



Cataract – Treatment of Adults

Effective Date: May 26, 2021

Scope

This guideline provides recommendations to primary care practitioners for the prevention, diagnosis, management and postoperative care of cataracts in adults (age 19 and older).

Key Recommendations

- The following are recommended to delay the onset and progression of cataracts:^{1,2}
 - Smoking cessation
 - Reduced ultraviolet (UV) -B exposure (hats, sunglasses with UV-B protection)
 - Safety eyeglasses during high-risk activities at work or recreation to avoid eye trauma
- Patients who are long-term users of corticosteroids (by any route) should be informed of the increased risk of cataract formation.²
- Indications for cataract surgery are not limited to Snellen visual acuity alone² and referral for cataract surgery consultation is indicated in the setting of glare, monocular diplopia or other non-visual functional impairment.
- Cataract surgery may be indicated in other ocular diseases for reasons independent of vision rehabilitation.
- When a cataract lens is surgically removed, it is replaced with a synthetic intraocular lens (IOL). There are many types of IOLs available. IOL technologies and choices continuously evolve as does MSP coverage of IOLs. Patients can be reassured that MSP-covered monofocal lenses provide fully satisfactory visual correction in the vast majority of patients. Glasses are usually required after surgery for near and sometimes also distance vision. Non-MSP covered lenses may lessen dependency on glasses post-surgery, but may not be appropriate for all patients due to individual suitability or side effects. IOL selection evolves out of a comprehensive discussion with the surgeon.
- Primary care practitioners should be aware of postoperative “red flags”. Post-operative patients should be urgently assessed (within 24 hours) by their surgeon or an on-call ophthalmologist with increasing eye redness, pain or decrease in vision (see [Table 4](#) for more details).

Definition

- A cataract is a progressive clouding of the lens in the eye that interferes with vision¹ and the examiner’s view of the fundus.
- Most cataracts are related to aging. They can occur in one or both eyes.² Younger age of onset can be due to trauma, radiation, diabetes or steroid use.
- Cataract types are defined by their specific location of opacity or clouding within the anatomical lens and include: nuclear, cortical, subcapsular (anterior and posterior), and mixed. The nuclear type is more common in the older population² whereas the posterior subcapsular (PSC) type can manifest at any age. The management of cataracts is similar irrespective of the type.

Epidemiology

- Between 1996-2001, the prevalence of low vision and blindness in all ages in B.C. was reported as 21.46/10,000 with cataract as the most common cause (29.9 %).³
- In 2018/2019, 69,463 cataract surgeries were performed in B.C.⁴

Risk factors

- The most common risk factors for cataracts include: diabetes, long term use of topical, systemic, intravitreal, inhaled or oral corticosteroids and prior intraocular surgery.²

Table 1. Risk Factors Associated with Cataracts

Ocular conditions	Non-ocular conditions
<ul style="list-style-type: none">• Myopia²• Prior pars plana vitrectomy²• Ocular inflammation• Chronic ocular disease• Ocular/orbit trauma²	<ul style="list-style-type: none">• Age• UV-B light exposure²• Ionizing radiation²• Chronic Steroid use including topical, systemic, intravitreal, inhaled• Smoking/Tobacco use²• Diabetes²• Family history²• Hypertension²• Hyperbaric oxygen• Social determinants of health⁵

Prevention

- There is an epidemiologic link between cataract development and smoking, steroid use, diabetes, and ultraviolet ray exposure. Patients who are subthreshold for surgery may benefit from lifestyle modification.^{1,2}
 - Smoking cessation
 - Reduced UV-B exposure (e.g. hats, sunglasses with UV-B protection)
 - Safety eyeglasses during high-risk activities at work or recreation to avoid eye trauma
- Patients who are long-term users of corticosteroids (by any route, dose and duration dependent) should be informed of the increased risk of cataract formation.²
- Nutritional supplementation has not been shown to reduce the rate of cataract development.¹
- There are no approved topical treatments for cataract prevention in Canada.

Diagnostic Process

- There is insufficient evidence to recommend routine screening for impaired vision in asymptomatic adults.^{6,7}
- In the primary care setting, recognition of risk factors and the use of screening questions to assess symptoms of visual function (e.g. blur, glare, colour change, dimming, monocular diplopia), Snellen visual acuity measurement and examination with an ophthalmoscope can suggest the diagnosis of cataracts. Symptoms and the patient's perspective of visual function are important, even with good Snellen visual acuity.
- It is helpful for the primary care practitioner to have a high index of suspicion for visual causes of functional decline (e.g. falling, mood change, depression,⁸ withdrawing from social activities, cessation of night driving). Consider enquiring whether older patients have had a recent eye examination. Patients may adapt to their visual impairment and may fail to notice functional decline that accompanies the progression of a typical cataract.²
- Primary care providers may consider enquiring whether older patients have had a recent eye examination assessment by an eye care professional (optometrist or ophthalmologist) is indicated to confirm the diagnosis of cataract and rule out other causes of vision loss. Slit lamp examination is the gold standard for this purpose, but does not solely determine who may benefit from cataract surgery as this is a complex, multifactorial decision.
- As with many other conditions, social determinants of health are important⁵ and may lead to a late cataract diagnosis

resulting in more complicated surgery and postoperative care.

Non-surgical Management

- Currently, there are no pharmacological treatments known to eliminate existing cataracts or stop their progression.²
- The main nonsurgical alternative to cataract surgery is to optimize the patient's refractive correction with glasses or contact lenses. In some cases, this may delay the patient's need for surgery.
- Tinted lenses, increased illumination, and magnifiers are other temporizing measures to improve visual function.

Indication for Referral to Eye Care

- See [Appendix 1: Overview of the Patient Pathway](#) for an overview of the patient care pathway.
- The decision to refer a patient to an eye care provider is based on decreased vision or visual symptoms.

Indications for Surgery

- The decision to recommend cataract surgery should not be made solely on the basis of Snellen visual acuity.² Functional impairment of vision and patient-centred decision making are the main drivers. Measurements of distance acuity, near vision, glare disability and contrast sensitivity, combined with patient goals and functional requirements, will all contribute to the decision to proceed with surgery.
- In the majority of cases, cataract surgery is performed on patients who have reported difficulties with their activities of daily living that are attributable to their lens opacity. Such difficulties may be situational, such as only occurring at night. Difficulties include:¹
 - Seeing fine details (reading, driving, watching television)
 - Problems with visual aberrations (glares, haloes, monocular diplopia, color change)
 - Problems with binocularity
- In some cases, patients may require expedited surgery to meet occupational visual acuity standards¹ (e.g. commercial drivers, pilots, marine pilots, railroad conductors, law enforcement).
- In some cases, due to the slow, progressive decline in vision associated with cataracts, patients may not be aware of their decrease in visual function¹ and may need deeper discussion with their eye care professional to review the possible implications to their driver's licence and benefits of surgery.
- In rarer and select cases, it is ethical to offer cataract surgery if there is an expectation of functional improvement even if visual acuity cannot be ascertained preoperatively (e.g. cognitive impairment, intellectual disability, moderate dementia, aphasia).
- Although most of the time, as described above, removing the cataract and placing an intraocular implant lens is done to improve vision impaired by lens opacity, this is not the only reason for cataract surgery. Surgical need also arises when the lens itself is the source of serious problems. The goal of surgery in these scenarios is to improve or maintain the anatomic health of the eye.¹ In these instances, patients require an explanation from their ophthalmologist that the primary reason for surgery is not to improve vision and that failure to remove the lens could lead to other ocular health issues. Some of these reasons include:
 - 1) When the cataract causes inflammation or secondary glaucoma²
 - 2) When the lens is causing shallow anterior chambers with risk of angle closure and acute glaucoma
 - 3) When the cataract interferes with visualization and management of retinal diseases (e.g. diabetes, macular degeneration, tumors)

- Historically, functional monocular status was a relative contraindication to cataract surgery given procedural risks. With advancement of technology, there is now good evidence (III, good quality, strong recommendation – see [Methodology](#) section) that delaying surgery until the cataract is very advanced may increase surgical risk and slow visual recovery.² Therefore, surgery in monocular patients should be carried out when the benefits outweigh the risks and should not be delayed solely due to monocular status.¹ In this circumstance, it should be discussed with the patient that blindness is one of the rare risks of cataract surgery (III, good quality, strong recommendation – see [Methodology](#) section).²

Refractive lens surgery or ‘clear lens’ exchange

- Occasionally the primary care practitioner may encounter patients undergoing refractive lens exchange in a non-visually significant cataract. Refractive lens exchange is essentially the same procedure as cataract surgery; however, the primary purpose is to reduce glasses dependence in people who do not yet need cataract surgery. The intraocular technique, postoperative care and complications are comparable to cataract surgery, however, the surgery is not medically necessary and is not covered by MSP.

Benefits and Risks

► Prognosis

- Up to 95% of patients have reported being satisfied with the results of their cataract surgery. Dissatisfied patients were more likely to be older and have an ocular comorbidity.²
- Cataracts cannot reoccur following cataract surgery.
- Physical function, mental health, emotional well-being, safety and overall quality of life can be improved when visual function is restored by cataract removal.

Table 2. Potential Benefits of Cataract Surgery (adapted from American Academy of Ophthalmology)²

Improved visual function
<ul style="list-style-type: none"> Better optically corrected vision Reduced glare Improved ability to function in dim levels of light Improved depth perception and binocular vision Improved colour vision Improved peripheral vision
Improved activities of daily living
<ul style="list-style-type: none"> Increased ability to perform self-care and continue independent living Increased ability to continue or resume an occupation Increased mobility (e.g. walking, driving)
Improved mental health and well-being
<ul style="list-style-type: none"> Improved self-esteem and independence Improved injury avoidance Better social engagement Relief from fear of blindness Reduced fear of falling

- Visual impairments such as poor depth perception and low contrast sensitivity are important risk factors for falls and hip fractures. First-eye cataract surgery has been shown to reduce the rate of falling and fracture by 34% over 1 year.⁹
- Cataract surgery in at least one eye has been shown to reduce the rate of motor vehicle accidents by 53% compared with patients with cataracts who declined surgery.¹ Drivers with visually significant cataracts are 2.5 times more likely to have an at-fault motor vehicle crash over a 5-year period compared with drivers without cataracts.²
- The loss of vision in the elderly is associated with a decline in physical and mental function as well as a loss of independence in the activities of daily living.²

► Risks

- Because cataract surgery is generally done with topical/local anaesthetic, general surgical risks, other than those directly related to the eye are minimal (see Table 3 below).

Table 3. Cataract Surgery Complications and Associated Symptoms

Complication	Symptom
Common cataract surgery complications	
Dry eye	Foreign body sensation or ocular irritation Intermittent blurred vision
Posterior capsular opacification (PCO) (up to 53%), ² treatable with laser	Decline in vision
Infrequent cataract surgery complications (< 9%^{2,10})	
Persistent corneal edema (swelling) or corneal decompensation (clouding)	Persistent blurred vision
Cystoid macular edema (central retinal swelling producing blur)	Persistent blurred vision
Ptosis	Drooping of eyelid
Rare complications that can lead to permanent loss of vision (< 1.1%²)	
High intraocular pressure	Decrease in vision, severe pain
Intraocular bleeding	Numerous floaters
Toxic anterior segment syndrome	Increasing redness and pain, declining vision
Infectious endophthalmitis	Increasing redness and pain, declining vision
Retinal detachment	Flashes, numerous floaters and visual field defects

Contraindications to Cataract Surgery

- Spectacle or other visual aids provide vision that meets the patient's needs.^{1,2} However, an exception to this exists when the surgery is medically necessary for other reasons (please see [Indications for Surgery](#) above).
- Surgery is not expected to improve visual function, and no other indication for lens removal exists.^{1,2}
- The patient cannot safely undergo surgery because of coexisting medical or ocular conditions.^{1,2}
- Appropriate postoperative care cannot be arranged.^{1,2}

Surgical Management

► Referral to Ophthalmology

- The patient's medical history should be included in the referral as the following conditions may affect surgery. An exhaustive list is not included here but specific considerations impact the ease of delivering surgery:
 - Allergies
 - Medications
 - history of tamsulosin hydrochloride (Flomax®) use (increased risk of complicated surgery)
 - COPD, CHF and musculoskeletal disorders (e.g. tremor,^{1,2} movement disorders, spine diseases),¹ can cause positional difficulty being supine for surgery
 - Obstructive sleep apnea and CPAP use (anesthetic considerations)
 - Psychiatric concerns
 - Cognitive impairment/dementia² (may necessitate a general anaesthetic)
 - Significant anxiety^{1,2} or mood disorders

► Preoperative assessment

- History and standardized ophthalmological physical exam
- Ancillary tests specific to cataract surgery or for other ocular conditions

► Preoperative surgical planning

- Logistics of peri-operative support system (e.g. transportation, medication purchase and cost, eye drop application, time off work)
- Logistics of shared care with optometrists who may refer and provide some education and monitor for postoperative complications
- Preoperative goals and postoperative expectations

► Lens selection

- Since June 2012 a non-toric (defined below) monofocal lens is covered by MSP at no cost to the patient.¹¹ Patients can be reassured that MSP-covered monofocal lenses provide fully satisfactory visual correction in the majority of patients. Glasses may be required after surgery for near and sometimes also distance vision. Lens choices, related testing, and MSP coverage continuously evolve with technological advances.
- Lens selection and refractive targets will be finalized with the patient by the surgeon. There are compromises to be made with each lens choice and the discussion is complex. Recommendations are made taking into account the patient's previous refractive state, ocular diseases, and desired goals. Post-operative refractive result options can be set up in multiple ways:
 - Bilateral emmetropia (distance vision optimized, reading glasses dependency)
 - Bilateral myopia (distance glasses dependency, reading vision optimized)
 - Monovision (one eye optimized for distance, the other for near)
- The current array of lens choices includes both monofocal and presbyopia-correcting IOLs:
 - A **monofocal** IOL aims to provide optimal clarity at only one working distance: near, mid-range or far. This choice will generally require glasses for other working distances that remain uncorrected after surgery. However, in suitable patients monovision (one eye optimized for distance, the other for near) can be achieved using MSP-covered monofocals. At the time of writing this guideline, there are some models of monofocal lenses that are not covered by MSP.
 - A **presbyopia-correcting** IOL provides clarity at multiple working distances. This choice aims to lessen dependence on glasses. However, this lens can come with side effects (e.g. glare and halo) which can be more significant than a monofocal lens and should be discussed with the surgeon. These lenses are not covered by MSP.
- For some patients with pre-existing corneal astigmatism, there is a '*toric*' version of the IOL that can be selected. There are toric monofocal and toric presbyopia-correcting IOLs:
 - A **toric** IOL aims to lessen dependence on glasses. This lens is only indicated if the patient has visually significant corneal astigmatism. Toric IOLs are not covered by MSP.
- Patients who wish to purchase lenses that are not covered by MSP can do so directly from their health authority at standardized prices that reflect provincial buying power. Patients pay the difference between the cost of the insured lens and the non-insured specialty lens they have chosen.¹¹
- Basic eye measurements are required for standard monofocal lenses.
 - Additional testing is often needed for toric and presbyopia-correcting IOLs. These IOLs may be referred to as "specialty lenses" or "premium lenses", however, these IOLs are not always the better choice for the patient and in fact may not be indicated based on individual patient's history, ocular health, and visual goals. Specific assessment and education, beyond what is provided and covered by MSP in the initial consultation for cataract surgery, are not benefits of MSP and may be billed directly to the patient.^{11,12}

► Surgical Considerations

- The predominant method of cataract surgery in the developed world is sutureless small-incision phacoemulsification with foldable IOL implantation.²
- Cataract surgery is predominantly an ambulatory outpatient operative procedure. Routinely it is carried out with topical anaesthetic alone, sometimes supplemented by oral or intravenous sedation. Rarely is general anaesthesia required.
- Cataract surgery prioritization is provincially standardized by urgency.
- Significant decline in visual function while waiting may require reassessment by the ophthalmologist.

► Cataract surgery combined with other ocular surgery

- When patients have other ocular diseases coexistent with their cataracts, there is a role for cataract surgery combined with other types of surgery. For example:
 - Patients with glaucoma and cataracts may sometimes have a glaucoma procedure combined with their cataract surgery
 - Cataract surgery may be combined with corneal transplantation in patients with corneal disease
 - Combined cataract surgery and vitrectomy can be used in cases where the cataract interferes with the surgical treatment of posterior segment pathology¹

Postoperative Monitoring

- Patients are typically followed for 6 weeks post-op. During this time, they may receive post-operative assessments from the surgeon and/or an optometrist due to geographic or other constraints. Conventionally, patients are given instructions to contact the surgeon directly if they have decreased vision, increased pain or redness. However, since patients may contact their primary care practitioner in this time period, it is important to be aware of red flag symptoms.
- Connect a patient back urgently (within 24 hours) to either their surgeon or the on-call ophthalmologist if the patient complains of reduction in vision, increasing pain, progressive redness, increased floaters, photopsia, eyelid edema or any periocular swelling (see Table 4, red flag symptoms section). The most concerning postoperative issues include infectious endophthalmitis, Toxic Anterior Segment Syndrome (TASS) or retinal detachment.²
 - TASS is a sterile postoperative inflammatory reaction caused by a non-infectious substance that enters the anterior segment, resulting in toxic damage to intraocular tissue.¹
 - If infectious endophthalmitis is suspected (acute intraocular infection), this requires emergency ophthalmology attention. Anterior chamber and/or vitreal fluid may be biopsied for evaluation of possible pathogens and the vitreous injected with antibiotics.²
- After the post-operative period (approximately 6 weeks after surgery), an updated spectacle prescription can be finalized, if needed.
- Decline in vision weeks to decades after cataract surgery can occur due to posterior capsular opacity (PCO) (previously referred to as a 'secondary cataract') and merits reassessment because of a decline in acuity.
- Non-urgent concerns can be electively referred back to the ophthalmologist.

Table 4. Postoperative Red Flags versus Expected Symptoms after Cataract Surgery

	Within 24 hours	24 hours to 1 week	>1 week – months
Red flag symptoms (refer within 24 hours)	<ul style="list-style-type: none">• Severe pain with or without redness	<ul style="list-style-type: none">• Severe pain• Increasing redness• Declining vision• Symptoms of retinal detachment (e.g. flashes, numerous floaters and visual field defect)	<ul style="list-style-type: none">• Rapid or significant decrease in vision
Expected symptoms	<ul style="list-style-type: none">• Decreased vision• Mild redness• Foreign body sensation	<ul style="list-style-type: none">• Improving vision• Mild redness• Improving foreign body sensation• Decreased pain	<ul style="list-style-type: none">• Increased awareness of pre-existing floaters• Stabilized vision by 6 weeks• Patients can have dry eye symptoms long term

Controversies in care

► 'Immediately sequential bilateral' or 'bilateral simultaneous' cataract surgery

- While further research is needed in the Canadian context to support this paradigm,¹³ the British Columbia pattern of practice is generally to limit this option and to limit to people who require general anesthesia and are at low risk of ocular complications during and after cataract surgery.¹⁴

► Femtosecond laser-assisted cataract surgery

- A limited number of surgical centres offer this non-MSP covered option in B.C. The femtosecond laser is used to assist with certain steps of cataract surgery. However, there is a paucity of high-quality evidence that it improves healing time, refractive outcome or complication rates.

Methodology

These guideline recommendations are tailored to support practice in British Columbia and are based on the ADAPTE Collaboration guideline adaption methodology.¹⁵ Clinical recommendations were developed based on the sourced guidelines (American Academy of Ophthalmology,² the Canadian Ophthalmological Society¹ and National Institute for Health and Care Excellence¹⁴), as well as expert clinical consensus where evidence was insufficient or unavailable. In situations where there is a lack of rigorous evidence, we provide best clinical opinion to support decision making and high-quality patient care. The source guidelines were chosen following an environmental scan of internationally available guidelines. Guidelines were chosen for adaptation following an evaluation using the Appraisal of Guidelines for Research and Evaluation II (*AGREE II*) tool.¹⁶ The guideline development process includes significant engagement and consultation with primary care practitioners, specialists and key stakeholders. For more information about Guidelines and Protocols Advisory Committee (GPAC) guideline development processes, refer to the GPAC handbook available at [BCGuidelines.ca](https://www.bcguidelines.ca).

Where level and quality of evidence ratings are included in this guideline, they are based on those used by the American Academy of Ophthalmology.²

Abbreviations

- CPAP – Continuous positive airway pressure
- IOL – Intraocular Lens
- PCO - Posterior capsular opacification
- PSC – Posterior subcapsular cataract
- TASS – Toxic Anterior Segment Syndrome
- UV – Ultraviolet

Appendices

[Appendix 1: Overview of the Patient Pathway](#)

► References

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This guideline is based on scientific evidence current as of the effective date.

The guideline was developed by the Guidelines and Protocols Advisory Committee and adopted by the Medical Services Commission.

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- encourage appropriate responses to common medical situations
- recommend actions that are sufficient and efficient, neither excessive nor deficient
- permit exceptions when justified by clinical circumstances

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Appendix 1: Overview of the Patient Pathway

Patient with Suspected Cataracts

Patient visits primary care practitioner or optometrist for assessment

Provide the Patient with Information

(see [A Decision-Making Guide for Patients Diagnosed with Cataract\[s\]](#))
Primary care practitioner or optometrist provides information tailored to the patients needs

Referral for Cataract Assessment

The decision to refer a patient to an eye care provider is based on patient/family members/caregivers discussion of decreased vision or visual symptoms

Pertinent information to include:

An exhaustive list is not included here but specific considerations impact the ease of delivering surgery:

- Allergies
- Medications
 - history of tamsulosin hydrochloride (Flomax®) use (increased risk of complicated surgery)
- Musculoskeletal disorders e.g. tremor^{1,2}, movement disorders, posturing challenges¹ or spine diseases (can cause positional difficulty being supine for surgery)
- Obstructive sleep apnea and CPAP use (anesthetic considerations)
- Psychiatric concerns
 - cognitive impairment/dementia² (may necessitate a general anaesthetic)
 - significant anxiety^{1,2} or mood disorders

Confirmation of Cataract and Rule Out Other Ocular Conditions

Appointment(s) with Surgical Team

Details of Cataract Surgery:

- which eye is being considered
- what cataract surgery involves, how long it takes and anesthetic requirements
- benefits and possible risks
- likely recovery time
- what support might be needed after surgery
- likely long-term outcomes, including the possibility of glasses for some tasks
- delay between eyes and prescription imbalance difficulties

Lens Implant Selection:

- Depends on detailed preoperative measurements and a complex discussion with the patient regarding the patient's desired goals, vision requirements and ocular exam findings. There are multiple lens choices, costs and compromises to be made with each lens choice.

Cataract Surgery

- **Anesthesia** – predominantly topical, occasionally periocular and sedation as needed, rarely general anesthesia
- **Surgical technique** – generally small-incision phacoemulsification with foldable intraocular lens (IOL) implantation
- **Intraocular lens implants** – soft foldable acrylic is standard of care
- **Perioperative topical medications** – commonly antibiotics, steroids, non-steroidal anti-inflammatories starting 1-2 days prior to surgery and continuing after surgery
- **Preventing and managing post operative complications** – see [Table 4](#) in the guideline

Postoperative Assessment

- The patient will be followed for about 6 weeks after surgery by eye care professionals
- About 6 weeks after surgery, a new spectacle correction can be finalized by an optometrist, if needed
- Primary care practitioners should be aware of 'red flags' during the post-operative period