**INTRODUCTION**

Inflammatory bowel diseases (IBDs), Crohn’s disease (CD) and ulcerative colitis (UC) refractory to conventional treatment are treated with biologics despite their high costs. In order to allocate healthcare spending efficiently, biologics for IBDs are an important target for cost-effectiveness analyses. The aim of this study was to systematically review all published literature on the cost-effectiveness of biologics for IBDs and to evaluate the methodological quality of cost-effectiveness analyses.

**METHODS**

A literature search was performed using Medline (Ovid), Cochrane Library, and SCOPUS in June 2014. Furthermore, the grey literature and other relevant websites and databases (Centre for Reviews and Dissemination, PROSPERO etc.) were hand-searched for relevant studies. All cost-utility analyses comparing biologics with conventional medical treatment, another biologic treatment, placebo, or surgery for the treatment of IBDs in adults were included in the review.

In order to facilitate the comparison of estimates collected from different studies, all costs were converted to 2014 euro. The methodological quality of the studies was assessed using three standardized checklists: Drummond's, Philips', and the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) checklist. Incremental cost-effectiveness ratio (ICER) was reported as a principal outcome. A quantitative synthesis of the study results was not possible because of heterogeneous study designs.

**RESULTS**

Altogether, 25 studies were included in the review (Figure 1). All cost-utility analyses involved economic evaluation modeling, of which 17 and 7 were focused on CD and UC, respectively, while one study featured both diagnoses.

**Crohn’s disease**

Among the patients refractory to conventional medical treatment, the ICER ranged from dominance to 549-355 €/Quality-Adjusted Life Year (QALY) when compared with conventional medical treatment (5.8-7.9, Table 1). Adalimumab (ADA) as an intervention treatment resulted in more frequently lower ICERs than did infliximab (IFX) in comparison with conventional medical treatment (5-8-7.9). Two studies evaluated the cost-effectiveness of biologics for different activity levels resulting in more favorable ICERs for severe CD than for moderate CD.5,10 According to one study, biologic induction treatment resulted in lower ICERs than maintenance treatment5. One study found more favorable ICER when including both direct and indirect cost than only direct costs.

### Table 1. Cost-effectiveness of biologics for CD.

<table>
<thead>
<tr>
<th>Biologic</th>
<th>Comparison treatment</th>
<th>Number of studies</th>
<th>ICER €/QALY (including only direct costs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infliximab (IFX)</td>
<td>Conventional medical treatment</td>
<td>9</td>
<td>IFX is dominant - Conventional medical treatment is dominant</td>
</tr>
<tr>
<td></td>
<td>Surgery</td>
<td>1</td>
<td>77,002 - 947,769</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>1</td>
<td>11,725 - 236,836</td>
</tr>
<tr>
<td></td>
<td>ADA</td>
<td>3</td>
<td>314,250 - 331,132</td>
</tr>
<tr>
<td>Adalimumab (ADA)</td>
<td>Conventional medical treatment</td>
<td>5</td>
<td>ADA is dominant - 276,539</td>
</tr>
<tr>
<td></td>
<td>IFX</td>
<td>1</td>
<td>ADA is dominant</td>
</tr>
<tr>
<td>Natalizumab</td>
<td>Gertolizumab pegol</td>
<td>1</td>
<td>314,020</td>
</tr>
</tbody>
</table>

**Ulcerative colitis**

ICER remained below 35,000 €/QALY when comparing IFX with either conventional medical treatment, surgery or placebo treatment for patients with acute exacerbation requiring hospitalization12-13 (Table 2). For patients with moderate-to-severe UC, ICER ranged from 33,067 – 407,499 €/QALY113-14,31 (Table 2).

### Table 2. Cost-effectiveness of biologics for UC.

<table>
<thead>
<tr>
<th>Intervention (Biologic)</th>
<th>Comparison treatment</th>
<th>Number of studies</th>
<th>ICER €/QALY (including only direct costs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infliximab (IFX)</td>
<td>Conventional medical treatment</td>
<td>8</td>
<td>19,198 – 407,499</td>
</tr>
<tr>
<td></td>
<td>Surgery</td>
<td>3</td>
<td>15,967 – 24,293</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>1</td>
<td>20,829</td>
</tr>
<tr>
<td>Adalimumab (ADA)</td>
<td>Conventional medical treatment</td>
<td>1</td>
<td>253,537</td>
</tr>
</tbody>
</table>

**CONCLUSION**

With a threshold of 35,000 €/QALY, current evidence showed that biologics are cost-effective for the induction treatment of active and severe IBD. Biologics were not cost-effective for moderate IBD. Between biologics the cost-effectiveness remains unclear.

**REFERENCES**