



Complete Summary

GUIDELINE TITLE

Cataract in the adult eye.

BIBLIOGRAPHIC SOURCE(S)

Cataract in the adult eye. Preferred practice pattern. In: American Academy of Ophthalmology (AAO). San Francisco (CA): American Academy of Ophthalmology (AAO); 2006. p. 69. [585 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American Academy of Ophthalmology (AAO), Anterior Segment Panel. Cataract in the adult eye. San Francisco (CA): American Academy of Ophthalmology (AAO); 2001. 62 p.

All Preferred Practice Patterns are reviewed by their parent panel annually or earlier if developments warrant and updated accordingly. To ensure that all Preferred Practice Patterns are current, each is valid for 5 years from the "approved by" date unless superseded by a revision.

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SCOPE

DISEASE/CONDITION(S)

Cataract in the adult eye

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Ophthalmology

INTENDED USERS

Health Plans
Physicians

GUIDELINE OBJECTIVE(S)

To improve functional vision and the quality of life for a patient with a cataract by addressing the following goals:

- Identify the presence and characteristics of cataract
- Assess the impact of the cataract on the patient's visual and functional status and on quality of life
- Inform the patient about the impact of a cataract on vision, functional activity and natural history, as well as the benefits and risks of surgical and nonsurgical alternatives so that the patient can make an informed decision about treatment options
- Establish criteria for a successful treatment outcome with the patient
- Perform surgery when there is the expectation that it will benefit the patient's function and when the patient elects this option
- Provide necessary postoperative care, rehabilitation, and treatment of any complications
- Perform surgery when indicated for management of coexistent ocular disease

TARGET POPULATION

Adults (18 years and older) with cataracts

INTERVENTIONS AND PRACTICES CONSIDERED

1. Diagnosis by evaluation of visual impairment, ophthalmic evaluation, and supplemental preoperative ophthalmic testing, as appropriate
2. Nonsurgical management, such as educating patients about the benefits of smoking cessation, use of ultraviolet (UV) B blocking sunglasses
3. Surgical management of cataracts, including: selection of appropriate candidates for surgery; preoperative medical evaluation; patient counseling regarding costs, risks, benefits, expected outcomes of surgery and care planning; discussion of anesthesia techniques and effects with patient; infection prophylaxis (5% solution of povidone iodine); selection of appropriate surgical technique (small-incision surgery preferred); intraocular lens implantation (monovision and multifocal); postoperative care, such as

- managing complications, discharge, medications, follow-up and examination, counseling and referral
4. Surgical management, as indicated, for co-existent ocular disease
 5. Neodymium:Yttrium-Aluminum Garnet (Nd:YAG) laser capsulotomy for management of Post-Capsular Opacification (PCO)

MAJOR OUTCOMES CONSIDERED

- Risk factors of cataract development
- Improvement in visual function
- Improvement in the quality of life
- Utilization of cataract surgery
- Adverse events associated with treatment

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

In the process of revising this document, a detailed literature search of articles in the English language was conducted on the subject of cataract for the years 2000 to August 2005.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

- I. Level I includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analysis of randomized controlled trials.
- II. Level II includes evidence obtained from the following:
 - Well-designed controlled trials without randomization
 - Well-designed cohort or case-control analytic studies, preferably from more than one center
 - Multiple-time series with or without the intervention
- III. Level III includes evidence obtained from one of the following:
 - Descriptive studies
 - Case reports
 - Reports of expert committees/organizations (e.g., Preferred Practice Pattern (PPP) panel consensus with peer review)

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The results of the literature search on the subject of cataract were reviewed by the Cataract and Anterior Segment Panel and used to prepare the recommendations, which they rated in two ways. The panel first rated each recommendation according to its importance to the care process. This "importance to the care process" rating represents care that the panel thought would improve the quality of the patient's care in a meaningful way. The panel also rated each recommendation on the strength of the evidence in the available literature to support the recommendation made.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Ratings of Importance to Care Process

Level A, defined as most important

Level B, defined as moderately important

Level C, defined as relevant but not critical

COST ANALYSIS

In a study in Sweden and a study in the United States, the hypothetical cost per quality-adjusted life year (QALY) gained for cataract extraction in one eye was estimated respectively at US \$4,500 and US \$2,023. In a US study, the estimated cost per QALY gained for cataract surgery in the second eye was US \$2,727 (calculated in 2003). These values for cataract surgery compare favorably with those reported for other ophthalmic procedures (e.g., laser photocoagulation for diabetic macular edema, \$3,101; laser photocoagulation for extrafoveal choroidal neovascularization, \$23,640).

A review of technological innovation looked at the costs and benefits of several treatments for disease conditions, including heart attack, low birthweight infants, depression, breast cancer, and cataracts. The authors concluded that expansion in treatment for patients operated at much less severe measures of visual acuity than in the past is almost certainly beneficial and that there have been substantial improvements in quality at no cost increase per patient. The present value of cataract surgery was estimated at \$95,000, which is much greater than the

estimated costs of \$2,000 to \$3,000. Thus, the benefits of expanded cataract treatment exceed the costs.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

These guidelines were reviewed by Council and approved by the Board of Trustees of the American Academy of Ophthalmology (September 16, 2006).

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Ratings of importance to the care process (A-C) and ratings of strength of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Diagnosis

Preoperative visual acuity is a poor predictor of postoperative functional improvement; therefore, the decision to recommend cataract surgery should not be made on the basis of visual acuity alone (Schein et al., 1994; Schein et al., 1995) [A:II].

The patient should be asked specifically about near and distant vision under varied lighting conditions for activities that the patient views as important [A:III].

Ophthalmic Evaluation

The comprehensive evaluation (history and physical examination) includes those components of the comprehensive adult medical eye evaluation (Preferred Practice Patterns Committee, 2005) specifically relevant to the diagnosis and treatment of a cataract as listed below:

- Patient history [A:III], including the patient's assessment of functional status, pertinent medical conditions, medications currently used, and other risk factors that can affect the surgical plan or outcome of surgery (e.g., immunosuppressive conditions, sympathetic alpha-1a antagonists).
- Visual acuity with current correction (the power of the present correction recorded) at distance and when appropriate at near. [A:III]
- Measurement of best-corrected visual acuity (with refraction when indicated). [A:III]
- External examination (lids, lashes, lacrimal apparatus, orbit). [A:III]
- Examination of ocular alignment and motility. [A:III]
- Assessment of pupillary function. [A:III]
- Measurement of intraocular pressure (IOP). [A:III]
- Slit-lamp biomicroscopy of the anterior segment. [A:III]

- Dilated examination of the lens, macula, peripheral retina, optic nerve, and vitreous. [A:III]
- Assessment of relevant aspects of the patient's mental and physical status. [B:III]

Management

Nonsurgical Management

At the present time, the highest quality evidence does not support a benefit from nutritional supplementation in preventing or delaying progression of cataracts; therefore, treatment with supplements is not recommended. (Huang et al., 2006) [A:I]

Patients who are currently smoking should be informed of the increased risk of cataract progression and the benefits of smoking cessation in retarding the progression of cataracts that have been demonstrated in several studies. (West et al., 1989; Christen et al., 1992; Christen et al., 2000) [A:II] Studies have found that smokers report that a physician's advice to quit is an important motivator in attempting to stop smoking. (National Cancer Institute [NCI], 1994; Ockene, 1987; Pederson, Baskerville & Wanklin, 1982; Ranney et al., 2006). Patients who are long-term users of oral or inhaled corticosteroids should be informed of the increased risk of cataract formation (Garbe, Suissa & Leloir, 1998; Jick, Vasilakis-Scaramozza & Maier 2001; Klein et al., 2001; Smeeth et al., 2003; Urban & Cotlier, 1986) [A:II] and may wish to discuss alternate medications with their primary care physician. Patients with diabetes mellitus should be informed of their increased risk of cataract formation. (Hennis et al., 2004; Klein, Klein & Lee, 1998; Leske et al., 1999) [A:II]. Brimmed hats and ultraviolet-B blocking sunglasses are reasonable precautions to recommend to patients. (McCarty, Nanjan & Taylor, 2000).

Surgical Management

Indications for Surgery

- The primary indication for surgery is visual function that no longer meets the patient's needs and for which cataract surgery provides a reasonable likelihood of improved vision. [A:III]
- Other indications for a cataract removal include the following:
 - Clinically significant anisometropia in the presence of a cataract. [A:III]
 - The lens opacity interferes with optimal diagnosis or management of posterior segment conditions. [A:III]
 - The lens causes inflammation (phacolysis, phacoanaphylaxis). [A:III]
 - The lens induces angle closure (phacomorphic or phacotopic). [A:III]

The ophthalmologist who is to perform the cataract surgery has the following responsibilities:

- To examine the patient preoperatively (see "Ophthalmic Evaluation" above). [A:III]

- To ensure that the evaluation accurately documents the symptoms, findings, and indications for treatment. [A:III]
- To obtain informed consent from the patient or the patient's surrogate decision maker after discussing the risks, benefits, and expected outcomes of surgery, including anticipated refractive outcome and the surgical experience. [A:III]
- To review the results of presurgical and diagnostic evaluations with the patient or the patient's surrogate decision maker. [A:III]
- To formulate a surgical plan, including selection of an appropriate intraocular lens (IOL). [A:III]
- To formulate postoperative care plans and inform the patient or the patient's surrogate decision maker of these arrangements (setting of care, individuals who will provide care). [A:III]
- To afford the patient or the patient's surrogate decision maker the opportunity to discuss the costs associated with surgery. [B:III]

All patients undergoing cataract surgery should have a history and physical examination relevant to the risk factors for undergoing the planned anesthesia and sedation and as directed by a review of systems. [A:III] For patients with certain severe systemic diseases (e.g., chronic obstructive pulmonary disease, recent myocardial infarction, unstable angina, poorly controlled diabetes, or poorly controlled blood pressure) a preoperative medical evaluation by the patient's physician should be strongly considered. (Lee et al., 1999). [A:II] Laboratory testing as indicated by the findings in the history and physical examination is appropriate. (Schein, et al., 2000) [A:I].

Given the lack of evidence for an optimal anesthesia strategy during cataract surgery, the type of anesthesia management should be determined by the patient's needs and the preferences of the patient and surgeon. (Agency for Healthcare Research and Quality [AHRQ], 2000) [A:II].

Use of a 5% solution of povidone iodine in the conjunctival cul de sac is recommended to prevent infection. (Speaker & Menikoff, 1991; Wu et al., 2006) [A:II].

Further management recommendations can be found in the main body of the original guideline document.

Postoperative Follow-up

The frequency of postoperative examinations is based on the goal of optimizing the outcome of surgery and swiftly recognizing and managing complications. The table below provides guidelines for follow-up based on consensus in the absence of evidence for optimal follow-up schedules.

Table. Postoperative Follow-up Schedule [A:III]

Patient Characteristics	First Visit	Subsequent Visits
Without high risks or signs or symptoms of possible complications following small-incision cataract	Within 48 hours of surgery	Frequency and timing dependent upon refraction, visual function, and medical condition of the eye

Patient Characteristics	First Visit	Subsequent Visits
surgery		
High risk; functionally monocular; glaucoma or glaucoma suspect patients; intraoperative complications	Within 24 hours of surgery	More frequent follow-up usually necessary

Patients should be instructed to contact the ophthalmologist promptly if they experience symptoms such as a significant reduction in vision, increasing pain, progressive redness, or periocular swelling, because these symptoms may indicate the onset of endophthalmitis [A:III].

In the absence of complications, the frequency and timing of subsequent postoperative visits depend largely on the size or configuration of the incision; the need to cut or remove sutures; and when refraction, visual function, and the medical condition of the eye are stabilized. More frequent postoperative visits are generally indicated if unusual findings, symptoms, or complications occur, and the patient should have ready access to the ophthalmologist's office to ask questions or seek care [A:III].

Components of each postoperative examination should include: [A:III]

- Interval history, including use of postoperative medications, new symptoms, and self-assessment of vision
- Measurement of visual function (e.g., visual acuity, pinhole testing)
- Measurement of intraocular pressure (IOP)
- Slit-lamp biomicroscopy
- Counseling/education for the patient or patient's caretaker
- Management plan

A final refractive visit should be made to provide an accurate prescription for spectacles to allow for the patient's optimal visual function [A:III].

Provider and Setting

It is the unique role of the ophthalmologist who performs cataract surgery to confirm the presence of the cataract and to formulate and carry out a treatment plan [A:III]. The surgical facility should comply with standards governing the particular setting of care (e.g., the Accreditation Association for Ambulatory Health Care, Inc., Joint Commission for Accreditation of Healthcare Organizations, American Hospital Association) [A:III].

Counseling/Referral

Patients with functionally limiting postoperative visual impairment should be referred for vision rehabilitation (American Academy of Ophthalmology [AAO], 2001) and social services [A:III].

Definitions:

Ratings of Importance to Care Process

Level A, defined as most important
Level B, defined as moderately important
Level C, defined as relevant, but not critical

Ratings of Strength of Evidence

- I. Level I includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analysis of randomized controlled trials.
- II. Level II includes evidence obtained from the following:
 - Well-designed controlled trials without randomization
 - Well-designed cohort or case-control analytic studies, preferably from more than one center
 - Multiple-time series with or without the intervention
- III. Level III includes evidence obtained from one of the following:
 - Descriptive studies
 - Case reports
 - Reports of expert committees/organization (e.g., Preferred Practice Pattern panel consensus with peer review)

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations.")

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Improved visual function as a result of cataract surgery
- Improved physical function as a critical outcome of cataract surgery
- Improved mental health and emotional well-being as a second critical outcome of cataract surgery

Subgroups Most Likely to Benefit

Patients without preoperative ocular comorbidities are more likely to have better outcomes from cataract surgery than patients with ocular comorbidities.

POTENTIAL HARMS

- **Cataract Surgery:** Major complications that are potentially sight-threatening include infectious endophthalmitis, intraoperative suprachoroidal hemorrhage, cystoid macular edema (CME), retinal detachment, corneal edema, and intraocular lens dislocation
- **Intraocular Lenses (IOL):** The most common reasons for IOL explantation include incorrect power, opacification, decentration or dislocation, and glare or optical aberrations. A rare late complication of IOL implantation is uveitis-glaucoma-hyphema syndrome.
- **Anesthesia:** Anesthesia techniques with needle injection may be associated with complications such as strabismus, globe perforation, retrobulbar hemorrhage, and macular infarction not seen with topical, blunt cannula, and other non-needle injection techniques.
- **Nd:YAG (Neodymium: Yttrium-Aluminum-Garnet) laser:** Complications of Nd:YAG laser capsulotomy include transient and long-term increased intraocular pressure (IOP), retinal detachment, CME, damage to the intraocular lens (IOL), hyphema, dislocation of the IOL, and corneal edema and corneal abrasions from using a focusing contact lens for the laser surgery. Axial myopia increases the risk of retinal detachment after Nd:YAG laser capsulotomy, as does pre-existing vitreoretinal disease, male gender, young age, vitreous prolapse into the anterior chamber, and spontaneous extension of the capsulotomy.
- **Ocular Comorbidities:** High-risk characteristics include a history of previous eye surgery, special types of cataracts, very large and very small eyes, deeply set eyes, eyes with small pupils or posterior synechiae, eyes with scarred or cloudy corneas, eyes with weak or absent zonules, prior ocular trauma, and the systemic use of alpha-1a antagonists.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Surgery for a visually impairing cataract should **not** be performed under the following circumstances:
 - Eyeglasses or visual aids provide vision that meets the patient's needs.
 - Surgery will not improve visual function.
 - The patient cannot safely undergo surgery because of coexisting medical or ocular conditions.
 - Appropriate postoperative care cannot be arranged.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- **Preferred Practice Patterns provide guidance for the pattern of practice, not for the care of a particular individual.** While they should generally meet the needs of most patients, they cannot possibly best meet the needs of all patients. Adherence to these Preferred Practice Patterns will not ensure a successful outcome in every situation. These practice patterns should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed at obtaining the best results. It may be

necessary to approach different patients' needs in different ways. The physician must make the ultimate judgment about the propriety of the care of a particular patient in light of all of the circumstances presented by that patient. The American Academy of Ophthalmology is available to assist members in resolving ethical dilemmas that arise in the course of ophthalmic practice.

- **Preferred Practice Patterns are not medical standards to be adhered to in all individual situations.** The Academy specifically disclaims any and all liability for injury or other damages of any kind, from negligence or otherwise, for any and all claims that may arise out of the use of any recommendations or other information contained herein.
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IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads
Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 Sep (revised 2006 Sep)

GUIDELINE DEVELOPER(S)

American Academy of Ophthalmology - Medical Specialty Society

SOURCE(S) OF FUNDING

American Academy of Ophthalmology

GUIDELINE COMMITTEE

Cataract and Anterior Segment Panel; Preferred Practice Patterns Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

These authors have disclosed the following financial relationships occurring from January 2005 to August 2006:

Samuel Masket, MD: Advanced Medical Optics, Medennium, IntraLase – Affiliation. Alcon – Affiliation. Consultant/Advisor. Lecture fees. Othera

Pharmaceuticals – Compensation. Consultant/Advisor. Power Vision – Consultant/Advisor. Visiogen – Affiliation. Consultant/Advisor.

David F. Chang, MD: Advanced Medical Optics – Affiliation. Compensation. Consultant/Advisor. Alcon – Compensation. Consultant/Advisor. Calhoun Vision – Equity owner. Cataract & Refractive Surgery Today – Affiliation. Ista Pharmaceuticals – Lecture fees. Slack – Consultant/Advisor. Patents/Royalty. Visiogen – Affiliation. Consultant/Advisor.

Stephen S. Lane, MD: Alcon – Affiliation. Ownership. Compensation. Consultant/Advisor. Lecture fees. Bausch and Lomb – Affiliation. Compensation. Consultant/Advisor. Lecture fees. Medennium, Surgical Specialties – Affiliation. Visiogen – Affiliation. Ownership. Compensation. Consultant/Advisor. VisionCare Ophthalmic Technologies – Affiliation. Compensation. Consultant/Advisor. WaveTech – Consultant/Advisor.

Kevin M. Miller, MD: Alcon – Compensation. Lecture/Advisor. Grant support. Hoya – Compensation. Grant support. STAAR Surgical – Equity owner.

Roger F. Steinert, MD: Advanced Medical Optics – Affiliation. Compensation. Consultant/Advisor. Alcon – Affiliation. Compensation. Allergan – Lecture fees. IntraLase – Affiliation. Compensation. Consult/Advisor. Grant support. ReVision Optics – Consultant/Advisor. Rhein Medical – Compensation. Carl Zeiss Meditec – Consultant/Advisor. Lecture fees.

Rohit Varma, MD, MPH: Alcon – Consultant/Advisor. Allergan – Lecture fees. National Eye Institute – Grant support. Pfizer Ophthalmics – Compensation. Lecture fees.

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GUIDELINE AVAILABILITY

Electronic copies: Available from the [American Academy of Ophthalmology \(AAO\) Web site](#).

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Summary benchmarks for preferred practice patterns. San Francisco (CA): American Academy of Ophthalmology; 2006 Nov. 21 p.

Available in Portable Document Format (PDF) from the [American Academy of Ophthalmology \(AAO\) Web site](#).

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on February 20, 1999. The information was verified by the guideline developer on April 23, 1999. This summary was updated on January 8, 2002. The updated information was verified by the guideline developer as of February 19, 2002. This NGC summary was updated on January 4, 2007. The updated information was verified by the guideline developer on January 30, 2007.

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Date Modified: 11/3/2008

