Optometry Australia 2025

Cataract Care Clinical Practice Guide

Part A: Pre-surgical Care and Surgical Considerations

Optometry
AUSTRALIA

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Glossary

ACRONYM	TERM
AAO	American Academy of Ophthalmology
aIOL	Accommodating intraocular lens
CPG	Clinical Practice Guide
D	Dioptre
DED	Dry eye disease
DM	Diabetes mellitus
ECCE	Extracapsular cataract extraction
EDOF	Extended depth-of-field
FLACS	Femtosecond laser-assisted cataract surgery
GP	General Practitioner
IC	Intracameral
IOL	Intraocular lens
IOP	Intraocular pressure
LAL	Light-adjustable lens
LOCS	Lens Opacities Classification System

ACRONYM	TERM
MIGS	Minimally (or micro) invasive glaucoma surgery
MSICS	Manual small-incision cataract surgery
mfIOL	Multifocal intraocular lens
NSAIDs	Nonsteroid anti-inflammatory drugs
NZ	New Zealand
OCT	Optical coherence tomography
PCR	Posterior capsular rupture
PPV	Pars plana vitrectomy
PXS	Pseudoexfoliation syndrome
RANZCO	The Royal Australian and New Zealand College of Ophthalmologists
UK	United Kingdom
US	United States
UV	Ultra-violet
VA	Visual acuity

1. Acknowledgement of Country

Optometry Australia would like to acknowledge the Traditional Custodians across the lands, waters and seas that we work and live on and pay our respects to Elders past and present and thank them for their continuing custodianship.

Optometry Australia acknowledges Māori as tangata whenua and Treaty of Waitangi partners in Aotearoa New Zealand.

We pay our respects to these traditional Custodians and honour their unique cultural and spiritual relationships to the land, waters and seas and their rich and ongoing contribution to society.

Artwork created by Bitja Patten of Bayila Creative

2. Development of this Guide

Optometry Australia has created this Clinical Practice Guide (CPG) in consultation with an expert working group comprised of experienced practitioners who work extensively in the area of cataract assessment and management.

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This Clinical Practice Guide outlines evidence-based recommendations reflecting current best practice in the management of cataract. It is intended as a general resource for optometrists and is not a formal management protocol. For further details, refer to the Appendix. All optometrists are expected to meet the standards outlined in the Entry-level Competency Standards for Optometry in Australia.[1] Optometry Australia supports the diversity of optometry practice models and encourages adherence to the shared Code of Conduct developed by the Australian Health Practitioner Regulation Agency.[2] This guide is scheduled for review in 2032.

3. Executive Summary

Cataract is one of the leading cause of blindness and a major cause of visual impairment worldwide, with estimates that 17 million people were blind and over 83 million were visually impaired from cataract in 2020.[3,4] Beyond visual impairment, cataract can also negatively impact quality of life[5] by affecting a person's independence, physical activity, social engagement and the ability to perform everyday tasks. Cataract-related visual impairment has also been associated with an increased risk of falls and related injuries, underscoring the importance of timely diagnosis and management to maintain functional independence and safety. Further information is available in Optometry Australia's Guidelines for optometrists to help prevent falls in older patients.

This clinical practice guide aims to provide an overview for optometrists when providing pre-surgical cataract care. This guide can be used in conjunction with Part B which focuses on post-surgical cataract care.

A modified Delphi process[6,7] was undertaken to establish recommendations for this Cataract Care Clinical Practice Guide (see Appendix for details). Following this process, the working group has endorsed the following recommendations:

- In patients with visually significant cataract:
    - optometrists should ensure that the patient is involved in the decision-making process before referral for cataract surgery is undertaken including to what extent the cataract is affecting the patient's vision and quality of life and whether the patient wishes to have surgery if it is offered.
    - optometrists should identify patients who present with characteristics that may make cataract surgery more complex and carry increased surgical risk. These risks should be clearly communicated in the cataract referral to enable the ophthalmologist to discuss any potential risks in more detail with the patient as part of the pre-surgical assessment.
- Optometrists should:
    - perform a comprehensive pre-operative screening which would generally include a thorough history, monocular habitual vision, pupil responses, cover test to evaluate for the presence or absence of strabismus, subjective refraction and visual acuity, slit lamp examination, grading of the cataract, comprehensive fundus examination, and other testing, such as contrast sensitivity, where appropriate.
    - if available, perform optical coherence tomography (OCT) screening to detect occult macular pathology in the routine pre-cataract surgery workup for all patients. Any costs associated with diagnostic imaging should be discussed with the patient, prior to this being performed.
    - assess for pre-existing dry eye disease (DED) and instigate appropriate treatment before surgery as tear film instability can lead to erroneous biometry readings and IOL power miscalculations.
- In patients with cataract who wished to be referred for cataract surgery:
    - optometrists should use a referral letter template, if one is available. If there is no referral template, the referral letter should include detailed information about:
        - the patient demographics
        - a summary of relevant health and social history
        - assessment of vision-related quality of life
        - ocular findings
        - whether the patient is of Aboriginal and Torres Strait Islander origin.
- optometrists should initiate discussions with the patient regarding the available options for refractive outcome following cataract surgery prior to referral to clarify the patient's understanding and so that the patient can make a fully informed decision.

4. Introduction

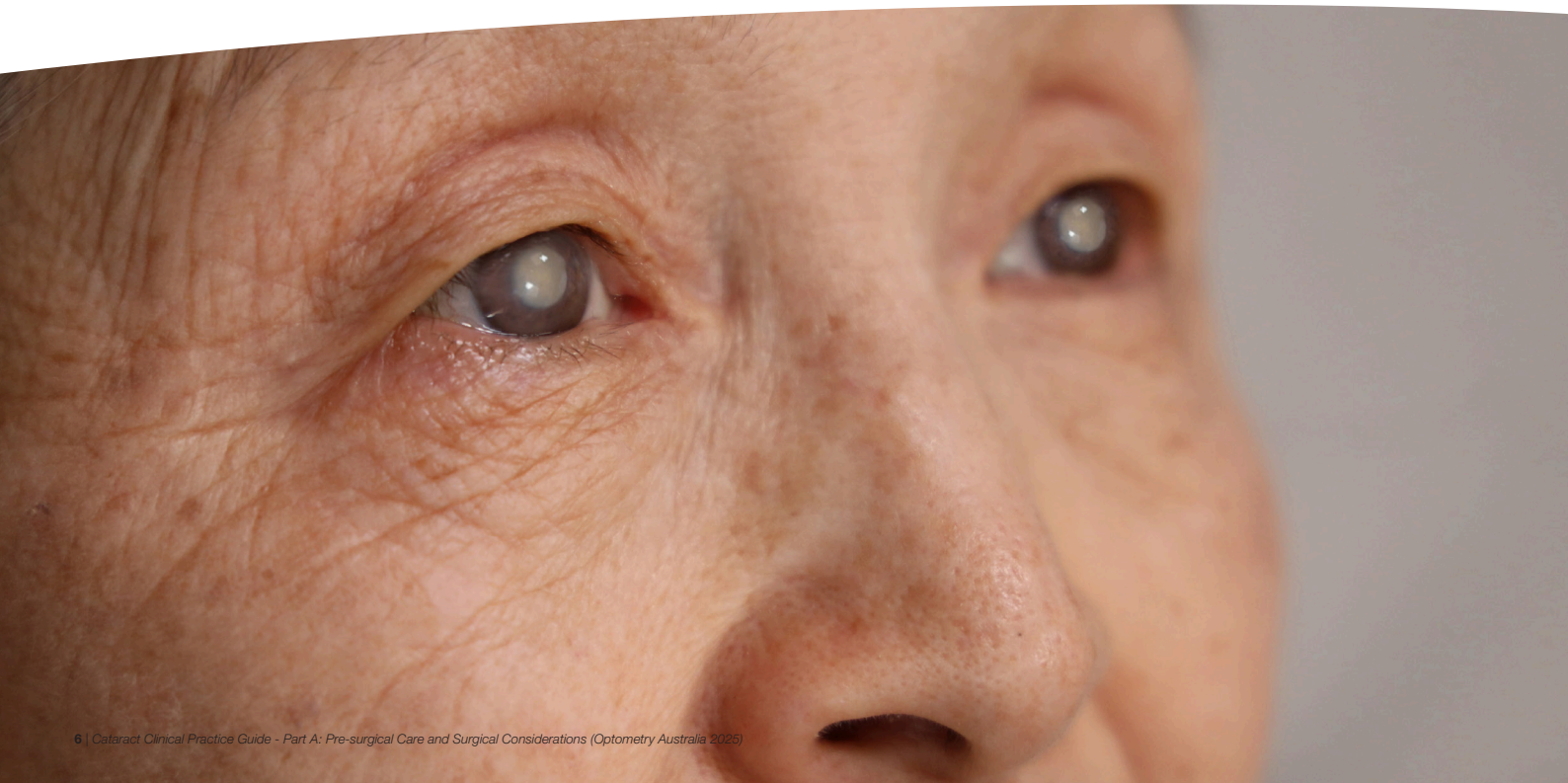
Cataract is a disease characterised by an opacification of the normally transparent crystalline lens. It can present with varying sizes, morphology, and degree of opacification with a broad aetiology. Most frequently, cataracts are an inherent part of the normal aging process (i.e. age-related cataract) and therefore are primarily considered to be a disease of the elderly.[8,9] However, cataracts can occur at any age (including from infancy) and can be acquired secondary to other conditions.

Various genetic, environmental, and lifestyle factors that have been linked to cataract and are thought to directly or indirectly disturb cellular and molecular homeostasis in the lens, resulting in opacification. For example, 50% of all cases of childhood cataract can be attributed to a genetic mutation implicating proteins responsible for lens development and transparency.[10] By contrast, age-related cataract is attributed to cumulative oxidative damage[11,12] from environmental stresses.

Most cataracts are progressive and irreversible. Although they tend to be asymptomatic when mild, cataract can severely impair vision if it significantly obstructs or scatters light transmission to the retina. In 2020, it was estimated that worldwide 17 million people were blind and over 83 million were visually impaired from cataract,[3,4] making it the leading cause of blindness and a major cause of visual impairment globally. Beyond visual impairment, cataract can also negatively impact quality of life[5] by affecting a person's independence, physical activity, social engagement and the ability to perform everyday tasks.

In addition to being a significant public health issue, cataract also poses a substantial economic burden. At present, the only effective treatment is surgical removal of the opaque lens and insertion of an artificial implant made of synthetic polymers to facilitate visual rehabilitation. More than 250,000 people undergo cataract surgery every year in Australia,[13] making it the most commonly performed elective surgery and the largest direct cost in the national health system.[14] When indirect costs such as vision aids and loss of wellbeing are included, the total economic cost of cataract was estimated to be $14.6 billion in 2010.[15]

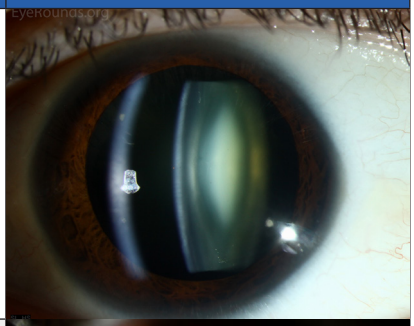
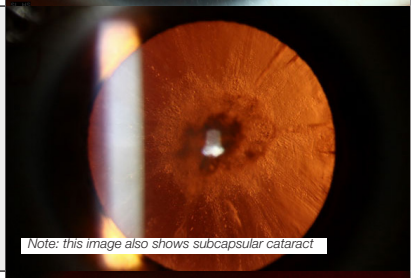
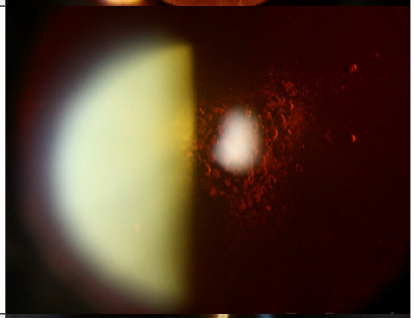
The volume of cataract surgery is expected to increase due to longer life expectancies and an ageing population.[13,16] Having evidence-based, standardised clinical care will not only optimise patient outcomes, but also enable the eye health sector to utilise our limited resources efficiently. This Clinical Practice Guide (CPG) addresses common adult-onset onset cataracts, for example, nuclear, cortical and posterior subcapsular. Childhood cataracts are not included as their clinical course and management substantially differs from that for adult-onset cataracts.



5. Types of Cataracts

Clinically, cataract can manifest in various morphologies. They are usually classified according to the anatomical location or the characteristics of the opacities. Different morphologies may imply different underlying aetiologies and sets of risk factors.[9,17] The most common type of adult-onset cataract is age-related nuclear cataract.[18] It is characterised by opacification and discolouration of the lens nucleus that starts as a slight yellowing that gradually progresses to brunescence. A brief description of other common adult-onset cataracts and their risk factors is provided in **Table 1**.

Table 1: Common adult-onset cataract morphologies

	CLINICAL CHARACTERISTICS	MAIN SYMPTOMS	RISK FACTORS	IMAGE*
Nuclear	Yellow-brown opacification of the lens nucleus	Blurry vision, loss of colour sensitivity, myopic shift	Age, diabetes mellitus, family history, hypertension, myopia, obesity, smoking, tobacco use, UV-B exposure, prior pars plana vitrectomy	
Cortical	Cuneiform or spoke-like opacities that follow the shape of lens fibres	Astigmatism, monocular diplopia, halos around lights, glare	Age, diabetes mellitus, family history, hypertension, myopia, obesity, ocular trauma, ionising radiation, UV-B exposure	 *Note: this image also shows subcapsular cataract*
Posterior subcapsular	Plaque-like opacification in the back portion of the lens	Blurry vision, reduced light sensitivity, reduced near vision	Diabetes mellitus, hypertension, myopia, obesity, smoking, corticosteroid use, ionising radition, retinitis pigmentosa, ocular trauma	
Anterior subcapsular	Fibrous plaques directly beneath the anterior capsule	Non-specific	Ocular trauma, diabetes mellitus, drug toxicity, ocular inflammation, irradiation, electrical burns	 *Note: this image also shows a nuclear cataract*

**All Table 1 images from Opthalmic Atlas Images by EyeRounds.org, The University of Iowa*

6. Considerations before cataract surgery

Patients should be involved in the decision-making process before referral for cataract surgery is undertaken. This includes making patients aware of all available treatment options regarding cataract surgery and its management in a format that is accessible and easy to understand. Importantly, optometrists should ascertain to what extent the cataract is affecting the patient's sight and quality of life and whether the patient wishes to have surgery if it is offered.[19] Where possible, optometrists should use referral letter templates if one is availble[20] and may include measures of vision-related activity limitation where relevant, for example Catquest-9SF[21] or Cat-PROMS.[22]

Discussions regarding the preferred refractive outcome following cataract surgery should be commenced by the optometrist prior to referral and continued by the ophthalmologist to clarify the patient's understanding and so that the patient can make a fully informed decision.[23] In particular this involves the concept of focal endpoints and variables such as monovision, intentional residual myopia and multifocal options. This includes informing patients who have previously worn, or trialled, monovision contact lenses or spectacles that this approach could continue to be provided post-surgery, and patients with myopia, who remove their glasses for near work, should be made aware of the possibility of aiming for a myopic target refraction.[24] Pre-surgical identification of dry eye disease (DED) and ocular surface disorders allows for improved visual function and greater patient satisfaction, post-cataract surgery.[25] Optometrists should assess for pre-existing DED and instigate appropriate treatment before surgery.[26] Ophthalmologists should be made aware of pre-existing DED as tear film instability can lead to erroneous biometry readings and IOL power miscalculations,[27] including toric IOL axis and magnitude estimates.

6.1 Pre-operative cataract assessment

Before cataract surgery patients should be fully assessed to determine their suitability for cataract surgery, including the probable benefits whilst also identifying any contraindications that might complicate the surgery.[28] Routine pre-operative screening would generally include history including previous trauma, surgeries and medications,[29] monocular habitual vision, pupil responses, cover test to rule out strabismus, subjective refraction and visual acuity, slit lamp examination with careful investigation for dry eye disease or corneal endothelial dysfunction, grading of the cataract using a validated scale (for example, LOCS III)[30], and fundus examination (with dilation where appropriate and particularly for patients at risk of post-operative retinal complications)[31] to exclude posterior segment pathologies. Additional testing such as ocular biometry and keratometry or topography may be useful, if available. Recent evidence suggests OCT screening before cataract surgery detects occult macular pathology in approximately 14% of patients,[32] and therefore should be considered in the routine pre-cataract surgery workup for all referrals. Where topography or OCT is performed, any abnormal results should be included with the referral to assist the ophthalmologist with surgical planning. Final discretion regarding surgical risk stratification and candidacy determination rests with the ophthalmologist.

6.1.1 What should be included in cataract referrals

Always check with your local ophthalmologists, but in general the following information is useful to include in a referral letter for cataract assessment:

- Patient demographics age, gender, address and correct contact details.[20] Other administrative data such as the patient's Medicare number and private health insurance details may also be useful.

- Whether the patient is of Aboriginal and/or Torres Strait Islander ethnicity as these patients may be eligible for fast-track referral pathways.

- Confirmation that the cataract is having a detrimental effect on the patient's lifestyle, and the patient is willing to undergo cataract surgery.[33]

- A summary of the relevant ocular and systemic history including ocular co-morbidities (e.g. diabetic retinopathy, glaucoma, Fuchs endothelial dystrophy, age-related macular degeneration), previous cataract surgery, ocular medications, general medical history, allergies, systemic medications, and the name and contact details of the patient's general practitioner (GP).[20]

- Social history such as driving status, reliance on driving for employment, independent living or residing in an aged care facility, falls history in the past year, language spoken at home and/or requirement for translator.

- Assessment of vision-related quality of life through descriptors such as the effect of cataract on driving, working, mobility problems, reading, watching television and hobbies. The use of a validated patient-reported outcome measures tool e.g. Catquest-9SF[34] may also be helpful.

- Distance and near visual acuity, plus unaided vision if appropriate.

- Glare or contrast sensitivity measures, if available.[35]

- Refraction including the date of the last refraction, refractive findings, type of correction worn, refractive target for patient (if this is known or has been discussed), and previous refraction(s) (and date) to document refractive change caused by the cataract.

- Relevant ocular health findings including anterior segment (particularly dry eye disease and its management) and retinal findings. Where possible, optometrists should include colour imaging obtained e.g. fundus photography, OCT and topography, as well as copies of recent visual field test results, particularly for patients with glaucoma or suspected glaucoma.

Patients may need to be brought back for a follow up visit to collect some of this additional data.

6.1.2 Pre-operative management of dry eye disease

The main objective of cataract surgery is to ensure it is performed safely; however, the true measure of success lies in the improvement of vision and quality of life it provides. Dry eye disease (DED) which has been reported to affect up to 80% of the cataract surgery population,[36,37] can be a potential barrier to successful cataract surgery particularly because IOL power calculations and surgical planning are heavily reliant on the preoperative ocular biometric measurements. Since DED can lead to inaccuracies in these measurements,[38,39] ocular surface disorders have the potential to adversely affect the refractive and visual outcomes of cataract surgery. Preoperative management of DED has been shown to improve surgical outcomes and enhance patient satisfaction,[40,41] highlighting the importance of identifying and addressing DED before cataract surgery.

6.1.2 Pre-operative management of dry eye disease (continued)

DED screening should be conducted during the preoperative visit, starting with an evaluation of patient symptomatology. Recommended tools for symptom assessment include well-established questionnaires such as the Ocular Surface Disease Index (OSDI)-6, or the 5-Item Dry Eye Questionnaire (DEQ-5).[42-44] The Standard Patient Evaluation of Eye Dryness (SPEED) II questionnaire, has been adapted by the American Society of Cataract and Refractive Surgery (ASCRS) for use specifically with cataract surgery patients.[41] The ASCRS algorithm[41] also recommends objective clinical testing for signs of DED using the non-invasive methods tear osmolarity and matrix metalloproteinase-9 (MMP-9) levels, however, these are not available for many optometrists. Therefore, using ocular surface staining or non-invasive tear breakup time, as recommended by the Tear Film and Ocular Surface Society (TFOS) Dry Eye Workshop (DEWS) III diagnostic methodology report[44] may be more appropriate and accessible for optometrists.

If initial screening confirms a positive DED diagnosis, the underlying cause of DED should be determined - tear film component deficiencies, eyelid abnormalities and/or ocular surface abnormalities. While specific approaches may vary, standard recommendations include a detailed examination of the ocular surface with slit-lamp biomicroscopy, including lissamine green staining, meibum expressibility/quality, tear meniscus height, lid margin and blink/lid closure assessment. Cataract surgery should be deferred in patients deemed to have visually significant DED, and treatment should be initiated before proceeding.

A range of therapeutic options is available for managing DED, with treatment strategies typically guided by disease classification, severity, and clinical presentation. Comprehensive frameworks have been outlined in clinical practice guidelines such as those published by the TFOS DEWS III[45] and AAO for the general management of DED,[46] however unique considerations apply to cataract surgery candidates. For these patients, it is recommended treatment should commence at a more advanced level, employing a multi-therapy approach to rapidly optimise the ocular surface and minimise delays to surgery. Patients should be reevaluated at 2- to 6-weeks[41,47] intervals until the ocular surface is adequately stabilised for biometry readings to be reproducible between follow-up visits. Once this is achieved, final measurements can be taken, and surgery can proceed.

6.1.3 Pre-operative management of patients with glaucoma with Minimally (or Micro) Invasive Glaucoma Surgery (MIGS)

MIGS devices create minimal trauma and disruption to normal ocular anatomy and physiology by using a micro-incisional approach, have high biocompatibility and a good safety profile, and effectively lower IOP in patients with glaucoma.[48] MIGS devices are often implanted at the time of cataract surgery, and most literature reports the outcomes of combined surgery, which tends to improve quality of life, visual outcomes, and reliance on medical therapy for glaucoma simultaneously.[49]

Currently, the primary role of optometrists is identifying patients suitable for this type of intervention, particularly those who have mild to moderate glaucoma with uncontrolled IOP despite medical and less invasive therapies, and patients who have difficulty adhering to medical treatment regimens due to unwanted side effects, adverse events or compliance issues.[50] Close communication with both the patient and ophthalmologist is vital to ensure coordinated care and optimal patient outcomes.

7. Cataract surgery techniques

Cataract surgery is the most commonly performed surgery in ophthalmology as well as the most commonly performed elective surgery in most parts of the world. Familiarity with the various surgical approaches is important for anticipating, recognising, and managing potential complications.

7.1 Extracapsular cataract extraction

All modern cataract extraction techniques are variations of extracapsular cataract extraction (ECCE), in which the lens is removed almost in its entirety while the posterior capsule is left intact. In traditional ECCE, a long corneoscleral incision (10–12 mm) is made to gain access to cataractous lens and is closed with sutures at the conclusion of the procedure.

Since the widespread adoption of phacoemulsification in the 1990s, ECCE is no longer the standard of care for cataract surgery.[51,52] However, primary ECCE may still be considered for very brunescent cataracts.

7.2 Phacoemulsification

Currently, phacoemulsification (phaco) is the standard of care for adult cataract extraction in most countries, including Australia[53,54] and New Zealand (NZ).[55] Phaco is a variation of traditional ECCE in that the posterior capsule is left intact, but an ultrasonic vibrating titanium or steel probe is used to disintegrate and subsequently aspirate the lens from the eye. In contrast to ECCE, phaco enables cataract extraction through a much smaller (2–3 mm) corneal incision. As the incisions made are generally small enough to be self-sealing, phaco is often a sutureless procedure.

Performing phaco over ECCE offers several advantages in terms of patient safety. Because it is less invasive, the structural integrity of the eye is better preserved, resulting in faster physical recovery rates and a lower risk of postoperative complications. The smaller incision also reduces surgery-induced astigmatism and facilitates earlier visual recovery as compared to ECCE.[56]

In developed countries like Australia, cataracts that are too dense for phaco are usually extracted with the manual small-incision cataract surgery (MSICS) technique.[57] This involves making a larger incision (6–7 mm) and a long scleral tunnel to manually remove the lens *in toto* (as a whole).

7.3 Femtosecond laser-assisted cataract surgery

In femtosecond laser-assisted cataract surgery (FLACS), femtosecond lasers are used in the initial steps of the surgery: formation of the corneal incision and anterior capsular opening, and fragmentation of the lens nucleus. The use of lasers enables these steps to be automated, theoretically offering increased precision, repeatability,[58,59] and hence, safety.

To date however, the proposed superiority of FLACS over phaco has not been shown to translate into significant improvements in clinical outcomes.[60] Roughly 10% of cataract surgeries in 2017 in the United States (US) and Australia were performed using FLACS.[61]

7.4 Intraocular lens (IOL) implantation

Before IOL implantation became a standard part of cataract surgery, patients were left aphakic after cataract extraction and their vision would remain impaired due to the significant residual refractive error. In the early days of intracapsular cataract extraction, removal of both the lens and its capsule necessitated that IOLs are placed within the anterior chamber. When ECCE and phaco became commonplace, IOLs were subsequently designed to be implanted in the capsular bag. Evolving clinical demands have since spurred a surge in the advent of IOLs with various optical and material properties (**Table 2**).

Table 2: Intraocular lens optical properties and their advantages and disadvantages

TYPE OF IOL	OPTICAL PROPERTIES	ADVANTAGES	DISADVANTAGES
Monofocal (spherical and toric)	Single focal point that provides clear vision at only one distance, with toric IOLs having a cylindrical correction to correct astigmatism.	Excellent visual performance (at the set distance) at a relatively low cost. Toric IOLs have superior postoperative unaided vision and reduced spectacle dependence in patients with astigmatism.	Optical correction is typically still required following cataract surgery. For toric IOLs, even small amounts of decentration may result in decreased vision that is not easily correctable with spectacle lenses which may result in irregular astigmatism
Monovision	Monofocal IOLs which target a different focal point in each eye. The dominant eye is usually optimised for distance viewing and the fellow eye is intentionally set for intermediate/near viewing.	Less reliance on spectacle correction.	Anisometropia, loss of stereopsis, difficulty with judging distances.
Multifocal (mfIOLs)	IOL multifocality achieved through refractive and/or diffractive optical principles. Bifocal IOLs have two foci (distance and near) while trifocal IOLs have three foci (distance, intermediate, and near).	Increased spectacle independence.	Reduced contrast sensitivity and photic phenomena compared to monofocals (e.g. glare, halos, starbursts)[62–64] that can lead to poorer retinal image quality.[65–66] They are also inherently more sensitive to decentration.[67] Less suited to patients with ocular pathology affecting central vision.

Table 2: Intraocular lens optical properties and their advantages and disadvantages			
TYPE OF IOL	**OPTICAL PROPERTIES**	**ADVANTAGES**	**DISADVANTAGES**
Extended depth of focus (EDOF)	EDOF IOLs have a single elongated focal point rather than having multiple discrete focal points achieved by increasing the spherical aberration of the IOL to extend light along the longitudinal plane.	Provide a greater depth-of-focus than monofocal IOLs while circumventing the adverse effects from light distribution in mfIOLs.	Poorer near vision than mfIOLs and may require additional reading glasses for small print / low contrast situations. Less suited to patients with ocular pathology affecting central vision.
Modified monovision	Single vision distance in one eye (usually the dominant eye) and an EDOF IOL in the fellow eye.	Superior distance vision in the non-dominant/EDOF eye. Better binocular vision and some degree of intermediate vision.	No guarantee of complete independence from glasses, likely to require glasses for reading small print. Limited evidence currently available to support this intervention.
Hybrid IOLs	Combination of mfIOL and EDOF IOLs.	Offer better vision quality across all distances than achievable by either design alone.	Decreased retinal image quality due to excessive amount of aberrations in combined design.
Accommodating (aIOL)	Based on the concept of mimicking the accommodative function of the crystalline lens. The majority of currently available aIOLs work by axial translation of a monofocal IOL to change the focal point of the eye.	Does not compromise quality of distance vision. Maintains better contrast sensitivity and produces less visual disturbances than mfIOLs or EDOF IOLs.	IOL movements are mostly too small to produce a clinically meaningful amount of accommodation. No aIOLs are currently available in Australia.
Light adjustable lens (LAL)	Constructed from a photoreactive silicone macromers, the LAL forms polymers when exposed to ultraviolet (UV) light, resulting in changes to its curvature. Targeted UV application can predictably alter the shape of the LAL postoperatively to achieve the desired optical power.	LALs can be precisely optimised after implantation if the target refraction is not achieved initially. Studies indicate that LALs demonstrate superior refractive and visual outcomes compared to monofocal IOLs.[68]	Not currently available in Australia or NZ.

8. Eye drops and other medications used before and during cataract surgery

Virtually all patients undergoing cataract surgery are prescribed various pharmacological agents pre- and during surgery to prevent complications that may threaten a successful surgical outcome (**Table 3**). However, there is little evidence to suggest an optimal regimen, leading to substantial diversity in practice patterns across the globe.

Table 3: Pharmacological agents used pre- and during cataract surgery

MEDICATION	INDICATIONS	WHEN USED
Topical mydriatics (cyclopentolate, tropicamide, phenylephrine 2.5%) Alternatives include administering mydriatic agents by intracameral (IC) injection or with depot delivery methods (e.g. Mydriasert)	Paramount for the safety and success of cataract surgery as poor mydriasis is associated with increased risk for intraoperative complications.[69,70]	At varying frequencies in the hours leading up to surgery.[71,72] Avoid dilating the patient the day before cataract surgery as it can result in suboptimal surgical mydriasis.[73]
Anaesthetics	General anaesthesia the least preferred method for cataract surgery,[53,74] and usually reserved for cases with poor expected patient cooperation. Regional anaesthesia with retrobulbar or peribulbar injection most commonly applied method of anaesthesiology in most parts of the world until mid-2010's. With the move toward minimally invasive cataract extraction, local anaesthesia with topical eye drops, with or without sub-Tenon's or IC injection, is gaining global popularity.[75–77]	During surgery

Table 3: Pharmacological agents used pre- and during cataract surgery		
MEDICATION	**INDICATIONS**	**WHEN USED**
Antiseptic (topical povidone-iodine)	Only proven method of infection prophylaxis is preoperative ocular surface antisepsis using topical povidone-iodine.[78]	Application of 5-10% solution to the ocular surface, conjunctival sac, and periocular skin for a minimum of three minutes prior to surgery.[79] Research has also shown that applying povidone-iodine three times a day for three days before cataract surgery also reduces bacterial colonisation in the conjunctival sac.[80]
Antibiotics (quinolones, chloramphenicol, cephalosporins)	Intraoperative IC antibiotic injections have been established as an effective means of reducing rates of endophthalmitis following cataract surgery[81–83] and IC antibiotics (vancomycin and cefazolin) are becoming routinely used in cataract surgery.[84,85] Topical ocular quinolones are used almost exclusively in the US[86] and many countries in Asia[87] while topical chloramphenicol is the preferred option in the United Kingdom (UK),[88] Australia[89], and NZ.[55]	Evidence based guidelines suggest a single dose of IC cefazolin at the end of surgery is best practice and that there is little evidence to support the use of prophylactic antiobiotics.[90] This is now the standard of care in Australia. However, some patients are prescribed topical antibiotic eye drops to instil pre- and postoperatively, though the agent, frequency, and duration of use varies considerably.[84,85] Clinical surveys reported that antibiotics are commonly commenced three days before (9–50%) or on the day of surgery (19–50%).
Anti-inflammatories (topical non-steroidal (NSAID))	Topical NSAID eye drops are used to manage inflammation and pain occurring during and after cataract surgery.[91,92] They can also prevent iris sphincter contraction[93,94] and help maintain pupil mydriasis intraoperatively. Can be used pre-operatively to reduce the risk of cystoid macular oedema development.	NSAID drops commenced one day to one week preoperatively.[76,91]

9. Common intraoperative complications of cataract surgery

While over 90% of modern cataract surgeries are uncomplicated,[53,54,95] the high volume of patients presenting for surgery means that even low complication rates can result in a significant number of patients suffering potentially serious complications (**Table 4**).

9.1 Patient risk factors

Apart from factors relating to surgeon experience and surgical environment (such as equipment and instruments), patients may also present with characteristics which can make cataract surgery more complex, thereby increasing the risk of complications. Since these characteristics are often non-modifiable, identifying high-risk patients preoperatively may help to mitigate potential complications by appropriately modifying the surgical care plan.

Patient risk factors for developing cataract surgery complications can be broadly categorised into ocular and systemic factors. The most consistently reported patient ocular risk factors for the various intraoperative[96–98] and postoperative complications[99–109] are: high ametropia (>6 D of myopia or hyperopia), posterior subcapsular or posterior polar cataract, dense/total/brunescent/white cataract, small pupil size (<3 mm), shallow anterior chamber depth (<2.5 mm), enophthalmos, and increased axial length (≥26 mm). Preexisting ocular comorbidities such as uveitis, glaucoma, diabetic retinopathy, corneal opacification (from scarring or decompensation), Fuch's endothelial dystrophy, previous vitrectomy surgery, previous intravitreal injections, previous corneal refractive surgery, previous ocular trauma, pseudoexfoliation syndrome (PXS), and phacodonesis have also been shown to be associated with an increased risk of cataract surgery complications.

In addition to ocular factors, some systemic conditions have been linked to the development of perioperative complications in cataract surgery including diabetes mellitus (DM);[96,97,101,103–109] hypertension, hyperlipidemia, congestive heart failure, rheumatic disease, and end-stage renal disease.[110] Older age, male gender, use of alpha antagonist medications, only eye surgery, and poor positioning or cooperation also predispose patients to several complications.[96,97,103–107,111,112]

Table 4: Common intraoperative complications seen in patients undergoing cataract surgery			
COMPLICATION	**PREVALENCE**	**CLINICAL PRESENTATION**	**MANAGEMENT**
Posterior capsular rupture (PCR)	0.6–4.9% over the last twenty years, with a decreasing trend over time.[96]	Visible tear during surgery with sudden deepening of the anterior chamber, momentary pupil dilation, sudden difficulty rotating the nucleus or removing a lens fragment during surgery.	Implantation of a IOL within the capsular bag may not be feasible and alternative IOL fixation methods may be required. Loss of a physical barrier between the posterior capsule and vitreous means it is typically accompanied by vitreous humour travel or dislocation of lens fragments to other parts of the eye.
Vitreous prolapse / loss	1.7-7.7% depending on the surgeon's experience.	Vitreous prolapse is defined as vitreous displacement into the anterior segment, whereas vitreous loss is defined as vitreous leakage out of the surgical incision.	Management involves the removal of any vitreous from the anterior chamber and surgical wound.
Dropped nucleus	Less than 1% (0.07–1.1%) of phaco surgeries.[53,54]	Typically occurs following PCR, permitting lens material to enter the vitreous chamber through breaks in the posterior capsule.	A pars plana vitrectomy (PPV), done the same day as the cataract surgery, is the recommended treatment. However it may be deferred by several days depending on the severity of corneal oedema and availability of vitreoretinal services.
Iris prolapse	Occurs in 0.23–1.6% of phaco surgeries.[53,113,114]	Iris may prolapse through the surgical incision.	Treatment is by identifying the cause of the anterior / posterior pressure imbalance and then restoring equilibrium.
Weak Zonules / Zonulopathy e.g. associated with pseudoexfoliation syndrome	An estimated 70 million people may have PXF worldwide.[115]	Poor pupil dilation and zonule weakness identified as most significant risks for surgical complications. Pseudoexfoliation may result in phacodonesis and lens subluxation.	Pre- and intra-operative assessment of zonular strength undertaken to assess zonular stability. Use of adjunctive pupil and zonular supportive devices may be required.[115]

10. Appendix

10.1 Scope and purpose

The purpose of this clinical practice guide is to aid clinicians in their management of cataract in the pre- and post-operative phases with the intent that all patients with cataract will receive a high standard of care from their optometrist.

The literature review undertaken by AL in 2024 aimed to:

- Understand the present best-practice optometry management of patients with cataract pre- and post-operatively as supported by evidence and consensus guidelines;
- Assist optometrists in providing appropriate follow-up care post-operatively to their patients who have received cataract surgery; and
- Determine which post-surgical pathologies and complications require surgical intervention or care from another healthcare practitioner.

This was framed in the Australian clinical and practice context.

10.2 Stakeholder involvement

An expert working group was established via a combination of direct invitation and a call for expressions of interest from Optometry Australia members. A rubric was created to ensure a breadth of expertise was included in the Cataract Care CPG working group – from those who worked in academia, private (optometry and/or ophthalmology) practice, corporate practice, hospital-based and public health care. Representation from across the country was also sought.

The Royal Australian and New Zealand College of Ophthalmologists (RANZCO) were also invited to provide feedback on the final draft of the clinical practice guide. Their feedback was reviewed in detail, and amendments were made where considered appropriate.

10.3 Development

The process for development of recommendations was undertaken via a modified Delphi process. Following a literature review (AL) in 2024 and a first working group meeting, a list of recommendations was established (NA). These recommendations went through 2 iterative rounds of voting by 12 working group members, excluding KH and NA. Feedback was provided to Delphi participants after each round of voting, and a final working group meeting was held to discuss any contentious recommendations. Following this meeting, a third round of voting was undertaken to improve the clarity of some recommendations. The final recommendations are included in the executive summary.

The working group considered the potential health benefits and risks for patients with cataract when voting on all recommendations. They also considered the potential resource implications of applying the recommendations (e.g., equipment required) on optometrists and the health system more broadly.

The clinical practice guide will be reviewed as new evidence becomes available, or in a maximum of 7 years' time.

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