

## Costing report

# Ulcerative colitis: management in adults, children and young people

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This costing report accompanies the clinical guideline: 'Ulcerative colitis: management in adults, children and young people' (available online at <http://guidance.nice.org.uk/CG166>).

**Issue date:** June 2013

#### **This report is written in the following context**

This report represents the view of NICE, which was arrived at after careful consideration of the available data and through consulting with healthcare professionals. It should be read in conjunction with the NICE guideline. The report and template are implementation tools and focus on the recommendations that were considered to have a significant impact on national resource utilisation.

The cost and activity assessments in the report are estimates based on a number of assumptions. They provide an indication of the likely impact and are not absolute figures. Assumptions used in the report are based on assessment of the national average. Local practice may be different from this, and the template can be amended to reflect local practice.

Implementation of the guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations. Nothing in this costing tool should be interpreted in a way that would be inconsistent with compliance with those duties.

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## Executive summary

This costing report looks at the resource impact of implementing the NICE guideline 'Ulcerative colitis: management in adults, children and young people' in England.

The costing method adopted is outlined in appendix A; it uses the most accurate data available, was produced in conjunction with key clinicians, and reviewed by clinical and financial professionals.

### ***Significant<sup>1</sup> resource-impact recommendations***

This report focuses on the recommendations that are considered to have the greatest resource impact, and therefore require the most additional resources to implement or can potentially generate the biggest savings. They are:

- using a high induction dose of an oral aminosalicylate and adding oral beclometasone dipropionate to induce remission in adults (recommendation 1.2.4)
- adding oral beclometasone dipropionate to an oral aminosalicylate to induce remission in children and young people (recommendation 1.2.5)
- adding oral tacrolimus to oral prednisolone to induce remission (recommendation 1.2.8)
- using oral mercaptopurine to maintain remission (recommendation 1.4.5)
- monitoring bone health in children and young people (recommendation 1.6.2).

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<sup>1</sup> The following impacts have been defined as significant:

- where the number of people affected by the guidance recommendations is estimated to be over 300 (equivalent to 1 patient per 170,000; in practice, smaller populations may have no patients or possibly more than one, particularly if it is a disease that runs in families and there is a cluster in one area)
- where initial costing work indicates that the national cost is more than £1 million (equivalent to £2000 per 100,000 population).

### ***Net resource impact***

The annual change in resource use per 100,000 population arising from implementing the recommendations considered in the costing analysis is summarised below.

	<b>Current practice £000's</b>	<b>Future practice £000's</b>	<b>Change in costs £000's</b>
High induction dose of an oral aminosalicylate, and adding oral beclometasone dipropionate, to induce remission	4.8	6.4	1.6
Adding oral tacrolimus to induce remission	2.3	9.6	7.3
Maintaining remission using mercaptopurine	7.1	9.8	2.7
Monitoring bone health in children and young people	0.6	1.3	0.7
<b>Estimated total resource impact of significant-impact recommendations</b>	<b>14.8</b>	<b>27.1</b>	<b>12.3</b>

### ***Benefits and savings***

Implementing the clinical guideline may result in people with an inflammatory exacerbation of ulcerative colitis moving into remission sooner. They may also remain in remission longer. This will reduce the need for interventions such as GP attendances, specialist outpatient attendances and surgical interventions.

As a result of more monitoring of the bone health of children and young people, future bone health problems may be avoided. This will reduce the need for pharmacological interventions and specialist outpatient attendances.

The mix and quantity of these benefits cannot be estimated and are not included in the costing template. It is anticipated that the potential future benefits would be in both primary and secondary care settings.

Commissioners should review and quantify the potential benefits at a local level.

### ***Local costing template***

The costing template produced to support this guideline enables organisations in England, Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. A sample calculation using this template showed that additional costs of around £12,300 could be incurred for a population of 100,000.

# 1 Introduction

## 1.1 *Supporting implementation*

1.1.1 The NICE clinical guideline on Ulcerative colitis: management in adults, children and young people is supported by the following implementation tools available on our website

[www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166):

- costing tools
  - a costing report; this document
  - a costing template; a spreadsheet that can be used to estimate the local cost of implementation
- baseline assessment tool; assess your baseline against the recommendations in the guidance in order to prioritise implementation activity, including clinical audit
- clinical audit tools; measure current practice against the guidance and identify areas in which practice can be improved
- an article that outlines two of the recommendations in the NICE clinical guideline that will be a significant change to current practice and the evidence behind them

## 1.2 *What is the aim of this report?*

1.2.1 This report provides estimates of the cost impact arising from implementation of guidance on ulcerative colitis in England. These estimates are based on assumptions made about current practice and predictions of how current practice might change following implementation.

1.2.2 This report aims to help organisations plan for the financial implications of implementing NICE guidance.

1.2.3 This report does not reproduce the NICE guideline on ulcerative colitis and should be read in conjunction with it (see [www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166)).

- 1.2.4 The costing template that accompanies this report is designed to help those assessing the resource impact at a local level in England, Wales or Northern Ireland.

### **1.3 *Epidemiology of ulcerative colitis***

- 1.3.1 Ulcerative colitis is the most common type of inflammatory disease of the bowel. It has an incidence in the UK of approximately 10 per 100,000 people annually and a prevalence of approximately 240 per 100,000 (National Clinical Guideline Centre Ulcerative colitis: management in adults, children and young people). This amounts to around 133,000 people in England with a diagnosis of ulcerative colitis.
- 1.3.2 The cause of ulcerative colitis is unknown. It can develop at any age, but peak incidence is between the ages of 15 and 25 years, with a second, smaller peak between 55 and 65 years (although this second peak has not been universally demonstrated).

### **1.4 *Current service provision***

- 1.4.1 Ulcerative colitis is a lifelong disease that is associated with significant morbidity. It can also affect a person's social and psychological wellbeing, particularly if poorly controlled. Typically, it has a relapsing–remitting pattern.
- 1.4.2 Current medical approaches focus on treating active disease to address symptoms, to improve quality of life, and thereafter to maintain remission. The long-term benefits of achieving mucosal healing remain unclear. The treatment chosen for active disease is likely to depend on clinical severity, extent of disease and the person's preference, and may include the use of aminosalicylates, corticosteroids or biological drugs. These drugs can be oral or topical (into the rectum), and corticosteroids may be administered intravenously in people with acute severe disease. Surgery may be considered as emergency treatment for severe ulcerative colitis that does not respond to drug treatment. People may also choose



to have elective surgery for unresponsive or frequently relapsing disease that is affecting their quality of life.

- 1.4.3 The wide choice of drug preparations and dosing regimens, the judgement required in determining the optimum timing for surgery (both electively and as an emergency) and the importance of support and information may lead to variation in practice across England. The guideline aims to address this variation, and to help healthcare professionals to provide consistent high-quality care. Managing ulcerative colitis in adults and children overlaps in many regards, so the guideline incorporates advice that is applicable to children and young people, which again should help to address potential inconsistencies in practice.

## **2 Costing methodology**

### **2.1 *Process***

- 2.1.1 We use a structured approach for costing clinical guidelines (see appendix A).
- 2.1.2 We have to make assumptions in the costing model. These are tested for reasonableness with members of the Guideline Development Group (GDG) and key clinical practitioners in the NHS.
- 2.1.3 Local users can assess local cost impact, using the costing template as a starting point, and update assumptions to reflect local circumstances.

### **2.2 *Scope of the cost-impact analysis***

- 2.2.1 The guideline offers best practice advice on the management of ulcerative colitis.
- 2.2.2 The guidance does not cover people with indeterminate colitis. Key clinical issues not covered include diagnosis, treatment of extra-intestinal manifestations of ulcerative colitis, surgical techniques

(except those listed above), reconstruction after previous surgery, pouchitis or management with antibiotics, fish oil, helminths, heparin as a primary treatment, leukapheresis, nicotine or probiotics. Therefore these issues are outside the scope of the costing work.

2.2.3 The wide choice of drug preparations and dosing regimens, the judgement needed to determine the optimum timing for surgery (both electively and as an emergency) and the importance of support and information may lead to variation in practice across England. The guideline economic model assessed the cost effectiveness of various treatment strategies that included a variety of drug treatment options. The recommendations made are based on the step 1 treatment strategy that is most cost effective. The step 2 therapy is based on the treatment strategies that were considered most probable to be cost effective in descending order.

2.2.4 We worked with the GDG and other professionals to identify the recommendations that would have the most significant resource impact (see table 1). Costing work has focused on these recommendations.

**Table 1 Recommendations with a significant resource impact**

Recommendation	Recommendation number	Guideline key priority?
To induce remission in adults with a mild to moderate first presentation or inflammatory exacerbation of left-sided or extensive ulcerative colitis: <ul style="list-style-type: none"> <li>offer a high induction dose of an oral aminosalicylate</li> <li>consider adding a topical aminosalicylate or oral beclometasone dipropionate<sup>1</sup> taking into account the person's preferences.</li> </ul>	1.2.4	✓
To induce remission in children and young people with a mild to moderate first presentation or inflammatory exacerbation of left-sided or extensive ulcerative	1.2.5	✓

colitis:		
<ul style="list-style-type: none"> <li>offer an oral aminosalicylate<sup>2</sup></li> <li>consider adding a topical aminosalicylate<sup>3</sup> or oral beclometasone dipropionate<sup>4</sup>, taking into account the person's preferences (and those of their parents or carers as appropriate).</li> </ul>		
Consider adding oral tacrolimus <sup>5</sup> to oral prednisolone to induce remission in people with mild to moderate ulcerative colitis if there is an inadequate response to oral prednisolone after 2–4 weeks.	1.2.8	✕
Consider oral azathioprine <sup>6</sup> or oral mercaptopurine <sup>6</sup> to maintain remission: <ul style="list-style-type: none"> <li>after two or more inflammatory exacerbations in 12 months that require treatment with systemic corticosteroids or</li> <li>if remission is not maintained by aminosalicylates.</li> </ul>	1.4.4	✕
Consider monitoring bone health in children and young people with ulcerative colitis in the following circumstances: <ul style="list-style-type: none"> <li>during chronic active disease</li> <li>after treatment with systemic corticosteroids</li> <li>after recurrent active disease.</li> </ul>	1.6.2	✕
<p><sup>1</sup> At the time of publication (June 2013), beclometasone dipropionate only has a UK marketing authorisation 'as add-on therapy to 5-ASA containing drugs in patients who are non-responders to 5-ASA therapy in active phase'. For use outside these licensed indications, the prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's <a href="#">Good practice in prescribing and managing medicines and devices</a> for further information.</p> <p><sup>2</sup> At the time of publication (June 2013), some oral aminosalicylates did not have a UK marketing authorisation for this indication in children and young people. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's <a href="#">Good practice in prescribing and managing medicines and devices</a> for further information. Dosing requirements for children should be calculated by body weight, as described in the BNF.</p> <p><sup>3</sup> At the time of publication (June 2013), some topical aminosalicylates did not have a UK marketing authorisation for this indication in children and young people. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's <a href="#">Good practice in prescribing and managing medicines and devices</a> for further information.</p> <p><sup>4</sup> At the time of publication (June 2013), beclometasone dipropionate did not have a UK marketing authorisation for this indication in children and young people. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's <a href="#">Good practice in prescribing and managing medicines and devices</a> for further information.</p>		

<sup>5</sup> At the time of publication (June 2013), tacrolimus did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

<sup>6</sup> Although use is common in UK clinical practice, at the time of publication (June 2013) azathioprine and mercaptopurine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

- 2.2.5 Ten of the recommendations in the guideline have been identified as key priorities for implementation. Two of these are also among the 5 recommendations considered to have a significant resource impact.
- 2.2.6 The key priority recommendation on patient information and support (recommendation 1.1.1) is not considered to have a significant resource impact because the infrastructure within which to have the relevant discussions is already in place.
- 2.2.7 The recommendations on inducing remission in step 1 therapy (recommendation 1.2.1) and step 2 therapy (recommendation 1.2.13) are not considered to have a significant resource impact because they are considered to already be current practice.
- 2.2.8 The recommendation on monitoring policies and procedures (recommendation 1.2.15) and assessing likelihood of needing surgery (recommendation 1.2.16) are not considered to have a significant resource impact because the means to implement them are already in place, with no incremental impact.
- 2.2.9 The recommendations on giving information about treatment options (recommendation 1.3.1) and surgery options (recommendation 1.3.6) are not considered to have a significant resource impact because the means to implement them are already in place with no incremental impact.

- 2.2.10 The recommendation on maintaining remission (recommendation 1.4.6) is not considered to have a significant cost impact. The total daily dose of drugs will not change. By people taking drugs in one daily dose rather than two split doses there is no change to drug cost.
- 2.2.11 We have limited the consideration of costs and savings to direct costs to the NHS that will arise from implementation. We have not included consequences for the individual, the private sector or the not-for-profit sector. If applicable, any realisable cost savings arising from a change in practice have been offset against the cost of implementing the change.

## **2.3 General assumptions made**

- 2.3.1 The model is based on a prevalence of ulcerative colitis of 0.24%. These have been applied to all three population groups: adults, young people and children. The numbers of people by population group are seen in table 2.

**Table 2 Number of people with ulcerative colitis shown by subpopulation type and incidence and prevalence per 100,000 population**

Population group	Prevalence
Adults (18 years & over)	190
Young people (12-17 years)	17
Children (11 years and younger)	33
<b>Totals</b>	<b>240</b>

- 2.3.2 Prices of drugs are taken from the Dictionary of Medicines and Devices browser. Recommended doses are taken from the British national formulary.

## **2.4 *Basis of unit costs***

- 2.4.1 If a national tariff price or indicative price exists for an activity this has been used as the unit cost.
- 2.4.2 Using these prices ensures that the costs in the report are the cost to the commissioner of commissioning predicted changes in activity at the tariff price, but may not represent the actual cost to individual trusts of delivering the activity.

## **3 Significant resource-impact recommendations**

### **3.1 *Using a high induction dose of an oral aminosalicylate and adding oral beclometasone dipropionate to induce remission***

To induce remission in adults with a mild to moderate first presentation or inflammatory exacerbation of left-sided or extensive colitis:

- offer a high induction dose of an oral aminosalicylate
- consider adding a topical aminosalicylate or oral beclometasone dipropionate<sup>2</sup>, taking into account the person's preferences.

[1.2.4]

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<sup>2</sup> At the time of publication (June 2013), beclometasone dipropionate only has a UK marketing authorisation 'as add-on therapy to 5-ASA containing drugs in patients who are non-responders to 5-ASA therapy in active phase'. For use outside these licensed indications, the prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

To induce remission in children and young people with a mild to moderate first presentation or inflammatory exacerbation of left-sided or extensive colitis:

- offer an oral aminosalicylate<sup>3</sup>
- consider adding a topical aminosalicylate<sup>4</sup> or oral beclometasone dipropionate<sup>5</sup>, taking into account the person's preferences (and those of their parents or carers as appropriate). [1.2.5]

## Background

3.1.1 When symptoms of an inflammatory exacerbation are present, treatment – that is, induction of remission – may involve a range of different drug types, administered by different routes and at different doses. Currently, the most widely used drugs are aminosalicylate preparations and corticosteroids.

## Assumptions made

3.1.2 The full guideline (National Clinical Guideline Centre Ulcerative colitis: management in adults, children and young people) assumes that 50% of people with ulcerative colitis experience a relapse at least once a year.

3.1.3 Calculations based on expert opinion (Costing template, sheet 9 References & data sources, reference 3) estimates the proportion

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<sup>3</sup> At the time of publication (June 2013), some oral aminosalicylates did not have a UK marketing authorisation for this indication in children and young people. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information. Dosing requirements for children should be calculated by body weight, as described in the BNF.

<sup>4</sup> At the time of publication (June 2013), some topical aminosalicylates did not have a UK marketing authorisation for this indication in children and young people. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

<sup>5</sup> At the time of publication (June 2013), beclometasone dipropionate did not have a UK marketing authorisation for this indication in children and young people. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

<sup>5</sup> Refer to the BNF for guidance on stopping oral prednisolone therapy.

of people who have left-sided or extensive ulcerative colitis to be around 59% of people with ulcerative colitis.

- 3.1.4 Calculations based on expert opinion (Costing template, sheet 9 References & data sources, reference 2) estimates the proportion of people who have mild to moderate disease is estimated by experts to be around 83%.
- 3.1.5 The total proportion of people with a mild to moderate inflammatory exacerbation of left-sided or extensive colitis in whom remission can be induced is calculated to be  $50\% * 59\% * 83\% = 24.5\%$ . In the costing template this is rounded up to 25%, around 60 people per 100,000 population.
- 3.1.6 Based on expert opinion, the costing template assumes that currently around 75% of people (around 45 people per 100,000 population) choose a high induction dose of an oral aminosalicylate and that this may increase to around 95% of people (around 57 people per 100,000 population) when the guideline is implemented.
- 3.1.7 Topical aminosalicylates are generally given to people with left-sided ulcerative colitis (and not by those with extensive disease). This is calculated to be 20% of the left-sided and extensive group – that is,  $20\%$  of the  $59\% = 33.89\%$ . This is rounded up to 34%, around 15 people per 100,000 population).
- 3.1.8 It is estimated, based on expert opinion, that in the future around half of the 34% group (17%, around 10 people per 100,000 population) may choose oral beclometasone dipropionate.
- 3.1.9 Based on health economics ([www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166)), it is assumed that an oral aminosalicylate is taken for 28 days before considering adding a topical aminosalicylate or oral beclometasone dipropionate. When either of these options is chosen, it is assumed that an oral aminosalicylate is taken for a further 28 days, together



with the topical aminosalicylate or oral beclometasone dipropionate.

### Cost summary

3.1.10 The average cost for 28 days' treatment with a low dose of an oral aminosalicylate is calculated to be £29.69 and that for a high dose is calculated to be £61.24. The average cost for 28 days' treatment with a topical aminosalicylate is calculated to be £104.54.

3.1.11 The cost for 28 days' treatment with oral beclometasone dipropionate is calculated to be £52.79.

**Table 3 Potential change in drug costs per 100,000 population (high dose oral aminosalicylate, topical aminosalicylate and oral beclometasone dipropionate)**

	Current		Future		Change	
	Numbers of patients	Cost £	Numbers of patients	Cost £	Numbers of patients	Cost £
Low dose ASA <sup>1</sup>	15	445	3	89	(12)	(356)
High dose ASA <sup>1</sup>	45	2,756	57	3,491	12	735
Topical ASA <sup>1,2</sup>	15	1,568	10	1,658	(5)	100
Oral beclometasone	0	0	10	1,140	10	1,140
<b>Totals</b>	<b>75</b>	<b>4,769</b>	<b>80</b>	<b>6,378</b>	<b>5</b>	<b>1,619</b>
<sup>1</sup> ASA, aminosalicylate.						
<sup>2</sup> Future practice topical ASA taken with a further course of high dose oral ASA.						

### Other considerations

3.1.12 Where there is poor or a lack of clinical response, progression to the next treatment step may be in less than 28 days. This may reduce the cost impact.

3.1.13 The costing model assumes that adults, children and young people will all be offered a high induction dose of an oral aminosalicylate. Where children and young people are offered a low induction dose of an oral aminosalicylate, costs will be slightly lower.

- 3.1.14 Users are encouraged to amend the costing template locally to include more appropriate rates and unit costs where required.

### **3.2 *Adding oral tacrolimus to induce remission***

Consider adding oral tacrolimus<sup>12</sup> to oral prednisolone to induce remission in people with mild to moderate ulcerative colitis if there is an inadequate response to oral prednisolone after 2–4 weeks.

[1.2.8]

#### **Background**

- 3.2.1 When symptoms of an inflammatory exacerbation are present, treatment – that is, induction of remission – may involve a range of different drug types, administered by different routes and at different doses. Currently, the most widely used drugs are aminosalicylate preparations and corticosteroids.

#### **Assumptions made**

- 3.2.2 It is assumed, based on expert opinion, that 50% of people with ulcerative colitis experience at least one relapse per year. Of these, expert opinion assumes that around 83% of people have a mild to moderate presentation of ulcerative colitis. This gives a total of around 42% of people needing step 1 therapy and receiving aminosalicylates.
- 3.2.3 It is estimated that about 101 people per 100,000 population choose step 1 aminosalicylate therapy.
- 3.2.4 Of this group, it is assumed that around 39% of people (Costing template, sheet 9 References & data sources, reference 8) (around 39 per 100,000 population) do not show an improvement within

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<sup>12</sup> At the time of publication (June 2013), tacrolimus did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

4 weeks of starting treatment or have worsening symptoms and progress to oral prednisolone.

- 3.2.5 Expert opinion estimates that currently around 1% of people choose oral tacrolimus in order to induce remission if there is an inadequate response to oral prednisolone. This may rise to around 20% of people when the guideline is implemented.

### Cost summary

- 3.2.6 The average daily cost for oral prednisolone is calculated to be £3.03. It is estimated that 21 days' treatment costs £59.33. The average daily cost for oral tacrolimus is calculated to be £10.87. It is estimated that 12 weeks' treatment costs £913.11.
- 3.2.7 The net cost of using oral tacrolimus to induce remission in people with mild to moderate ulcerative colitis, if there is an inadequate response to oral prednisolone after 2–4 weeks, is calculated to be around £7300 per 100,000 population.

**Table 3 Potential change in drug costs per 100,000 population (oral tacrolimus)**

	Current		Future		Change	
	Numbers of patients	Cost (£)	Numbers of patients	Cost (£)	Numbers of patients	Cost (£)
Oral prednisolone	39	2,314	39	2,314	0	0
Oral tacrolimus	0	0	8	7,305	8	7,305
<b>Totals</b>	<b>39</b>	<b>2,314</b>	<b>47</b>	<b>9,619</b>	<b>8</b>	<b>7,305</b>

### Other considerations

- 3.2.8 The proportion of people who may choose oral tacrolimus is unknown and may vary from the estimate used. This is included in the sensitivity analysis.
- 3.2.9 Using tacrolimus to induce remission in people who have had an inadequate response to oral prednisolone may reduce the need for

surgery. There is a lack of long term data and so the number of people affected cannot be estimated.

### **3.3      *Maintaining remission using oral mercaptopurine***

Consider oral azathioprine<sup>13</sup> or oral mercaptopurine<sup>13</sup> to maintain remission:

- after two or more inflammatory exacerbations in 12 months that require treatment with systemic corticosteroids **or**
- if remission is not maintained by aminosalicylates. [1.4.4]

#### **Background**

3.3.1      Two main groups of drugs are used to try to maintain remission: aminosalicylates and immunomodulators (azathioprine, mercaptopurine).

#### **Assumptions made**

3.3.2      Expert opinion assumes that around 30% of people are eligible to choose oral azathioprine or oral mercaptopurine after they have had 2 or more inflammatory exacerbations in 12 months that require treatment with systemic corticosteroids, or if remission is not maintained by aminosalicylates.

3.3.3      It is estimated that currently azathioprine is chosen by around 95% of people and mercaptopurine by around 5%. Expert opinion estimates that the uptake of mercaptopurine will rise to around 10% of people (around 4 people per 100,000 population). The remaining 90% (around 32 people per 100,000 population) will still choose azathioprine.

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<sup>13</sup> Although use is common in UK clinical practice, at the time of publication (June 2013) azathioprine and mercaptopurine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

## Cost summary

3.3.4 The average daily cost for azathioprine is calculated to be £0.34. It is estimated that annual treatment costs are £120.97. The average daily cost for mercaptopurine is calculated to be £4.04. It is estimated that annual treatment costs are £1473.72.

3.3.5 The net cost of considering mercaptopurine to maintain remission is calculated as around £2700 per 100,000 population.

**Table 4 Potential change in drug costs per 100,000 population (mercaptopurine)**

	Current		Future		Change	
	Numbers of patients	Cost (£)	Numbers of patients	Cost (£)	Numbers of patients	Cost (£)
Azathioprine	34	4,113	32	3,871	(2)	(242)
Mercaptopurine	2	2,947	4	5,895	2	2,947
<b>Totals</b>	<b>36</b>	<b>7,060</b>	<b>36</b>	<b>9,766</b>	<b>0</b>	<b>2,705</b>

## Other considerations

3.3.6 The proportion of people who may switch to mercaptopurine is unknown and may vary from the estimate used. This is included in the sensitivity analysis.

## 3.4 *Monitoring bone health in children and young people*

Consider monitoring bone health in children and young people with ulcerative colitis in the following circumstances:

- during chronic active disease
- after treatment with systemic corticosteroids
- after recurrent active disease. [1.6.2]

## Background

3.4.1 Evaluation of bone health is considered an important aspect of chronic disease management in people with inflammatory bowel disease. This is particularly the case for children and young people,

who are considered to be a vulnerable group. The most objective measure of bone health is bone mineral density, which is currently measured best by dual-energy x-ray absorptiometry (DEXA). During the active disease state in inflammatory bowel disease, clinicians need to consider how bone development and health may be disturbed by a number of factors, including corticosteroid treatment.

### **Assumptions made**

- 3.4.2 It is assumed that around 50% of children and young people have chronic active disease, are taking systemic corticosteroids or have recurrent active disease, based on the fact that 50% of people have at least one relapse per year (National Clinical Guideline Centre Ulcerative colitis Management in adults, children and young people).
- 3.4.3 Experts estimate that a general assessment bone health is made once a year. It is estimated that around 15% children and young people have a DEXA scan each year.
- 3.4.4 The increase in the number of children and young people who will have their bone health monitored is not known, but it is estimated that those who have a DEXA scan may increase to around 33% of children and young people (around an extra 3 children and young people per 100,000 population).

## Cost summary

3.4.5 It is assumed that increases in monitoring of bone health will result in an extra secondary care outpatient attendance. The unit cost of a follow-up paediatric gastroenterology outpatient appointment is £157 (Payment by results 2013/14).

3.4.6 The unit cost of a DEXA scan, including reporting, is £63 (Payment by results 2013/14).

3.4.7 The net cost of monitoring bone health is calculated to be around £700 per 100,000 population.

**Table 5 Potential change in costs of monitoring bone health per 100,000 population**

	Current		Future		Change	
	Numbers of patients	Cost (£)	Numbers of patients	Cost (£)	Numbers of patients	Cost (£)
Outpatient attendances	3	471	6	942	3	471
DEXA scans	3	189	6	378	3	189
<b>Totals</b>		<b>660</b>		<b>1320</b>		<b>660</b>

## Other considerations

3.4.8 There may be variation at a local level of the clinical monitoring of bone health. The diagnostics and assessments that take place may vary from those assumed in the costing template

3.4.9 Commissioners and providers are encouraged to work together to estimate any change in capacity required at a local level and to plan accordingly.

## 3.5 *Benefits and savings*

3.5.1 Because of variation in treatment options among clinicians locally and between different provider settings, as well as a lack of data, a baseline of typical prescribing could not be established. When a change in clinical practice to align with the recommendations takes

place, there may be benefits. People with an inflammatory exacerbation of ulcerative colitis may move into remission sooner. They may also remain in remission longer. This will reduce the need for interventions such as GP attendances, specialist outpatient attendances and surgical interventions.

- 3.5.2 If there is more monitoring of bone health in children and young people, future bone health problems may be avoided. This will reduce the need for pharmacological interventions and specialist outpatient attendances.
- 3.5.3 The mix and quantity of these benefits cannot be estimated and are not included in the costing template.
- 3.5.4 It is anticipated that these potential future benefits would be in both primary and secondary care settings.

## **4 Sensitivity analysis**

### **4.1 *Methodology***

- 4.1.1 There are a number of assumptions in the model for which no empirical evidence exists; these are therefore subject to a degree of uncertainty.
- 4.1.2 Appropriate minimum and maximum values of variables were used in the sensitivity analysis to assess which variables have the biggest impact on the net cost or saving. This enables users to identify the significant cost drivers.
- 4.1.3 It is not possible to arrive at an overall range for total cost because the minimum or maximum of individual lines are unlikely to occur simultaneously. We undertook one-way simple sensitivity analysis, altering each variable independently to identify those that have greatest impact on the calculated total cost.



- 4.1.4 Appendix B contains a table detailing all variables modified, and the key variables are discussed below.

## **4.2 *Impact of sensitivity analysis on costs***

### **Prevalence of ulcerative colitis**

- 4.2.1 The baseline prevalence of ulcerative colitis is 0.24% with an estimated cost impact of £12,300. Varying this to 0.2% and 0.3% changes the cost impact per 100,000 population to £9,500 and £16,000 respectively.

### **Proportion of people choosing mercaptopurine**

- 4.2.2 The baseline proportion of people choosing mercaptopurine is 10%. Varying this to 5% and 15% changes the cost impact per 100,000 population to £9,600 and £13,600 respectively.

### **Proportion of people choosing oral tacrolimus**

- 4.2.3 The baseline proportion of people choosing oral tacrolimus is 20%. Varying this to 15% and 25% changes the cost impact per 100,000 population to £10,500 and £14,100 respectively.

## **5 Impact of guidance for commissioners**

- 5.1.1 This guidance will require commissioners and providers to work together to agree any changes in clinical practice. It is anticipated that commissioners will be Clinical Commissioning Groups (CCGs).
- 5.1.2 Changes in prescribing, an increase in the use of diagnostic services and increases in outpatient capacity may be necessary to implement the guidance recommendations.
- 5.1.3 It is anticipated that prescribing cost impacts will be incurred by providers.
- 5.1.4 It is anticipated that increases in the use of diagnostic and outpatient services will create a cost impact for commissioners,

with higher levels of activity and payments under Payment by results.

## 6 Conclusion

### 6.1 *Total cost for England*

6.1.1 Using the significant resource-impact recommendations shown in table 1 and assumptions specified in section 3 we have estimated the annual impact of implementing these recommendations in a population of 100,000 people to be a cost of around £12,300. Table 6 shows the breakdown of the cost of each significant resource-impact recommendation.

**Table 6 Estimated annual impact of implementing the significant resource-impact recommendations for a population of a 100,000**

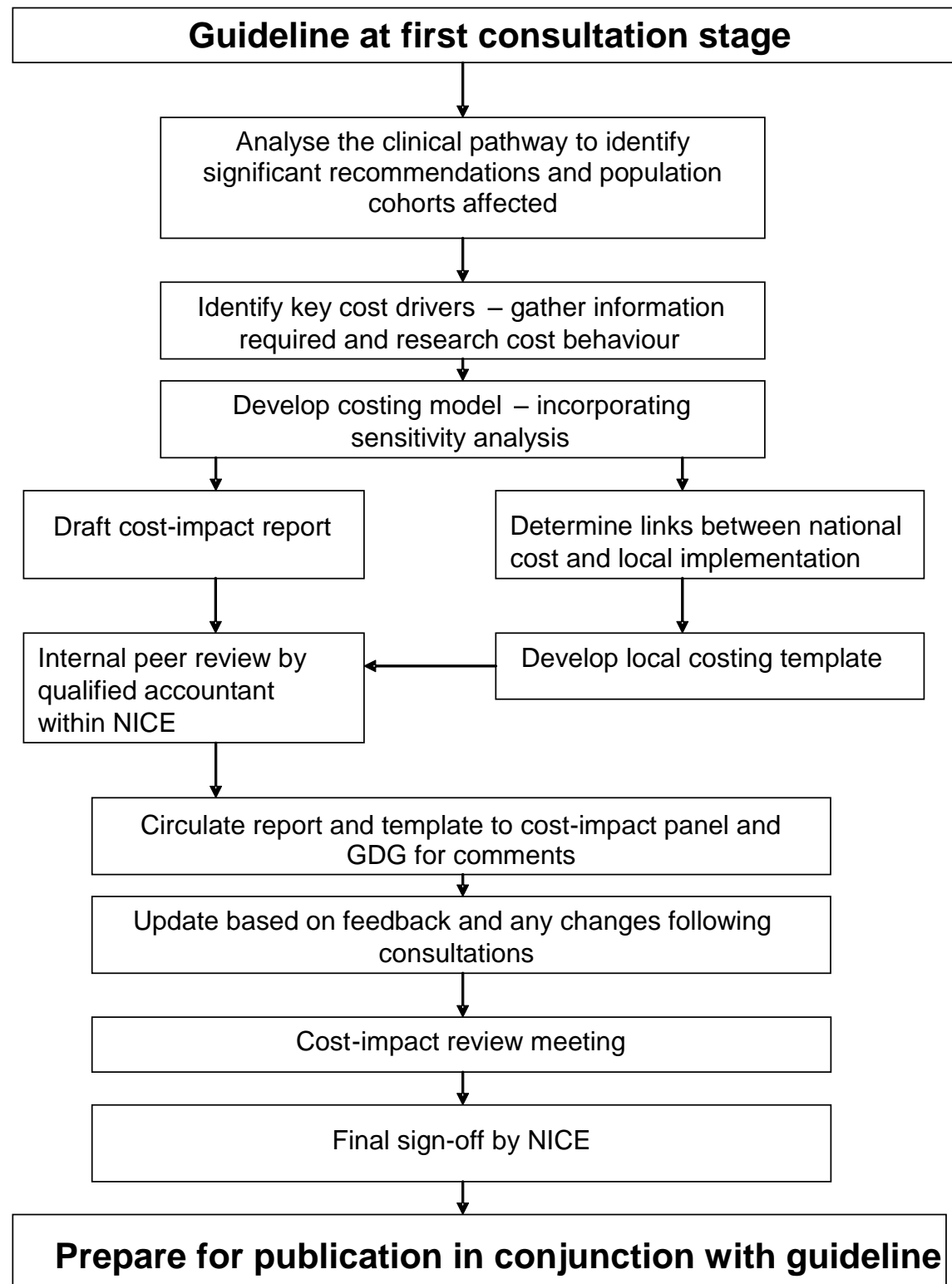
	Current practice £000's	Future practice £000's	Change in costs £000's
High induction dose of an oral aminosalicylate and adding oral beclometasone dipropionate	4.8	6.4	1.6
Oral tacrolimus to induce remission	2.3	9.6	7.3
Maintaining remission using oral mercaptopurine	7.1	9.8	2.7
Monitoring bone health in children and young people	0.6	1.3	0.7
Estimated total resource impact of significant resource-impact recommendations	<b>14.8</b>	<b>27.1</b>	<b>12.3</b>

6.1.2 The costs presented are estimates and should not be taken as the full cost of implementing the guideline.

## **6.2      *Next steps***

- 6.2.1      The local costing template produced to support this guideline enables commissioners in Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. Use this template to calculate the cost of implementing this guidance in your area.

## Appendix A. Approach to costing guidelines



## Appendix B. Results of sensitivity analysis

	Baseline value	Minimum value	Maximum value	Recurrent costs			Change (£)
				Baseline costs (£)	Minimum costs (£)	Maximum costs (£)	
prevalence of ulcerative colitis	0.24%	0.20%	0.30%	12,300	9,479	16,035	6,556
rec 1.2.4 & 1.2.5 people choosing a topical aminosalicylate	34%	30%	40%	12,300	12,384	11,966	-418
rec 1.2.4 & 1.2.5 people choosing oral beclometasone	17%	15%	20%	12,300	12,104	12,145	41
rec 1.2.9 people choosing oral tacrolimus	20%	15%	25%	12,300	10,453	14,105	3,652
rec 1.4.4 people choosing mercaptopurine	10%	5%	15%	12,300	9,574	13,632	4,058
rec 1.6.2 proportion receiving DEXA scan and follow-up	33%	25%	30%	12,300	11,839	12,059	220
cost of oral tacrolimus	£913	£730	£1,096	12,300	10,594	13,522	2,928
cost of mercaptopurine	£1,474	£1,179	£1,768	12,300	11,470	12,648	1,178

## Appendix C. References

National Clinical Guideline Centre, Ulcerative colitis: management in adults, children and young people. [www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166)

NICE clinical guideline 166, Costing template, [www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166)

NICE clinical guideline 166, Health economics, [www.nice.org.uk/guidance/CG166](http://www.nice.org.uk/guidance/CG166)