



THE COLLEGE
OF OPTOMETRISTS

The
Royal
College of
Ophthalmologists



Commissioning better eye care

Clinical commissioning guidance from

The College of Optometrists and The Royal College of Ophthalmologists

Glaucoma

Version: 2

Published: 21 March 2013

RightCare



national association of primary care



Commissioning better eye care: clinical commissioning guidance from The College of Optometrists and The Royal College of Ophthalmologists

This resource is to help those designing and commissioning eye care improve the value of their services.

It was produced by the Colleges using a template provided by the Department of Health's Right Care team led by Professor Sir Muir Gray. In addition to the Right Care team, The Royal College of General Practitioners, the National Association of Primary Care, the UK Vision Strategy and partners in the eye health sector have supported the Colleges to produce this guidance.

It is arranged in to the following sections:

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- What are the best value treatments?
- How can individuals and carers be best supported long term?
- How to compare services based on activity, quality and outcome
- What are the elements of a system of care for a population?

Summary: glaucoma

- Glaucoma is common (prevalence 0.3% at age 40 rising steeply with advancing age). It is more common in certain ethnic groups and in people who have a first-degree relative with glaucoma.
- Glaucoma itself cannot be prevented but its impact on sight can be minimised.
- Once the diagnosis is established, lifelong monitoring is required to minimise the risk of progressive, irreversible damage to vision.
- The diagnosis and monitoring of glaucoma is the subject of a NICE guideline (CG85) and quality standard (QS7).

Recommendations

- Establish a local glaucoma register to monitor compliance with the NICE glaucoma quality standard and to prevent delayed follow up or loss to follow up.
- Patients should be treated with generic drugs wherever appropriate.
- Repeat measurement schemes involving community optometrists should be established as a priority. They can significantly reduce false-positive referrals into the hospital eye service and are relatively easy to introduce.
- Consider a referral refinement scheme to further reduce false positive referral rates from community optometrists. To improve the quality of referral refinement services, the College of Optometrists recommends that optometrists involved undertake a Professional Higher Certificate in Glaucoma from one of its accredited providers.
- Sharing the care of patients at relatively low risk of progression between the hospital eye service and suitably trained community providers has the potential to reduce costs but needs shared clinical information and the right IT infrastructure.
- Services need to be in place to support patients who have suffered significant visual loss from glaucoma and patients who find it difficult to administer eye drops themselves.

Introduction

Visual impairment is a public health problem, as recognised by the inclusion of preventable sight loss as an indicator in the Public Health Outcomes framework for England 2013-2016 (DH 2012).

Glaucoma is a condition that causes **severe** visual impairment and blindness if left untreated. Visual impairment from glaucoma has been associated with poor quality of life and loss of independence, for example from falls or losing the ability to drive.

Despite the fact that the diagnosis and management of glaucoma carry a significant economic burden of disease, the condition has only recently received attention from commissioners. This is largely due to guidance from the National Institute for Clinical Excellence (NICE 2009) and The Royal College of Ophthalmologists (RCOphth 2011) on new referrals and concerns from the National Patient Safety Agency (NPSA 2009) that service pressures and inappropriate imposition of new-to-follow up ratio targets have sometimes resulted in failures of care of patients with glaucoma.

In general, baseline population data for glaucoma tends to be less accurate and detailed than for cataract and age-related macular degeneration as few localities routinely use electronic clinical records for glaucoma services. Glaucoma is a high volume and resource demanding disease where significant efficiencies may be made by decentralising care (referral refinement and shared care closer to home). While there is currently no record of commissioner activity for glaucoma, the prevalence of the disease indicates that a large proportion of the programme budget for eyes and vision services (£2bn a year) is spent on glaucoma and the eye examinations that play a key role in detecting it.

What is glaucoma?

Glaucoma can be classified in these ways:

- Chronic open angle glaucoma (COAG)
- Ocular hypertension (OHT) and COAG suspects
- Acute and chronic angle closure glaucoma
- Secondary glaucoma
- Paediatric glaucoma (covering congenital, infantile and juvenile)

Glaucoma describes a group of eye diseases in which there is progressive damage to the optic nerve with characteristic changes in the optic disc and typical defects in the visual field with or without raised intra-ocular pressure (IOP). Importantly, it is not rare for COAG to occur in patients with normal IOP. This is known as normal pressure or normal tension glaucoma (NTG).

OHT, a condition with elevated IOP (greater than 21 mmHg) but without pathology of the optic nerve head or impairment of visual fields, is a major risk factor for development of open angle glaucoma (NICE 2009).

This document will refer only to COAG, OHT and suspect COAG as these make up the overwhelming majority of the glaucoma workload.

What are the causes of and scope of prevention for glaucoma?

It is not possible to prevent glaucoma itself but you can minimise the resulting sight loss.

Risk factors

The risks of developing glaucoma and worsening of existing glaucoma increases with elevated IOP. For every 1mmHg of pressure above the normal range, the risk of developing glaucoma increases by 12% (Leske et al 2007). Other risk factors for open angle glaucoma include increasing age, myopia, low central corneal thickness (CCT), diabetes and a family history with a first degree relative being affected by glaucoma (Burr 2007). The risk is four times higher for those of African ethnicity (Burr 2007).

Scope for prevention

Primary open-angle glaucoma cannot be prevented but visual loss can be minimised. Patients at higher risk of COAG, such as those with OHT, should be monitored.

In the UK, based on currently available evidence, population screening for open angle glaucoma is unlikely to be cost effective although targeted case detection programmes for those at higher risk may be (Burr 2007). People over the age of 40 who have a first degree relative with glaucoma are entitled to free NHS sight tests. However all adults over the age of 40 should have a regular eye check which includes measuring the intraocular pressure and checking the appearance of their optic nerve. In particular, national and local health promotion programmes to raise awareness among high risk groups could be worthwhile. Once diagnosed with COAG, sight loss is minimised by lifelong eye drops and possibly laser therapy and surgery.

Individuals identified as having OHT should be monitored according to NICE (2009) guidelines (IOP above 21mmHg and no signs of glaucoma). There is uncertainty regarding the optimal frequency of monitoring and research is ongoing (Burr 2007).

How many people have glaucoma?

Incidence (number of new cases each year)

Based on five year cumulative studies, the incidence of COAG is between 0.5% and 0.6% (deVoogd 2005, Mukesh 2002). Incidence is sensitive to the age and ethnic profile of the population since glaucoma is more common among people who are older and those with African or Caribbean ethnicity.

Prevalence (proportion of cases in a set population at a given time)

In England, 489,000 people are estimated to have chronic open angle glaucoma. The prevalence of glaucoma is approximately 0.3% at the age of 40 but rises steeply with advancing age. More than half of those glaucoma cases are thought to be undetected (Burr 2007, Bunce 2010). It is estimated that 172,000 referrals of patients with suspected glaucoma are made to the hospital eye service in England each year, of which about one third will require long term follow up (NICE 2009). Nationally, 10% of severely sight impaired (blindness) registrations are ascribed to glaucoma (NICE 2009). Many more people have glaucoma not severe enough to be registered as blind or visually impaired but severe enough to reduce vision and quality of life, from losing their driving licence for example (Burr 2007).

Overall, OHT is thought to affect 1 million people in England. Among patients aged 40 and over the prevalence of OHT is around 3-5% (NICE 2009). With changes in population demographics the number of people affected by COAG and OHT is expected to rise even further.

What are the best value diagnostic tests?

Patients with glaucoma are generally asymptomatic in the early stages and the condition is often not noticed until significant damage to vision has already occurred. There is no agreed screening test for open angle glaucoma (Mowatt 2008). Most cases are detected through routine eye examinations by community optometrists.

The three main tests used in routine eye examinations to detect glaucoma are: IOP measurement, optic disc examination and visual field assessment. Done individually the tests are not sensitive enough to diagnose suspected glaucoma and patients should not be referred unless a combination of the tests is positive.

Optometrists use both contact and non-contact tonometry to detect glaucoma. However NICE recommends that to reduce false positives contact tonometry should be used which is more accurate but may generate more costs (NICE 2009, College of Optometrists & Royal College of Ophthalmologists 2009).

Slit lamp biomicroscopic assessment is considered the most accurate test for identifying optic nerve damage and may be associated with fewer costs compared with Heidelberg retina tomography, OCT and laser polarimetry (NICE 2009). If a combination of IOP measurement, optic disc examination and visual field measurement provides positive evidence of glaucoma, NICE recommends that

patients be referred to a specialist for gonioscopy and pachymetry to confirm the diagnosis (NICE 2009).

What are the best value treatments?

This section provides guidance on improving the value of treatment, medications, surgery and pathways.

Improving the value of treatment

The NICE guideline provides detailed standards for the diagnosis and treatment of glaucoma and OHT. The estimated cost of hospital monitoring of a patient with COAG or OHT per year was £132.50, based on the tariff for hospital visits (NICE 2009a).

Treatment for COAG involves lowering intraocular pressure. This can be lowered by topical medication (eye drops), laser therapy or drainage surgery.

Table 3 Treatment for people with OHT or suspected COAG (NICE 2009)

CCT	More than 590 micrometres		555–590 micrometres		Less than 555 micrometres		Any
Untreated IOP (mmHg)	> 21 to 25	> 25 to 32	> 21 to 25	> 25 to 32	> 21 to 25	> 25 to 32	> 32
Age (years) ^a	Any	Any	Any	Treat until 60	Treat until 65	Treat until 80	Any
Treatment	No treatment	No treatment	No treatment	BB ^b	PGA	PGA	PGA

^a Treatment should not be routinely offered to people over the age threshold unless there are likely to be benefits from the treatment over an appropriate timescale. Once a person being treated for OHT reaches the age threshold for stopping treatment but has not developed COAG, healthcare professionals should discuss the option of stopping treatment.

The use of age thresholds is considered appropriate only where vision is currently normal (OHT with or without suspicion of COAG) and the treatment is purely preventative. Under such circumstances the threat to a person's sighted lifetime is considered negligible. In the event of COAG developing in such a person then treatment is recommended.

^b If beta-blockers (BB) are contraindicated offer a prostaglandin analogue (PGA).

Treatment with a prostaglandin analogue should be offered to people with early or moderate COAG who are at risk of significant visual loss in their lifetime (NICE 2009).

People at risk of progressing to sight loss despite treatment should be offered surgery with pharmacological augmentation (mitomycin C [MMC] or 5-fluorouracil [5-FU]) (NICE 2009).

Improving the value of medications

The annual cost of medications depends on the type of medication used, number of medications required and the dexterity of the patient or carer. Traverso et al (2005) reported that the direct costs of monitoring and treating glaucoma per year varied with severity; the cost of treating a patient with severe glaucoma was around twice that of mild glaucoma.

Cost savings can be achieved in eye care if commissioners and eye health professionals prescribe generic medications, where clinically appropriate. For example, in January 2012, the patent expired for the prostaglandin analogue Xalatan® and it is now available in generic form (latanoprost 0.005%).

Further savings could be made if GPs and eye care professionals actively recommended generic latanoprost as first line treatment for glaucoma for appropriate patients, as agreed by the Yorkshire and Humber Clinical Compact (see Appendix 1 for further information).

Improving the value of surgery

People with COAG with advanced visual loss or those who are progressing to visual loss despite treatment are offered surgery with pharmacological augmentation. Early surgery could lead to a reduction in expenditure on future medication, however this would be difficult to quantify as each

patient's needs would be different. According to hospital episode statistics (HES), the 2009-10 tariff values for surgical admissions were £595 for day case glaucoma and £1,274 for inpatient glaucoma. Costs of follow-up and monitoring would vary. Commissioners should estimate the number of people in their area likely to require surgery. A local glaucoma register would facilitate the access of this information.

Improving the value of glaucoma pathways – patient registers, referrals, shared care and local eye health networks

The [NHS Map of Medicine](#) provides CCGs with the best pathways and treatment options for COAG, suspect COAG and OHT. The [Local Optical Committee Support Unit](#) has also produced pathways.

Some schemes such as repeat measures programmes offer relatively quick and easy ways to improve value by reducing false positive referrals. However, commissioners should consider the impact on the whole glaucoma pathway when taking strategic decisions rather than focussing on one particular scheme in isolation. The key requirement for a sustainable programme providing successful outcomes is an integrative approach which remains focussed on value for money.

A local glaucoma register

To track patients through the pathway, ensure they are treated at the right times and do not drop off the pathway, a glaucoma service should establish a register of patients with and at risk of glaucoma.

A glaucoma register is a failsafe record of all patients with COAG, suspect COAG and OHT. Registers need to be **accessible** (e.g via an N3 network or other secure link), **inclusive** (of all participating providers) and **confidential** (overseen by a failsafe officer as is the case in the diabetic retinopathy screening programme).

Commissioners can work with their local information governance teams to develop a software platform and hosting arrangements for their register. They may wish to use levers or incentives to enable local organisations to put innovative systems in place to monitor compliance. A glaucoma register may also facilitate targeted screening of at risk populations; for example by identifying first degree relatives of glaucoma patients and encouraging this group to have free sight tests.

Other possible solutions to share clinical information for glaucoma include open source applications such as Open Eyes which has been implemented at Moorfields Eye Hospital Foundation Trust and University Hospital of Wales. Encouraging patient-held records also minimises problems of information transfer.

Better value referrals

Referrals from primary care to hospital eye services stand out as an area where pathways can be improved through:

- regular audit of referral patterns
- the introduction of repeat measurement schemes
- the introduction of referral refinement schemes
- using e-referrals.

Regular audit of referral patterns is essential to identify and tackle unjustifiable variations in the quality of referrals.

Repeat measurement

This describes the repeated measurement of the ocular parameters of intraocular pressures (IOP) and may include visual fields. NICE CMG44 recommends that referrals should be made to a glaucoma service only when repeat measures have taken place.

In Bexley Care Trust, community optometrists improved the quality of hospital referrals by repeating IOPs with contact applanation tonometry on up to two occasions and/or repeating visual fields on a separate occasion. By using the repeat measures scheme, it resulted in 76% of patients not being referred and demonstrated substantial cost benefits while onward referral for refinement by an accredited optometrist was essentially cost neutral (Parkins & Edgar, 2011). This scheme reported overall savings of up to 62% against the hospital eye service tariff and a full year saving of £32,500; equating to £15,000 per 100,000 population (NHS Evidence: QIPP case study 2011). While there are some costs of setting up such schemes, repeat measurement paves the way for developing and

enhancing local programmes which may achieve more long term savings. The risk of false negatives in repeat measure schemes, where a patient with glaucoma is not referred to the hospital eye service, appears to be low (Devarajan et al, 2011).

Referral refinement

Referral refinement describes a two-tier assessment in which an initial suspicious finding is validated by a subsequent enhanced assessment which adds value beyond that achieved through a simple repeat measures scheme.

A referral refinement service involves trained and accredited optometrists/ophthalmic medical practitioners working in accordance with NICE guidance. The College of Optometrists recommends optometrists in referral refinement services undertake a Professional Higher Certificate in Glaucoma from one of its accredited providers if they do not work under the supervision of a consultant in order to allow them to diagnose OHT and COAG and monitor those with OHT. The cost of training must be incorporated into any referral refinement scheme.

Further examples of repeat measurement and referral refinement schemes and their respective cost savings are listed below:

Programme	Description	Cost saving
Community Referral Refinement, Henson et al (2003)	Patients in Manchester with suspect glaucoma were referred to a group of specially trained community optometrists working to an agreed set of referral criteria. Patients were assessed and subsequently referred back to their optometrist or to the hospital eye service as appropriate.	This resulted in a cost saving of £17 per patient. This figure is based on the savings made from averted GP and hospital referrals and accounts for the cost of training and audit of community optometrists.
Bridlington Eye Project (2011)	This study analysed referrals for OHT in people over 65 years of age by community optometrists post-NICE guidelines. It found that if community optometrists use Goldmann Applanation Tonometry and pachymetry along with the joint college guidelines, referrals of OHT could be reduced to 1/5th of those under previous guidance (Vernon et al, 2011).	Study identifies potential savings of £16,463,570 (assuming that these patients were not referred to hospital under the Nottingham PCT sub-tariff of £86.80 per new referral). This figure is based on the assumption that in England and Wales in 2009, 4.3 million sight tests were performed on over-65s.
LOCSU repeat readings Ocular Hypertension Monitoring Pathways (revised June 2012)	Evaluation of data in Stockport, Bexley and North of Tyne PCTs shows that a reduction in referrals of up to 76% following implementation of scheme provided by community optometrists.	The scheme assumes savings of £87 per patient resulting from averted hospital referrals.
Carmarthenshire Glaucoma Referral Refinement Scheme:	Optometrists in Wales were recruited to review previous glaucoma referrals and this resulted in a 53% reduction of patients attending secondary care.	Cost savings of £117 per patient reviewed were identified (Devarajan 2011).

E-referral

Commissioners may wish to identify whether their locality has the potential for the implementation of e-referrals and virtual clinics between primary and secondary eye care. E-referral has been piloted within ophthalmology as a means to reduce unnecessary hospital referrals. In Fife, e-referrals between community optometrists and the hospital eye service reduced referral rates by 37% (Cameron 2009). Potential cost savings were predicted given that in Scotland outpatient appointment costs are generally between £108-£307.

While this scheme has great potential to reduce the costs of hospital eye care, commissioners must initially assess whether their region has the appropriate IT infrastructure to support e-technology (for example optometrists having access to NHS.net).

Shared care

New ways to transfer the management of stable glaucoma and OHT into the community have been proposed, including shared care models. NICE notes that services can be commissioned from a range of providers including the hospital eye service and community ophthalmology and optometry services (NICE CMG44).

NICE estimates that of the 169,500 patients with COAG, suspect COAG and OHT currently managed in the hospital eye service, 56,320 could be managed in the community. 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 (NICE 2009a).

While moving resources could free up capacity within the hospital eye service, cost of community provision should be assessed locally as there may be additional costs of training and audit of community optometrists. Any shared care scheme must be audited against NICE standards to compare quality and attendance rates in the community to those in the hospital eye service. A recent study by Mandalos et al (2012) reported a higher DNA rate among patients attending community optometrists for OHT monitoring than for hospital appointments. Research on quality, safety and outcome is ongoing. Importantly, in any shared care scheme collaboration between providers, clinicians and commissioners should take precedence over competition.

Examples of reported cost savings in shared care schemes:

Programme	Description	Cost saving
Bristol shared care (Gray 2000)	This is the only randomised controlled trial which reviewed stable glaucoma patients who were followed up either in the hospital or by community optometrists. While the study did not generate appreciable savings in 2000, it showed that community optometrists took measurements of comparable accuracy to those made in the hospital. There was no statistically significant difference in clinical outcome at 2 years (as measured by mean no. of missed points on visual field testing, IOP and cup-disc ratio). (Gray et al 2000).	Annual cost per patient for follow up by a community optometrist was £68.98-£108.98 vs £14.50-£59.95 in the hospital. However, authors note that IF follow up intervals of optometrists were similar to those of the hospital each follow up would then cost around £46.31. While this study did not generate appreciable savings, shared care freed up capacity within the hospital eye service.
Community and Hospital Allied Network Glaucoma Evaluation Scheme (CHANGES) (Mandalos 2012)	OHT patients were monitored by community optometrists under the virtual supervision of the hospital glaucoma service (HGS). OSIs used contact applanation tonometry, slit lamp biomicroscopy, automated visual field testing and digital optic disc photography.	Not listed
Nottingham shared care	Ocular hypertension scheme Optometrists see OHT patients (Doctors review patients in 15% of cases) Optometrist led glaucoma assessment (OLGA) In Nottingham, optometrists review 12 patients per clinic (Vernon et al 2011 unpublished).	No formal cost-benefit analysis has been performed on these programmes. However, in the OHT scheme, patients are reviewed by optometrists with a charge of £35 per visit. In glaucoma clinics optometrists are paid £100 per clinic.

It is important to note however that a study also exists showing the cost of community glaucoma clinics can be greater than hospital ones:

Programme	Description	Cost comparison
Moorfields Ealing and Upney (Sharma et al 2012)	An economic comparison of a community-based and hospital based glaucoma clinic. Trained and accredited optometrists ran half day clinics in their high street practices and assisted in a hospital-based glaucoma clinic session.	The estimated cost per patient in the hospital clinic was £63.91 compared to £145.62 per patient in the community clinic. The difference was mainly due to higher overhead costs in the community.

Local eye health networks

In England, from April 2013, local eye health networks will be part of the NHS Commissioning Board's local area teams. These local professional networks for eye health will provide local intelligence and expertise in quality and health improvement work for eye health services.

They will have an important role to play in advising CCGs on matters relating to programme budgeting for glaucoma services. The Local Eye Health Network will give CCGs access to a range of partners and stakeholders, including the hospital eye service, community optometry services, social care and [service users and carers](#), when planning services for people who have glaucoma or OHT or are at risk of developing glaucoma.

How can individuals and carers be best supported long term?

NICE (2009, paragraph 1.5.6) states "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".

Involving patients with COAG in their own care plan is likely to heighten their understanding of the condition, reduce stress and uncertainty and improve adherence to medical treatment. Patient-held records can increase safety and improve monitoring (as in expert patient programmes, for instance). Improved compliance with medication has been demonstrated to be cost effective.

All patients and carers should have the opportunity to discuss their diagnosis, prognosis and treatment. They should be provided with information on their condition, its implications and visual prognosis. They should understand the importance of compliance with eye drops, potential side effects and the need for lifelong monitoring. At risk family members may wish to be tested and should be advised accordingly. Written and face-to-face information regarding quality of life should be provided and patients should be made aware of available support including sight loss services, Eye Clinic Liaison Officers (ECLOs), mental health services and carers' groups. Health care professionals should be familiar with latest DVLA guidance and must advise patients to contact the DVLA appropriately.

If possible, patients should be treated closer to home. Health professionals should be aware of factors which could prevent patients with OHT/COAG seeking care including: patients fearing what they may find out, stigma surrounding hereditary sight threatening conditions, cultural issues and perceived costs of local sight tests.

Given that more than half of glaucoma cases are undetected in the community, there is a need for NHS staff including GP nurses and/or receptionists to remind patients and family members about their need and eligibility for regular free NHS sight tests.

How to compare services based on activity, quality and outcome

At present, commissioners cannot compare their glaucoma service in terms of activity, quality and outcomes. Compiling an annual quality report for glaucoma is the first step to understanding these issues.

Annual glaucoma report

The production of an annual glaucoma report as a collaborative initiative between commissioners, providers and other stakeholders (eg organisations representing patients with visual disability) is one way to ensure that there is an effective and safe population-based framework for the detection and management of glaucoma in each locality. Commissioners can then use the report to inform commissioning decisions.

This approach is being used in Buckinghamshire where four projects contribute to the annual glaucoma report:

- **An information project:** which manages a glaucoma patient register for patients with glaucoma and ocular hypertension and which will facilitate the development of the right IT infrastructure to share clinical information between providers of care.
- **An education and patient support project:** has a remit to review existing sources of information for patients and update / adapt as necessary, to identify at risk groups of patients and plan targeted care and support, to review the provision of education for patients in glaucoma clinics and to review the process for supporting patients with visual impairment due to glaucoma.
- **A repeat measurement project:** has a remit to ensure that all patients referred for hospital assessment have had contact applanation tonometry before referral.
- **A devolved care project:** will have a remit to develop a pathway for the safe sharing of care between providers, ensuring consistent standards of care and record keeping. The group will draw on experience and innovation from other areas of the country and will have an input from a consumer panel.

In England, Health and Well Being Boards should also engage with their local eye health network to perform Joint Strategic Needs Assessments (JSNAs) for suspect COAG/COAG/OHT. A JSNA is a powerful tool which identifies local health needs and aims to improve the health of the population and reduce inequalities. The 2009 Department of Health document 'improving community based eye services' provides a guide for commissioning of primary care eye services and how to map out health needs. Commissioners can currently compare their own activity on sight loss.

A list of sources of data that could be used to support a JSNA, annual report or comparison of services is included in Appendix 2.

What are the elements of a system of care for a population?

This section recommends objectives for a system of glaucoma care and how they should be measured with a view to being published in the annual report.

OBJECTIVE	CRITERIA	OUTCOME	STANDARDS		
			Baseline	Achievable	Excellent
To reduce the number of false positive referrals into the glaucoma service	A false positive is defined as a referral into the glaucoma service which is determined not to have OHT at the first assessment and can be discharged	Patients with IOP reading >21mmHg, normal discs and normal fields have repeat measurement with contact applanation tonometry before referral to the glaucoma service	Very few referrals for OHT into the service have had contact applanation tonometry before referral to the glaucoma service	50% of referrals for OHT have had contact applanation tonometry before referral to the glaucoma service	80% of referrals for OHT have had contact applanation tonometry before referral to the glaucoma service
To reduce the number of false positive referrals into the glaucoma service	A false positive is defined as a referral into the glaucoma service which is determined not to have suspect COAG at the first assessment and can be discharged	Repeat measures of visual fields minimise number of false positive referrals for COAG	Very few referrals for COAG into the service have had repeat measures for visual fields	50% of referrals for COAG have had repeat measures for visual fields	80% of referrals for COAG have had repeat measures for visual fields

OBJECTIVE	CRITERIA	OUTCOME	STANDARDS		
			Baseline	Achievable	Excellent
To ensure that patients with confirmed COAG, OHT or continuing suspicion of COAG are entered into a register to ensure appropriate and timely ongoing care	The register should include diagnosis, dates of clinical encounters, dates of investigations, target frequency of assessments and investigations, changes to medications and interventions	Achievement of this objective will allow compliance with RCOphth and NICE quality standards to be measured	No register exists	50% of new and 50% of existing patients entered in the first year	75% of new and 75% of existing patients entered in the first year
To ensure that patients with COAG, OHT or suspected COAG have access to timely follow up assessments, investigations and interventions according to NICE guideline CG85	The management plan should specify frequency of follow up, frequency of visual fields and disc imaging and target IOP (or trigger points for intervention)	Identification of a lead clinician for COAG / OHT pathway. Audit of glaucoma register to ensure that objective is being met	Anecdotal information suggests that >75% of patients are seen within 15% of target follow up interval and meet NICE target for frequency of fields. Frequency of disc imaging more variable.	85% of patients receive follow up appointments within 15% of the target interval. 90% of patients meet NICE target for frequency of fields and disc images (excluding DNA)	95% of patients receive follow up appointments within 15% of target interval. 100% of patients meet NICE target for frequency of fields and disc images (excluding DNA)

OBJECTIVE	CRITERIA	OUTCOME	STANDARDS		
			Baseline	Achievable	Excellent
To ensure that all professionals involved in the care of patients with COAG, OHT or suspected COAG have access to appropriate documentation and records at each clinical encounter	Shared clinical information, preferably in electronic form would reduce likelihood of non-availability of records and would make possible shared-care of POAG and OHT	Establishment of shared clinical information systems and scoping of potential for shared care with intermediate care providers and community optometrists and / or technician-led "virtual" clinics	Varies widely between units.	The clinical information of 75% of patients is shared in a standard format	The clinical information of 90% of patients is shared in a standard format
To ensure that patients receiving treatment for COAG or OHT are adequately informed and supported so that treatment is administered or self-administered correctly	Accessible written information for patients and carers. Training of clinic support staff to counsel and assist self-administration of eye drops	Periodic audit of patient understanding of COAG, adherence to treatment plan and perceptions of own health.	No recent data	50% of patients surveyed have received this care	80% of patients surveyed have received this care

OBJECTIVE	CRITERIA	OUTCOME	STANDARDS		
			Baseline	Achievable	Excellent
To maintain an ongoing audit of visual impairment due to COAG	New registrations due to glaucoma should trigger a look-back to see whether visual loss could have been prevented or delayed	Periodic audit of new registrations where the main cause was glaucoma	New CVI registrations are logged with primary cause, though no recent data specifically on glaucoma	Look-back at 75% of new registrations for glaucoma	Look-back at 90% of new registrations for glaucoma
To maintain ongoing surveillance of DNAs and provider-cancellations of appointments	Delayed follow up and loss to follow up increases the risk of irretrievable visual loss	Periodic audit of DNAs and cancellations from glaucoma register	Total DNAs and cancellations: data not available specifically for COAG and OHT	<15% appointments subject to provider cancellation and 90% reappointed within one month	<10% appointments subject to provider cancellation and 100% reappointed within one month

OBJECTIVE	CRITERIA	OUTCOME	STANDARDS		
			Baseline	Achievable	Excellent
To achieve reliable baseline costs of the care of COAG and OHT	Costs of COAG/OHT pathway include tariff costs of clinical encounters, investigations, NHS transport, medication costs, costs of laser or surgical interventions	Design of glaucoma register should build in the needs for secondary uses of data eg for monitoring of costs	Typical cost for average patient per year can be estimated, but number of patients with COAG and OHT not known accurately	Costing data includes costs of clinical encounters and monitoring	Costing data accurate and comprehensive (includes GP prescribing costs and NHS transport costs)
Annual review of quality, safety and value of the COAG / OHT pathway	NICE and RCOphth quality standards	Annual report by the clinical lead for glaucoma	Little more than guesswork	Data accurate and largely complete	Data accurate and comprehensive

Appendix 1

Prescription of generic medications as first line therapy

In January 2012, the patents for latanoprost and latanoprost 0.005%/timolol 0.5% fixed combination eye drops expired. As a result, the cost of generic latanoprost is now estimated to be around 70% of the acquisition cost of Xalatan (as predicted by a Pfizer costing model). In 2014, patents for other glaucoma medications will also expire creating further opportunities for the use of generic prescribing for glaucoma. The manufacturer of latanoprost and latanoprost 0.005%/timolol 0.5% fixed combination eye drops has produced a budget impact model that estimates current savings and potential long-term savings from generic prescribing for glaucoma.

Source: Pfizer Chronic Open Angle Glaucoma (COAG) acquisition cost estimator

	Leeds PCT	National
Patient population size	4230	344 793
Total annual market cost for all glaucoma medications	£1,540,155.18	£150,506,378.70
Annual NHS expenditure on bimatoprost, travoprost, latanoprost	£938,255.63	£75,197,294
Proportion of latanoprost 0.005% prescribed as a percentage of all PGAs (%)	75.71%	62.67%
Previous cost of prescribing Xalatan® per annum	£759,622	£52,192,157
Estimated cost of prescribing equivalent amount of generic latanoprost 0.005% per annum	£531,735	£36,534,510
Estimated cost savings to be expected in 2012 secondary to expiry of patent for Xalatan®.	£227,887 per annum	£15,659,188 per annum

Table 1 shows a) the estimated cost of prescribing glaucoma medications in Leeds and the UK between January 2010 and January 2011 b) estimated cost savings to be expected in 2012 as a result of the expiry of patent for Xalatan®.

These savings are estimated on current prescribing patterns. Further savings can be made by GPs and eye care professionals *recommending* generic latanoprost 0.005% as first line treatment for glaucoma (as agreed by the Yorkshire and Humber Clinical Compact). Any windfall can subsequently be channelled into improving glaucoma care for example through the creation of a glaucoma register.

To achieve these savings CCGs will need to coordinate across their health economy with pharmacists and Medicines Management processes to ensure first line prescribing of latanoprost 0.005%.

Important caveat

These predictions are estimates only. According to the Prescription Medicines Code of Practice Authority (PMCPA), the budget impact model was based on 'many assumptions and uncertainties such that the comparative data generated was too speculative and...misleading.' In addition this tool is based on estimates of the current market. It does not predict the future pricing behaviour of competitors (PMCPA).

Potential challenges regarding conversion of medications:

Generic latanoprost 0.005% is not an appropriate treatment for all patients:

- Stable patients on other PGAs should not incur any undue harm from having their medication converted.
- Some patients may achieve better IOP control on other PGAs such as bimatoprost and should continue with the most beneficial treatment.
- The bottles of generic latanoprost differ in shape and size from one manufacturer to another which may affect the reliability of instillation. Pharmacists may change the brand of generic latanoprost they purchase from wholesalers without warning.
- There may be issues of variable tolerability and ease of use of different manufacturers' versions of latanoprost as osmolality and pH may vary, and bottle design may differ from one manufacturer to another. In such cases the clinician should prescribe the most safe and effective treatment.

Prescribers must ensure that any patients who are commenced on or converted to generic latanoprost are appropriately monitored for side effects and followed up at regular intervals to ensure patient confidence and compliance with their therapy.

Appendix 2

Sources of information for comparing activity, outcome, and quality of local COAG, suspect COAG or OHT services

Source	What will this tell me?
National Eye Health Epidemiological Model (NEHEM): www.eyehhealthmodel.org.uk	Allows you to see the number of people affected by eye health conditions in different areas in the UK
West Midlands Public Health Observatory older people's health and well being atlas http://www.wmpho.org.uk/olderpeopleatlas/Atlas/atlas.html	Number of people registered as partially sighted in your area.
Primary Care Quality outcomes Framework (QoF) data	'QOF' data can be used to see how many people GPs are recording conditions of interest to the Ophthalmologist
Databases from local providers e.g CVI	Gives an indication of health outcomes e.g sight loss
Primary care prescribing EPACT data	Provides information on the main reasons why people are registered locally and the demographic variables e.g how much do we spend on glaucoma drops in this district per year?
Local GP with Special Interest (GPSI)	Provides audit data e.g what conditions is the GPSI dealing with? How many patients have they seen in the last year and why?
Hospital Episode Statistics	Tells us about hospital admissions e.g how many trabeculectomies have been done this year? How many emergency presentations of angle closure have there been?
Electronic patient records	These can provide quantitative clinical evidence e.g what was the average field loss of patients presenting with glaucoma?
Qualitative data	Allows expressed local needs to be acknowledged e.g what are peoples' views about getting their eyes tested? What barriers do people face in accessing care?
General Ophthalmic services (GOS) http://www.ic.nhs.uk/statistics-and-data-collections/primary-care/eye-care	Provides information on sight tests e.g how many NHS funded sight tests were done in this area? Were there more this year than last year?
National Charities such as Royal National Institute of Blind People (RNIB), Guide Dogs, International Glaucoma Association (IGA)	Commissions studies addressing the needs of specific groups for example, or how many people with sight loss are in employment?
National Screening Programme or local Screening Programme http://www.retinalscreening.nhs.uk/pages/	Provides information on screening e.g how many people were screened last year, how many failed to attend?

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Acknowledgements and feedback

This guidance was produced by a working group convened by The College of Optometrists and The Royal College of Ophthalmologists. The working group will produce guidance for commissioners of the following eye care services: age-related macular degeneration, cataract, diabetic retinopathy, glaucoma, low vision, oculoplastics and urgent eye care.

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The working group would like to thank the following people for their valuable input:

Mr Rupert Bourne
Ms Aditi Das
Professor David Edgar
Mr Robert Harper
Ms Aeesha Malik
Mr Ian Murdoch
Mr Geoff Roberson
Dr Waqaar Shah
Mr John Sparrow
Ms Fiona Spencer
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The working group was supported by the Systems Planning Support (SPS) Team at Right Care, namely:

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