The Cost-Effectiveness of Bevacizumab in Advanced Ovarian Cancer Using Evidence from the ICON7 Trial

Sebastian Hinde, MSc,*, David Epstein, PhD, Adrian Cook, MSc, Andrew Embleton, MSc, Timothy Perren, MD, Mark Sculpher, PhD

1Centre for Health Economics, University of York, York, UK; 2Department of Applied Economics, University of Granada, Granada, Spain; 3Medical Research Council Clinical Trials Unit, University College London, London, UK; 4St James Institute of Oncology, St James University Hospital, Leeds, UK

ABSTRACT

Background: Bevacizumab is used extensively in the treatment of cancer, including advanced ovarian cancer, for which results of the International Collaborative Ovarian Neoplasm (ICON) 7 trial have been recently reported. The National Institute for Health and Care Excellence’s (NICE’s) recent decision not to recommend bevacizumab for advanced ovarian cancer was based on evidence related to the unlicensed lower dosage (7.5 mg/kg) of the drug despite its use in the English National Health Service (NHS) and the ICON7 trial. Objective: To report on the findings of an analysis that considered whether the lower dose is cost-effective. Methods: Cost-effectiveness analysis is assessed from the perspective of the English NHS and health outcomes expressed in terms of quality-adjusted life-years (QALYs). The analysis focuses on a clinically predefined high-risk subgroup of the ICON7 trial. The price at which the lower dose of bevacizumab could be considered cost-effective for the English NHS is presented for a range of scenarios to inform decisions about price negotiations by international health systems. Results: In the base-case analysis, bevacizumab has an incremental cost-effectiveness ratio of £48,975 per additional QALY, which is above NICE’s standard cost-effectiveness threshold (£20,000–£30,000 per QALY). The official price of bevacizumab in 2013 was between £2.31 and £2.63 per milligram. A price reduction of between 46% and 67%, dependent on the NICE threshold, would be required for the product to be cost-effective in the high-risk subgroup. Conclusions: The lower dose of bevacizumab for advanced ovarian cancer is not cost-effective based on the product’s list price and using NICE’s cost-effectiveness thresholds. Significant price discounts would be needed to make the drug affordable to the NHS. Keywords: bevacizumab, cost-effectiveness, economic evaluation, ovarian cancer.

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Introduction

In the United Kingdom, ovarian cancer represents the fifth most prevalent gynecological cancer, with 7116 new cases diagnosed in 2011 [1]. Until 2012 the standard treatment for ovarian cancer in the National Health Service (NHS) had remained relatively unchanged over the previous decade [2], with debulking surgery where possible followed by carboplatin chemotherapy usually given in combination with paclitaxel [3,4]. Bevacizumab, as an angiogenesis inhibitor, represents an adjunctive therapy to standard chemotherapy.

Bevacizumab currently holds licenses from the European Medicines Agency in a range of oncological indications, including colorectal, lung, and breast, in addition to the license held for ovarian cancer. Its license in ovarian cancer is limited to advanced disease, at a recommended dose of 15 mg/kg. The National Institute for Health and Care Excellence (NICE) has not recommended bevacizumab in any of the cancers it has assessed [5–7], with its use in advanced ovarian cancer being rejected on the grounds of poor value for money to the NHS [8]. Although NICE’s recommendation was limited to the higher dose, interim trial results were reported during the technology assessment suggesting that it was not cost-effective at the lower dose either. Bevacizumab is, however, currently funded by the NHS at the lower dose (7.5 mg/kg) through the Cancer Drugs Fund. A recent update of the fund’s list of approved treatments confirmed that bevacizumab will continue to be funded in the short-term [9]. However, as the Cancer Drugs Fund reaches the end of its funding period (March 2016), understanding the cost-effectiveness of treatments that it currently funds will become important to guide decisions about resourcing in the future.

A recent publication has reported the mature clinical results of the International Collaborative Ovarian Neoplasm (ICON) 7 trial [10], a two-arm, multicenter randomized controlled trial of bevacizumab in ovarian cancer, which followed 1528 patients, recruited between 2006 and 2009, with high-risk early- or

Conflict of interest: M. Sculpher has been a consultant to various pharmaceutical companies including Roche.

* Address correspondence to: Sebastian Hinde, Centre for Health Economics, Alcuin ‘A’ Block, University of York, Heslington, York YO10 5DD, UK.

E-mail: Sebastian.hinde@york.ac.uk.

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advanced-stage epithelial ovarian carcinoma, for up to 5 years [11]. This analysis found modest gains from bevacizumab in progression-free survival (PFS) in the full trial population (a restricted mean difference of 1.5 months between the arms; \( P = 0.004 \)), with no clinically or statistically significant difference in overall survival. In contrast, evidence was found for differences in both PFS (a restricted mean difference of 3.5 months; \( P < 0.001 \)) and overall survival (a restricted mean difference of 4.8 months; \( P = 0.03 \)) between the two treatment arms in a predefined high-risk subgroup.

This analysis reports the findings of a cost-effectiveness analysis of the predefined high-risk subgroup in the ICON7 trial, and as such represents the first cost-effectiveness analysis of mature data from a trial of bevacizumab for ovarian cancer at the lower dose. The analysis focuses on the high-risk subgroup, as predefined in the trial analysis, due to the lack of significant differences in PFS or overall survival between the trial arms in the full trial population.

**Methods**

**Overview**

Cost-effectiveness analysis compares the benefits (generally gains in health) offered by a given intervention with the benefits other patients must forgo as a result of services that are displaced when additional costs are imposed on a health care system with a constrained budget, such as the NHS. This is achieved by considering the incremental health gains and costs associated with a new intervention, as represented by the incremental cost-effectiveness ratio (ICER), against a cost-effectiveness threshold representing forgone health associated with the additional cost. This evaluation is consistent with NICE methods guidelines [12], considering costs from the perspective of the NHS and Personal Social Services, expressed in UK pounds sterling at 2013 prices. Health outcomes are expressed in terms of quality-adjusted life-years (QALYs), with both costs and outcomes discounted at 3.5% per annum. A cycle length of a week was used to account for the rapid development of advanced ovarian cancer.

**Analytical Methods**

Clinical analysis of the ICON7 trial has found that in the high-risk subgroup, there remains a small difference in the rate of overall survival at 5 years in the two treatment arms despite the convergence of the PFS curves [10]. This persistent difference can be seen in Figure 1, which presents Kaplan-Meier curves for the two arms of the trial for both PFS and overall survival, alongside the extrapolations discussed in the next section. Given the difference in overall survival at 5 years, an estimate of differences in mean quality-adjusted life expectancy requires a longer time horizon, based on extrapolation of survival estimates beyond the trial evidence. Such extrapolation is also needed to estimate mean differences in lifetime costs. A partitioned survival model [14,15] is adopted for this purpose, which considers a three-state model of disease (preprogression, postprogression, and death). The areas under the PFS and overall survival curves shown in Figure 1 are used to estimate mean time in the preprogression state and mean overall survival, respectively.

![Figure 1 - Kaplan-Meier and extrapolated survival curves used to inform partition survival analysis. OS, overall survival; PFS, progression-free survival. (Color version of figure available online).](image-url)
The difference between these two mean durations is the mean time in the postprogression state.

**Evidence Sources**

The clinical outcomes of progression and mortality that inform the analysis are drawn directly from the ICON7 trial, and have been reported elsewhere [19]. The partition survival model applied to the high-risk subgroup is constructed around the PFS and overall survival Kaplan-Meier curves estimated from the trial, and presented in Figure 1. Given the need for a lifetime time horizon and because of censoring in the trial, there is a need to estimate the rate of mortality and progression in patients beyond trial follow-up. In the base-case analysis, overall survival is extrapolated beyond the trial period by assuming that the rate of mortality in those patients surviving at 5 years is assumed to be the same as that found in a large observational study of epithelial ovarian cancer [16]. The rate of progression in those women who were progression free at 5 years is assumed to be the same as in patients subject to long-term follow-up in the ICON3 trial [17]. The analysis assumes that patients receive treatment at the age of 60 years, the median age of high-risk patients in the ICON7 trial. All extrapolation assumptions are tested using a range of alternative scenarios. Further details of these extrapolation methods can be found in Appendix 1 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2016.01.013.

Health-related quality of life (HRQOL) is based on the three-level EuroQol five-dimensional questionnaire completed by patients at multiple time points throughout the ICON7 trial. A maximum of 19 responses were available for each patient, up to 18 over time in patients who were progression free plus 1 at the point of progression of disease. Patients’ responses are valued using the UK scoring algorithm to provide a single HRQOL score per-patient response, which is bound by −0.594 and 1, where 0 and 1 represent death and good health, respectively [18].

Mean HRQOL before patients have progressed was estimated for each of the 18 time points collected in the trial to allow for a possible changing impact of adverse events over time and potential accommodation. Data on postprogression HRQOL were collected in the trial only at the time of diagnosis of progression and at 3 years after baseline. The mean HRQOL at these time points was calculated to inform the postprogression HRQOL in the model.

The base-case analysis assumed that the HRQOL of the patient population reflects disease stage and time since randomization only and is independent of initial treatment. This assumption of treatment independence was tested in a scenario analysis. The HRQOL of women in the general population, stratified by age (pooled quality-of-life estimates provided by Dr. Anju Keetharuth, University of Sheffield), was used as an estimate of the longer-term HRQOL of those women whose disease has not progressed at 5 years.

A complete set of resource use data on all patients was collected in the ICON7 trial, and this was used to estimate the costs associated with the two treatment arms. The following cost categories were considered: trial drugs, other treatments, clinical investigations, and laboratory tests. An average cost of treatment was estimated for the two arms and assumed to be incurred within the first year since treatment initiation. Mean daily costs during the progression-free stage of the high-risk model were estimated in each of these categories and for each treatment arm over three time periods (baseline to 1 year, 1–3 years, and 3–5 years). As with HRQOL, non-treatment cost for patients who have progressed is an average of the observed costs from the trial. Further details of these costs can be found in Appendix 2 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2016.01.013. The list price of bevacizumab ranges from £2.31 to £2.63 per milligram depending on the size of the vial. A range of possible prices, reflecting alternative vial sizes and combinations, was used assuming minimal drug wastage [19].

**Statistical Methods**

Missing data in clinical trials can result in bias and inefficient use of the data if handled incorrectly [20,21], necessitating its quantification and appropriate analysis in estimating costs and HRQOL. The analysis uses multiple imputation with chained equations [21], which assumes data are missing at random. Further details are available in Appendix 3 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2016.01.013.

Uncertainty is considered using three approaches. First, a probabilistic sensitivity analysis is conducted, in which distributions representing uncertainty in each parameter are repeatedly resampled (3000 times in this analysis). An average is taken across these simulations to generate an expected ICER, the simulations also provide a means of expressing the parameter uncertainty cost-effectiveness, which is presented as the probability each treatment is cost-effective based on alternative cost-effectiveness thresholds, here based on NICE range of £20,000 to £30,000 per QALY gained [12]. Appendix 4 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2016.01.013 provides more details of the uncertainty analysis. Second, an analyses of the price per milligram at which bevacizumab would have to be set for it to be cost-effective is presented. This analysis was conducted to inform decisions about the magnitude of discount that would be necessary to result in a cost-effective outcome. Finally, a range of scenario analyses is conducted. Table 1 details the seven scenarios considered, alongside the assumptions made in the base-case analysis. These scenarios are used to test the impact of key structural uncertainty, where this might not be sufficiently captured by the probabilistic sensitivity analysis approach. The scenarios relate to the extrapolation of survival curves (extrapolation scenarios 1 and 2), the treatment independence of HRQOL (HRQOL scenario 1), assumptions around long-term mortality (long-term mortality scenarios 1 and 2), and the impact of vial-sharing assumptions (vial-sharing scenarios 1 and 2). Probabilistic sensitivity analysis and price threshold analyses are conducted for all the scenarios.

**Results**

**Costs**

Table 2 presents the estimated mean costs (and standard errors [SEs]) per day from the ICON7 trial used in the model. The costs per day in the chemotherapy-only arm were found to be higher in the first year preprogression and in the postprogression periods, but much lower in the later preprogression periods. After the first year preprogression, the mean cost per day excluding trial drugs was greater in the bevacizumab arm.

**Health-Related Quality of Life**

Figure 2 shows the HRQOL scores over time used in the progression-free state of the base-case analysis, in which HRQOL is assumed to be treatment independent. The figure shows a trend toward higher levels of HRQOL over time in those who remain progression free, potentially a result of sicker patients (i.e., those with lower HRQOL) progressing earlier. The impact of treatment-related adverse events is shown through the large variations in HRQOL during the first 6 months after randomization.

As with HRQOL before progression, postprogression HRQOL is assumed to be treatment independent in the base-case analysis.
**Table 1 – Scenarios in the high-risk population model.**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Scenario phase</th>
<th>Costs</th>
<th>HRQOL</th>
<th>PFS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base case</td>
<td>Within trial phase (0–5 y)</td>
<td>Treatment and state-specific mean costs as observed in the trial. Vial sharing is assumed for chemotherapy treatment</td>
<td>Treatment-independent mean EQ-5D observed in the trial, for states without and with progression</td>
<td>Treatment-specific KM function estimated from the ICON7 trial</td>
<td>Treatment-specific KM function estimated from the ICON7 trial</td>
</tr>
<tr>
<td></td>
<td>Extrapolation phase (&gt;5 y)</td>
<td>No difference in cost per day for without progression; trial-based treatment-dependent cost per day for progression</td>
<td>Trial-based treatment-independent mean EQ-5D, for progression. HRQOL of general population for without progression</td>
<td>Rate of progression (given progression-free at 5 y) from the ICON3 trial [17]. Treatment independent</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Within trial phase (0–5 y)</th>
<th>Extrapolation phase (&gt;5 y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrapolation scenario 1, no extrapolation</td>
<td>As base case</td>
<td>No extrapolation of model</td>
</tr>
<tr>
<td>Extrapolation scenario 2, long-term treatment independence</td>
<td>As base case</td>
<td>Treatment independent</td>
</tr>
<tr>
<td>HRQOL scenario 1, treatment-dependent adjusted HRQOL</td>
<td>As base case</td>
<td>As base case</td>
</tr>
<tr>
<td>Long-term mortality scenario 1, patients &quot;cured&quot; after 10 y</td>
<td>As base case</td>
<td>As base case</td>
</tr>
<tr>
<td>Long-term mortality scenario 2, patients &quot;cured&quot; after 5 y</td>
<td>As base case</td>
<td>As base case</td>
</tr>
</tbody>
</table>

continued on next page
Postprogression HRQOL is also assumed to be independent of time since randomization, and is estimated from the trial data as 0.74 (SE 0.013).

HRQOL scenario 1 considered the assumption of treatment independence of preprogression HRQOL scores. The analysis found that there was a statistically significant difference in the HRQOL between the two arms (0.066 higher in the chemotherapy-alone arm; SE 0.061) at baseline, such that patients in the chemotherapy-alone arm were typically healthier before the commencement of treatment. This difference was adjusted for by reducing all subsequent HRQOL scores for the chemotherapy-only arm by 0.066. Figure 3 shows the adjusted mean difference in preprogression HRQOL scores and 95% confidence intervals. The figure shows that after adjusting for baseline differences, there was little difference in HRQOL between the treatment groups up to around 6 months. After this, HRQOL deteriorates in the chemotherapy arm relative to the bevacizumab arm. However, the 95% confidence intervals in Figure 3 show that the difference is never statistically significant, strengthening the assumption of treatment-independent HRQOL scores made in the base case.

There was a small difference in postprogression HRQOL between the two arms, being slightly higher in the chemotherapy-alone arm (0.75; SE 0.016) when compared with the bevacizumab arm (0.71; SE 0.020). However, as with progression-free HRQOL, there was no evidence that this difference was statistically significant (P = 0.095).

**Cost-Effectiveness**

Table 3 provides the cost-effectiveness results from the base-case and alternative scenarios considered.

In the base-case analysis, the bevacizumab arm was associated with higher costs than chemotherapy alone (incremental costs £18,684), most of which (£17,760) was the additional drug-related cost associated with bevacizumab. The remaining incremental difference (£924) is the result of the higher mean survival duration associated with bevacizumab, with patients incurring the cost of continued care for longer. This ratio of drug costs to other costs is consistent across the scenarios tested, with total and incremental costs changing little.

Similarly, in the base-case analysis, bevacizumab is associated with a larger total number of QALYs than chemotherapy only (incremental QALYs 0.381), most of which is the result of greater gains in QALYs in the preprogression period of the analysis (0.221), with smaller gains in the postprogression (0.066) and long-term (0.095) periods. Only three of the scenarios impact the QALY gains: HRQOL scenario 1 and long-term mortality scenarios 1 and 2. In all three scenarios, the bevacizumab arm
remains more effective (i.e., greater QALYs). Long-term mortality scenario 2, which assumes that surviving patients return to the mortality risk of the general population 5 years after treatment initiation, results in a large increase in total QALYs in both arms but proportionately larger in the bevacizumab arm, resulting in an increase in the incremental QALY gain to 0.563.

The results demonstrate that in none of the scenarios considered is bevacizumab cost-effective at NICE’s conventional cost-effectiveness thresholds. The base-case analysis results in an ICER of £48,975 per QALY gained, with a probability of bevacizumab being cost-effective of 0.01 and 0.13 at thresholds of £20,000 and £30,000 per QALY, respectively. The per milligram price at which bevacizumab would be cost-effective was £0.75 and £1.25, respectively, for these two thresholds.

Most of the scenarios considered did not have a significant impact on the ICER, with four of the seven impacting the ICER by less than £5000 per QALY. Where no extrapolation of the survival curves is assumed (i.e., extrapolation scenario 1), the ICER increases significantly to £65,519 because none of the long-term survival gains associated with bevacizumab is incorporated.

Of all the scenarios considered, only one results in an ICER below £40,000 per QALY, long-term mortality scenario 2, and is associated with an ICER of £32,898 per QALY and probabilities of being cost-effective of 0.21 and 0.45 at thresholds of £20,000 and £30,000 per QALY, respectively.

Discussion

This analysis found that bevacizumab (7.5 mg/kg), in combination with carboplatin, and paclitaxel when used as a first-line treatment for advanced ovarian cancer is not cost-effective at its list price. In the predefined high-risk subgroup considered in the ICON7 trial, bevacizumab is associated with a base-case ICER of £48,975 per QALY. Although the ICON7 trial found that there were gains from bevacizumab in both overall survival and PFS in this subgroup, the short duration of these gains and the significant acquisition cost associated with bevacizumab resulted in only small gains in expected QALYs but a high incremental cost.
<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total costs (£)</th>
<th>Incremental costs (£)</th>
<th>Total QALYs</th>
<th>Incremental QALYs</th>
<th>Incremental cost per QALY gained of bevacizumab (£)</th>
<th>Probability of bevacizumab being cost-effective at thresholds (per QALY)</th>
<th>Price per milligram at which bevacizumab is cost-effective (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base-case probabilistic</td>
<td>12,876</td>
<td>31,560</td>
<td>17,760</td>
<td>924</td>
<td>2.820</td>
<td>0.221 0.066 0.095 48,975</td>
<td>0.006 0.125 0.75 1.25</td>
</tr>
<tr>
<td>Extrapolation scenario 1</td>
<td>12,013</td>
<td>30,765</td>
<td>17,760</td>
<td>993</td>
<td>2.021</td>
<td>0.221 0.066 0.000 65,519</td>
<td>0.000 0.000 0.52 0.92</td>
</tr>
<tr>
<td>Extrapolation scenario 2</td>
<td>12,792</td>
<td>31,667</td>
<td>17,760</td>
<td>1,114</td>
<td>2.820</td>
<td>0.221 0.066 0.095 49,474</td>
<td>0.006 0.118 0.72 1.22</td>
</tr>
<tr>
<td>HRQOL scenario 1</td>
<td>12,876</td>
<td>31,560</td>
<td>17,760</td>
<td>924</td>
<td>2.871</td>
<td>0.281 0.008 0.060 48,701</td>
<td>0.008 0.136 0.75 1.25</td>
</tr>
<tr>
<td>Long-term mortality scenario 1</td>
<td>13,602</td>
<td>32,221</td>
<td>17,760</td>
<td>859</td>
<td>3.254</td>
<td>0.221 0.066 0.168 40,981</td>
<td>0.067 0.302 0.93 1.52</td>
</tr>
<tr>
<td>Long-term mortality scenario 2</td>
<td>14,638</td>
<td>33,167</td>
<td>17,760</td>
<td>770</td>
<td>4.333</td>
<td>0.221 0.066 0.277 32,898</td>
<td>0.209 0.446 1.20 1.92</td>
</tr>
<tr>
<td>Vial sharing of all trial drugs</td>
<td>12,876</td>
<td>29,601</td>
<td>17,760</td>
<td>924</td>
<td>2.820</td>
<td>0.221 0.066 0.095 43,840</td>
<td>0.020 0.205 0.82 1.38</td>
</tr>
<tr>
<td>No vial sharing of trial drugs</td>
<td>13,263</td>
<td>31,985</td>
<td>17,798</td>
<td>924</td>
<td>2.820</td>
<td>0.221 0.066 0.095 49,076</td>
<td>0.008 0.125 0.74 1.25</td>
</tr>
</tbody>
</table>

HRQOL, health-related quality of life; QALY, quality-adjusted life-year.

* The fixed price per milligram that bevacizumab would have to be set at to be expected to be cost-effective at cost-effectiveness thresholds of £20,000 and £30,000 per QALY. The calculation assumes a fixed cost per milligram of bevacizumab and uses a deterministic model structure.
Patients with advanced ovarian cancer have poor prognosis in terms of overall survival, with a mean survival of 34.5 months in the comparator arm of the ICON7 trial [10]. The provision of bevacizumab in advanced ovarian cancer does not, however, satisfy NICE’s criteria for end-of-life consideration [8]. As such, NICE would consider there to be no special circumstance to accept an ICER above its usual cost-effectiveness thresholds.

The analysis considers the price reductions that can be expected to make bevacizumab cost-effective in the high-risk subgroup (Table 3). These show that a price reduction of between 46% and 67% (depending on the cost-effectiveness threshold applied) would be necessary in the base case. However, in the scenario associated with the lowest ICER, long-term scenario 2, a reduction of between 21% and 45% would be sufficient. The Cancer Drugs Fund in England could use these price analyses to inform any future decisions about the product in this indication. Similar decisions are necessary internationally and can be guides by the analysis. It should be noted that the price reductions are the minimum that should be necessary to receive positive guidance, with the possible need for greater reductions to reflect uncertainty in cost-effectiveness [22].

As with most cost-effectiveness analysis of new cancer medications, the main limitation of the analysis is that the ICON-7 trial included a proportion of patients who remained alive and, in some cases, without progression at the end of study follow-up. To estimate costs and relevant health outcomes over a lifetime time horizon, assumptions are necessary regarding the extrapolation of rates of PFS and mortality seen in the trial. The significant impact of extrapolation scenario 1 and long-term mortality scenarios 1 and 2 on the cost-effectiveness result highlights that the use of different assumptions has a large impact on cost-effectiveness, although ICERs do not fall below the upper bound of the NICE cost-effectiveness threshold. In addition, some authors have suggested that partition survival models, as used here, are biased [23]; however, the authors suggest that such bias is limited to cases in which only PFS differs between treatment arms, and not overall survival as is evident with bevacizumab. In addition, there has been little research into the robustness of this argument, making the generalizability of its inference impossible to comment on.

Future research should be aimed at directly comparing the costs and outcomes of using the lower dose of bevacizumab in advanced ovarian cancer with those of the product at its higher dose. The higher dose imposes higher costs but potentially improves outcomes further in the high-risk subgroup. We considered incorporating the higher dose into our analysis via an indirect comparison, using findings from the GOG-0218 trial [24]. However, a different trial population, widespread crossover from control to bevacizumab after progression in GOG-0218, and differences between UK practice and US practice made meaningful synthesis impossible. However, consideration of the published median PFS results [10,24] and cost-effectiveness estimates here and elsewhere [8] suggests that the lower dose of bevacizumab represents the more cost-effective option despite not being cost-effective given a NICE threshold. However, a robust trial or meta-analysis of published data is required to produce a robust estimate of the efficacy of the two doses.

The NICE single technology appraisal of bevacizumab in advanced ovarian cancer reported estimates of the cost-effectiveness of bevacizumab at both the lower (7.5 mg/kg) and higher (15 mg/kg) doses [8]. However, because of NICE’s restrictive remit, it was unable to comment on the results produced for the lower unlicensed dose. The manufacturer’s report to NICE estimated ICERs for both doses in the high-risk subgroup, reporting £144,682 per QALY at 15 mg/kg and £32,683 per QALY at 7.5 mg/kg [8], very close to NICE’s upper threshold. The latter estimate is considerably lower than that in the base case reported here (£48,975). This is likely to be due to Roche’s estimate being based on an early “cut” of the ICON7 trial data, although there were also some differences in methods (e.g., the use of elicited resource use profiles for hospitalization and supportive care rather than from the trial evidence).

In conclusion, the lower dose of bevacizumab for advanced ovarian cancer is not cost-effective based on the product’s list price and using NICE’s cost-effectiveness thresholds. Significant price discounts would be needed to make the drug affordable to the NHS. The Cancer Drugs Fund in England will be informed by such analysis in any future price negotiations, as will decision-making organizations internationally.

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Supplemental Materials
Supplemental material accompanying this article can be found in the online version as a hyperlink at http://dx.doi.org/10.1016/10.1016/j.jval.2016.01.013 or, if a hard copy of article, at www.valueinhescaljournal.com/issues (select volume, issue, and article).

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