
<td>No. of days</td>
<td>9.90</td>
<td>17.21</td>
</tr>
<tr>
<td>Total cost</td>
<td>2504</td>
<td>4354</td>
</tr>
<tr>
<td>Day clinic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit cost/day</td>
<td>113</td>
<td>113</td>
</tr>
<tr>
<td>No. of days</td>
<td>4.17</td>
<td>6.13</td>
</tr>
<tr>
<td>Total cost</td>
<td>471</td>
<td>693</td>
</tr>
<tr>
<td>Visits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit cost/day</td>
<td>14.5</td>
<td>14.5</td>
</tr>
<tr>
<td>No. of visits</td>
<td>22.9</td>
<td>41.7</td>
</tr>
<tr>
<td>Total cost</td>
<td>332</td>
<td>605</td>
</tr>
</tbody>
</table>

*These costs were calculated as the average between the first year follow-up and the planned subsequent follow-up. The follow-up costs after locoregional relapse were estimated similar to node-positive breast cancer. Only endocrine costs were slightly different: on average €465/year.
Wolstenholme et al. [26] used a modeling approach to assess the implications of treatment costs for different stages at diagnosis on breast cancer screening cost-effectiveness. Screening programs reduce the stage at diagnosis, and improve breast cancer survival by \( \sim 24\% \) by shifting to earlier stages at diagnosis. Similar to previous reports, the study illustrates that late stage cancer is more expensive than early breast cancer, improving the expected cost-effectiveness of screening [27]. However, the cost difference between cancer stages loses significance when lifetime costs are considered. This was also the case in our analysis, in which changing the probability of metastatic disease at the time of diagnosis had only a modest influence on the overall total 10-year costs.

Thus, the results are in accordance with those reported by Wolstenholme et al. [26]; namely, that reducing the stage at diagnosis by breast cancer screening is unlikely to result in large treatment cost economies. The high costs of palliative care for late stage breast cancer management could be counterbalanced by high costs for aggressive initial cancer treatment and for long-term follow-up.

The medical profession shows great interest in any treatment that may reduce the incidence of breast cancer, such as screening or preventive medication. In this respect, selective estrogen receptor modulators show some promise in prevention, but their cost-effectiveness still needs to be analyzed further [28].

The results from our analysis may be of interest for the estimation of the possible savings incurred by breast cancer prevention and early treatment, and to identify populations, for example based on their risk profile, in which a specific intervention is both effective and cost-effective.

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References