The ROYAL COLLEGE of OPHTHALMOLOGISTS

CLINICAL COUNCIL

FOR EYE HEALTH COMMISSIONING

Final

# Commissioning Guide: Glaucoma (Long Version)

June 2016


NICE has accredited the process used by **The Royal College of Ophthalmologists** to produce its **Commissioning Guidance**. Accreditation is valid for 5 years from **1 September 2015.** More information on accreditation can be viewed at www.nice.org.uk/accreditation

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Date of review: January 2018

# 1. Abbreviations

| | |
|---|---|
| 5FU | 5-Fluorouracil - an anti-scarring agent used for some glaucoma surgical procedures |
| AACG | Acute Angle Closure Glaucoma which is of sudden onset typically with very high pressure elevation |
| AAO | American Academy of Ophthalmology |
| AMD | Age-Related Macular Degeneration - a common, potentially blinding disease of the retina |
| BB | Beta-Blocker (topical preparation) - a common eye drop medication for glaucoma |
| CAI | Carbonic Anhydrase Inhibitor - a medication class used both topically (eye drop) and systemically in the management of glaucoma |
| CCG | Clinical Commissioning Group |
| CCT | Central Corneal Thickness - this is known to influence IOP measurements |
| COAG | Chronic Open Angle Glaucoma. This term is adopted from the NICE Glaucoma Guideline - CG85 and includes variants:<br>with elevated pressure, Primary Open Angle Glaucoma (POAG); with normal pressure, Normal Tension Glaucoma (NTG); with Pseudo-exfoliation (PXF); and pigment dispersion syndrome (PDS). |
| CoO | College of Optometrists |
| CQUIN | Commissioning for Quality and Innovation - a framework for securing improvements in quality of services and better outcomes for<br>patients, whilst also maintaining strong financial management. |
| CVI | Certificate of Vision Impairment |
| DNA | Did Not Attend appointment |
| EAGLE | Effectiveness, in Angle-closure Glaucoma, of Lens Extraction study - a multi-centre clinical trial |
| ECLO | Eye Clinic Liaison Officer or Eye Care Liaison Officer (both terms being used). Their roles include provision of support and information to people attending eye care services. |
| GAT | Goldmann Applanation Tonometry |
| GDG | Guidance Development Group |
| GOS | General Ophthalmic Services |
| HCP | Health Care Professional / Practitioner |
| HES | Hospital Eye Service |
| IGA | International Glaucoma Association |
| IOP | Intraocular Pressure - the pressure inside the eye. A high IOP is an important risk factor for glaucoma |
| LiGHT | Laser in Glaucoma and Ocular Hypertension study - a multi-centre clinical trial |
| LOCSU | Local Optical Committee Support Unit |
| LPI | Laser Peripheral Iridotomy - an outpatient laser procedure used in the management of patients with narrow angles |

| | |
|---|---|
| LVI | Letter of Vision Impairment - for a patient to self-complete and send to the Sensory Impairment Team at Social Services |
| MMC | Mitomycin C - an anti-scarring agent used for some glaucoma surgical procedures |
| NCT | Non-Contact Tonometry - measures IOP using a "puff of air" |
| NICE | National Institute for Health and Care Excellence |
| NPSA | National Patient Safety Agency |
| NTG | Normal Tension Glaucoma - a low pressure variant of COAG |
| OHT | Ocular Hypertension - elevated eye pressure with open angles, normal optic discs and normal visual fields (with or without pigment dispersion or pseudo-exfoliation) |
| PAC | Primary angle closure - Primary Narrow Angle with elevated pressure and normal optic discs and visual fields |
| PACG | Primary angle closure glaucoma - Primary Narrow Angle Glaucoma which is chronic |
| PACS | Primary angle closure suspect - Primary Narrow Angle with normal pressure and normal optic discs and visual fields (such eyes are at risk of possible future AACG, PAC, PACG) |
| PAS | Peripheral Anterior Synechiae - fibrous adhesions formed between the peripheral cornea and iris, a sign of PACG |
| PDS | Pigment dispersion syndrome - a condition affecting the pigment of the anterior segment of the eye which is associated with open angle glaucoma |
| PGA | Prostaglandin Analogue (topical preparation) - a common first line eye drop medication for glaucoma |
| PICO | A question phrased to search out specific information from the published medical literature for a particular Population of Patients or People, an Intervention, a Comparison between groups and with reference to an Outcome |
| POAG | Primary Open Angle Glaucoma - a high pressure variant of COAG |
| POEM | Patient-reported Outcome and Experience Measure |
| PREM | Patient Reported Experience Measure |
| PROM | Patient Reported Outcome Measure |
| PXF | Pseudo-exfoliation - a condition affecting the anterior segment of the eye which is associated with open angle glaucoma |
| QIPP | Quality, Innovation, Productivity and Prevention - quality assured examples of improvements in quality and productivity across the NHS and social care |
| QS | Quality Standard - NICE and the Royal College of Ophthalmologists have produced these for Glaucoma and related conditions |
| RCOphth | Royal College of Ophthalmologists |
| RNIB | Royal National Institute of Blind People |
| RVI | Referral of Vision Impairment - for a community or hospital-based optometrist to refer a patient to Social Services, e.g. if the patient requires help but is not eligible or declines registration, or has not seen an ophthalmologist |
| SeeAbility | A national charity which works with people with sight loss and multiple disabilities |
| VEGF | Vascular Endothelial Growth Factor - anti-VEGF pharmacological treatments are used in some cases of secondary glaucoma |

## 2. Introduction: Glaucoma

Glaucoma is a common sight threatening disease that affects the optic nerve. If not diagnosed, monitored and treated correctly, glaucoma can result in severe loss of vision or blindness. Approximately 10% of UK blindness registrations are related to glaucoma. Vision lost due to glaucoma is not recoverable. Therefore, successful management of glaucoma requires lifelong monitoring and treatment to prevent or minimise further vision loss; on average a person diagnosed with glaucoma will have one initial visit and 40 follow up visits.

People with glaucoma often do not experience symptoms until the disease is advanced and there has already been considerable damage to the person's vision. Therefore, people at high risk of glaucoma need to be monitored to diagnose and treat glaucoma at an early stage. Fifty percent of glaucoma in the community remains undiagnosed; previously undetected cases are largely identified at routine sight tests by community optometrists.

There is evidence that the most deprived geographical areas are least served by optometry practices and people in these areas may therefore be at an increased risk of a delayed diagnosis of glaucoma. Similarly, there may be missed cases of glaucoma in 'hard to reach' groups, including vulnerable individuals, homeless people, and people with special needs, where access to routine optometric services and opportunistic case finding may be limited or unavailable.

The commonest type of glaucoma in the UK is chronic open angle glaucoma (COAG), affecting around 2% of people older than 40 years and rising to almost 10% in people older than 75 years in white Europeans. Around half a million people are currently affected by COAG in England and there are over a million glaucoma-related outpatient visits in the hospital eye service (HES) annually. The number of individuals affected by COAG is expected to rise due to changes in population demographics.

The prevalence of COAG is higher in people of black African or black Caribbean descent and in people who have a family history of the condition. These people, as well as people living in deprived areas with poor access to services, are at highest risk of becoming blind due to glaucoma.

Ocular hypertension (OHT) is a very important risk factor for COAG, although COAG can occur with or without raised eye pressure. 'Simple' OHT is defined as consistently or recurrently elevated intraocular pressure (IOP) greater than 21 mmHg with open anterior chamber angles, normal visual fields and healthy optic discs (nerve heads). OHT may occur in the presence of clinical features suggestive of possible future development of sight threatening glaucoma, such as equivocal visual field test results or suspicious optic nerve appearances. It is estimated that 3–5% of people over the age of 40 have OHT, which represents around 1 million people in England.

Over 30% of glaucoma related NHS Hospital Eye Service attendances are related to OHT and suspected glaucoma, and much of this workload could be commissioned in the community under appropriately governanced contracting. This approach has the potential to relieve the HES of significant workload and to assist with current chronic HES under capacity.

As with other medical conditions it is the clinical needs of patients which ultimately dictate the necessary skills, competences and experience required of Health Care Professionals (HCPs) to deliver services for different levels of clinical case complexity. These requirements have been set out by NICE in the Glaucoma Clinical Guideline (CG85) and the NICE Glaucoma Quality Standard (QS7). In the context of care for glaucoma by non-medically qualified HCPs,

the College of Optometrists (CoO) has been particularly active in developing a suite of higher professional qualifications which align to various levels of clinical case complexity in glaucoma (Professional Certificate in Glaucoma, Higher Professional Certificate in Glaucoma, Diploma in Glaucoma). Whilst it must be stressed that these training and experience requirements apply to all health care professionals, in this guideline we have used the CoO higher qualifications as an illustrative example because they map directly to NICE requirements, they are the most highly developed, and they relate to the professional group outside of medicine which currently has the greatest level of involvement in glaucoma related care. Equivalent qualifications which adhere to the necessary standards would be equally acceptable. Within the next three years, providers delivering higher qualifications should consider making these qualifications more accessible to allow appropriate up-skilling of the workforce. Alternative qualifications may also in future apply to non-optometric HCPs; it is the skill set of the HCP which is of primary importance, and ideally access to training should be available to all relevant and interested allied health professional groups.

Primary angle-closure glaucoma (PACG) is less common than COAG, but it is associated with higher rates of blindness. PACG is more common in people of far eastern origin. The acute form of PACG requires urgent treatment in the HES. Whilst chronic PACG shares many care pathway features with COAG, there are investigations and treatments which are specific to the management of PACG. In contrast to primary COAG and PACG, secondary glaucomas are associated with raised IOP due to a recognised ocular or systemic disease or pharmacological treatment.

Common forms of secondary glaucoma include uveitic glaucoma, neovascular glaucoma and steroid-induced glaucoma. Pragmatically, NICE include pseudoexfoliative and pigmentary glaucoma within COAG as the main approaches to diagnosis and management are similar to primary COAG.

*It is vital for commissioners to understand that glaucoma and related conditions comprise a collection of specific diagnoses and disease severity states within an evolving clinical picture. Individual patients and individual eyes progress and move between severities and diagnostic categories and the care needs of the individual vary accordingly. The disease state described as 'stable glaucoma' is generally time limited.*

For certain individuals it may be necessary to manage the condition in the face of considerable clinical uncertainty as accurate visual field test performance may be difficult for some people and others may be unable to co-operate with full clinical assessments for a variety of reasons which may include physical health, mental health, learning difficulty or emotional issues. Services must be accessible to all, meeting equality and diversity requirements, and must be sufficiently intelligent and flexible to identify and respond to changes in the clinical status of patients and their eyes.

This guidance document applies to commissioning services for adult-onset glaucoma and adults who are at risk of developing glaucoma. The guidance does not apply to paediatric and juvenile glaucoma.

### Recommendations Key

| | | |
|---|---|---|
| NICE & Expert Opinion | AAO PPP & Expert Opinion | NPSA & Expert Opinion |
| NICE, NPSA & Expert Opinion | Expert Opinion | |

## 3. Commissioning Guidance for Glaucoma

Commissioning Guidance aims to improve the health and wellbeing of people and communities, support local service redesign to ensure the provision of high quality, cost-effective services that meet the needs of the local population, and take into account patient experience. This guidance is a resource to assist commissioners, clinicians and managers deliver high quality and evidence and outcome-based healthcare across England and beyond.

**Recommendation 1:** Commissioners of glaucoma care should work in partnership with a range of stakeholders, including service users and carers, community optometry services, general practitioners, health and wellbeing boards, the HES, community pharmacy services, established local networks, social care, rehabilitation officers for the visually impaired, voluntary organisations, and adjacent clinical commissioning groups.

**Recommendation 2:** Commissioners should be mindful of ensuring access for hard to reach groups, including those with special needs. Vulnerable individuals, such as people in long term care and people with learning difficulties, are at increased risk of sight loss and should undergo regular sight tests, including reasonable adjustments as necessary (http://www.rnib.org.uk/knowledge-and-research-hub/research-reports/prevention-sight-loss/prevalence-VI-learning-disabilities).

High value care pathways provide patients and the public, health and social care professionals, commissioners and service providers with a clear description of what constitutes a high quality service.

**Recommendation 3:** Organisations should use the guidance to assess their current performance against evidence-based measures of best practice, and identify priorities for improvement.

Audit and peer review measures support the implementation of the recommendations through commissioning and the contracting process. Commissioning Guidance gives examples of measures that can be used in the service specification and how commissioners can incentivise provider performance by using the indicators in association with incentive payments such as Commissioning for Quality and Innovation (CQUIN). As reflected in the NICE Quality Standards, accessible outcome measures are not routinely available. For this reason process measures must be used as proxy outcomes. At a population level, rates of visual impairment can provide a long term overview of treatment success, but commissioning on this basis is not practical because of the lengthy time course of glaucoma. A relatively short term commissioning contract would be unable to detect poor visual outcomes in the presence of a failing service.

Implementation of the guidance is the responsibility of local commissioners and/or providers, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of access. Nothing in the guidance should be interpreted in a way which would be inconsistent with compliance with those duties. It is not intended that this guidance destabilises or stops existing low risk monitoring schemes or those under development as the numbers holding the CoO certificate level are currently small. Where there are existing schemes which do not align with the requirements of NICE CG85, NICE QS7 and this commissioning guideline, a reasonable period of adjustment should be permitted in order to cater for the necessary training and scheme amendments to be put

into place. The NICE CG85 update should provide an opportunity for greater clarity in this area of flow between community and hospital care to further inform commissioners. New or updated recommendations of relevance to commissioning of services for glaucoma and related conditions which arise from the CG85 update will be given due consideration, and if needed, an early review of this commissioning guideline will be undertaken to ensure alignment with the NICE update.

The Royal College of Ophthalmologists is keen to improve Commissioning Guidance for Glaucoma in order to better meet the needs of commissioners and patients. Please send us your comments and ideas for future revisions.

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# 4. High value care pathway

## 4.1 Introduction

The high value care pathway for glaucoma that is presented in this guidance is based on best available evidence as identified by systematic review of the literature (see section 10). The pathway is compliant with the National Institute for Health and Care Excellence (NICE) recommendations as set out in publications including *Diagnosis and management of chronic open angle glaucoma and ocular hypertension* (NICE clinical guideline 85),[1] *Glaucoma Quality Standard* (NICE quality standard 7),[2] *Glaucoma Pathway*,[3] and *Commissioning Guidance for Services for people at risk of developing glaucoma*.[4] The pathway is also compliant with current guidance from the Royal College of Ophthalmologists (RCOphth) and the College of Optometrists (CoO),[5,6] as well as with recommendations from the National Patient Safety Agency (NPSA).[7]

As with NICE Clinical Guidance generally, this commissioning guideline is intended to apply to 80% of patients on 80% of occasions. In clinical medicine there will always be exceptions and it is intended that guidance should set out principles and the minimum standards which can be expected by the public in regard to the care which they receive from the NHS. Well informed clinical judgement and common sense are expected from properly trained and experienced medical and non-medical HCPs who must take responsibility for the care which they deliver and work within their sphere of competence.

Given the large number of follow-up examinations required for the significant number of people at risk of glaucoma, a high value care pathway will need to include providers other than the HES. Some NICE compliant care setting options for people with glaucoma or at risk of glaucoma are shown in Table 1.

Older age is an important risk factor for glaucoma and related conditions, and many affected individuals will have other chronic diseases. Whether based in a hospital or the community, services should cater for the transport needs of those with significant mobility issues and be readily accessible in terms of location, affordable parking and public transport, and hours of opening. A patient focused and integrated approach should be maintained as an overarching principle when designing local pathways.

Table 1: **Recommendation 4:** Recommended care setting options and requisite HCP training for people at risk of glaucoma and for the diagnosis and monitoring of people with glaucoma and related conditions (1a – for newly identified patients; 1b – for established glaucoma patients).

✓ Permitted by NICE and advised;

✗ Not permitted by NICE – should not be commissioned;

*CoO: College of Optometrists*

*HCPs (Health Care Practitioners) may include GPs with a special interest and training*

*HCPs may or may not be qualified for independent or other forms of prescribing*

*Note: The CoO Certificate A and Certificate B (B=Diploma in Glaucoma) have now been phased out and replaced by the 'Professional Higher Certificate in Glaucoma' and the 'Professional Diploma in Glaucoma' respectively. In addition, a lower level 'Professional Certificate in Glaucoma' has been introduced by the CoO which will standardise the training required for the new 'enhanced case finding' and for low risk monitoring (here and see Level II in Table 2 below). The CoO qualifications have been designed to map directly to the NICE guideline (CG85) requirements and are used here as an example since they are to date the most well developed NICE compliant series of qualifications for non-medically qualified HCPs. It is anticipated that optometrists and non-optometrist professional groups will move towards gaining these or equivalent qualifications from accredited providers. Those optometrists holding existing LOCSU/WOPEC qualifications may receive partial credit as appropriate.*

** Definitions:*

*a) According to NICE:*

*'Repeat measures' is a term specific to glaucoma that primarily describes the repeated measurement of parameters related to the diagnosis of glaucoma. A simple repeat measures scheme may involve repeat measurement of intraocular pressure (IOP) only. Other repeat measures schemes may also include repeated measurement of visual fields and other relevant ocular parameters when clinically necessary.*

*'Referral refinement' is a term specific to glaucoma management that describes a two-tier assessment in which initial evidence of abnormality during case-finding assessment or screening is validated by a subsequent enhanced assessment which adds value beyond that achieved through a simple 'repeat measures' scheme. A referral refinement service involves the undertaking of tests sufficient for diagnosis of OHT and suspected COAG and the interpretation of these clinical findings, with specialist practitioners who are delivering this service independently, being qualified and experienced in accordance with NICE guidance. Practitioners providing a referral refinement service should be qualified to make a diagnosis of OHT and suspected glaucoma, and to carry out gonioscopy to exclude angle-closure glaucoma.*

*b) Additional to NICE*

*In addition to established NICE terminology the term 'Enhanced Case Finding' has been introduced to provide for enhanced services which include slit-lamp mounted Goldmann applanation tonometry, dilated slit-lamp indirect biomicroscopy and other relevant or repeated tests deemed necessary by the HCP according to their clinical judgement. (Earlier refresher training / accreditation arrangements for such services are now complimented, standardised and formalised by the CoO Professional Certificate in Glaucoma.)*

*** Risk strata:*

*Low Risk = COAG suspect or OHT with or without suspicious features, i.e. equivocal optic disc or visual field, and those with PAC who have been successfully treated and have been demonstrated to have non-occludable angles. Essential elements include the fact that the optic disc and visual field are undamaged due to glaucoma*

*and a diagnosis has been established by an appropriately trained and experienced HCP (as specified by NICE) and a management plan has been formulated and communicated along with relevant information for monitoring and triggers for return referral. There is a distinction between monitoring of low risk patients, and the management of low risk patients which requires further qualifications and enables a change of treatment plan within the care setting. Monitoring is a clinical process of following a patient's condition through time to detect changes in clinical or disease status which may require action. Management is a clinical process of reviewing treatment in response to changes in a patient's clinical or disease status.*

*Medium Risk = Early to moderate established apparently 'stable' glaucoma.*

*High Risk = Complex glaucoma (inc. COAG, PACG, secondary glaucoma and rare glaucomas). Patients at high risk of significant visual loss and those under active management or requiring, or having recently undergone glaucoma surgery.*

**** Referrals should be in line with Joint College Guidance*[6] *on the referral of Glaucoma suspects by community optometrists. In addition, Joint College Guidance allows for defined low risk subgroups who do not require treatment to not be referred. Similarly, people not requiring treatment who have been monitored for a period and who have been found to be stable are advised by NICE to attend their optometrist for annual visits (e.g. people with mild OHT and increased CCT). A repeat measures scheme may provide a useful context for observation of these subgroups of low risk individuals who do not require formal monitoring (see also Table 2).*

***** Consultant supervision should be in line with the joint college guidance in relation to glaucoma-related care by optometrists.*[8]

Table 1a: Case finding & diagnostic services for newly identified patients

| Case setting options | *Repeat Measures (IOP & Fields, Optic disc normal)* | *Enhanced Case Finding (Repeat Measures plus)* | *Referral refinement with Diagnosis of OHT/COAG suspect* | *Glaucoma Diagnosis* |
|---|---|---|---|---|
| Community | | | | |
| **Community Optometrist (HCP)**<br>Core competence *** | ✓ | × | × | × |
| **Community Optometrist (HCP)**<br>CoO Professional Certificate in Glaucoma (or equivalent) | ✓ | ✓ | × | × |
| **Optometrist (HCP) with specialist training, competence and experience as specified by NICE.**<br>Care may be delivered in Community or Outreach setting.<br>CoO Professional Higher Certificate in Glaucoma (or equivalent)<br>≈ Glaucoma Certificate A | ✓ | ✓ | ✓ | × |
| **Optometrist (HCP) with highest level specialist training, competence and experience as specified by NICE.**<br>Care usually in HES (inc. outreach) and rarely in a Community Optometric setting.<br>CoO Professional Diploma in Glaucoma<br>(or equivalent)<br>≈ Glaucoma Certificate B | ✓ | ✓ | ✓ | × |
| Hospital or Consultant Supervised (may include outreach) | | | | |
| **Consultant Ophthalmologist delivered and supervised HES care**.<br>**HCPs participating in such supervised services**** may be medically qualified (e.g. trainee ophthalmologists) or non-medically qualified HCPs (e.g. optometrists, nurses, orthoptists) | ✓ | ✓ | ✓ | ✓ |

Table 1b: Risk Stratified Management by Perceived Risk of Progression to Blindness **

| Case setting options | *Low Risk (monitoring only)* | *Low Risk (monitoring & management)* | *Medium Risk* | *High Risk* |
|---|---|---|---|---|
| Care setting only | | | | |
| **Community Optometrist (HCP)**<br>Core competence*** | ✗ | ✗ | ✗ | ✗ |
| **Community Optometrist (HCP)**<br>CoO Professional Certificate in Glaucoma (or equivalent) | ✓ | ✗ | ✗ | ✗ |
| **Optometrist (HCP) with specialist training, competence and experience as specified by NICE.**<br>Care may be delivered in Community or Outreach setting.<br>CoO Professional Higher Certificate in Glaucoma (or equivalent)<br>≈ Glaucoma Certificate A | ✓ | ✓ | ✗ | ✗ |
| **Optometrist (HCP) with highest level specialist training, competence and experience as specified by NICE.**<br>Care usually in HES (inc. outreach) and rarely in a Community Optometric setting.<br>CoO Professional Diploma in Glaucoma (or equivalent)<br>≈ Glaucoma Certificate B | ✓ | ✓ | ✓ | ✗ |
| **Hospital or Consultant Supervised (may include outreach)** | | | | |
| **Consultant Ophthalmologist delivered and supervised HES care.**<br>**HCPs participating in such supervised services**** may be medically qualified (e.g. trainee ophthalmologists) or non-medically qualified HCPs (e.g. optometrists, nurses, orthoptists) | ✓ | ✓ | ✓ | ✓ |

### 4.2 Population to whom the high value care pathway applies

This high value care pathway for glaucoma applies to people across a range of risk strata for progression to blindness and covers a number of specific diagnoses. Included are those suspected of being at an increased risk of future glaucoma (COAG Suspects & OHT), adult-onset COAG, PACG and secondary glaucoma. The pathway does not apply to congenital or juvenile glaucoma, or to complex cases of glaucoma including patients requiring multi-specialist care (e.g. patients with co-existing corneal disease or uveitis), or patients requiring complex surgery (e.g. revision of trabeculectomy or fitting of drainage devices). Care for such patients is covered by Specialist Commissioning.

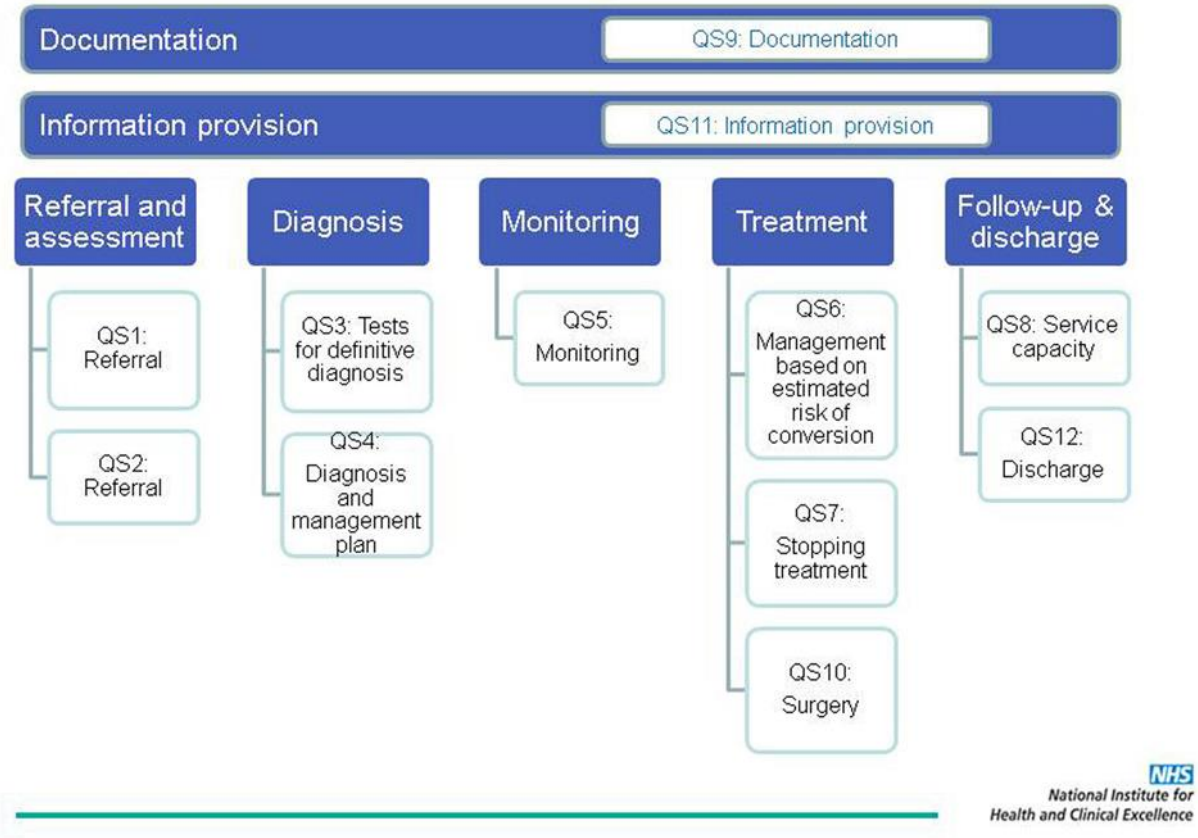
**Recommendation 4:** Commissioners may need to collaborate with neighbouring CCGs so that care pathways for glaucoma do not confuse or impair the management of people living near two regions covered by different CCGs; i.e. a harmonised approach across local boundaries.

Established local networks may have a role in advising adjacent CCGs to ensure consistency of approach. Commissioners should work in collaboration with local public health bodies to help address any inequality in service provision to their local population. Where suitable alternative providers are available, patients should have a say in where their care is provided

### 4.3 Mapped areas of the glaucoma care pathway

The following diagram illustrates the areas of the care pathway to which the NICE Glaucoma Quality Standards[2] apply. A high value care pathway for glaucoma should aim to adhere to all 12 quality standards, and the implications of this for commissioners are summarised in this section.

*Figure 1: NICE Glaucoma Quality Standards (QS) and the areas of the high value care pathway they apply to.*




### 4.3.1 Documentation

NICE Quality Standard 9 states that "Healthcare professionals involved in the care of a person with COAG, suspected COAG or with OHT have appropriate documentation and records available at each clinical encounter in accordance with NICE guidance".

**Recommendation 5:** Commissioners should ensure that they commission services that make all relevant documentation available at each clinical encounter, including clinical notes and results of specialist investigations.

Suitably networked central databases combined with specialty specific electronic medical record systems have the potential to allow multi-site care without the need to physically transfer records or data.

### 4.3.2 Information provision

NICE Quality Standard 11 states "People with COAG, suspected COAG or with OHT are given the opportunity to discuss their diagnosis, prognosis and management, and are provided with relevant and accessible information and advice at initial and subsequent visits in accordance with NICE guidance".

**Recommendation 6:** Commissioners should ensure that they commission services that conform to NICE QS11 for all types of glaucoma, including those with narrow angles. Box 1 summarises important elements of information that need to be provided.

Appropriate members of the care team should be tasked with responsibility for information provision, e.g. the treating clinician should alert patients to the possibility of drug side effects, implications for family members and where appropriate advise drivers to contact the DVLA while an allied professional should check drop instillation ability and technique. Information provision should be part of shared decision making and the clinician and patient should collaboratively produce an agreed care plan that is shared with the patient's GP and community optometrist

Patients should be asked in what format they would like information in, such as large print, audio, or demonstration.

**Recommendation 7:** There should be an Eye Care Liaison Officer (ECLO) service commissioned as part of every glaucoma pathway to work alongside the clinical team in providing information and support.

The ECLO compliments the information and support provided by the clinical team by offering appropriate emotional and practical support and linking patients with relevant local services and support groups including social care and a falls service. ECLOs are well placed to encourage adherence to drop treatment and have a key role in patient education. Commissioners should also commission services that regularly audit appointment delays, cancellations and DNAs (did not attend appointment) to monitor and take action where the number and frequency of these become unreasonable and potentially place patient sight at risk.

Certification of vision impairment (CVI) is included in the Public Health Outcomes Framework with CVI rates as a public health indicator. Certification remains an important facilitator for provision of support for people whose vision has been significantly damaged by advanced glaucoma.

**Recommendation 8:** Individuals presenting late and those whose disease has progressed to an advanced stage despite treatment should be made aware of the importance and potential benefits of certification. People whose vision has been affected by glaucoma who may as yet not be eligible for certification should be made aware that in the event of further deterioration of their vision support would be available.

An ECLO is ideally placed to facilitate the offering of a CVI to eligible patients and to discuss the benefits of certification and registration. Commissioners should be aware that CVI rates by geographical region will be published at http://www.phoutcomes.info/search/sight with the expectation that over time these would reduce as a result of better case finding and treatment for people with glaucoma.

*Box 1: Information provision for patients.*

**Condition**

- What is glaucoma and how it causes loss of sight (www.glaucoma-association.com/shop/cat/15.html www.rnib.org.uk/eye-health-eye-conditions-z-eye-conditions/glaucoma )
- The patient's specific condition, including type of glaucoma and prognosis for sight loss
- Glaucoma is asymptomatic in its early stages
- Once sight is lost it cannot be recovered, but if treated most patients will not become blind
- Glaucoma runs in families and some family members can be tested for free under the NHS at an optometric practice: www.nhs.uk/nhsengland/Healthcosts/pages/Eyecarecosts.aspx

**Drug treatment**

- How eye drops work to lower pressure and prevent or minimise progression of field loss
- Drug treatment for glaucoma is usually life-long, most patients do not require laser or surgery
- The different types and side effects of treatment, including clarification of generic versus branded eye drops and use of more than one type of drop treatment to control disease progression
- Adherence to eye drops is important to delay or prevent progression of glaucoma
- How to instil eye drops, including waiting 5 minutes between instillation (where more than one drop is being used in an eye) and punctal occlusion, through demonstration as well as the provision of accessible information. A useful leaflet is available from the IGA (see below)
- How to get further supplies using repeat prescriptions
- Discuss the use and availability of compliance aids, including eye drop administration aids.
- Information booklets are available to order, free of charge, from the IGA (www.glaucoma-association.com/shop/cat/15.html).

**The patient role in the management of the condition**

- The need for and importance of regular monitoring and attendance
- How long appointments take and how frequently to expect these
- The methods and importance of investigations and driving restrictions after dilating drops
- The name and contact details of a qualified HCP (e.g. ophthalmic nurse or ECLO) whom patients can contact if they have any queries or drug side effects
- Ensure the patient has time to ask questions at each consultation and is informed about what to expect at each stage, including the timeframes. Key messages should be reinforced through the provision of accessible information.
- Encourage patients to make a note of any questions they have and to raise them at future appointments
- When the patient is discharged, discuss the procedure with them and ensure they understand their follow-up care in the community. Ensure patients receive a copy of their discharge letter and that it is in an accessible format.
- What help is available to allow the patient to fulfil their role, including from the IGA, the RNIB and local voluntary groups.

**Additional information**

- The regulations for driving and glaucoma (DVLA - Driving Vehicle Licensing Agency) https://www.gov.uk/government/publications/assessing-fitness-to-drive-a-guide-for-medical-professionals
- What the Letter of Vision Impairment (LVI), Referral of Vision Impairment (RVI) and Certificate of Vision Impairment (CVI) registration are, where appropriate
- The support groups available for people with glaucoma including the IGA, RNIB and SeeAbility for people with sight loss and multiple disabilities (www.seeability.org/sharing-knowledge/?book=eye-care-conditions#glaucoma).

### 4.3.3 Referral and assessment

People who are suspected of having glaucoma are most commonly identified opportunistically following a routine optometric examination. Assessment for glaucoma essentially involves three types of test: measurement of IOP, automated testing of the visual field, and assessment of the optic nerve head. An abnormality on any of these three assessments may trigger a referral for further investigation. At present, screening for glaucoma in the general population is not recommended due to several reasons including the lack of a test that is sufficiently specific.[9–11]

The NICE Quality Standard 1 states that "people are referred to a consultant ophthalmologist for further assessment and definitive diagnosis if the optometrist or other healthcare professional suspects COAG. There are local agreements in place for referral refinement". NICE Quality Standard 2 states that "people with elevated IOP alone are referred to an appropriately qualified healthcare professional for further assessment on the basis of perceived risk of progression to COAG. There are agreements in place for repeat measures".

**Recommendation 9:** Commissioners should ensure they commission services that allow people with OHT or suspected glaucoma (visual field defects or suspicious optic nerve head appearance) to be appropriately assessed in the community before timely referral to a consultant ophthalmologist if glaucoma is still suspected. The additional examination in the community between the initial identification and referral to a consultant ophthalmologist may take the form of "repeated measures", "enhanced case finding" or "referral refinement" as described in this guideline.

It is to be noted that the structure of the General Ophthalmic Services (GOS) contract for the NHS sight test does not fund optometrists to perform repeat measures by applanation tonometry. If only working under this contract, optometrists will refer patients on having seen them only once. In England, community (enhanced) services by optometrists are commissioned by Clinical Commissioning Groups. In Scotland, the service is different as these extra tests are included in the main Scottish GOS contract and in Wales, included the Welsh Eye Health Examination. Commissioners should be aware that if the GOS contract changes similarly in England and Northern Ireland, there will be a change to the commissioned services described below, which are only necessary as currently excluded in the GOS.

#### Repeated measures

A "repeat measures" pathway involves the initial abnormal test being repeated later, and only if the test remains abnormal is the person referred on. The repeated test usually refers to measurement of IOP, but may also refer to other tests such as visual fields.[12] A Quality, Innovation, Productivity and Prevention (QIPP) case study details the successful implementation of a repeat measurement scheme in Bexley.[13]

Commissioners should be aware that:

- NICE clinical guidelines[1] recommend slit lamp mounted Goldmann applanation tonometry (GAT) for the measurement of IOP for diagnosis and monitoring. In a case finding environment, however, 'Goldmann-type' contact applanation tonometry e.g. Perkins hand held tonometer is acceptable.

- Most community optometrists do not use Goldmann-type contact applanation tonometry for measurement of IOP, and use non-contact tonometry (NCT; "puff of air") instead. NCT is considered less accurate than GAT and the evidence base underpinning glaucoma management is based on research using slit lamp mounted GAT
- Whilst GAT is a current core competence of optometrists, commissioners may need to work with local providers to offer any necessary refresher training given the relatively infrequent use of GAT in the community. An optometrist with the CoO Professional Certificate in Glaucoma may be assumed to have competency and familiarity (proficiency) with GAT.
- In a person with narrow anterior chamber angles the IOP may be normal prior to the onset of a potentially rapidly sight damaging attack of acute angle closure glaucoma. HCPs should therefore maintain vigilance in regard to this possibility *regardless of the level of IOP*.

Commissioners should specify that:

- People with an initial IOP measurement >21 mmHg but no other signs suggestive of glaucoma have their measures repeated **before** referral to the HES. Should a slightly elevated Goldmann-type contact applanation tonometry measurement be found, a second measurement should be taken at least a few days following the initial measurement
- Repeated IOP measurements are taken using Goldmann-type contact applanation tonometry (ideally slit-lamp mounted GAT but in this context Perkins tonometry or similar would be acceptable as an alternative)
- Where Goldmann-type contact applanation tonometry is not available at initial assessment, **four** readings using NCT are taken for each eye ('rogue' readings outside 1 standard deviation should be discarded and repeated), and decisions made according to the mean of the four values. This is in accordance with joint guidance from the RCOphth and CoO.[6]

### Enhanced Case Finding (Repeat Measures Plus)

As indicated in Table 1a, additional training to the level of the CoO Professional Certificate in Glaucoma allows for increased clinical input at the level of Enhanced Case Finding which goes beyond simple repeat measures. Such services should specify:

- slit-lamp mounted Goldmann applanation tonometry
- dilated slit-lamp indirect biomicroscopy and
- other relevant or repeated tests such as:
    - the use of perimetric tests for the assessment of patients at risk of COAG development
    - the ability to perform and interpret the results of the van Herick test for the assessment of anterior chamber depth
- may include measurement of corneal thickness
- a relevant qualification (such as the CoO Professional Certificate in Glaucoma).

With this service specification it may be practical to combine Enhanced Case Finding with the Monitoring of people who have an established diagnosis and management plan for OHT and / or COAG suspect status, as doing so improves efficiency for both these elements of service delivery. Such a combined service is intended to allow HCPs to both detect potential new cases of COAG and OHT and, following formal diagnosis and establishment of a

management plan, to monitor patients with OHT and / or COAG suspect status. (For new cases, an additional visit to a referral refinement scheme or the HES would be needed to access input from a HCP permitted to establish a diagnosis and management plan in accordance with NICE. Similarly, where a change to a patient's management plan is needed, additional input from such a HCP would be needed.) These schemes require clinical leadership, and service models may be hospital or community led and need to be flexible depending on local requirements.

An integrated approach should cater for both onward referral when higher skill levels are required as well as arrangements for eligible patients to be transferred back into community monitoring. This combination of monitoring for people within an established diagnosis and management plan together with enhanced case finding makes optimum use of HCPs with training and experience equivalent to the CoO Professional Certificate in Glaucoma.

A significant number of services undertaking this function have been in place since before the NICE guidelines were published and are commonly known as 'referral refinement' schemes, although they do not exactly reflect the NICE definition of referral refinement. It is important for patients, practitioners and commissioners to fully understand a change in terminology will be required to align with the established NICE definitions. There should be a transitional period to introduce the change of name so that existing schemes are not put at risk.

### Referral refinement

A "referral refinement" pathway goes further than repeated measures and enhanced case finding; the extra examination before referral to the HES includes further examination and tests as well as repeating the abnormal measures. Further assessment should include measurement of central corneal thickness and a more detailed assessment of the optic nerve head, and also includes interpretation of the clinical findings to determine if glaucoma is present and therefore whether the person needs to be referred to the HES.
The assessment should also include gonioscopy to diagnose or exclude angle-closure.

A referral refinement service is thus expected to deliver *added clinical value* and must be undertaken by a HCP with relevant specialist qualification and experience in accordance with NICE guidance (see Tables 1 and 2). HCPs working at this level would be expected to have attained the *level of training equivalent to the CoO Professional Higher Certificate in Glaucoma, which would allow them to not only establish a diagnosis but also to formulate or amend a management plan for people with OHT and / or COAG suspect status*. There is evidence that filtering schemes result in cost savings while increasing the positive predictive value of HES referrals.[14]

Commissioners should be aware that:

- The skills and equipment required for referral refinement as defined by NICE are not commonly available in community optometry practices
- It has been estimated that the majority of optometrists with the required qualifications and experience to carry out referral refinement currently work in the HES rather than the community
- Where the necessary skills are not currently available in the community, it may be appropriate to refer directly to the HES or community-based ophthalmology following repeated measures or enhanced case finding
- Slit-lamp mounted GAT is required for this level of service and remains the Gold Standard for glaucoma care (though this may evolve with time).

### Referral for diagnosis of OHT, suspected glaucoma or glaucoma

**Recommendation 10:** Commissioners should ensure that local systems allow:

- Urgent referrals to be "red-flagged" permitting direct and timely access to the HES. Such urgent cases would include acute angle-closure (see below) or very high IOP (which would be defined locally, but may be ≥32 mmHg)
- HCPs to refer people directly to a consultant ophthalmologist on the basis of examination and test results rather than having to ask a person's GP to refer
- All referrals to indicate relative urgency, so that HESs can manage demand optimally.
- Transfer of complete information on clinical findings including fields (and images where applicable).

## 4.3.4 Diagnosis

**Recommendation 11:** The NICE Quality Standard 3 states that "people referred for definitive diagnosis in the context of possible COAG or with OHT receive all relevant tests in accordance with NICE guidance".

The NICE clinical guidelines are regarding OHT, suspected COAG and COAG, but also have applicability to PACG; they state that the following tests should be carried out at diagnosis:

- IOP by GAT
- Measurement of central corneal thickness
- Peripheral anterior chamber configuration and depth assessments using gonioscopy
- Visual field assessment using standard automated perimetry (central thresholding test) by appropriately trained staff in an environment that allows patients to perform optimally
- Optic nerve assessment, with dilatation (where safe), using stereoscopic slit lamp biomicroscopy with fundus examination

**Recommendation 12:** Optic disc imaging should also be carried out and the images should be available at all future visits to facilitate the detection of optic disc change. Imaging may take the form of standard photography or other modalities such as optical coherence tomography.

**Recommendation 13:** The NICE Quality Standard 4 states that "people with COAG, suspected COAG or with OHT are diagnosed and have a management plan formulated by a suitably trained healthcare professional with competencies and experience in accordance with NICE guidance". Diagnosis of glaucoma and management plan formulation should be the responsibility of a consultant ophthalmologist. Table 2 summarises these requirements.

Other healthcare professionals with a range of experience and training can be involved in the care pathway for glaucoma. Table 2 summarises the competencies required of healthcare professionals involved in care pathways for glaucoma, as aligned with the NICE clinical guidelines. Commissioners should be aware of the benefits of maximising involvement of HCPs other than ophthalmologists in glaucoma care, facilitating reduction of demand on the HES and allowing more time for the HES to manage complex glaucoma cases. The CoO Higher Qualifications have been used as an illustrative example here, qualifications for optometric and non-optometric HCPs which quality-assure the same NICE CG85 levels of training would be equally acceptable.

Table 2: Recommendations for experience, qualifications and competencies of healthcare professionals involved in care pathways for OHT, suspected glaucoma and glaucoma.

The term competence implies proficiency, i.e. familiarity based on regularly performing and interpreting an examination or procedure.

** Local foundation level or core competence refresher training as provided by LOCSU/WOPEC is widely undertaken in current schemes for some low risk subgroups of patients. Joint College Guidance[6] allows for defined low risk subgroups who do not require treatment to not be referred. Similarly, people not requiring treatment who have been monitored for a period and who have been found to be stable are advised by NICE to attend their optometrist for annual visits (e.g. people with mild OHT and increased CCT). A repeat measures scheme may provide a useful context for observation of these subgroups of low risk individuals who do not require formal monitoring.*

*** Consultant supervision should be in line with the joint college guidance in relation to glaucoma-related care by optometrists.[8] Principles which apply to optometrists should similarly apply to other HCPs.*

| | Level I | Level II | Level III | Level IV |
|---|---|---|---|---|
| **Type of Care** | Case finding; Repeat measures (IOP/Fields only, optic disc appearance normal) * Observation of individuals not requiring referral (Joint College Guidance[6]) and stable individuals off treatment discharged to annual optometric visits (CG85). | Enhanced Case Finding (IOP and other measures); Monitoring (but not altering the treatment of) people with an established diagnosis and management plan for OHT or suspected glaucoma (Level I activities also permitted) | Diagnosis of OHT/COAG suspect; Management of OHT and suspected glaucoma (Level I & II activities also permitted) | Management of established glaucoma where a diagnosis has been made by a consultant ophthalmologist (or someone working under their supervision**) (Level I,II & III activities also permitted) |
| **Experience / qualification / supervision** | Core competence for optometrists | CoO Professional Certificate in Glaucoma, or equivalent. (Prior to this CoO qualification refresher training and accreditation in common use.) | Specialist qualification (CoO Professional Higher Certificate in Glaucoma, or Glaucoma Certificate A, or equivalent), or working under supervision of a consultant ophthalmologist** | Specialist qualification (CoO Professional Diploma in Glaucoma, or Glaucoma Certificate B, or equivalent), or working under supervision of a consultant ophthalmologist** |
| **Competency and familiarity in performing and interpreting** | • Goldmann type applanation tonometry<br>• standard automated perimetry<br>• central supra-threshold perimetry<br>• anterior segment examination | As per Level I, **and**:<br>• experience and ability to detect a change in clinical status from normal to abnormal<br>• slit lamp mounted Goldmann applanation tonometry<br>• stereoscopic slit lamp biomicroscopic examination of the anterior segment<br>• Van Herick's peripheral anterior | As per Level II, **and**:<br>• medical and ocular history<br>• differential diagnosis<br>• gonioscopy<br>• CCT measurement<br><br>NB. Optometrists working at Level III who *in addition* have prescribing rights (Independent prescribing / supplementary prescribing / patient group directions) may themselves prescribe | As per Level III, **and** should be trained and able to make management decisions on:<br>• risk factors for conversion to glaucoma<br>• coexisting pathology<br>• risk of sight loss<br>• monitoring and clinical status change detection<br>• pharmacology of IOP-lowering medications<br>• advise treatment changes for COAG, COAG suspect status and OHT (with |

| | Level I | Level II | Level III | Level IV |
|---|---|---|---|---|
| | | chamber depth assessment<br>• examination of the posterior segment using slit lamp binocular indirect ophthalmoscopy | or supply (initiate or alter) topical treatment for people with OHT / COAG Suspect (fields and discs normal or equivocal). Those without prescribing rights can do so in conjunction with a prescriber. | consideration given to relevant contraindications and interactions)<br><br>NB. Optometrists working at Level IV who *in addition* have prescribing rights may themselves prescribe topical treatment for people with an established diagnosis of COAG. |

### 4.3.5 Monitoring

The NICE Quality Standard 5 states "People diagnosed with COAG, suspected COAG or with OHT are monitored at intervals according to their risk of progressive loss of vision in accordance with NICE guidance".

**Recommendation 14:** Commissioners should commission services that adhere to NICE guidance for monitoring intervals, as summarised in Tables 3&4.

Table 3: Recommended monitoring intervals for people with OHT or suspected COAG who are recommended to receive medication

| Clinical Assessment | | | Monitoring Intervals (months) | |
|---|---|---|---|---|
| **IOP at target [a]** | **Risk of conversion to COAG [b]** | **Outcome [c]** | **IOP alone [d]** | **IOP, optic nerve head and visual field** |
| Yes | Low | No change in treatment plan | N/A | 12 to 24 |
| Yes | High | No change in treatment plan | N/A | 6 to 12 |
| No | Low | Review target IOP or change treatment plan | 1 to 4 | 6 to 12 |
| No | High | Review target IOP or change treatment plan | 1 to 4 | 4 to 6 |

[a] Person is treated and IOP is at or below target. If IOP cannot be adequately controlled medically, refer to consultant ophthalmologist.
[b] To be clinically judged in terms of age, IOP, CCT, appearance and size of optic nerve head.
[c] For change of treatment plan refer to treatment recommendations.
[d] For people started on treatment for the first time check IOP 1 to 4 months after start of medication.

Table 4: Recommended monitoring intervals for people with COAG

| Clinical Assessment | | | Monitoring Intervals (months) | |
|---|---|---|---|---|
| **IOP at target [a]** | **Progression [b]** | **Outcome [c]** | **IOP alone [d]** | **IOP, optic nerve head and visual field** |
| Yes | No [e] | No change in treatment plan | N/A | 6 to 12 |
| Yes | Yes | Review target IOP and change treatment plan | 1 to 4 | 2 to 6 |
| Yes | Uncertain | No change in treatment plan | N/A | 2 to 6 |
| No | No [e] | Review target IOP or change treatment plan | 1 to 2 | 2 to 6 |

[a] IOP at or below target.
[b] Progression = increased optic nerve damage and/or visual field change confirmed by repeated test where clinically appropriate.
[c] For change of treatment plan refer to treatment recommendations.
[d] For people started on treatment for the first time check IOP 1 to 4 months after start of medication.
[e] No = not detected or not assessed if IOP check only following treatment change.

**Recommendation 15:** For people with OHT or suspected COAG who are not recommended to receive medication, NICE clinical guidance recommends assessing IOP, optic nerve head and visual field at the following intervals: between 12 and 24 months if there is a low risk of conversion to COAG; between 6 and 12 months if there is a high risk of conversion to COAG. If no change in the parameters has been detected after 3 to 5 years (depending on perceived risk of conversion), or before if confirmed normal, the person should be discharged from active glaucoma care to community optometric care. Commissioners should commission services accordingly.

Commissioners should note that the current GOS contract does not include specific glaucoma related testing for this group of people who may none-the-less be at an increased (albeit low) risk of conversion to glaucoma. Dependent upon local arrangements, such people could be catered for within the context of an 'expanded' repeat measures or enhanced case finding scheme (see above). Without adequate arrangements (including communication of clinical information and a management plan from the diagnostic centre) it is likely that such individuals will be repeatedly referred back into the HES on the basis of equivocal clinical parameters.

**Recommendation 16:** Commissioners should be aware of the risk of avoidable sight loss when patients miss monitoring appointments, or when appointments are delayed or cancelled. Therefore, commissioners should monitor providers' compliance with the NICE monitoring criteria and should adopt the recommendations provided by the NPSA,[7] with due regard to the source documentation and summaries in this guideline.

1. Make NICE guidelines on glaucoma available to all relevant staff and develop an action plan to implement the recommendations.

2. Review levels of hospital initiated cancellation of appointments for patients with established or suspected glaucoma through clinical governance forums.
3. Review patient 'did not attend' rates in order to identify and audit high risk non-attending patients.
4. Identify the number of patients currently awaiting follow up and confirm there is sufficient capacity within the local health community to meet this number in terms of outpatient appointments and any specialist investigations e.g. visual field and optic disc imaging.
5. Develop a system whereby patients can be 'flagged' on the booking/ appointment system to indicate the clinical priority given to the appointment and monitor activity to ensure compliance with NICE follow-up intervals.
6. HCP not working under supervision of a consultant ophthalmologist should be qualified and experienced in accordance with NICE guidance as summarised in Table 2; Level II or above for monitoring but not altering treatment and Level III or above for monitoring *and* altering treatment.
7. Make information on glaucoma available to patients and ensure that there is a clear and reliable process for informing patients about appointments. Access to advice and guidance for patients and practitioners should be straight-forward (e.g. by telephone and electronically) and may form part of an ECLO service.

### 4.3.6 Treatment

Since vision lost from glaucoma is irrecoverable, treatment aims to prevent or minimise further damage, or prevent damage in those at risk of developing glaucoma. The only proven treatment strategy for glaucoma is lowering of IOP. This may be achieved pharmacologically (largely via eye drop administration), by laser trabeculoplasty (this may be either the older Argon Laser Trabeculoplasty – ALT or the newer Selective Laser Trabeculectomy – SLT, both an outpatient procedure) or by surgery (most frequently trabeculectomy with augmentation and usually as a day case procedure).

**Recommendation 17:** The NICE Quality Standard 6 states that "People with suspected COAG or with OHT are managed based on estimated risk of conversion to COAG and progression to visual impairment using IOP, CCT and age, in accordance with NICE guidance".

Commissioners should ensure that providers adhere to NICE guidance, as summarised in Table 5:

Table 5: Treatment for people with OHT or suspected COAG

| CCT | More than 590 microm etres | | 555–590 microm etres | | Less than 555 microm etres | | 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 | PGA[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] NICE recommended beta-blockers (BB) for this subgroup in 2009. At least one PGA has since come 'off patent' and for generic prescribing the cost is now considerably lower. For this reason in this guidance we have switched this subgroup recommendation to a prostaglandin analogue (PGA) which is known to be more clinically effective with less systemic side effects and now available with alternative preservatives and in preservative free formulations.

**Recommendation 18:** Commissioners should ensure they commission providers that offer treatment for people diagnosed with glaucoma according to NICE clinical guidelines.[1] NICE recommendations include:

- A diagnosis of glaucoma should be established by a consultant ophthalmologist together with formulation of a management plan
- Contra-indications and potential drug interactions should be checked prior to offering medication
- People at risk of significant visual loss in their expected lifetime are offered first line treatment with a prostaglandin analogue
- People prescribed topical medication are encouraged to continue with the same treatment unless: IOP is not sufficiently reduced, the glaucoma has progressed, or they are intolerant to the drug
- For people with insufficient IOP lowering, adherence to treatment and drop instillation technique are checked. If adherence and technique are adequate, one of the following should be offered: alternative or additional pharmacological treatment (more than one medication may be required), laser trabeculoplasty, or surgery (see below)

- For people intolerant to prescribed medication, consider offering an alternative medication or a preservative free preparation if there is evidence that the person is allergic to or intolerant of preservatives. After trying two or more pharmacological regimens (which may include combinations), consider offering laser trabeculoplasty or surgery.

**Recommendation 19:** The NICE Quality Standard 10 states that "people with COAG who are progressing to loss of vision despite treatment or who present with advanced visual loss are offered surgery with pharmacological augmentation (for example, mitomycin-C [MMC] or 5-Fluorouracil [5FU]) as indicated, and provided with information on the risks and benefits associated with surgery". Commissioners should ensure they commission services that offer surgery, with augmentation as appropriate, as detailed in the NICE glaucoma guideline and quality standard.

Cochrane reviews have reported evidence supporting the effectiveness of both MMC[15] and beta radiation[16] for trabeculectomy, though there is no evidence comparing efficacy between MMC and beta radiation. Aqueous shunt surgery is more common in complex cases of glaucoma, and there is no evidence of superiority of one particular model of shunt over others.[17] Complex glaucoma may require a range of specialist interventions depending on the clinical circumstances which may include diode laser cyclophotocoagulation and anti-VEGF treatments, some of which will be available only in specialist units. Where necessary referral arrangements should take account of the need for these less standard interventions.

**Recommendation 20:** Commissioners should also note NICE guidance regarding new emerging surgical treatments and ensure they commission providers that are compliant with this guidance.

A NICE evaluation concluded that current evidence on the safety and efficacy of trabeculotomy ab interno for COAG is adequate to support its use, provided that normal arrangements are in place for clinical governance, consent and audit.[18] However, a NICE evaluation of canaloplasty for the treatment of COAG found insufficient evidence to support its use and therefore recommend the procedure is used only in the context of research or prospective data collection.[19] A NICE evaluation of trabecular stent bypass microsurgery for COAG found no major safety concerns but that there was limited evidence for efficacy; it is therefore advised that the procedure should only be used with special arrangements for clinical governance, consent and audit or research.[20] This includes ensuring that patients and their carers understand the uncertainty about the procedure's safety and efficacy and are provided with clear information.[20]

Whilst published reviews have found no strong evidence to suggest that one particular medical therapy is most cost-effective at reducing the risk of glaucoma damage or which of medication, laser or surgery would be most cost-effective as first line therapy,[21–25] NICE have made recommendations regarding the relative cost-effectiveness of four alternative treatment strategies in the management of OHT or COAG (no treatment, topical beta-blocker, topical prostaglandin analogue (PGA) and trabeculectomy).[1]

The NICE recommendations for cost-effective OHT management are summarised in Table 5. At the time of the NICE analysis generic PGA formulations were not yet available and the current lower price of these preparations will increase their relative cost effectiveness. For COAG, the NICE analysis found trabeculectomy to be most cost-effective, but acknowledged that trabeculectomy was invasive and that the cost of complications of the procedure may

have been underestimated.[1] NICE therefore recommends trabeculectomy in people with COAG who have evidence of disease progression despite less invasive therapy.[1]

Amongst the different medication options, NICE guidance recommends the use of a prostaglandin analogue as first line treatment for early to moderate COAG.[1] A UK multi-centre randomised trial (LiGHT, www.moorfields.nhs.uk/content/laser-glaucoma-and-ocular-hypertension-light-study ) is addressing the question of the relative cost-effectiveness of initial laser therapy compared with initial eye drop therapy.

**Recommendation 21:** The NICE Quality Standard 7 states that "people with COAG, suspected COAG or with OHT have a regular review of management options with their healthcare professional, taking into account comorbidity and other changed circumstances, including a discussion of the benefits and risks of stopping treatment for those at low risk of progressing to visual impairment". Commissioners should ensure they commission services that discuss cessation of therapy with people who have an acceptable IOP and have a low risk of developing visual impairment in their expected lifetime. If therapy is stopped, an IOP check should be offered in 1 to 4 months' time and further monitoring if considered clinically necessary.

### 4.3.7 Follow-up and discharge

**Recommendation 22:** The NICE Quality Standard 8 states that "people diagnosed with COAG, suspected COAG or with OHT have access to timely follow-up appointments and specialist investigations at intervals in accordance with NICE guidance. Sufficient capacity is put in place to provide this service, and systems are developed to identify people needing clinical priority if appointments are cancelled, delayed or missed". Commissioners should ensure they commission providers with sufficient capacity to meet the local clinical demand; tools discussed in section 2 may assist commissioners in estimating local needs.

**Recommendation 23:** Commissioners should ensure that patient focused mechanisms are in place to track appointments, which is of particular importance where integrated services straddle the hospital-community boundary. Commissioners should also ensure that patients with clinical priority are clearly identifiable and if their appointment is cancelled, missed or delayed that measures are in place to ensure that their appointment takes place within an appropriate time frame. Commissioners should ensure they commission services that are compliant with the NPSA recommendations listed in section 1.3.5.[7]

If 15% of follow up appointments are delayed beyond 15% of the time period specified by the HCP, this may be indicative of a problem with the service and commissioners should investigate. A range of options for addressing this issue are possible with case studies available on the NICE website

**Recommendation 24:** Commissioners should be aware that transport services to the hospital or community setting may be required for some patients to ensure appointments are not missed.

**Recommendation 25:** Commissioners should ensure that they are aware that provider DNA policies may need to be amended for patients with glaucoma given the risk of preventable blindness. All missed appointments should be risk-assessed and appropriate action taken. Automatic discharge following a missed appointment is usually not appropriate. Letters following up missed appointments should be sent to the patient in accessible formats (i.e. in the format they require) as well as to the GP. Particular caution is needed in the context of

people with learning difficulties and DNAs should be followed up with the patient's GP and care facility where relevant.

It is important commissioners understand the chronic nature of glaucoma, and the necessary high numbers of follow up appointments relative to new referrals seen. It has been shown that a new to follow up ratio (N:F) of around 1:12 may be appropriate on average for a service seeing patients with COAG, OHT and suspected COAG.[26]

Commissioners should also be aware that the introduction of repeat measures or referral refinement schemes will reduce the false positive referral rate, but that this will in turn increase the proportion of follow-ups. In the absence of a detailed understanding of the local pathway and the case complexity, the N:F ratio is an inappropriate measure and should not be pre-specified for glaucoma services.

**Recommendation 26:** The NICE Quality Standard 12 states that "people with suspected COAG or with OHT who are not recommended for treatment and whose condition is considered stable are discharged from formal monitoring with a patient-held management plan". Commissioners should ensure they commission services that are compliant with NICE clinical guidelines,[1] including:

- If people with OHT or suspected COAG have had no changes in parameters for IOP, visual fields and optic nerve head and are not recommended to receive medication, they are discharged from the glaucoma care pathway after 3-5 years (depending on the perceived risk of conversion to glaucoma) or sooner if confirmed normal
- People who are discharged should see a community optometrist qualified to carry out enhanced case finding (Level II, Table 2) annually, or at the recommended interval, with a patient-held management plan so that any future changes can be detected. These tests are not covered by the current GOS contract and should be commissioned. Where established community schemes exist, annual testing of such individuals could be incorporated within the scheme.

A patient-held management plan should include:

- diagnosis
- copies of disc imaging and visual fields
- central corneal thickness
- return referral criteria, including threshold IOP for referral
- review interval

### 4.3.8 Training and Workforce

**Recommendation 27:** Commissioners should:

- Explore the availability of community optometrists who are able to provide enhanced case finding, referral refinement, community monitoring of OHT and Suspected COAG and community management of OHT and Suspected COAG (normal visual fields – See Table 1a&b).
- Estimate the demand for training among local community optometrists to become competent at enhanced case finding, referral refinement and community monitoring of OHT and Suspected COAG and community management of OHT and Suspected COAG.
- Where availability of suitably trained community optometrists to undertake these roles is poor and demand for training exits, commissioners should support initiatives which

encourage optometrists to undertake the training required to deliver these community services. Funding may be required for delivery of training.

- Explore the availability of other potentially competent providers of enhanced case finding, referral refinement and community management of OHT and Suspected COAG such as community-based ophthalmology practices.

### 4.3.9 Primary angle-closure glaucoma (PACG)

The distinguishing characteristic of people with PACG is that the drainage angle between the back of the cornea and front of the iris within the eye is narrow, limiting or obstructing fluid flow between the central anterior chamber and the trabecular mesh where fluid exits the eye. Whilst the NICE guidelines and quality standards were formulated for patients with open-angle glaucoma, many of the recommendations apply equally to people with PACG.

A proportion of patients with glaucoma and narrow angles will have a mixed mechanism glaucoma which blurs the margins between these types of glaucoma. However, there are critical differences between the care pathways of open-angle and angle-closure glaucoma patients and commissioners should be aware of the key differences. In general, initial identification of people with PACG or at risk of PACG is similar to the care pathway for COAG detailed above and largely occurs opportunistically in community optometric practices. The usual tests of IOP, visual field and optic disc assessment should trigger referral, but in addition, there are other critically important additional tests required. The specific tests which identify a person to have primary angle-closure rather than open-angle disease are slit lamp examination with Van Herick's peripheral anterior chamber depth assessment and gonioscopy.

The skills and associated equipment for gonioscopy are not routinely available in every community optometric practice, but every practice should have a slit lamp, and clinical examination of the anterior ocular segment and assessment of the risk of angle closure are part of core competence for all optometrists (Table 2, Level I). Van Herick's test should be available for enhanced case finding (Table 2, Level II) and gonioscopy for referral refinement (Table 2, Level III and above).

Following identification of primary angle-closure, the care pathway differs from that of COAG and is not covered by NICE guidelines. In particular, people with PACG or at risk of PACG may require treatment to open the angle of the peripheral anterior chamber of the eye; this is most commonly laser peripheral iridotomy (LPI) but may also include surgical iridectomy, lens extraction, laser iridoplasty and topical pilocarpine medication.

**Recommendation 28:** Where a narrow and potentially closable angle is suspected, timely onward referral should be made. In the presence of either acute or sub-acute angle closure with elevated IOP, either an emergency or urgent HES referral should be made depending on the clinical circumstances.

The American Academy of Ophthalmology Preferred Practice Pattern for primary angle closure provides up-to-date evidence based guidelines for optimal care of people with PACG or at risk of PACG.[27] Commissioners should be aware of the classification of people with angle-closure:

- *Primary angle-closure suspect* – iridotrabecular contact (closed angle) for at least 180 degrees on gonioscopy with no signs of peripheral anterior synechiae (PAS; fibrous adhesions formed between the peripheral cornea and iris) and without raised IOP (>21 mmHg)

- *Primary angle-closure* - iridotrabecular contact for at least 180 degrees on gonioscopy with either PAS or raised IOP
- *Primary angle-closure glaucoma* – primary angle-closure with signs of glaucomatous damage to the optic nerve head and /or visual fields.

PACG may develop insidiously (chronic) or the angle may close acutely causing a rapid and large increase in IOP. Acute angle-closure is symptomatic and requires emergency treatment which will be discussed below.

**Recommendation 29:** Commissioners should ensure they commission services which:

- Specify that all people seen at their first visit for diagnosis in referral refinement, community-based ophthalmology, or the HES undergo peripheral anterior chamber depth assessment and gonioscopy to identify angle-closure. Referral refinement schemes should offer peripheral anterior chamber depth assessment by gonioscopy (Table 2, Level III).
- Discuss the option of LPI with primary angle-closure suspects to potentially reduce the risk of angle-closure and glaucoma. The evidence for benefit is currently uncertain and the risks and benefits of LPI should be discussed with each patient. If the patient opts for observation rather than LPI, they should be fully informed regarding the symptoms of a possible acute angle-closure attack and be aware that emergency treatment in the HES would be necessary should this occur.
- Offer LPI to people with primary angle-closure (PAS or elevated IOP) or primary angle-closure glaucoma (disc &/or field damage). LPI should be carried out by an ophthalmologist or healthcare professional with suitable qualification, training and experience. LPI should be carried out according to a protocol which may be based on the preferred practice pattern.[27]
- Offer lens extraction as an alternative to LPI for people with primary angle-closure or primary angle-closure glaucoma and coexistent cataract. LPI may be required in advance of cataract surgery to avoid acute angle closure when pilocarpine treatment is discontinued and pupils are dilated pre-operatively.
- Provide information to patients regarding which topical, inhaled or systemic medications are contraindicated in their condition.

Following LPI, gonioscopy should be carried out to determine if the angle has opened. If the angle remains closed in the presence of a full thickness iridotomy, lens extraction or laser iridoplasty may be offered. Laser iridoplasty is an alternative laser therapy for the treatment of angle-closure, though commissioners should be aware that a recent Cochrane review has found no strong current evidence for the efficacy of iridoplasty in angle-closure.[28] Commissioners should also be aware that there is currently limited evidence for the effectiveness of lens extraction in PACG, despite the clear biological plausibility.[29] However, a large multi-centre randomised trial for lens extraction versus LPI (EAGLE[30]) has completed recruitment and after reporting will better inform future guidance.

If the angle opens following treatment, patients may follow a care pathway that is similar to those of OHT, suspected COAG or COAG but potentially needing more frequent gonioscopy to detect recurrent or progressive angle closure. Following interventional risk reduction the same pharmacological treatments as used in the treatment of COAG are used in treatment of PACG, and augmented trabeculectomy is similarly an effective procedure in PACG.

However, laser trabeculoplasty is not indicated in eyes in which the view of the angle structures is compromised to the point where treatment cannot be safely applied.

**Recommendation 30:** Regarding the treatment of acute-angle closure, commissioners should ensure they commission services which:

- Have 24-hour emergency access to the HES, or have an agreement in place with another service to provide this service
- Have processes in place for efficient emergency referral from the community to the HES
- Have a protocol for the management of acute angle-closure that is compliant with the preferred practice pattern[27]
- Ensures patients are not discharged without prophylactic laser therapy to the fellow eye unless contraindicated.

It should be noted that patients may be discharged following effective treatment of angle-closure, if all signs resolve and the patient is deemed at very low risk of future glaucoma.

### 4.3.10 Secondary glaucoma

Secondary glaucoma is associated with raised IOP due to an identifiable ocular or systemic disease or pharmacological therapy, and represents a diverse range of conditions with variable natural history and required management. Treatment of secondary glaucoma, therefore, often requires treatment of the underlying cause.

The scope of the NICE clinical guidelines for glaucoma[1] included two common forms of secondary glaucoma: pseudoexfoliative glaucoma (the drainage angle of the eye is obstructed by pseudoexfoliative material) and pigmentary glaucoma (the drainage angle of the eye is obstructed by pigment from the iris – pigment dispersion syndrome). The NICE guidance advises that patients with pseudoexfoliative or pigmentary glaucoma would be expected to follow a slightly different natural history to patients with primary COAG, and in accordance with such variations informed clinical judgment should be used to maintain optimal care.[1]

The literature search for evidence of effectiveness of treatments underlying the NICE guidelines yielded no studies specifically for pseudoexfoliative or pigmentary glaucoma, or as part of subgroup analyses. Therefore, the NICE guidelines do not make specific recommendations regarding pseudoexfoliative or pigmentary glaucoma and advise that patients with these conditions should be treated according to the principles and recommendations used for COAG patients.[1]

Many secondary glaucomas, such as uveitic glaucoma, traumatic glaucoma, and glaucoma following ocular surgery are complex in nature. These complex conditions require management within the HES and details of individual conditions are beyond the scope of this guidance.

**Recommendation 31:** Commissioners should ensure they commission services that:

- Adhere to COAG guidelines for patients with pseudoexfoliative or pigmentary glaucoma, whilst at the same time recognising that variations in treatment may be clinically necessary for these subgroups
- Ensure patients with complex forms of secondary glaucoma are managed within or in collaboration with the HES.

- Ensure that arrangements for specialist treatments such as diode laser cyclophotocoagulation and anti-VEGF are available either locally or through onward specialist referral.

### 4.4 Non-traditional therapies for glaucoma

A recent Cochrane review did not find good evidence to support the role of acupuncture in the management of glaucoma.[31] The current evidence search did not find good evidence for other non-traditional therapies such as Ginkgo biloba.

### 4.5 Adherence to glaucoma medication

Adherence to medication is defined as the extent to which a patient follows an agreed prescription, and poor adherence is a well-recognised problem in the management of glaucoma patients. Current evidence does not support any specific interventions to improve adherence,[32] but identifies that patient education including behaviour change techniques, and simpler medication dosing regimens may be effective.[33,34] The evidence for providing only information to patients in order to change behaviour is equivocal; patient education is more effective if it also includes teaching patients how to instil eye drops, identification of barriers to drop instillation, a review of patient beliefs about medication and an agreed personal plan of action on how to improve adherence.

**Recommendation 32:** It is recommended that effective patient education be delivered as part of an ECLO service, as described in this guideline. Box 1 details important components of information provision for patients.

### 4.6 Generic medication

**Recommendation 33:** Commissioners should recommend the use of generic medication where appropriate, given the potential cost savings. However, commissioners should be aware that:

- If a patient with stable glaucoma is tolerating a branded medication well, it may not be appropriate or cost-effective to switch to a generic version of that medication.
- The different appearance of the bottle may cause confusion, especially with the visually impaired, and the bottle may not be as easy for the patient to use.
- Switching to a generic medication may prompt extra monitoring visits – there will be costs associated with this
- Patients should receive instruction on the correct use of eye drop administration aids.
- Patients may need different eye drop administration aids if their drops are changed because generic bottles are not necessarily the same size, rigidity nor shape and may not fit their present aid
- Any adverse events observed on switch to a generic medication should be reported through the yellow-card system.

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## 6. Commissioning & costing tools

Tools have been published by NICE to assist commissioners in ensuring that appropriate risk stratified services are made available. The vast majority of patients with established glaucoma will require services which are currently available only in the HES, some of which will be physically based in community settings with direct hospital links.

**Recommendation 34:** Risk stratification is key to appropriate commissioning and commissioners are advised to download and use the cost impact and commissioning assessment for implementing the NICE Glaucoma Quality Standard published by NICE.[35]

This resource covers the range of glaucoma case complexity, i.e. established COAG, suspected COAG and OHT. A further resource for commissioners is the Glaucoma Commissioning and Benchmarking Tool which caters for people at risk of future glaucoma (OHT and suspected glaucoma, i.e. patients with no current visual impairment due to glaucoma)[36] to help estimate the level of service required locally and calculate estimated costs of commissioning the service needed for low risk patients. The tool is pre-populated with indicative benchmarks that have been estimated from national data. However, if local population data and demographics are known, this data can be entered which adjusts the benchmarks accordingly.

For example, if a commissioner's local population are younger or older than the national average, or have a different ethnic mix, then the commissioner may need to provide services for relatively fewer or more people. The tool also allows commissioners who currently commission a service to enter current commissioned activity and costs to further customise estimates. Future changes in capacity can be calculated as well as the related increase or decrease in costs. Commissioners should also factor in costs of monitoring the quality of the commissioned services.

**Recommendation 35:** An integrated approach to the patient pathway is advised for both those people newly identified with glaucoma as well as those at risk of future development of glaucoma. In most areas, community resources are insufficiently developed in terms of NICE recommended competencies, qualifications and experience for commissioning of services for higher risk patients outside of the HES. However, repeat measures schemes and enhanced case finding schemes should be, and referral refinement schemes may be, community based where local health care providers with appropriate skills and competencies are available in community settings (Tables 1 & 2).

Whilst cost-savings from implementing these schemes have been demonstrated,[37] their major benefit would be to release capacity in the HES for care of glaucoma patients at high risk of blindness. There should be a seamless interface between primary and secondary care and between different providers, e.g. between those delivering different complexities of care across a pathway. There should be no perverse incentive to continue to monitor patients when onward referral is the best course.

Given demographic trends, there is likely to be increasing levels of glaucoma care activity and avoidable sight loss from glaucoma, as well as other eye conditions, with associated significant impacts on future demand for health and social care services. In order to ensure sustainability of services, commissioning of eye care may need to be co-ordinated along pathways of care and services realigned to manage future demand within a finite programme budget. There is a movement towards 'outcomes-based' commissioning

strategies rather than 'activity-based', and to create patient-focused integrated services within the resources available. For this to deliver optimum value and outcomes, all providers involved will be required to apply 'Right Care' principles for their part of the pathway e.g. all optometrists within an area using a 'repeat measures' scheme prior to referral.

Right Care is a new concept to ophthalmology pathways and commissioners may wish to consider the development of programme budgets for eye care with a view to defining population based budgets for a small number of specific common conditions (e.g. glaucoma, AMD, cataract) and a remainder for the amalgamated less common problems. This highlights the importance of systems that record timely data of activity and outcomes within the eye care pathways.

# 7. Levers for implementation

Levers for Implementation are tools for commissioners and providers to aid implementation of high value care pathways.

### 7.1 Audit and Peer Review Measures

'Clinical audit is a quality improvement cycle that involves measurement of the effectiveness of healthcare against agreed and proven standards for high quality, and taking action to bring practice in line with these standards so as to improve the quality of care and health outcomes' (Healthcare Quality Improvement Partnership, 2011). Commissioners should acknowledge the costs associated with auditing the quality of the services they commission.

Peer Review is a quality assurance programme for health services. The programme may involve both self-assessment by provider teams and external reviews of teams conducted by professional peers, against nationally agreed "quality measures". Peer Review aims to improve care for people and their families by:

- Ensuring services are as safe as possible;
- Improving the quality and effectiveness of care;
- Improving the patient and carer experience;
- Undertaking independent, fair reviews of services;
- Providing development and learning for all involved;
- Encouraging the dissemination of good practice

(Adapted from National Cancer Action Team, 2012)

**Recommendation 36:** Commissioners should be aware that NICE has provided a range of Quality Standards which can be audited and used by providers to demonstrate the quality of their services (http://www.nice.org.uk/guidance/QS7/chapter/Introduction-and-overview)

In addition to the NICE Quality Standards, Statements, and Measures the GDG considered some further items to be relevant to service quality and of potential value to commissioners (Table 6).

Table 6: Standards relevant to service quality in addition to NICE Quality Standards

| Standard | Description | Data Specification |
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| Proportion of new referrals seen in the Hospital Eye Service originating from the community with written feedback of the visit examination and outcome sent to the referring community HCP. | Evidence of systematic written feedback to community optometrists and other HCPs involved in the care of patients with glaucoma or OHT. | *Numerator* – the number of people in the denominator with evidence of written communication to their community HCP (other than their GP) from the Hospital Eye Service<br><br>*Denominator* – the number of new referrals originating from the community seen in the Hospital Eye Service for suspected glaucoma or OHT. |
| Proportion of referrals seen in the Hospital Eye Service with minimum dataset details in the referral communication. | Evidence that Hospital Eye Services are only accepting people with adequately detailed referrals. | *Numerator* – the number of people in the denominator with all the minimum dataset details (locally determined) in the referral communication<br><br>*Denominator* – the number of new referrals originating from the community seen in the Hospital Eye Service for suspected glaucoma or OHT. |
| Proportion of people eligible for sight impairment certification who are offered certification. | Evidence that people entitled to sight impairment certification are offered certification | *Numerator* – the number of people in the denominator who have written documentation of a discussion relating to the possibility of certification<br><br>Denominator – the number of people seen in the Hospital Eye Service with glaucoma who meet the criteria for sight impairment. |
| Proportion of people with suspected COAG from community optometry have a further assessment before consultant ophthalmologist referral (NICE quality statement 1[2]) | Evidence of arrangements for referral refinement | Proportion of people in whom an optometrist or other healthcare professional suspects COAG who undergo further assessment with referral refinement.<br><br>*Numerator* – the number of people in the denominator who undergo further assessment with referral refinement. |
| Proportion of people undergoing referral refinement that are subsequently referred to a consultant ophthalmologist (NICE quality statement 1[2]) | An efficient referral refinement service | Proportion of people who undergo referral refinement who are subsequently referred on to a consultant ophthalmologist for definitive diagnosis because COAG is suspected.<br><br>*Numerator* – the number of people in the denominator who are referred to a consultant ophthalmologist for definitive diagnosis.<br><br>*Denominator* – the number of people undergoing referral refinement because COAG is suspected. |
| People with elevated IOP alone are referred to an appropriately qualified healthcare professional for further assessment on the basis of perceived risk of progression to | Evidence of repeat measures service for people suspected of glaucoma solely due to raised IOP | Proportion of people with elevation of IOP alone, who are referred for repeat measures to an appropriately qualified healthcare professional.<br><br>*Numerator* – the number of people in the denominator referred for repeat measures to an appropriately qualified healthcare professional. |

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| COAG. There are agreements in place for repeat measures. (NICE quality statement 2[2]) | | *Denominator* – the number of people with suspected elevation of IOP alone. |
| People referred for definitive diagnosis in the context of possible COAG or with OHT receive all relevant tests in accordance with NICE guidance (see section 1.3.4) (NICE quality statement 3[2]). | People referred for a definitive diagnosis have all the tests specified by NICE guidance | Proportion of people referred for definitive diagnosis in the context of possible COAG or with OHT who attend and receive all relevant tests in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator receiving all relevant tests in accordance with NICE guidance.<br><br>*Denominator* – the number of people attending an appointment following a referral for definitive diagnosis in the context of possible COAG or with OHT. |
| People with COAG, suspected COAG or with OHT are diagnosed and have a management plan formulated by a suitably trained healthcare professional with competencies and experience in accordance with NICE guidance (see section 1.3.4) (NICE quality statement 4[2]). | Suitably trained healthcare professionals are making the definitive diagnosis and management plan for patients. | a) Proportion of people with COAG, suspected COAG or with OHT who are diagnosed by a suitably trained healthcare professional with competencies and experience in the relevant condition in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator diagnosed by a suitably trained healthcare professional with competencies and experience in the relevant condition in accordance with NICE guidance.<br><br>*Denominator* – the number of people with COAG, suspected COAG or with OHT.<br><br>b) Proportion of people with COAG, suspected COAG or with OHT who have a management plan formulated by a healthcare professional with competencies and experience in the relevant condition in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator with a management plan formulated by a healthcare professional with competencies and experience in the relevant condition in accordance with NICE guidance.<br><br>*Denominator* – the number of people with COAG, suspected COAG or with OHT |
| People diagnosed with COAG, suspected COAG or with OHT are monitored at intervals according to their risk of progressive loss of vision in accordance with NICE guidance (see section 1.3.5) (NICE quality statement 5[2]). | Suitable follow-up intervals to minimise risk of progressive vision loss. | Proportion of people with COAG, suspected COAG or with OHT who are monitored at intervals according to their risk of progressive loss of vision in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator monitored at intervals according to their risk of progressive loss of vision in accordance with NICE guidance.<br><br>*Denominator* – the number of people diagnosed with COAG, suspected COAG or with OHT. |

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| People with suspected COAG or with OHT are managed based on estimated risk of conversion to COAG and progression to visual impairment using IOP, CCT and age, in accordance with NICE guidance (see section 1.3.6) (NICE quality statement 6[2]). | Ensuring cost-effective management of people with suspected COAG or with OHT. | a) Proportion of people diagnosed with suspected COAG or with OHT who are assessed for treatment eligibility based on estimated risk of conversion to COAG and progression to visual impairment using IOP, CCT and age.<br><br>*Numerator* – the number of people in the denominator assessed for treatment eligibility based on estimated risk of conversion to COAG and progression to visual impairment using IOP, CCT and age.<br><br>*Denominator* – the number of people diagnosed with suspected COAG or with OHT.<br><br>b) Proportion of people diagnosed with suspected COAG or with OHT who are eligible and who are offered treatment based on estimated risk of conversion to COAG and progression to visual impairment using IOP, CCT and age, who are managed in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator managed in accordance with NICE guidance.<br><br>*Denominator* – the number of people diagnosed with suspected COAG or with OHT who are eligible for treatment based on estimated risk of conversion to COAG and progression to visual impairment using IOP, CCT and age.<br><br>c) Proportion of people diagnosed with suspected COAG or with OHT at low risk of progressing to visual impairment who receive no treatment in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator who receive no treatment in accordance with NICE guidance.<br><br>*Denominator* – the number of people diagnosed with suspected COAG or with OHT at low risk of progressing to visual impairment for whom treatment is not recommended by NICE guidance. |
| People with COAG, suspected COAG or with OHT have a regular review of management options with their healthcare professional, taking into account comorbidity and other changed circumstances, including a discussion of the benefits and risks of stopping treatment for those at low risk of progressing to visual impairment. (NICE quality statement 7[2]). | Evidence of arrangements to ensure that people with chronic open angle glaucoma (COAG), suspected COAG or with ocular hypertension (OHT) have a regular review of management options with their healthcare professional, taking into account comorbidity and other changed circumstances, including a discussion of the benefits and risks of stopping treatment for | a) Proportion of people with COAG, suspected COAG or with OHT who have a regular review of management options with their healthcare professional taking into account comorbidity and other changed circumstances.<br><br>*Numerator* – the number of people in the denominator having a regular review of management options with their healthcare professional taking into account comorbidity and other changed circumstances.<br><br>*Denominator* – the number of people with COAG, suspected COAG or with OHT.<br><br>b) Proportion of people with COAG, suspected COAG or with OHT at low risk of progressing to visual |

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| | those at low risk of progressing to visual impairment. | impairment who have a discussion of the benefits and risks of stopping treatment.<br><br>*Numerator* – the number of people in the denominator participating in a discussion of the benefits and risks of stopping treatment.<br><br>*Denominator* – the number of people with COAG suspected COAG or with OHT at low risk of progressing to visual impairment. |
| People diagnosed with COAG, suspected COAG or with OHT have access to timely follow-up appointments and specialist investigations at intervals in accordance with NICE guidance. Sufficient capacity is put in place to provide this service, and systems are developed to identify people needing clinical priority if appointments are cancelled, delayed or missed. (NICE quality statement 8[2]). | a) Evidence of arrangements to ensure people diagnosed with chronic open angle glaucoma (COAG), suspected COAG or with ocular hypertension (OHT) have access to timely follow-up appointments and specialist investigations in accordance with NICE guidance.<br><br>b) Evidence of arrangements to ensure sufficient capacity is put in place to provide this service and systems are developed to identify people needing clinical priority if appointments are cancelled, delayed or missed. | a) Proportion of people with COAG, suspected COAG or with OHT who have access to timely follow-up appointments and specialist investigations at appropriate intervals in accordance with NICE guidance.<br><br>*Numerator* – the number of available appointments and specialist investigations for people with COAG, suspected COAG or with OHT.<br><br>*Denominator* – the number of requested appointments and specialist investigations for people with COAG, suspected COAG or with OHT.<br><br>b) Proportion of people with COAG, suspected COAG or with OHT, whose appointment has been cancelled, delayed or missed who have their clinical priority assessed.<br><br>*Numerator* – the number of people in the denominator with a clinical priority assessment.<br><br>*Denominator* – the number of people with COAG, suspected COAG or with OHT and a cancelled, delayed or missed appointment.<br><br>c) Proportion of people with COAG, suspected COAG or with OHT whose cancelled, delayed or missed appointment is rescheduled within an appropriate time interval (e.g. one month).<br><br>*Numerator* – the number of people in the denominator with a rescheduled appointment following a cancelled, delayed or missed appointment within an appropriate time interval.<br><br>*Denominator* – the number of people with COAG, suspected COAG or with OHT with a cancelled, delayed or missed appointment. |
| Healthcare professionals involved in the care of a person with COAG, suspected COAG or with OHT have appropriate documentation and records available at each clinical encounter in accordance with NICE guidance. (NICE quality statement 9[2]). | Evidence of arrangements to ensure that healthcare professionals involved in a person's care have appropriate documentation available at each clinical encounter in accordance with NICE guidance. | Proportion of people with chronic open angle glaucoma (COAG), suspected COAG or with ocular hypertension (OHT) whose documentation and records are available to healthcare professionals at each clinical encounter.<br><br>*Numerator* – the number of people in the denominator whose documentation and records are available to the healthcare professional(s) present. |

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|---|---|---|
| | | *Denominator* – the number of people with COAG, suspected COAG or with OHT attending a clinic appointment. |
| People with COAG who are progressing to loss of vision despite treatment or who present with advanced visual loss are offered surgery with pharmacological augmentation (for example, MMC or 5FU) as indicated and information on the risks and benefits associated with surgery. (NICE quality statement 10[2]). | Evidence of arrangements to ensure that all people with chronic open angle glaucoma (COAG) who are progressing to loss of vision despite treatment or who present with advanced visual loss are offered surgery with pharmacological augmentation. | a) Proportion of people with COAG who are progressing to loss of vision despite treatment or who present with advanced visual loss who are offered surgery with pharmacological augmentation (for example, MMC or 5FU) as indicated.<br><br>*Numerator* – the number of people in the denominator offered surgery with pharmacological augmentation (for example, MMC or 5FU) as indicated.<br><br>*Denominator* – the number of people with COAG progressing to loss of vision despite treatment or who present with advanced visual loss.<br><br>b) Proportion of people with COAG offered surgery because they are progressing to loss of vision despite treatment or who present with advanced visual loss, who receive information on the risks and benefits associated with surgery.<br><br>*Numerator* – the number of people in the denominator who receive information on the risks and benefits associated with surgery.<br><br>*Denominator* – the number of people with COAG who are offered surgery because they are progressing to loss of vision despite treatment or who present with advanced visual loss. |
| People with COAG, suspected COAG or with OHT are given the opportunity to discuss their diagnosis, prognosis and management, and are provided with relevant and accessible information and advice at initial and subsequent visits in accordance with NICE guidance. (NICE quality statement 11[2]). | Evidence of arrangements to ensure that people with chronic open angle glaucoma (COAG), suspected COAG or with ocular hypertension (OHT) are given the opportunity to discuss their diagnosis, prognosis and management, and are provided with relevant and accessible information and advice at initial and subsequent visits in accordance with NICE guidance. | Proportion of people with COAG, suspected COAG or with OHT who are given the opportunity to discuss their diagnosis, prognosis and management and who are provided with relevant and accessible information and advice at initial and subsequent visits in accordance with NICE guidance.<br><br>*Numerator* – the number of people in the denominator given the opportunity to discuss their diagnosis, prognosis and management and provided with relevant and accessible information and advice at initial and subsequent visits in accordance with NICE guidance.<br><br>*Denominator* – the number of people with COAG, suspected COAG or with OHT. |
| People with suspected COAG or with OHT who are not recommended for treatment and whose condition is considered stable are discharged from formal monitoring with a patient-held | Evidence of arrangements to ensure that all people with suspected chronic open angle glaucoma (COAG) or with ocular hypertension (OHT) who are not recommended for treatment and whose | Proportion of people with suspected COAG or with OHT who are not recommended for treatment and whose condition is considered stable who are discharged from formal monitoring with a patient-held management plan. |

| | | |
|---|---|---|
| management plan (NICE quality statement 12[2]). | condition is considered stable are discharged from formal monitoring with a patient-held management plan. | *Numerator* – the number of people in the denominator discharged from formal monitoring with a patient-held management plan.<br><br>*Denominator* – the number of people with suspected COAG or with OHT who are not recommended for treatment and whose condition is considered stable. |

### 7.2 Quality Specification / CQUIN

”The Commissioning for Quality and Innovation (CQUIN) payment framework enables commissioners to reward excellence by linking a proportion of providers’ income to the achievement of local quality improvement goals.”

“The framework has been developed with those working in the NHS, to help produce a system which actively encourages organisations to focus on quality improvement and innovation in commissioning discussions and so to stretch themselves, improve quality for patients and innovate.” (Department of Health, 2008)

**Recommendation 37:** Commissioners should develop CQUINs in joint discussion with providers, and the content of CQUINs are best decided locally. The CQUIN may contain goals related to staged implementation of a new process as well as goals related to performance. The outcome of non-achievement of any stages should also be jointly discussed and agreed upon.

Use of an up-to-date CQUIN Scheme Template (NHS England) may aid the development of a locally successful CQUIN.[38,39]

# 8. Directory

## 8.1 Patient Information for glaucoma

*Table 7: Links to patient information and shared decision making tools*

| Name | Publisher | Link |
|---|---|---|
| Diagnosing and treating glaucoma and raised eye pressure | NICE | http://publications.nice.org.uk/diagnosing-and-treating-glaucoma-and-raised-eye-pressure-ifp85 |
| | International Glaucoma Association | www.glaucoma-association.com<br>Tel: 01233 64 81 70 |
| | Royal National Institute of Blind People (RNIB) | www.rnib.org.uk<br>www.rnib.org.uk/eye-health-eye-conditions-z-eye-conditions/glaucoma<br>Tel: 0303 123 9999 |
| | NHS Choices | http://www.nhs.uk/conditions/glaucoma |
| | Seeability | https://www.seeability.org/ |

### 8.2 Clinician Information for glaucoma

*Table 8: Links to clinical guidelines, decision support tools*

| Name | Publisher | Link |
|---|---|---|
| Diagnosis and management of chronic open angle glaucoma and ocular hypertension | NICE | http://guidance.nice.org.uk/CG85 |
| Glaucoma Quality Standard | NICE | http://guidance.nice.org.uk/QS7 |
| Glaucoma Pathway | NICE | http://pathways.nice.org.uk/pathways/glaucoma |
| Guidance on Supervision in relation to Glaucoma-related Care by Optometrists | RCOphth / CoO | https://www.rcophth.ac.uk/professional-resources/glaucoma/ |
| Guidance on the referral of glaucoma suspects by community optometrists | RCOphth / CoO | https://www.rcophth.ac.uk/professional-resources/glaucoma/ |
| Glaucoma Repeat Readings & OHT Monitoring Community Service Pathway | LOCSU | http://www.locsu.co.uk/uploads/enhanced_pathways_2013/locsu_glaucoma_repeat_readings_and_oht_monitoring_pathway_rev_nov_2013.pdf |

### 8.3 NHS Evidence Case Studies for glaucoma

*Table 9: Links to examples of good practice*

| Name | Publisher | Link |
|---|---|---|
| Avoiding unnecessary referral for glaucoma: use of a repeat measurement scheme | NHS Evidence Quality, Innovation, Productivity and Prevention | https://www.evidence.nhs.uk/topic/glaucoma?om=%5B%7B%22srn%22%3A%5B%22%20qipp%20%22%5D%7D%5D |

## 9. Benefits and risks of implementing this guidance

*Table 10: Benefits and risks of implementing this guidance.*

| Consideration | Benefit | Risk |
|---|---|---|
| Patient outcome | Less avoidable vision loss<br>Less cancelled appointments<br>Well informed patients | Added pressure on eye care service capacity |
| Patient safety | Reduced risk of loss to follow-up | Some patients may not benefit from treatment |
| Equality of access | More care in the community will increase equity of access | Insufficient numbers of qualified and experienced HCPs to cater for demand.<br>Deprived areas are poorly served by optometric practices which may increase inequalities |
| Resource impact | Savings associated with reducing unnecessary hospital referrals | Cost of referral refinement / repeated measures schemes |

# 10. Further information

## 10.1 Research Recommendations based on Uncertainties

- A review of patient reported outcome measures for glaucoma revealed that most of the instruments had poor developmental quality.[40] More research is required into patient relevant outcomes in glaucoma.
- Development of local registers of glaucoma patients who attend general practices would facilitate integrated patient care between community and hospital, efficient monitoring of patient follow-up to help ensure loss of vision secondary to missed appointments does not occur, assessment of glaucoma prevalence and incidence in the region, more informed and accurate service planning and specification, and easier audit on a region-wide scale. Feasibility research and pilot schemes in this area are needed to evaluate benefits and facilitate uptake of glaucoma registers as appropriate. Furthermore, electronic patient record developers should be encouraged to develop exportable packages for register capability.
- Uncertainty remains regarding relative real-world efficacy and adverse reactions of generic versus branded medications.
- The relative cost-effectiveness of repeat measures and referral refinement schemes should be further examined and the role of new ocular imaging devices in referral refinement investigated.
- The relative cost effectiveness of community vs. hospital based monitoring and management of people with an established diagnosis of COAG, Suspected COAG or OHT for various strata of case complexity would facilitate rational service development strategies.
- A greater understanding of why patients miss appointments may reduce loss to follow-up and avoidable blindness.
- Further research is required to identify successful approaches to optimising patient adherence to therapy, such as motivational techniques and community pharmacist interventions.

## 10.2 Other Recommendations

**Recommendation 38:** Commissioners should be aware of the following further recommendations for efficient commissioning of glaucoma services:

- Commissioners should explore commissioning model options according to their local population need, ensuring that patient choice and procurement regulations are met. They could consider a “Prime Provider” or more collaborative “Alliance Model”. The financial model also needs consideration. One option is a Programme Budget approach, inclusive of Community and Secondary Care spend, which encompasses the entire patient pathway; this would drive the patient to be seen by the right person at the right time in the right place.
- Commissioners should consider a glaucoma register with diagnostic and patient visit information to reduce the risks associated with loss to follow up. Failsafe approaches are especially relevant where services are distributed across hospital / community boundaries.
- Commissioners should commission glaucoma services for a reasonable amount of time (e.g. five years). Glaucoma care is very different from cataract care, for example. Cataract

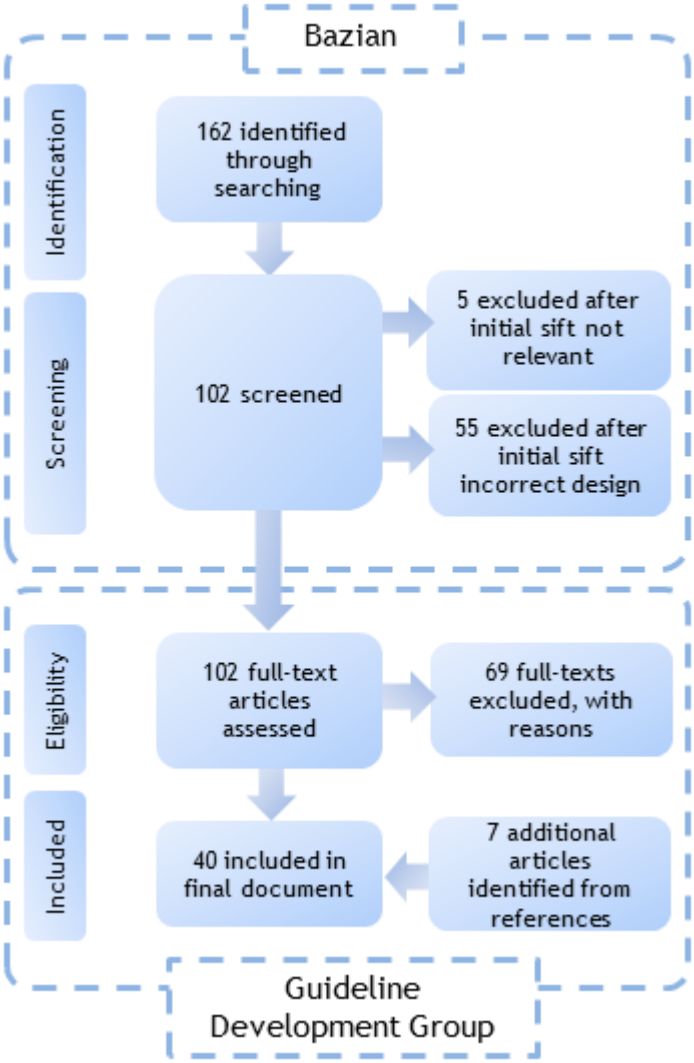
services treat people for a short, defined period of time and then discharge people from their care. Glaucoma patients, once diagnosed, are usually treated for life. On average, glaucoma affects people for 15 years. Continuity of care is important and a change of provider may disrupt this.

- Commissioners should consider making accessible a listing of local community optometrists with higher level glaucoma qualifications (Table 2) for the benefit of patients who wish to see a community optometrist who has experience with glaucoma patients.
- Inclusion of Glaucoma and related conditions in the 'New Medicines Service' should be considered as this would bring benefits in terms of getting patients correctly established on treatment early on in the course of their condition www.nhs.uk/NHSEngland/AboutNHSservices/pharmacists/Pages/medicine-service-qa.aspx.
- Commissioners should be working alongside Health Education England to ensure future provision of an appropriately qualified workforce.

### 10.3 Evidence Base

A systematic review of the literature was undertaken. The Guideline Development Group came to a consensus on the topics and questions for the search, formulated in a PICO structure if appropriate. The systematic search was undertaken by Bazian Ltd on 15th October 2013 and included the Cochrane Libraries, MEDLINE, EMBASE, NHS Evidence – guidelines, NHS Evidence – commissioning, National Guidelines Clearing House, Google and other grey literature including the Royal College of Ophthalmologists and College of Optometrists' websites. Figure 2 illustrates the search flow.

*Figure 2: Flow diagram detailing the systematic literature review.*




Details of the research questions and search strategies can be found in Appendix A. A list of full texts excluded, with reasons, is given in Appendix B.

### 10.4 Guideline Development Group

| GDG Member | Designation |
|---|---|
| Professor John Sparrow (Chair) | Consultant Ophthalmologist, University Hospitals Bristol NHS Foundation Trust and The Royal College of Ophthalmologists |
| Ms Jane Bell | Local Optical Committee Support Unit, and community optometrist |
| Mr Daniel Byles | Consultant Ophthalmologist, The Royal Devon and Exeter NHS Foundation Trust and The Royal College of Ophthalmologists |
| Dr Timothy Crook | GP, Senior Partner Rother House Medical Centre, Stratford upon Avon |
| Ms Clara Eglan | Royal National Institute of Blind People |
| Mr Anthony Khawaja | Specialist Registrar in Ophthalmology, Moorfields Eye Hospital NHS Foundation Trust |
| Mr Simon Longstaff | Consultant Ophthalmologist, Sheffield Teaching Hospitals NHS Foundation Trust |
| Mr David Parkins | Assistant Director of Quality, Bexley Clinical Commissioning Group |
| Ms Mary-Ann Sherratt | Optometrist, University Hospitals Bristol NHS Foundation Trust and the College of Optometrists |
| Mr Richard Smith | Consultant Ophthalmologist, Buckinghamshire Healthcare NHS Trust and The Royal College of Ophthalmologist |
| Professor Stephen Vernon | Consultant Ophthalmologist, Nottingham University Hospitals NHS Trust and The Royal College of Ophthalmologists |
| Mrs Lucy Titcomb | Pharmacist, UK Ophthalmic Pharmacy Group |
| Mrs Christine Wall | Lay Advisory Group, The Royal College of Ophthalmologists |
| Professor Heather Waterman | School of Nursing, Midwifery and Social Work. The University of Manchester |
| Mr Richard Wormald | Consultant Ophthalmologist, Head of Epidemiology, Moorfields Eye Hospital and The Royal College of Ophthalmologists |
| Ms Maxine Wright | Team Manager, Sensory team, Hampshire County Council |
| Mr Russell Young | International Glaucoma Association |

### 10.5 Funding Statement

The development of this commissioning guidance has been funded by the following sources:

- The Royal College of Ophthalmologists
- Nottingham University Hospitals NHS Trust (under £10,000)

### 10.6 Conflict of Interest Statement

Individuals involved in the development and formal peer review of commissioning guidance are asked to complete a conflict of interest declaration. It is noted that declaring a conflict of interest does not imply that the individual has been influenced by his or her interest. It is intended to ensure interests (financial or otherwise) are transparent and allow other to have knowledge of that interest.

The following interests have been declared by this Group:

- Ms Jane Bell is a LOCSU Clinical Advisor and a member of the Board of Director of the Association of Optometrists.
- Dr Timothy Crook is Partner in Circle Health.
- Mr Simon Longstaff has in the past received consultancy fees from Allergan and Alcon as part for advisory board work.
- Mr David Parkins is president of the College of Optometrists
- The Royal National Institute of Blind People receives money from pharmaceutical companies in the form of educational grants. In recent years we have been supported by Novartis, Allergan, Alcon, and Bayer for initiatives such as the provision of Eye Clinic Liaison Officers in eye clinics. The funding is declared in RNIB's annual report and each year the support given by pharmaceutical companies represents less than 0.001% of our overall funding.
- Ms Mary-Ann Sherratt is president elect of the College of Optometrists
- Professor John Sparrow was Chair of the NICE Glaucoma Guideline Development Group and Chair of the NICE Quality Standard Topic Expert Group
- Mr Russell Young was previously employed by MSD (retired in 2009).

### 10.7 Guideline Scope

- Conditions
    - Adult Glaucoma
        - COAG (inc. POAG, NTG, with or without pigment dispersion or pseudo-exfoliation)
        - Glaucoma with narrow angles (PACG, AACG)
        - Secondary Glaucomas
    - Conditions conferring an increased risk of glaucoma development
        - OHT (open angles with or without pigment dispersion or pseudo-exfoliation)
        - COAG Suspects (open angles with or without pigment dispersion or pseudo-exfoliation)
        - Conditions with narrow angles (PAC, PACS)
    - Exclusions (covered by specialist commissioning)
        - Surgical treatment for complex glaucoma
        - Paediatric glaucoma
- Services
    - HES

        - All forms of glaucoma with particular emphasis on higher risk and more clinically challenging disease (e.g. advanced, surgical, narrow angles) and less predictability (e.g. NTG, PDS, PXF)
    - Community
        - Repeat Measures for OHT
        - Referral Refinement (added value as per NICE Quality Standards definition)
        - Monitoring OHT & Suspected COAG
        - Monitoring COAG (inc. 'virtual' clinics with consultant review of collected data or optometrists with CoO Glaucoma Diploma equivalent, and relevant experience)
    - Pathways of Care
        - Algorithms related to case mix and care needs
    - Capacity planning
        - Population requirements for new referrals and monitoring
        - New to follow up ratios for case mix categories
    - Failsafe Databases
- Training, qualifications and experience of health care professionals
    - Skill mix required for different case complexity
- Cost effective prescribing
    - Drug classes
    - Generics vs. branded
    - Community wide approaches
- PROMs, PREMs, POEMs
    - Validated instruments
- Patient education and support
    - Information leaflets
    - Accessible formats
    - Visual impairment registration (CVI as Public Health Indicator)
    - ECLOs and HCPs
- Uncertainties
    - Evidence gaps
    - Research Questions

# APPENDIX A – Search questions and search strategies

## Search questions and notes

| | |
|---|---|
| **Short title** | Clinical Commissioning for Glaucoma Services |
| **Research question(s)** | • What service models and pathways of care operate in the English NHS and what are the patient perceptions and relative cost and cost effectiveness of these?<br>• What case complexity do the models cater for?<br>• What is the clinical effectiveness of different treatments in terms of IOP lowering and visual field preservation?<br>• What is the treatment cost, cost effectiveness and relative cost effectiveness of different treatments?<br>• What mechanisms exist for avoidance of loss to follow up for people with or at risk of glaucoma and associated vision loss?<br>• What are the available instruments for self-reported VR-QoL, visual disability, adherence to therapy and treatment outcomes in glaucoma?<br>• What information and support should people with glaucoma related conditions receive and how should this be made accessible?<br>• What social support should be made available to people with visual impairment from glaucoma? |
| **Population(s)** | • Adults with glaucoma or conditions conferring an increased risk of glaucoma, i.e.<br>• Adult Glaucoma<br>• COAG (inc. POAG, NTG, with or without pigment dispersion or pseudo-exfoliation)<br>• Glaucoma with narrow angles (PACG, AACG)<br>• Secondary Glaucomas<br>• Conditions conferring an increased risk of glaucoma development<br>• OHT (open angles with or without pigment dispersion or pseudo-exfoliation)<br>• COAG Suspects (open angles with or without pigment dispersion or pseudo-exfoliation)<br>• Conditions with narrow angles (PAC, PACS) |
| **Intervention(s)** | Services:<br>• All forms of glaucoma with particular emphasis on higher risk and more clinically challenging disease (e.g. advanced, surgical, narrow angles) and less predictability (e.g. NTG, PDS, PXF)<br>• Community<br>• Repeat Measures for OHT<br>• Referral Refinement (added value as per NICE QS definition)<br>• Monitoring OHT & Suspected COAG<br>• Monitoring COAG (inc. 'virtual' clinics with consultant review of collected data or optometrists with CO Glaucoma Diploma equivalent, and relevant experience)<br>• Pathways of Care<br>• Algorithms related to case mix and care needs<br>• Capacity planning<br>• Population requirements for new referrals and monitoring<br>• New to follow up ratios for case mix categories<br>• Failsafe Databases<br>• Training, qualifications and experience of health care professionals<br>• Skill mix required for different case complexity |

| | |
|---|---|
| | • Cost effective prescribing<br>• Drug classes<br>• Generics vs. branded<br>• Community wide approaches<br>• PROMs, PREMs, POEMs<br>• Validated instruments<br>• Patient education and support<br>• Information leaflets<br>• Accessible formats<br>• Visual impairment registration (CVI as Public Health Indicator)<br>• Uncertainties<br>• Evidence gaps<br>• Research Questions |
| **Comparators** | • n/a |
| **Outcomes** | • Not provided |
| **Exclusion criteria** | Exclusions (covered by specialist commissioning)<br>• Surgical treatment for complex glaucoma<br>• Paediatric glaucoma |
| **Level of search** | • Level 1 and 2 search for:<br>• Guidelines<br>• Systematic reviews<br>• Economic evaluations<br>• Commissioning grey literature |
| **Notes** | • English language only<br>• Date limits: 2003-present |

## Search record

| Databases and sites searched | Dates searched | Search terms/strategy | Number of hits |
|---|---|---|---|
| Cochrane Library: Cochrane Database of Systematic Reviews - CDSR | 15/10/13 | ID Search<br>#1 MeSH descriptor: [Glaucoma] explode all trees 2099<br>#2 ("ocular hypertension" or hydrophthalmos):ti,ab,kw (Word variations have been searched) 1453<br>#3 (secondary glaucoma or "pigment dispersion" or COAG or POAG or NTG or PACG or AACG or PXF or pseudoexfoliati* or pseudo exfoliati* or "normal tension glaucoma" or "low tension glaucoma"):ti,ab,kw 1101<br>#4 #1 or #2 or #3 3531<br>#5 MeSH descriptor: [Patient Care Management] explode all trees 14607<br>#6 ("service model*" or pathway* or cost* or cost-effective* or adherence or "case management" or prescribing or "visual disability" or VR-QOL or training or education or information | 14 |

| | | | |
|---|---|---|---|
| | | or referral or monitoring or support or "self report"):ti,ab,kw 159190<br>#7 #5 or #6 164631<br>#8 #4 and #7 from 2003 to 2013, in Cochrane Reviews (Reviews and Protocols), Other Reviews, Technology Assessments and Economic Evaluations 72 | |
| Cochrane Library: Database of Abstracts of Reviews of Effects – DARE | 15/10/13 | See above | 4 |
| Cochrane Library: Health Technology Assessments (HTA) | 15/10/13 | See above | 12 |
| Cochrane Library: NHS Economic Evaluation Database (NHSEED) | 15/10/13 | See above | 42 |
| MEDLINE | 15/10/13 | Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present><br>Search Strategy:<br>---<br>1 exp Glaucoma/ (42540)<br>2 Hydrophthalmos/ (386)<br>3 Ocular Hypertension/ (5230)<br>4 (OHT or ocular hypertension?).tw. (4587)<br>5 or/1-4 (46009)<br>6 (secondary or pigment or closed angle? or open angle? or narrow angle? or pseudoexfoliati$ or pseudo exfoliati$ or normal tension or low tension).tw. (484774)<br>7 5 and 6 (11601)<br>8 glaucoma?.ti. (25401)<br>9 Low tension glaucoma/ (287)<br>10 primary angle closure.tw. (895)<br>11 (COAG or POAG or NTG or PACG or AACG or PXF).tw. (4954)<br>12 or/7-11 (31313)<br>13 exp Patient Care Management/ (534050)<br>14 (service model? or pathway? or perception? or cost? or cost-effective$ or effective$ or (complex$ adj2 case?) or loss to follow-up or patient information or support or educat$ or | 113 |

| | | | |
|---|---|---|---|
| | | training or self-report or referral or monitor$ or case management).tw. (3670011)<br>15 (adherence or capacity planning or prescribing or visual disability or VR-QOL or treatment outcome?).tw. (118805)<br>16 or/13-15 (4096988)<br>17 12 and 16 (5308)<br>18 exp review/ (1917436)<br>19 (scisearch or psychinfo or psycinfo or medlars or embase or psychlit or psyclit or cinahl or pubmed or medline).ti,ab,sh. (93776)<br>20 ((hand adj2 search$) or (manual$ adj2 search$)).ti,ab,sh. (8073)<br>21 ((electronic or bibliographic or computeri?ed or online) adj4 database$).ti,ab. (17898)<br>22 (pooling or pooled or mantel haenszel).ti,ab,sh. (55794)<br>23 (peto or dersimonian or der simonian or fixed effect).ti,ab,sh. (4045)<br>24 or/19-23 (153956)<br>25 18 and 24 (72566)<br>26 Meta Analysis/ (51105)<br>27 (meta-analys$ or meta analys$ or metaanalys$).ti,ab,sh. (86859)<br>28 ((systematic$ or quantitativ$ or methodologic$) adj5 (review$ or overview$ or synthesis$)).ti,ab,sh. (68466)<br>29 (integrative research review$ or research integration).ti,ab,sh. (88)<br>30 or/26-29 (132906)<br>31 25 or 30 (167296)<br>32 clinical trials, phase iv/ or clinical trials, phase iii/ or randomized controlled trials/ or multicenter studies/ (286246)<br>33 (random$ or placebo$ or ((singl$ or double$ or triple$ or treble$) and (blind$ or mask$))).ti,ab,sh. (999061)<br>34 32 or 33 (1113106)<br>35 (animal$ not human$).sh. (3961628)<br>36 34 not 35 (996246)<br>37 (cost$ or economic$).tw. (480543)<br>38 31 or 36 or 37 (1520752)<br>39 17 and 31 (137)<br>40 limit 39 to english language (129)<br>41 limit 40 to yr="2003 - 2014" (113) | |
| EMBASE | 15/10/13 | Database: Embase <1996 to 2013 October 14><br>Search Strategy:<br>---<br>1 exp Glaucoma/ (37550) | 7 |

| | | | |
|---|---|---|---|
| | | 2 Hydrophthalmos/ (201)<br>3 Ocular Hypertension/ (6677)<br>4 (OHT or ocular hypertension?).tw. (4021)<br>5 or/1-4 (38613)<br>6 (secondary or pigment or closed angle? or open angle? or narrow angle? or pseudoexfoliati$ or pseudo exfoliati$ or normal tension or low tension).tw. (427335)<br>7 5 and 6 (10535)<br>8 glaucoma?.ti. (15618)<br>9 Low tension glaucoma/ (455)<br>10 primary angle closure.tw. (848)<br>11 (COAG or POAG or NTG or PACG or AACG or PXF).tw. (4822)<br>12 or/7-11 (21815)<br>13 exp Patient Care Management/ (429212)<br>14 (service model? or pathway? or perception? or cost? or cost-effective$ or effective$ or (complex$ adj2 case?) or loss to follow-up or patient information or support or educat$ or training or self-report or referral or monitor$ or case management).tw. (3323847)<br>15 (adherence or capacity planning or prescribing or visual disability or VR-QOL or treatment outcome?).tw. (125709)<br>16 or/13-15 (3646817)<br>17 12 and 16 (5807)<br>18 exp review/ (1519115)<br>19 (scisearch or psychinfo or psycinfo or medlars or embase or psychlit or psyclit or cinahl or pubmed or medline).ti,ab,sh. (99921)<br>20 ((hand adj2 search$) or (manual$ adj2 search$)).ti,ab,sh. (8059)<br>21 ((electronic or bibliographic or computeri?ed or online) adj4 database$).ti,ab. (20132)<br>22 (pooling or pooled or mantel haenszel).ti,ab,sh. (53158)<br>23 (peto or dersimonian or der simonian or fixed effect).ti,ab,sh. (3769)<br>24 or/19-23 (158971)<br>25 18 and 24 (63514)<br>26 Meta Analysis/ (72160)<br>27 (meta-analys$ or meta analys$ or metaanalys$).ti,ab,sh. (106473)<br>28 ((systematic$ or quantitativ$ or methodologic$) adj5 (review$ or overview$ or synthesis$)).ti,ab,sh. (103794)<br>29 (integrative research review$ or research integration).ti,ab,sh. (77)<br>30 or/26-29 (177577)<br>31 25 or 30 (206654) | |

| | | | |
|---|---|---|---|
| | | 32 clinical trials, phase iv/ or clinical trials, phase iii/ or randomized controlled trials/ or multicenter studies/ (46285)<br>33 (random$ or placebo$ or ((singl$ or double$ or triple$ or treble$) and (blind$ or mask$))).ti,ab,sh. (955955)<br>34 32 or 33 (961025)<br>35 (animal$ not human$).sh. (1848289)<br>36 34 not 35 (868467)<br>37 (cost$ or economic$).tw. (458194)<br>38 31 or 36 or 37 (1396624)<br>39 17 and 31 (164)<br>40 limit 39 to english language (148)<br>41 limit 40 to yr="2003 - 2014" (132)<br>42 limit 41 to exclude medline journals (7) | |
| NHS Evidence - guidelines | 15/10/13 | Glaucoma (filter: Guidelines, type of information) | 333 (15 in RefMan) |
| NHS Evidence – commissioning | 15/10/13 | Glaucoma (filter: Commissioning, area of interest) | 71 (3 in RefMan) |
| National Guidelines Clearing House | 15/10/13 | Keyword: glaucoma<br>Indexing keywords: Disease or Condition | 2 |
| Google | 15/10/13 | glaucoma guidance OR guideline filetype:pdf | 4 |
| **Total number after deduplication** | | | **162** |
| **Total number after first sift** | | **Tagged with 'Included'** | **102** |

## APPENDIX B – Documents not included in guidance

The following is a list of documents retrieved from the literature search but not included in the final guidance document. A reason for lack of inclusion is given for each document.

American Academy of Ophthalmology. *Comprehensive adult medical eye evaluation*.; 2010. **– general open-angle glaucoma guidance covered by already cited NICE guidance.**

American Optometric Association. *Care of the patient with open angle glaucoma*.; 2011. – **not directly relevant to guidance.**

Ang LPS, Ang LPK. Current understanding of the treatment and outcome of acute primary angle-closure glaucoma: an Asian perspective. *Ann. Acad. Med. Singapore*. 2008;37(3):210–5. **– not directly relevant to UK system.**

Antony K, Genser D, Fröschl B. Validity and cost-effectiveness of methods for screening of primary open angle glaucoma. *GMS Health Technol. Assess.* 2007;3(3):Doc01. – **covered in systematic review of screening that is already cited.**

Berenson KL, Kymes S, Hollander DA, Fiscella R, Burk C, Patel VD. Cost-offset analysis: bimatoprost versus other prostaglandin analogues in open-angle glaucoma (Structured abstract). 2011;17(9):e365–e374. . - **covered by another review article.**

Budenz DL. A clinician's guide to the assessment and management of nonadherence in glaucoma. *Ophthalmology*. 2009;116(11 Suppl):S43–7. **– content covered in another cited article**.

Burr JM, Botello-Pinzon P, Takwoingi Y, et al. Surveillance for ocular hypertension: an evidence synthesis and economic evaluation. *Health Technol. Assess.* 2012;16(29):1–271, iii–iv. – **no additional recommendations compared with NICE guidance.**

Cheng JW, Cai JP, Li Y, Wei RL. Intraoperative mitomycin C for nonpenetrating glaucoma surgery: a systematic review and meta-analysis. [Review]. 2011;20(5):322–326. - **beyond the scope of the guidance.**

Cheng J-W, Cai J-P, Wei R-L. Meta-analysis of medical intervention for normal tension glaucoma. *Ophthalmology*. 2009;116(7):1243–9. – **covered by another review article**

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Cost-effectiveness of glaucoma screening (Project record). 2005;(3). - **covered by another review article.**

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