NHS
National Institute for
Health and Clinical Excellence

Glaucoma: diagnosis and management of chronic open angle glaucoma and ocular hypertension

Costing report

Implementing NICE guidance

April 2009

Clinical Guideline Implementation Tools

NICE clinical guideline 85

This costing report accompanies the clinical guideline: 'Glaucoma: diagnosis and management of chronic open angle glaucoma and ocular hypertension' (available online at www.nice.org.uk/CG85).

Issue date: April 2009

This guidance is written in the following context

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

The cost and activity assessments in the reports are estimates based on a number of assumptions. They provide an indication of the likely impact of the principal recommendations 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 to estimate local impact.

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Executive summary

This costing report looks at the resource impact of implementing the NICE guideline on 'Glaucoma: diagnosis and management of chronic open angle glaucoma and ocular hypertension' 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.

Supporting implementation

The NICE clinical guideline on glaucoma is supported by a range of implementation tools available on our website www.nice.org.uk/CG85 and detailed in the main body of this report.

Significant resource-impact recommendations

Because of the breadth and complexity of the guideline, this report focuses on recommendations that are considered to have the greatest resource impact and therefore require the most additional resources to implement or can potentially generate savings. They are:

- treatment and monitoring of people with ocular hypertension (OHT) or suspected chronic open angle glaucoma (COAG)
- surgery as treatment for people with COAG who are at risk of progressing to sight loss
- potential for service provision by different healthcare professions under shared care schemes – this is in line with Department of Health (DH) proposals to address demand pressures and accessibility for hospital eye services.

Total cost impact

The estimated annual changes in revenue costs arising from fully implementing the guideline are summarised in the table below.

Estimated total additional cost of implementing glaucoma guideline

Description	Total costs (£000s)
Monitoring of people with OHT or suspected COAG	10,598
Increase in glaucoma surgery	1,938
Estimated total costs*	**12,536**

*There may be some savings, for example in referral refinement that could arise as a result of implementing the guideline. We are unable to quantify these as they are dependent on local circumstances.

Potential shift from hospital eye service to community**	£000s
Cost of patients who may be effectively managed in the community	**7,462**
Capacity released in hospital eye service to alleviate demand pressures	**–7,462**

**The potential shift from the hospital eye service to the community is based on the national tariff for outpatient ophthalmology visits and assumes cost of provision in the community will be the same. However, the cost of community provision should be assessed locally and if lower than the hospital eye service, could free up resources.

Benefits and savings

Implementing the clinical guideline may bring the following benefits and savings:

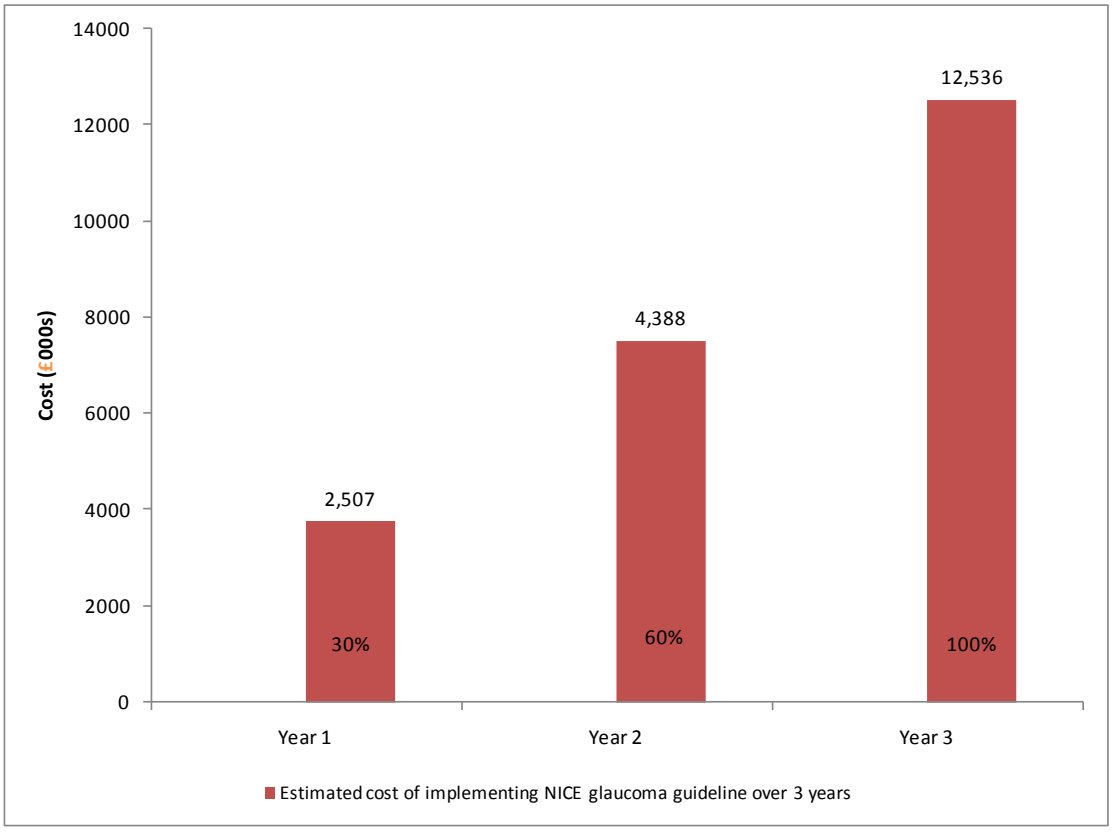
- Potential capacity released in hospital eye services as a result of redirecting services for people who have OHT, suspected COAG and stable COAG from the hospital to the community. This may alleviate current demand pressures in hospital eye services.
- Savings in future years from the reduced number of people losing their sight as a result of improved testing of OHT and people with suspected COAG, leading to earlier intervention (NHS savings estimated at £0.6 million a year for England).
- Considerable savings in the costs per person of social care: the voluntary residential care costs for older people who have sight loss are estimated to be £23,000 per person a year.
- A potential discount on contributions to NHS Litigation Authority schemes (including the Clinical Negligence Scheme for Trusts) because compliance

with NICE guidance is one of the criteria indicating good risk reduction strategies.

Estimated timeframe for implementation

For indicative purposes, the timeframe for implementation is estimated to be about 3 years. For some trusts this could vary to up to 5 years so it should be reviewed locally. This is because it may take time to establish capacity for services with the necessary requirements for delivering safe and effective services in or outside the hospital eye service. The graph below shows the cumulative increase in cost according to the national assumptions on how services may be configured after full implementation.

Figure 1 Estimated costs over time of implementing glaucoma guideline



The estimated build up to achieving the capacity needed to meet additional demand is 30% in year 1, increasing to 60% in year 2 and 100% in year 3. The total costs in year 1 are estimated to be £4 million, rising to £8 million in year 2 and £13 million in year 3, illustrated above.

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 £24,628 could be incurred for a population of 100,000.

Introduction

1.1 Supporting implementation

1.1.1 The NICE clinical guideline on glaucoma is supported by the following implementation tools available on our website www.nice.org.uk/CG85

- costing tools
  - a national costing report; this document
  - a local costing template; a simple spreadsheet that can be used to estimate the local cost of implementation.
- a slide set; key messages for local discussion
- audit support
- a commissioning guide will be produced later in 2009–10.

1.1.2 A practical guide to implementation, 'How to put NICE guidance into practice: a guide to implementation for organisations', is also available to download from the NICE website. It includes advice on establishing organisational level implementation processes as well as detailed steps for people working to implement different types of guidance on the ground.

1.2 What is the aim of this report?

1.2.1 This report provides estimates of the national cost impact arising from implementation of guidance on glaucoma 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 glaucoma and should be read in conjunction with it (see www.nice.org.uk/CG85).

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. NICE clinical guidelines are developmental standards in the DH's document 'Standards for better health'. The costing template may help inform local action plans demonstrating how implementation of the guideline will be achieved.

1.3 Epidemiology of glaucoma

1.3.1 Approximately 10% of UK blindness registrations are attributed to glaucoma. The overall prevalence of glaucoma is around 2% of people over 40. The prevalence rate increases with age and is estimated to rise to almost 10% in people over 75. The prevalence may be higher in people of black African or black Caribbean descent or who have a family history of glaucoma. Local data on prevalence may vary and trusts may need to consider reviewing this average where they have a higher proportion of older people or people with different ethnicity. With changes in population demographics and life expectancy the number of individuals affected is expected to rise. With a population of people aged over 40 in England of 24.4 million, it is estimated that around 489,000 people are currently affected by COAG in England.

1.3.2 According to one study (Burr et al. 2007) there are an estimated 11,054 new cases of COAG in people aged 40 to 70 per year in the UK. The number for England is an estimated 9,263 new cases of COAG per year.

1.3.3 Some people with OHT are treated and monitored in the hospital eye service, as well as people with glaucoma. We do not know how many people with OHT have used hospital eye services for treatment, and estimates on annual incidence for this group are difficult to obtain. In the absence of good-quality data, we have used an extrapolation for England provided in an assessment report (Vernon et al. 2004) for eye care services relating to

glaucoma. This indicates that 172,000 referrals are sent to the hospital eye service each year, of which a third would be people with suspected COAG who need long-term review. In addition, there are people who have OHT or are suspected of having COAG who are visiting their optometrist and have not been referred to the hospital eye service. According to expert opinion, there may be as many of these as there are people with suspected COAG identified and referred to the hospital eye service. The table below shows the estimated annual number of people who have OHT or who are suspected of having COAG in England.

Table 1 Estimated annual incidence of people with OHT or suspected COAG

Population aged over 40	24,432,035
Annual incidence of OHT or COAG in people over 40	1.4%
Estimated number of new cases of OHT or suspected COAG per year	344,000

Models of care

1.3.4 Standard practice by optometrists for people with suspected COAG is to refer them to their GP. Referrals are then directed to a consultant ophthalmologist working within the hospital eye service. According to expert opinion further diagnostic investigation within the hospital eye service is thought to be fairly standard. While the consultant ophthalmologist oversees the initial consultation in all units, clinical measurements may be made, to a varying degree, by other members of staff such as optometrists or orthoptists.

1.3.5 People who are diagnosed with COAG are managed by the hospital eye service and lifelong follow-up is normally needed. There may be some people with COAG who could be managed in the community if the conditions in recommendation 1.5.4 are met.

1.3.6 There may be changes in the way eye services are configured as a result of the NICE clinical guideline and other guidance from the DH. The DH has produced a commissioning toolkit for community eye care services that takes into account the findings from the General Ophthalmic Services review, which tested community-based eye care pathways for glaucoma. This can be found at: www.dh.gov.uk/en/Healthcare/Primarycare/Optical/DH_219

Implementation should take account of this and other initiatives when considering the most practical local approach for the way in which eye services are configured.

2 Costing methodology

2.1 Process

2.1.1 We use a structured approach for costing clinical guidelines (see appendix A).

2.1.2 Little information has been systematically collected about the care of people with OHT, suspected COAG and COAG and this led to problems in building a comprehensive bottom-up model for costing (a costing methodology where the unit cost of individual elements and number of units are estimated and added together to provide a total cost). To overcome this limitation, we had to make assumptions in the costing model. We developed these assumptions and tested them for reasonableness with members of the Guideline Development Group (GDG) and key clinical practitioners in the NHS.

2.2 Scope of the cost-impact analysis

2.2.1 The guideline offers best practice advice on the care of adults who are suspected of having, or are diagnosed with, COAG.

2.2.2 The guidance does not cover:

- people under 18
- people with secondary glaucoma (for example neovascular or uveitic) except for those who have COAG or OHT associated with pseudoexfoliation or pigment dispersion
- people with, or at risk of, primary or secondary angle closure glaucoma, **or**
- adults with primary congenital infantile or childhood glaucoma.

Therefore, these groups are outside the scope of the costing work.

2.2.3 Due to the breadth and complexity of the guideline, we worked with the GDG and other professionals to identify the recommendations that would have the most significant resource-impact (see table 2). Costing work has focused on these recommendations.

Table 2 Recommendations with a significant resource impact

High-cost recommendations	Recommendation number	Key priority?
Monitor at regular intervals people with OHT or suspected COAG recommended to receive medication according to their risk of conversion to COAG.	1.2.10	✓
Offer surgery with pharmacological augmentation (mitomycin C [MMC] or 5-fluorouracil [5-FU][1]) as indicated to people with COAG who are at risk of progressing to sight loss despite treatment. Offer them information on the risks and benefits associated with surgery.	1.4.7	✓
People with a confirmed diagnosis of OHT or suspected COAG and who have an established management plan may be monitored (but not treated) by a suitably trained healthcare professional with knowledge of OHT and COAG, relevant experience and ability to detect a change in clinical status. The healthcare professional should be able to perform and interpret all of the following: • Goldmann applanation tonometry (slit lamp mounted) • standard automated perimetry (central thresholding test) • central supra-threshold perimetry (this visual field strategy may be used to monitor people with OHT or COAG suspect status when they have normal visual field) • stereoscopic slit lamp biomicroscopic examination of the anterior segment • Van Herick's peripheral anterior chamber depth assessment • examination of the posterior segment using slit lamp binocular indirect ophthalmoscopy.	1.5.6	

[1] At the time of publication (April 2009), MMC and 5-FU did not have UK marketing authorisation for this indication. Informed consent should be obtained and documented. Both drugs should be handled with caution and in accordance with guidance issued by the Health and Safety Executive.

2.2.4 Ten of the recommendations in the guideline have been identified as key priorities for implementation, and two of these are also considered to have significant resource impact.

2.2.5 The key priority recommendations that have not been costed (recommendations 1.1.1, 1.1.5, 1.2.14, 1.3.1, 1.4.2, 1.5.1, 1.5.4 and 1.6.1) are not considered to present a significant change to current practice and are not anticipated to have significant cost impact nationally. The reasons are covered in more detail below.

2.2.6 Recommendation 1.1.1 defines what tests should be offered to all people who have COAG, are suspected of having COAG or who have OHT: current practice suggests intraocular pressure measurement is part of the routine eye examination in 90% of people over 40 (Spry PGD and Sparrow JM 2001). This is self-reported data and is likely to be at the top end of estimates. Anyone with visual field changesis referred to the hospital eye service where the consultant ophthalmologist carries out further and more reliable tests, which are also described in the recommendation. There may be additional costs in using Goldmann applanation tonometry for intraocular pressure measurement. This is difficult to quantify nationally; flexibility has been provided in the costing template to capture other costs of providing services.

2.2.7 Recommendation 1.1.5 says that records of all previous tests and images should be made available at each clinical episode to all healthcare professionals involved in the person's care. This is not anticipated to have significant cost impact nationally. However flexibility has been provided in the costing template for any local costs relating to different service configurations, where there may be subscription costs to providers of shared information systems.

2.2.8 Recommendation 1.2.14 defines appropriate monitoring intervals for people with COAG. The recommended monitoring intervals, which average 2.5 visits a year, are current practice in the UK according to expert opinion and a report by Vernon et al. (2004) relating to

workload calculation for UK ophthalmologists. It is recognised, however, that there are follow-up delays in some areas. A section is included in the costing template to assess the local cost impact of additional capacity that may be needed to implement recommendation 1.2.14 (table 4).

2.2.9 Recommendation 1.3.1 defines what treatment should be given to people with OHT or suspected COAG based on their estimated risk of conversion to COAG. Although there may be additional demand on services as a result of recommendation 1.2.10 in table 2 above, treatments such as beta-blockers and prostaglandin analogues are low cost and are already used to treat people with COAG, therefore it is not anticipated that this recommendation will have significant cost impact nationally.

2.2.10 Recommendation 1.4.2 says that people newly diagnosed with early or moderate COAG, and at risk of significant visual loss in their lifetime, should be offered treatment with a prostaglandin analogue (where there are no relevant comorbidities or potential drug interactions – recommendation 1.4.1). As the number of people newly diagnosed with COAG for England every year is estimated to be 9,263 (Burr et al. 2007), and the average price for a 2.5 ml bottle of eye drops is £12.90 (BNF 57), the annual cost per patient based on both eyes needing treatment is £100 (a 2.5 ml bottle lasting on average 47 days). If this recommendation can only be applied to 70% of people newly diagnosed with COAG then the estimated cost is less than £0.7 million. This is not significant nationally, however flexibility has been provided in the costing template as the recommendation may have significant local impact.

2.2.11 Recommendation 1.5.1 says that people with suspected optic nerve damage or visual field defect should be referred to a consultant ophthalmologist for definitive diagnosis of COAG and formulation of a management plan. According to Spry and Sparrow (2001) current practice is for this to happen through GP referral

after identification by the optometrist. Therefore no significant change is anticipated. There may be an opportunity to streamline the referral process where this is appropriate and possible.

2.2.12 Recommendation 1.5.4 says that people with a diagnosis of OHT, suspected COAG or COAG should be monitored and treated by a trained healthcare professional who has a specialist qualification (when not working under the supervision of a consultant ophthalmologist), relevant experience and the ability to detect a change in clinical status. According to expert opinion, once diagnosis of COAG is made, monitoring and treatment is undertaken by the hospital eye service, as few optometrists have the necessary qualification required to monitor people with COAG. For people with OHT or suspected COAG, monitoring may be undertaken in different settings. There may be a redirection of existing resources from the hospital eye service to other service providers who have the appropriate infrastructure in terms of trained and qualified clinical staff, logistics, and IT systems. This may not, therefore, have significant recurring cost impact; however this depends on local circumstances. There may also be one-off set-up costs associated with different service configurations, which could be significant locally.

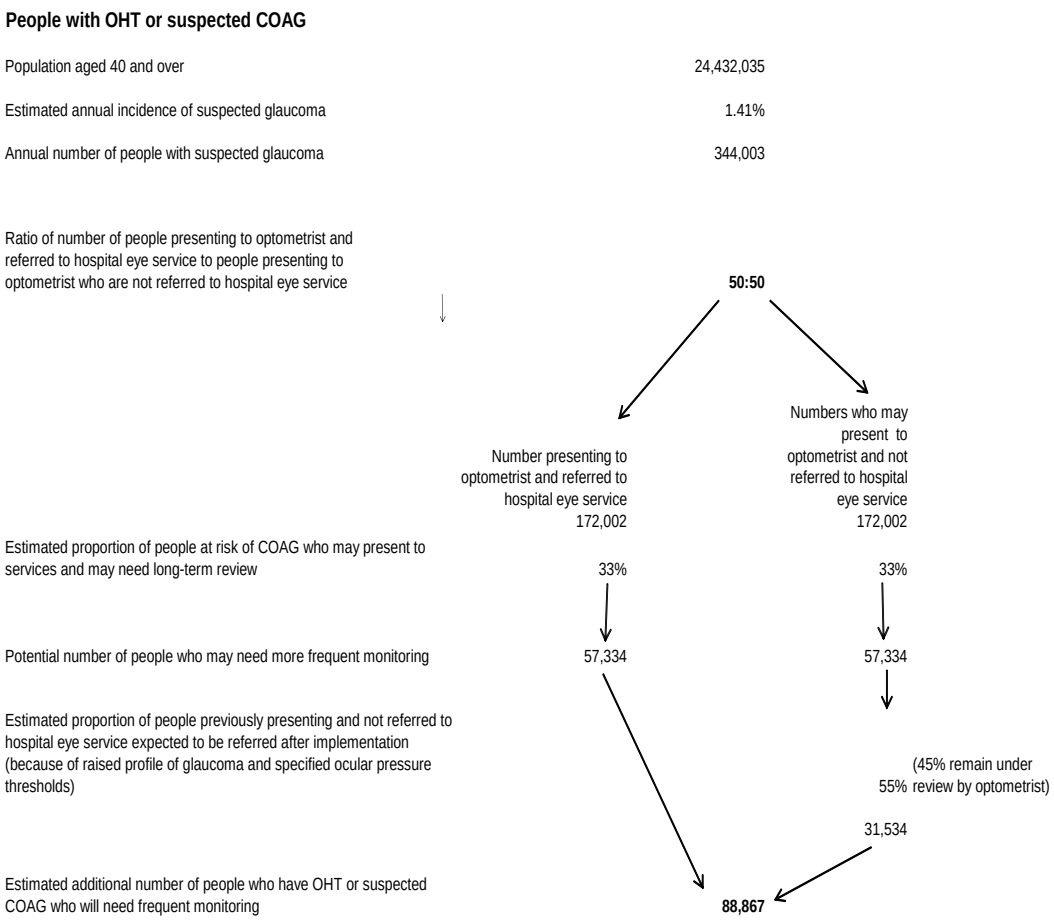
2.2.13 Recommendation 1.6.1 says that information should be provided for people in an accessible format at initial and subsequent visits. According to expert opinion, this is already provided widely by hospital eye services and is not anticipated to have a significant cost impact.

2.2.14 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. Where 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 annual incidence and population estimates (see figure 2 below). This is because prevalence data includes existing and backlog cases. For costing purposes the additional annual workload needs to be identified to estimate recurring costs.

Figure 2 Pathway used in the costing model



2.4 Basis of unit costs

2.4.1 The way the NHS is funded has undergone reform with the introduction of 'Payment by results', based on a national tariff. The national tariff will be applied to all activity for which Healthcare Resource Groups (HRGs) or other appropriate case-mix measures are available. Where a national tariff price or indicative price exists

for an activity this has been used as the unit cost; this has then been inflated by the national average market forces factor.

2.4.2 Using these prices ensures that the costs in the report are the cost to the primary care trust (PCT) of commissioning predicted changes in activity at the tariff price, however commissioning services delivered by community optometrists may be different to the tariff. Also, the tariff used may not represent the actual cost to individual trusts of delivering the activity. Flexibility has been given in the costing template to amend costs according to local circumstances.

2.4.3 We have used the national 2009/10 tariff for glaucoma. This could be applied to community services or hospital services.

3 Cost of significant resource-impact recommendations

3.1 Monitoring of people with OHT or suspected COAG

Recommendation 1.2.10

3.1.1 Monitor at regular intervals people with OHT or suspected COAG recommended to receive medication, according to their risk of conversion to COAG.

Background

3.1.2 The current treatment pathway for people with OHT or suspected COAG is subject to uncertainty and variations exist in clinical practice. Some optometrists may pick up abnormalities but as no formal pathway exists they may not refer people on to relevant services, and monitoring may take place less frequently than is ideal. When these people are referred to the hospital eye service practice may vary as there is currently no formal requirement to treat and monitor them.

Costing pathway

3.1.3 Figure 2 above shows the estimated annual number of people with OHT or suspected COAG who may need more regular monitoring and treatment as a result of implementation.

Assumptions made

3.1.4 Assumptions for the annual incidence of OHT and suspected COAG have been difficult to obtain. Based on annual referral data from Nottingham University Hospital, the extrapolated number of annual referrals to the hospital eye service for suspected COAG in England is 172,000 (Vernon et al. 2004). Expert opinion suggests a third of these would be found to be normal, one third would have COAG and one third would have suspected COAG. This gives an annual incidence figure of 57,334 (one third of 172,000) for people with suspected COAG in England. It is assumed that these people were monitored every year up until this guideline was produced and will now be seen more thoroughly and more regularly as a result of implementation.

3.1.5 Experts from the GDG were also surveyed for their opinions. Results suggested that 50% of people who have OHT or suspected COAG have not been referred to the hospital eye service. Instead when an optician identifies an abnormality the patient is monitored informally. This results in a further 172,000 (equivalent to the annual incidence) of people in the community who have not been referred. If a third of these are identified as having suspected COAG, this brings a further 57,334 cases to the hospital eye service for lifelong review. Expert opinion suggests that 50–60% of these will be referred as a result of implementing recommendation 1.1.1, which recommends specific tests for all people who have COAG, suspected COAG or OHT. By applying a midpoint to the range given, this produces a further 31,534 cases referred after implementation.

3.1.6 By totalling the figures in 3.1.4 above (57,334 and 31,534) we can estimate the annual number of people with OHT or suspected COAG in need of treatment and more regular monitoring to be 88,867. The proportion of people with OHT or suspected COAG who can be managed safely in the community was based on the survey carried out with members of the GDG. This produced an average estimate of 90%. When applied to the activity increase of 88,867 above this produces approximately 79,981 people each year with OHT or suspected COAG who may be effectively managed in the community.

3.1.7 The costing template and tools do not specify service delivery options as these cannot be predicted and costed at national level and depend on local circumstances. Flexibility is provided in the costing template to allow for other recurring costs that may arise such as training, qualifications, audit and governance and IT as these may be significant locally.

Cost summary

3.1.8 The significant costs identified for recommendation 1.2.10 are driven by a more robust and consistent approach to monitoring people with OHT and suspected COAG. This may have the following impact:

- Increased activity levels and workload for healthcare professionals.
- A potential shift in existing care pathways to increase capacity either within the hospital eye service through community-based medical centres (primary care) or shared care schemes with local optometrists.

3.1.9 There may be a knock-on effect for people who have OHT, suspected COAG, or diagnosed with COAG whose condition is currently being managed by the hospital eye service. Service capacity may need to increase in the hospital eye service or, where

possible and appropriate for the patient, in community-based services, to ensure the demand from people in need of lifelong monitoring and treatment is met.

3.1.10 The cost of recommendation 1.2.10 is summarised in the table below.

Table 3 Estimated additional cost of monitoring people with OHT or suspected COAG*

Number of people with OHT or suspected COAG	79,981
Additional visits per year	2.5
Cost per patient per year (£)	132.50
Total cost per year (£000s)	**10,598**

*As there is no current pathway for this group of people, the estimated annual number of patients can be used as the baseline for additional cost.

Other considerations

3.1.11 The costs of training, IT and governance arrangements for community schemes will depend on local arrangements and cannot be quantified nationally. Flexibility has been given in the costing template to estimate these locally.

3.2 Surgery for people with COAG

Recommendation 1.4.7

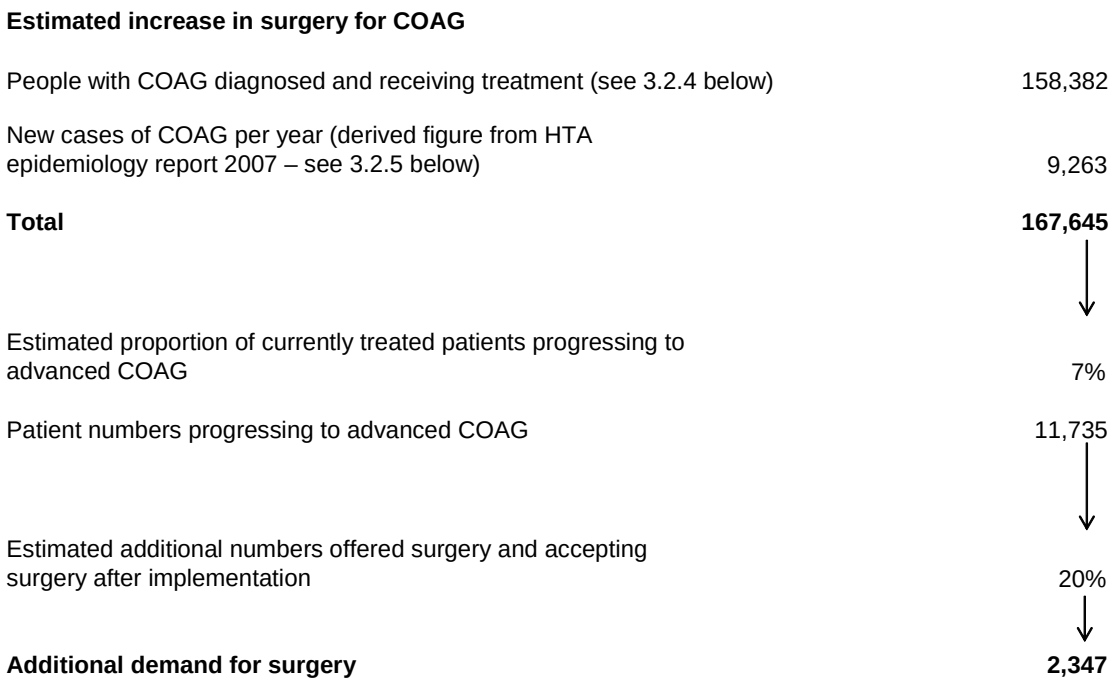
3.2.1 Offer surgery with pharmacological augmentation (MMC or 5-FU[2]) as indicated to people with COAG who are at risk of progressing to sight loss despite treatment. Offer them information on the risks and benefits associated with surgery.

Costing pathway

3.2.2 Figure 3 below shows the how the estimated increase in surgery for people who are at risk of progressing to sight loss has been derived in the costing model.

[2] At the time of publication (April 2009), MMC and 5-FU did not have UK marketing authorisation for this indication. Informed consent should be obtained and documented. Both drugs should be handled with caution and in accordance with guidance issued by the Health and Safety Executive.

Figure 3 Pathway used in the costing model



Background

3.2.3 Expert opinion suggests surgery as a treatment for COAG may increase following implementation. This may not, however, apply to all hospitals. The current level of COAG surgery based on Hospital Episode Statistics data 2007 indicates there are currently around 4,500 glaucoma-related surgical episodes per year. Around 4,000 of these are trabeculectomy procedures and around 500 are laser trabeculoplasty procedures (codes H400 to H409). The figures have been adjusted to take account of people aged 40 and over. It is difficult to predict the potential increase in surgery for COAG but improved identification of COAG progression through the improved availability of quality sequential patient data as recommended in 1.1.5 of the guideline, along with recommendation 1.4.7, may contribute to a significant national cost impact.

Assumptions made

3.2.4 The number of people being currently treated who are likely to progress from moderate to advanced COAG and who are at risk of progressing to sight loss despite treatment is estimated to be 7% of the current number of people with COAG diagnosed and receiving

treatment. This percentage has been taken from appendix F of the NICE full guideline on glaucoma (National Collaborating Centre for Acute Care 2009). Burr et al. (2007) identified 569,000 people affected by COAG in the UK of whom 380,000 are estimated to be undetected. This leaves an estimated 189,000 people in the UK diagnosed with COAG glaucoma. Using the proportion for England, this produces approximately 158,382 people currently diagnosed. If the 7% rate of progression is applied to this number, this gives 11,087 people who are at risk of progression per year.

3.2.5 The annual incidence of people diagnosed with COAG in England also needs to be taken into account. Based on figures from Burr et al. (2007) there are 11,054 new cases of COAG a year in the UK in people aged 40–70. An estimate of the number of cases for England is 9,263 people. Using the 7% rate of progression for this group results in 648 people who are at risk of progression a year. The total number of people at risk of progression is therefore 11,735.

3.2.6 The additional proportion of people who would be offered surgery after implementation of the guideline, and who accept surgery, is estimated to be 20% of the total people at risk of progressing to sight loss despite treatment. This is based on expert opinion, and produces an estimated additional 2,347 COAG surgical episodes a year for England.

3.2.7 Based on Hospital Episode Statistics data 2006–07, the proportion of people who have surgery for COAG as a day case is 66% and as an inpatient is 34%. The relevant tariff values applied are £595 (average 2009–10 tariff for day case glaucoma) and £1,274 (2009–10 tariff for inpatient glaucoma categories 1, 2 and 3). When applied to the estimated increase in glaucoma surgery this produces a total cost of £1.9 million.

Cost summary

3.2.8 The significant costs identified for recommendation 1.4.7 are driven by the potential increase in activity for surgery as a result of implementation.

3.2.9 The net estimated cost of offering surgery to people with advanced COAG and people with COAG who have visual field defects and/or progression of optic nerve damage in one or both eyes is summarised in table 4 below.

Table 4 Estimated cost of potential increase in glaucoma surgery after implementation

	Current number of patients	Current cost (£000s)	Predicted number of patients	Predicted cost (£000s)	Change in cost (£000s)
Surgery as inpatient	1,530	1,949	2,328	2,966	+1,016
Surgery as day case	2,970	1,767	4,519	2,689	+922
Totals	**4,500**	**3,716**	**6,847**	**5,655**	**+1,938**

Other considerations

3.2.10 There may be additional costs associated with the training surgeons to perform glaucoma surgery; flexibility has been provided in the costing template to allow for any costs associated with workforce training as a result of implementation.

3.2.11 An increase in surgery for COAG may result in a capacity gap in hospital eye clinics where surgeons are taken out of clinics to perform surgery.

3.3 Monitoring of people with OHT, suspected COAG or COAG

Recommendation 1.5.6

3.3.1 People with a confirmed diagnosis of OHT or suspected COAG and who have an established management plan may be monitored (but not treated) by a suitably trained healthcare professional with

knowledge of OHT and COAG, relevant experience and ability to detect a change in clinical status. The healthcare professional should be able to perform and interpret all of the following:

- Goldmann applanation tonometry (slit lamp mounted)
- standard automated perimetry (central thresholding test)
- central supra-threshold perimetry (this visual field strategy may be used to monitor people with OHT or COAG suspect status when they have normal visual field)
- stereoscopic slit lamp biomicroscopic examination of the anterior segment
- Van Herick's peripheral anterior chamber depth assessment
- examination of the posterior segment using slit lamp binocular indirect ophthalmoscopy.

Background

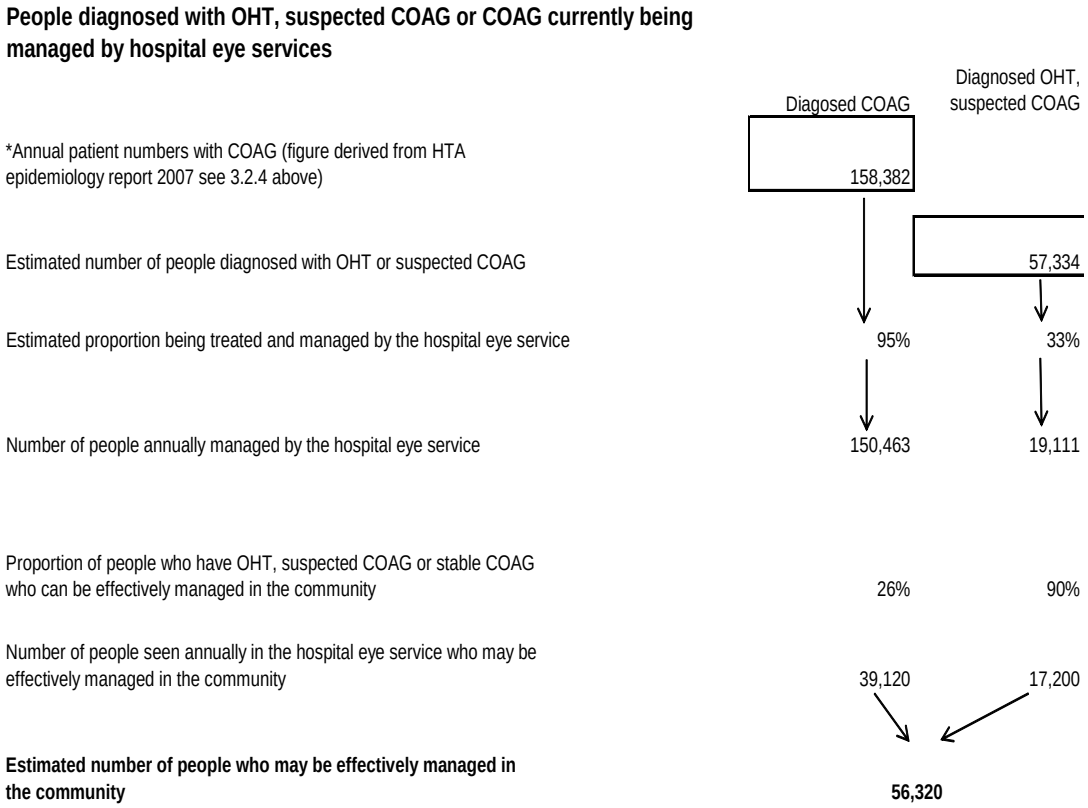
3.3.2 As there is a relatively low number of ophthalmologists working in the hospital eye service, and hospital eye service outpatient clinics tend to gradually expand the number of people they have registered with COAG or suspected COAG waiting times for initial assessment remain a problem in many areas (Vernon et al. 2004). Implementation of the guidance would result in more consistent and robust processes that are likely to require greater capacity in current services. Recommendation 1.5.6 allows for options in creating additional capacity to monitor people with OHT or people suspected with COAG, which could be explored by PCTs. People with stable COAG may also be monitored in the community where the conditions in recommendation 1.5.4 are met, however there are issues affecting this which are identified in paragraph 3.3.10 of this report under other considerations.

Costing pathway

3.3.3 Figure 4 below shows how the estimated number of people with OHT, suspected of having COAG or diagnosed with stable COAG

who may be effectively managed in the community has been derived in the costing model.

Figure 4 Pathway used in the costing model



Assumptions made

3.3.4 The proportion of people with OHT or suspected COAG who are currently managed by the hospital eye service is estimated to be 33%. This is based on the survey of experts from the GDG. The estimated proportion who can be effectively managed in the community is 90%, based on expert opinion. When these figures are applied to the estimated current annual incidence of people with OHT or suspected COAG accessing the hospital eye service of 57,334 identified above, this gives a figure of 17,200 people in England.

3.3.5 The 2009–10 national tariff for a follow-up visit to an outpatient ophthalmology clinic is £53. The estimated number of visits per person per year based on averaged monitoring intervals in the guideline and Vernon et al. (2004) is 2.5 per year. Applying this to the national tariff for a follow-up visit produces an estimated cost of monitoring of £132.50 per person per year. The estimated total cost of a potential shift in services for people with OHT or suspected COAG to the community is therefore £2.28 million for England. This estimate assumes the predicted number of additional visits per person per year does not change. Flexibility is provided in the costing template to amend the average number of additional visits per person per year according to local experience.

3.3.6 The proportion of people with stable COAG currently managed by the hospital eye service who can be effectively managed in the community is estimated to be 26%, based on expert opinion. When applied to the estimated current number of people with COAG diagnosed and receiving treatment in the hospital eye service each year, this produces a figure of 39,120 people for England. Applying this to the estimated cost each year for follow-up per person of £132.50, this gives an estimated cost for the potential shift in resources of £5.18 million.

3.3.7 The costing template and tools do not specify service delivery options as these cannot be predicted and costed at national level and depend on local circumstances.

Cost summary

3.3.8 Recommendation 1.5.6 may result in a shift in services, which may also be triggered by the additional numbers anticipated following implementation of recommendation 1.2.10. Further pressure on services may result from the increased number of people with suspected COAG as the population ages, as prevalence in the population aged over 75 is up to 10%.

3.3.9 The net estimated cost of the potential shift in current service provision after implementation is summarised in the table below:

Table 5 Estimated cost of potential shift in service provision for the monitoring of people with OHT, suspected COAG and stable COAG

	Current numbers managed by hospital eye services	Estimated numbers who can be managed in the community	Revised numbers managed by hospital eye services	Current cost to hospital eye services (£000s)	Predicted cost if services can be shifted to community (£000s)	Change in cost to community-based services (£000s)
People with OHT or suspected COAG transferred to community	19,111	17,200	1,911	2,532	253	2,279
People with stable COAG transferred to the community	150,463	39,120	111,343	19,936	14,753	5,183
Totals	**169,574**	**56,320**	**113,254**	**22,469**	**15,006**	**7,462**

Other considerations

3.3.10 The cost of providing services in the community will vary in different areas and depend on the levels of service that can be agreed. It may be more expensive in areas where enhanced payments are negotiated. When these costs are considered alongside the relatively low percentage of people with COAG for whom such schemes are suitable (approximately 26% based on expert opinion), further consideration should be given as to whether this represents value for money for your local area.

3.3.11 Expert opinion suggests time and investment is needed to ensure community optometrists are equipped to implement NICE guidance and costs may also arise from governance and audit. Any externally contracted community schemes are also dependent on take up by optometrists.

3.3.12 For people with COAG, recommendation 1.5.4 of the guidance states that people should be treated and monitored by healthcare professionals with a specialist qualification, relevant experience and the ability to detect a change in clinical status unless they are working under the direct supervision of a consultant ophthalmologist. Expert opinion suggests that there is only a small number of optometrists who have the necessary qualification; therefore any scope for shifting services for people with COAG may be limited in the short term.

3.3.13 It is common for people with COAG particularly the elderly, to have coexisting conditions. These often cause symptoms and comorbidity that would require identification and management (Vernon et al. 2004).

3.4 Benefits and savings

Background

3.4.1 Because uncertainty and variation exist in clinical practice, the guideline gives clear recommendations on testing for and diagnosing COAG and OHT, and on effective monitoring and treatment to prevent these conditions progressing. By implementing the guideline further damage can be minimised so more people will be prevented from going blind. There are potential cost savings that may arise from implementation. These are non cash releasing but can be expressed in terms of resources released from the hospital eye service that may alleviate demand pressures. Potentially, annual resources could be released through referral refinement and the creation of capacity outside the hospital eye service, allowing resources to be diverted, although these savings could not be quantified. There are also savings that might arise in the future through the prevention of sight loss.

Assumptions

3.4.2 Resources could potentially be released if services can be reconfigured for people with OHT, suspected COAG or stable

COAG who currently attend the hospital eye service. The value for this is based on the tariff and average number of visits a year per patient. The annual total number of people who can effectively be managed in the community is estimated to be 56,320 for England, based on expert opinion. This produces an estimated shift in resources of £7.4 million when applied to the estimated cost per year of more regular monitoring intervals of £132.50 per patient (please see paragraph 3.3.5). The resources released may be redirected to reduce demand pressures on existing services. The cost of services commissioned by the hospital eye service may differ for community optometrists: flexibility is provided in the costing template to reflect local circumstances.

3.4.3 There may be savings in future years if the guideline is implemented, as a result of improved testing, monitoring and treatment of people with OHT, suspected COAG or COAG. The findings of a study on the cost of blindness showed that if only 10% of people with COAG received earlier treatment to arrest the development of visual impairment, it could save the government between £555 million and £1 billion (Ethical Strategies Ltd 2003). These figures include costs relating to social benefits and productivity losses, and exclude condition-specific treatment costs.

3.4.4 Studies have also shown that people with visual impairment tend to have longer hospital stays, make greater use of health and community services' care services and are more likely to be admitted to nursing homes (Colquitt et al. 2008).

3.4.5 The costs of residential care are significant. Voluntary residential care costs for older people are £443 per permanent residential week (£23,000 a year) (Personal Social Services Research Unit [PSSRU] 2007); local authority care for older people costs £829 per permanent resident week (£43,000 a year) (PSSRU 2007). This is the reported cost for all people receiving residential care and not just those with COAG.

3.4.6 The risk of having an unintentional injury is higher for people who are visually impaired compared with the fully sighted population (Legood et al. 2002). The evidence on falls, which relates mainly to older people, suggests that people with visual impairment are 1.7 times more likely to have a fall and 1.9 times more likely to have multiple falls compared with fully sighted people. The odds of a hip fracture are between 1.3 and 1.9 times greater for people with visual impairment (Legood et al. 2002). The cost of a hip replacement is about £8,781 (HRG HA11 2009–10 mandatory tariff).

3.4.7 The Ethical Strategies study (2003) identified annual cost estimates associated with vision impairment in the elderly population as £4,980 per person. Assuming at least 50% of this cost is from falls treated on the NHS and from the cost of residential care, which is shared between the NHS and local authorities, estimated annual future savings are £2,490 per person per year.

3.4.8 The number of new blind registrations from March 2006 to March 2008 is 10,200 for England. The proportion of people who lose their sight to COAG is estimated to be 10% (NICE 2009). Following implementation of the NICE guideline, we predict that this could be reduced to 5%, with 510 blindness registrations prevented over 2 years (based on expert opinion). This results in potential future savings of £1.3 million over 2 years or an estimated £0.635 million annually. These may increase year on year if the guideline is fully implemented.

3.4.9 The table below shows the potential shift in service provision as a result of implementation and estimated annual savings in future years. Future savings do not contribute to the net cost in the costing template as these will be experienced over time.

Table 6 Estimated annual and future savings as a result of implementation

Potential capacity diverted from hospital eye services to the community	Cost per patient per year (£)	Number of patients	Estimated total costs/savings (£000s)
Patients who may be effectively managed in the community	132.50	56,320	7,462
Capacity released in hospital eye service to alleviate demand pressures	132.50	56,320	–7,462
Future annual savings			
Costs to NHS of vision impairment			**–635**

Other considerations

3.4.10 People over 65 who undergo surgery for glaucoma have an increased risk of developing cataracts within a 5-year period (National Collaborating Centre for Acute Care 2009). This may increase numbers undergoing cataract surgery over a 5-year period.

4 Sensitivity analysis

4.1 Methodology

4.1.1 There are a number of assumptions in the model for which no empirical evidence exists. Because of the limited data, the model developed is based mainly on discussions of typical values and predictions of how things might change as a result of implementing the guidance and is therefore subject to a degree of uncertainty.

4.1.2 As part of discussions with practitioners, we discussed possible minimum and maximum values of variables, and calculated their impact on costs across this range.

4.1.3 Wherever possible we have used the national tariff plus market forces factor to determine cost. We used the variation of costs for

the 25th and 75th percentiles from reference costs compared with the reference cost national average as a guide to inform the maximum and minimum range of costs.

4.1.4 It is not possible to arrive at an overall range for total cost because the minimum or maximum of individual lines would not 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.

4.1.5 Appendix B contains a table detailing all variables modified and the key conclusions drawn are discussed below.

4.2 Impact of sensitivity analysis on costs

Annual incidence of OHT and suspected COAG

4.2.1 The estimated annual incidence of OHT or suspected COAG is 1.41% in people over 40. This is likely to vary because of changes in demographics such as increased life expectancy. When the baseline percentage of 1.41% is varied to a minimum value of 0.5% and a maximum value of 2% this produces a cost variation of £11.3 million.

Estimated proportion of people with OHT or suspected COAG currently presenting to their optometrist

4.2.2 Based on expert opinion, 50% of people with OHT or suspected COAG are currently presenting to their optometrist. When this baseline is varied to the minimum value of 40% and a maximum value of 60%, the cost variation is £2.7 million.

Estimated proportion of people with OHT or suspected COAG who can be effectively managed in the community

4.2.3 Based on expert opinion, 90% of people with OHT or suspected COAG can be effectively managed in the community. When this baseline is varied to a minimum value of 80% and a maximum value of 100%, the cost variation is £2.3 million.

Estimated average number of follow-up visits per patient per year

4.2.4 The baseline average number of follow-up visits per patient per year is 2.5. When this is varied to a minimum of two visits and a maximum of three visits, the cost variation is £4.2 million.

5 Impact of guidance for commissioners

5.1.1 Glaucoma falls within programme budget category 208x – problems of vision. There is a 2009–10 inpatient and planned same-day tariff for glaucoma categories 1, 2 and 3 (BZ17Z, BZ18Z and BZ19Z). There is a mandatory tariff for follow-up costs of ophthalmology outpatient attendances that falls within speciality code 130.

5.1.2 The costing areas that use the tariff are the costs of surgery for an inpatient and for a day case, and the monitoring costs of people attending outpatient services for follow-up and monitoring.

6 Conclusion

6.1 Total national cost for England

6.1.1 Using the significant resource-impact recommendations shown in table 2 and assumptions specified in section 3 we have estimated the annual net cost impact of fully implementing the guideline in England to be £13 million. Table 8 shows the breakdown of cost of each significant resource-impact recommendation.

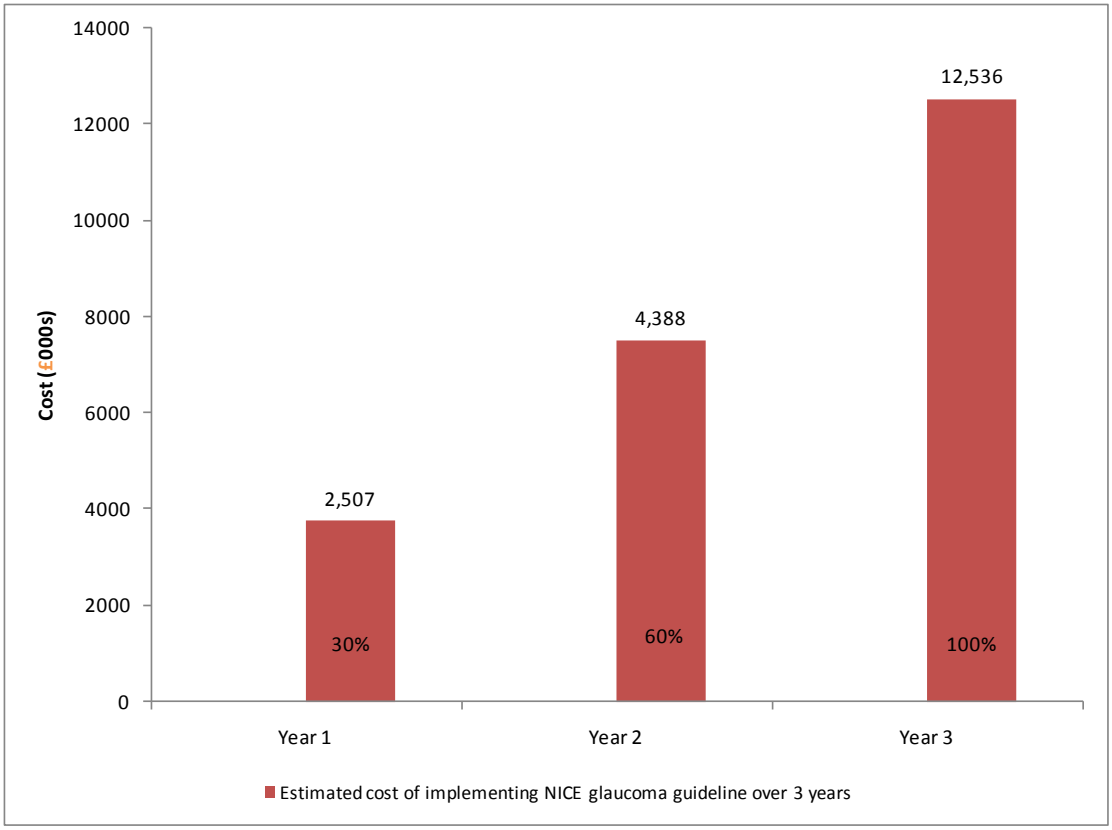
Table 7 Cost of significant resource impact recommendations.

Description	Total costs (£000s)
Monitoring of people with OHT or suspected COAG	10,598
Increase in COAG surgery	1,938
Estimated total costs	**12,536**

6.1.2 We applied reality tests against existing data wherever possible, but this was limited by the availability of detailed data. We consider this assessment to be reasonable, given the limited detailed data regarding annual incidence, diagnosis and treatment paths and the time available. However, the costs presented are estimates and should not be taken as the full cost of implementing the guideline.

6.1.3 As the factors which affect implementation of the guideline involve developing the workforce profile and skills to meet the additional demand on services, it can be anticipated that implementation would take place over a period of more than a year. The graph below shows the cumulative cost of implementation over 3 years.

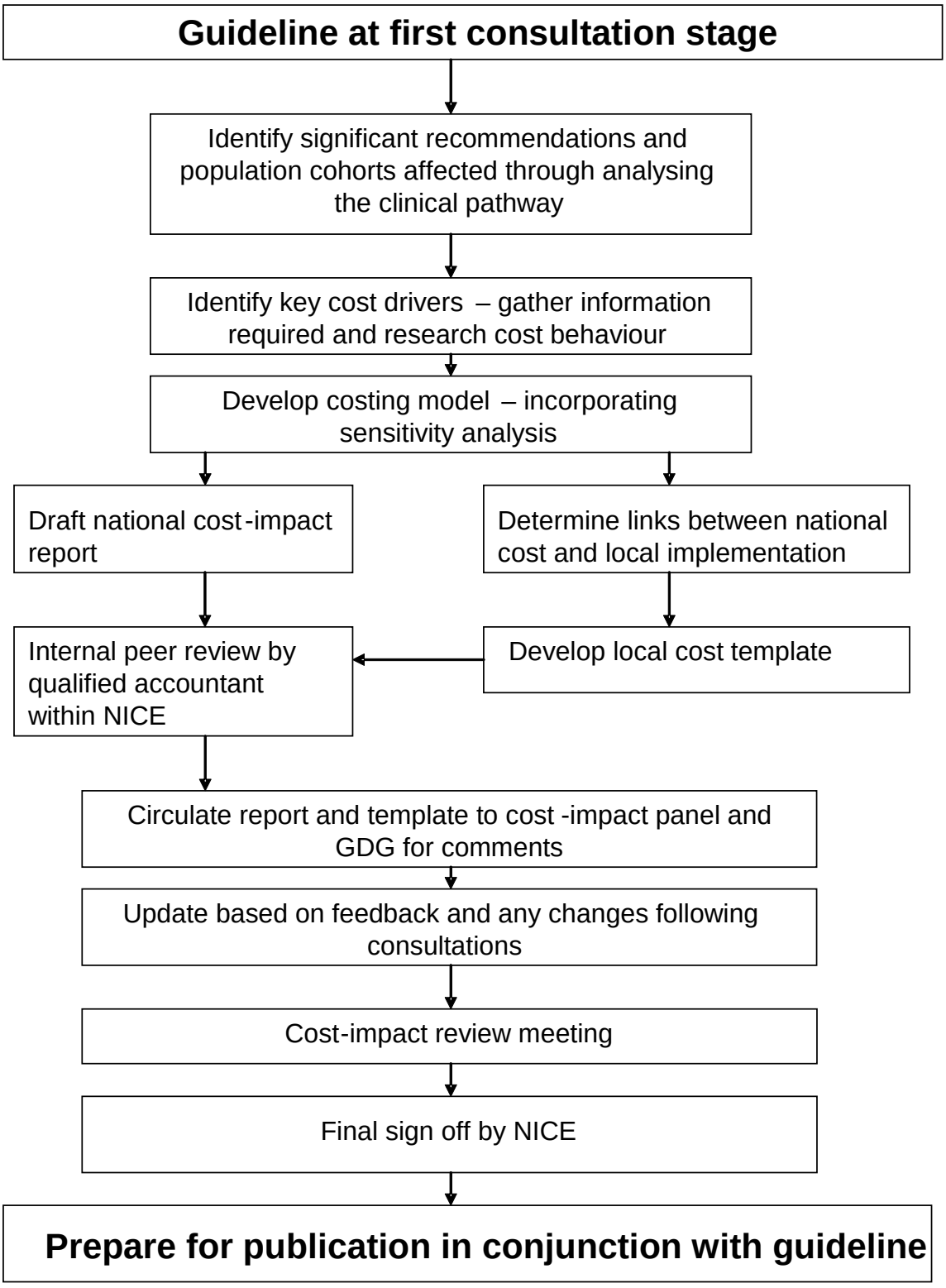
Figure 5 Estimated costs over time of implementing glaucoma guideline



6.2 Next steps

6.2.1 The local costing template produced to support this guideline enables organisations such as PCTs or health boards in 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 a population of 100,000 could expect to incur additional costs of £24,628. 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

Appendix C. References

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