NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Guideline

Glaucoma: diagnosis and management

Draft for consultation, November 2021

This guideline covers diagnosing and managing glaucoma in people aged 18 and over. It includes recommendations on testing and referral (case-finding) for chronic open angle glaucoma and ocular hypertension associated with pseudoexfoliation or pigment dispersion, and on effective diagnosis, treatment and reassessment to stop these conditions progressing.

This guideline will update NICE guideline NG81 (published November 2017).

Who is it for?

- Healthcare professionals
- Commissioners and providers of eye care services
- Adults with chronic open angle glaucoma or ocular hypertension, or who are at risk of developing glaucoma, their families and carers

What does it include?

- the recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the 2022 recommendations and how they might affect practice.
- the guideline context.

Information about how the guideline was developed is on the guideline's webpage. This includes the evidence reviews, the scope, details of the committee and any declarations of interest.

Commenting on this update

We have reviewed the evidence on the treatment and organisation of care for ocular hypertension and chronic open angle glaucoma. You are invited to comment on the new and updated recommendations, marked **[2022]**.

We have moved the recommendation section on treatment to before the section on reassessment. The numbering of those sections has changed accordingly.

You are also invited to comment on recommendation 1.5.10 in table 1 (recommendation number in the 2017 guideline), which we propose to delete from this guideline.

We have not reviewed the evidence for the recommendations shaded in grey and cannot accept comments on them. In some cases, we have made minor wording changes for clarification.

See update information for a full explanation of what is being updated.

Full details of the evidence and the committee's discussion on the 2022 recommendations are in the evidence review. Evidence for the 2017 recommendations is in the full version of the 2017 guideline.

Contents

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

Recommendations

1.1 Case-finding

The recommendations on case-finding are for primary eye care professionals before referral for diagnosis of chronic open angle glaucoma (COAG) and related conditions and are separate from a sight test.

1.1.1 Before referral for further investigation and diagnosis of COAG and related conditions, offer all of the following tests:

- central visual field assessment using standard automated perimetry (full threshold or supra-threshold)
- optic nerve assessment and fundus examination using stereoscopic slit lamp biomicroscopy (with pupil dilatation if necessary), and optical coherence tomography (OCT) or optic nerve head image if available
- intraocular pressure (IOP) measurement using Goldmann-type applanation tonometry
- peripheral anterior chamber configuration and depth assessments using gonioscopy or, if not available or the patient prefers, the van Herick test or OCT. **[2017]**

1.1.2 Do not base a decision to refer solely on IOP measurement using non-contact tonometry. **[2017]**

1.1.3 Do not refer people who have previously been discharged from hospital eye services after assessment for COAG and related conditions unless clinical circumstances have changed and a new referral is needed. **[2017]**

1.1.4 Before deciding to refer, consider repeating visual field assessment and IOP measurement on another occasion to confirm a visual field defect or IOP of 24 mmHg or more, unless clinical circumstances indicate urgent or emergency referral is needed. **[2017]**

1.1.5 Refer for further investigation and diagnosis of COAG and related conditions, after considering repeat measures as in recommendation 1.1.4, if:

- there is optic nerve head damage on stereoscopic slit lamp biomicroscopy **or**
- there is a visual field defect consistent with glaucoma **or**
- IOP is 24 mmHg or more using Goldmann-type applanation tonometry. **[2017]**

1.1.6 Provide results of all examinations and tests with the referral. **[2017]**

1.1.7 Advise people with IOP below 24 mmHg to continue regular visits to their primary eye care professional. **[2017]**

These recommendations are for people planning and providing eye care services before referral

1.1.8 People planning and providing eye care services should use a service model that includes Goldmann-type applanation tonometry before referral for diagnosis of COAG and related conditions. **[2017]**

1.1.9 People planning eye care services should consider commissioning referral filtering services (for example, repeat measures, enhanced case-finding, or referral refinement) for COAG and related conditions. **[2017]**

1.2 Diagnosis

1.2.1 To diagnose COAG and related conditions, offer all of the following tests:

- visual field assessment using standard automated perimetry (central thresholding test), repeated if necessary to establish severity at diagnosis
- optic nerve assessment and fundus examination using stereoscopic slit lamp biomicroscopy, with pupil dilatation
- IOP measurement using Goldmann applanation tonometry (slit lamp mounted)
- peripheral anterior chamber configuration and depth assessments using gonioscopy
- central corneal thickness (CCT) measurement. **[2017]**

1.2.2 Adopt professional/Department of Health guidance to reduce the risk of transmitting infective agents via contact tonometry or gonioscopy.

See the Royal College of Ophthalmologists' ophthalmic services guidance and the Department of Health's guidance on minimising transmission risk of CJD and vCJD in healthcare settings. **[2009]**

1.2.3 Use the van Herick peripheral anterior chamber depth assessment if clinical circumstances rule out gonioscopy (for example, when people with physical or learning disabilities are unable to participate in the examination). **[2009]**

1.2.4 Obtain an optic nerve head image at diagnosis for baseline documentation (for example, a stereoscopic optic nerve head image or OCT). **[2009, amended 2017]**

1.2.5 After referral, consider an early assessment appointment when there is clinical concern based on the information provided. **[2017]**

1.2.6 At the time of diagnosis of ocular hypertension (OHT), assess risk of future visual impairment, taking account of risk factors such as:

- level of IOP
- CCT
- family history

- life expectancy. **[2017]**

1.3 Standard practice for all assessments

1.3.1 Ensure that all of the following are made available at each clinical episode to all healthcare professionals involved in a person's care:

- records of all previous tests and images relevant to COAG and OHT assessment
- records of past medical history that could affect drug choice
- current systemic and topical medication
- glaucoma medication record
- drug allergies and intolerances. **[2009]**

1.3.2 Use alternative methods of assessment if clinical circumstances rule out standard methods (for example, when people with physical or learning disabilities are unable to participate in the examination). **[2009]**

1.3.3 Ensure that all machines and measurement instruments are calibrated regularly according to the manufacturers' instructions. **[2009]**

1.4 Treatment

1.4.1 Take into account any cognitive and physical impairments when making decisions about management and treatment. **[2017]**

1.4.2 Check that there are no relevant comorbidities or potential drug interactions before offering pharmacological treatment. **[2009]**

Treatment for people with OHT

1.4.3 Do not offer treatment to people with OHT who are not at risk of visual impairment in their lifetime. Advise people to continue regular visits to their primary eye care professional, at clinically appropriate intervals. **[2017]**

Selective laser trabeculoplasty for people with OHT

1.4.4 Offer 360° selective laser trabeculoplasty (SLT) to people with newly diagnosed OHT with IOP of 24 mmHg or more (excluding cases associated with pigment dispersion syndrome) if they are at risk of visual impairment within their lifetime. Provide people with the following information to inform their decision:

- having SLT can delay the need for eyedrops and can reduce but does not remove the chance they will be needed at all.
- how long it may take for their IOP to improve after the procedure
- SLT-specific side effects and how long they are likely to last
- a second SLT procedure may be necessary at a later date. **[2022]**

1.4.5 Consider a second 360° SLT for people with OHT if the effect of an initial successful SLT has subsequently diminished. **[2022]**

For a short explanation of why the committee made these recommendations see the rationale and impact section on selective laser trabeculoplasty for people with ocular hypertension and chronic open angle glaucoma.

Full details of the evidence and the committee's discussion are in evidence review A: Glaucoma diagnosis and management.

Pharmacological treatment for people with OHT

1.4.6 Offer a generic prostaglandin analogue (PGA) to people with OHT with IOP of 24 mmHg or more if they are at risk of visual impairment within their lifetime (see the recommendation on taking account of risk factors in the section on diagnosis) and:

- they choose not to have SLT **or**
- SLT is not suitable (for example because they have pigment dispersion syndrome) **or**
- as interim treatment if they are waiting for an SLT procedure **or**
- they have previously had SLT but need additional treatment to reduce their IOP sufficiently to prevent the risk of visual impairment **[2022]**

For a short explanation of why the committee made these recommendations see the rationale and impact section on generic prostaglandin analogues for people with OHT or COAG.

Full details of the evidence and the committee's discussion are in evidence review A: Glaucoma diagnosis and management.

1.4.7 Offer another pharmacological treatment to people with an IOP of 24 mmHg or more who cannot tolerate their current treatment. The first choice should be an alternative generic PGA, if available, and if this is not tolerated, offer a beta-blocker. If none of these options are tolerated, offer non-generic PGA, carbonic anhydrase inhibitors, sympathomimetics, miotics or a combination of treatments. **[2017]**

1.4.8 Offer a drug from another therapeutic class (beta-blocker, carbonic anhydrase inhibitor or sympathomimetic) to people with an IOP of 24 mmHg or more whose current treatment is not reducing IOP sufficiently to prevent the risk of progression to sight loss. Topical drugs from different therapeutic classes may be needed at the same time to control IOP. **[2009, amended 2017]**

1.4.9 Refer people whose IOP cannot be reduced sufficiently with SLT or pharmacological treatment or both to prevent the risk of progression to sight loss to a consultant ophthalmologist to discuss other options. **[2009, amended 2022]**

1.4.10 Offer preservative-free eye drops to people who have an allergy to preservatives or people with clinically significant and symptomatic ocular surface disease, but only if they are at high risk of conversion to COAG. **[2009, amended 2017]**

Treatment for people with suspected COAG

1.4.11 Do not offer treatment to people with suspected COAG and IOP less than 24 mmHg. Advise people to continue regular visits to their primary eye care professional, at clinically appropriate intervals. **[2017]**

Stopping treatment for people with OHT or suspected COAG

1.4.12 Discuss the benefits and risks of stopping treatment with people with OHT or suspected COAG who have both:

- a low risk of developing visual impairment within their lifetime
- an acceptable IOP.

If a person decides to stop treatment after this discussion, offer to assess their IOP in 1 month to 4 months with further reassessment if clinically indicated. **[2009]**

Treatment for people with COAG

In November 2021 the use of mitomycin-C (MMC) in recommendations 1.4.16, 1.4.19, 1.4.20 and 1.4.21 was off label. See NICE's information on prescribing medicines.

SLT for people with COAG

1.4.13 Offer 360° SLT to people with newly diagnosed COAG (excluding cases associated with pigment dispersion syndrome). For people with advanced COAG see recommendations 1.4.16 and 1.4.23. Provide people with the following information to inform their decision:

- having SLT can delay the need for eyedrops and can reduce but does not remove the chance they will be needed at all
- how long it may take for their IOP to improve after the procedure
- SLT-specific side effects and how long they are likely to last
- a second SLT procedure may be necessary at a later date. **[2022]**

1.4.14 Consider a second 360° SLT for people with COAG if the effect of an initial successful SLT has subsequently diminished. **[2022]**

For a short explanation of why the committee made these recommendations see the rationale and impact section on selective laser trabeculoplasty for people with ocular hypertension and chronic open angle glaucoma.

Full details of the evidence and the committee's discussion are in evidence review A: Glaucoma diagnosis and management.

Pharmacological treatment and surgery for people with COAG

1.4.15 Offer a generic PGA to people with COAG if:

- they choose not to have SLT **or**
- SLT is not suitable (for example because they have pigment dispersion syndrome) **or**
- as interim treatment if they are waiting for an SLT procedure **or**
- they have previously had SLT but need additional treatment to reduce their IOP sufficiently to prevent the risk of visual impairment. **[2022]**

For a short explanation of why the committee made these recommendations see the rationale and impact section on generic prostaglandin analogues for people with OHT or COAG.

Full details of the evidence and the committee's discussion are in evidence review A: Glaucoma diagnosis and management.

1.4.16 Offer people with advanced COAG surgery with pharmacological augmentation (MMC) as indicated. Offer them information on the risks and benefits associated with surgery. **[2009, amended 2017]**

1.4.17 Offer people who present with advanced COAG and who are listed for surgery, interim treatment with a generic PGA. **[2009, amended 2017]**

1.4.18 Encourage people to continue with the same pharmacological treatment unless:

- their IOP cannot be reduced sufficiently to prevent the risk of progression to sight loss
- there is progression of optic nerve head damage
- there is progression of visual field defect
- they cannot tolerate the drug. **[2009]**

1.4.19 Ask about adherence to treatment and check the eye drop instillation technique in people with COAG whose IOP has not been reduced sufficiently to prevent the risk of progression to sight loss, despite pharmacological treatment with a generic PGA. If adherence and eye drop instillation technique are satisfactory offer 1 of the following:

- a drug from another therapeutic class (a beta-blocker, carbonic anhydrase inhibitor or sympathomimetic); topical drugs from different therapeutic classes may be needed at the same time to control IOP **or**
- SLT **or**
- surgery with pharmacological augmentation (MMC) as indicated.

If the drug treatment option is chosen after trying drugs from 2 therapeutic classes, consider offering SLT or surgery with pharmacological augmentation (MMC) as indicated. **[2009, amended 2022]**

1.4.20 Offer surgery with pharmacological augmentation (MMC) as indicated to people with COAG who are at risk of progressing to sight loss despite treatment. Offer them information on the risks and benefits associated with surgery. **[2009, amended 2017]**

1.4.21 Consider 1 of the following for people with COAG who cannot tolerate a pharmacological treatment:

- a drug from another therapeutic class (a beta-blocker, carbonic anhydrase inhibitor or sympathomimetic) **or**

- preservative-free eye drops if there is evidence that the person is allergic to the preservative or has clinically significant and symptomatic ocular surface disease.

After trying drugs from 2 therapeutic classes, consider SLT or surgery with pharmacological augmentation (MMC) as indicated. **[2009, amended 2022]**

1.4.22 After surgery offer people with COAG whose IOP has not been reduced sufficiently to prevent the risk of progression to sight loss 1 of the following:

- pharmacological treatment; topical drugs from different therapeutic classes may be needed at the same time to control IOP
- further surgery **or**
- cyclodiode laser treatment. **[2009, amended 2022]**

1.4.23 Offer people with COAG (including advanced COAG) who prefer not to have surgery or for whom surgery is not suitable 1 of the following:

- pharmacological treatment; topical drugs from different therapeutic classes may be needed at the same time to control IOP
- SLT (for example in people with systemic comorbidities) **or**
- cyclodiode laser treatment. **[2009, amended 2022]**

1.5 Reassessment

Reassessment tests

1.5.1 At each assessment, offer the following tests to people with COAG, people suspected of having COAG and people with OHT:

- Goldmann applanation tonometry (slit lamp mounted)
- anterior segment slit lamp examination with van Herick peripheral anterior chamber depth assessment when clinically indicated. **[2017]**

1.5.2 When clinically indicated, repeat gonioscopy, for example, where a previous examination has been inconclusive or where there is suspicion of a change in clinical status of the anterior chamber angle. **[2017]**

1.5.3 When clinically indicated, repeat visual field testing using standard automated perimetry (central thresholding test) for people with COAG and those suspected of having visual field defects who are being investigated for possible COAG (see tables 2 and 3 for recommended reassessment intervals). **[2009, amended 2017]**

1.5.4 When clinically indicated, repeat visual field testing using either a central thresholding test or a supra-threshold test for people with OHT and those suspected of having COAG whose visual fields have previously been documented by standard threshold automated perimetry (central thresholding test) as being normal (see tables 1 and 2 for recommended reassessment intervals). **[2009, amended 2017]**

1.5.5 When a visual field defect has previously been detected, use the same measurement strategy for each visual field assessment. **[2009]**

1.5.6 When clinically indicated, repeat assessment of the optic nerve head (for example, stereoscopic slit lamp biomicroscopy or imaging). **[2017]**

1.5.7 When a change in optic nerve head status is detected by stereoscopic slit lamp biomicroscopy, obtain a new optic nerve head image for the person’s records to provide a fresh benchmark for future assessments. **[2009]**

1.5.8 When an adequate view of the optic nerve head and surrounding area is unavailable at reassessment, people should have their pupils dilated before stereoscopic slit lamp biomicroscopy or optic nerve head imaging is repeated. **[2009]**

When to reassess

People with COAG, suspected COAG and OHT

1.5.9 At each assessment, re-evaluate risk of conversion to COAG and risk of sight loss to set time to next assessment. **[2017]**

1.5.10 At each assessment, ask about general health and, if appropriate, factors affecting adherence to treatment, including cognitive impairment and any treatment side effects. **[2017]**

People with treated OHT (baseline IOP 24 mmHg or more) and a normal optic nerve head and visual field at most recent assessment

1.5.11 For people with treated OHT (baseline IOP of 24 mmHg or more) and a normal optic head and visual field at the most recent assessment:

- use clinical judgement to assess control of IOP and risk of conversion to COAG, **and**
- reassess according to table 1. **[2017]**

Table 1 Time to next assessment for people being treated for ocular hypertension

Conversion from ocular hypertension to chronic open angle glaucoma	Control of intraocular pressure	Time to next assessment
Not detected or uncertain conversion	No	Review management plan and reassess between 1 month and 4 months
Uncertain conversion	Yes	Reassess between 6 months and 12 months
No conversion detected	Yes	Reassess between 18 months and 24 months
Conversion	No or yes	See recommendations on the diagnosis and reassessment of chronic open angle glaucoma

Use clinical judgement to decide when the next appointment should take place within the recommended interval.

Uncertain conversion includes having insufficient accurate information (perhaps because the person was unable to participate in the assessment).

People with suspected COAG

1.5.12 For people with suspected COAG:

- use clinical judgement to assess control of IOP and risk of conversion to COAG (optic nerve head damage and visual field defect), **and**
- reassess according to table 2. **[2017]**

Table 2 Time to next assessment for people with suspected chronic open angle glaucoma

Conversion to chronic open angle glaucoma	Control of intraocular pressure	Time to next assessment
Not detected or uncertain conversion	No	Review management plan and reassess between 1 month and 4 months
Uncertain conversion	Yes	Reassess between 6 months and 12 months
No conversion detected	Yes	Reassess between 12 months and 18 months
Conversion	No or yes	See recommendations on the diagnosis and reassessment of chronic open angle glaucoma

Use clinical judgement to decide when the next appointment should take place within the recommended interval.

Uncertain conversion includes having insufficient accurate information (perhaps because the person was unable to participate in the assessment).

People with COAG

1.5.13 For people with COAG:

- use clinical judgement to assess risk of COAG progression to sight loss, **and**
- reassess according to table 3. **[2017]**

Table 3 Time to next assessment for people with chronic open angle glaucoma

Progression of chronic open angle glaucoma	Control of intraocular pressure	Time to next assessment
Not detected	No	Review treatment plan and reassess between 1 month and 4 months

Progression of chronic open angle glaucoma	Control of intraocular pressure	Time to next assessment
Uncertain progression or progression	No	Review treatment plan and reassess between 1 month and 2 months
No progression detected and low clinical risk	Yes	Reassess between 12 months and 18 months
No progression detected and high clinical risk	Yes	Reassess between 6 months and 12 months
Uncertain progression or progression	Yes	Review treatment plan and reassess between 2 months and 6 months

Use clinical judgement to decide when the next appointment should take place within the recommended interval.

Uncertain conversion includes having insufficient accurate information (perhaps because the person was unable to participate in the assessment).

Discharge back to primary care

1.5.14 Discharge people back to primary eye care services if:

- they were referred for OHT but do not need treatment
- they were referred for suspected COAG but this is no longer suspected.

Advise people that they should continue with regular visits to their primary eye care professional, at clinically appropriate intervals. **[2017]**

1.5.15 Give a discharge summary to people who have been assessed and discharged to primary care. Send a copy to their GP and, with patient consent, copy the relevant information to the primary eye care professional nominated by the patient. Advise people to take their discharge summary with them when attending future sight tests. **[2017]**

1.6 Organisation of care

1.6.1 Refer people with suspected optic nerve damage or repeatable visual field defect, or both, to a consultant ophthalmologist for consideration of a definitive diagnosis and formulation of a management plan. **[2009]**

1.6.2 Diagnosis of OHT and suspected COAG and formulation of a management plan should be made by a suitably trained healthcare professional with:

- a specialist qualification and
- relevant experience. **[2009, amended 2017]**

1.6.3 Be aware that holding an independent or non-medical prescribing qualification alone (without a specialist qualification relevant to the case complexity of glaucoma being managed) is insufficient for managing glaucoma and related conditions. **[2017]**

1.6.4 Healthcare professionals involved in the diagnosis of OHT and COAG suspect status and preliminary identification of COAG should be trained in case detection and referral refinement and be able to identify abnormalities based on relevant clinical tests and assessments. They should understand the principles of diagnosis of OHT and COAG and be able to perform and interpret all of the following:

- medical and ocular history
- differential diagnosis
- Goldmann applanation tonometry (slit lamp mounted)
- standard automated perimetry (central thresholding test)
- central supra-threshold perimetry
- stereoscopic slit lamp biomicroscopic examination of anterior segment
- examination of the posterior segment using a slit lamp binocular indirect ophthalmoscopy
- gonioscopy
- van Herick peripheral anterior chamber depth assessment
- CCT measurement. **[2009]**

1.6.5 People with OHT, suspected COAG or COAG should have monitoring and treatment from a trained healthcare professional who has all of the following:

- a specialist qualification
- relevant experience

- ability to detect a change in clinical status. **[2009, amended 2017]**

1.6.6 Healthcare professionals involved in monitoring and treating OHT, suspected COAG and established COAG should be trained to make management decisions on all of the following:

- risk factors for conversion to COAG
- coexisting pathology
- risk of sight loss
- monitoring and detecting a change in clinical status (for example, visual field changes and stereoscopic slit lamp biomicroscopic examination of anterior segment and posterior segment)
- pharmacology of IOP-lowering drugs
- eligibility for SLT
- treatment changes for COAG, suspected COAG and OHT (with consideration given to relevant contraindications and interactions). **[2009, amended 2022]**

1.6.7 Healthcare professionals should discuss with the responsible consultant ophthalmologist the decision to offer SLT and how it will be performed. Healthcare professionals undertaking SLT should be given support by the responsible consultant ophthalmologist and have relevant training on:

- the suitability of the procedure
- laser procedure and safety
- benefits and risks of SLT, and how to discuss these with patients and their family members or carers (as appropriate)
- patient consent. **[2022]**

For a short explanation of why the committee made these recommendations see the rationale and impact section on organisation of care.

Full details of the evidence and the committee's discussion are in evidence review A: Glaucoma diagnosis and management.

1.6.8 People with a confirmed diagnosis of OHT or suspected COAG and who have an established management plan may have monitoring (but not treatment) from a suitably trained healthcare professional with knowledge of OHT and COAG, relevant experience and ability to detect a change in clinical status. The healthcare professional should be able to perform and interpret all of the following:

- Goldmann applanation tonometry (slit lamp mounted)
- standard automated perimetry (central thresholding test)
- central supra-threshold perimetry (this visual field strategy may be used for monitoring OHT or suspected COAG when the visual field is normal)
- stereoscopic slit lamp biomicroscopic examination of the anterior segment
- van Herick peripheral anterior chamber depth assessment
- examination of the posterior segment using slit lamp binocular indirect ophthalmoscopy. **[2009]**

1.6.9 Healthcare professionals who diagnose, treat or monitor independently of consultant ophthalmologist supervision should take full responsibility for the care they provide. **[2009]**

1.7 Providing information

1.7.1 Ensure that people are offered the opportunity to discuss their diagnosis, referral, prognosis, treatment and discharge so they can take an active part in decision making (see NICE's guideline on shared decision making). Provide them with relevant information in an accessible format at initial and subsequent visits. This should include information on:

- their specific condition (OHT, suspected COAG and COAG), its life-long implications and their prognosis for retention of sight
- that COAG in the early stages and OHT and suspected COAG are symptomless
- that most people having treatment for COAG will have good quality of life and not go blind
- that once lost, sight cannot be recovered

- the different types of treatment options, including mode of action, frequency and severity of side effects, and risks and benefits of treatment
- that glaucoma can run in families and that family members may wish to be tested for the condition
- the importance of the person's role in their own treatment – for example, the ongoing regular application of eye drops to preserve sight

1.7.2 Ensure that people are given practical information and advice on

- how to apply eye drops, including technique (punctal occlusion and devices) and hygiene (storage)
- the need for regular monitoring as specified by the healthcare professional
- methods of investigation during assessment
- how long each appointment is likely to take and whether the person will need any help to attend (for example, driving soon after pupil dilatation would be inadvisable)
- how to contact the eye clinic liaison officer (ECLO)
- support organisations and support groups
- compliance aids (such as dispensers) available from their GP or community pharmacist
- Letter of Vision Impairment (LVI), Referral of Vision Impairment (RVI) and Certificate of Vision Impairment (CVI), registration
- Driver and Vehicle Licensing Agency (DVLA) regulations. **[2009, amended 2017]**

Terms used in this guideline

COAG and related conditions

These include COAG, OHT and suspected COAG.

Enhanced case-finding

Enhanced community case-finding services use slit lamp mounted Goldmann-type applanation tonometry, dilated slit lamp indirect biomicroscopy and other tests deemed necessary by the healthcare professional.

Hospital-based triage

A hospital-based risk assessment shortly after referral. Initial tests are performed to determine what happens next. For example, people at a low risk following initial testing by a nurse or technician may be discharged whereas those at higher risk may be directed to a more senior member of the assessment and diagnostic team, such as a consultant ophthalmologist.

MMC

Mitomycin-C

Primary eye care professionals

These include optometrists, GPs with a special interest in ophthalmology and community orthoptists.

Referral filtering

A general term for any type of accuracy checking before referral to hospital eye services. Referral filtering may take the form of ‘repeat measures’, ‘enhanced case-finding’, ‘referral refinement’, ‘hospital-based triage’ or ‘administrative paper-based triage’.

Referral refinement

A 2-tier assessment in which initial evidence of abnormality found during case-finding or screening is validated by an enhanced assessment, which adds value beyond that achieved through a simple 'repeat measures' scheme. A referral refinement service performs tests to diagnose OHT and suspected COAG and interprets the results in the light of clinical findings. Specialist practitioners who deliver this service independently have the qualifications and experience set out in the recommendations on organisation of care. 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.

Repeat measures

The repeated measurement of parameters related to the diagnosis of glaucoma. A simple repeat measures scheme may involve repeat measurement of IOP only. Other repeat measures schemes may also include repeated measurement of visual fields and other relevant ocular parameters when clinically necessary.

Sight loss

Sight loss in glaucoma is visual damage that manifests as blind spots in the field of vision. Early on these are mostly asymptomatic with many people being unaware of a problem. Sight loss may progress to visual impairment and eventually become symptomatic.

Sight test

A sight test determines whether or not a person has a sight defect, and if so, what is needed to correct, remedy or relieve it. An optometrist performing a sight test has to conduct the examinations specified in the Sight Testing (Examination and Prescription) (No 2) Regulations 1989. These include an internal and external examination of the eyes and any other examinations needed to detect signs of injury, disease or abnormality in the eye or elsewhere.

Visual impairment

A severe reduction in vision, which cannot be corrected with standard glasses or contact lenses and reduces a person's ability to function in a visual environment.

Recommendations for research

The guideline committee has made the following recommendations for research.

Key recommendations for research

1 Risk tools to identify risk of developing COAG and risk of sight loss

What is the predictive value of risk tools for identifying people in the community who are at increased risk of developing chronic open angle glaucoma (COAG) and identifying people with COAG who are at increased risk of sight loss?

2 Treatment for people with an IOP of 22 or 23 mmHg

What is the clinical and cost effectiveness of treating an intraocular pressure (IOP) of 22 or 23 mmHg in people with normal optic discs and visual fields?

3 An instrument to measure quality of life in people with glaucoma

What instrument should be used to measure health-related quality of life in people with glaucoma?

4 Optical coherence tomography for glaucoma

What is the effectiveness and cost effectiveness of optical coherence tomography (OCT) for diagnosing and monitoring glaucoma?

5 Referral filtering

What is the effectiveness and cost effectiveness of the different models for glaucoma filtering (pathways from case-finding to assessment in secondary ophthalmic care) for detecting glaucoma and glaucoma-related conditions (ocular hypertension and suspected glaucoma)?

Other recommendations for research

Long-term effectiveness of selective laser trabeculoplasty

What is the long-term effectiveness and cost-effectiveness of selective laser trabeculoplasty as a first-line treatment compared with intraocular pressure-lowering eyedrops in ocular hypertension or chronic open angle glaucoma in adults?

For a short explanation of why the committee made this recommendation see the rationale section on selective laser trabeculoplasty for people with ocular hypertension and chronic open angle glaucoma.

Full details of the evidence and the committee's discussion are in evidence review A: Glaucoma diagnosis and management.

Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice.

Selective laser trabeculoplasty for people with ocular hypertension or chronic open angle glaucoma

Recommendations 1.4.4 and 1.4.5 and recommendations 1.4.13 and 1.4.14

Why the committee made the recommendations

The committee agreed that the key outcome for adults with OHT or COAG was visual field progression that, in the long-term, could affect people's vision. Intraocular pressure (IOP) was considered to be a relevant surrogate outcome because lowering IOP could prevent the risk of optic nerve damage and vision loss. High-quality evidence showed that there was no meaningful difference between selective laser trabeculoplasty (SLT) and eye drops in achieving the target IOP, health-related quality of life, risk of total adverse events, and treatment adherence. In people who have first-line eye drop treatment compared with first-line SLT, more people used eye drops and more people had more than 1 eye drop medication.

The evidence showed that first-line treatment with 360° SLT was more effective and less costly compared with eye drops, with a probability of at least 90% of being the more cost-effective option. For costs, this result was driven by treatment involving SLT costing less overall compared with eye drops alone. This is because the additional costs of SLT were outweighed by reduced costs of eyedrops. For quality of life, SLT resulted in a longer period without eye drops, or with fewer eyedrops, and slightly slower estimated progression rates for glaucoma. This improved quality of life (although no direct benefit on quality of life was found in the trial, the cost-effectiveness analysis incorporated additional data on the natural history of glaucoma). The cost-effectiveness analysis included the costs and benefits of a second SLT if the clinicians deemed it necessary. Even if SLT was assumed to have the same clinical effectiveness as eye drops, it would still be a highly cost-effective treatment, due to the estimated reduction in overall costs.

Based on this evidence and their clinical experience, the committee recommended 360° SLT as first-line treatment for people with newly diagnosed ocular hypertension (OHT) or newly diagnosed chronic open angle glaucoma (COAG). The recommendation excludes cases associated with pigment dispersion syndrome. This was because there was no evidence on the use of SLT in people with pigment dispersion syndrome and the committee agreed that eye drop treatment is more suitable for those people.

The committee recommended that a second 360° SLT could be needed if the effect of an initial successful SLT has subsequently diminished. This follows the procedure used in the main UK randomised trial (the LiGHT trial).

The committee highlighted that there was a lack of long-term evidence on progression of glaucomatous visual field defect and progression of optic nerve head damage. The committee also highlighted that patients care more about vision outcomes than other outcomes such as IOP. A research recommendation was developed to cover this gap in the evidence on the long-term effectiveness of SLT (with follow-up times of 5 years and 10 years).

Impact on other recommendations

The committee considered the impact of recommending SLT on other recommendations in the guideline. Recommendations were amended as necessary, taking into account the original evidence for each recommendation and the committee’s knowledge and experience.

How the recommendations might affect practice

The recommendations are likely to result in a significant change in practice, because more people with newly diagnosed OHT or COAG could be offered SLT as their first treatment. Overall, this is not likely to have a substantial cost impact because evidence shows that first-line SLT (including the purchase and maintenance of the SLT machine) was less costly than first-line use of IOP-lowering eye drops. However, there will be changes in the types of costs incurred, with significant reductions in the cost of eye drop prescriptions but increases in costs for SLT devices and staffing.

Return to recommendations 1.4.3 and 1.4.4

Return to recommendations 1.4.13 and 1.4.14

Generic prostaglandin analogues for people with OHT or COAG

Recommendations 1.4.6 and 1.4.15

Why the committee made the recommendations

The 2017 guideline recommended prostaglandin analogue (PGA) eye drops for OHT or COAG. The committee amended this to reflect the new 2022 recommendations on using SLT. They agreed that people who prefer not to have SLT or for whom it is not suitable should be offered generic PGA eye drops. This was because PGA eye drops were used for first-line treatment in the 2017 guideline and in the LiGHT trial.

Return to recommendations 1.4.6

Return to recommendation 1.4.15

Organisation of care

Recommendations 1.6.6 and 1.6.7

Why the committee made the recommendations

The committee noted that the first-line use of SLT to treat OHT or COAG might lead to a significant change in practice that requires different organisation of care. They also discussed the safety of the SLT procedure and agreed that healthcare professionals should discuss with the responsible consultant ophthalmologist the decision to offer SLT and how it will be performed. This means that healthcare professionals such as associate specialists, specialist nurses, optometrists and allied health professionals can perform SLT with support from a consultant ophthalmologist.

The committee also noted that healthcare professionals who provide SLT should be given support and have relevant training on the suitability and safety of the procedure, including its benefits and risks. They should also be trained on discussing these points and patient consent with patients and their family members or carers. A similar approach was taken in the LiGHT trial, where training was given to all treating surgeons before recruitment and the chief investigator, who was a consultant ophthalmic surgeon, observed each surgeon perform at least 1 laser treatment. Based on these discussions, new recommendations were added to provide further clarification on organisation of care.

How the recommendations might affect practice

The recommendations are likely to result in a significant change in practice because training and support will be needed for healthcare professionals performing the SLT procedure.

Return to recommendations 1.6.6 and 1.6.7

Context

The scope of this NICE guideline on diagnosing and managing chronic open angle glaucoma (COAG) was extended to cover referral in 2017. This included the most effective service models for referral filtering schemes (repeat measures, enhanced case-finding and referral refinement), the tests to be used for finding people with COAG, suspected chronic open angle glaucoma and ocular hypertension (OHT), and thresholds for onward referral. In 2017, the guidance was also updated on tests for diagnosis and reassessment, pharmacological treatments for lowering intraocular pressure (IOP) and preserving visual field, and reassessment intervals, which depend on prognosis.

The 2017 update provided an opportunity to re-evaluate the clinical effectiveness, cost effectiveness and indications for treating OHT. Knowledge of corneal thickness is no longer needed to decide whether or not to treat OHT and a single threshold of 24 mmHg is now recommended for both onward referral and treatment. Changes in the costs of pharmacological treatments, acknowledgement of short- and long-term variations in IOP and the uneven relationship between rising pressure and increased risk have allowed a simplification of the indications for OHT treatment.

Control of IOP remains critical to the therapeutic approach, with intensity of treatment and ongoing management being guided by disease severity and progression as shown by visual field change, morphological change in the optic disc, and the likelihood of progressive sight loss. Reassessment at each visit is emphasised, encouraging flexible clinical judgement about the frequency of visits and options for treatment, including stopping treatment when the perceived risk to a sighted lifetime is low.

Since the update in 2017, there has been new evidence on the treatment of OHT and COAG on the use of selective laser trabeculoplasty (SLT) as a first-line treatment. Therefore, recommendations on treatment for people with OHT and for people with COAG needed to be updated.

Where new evidence was not found the guideline has not been updated, that is, accuracy of visual field tests, surgical interventions, and information, education and support needed for adherence to treatment.

Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE webpage on eye conditions.

For details of the guideline committee see the committee member list.

Update information

January 2022

We have reviewed the evidence on treatment and organisation of care for people with ocular hypertension and chronic open angle glaucoma.

Recommendations are marked **[2022]** if the evidence has been reviewed.

Recommendations that have been deleted, or changed without an evidence review

We propose to delete some recommendations from the 2017 guideline. Table 1 sets out these recommendations and includes details of replacement recommendations. If there is no replacement recommendation, an explanation for the proposed deletion is given.

For recommendations shaded in grey and ending **2009, amended 2022**, we have made changes that could affect the intent without reviewing the evidence. Yellow shading is used to highlight these changes, and reasons for the changes are given in table 2.

For recommendations shaded in grey and ending **2017**, we have not reviewed the evidence. In some cases, minor changes have been made – for example, to update links, or bring the language and style up to date – without changing the intent of the recommendation. Minor changes are listed in table 3.

See also the previous NICE guideline and supporting documents.

Table 1 Recommendations that have been deleted

Recommendation in 2017 guideline	Comment
1.5.10 Offer a generic PGA to people with suspected COAG and IOP of 24 mmHg or more, in line with the recommendations on treatment for people with OHT. **[2017]** In November 2017, this was an off-label use of some generic PGAs. See NICE's information on prescribing medicines.	This recommendation has been deleted because the committee noted that the threshold stated in the recommendation is not reflective of glaucoma suspicion and instead indicates that a patient has OHT, which is covered in separate recommendations.
Footnote to recommendation 1.5.3 In November 2017, this was an off-label use of some generic PGAs. See NICE's information on prescribing medicines. Footnote to recommendation 1.5.6 In November 2017, this was an off-label use of some carbonic anhydrase inhibitors. See NICE's information on prescribing medicines.	Off-label footnotes were removed when those referred to the use of generic PGAs and carbonic anhydrase inhibitors because both types of medications are now licensed to reduce intraocular pressure in ocular hypertension and open-angle glaucoma. Currently, the note at the beginning of section 'Treatment for people with COAG' only includes the use of MMC which is still off label.

Note at the beginning of section 'Treatment for people with COAG' In November 2017: • the use of some generic PGAs in recommendations 1.5.12 and 1.5.14 was off label • the use of some carbonic anhydrase inhibitors in recommendations 1.5.16 and 1.5.18 was off label.	

Table 2 Amended recommendation wording (change to intent) without an evidence review

Recommendation in 2017 guideline	Recommendation in current guideline	Reason for change
1.5.7 Refer people whose IOP cannot be reduced sufficiently with pharmacological treatment to prevent the risk of progression to sight loss to a consultant ophthalmologist to discuss other options. [2009]	1.4.9 Refer people whose IOP cannot be reduced sufficiently with SLT or pharmacological treatment or both to prevent the risk of progression to sight loss to a consultant ophthalmologist to discuss other options. [2009, amended 2022]	This recommendation has been amended because SLT is now recommended as a first-line treatment and some people could have either SLT or pharmacological treatment or both.
1.5.16 Ask about adherence to treatment and check the eye drop instillation technique in people with COAG whose IOP has not been reduced sufficiently to prevent the risk of progression to sight loss despite pharmacological treatment. If adherence and eye drop instillation technique are satisfactory offer 1 of the following: • a drug from another therapeutic class (a beta-blocker, carbonic anhydrase inhibitor or sympathomimetic); topical drugs from different therapeutic classes may be	1.4.19 Ask about adherence to treatment and check the eye drop instillation technique in people with COAG whose IOP has not been reduced sufficiently to prevent the risk of progression to sight loss, despite pharmacological treatment. If adherence and eye drop instillation technique are satisfactory offer 1 of the following: • a drug from another therapeutic class (a beta-blocker, carbonic anhydrase inhibitor or sympathomimetic); topical drugs from different therapeutic classes may be	Laser trabeculoplasty was replaced by SLT to be in line with new recommendations.

needed at the same time to control IOP • laser trabeculoplasty • surgery with pharmacological augmentation (MMC) as indicated. If the drug treatment option is chosen, after trying drugs from 2 therapeutic classes, consider offering surgery with pharmacological augmentation (MMC) as indicated or laser trabeculoplasty. [2009, amended 2017]	needed at the same time to control IOP or • SLT or • surgery with pharmacological augmentation (MMC) as indicated. If the drug treatment option is chosen, after trying drugs from 2 therapeutic classes, consider offering SLT or surgery with pharmacological augmentation (MMC) as indicated. [2009, amended 2022]	
1.5.18 Consider offering people with COAG who cannot tolerate a treatment: • a drug from another therapeutic class (a beta-blocker, carbonic anhydrase inhibitor or sympathomimetic) or • preservative-free eye drops if there is evidence that the person is allergic to the preservative or has clinically significant and symptomatic ocular surface disease. After trying drugs from 2 therapeutic classes, consider offering surgery with pharmacological augmentation (MMC) as indicated or laser trabeculoplasty. [2009, amended 2017]	1.4.21 Consider 1 of the following for people with COAG who cannot tolerate a pharmacological treatment: • a drug from another therapeutic class (a beta-blocker, carbonic anhydrase inhibitor or sympathomimetic) or • preservative-free eye drops if there is evidence that the person is allergic to the preservative or has clinically significant and symptomatic ocular surface disease. After trying drugs from 2 therapeutic classes, consider SLT or surgery with pharmacological augmentation (MMC) as indicated. [2009, amended 2022]	The start of the recommendation was updated to be in line with NICE style removing 'offering' and rewording to 'Consider 1 of the following for…'. Laser trabeculoplasty was also replaced by SLT to be in line with new recommendations.
1.5.19 After surgery offer people with COAG whose IOP has not been reduced sufficiently to prevent the risk of progression to sight loss 1 of the following: • pharmacological treatment; topical drugs from different therapeutic classes	1.4.22 After surgery offer people with COAG whose IOP has not been reduced sufficiently to prevent the risk of progression to sight loss 1 of the following: • pharmacological treatment; topical drugs from different therapeutic classes	The new evidence excluded people with a previous intraocular surgery. Therefore, the option of having laser trabeculoplasty after surgery was removed from the recommendation.

may be needed at the same time to control IOP • further surgery • laser trabeculoplasty or cyclodiode laser treatment. [2009, amended 2017]	may be needed at the same time to control IOP • further surgery or • cyclodiode laser treatment. [2009, amended 2022]	
1.5.20 Offer people with COAG who prefer not to have surgery or for whom surgery is not suitable: • pharmacological treatment; topical drugs from different therapeutic classes may be needed at the same time to control IOP • laser trabeculoplasty or cyclodiode laser treatment. [2009, amended 2017]	1.4.23 Offer people with COAG who prefer not to have surgery or for whom surgery is not suitable 1 of the following: • pharmacological treatment; topical drugs from different therapeutic classes may be needed at the same time to control IOP • SLT or • cyclodiode laser treatment. [2009, amended 2022]	Laser trabeculoplasty was replaced by SLT to be in line with new recommendations. SLT is a separate bullet point to cyclodiode laser treatment because the committee highlighted that these are different laser treatment.
1.6.6 Healthcare professionals involved in the monitoring and treatment of OHT, suspected COAG and established COAG should be trained to make management decisions on all of the following: • risk factors for conversion to COAG • coexisting pathology • risk of sight loss • monitoring and detecting a change in clinical status (for example, visual field changes, stereoscopic slit lamp biomicroscopic examination of anterior segment and posterior segment) • pharmacology of IOP-lowering drugs • treatment changes for COAG, suspected COAG and OHT (with	1.6.6 Healthcare professionals involved in monitoring and treating OHT, suspected COAG and established COAG should be trained to make management decisions on all of the following: • risk factors for conversion to COAG • coexisting pathology • risk of sight loss • monitoring and detecting a change in clinical status (for example, visual field changes, stereoscopic slit lamp biomicroscopic examination of anterior segment and posterior segment) • pharmacology of IOP-lowering drugs • eligibility for SLT	'Eligibility for SLT' was added to be in line with new recommendations.

consideration given to relevant contraindications and interactions). [2009]	• treatment changes for COAG, suspected COAG and OHT (with consideration given to relevant contraindications and interactions). [2009, amended 2022]	