

April 1993

# CATARACT SURGERY

## Patient-Reported Data on Appropriateness and Outcomes



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**United States  
General Accounting Office  
Washington, D.C. 20548**

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**Program Evaluation and  
Methodology Division**

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The Honorable David Pryor  
Chairman  
The Honorable William Cohen  
Ranking Minority Member  
Special Committee on Aging  
United States Senate

This report describes the symptoms and visual functioning of Medicare patients both before and after they underwent cataract surgery. Because these data come from a random sample of nearly 1,500 cataract patients in California, Massachusetts, Pennsylvania, and Texas, they provide new information on the appropriateness and outcome of cataract surgery from the patient's perspective.

As agreed with your office, we will send copies to the Secretary of Health and Human Services, Administrator of the Health Care Financing Administration, and Administrator of the Agency for Health Care Policy and Research. We will also send copies to other interested parties upon request.

If you have any questions or would like additional information, please call me at (202) 512-2900 or Robert L. York, Director of Program Evaluation in Human Service Areas, at (202) 512-5885. Other major contributors to this report are listed in appendix II.

Eleanor Chelimsky  
Assistant Comptroller General

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# Executive Summary

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## Purpose

The Medicare program paid for more than 1.3 million outpatient cataract surgeries in 1991. For many patients, cataract surgery provides a dramatic improvement in vision. Yet the potential also exists for patients to suffer complications that result in worse rather than better vision or to have the procedure done when they do not really need it.

Under a larger study undertaken at the request of the chairman and ranking member of the Senate Special Committee on Aging, GAO conducted a survey of Medicare patients who had undergone cataract surgery. The survey responses describe, from the patients' perspectives, their experiences with that surgery. The focus is on the extent of eye symptoms and visual limitations before and after surgery. These data permit an assessment of the outcome of the operation in terms of changes—for better or worse—in those symptoms and limitations after the surgery took place.

A subsequent report will complete GAO's examination of Medicare's quality assurance for outpatient cataract surgery. It will compare the survey responses presented here to the results of current Medicare review procedures for outpatient surgery in order to evaluate the way that Medicare has approached quality assurance for cataract surgery.

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## Background

A cataract is a clouding of the lens of an eye that typically develops slowly as people get older. Depending on what part of the lens is most affected, and how far along the process has gone, the effect on vision can range from minimal to catastrophic. In most cases, surgical removal of the obscured natural lens, usually combined with the insertion of an artificial lens implant, is the only treatment option available. In recent years, the vast majority of these operations have been performed either in a hospital outpatient department or in a free-standing ambulatory surgery center.

Cataract surgery is not risk-free. A small proportion of patients experience serious complications leading to partial or complete loss of vision. Cataract surgery, therefore, raises two related quality issues. First, to what extent do patients undergo the operation when its likely benefit does not exceed its risks? Second, what proportion of cataract patients ultimately experience improved vision after the surgery?

The American Academy of Ophthalmology has established guidelines for determining the appropriateness (or medical necessity) of cataract surgery. The guidelines emphasize the importance of assessing both the

effect of the cataract on the patient's usual activities and the clinical measurement of visual acuity in weighing the likely benefits of surgery against the risks of serious adverse outcomes. According to the guidelines, surgery is not appropriate unless there is evidence that the cataract has led to both clinically measured limitations in visual acuity and functional impairment perceived by the patient in his or her daily life.

In order to obtain data on both presurgical visual limitations and outcomes, GAO developed a survey instrument designed to obtain patients' assessments of their eye symptoms and functional impairments prior to and after surgery. It was sent to a random sample of 1,964 Medicare patients who had recently undergone cataract surgery in California, Massachusetts, Pennsylvania, and Texas. Usable responses were obtained from 76 percent of the sample. The strengths and limitations of using a survey to collect this type of information are discussed in appendix I.

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## Results in Brief

About three quarters of Medicare patients reported one or more substantial functional impairments affecting their ability to drive, read, or watch television prior to their cataract surgery. These responses generally support the appropriateness of the procedure for those patients. With the inclusion of symptoms such as blurred vision or sensitivity to glare, the proportion of patients with substantial presurgical vision problems increased to 84 percent. Surgery may have been more questionable for the remaining 16 percent of patients, depending on the weight given to "slight" symptoms and functional limitations relative to the risks of the surgery itself.

With respect to the long-term outcomes of the surgery, the overwhelming majority of respondents reported that they improved on one or more symptoms and functional impairments. For about two thirds (66 percent), this improvement was uniform across all dimensions (that is, the symptoms and functions that did not get better at least stayed unchanged). Most of the other patients (30 percent) reported mixed results, with improvements in some symptoms or functional impairments and worsening in others.

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## Principal Findings

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### Medical Necessity

The results from the GAO survey provide insight, from the patients' own experiences, on the likely magnitude of inappropriate cataract surgery. However, because inappropriateness has not been clearly defined, the survey results show different amounts of questionable surgery based on different criteria for appropriateness.

If the criterion is that any level of problem with either symptoms or functions (even those the patient considers slight) is sufficient to warrant surgery, responses to the GAO survey show that very few surgeries (2.5 percent) were inappropriate. If the criterion is functional impairment (as it is in the American Academy of Ophthalmology guidelines), then 6 percent of respondents' surgeries were inappropriate. This estimate is based on the proportion of patients who indicated they had no limitations in any of the 12 functional activities included in the GAO survey before their cataract surgeries.

If the criterion for inappropriateness escalates from "no problem" to "slight problem," then 16 percent of surgeries were questionable. This proportion corresponds to the 16 percent of patients who indicated they had no more than "slight" problems with either symptoms or functions prior to surgery.

Finally, if the criterion is one of substantial functional impairment, almost a quarter of our respondents (24 percent) would have had inappropriate surgery, reporting to GAO that they had no more than slight problems with visual function before their surgeries.

The data from four states do not allow GAO to make generalizations regarding the likely levels of questionable cataract surgery in the nation as a whole. However, to get some sense of the financial importance reducing such surgery could have, GAO (1) hypothesized that these four states were not unrepresentative of current practice, (2) applied the permissive criterion that, for the surgery to be considered inappropriate, a patient must have reported no functional impairment, and (3) calculated that every 1 percent of cataract surgeries represented approximately \$34 million in expenditures for the Medicare program as a whole. Under this scenario, Medicare would have spent approximately \$200 million in 1991 for inappropriate cataract surgery.

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**Outcomes of Cataract Surgery**

Concerning long-term changes in both symptoms and functional impairments, the survey responses indicated that a high proportion of patients benefited from the surgery in both areas. Slightly more than 70 percent reported one or more symptoms improved, with none worsening, and almost three quarters (74 percent) said the same for their visual functioning. Most of the rest indicated mixed outcomes for symptoms (18 percent) and functional impairments (12 percent). For this group, some symptoms or functions improved and others worsened. Only a few respondents (5 percent) reported a uniform worsening of symptoms or functional capabilities.

Even patients with no moderate to severe symptoms or functional limitations prior to surgery tended to report modest improvement, particularly in blurred vision. However, the patients who underwent surgery with more substantial visual impairments improved in a larger number of symptoms and functions.

Most patients reported no more than slight interim effects from the surgery itself, such as numbness, bleeding, swelling, or pain. However, there were exceptions, with 1 to 2 percent indicating severe pain or swelling, 7 to 8 percent moderate pain or swelling. Most of these postsurgical symptoms lasted just 1 to 2 days. Adverse events were also rare, with 5 percent of patients reporting an infection, 13 percent a second procedure related to the cataract surgery, and 1.5 percent hospitalization for complications from the surgery.

It is important to note that the findings of this study describe a situation in which expenditures could be reduced and the quality of service could be enhanced at the same time. In effect, if the volume of inappropriate surgeries could be reduced, not only would financial savings be realized but the quality of care for individuals with cataracts would also improve.

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**Recommendations**

This report contains no recommendations.

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**Agency Comments**

GAO deemed it unnecessary to obtain comments on a draft of this report from the Health Care Financing Administration, because it did not address Medicare policies or operations. As mentioned, a subsequent report will examine Medicare's quality assurance procedures for cataract surgery.

# Contents

<b>Executive Summary</b>		<b>2</b>
<b>Chapter 1</b>		<b>10</b>
<b>Introduction</b>	Background	10
	Objective, Scope, and Methodology	14
	Strengths and Limitations of the Survey	16
	Report Overview	20
<b>Chapter 2</b>		<b>21</b>
<b>The Condition of Patients Prior to Cataract Surgery</b>	Functional Impairment and Symptoms Before Surgery	21
	Relationship of Patient-Reported Condition to Appropriateness of Surgery	24
	Conclusion	27
<b>Chapter 3</b>		<b>29</b>
<b>Outcomes of Cataract Surgery</b>	Long-Term Outcomes	29
	Interim Outcomes	31
	Conclusion	37
<b>Chapter 4</b>		<b>38</b>
<b>The Effect of Presurgical Conditions on Outcomes of Cataract Surgery</b>	Change in Individual Symptoms and Functional Impairments	38
	Change in Overall Symptoms and Functional Impairment	41
	Summary	44
<b>Appendixes</b>	Appendix I: Interpreting Survey Data on Patients' Experiences Before and After Surgery	46
	Appendix II: Major Contributors to This Report	51
<b>Tables</b>	Table 2.1: Extent of Impaired Visual Functioning Prior to Surgery Reported by Patients	22
	Table 2.2: Extent of Presurgery Eye Symptoms Reported by Patients	23
	Table 2.3: Highest Level of Presurgery Visual Impairment Reported by Patients for Any of Twelve Functional Activities	25



<b>Table 2.4: Highest Level of Presurgery Eye Symptoms Reported for Any of Six Symptoms</b>	25
<b>Table 2.5: Proportion of Cataract Patients Meeting Permissive and Restrictive Standards for Appropriateness Based on Patient-Reported Eye Symptoms and Functional Impairments</b>	26
<b>Table 2.6: Estimates of the Proportion of Inappropriate Cataract Surgeries Based on More or Less Restrictive Criteria</b>	27
<b>Table 3.1: Proportion of Patients Who Reported Their Visual Functioning Improved, Stayed the Same, or Worsened After Surgery</b>	30
<b>Table 3.2: Proportion of Patients Who Reported Their Eye Symptoms Improved, Stayed the Same, or Worsened After Surgery</b>	30
<b>Table 3.3: Cumulative Change in Symptoms and Functions: Cataract Patients Who Experienced Improvement, No Change, Worsening, or Mixed Outcomes</b>	31
<b>Table 3.4: Proportion of Patients Who Experienced Symptoms at Discharge or Immediately After</b>	32
<b>Table 3.5: Proportion of Patients With Symptoms That Generally Accompany Surgery</b>	33
<b>Table 3.6: Proportion of Patients Who Experienced Various Durations of Symptoms That Generally Accompany Surgery</b>	33
<b>Table 3.7: Proportion of Patients With Eye Symptoms Following Surgery</b>	34
<b>Table 3.8: Proportion of Patients With Various Durations of Eye Symptoms Following Surgery</b>	34
<b>Table 3.9: Proportion of Patients Who Experienced Eye Symptoms Before Surgery, Following Surgery, and at Time of Survey</b>	35
<b>Table 3.10: Proportion of Patients Who Reported They Needed Various Lengths of Time to Recover From Surgery</b>	36
<b>Table 3.11: Proportion of Patients With Various Adverse Events</b>	37
<b>Table 4.1: Proportion of Patients Who Reported Their Visual Functioning Improved, Stayed the Same, or Worsened by Difficulty Experienced Before Surgery</b>	39
<b>Table 4.2: Proportion of Patients Who Reported Their Eye Symptoms Improved, Stayed the Same, or Worsened by Condition Before Surgery</b>	40

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Table 4.3: Cumulative Change in Symptoms and Functions: Percent of Cataract Patients Who Experienced Improvement, No Change, Worsening, or Mixed Outcomes by Condition Before Surgery	41
Table 4.4: Number of Functions That Patients Reported Improved Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery	42
Table 4.5: Number of Functions That Patients Reported Got Worse Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery	43
Table 4.6: Number of Symptoms That Patients Reported Improved Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery	43
Table 4.7: Number of Symptoms That Patients Reported Got Worse Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery	43

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**Abbreviations**

AAO	American Academy of Ophthalmology
GAO	U.S. General Accounting Office
HCFA	Health Care Financing Administration
HCPCS	HCFA Common Procedure Coding System
HHS	Health and Human Services
PRO	Peer review organization



# Introduction

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The Medicare program paid for more than 1.3 million cataract surgeries in 1991. For many patients, cataract surgery provides a dramatic improvement in vision. Yet the potential also exists for patients to suffer complications that result in worse rather than better vision or to have the procedure done when they do not really need it.

This report presents our results from a survey of patients who had cataract surgery performed under the Medicare program. It describes, from the patients' perspective, their eye symptoms and visual limitations prior to their operations. It also presents data on the outcomes of those operations. Our concern is with the extent to which the symptoms and limitations that existed before the surgery improved after the surgery. Before outlining the specific objectives of our study, we present some background information on the growth of outpatient surgery in general and on the issues in assessing the appropriateness of performing outpatient cataract surgery on different patients and evaluating the outcome of those operations.

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## Background

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### The Growth in Outpatient Surgery

The vast majority of cataract surgeries are now performed as outpatient procedures, either in hospital outpatient departments or in free-standing ambulatory surgical centers. This reflects a larger trend in which surgical procedures in general have shifted to an outpatient setting. In fact, in 1990, 51 percent of all surgical procedures performed in U.S. community hospitals were done on an outpatient basis.<sup>1</sup>

As the volume of outpatient surgery has increased, there has been concern over quality assessment and assurance.<sup>2</sup> The concern arises because less information is generally available in the medical record for an outpatient procedure than for a typical inpatient hospital stay, particularly regarding

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<sup>1</sup>American Hospital Association, "Outpatient Surgery Trends 1980-1990," *Ambulatory Care Trendlines: 1992*, 1:2 (April 1992), 1, 6, and 10.

<sup>2</sup>Quality assessment involves the application of measures of quality (using either implicit or explicit criteria) retrospectively to the structure, process, or outcomes of care and the monitoring of levels of quality over time. Quality assurance works prospectively and extends the concept of assessment to include the formal organization of activities designed to identify problems in the quality of medical care, determine solutions to them, monitor the effectiveness of the solutions, and institute additional change and monitoring where warranted.

the outcome of care.<sup>3</sup> This makes it more difficult to conduct the traditional form of quality assurance, historically focused on peer review of hospital medical records.

We were asked by the chairman and ranking member of the Senate Special Committee on Aging to examine quality assurance for outpatient surgery under Medicare. In response to this request, we examined the procedures currently followed by peer review organizations (PROs) to monitor the appropriateness and outcomes of outpatient cataract surgery, gathered data on PRO reviews of actual cases, and conducted a survey of patients to obtain information directly from them regarding their experiences with cataract surgery.<sup>4</sup> The objective of the full study is to see if data provided by patients could usefully supplement the medical record data on outpatient surgery currently used by PROs for such reviews. The results of this analysis and our recommendations for possible changes in Medicare's procedures for reviewing outpatient cataract surgery will appear in a subsequent report. In this report, we present the results from the survey component of our work.

The data presented in the chapters that follow detail the status of patients prior to their surgery, how they felt in the period immediately following surgery, and the extent to which they experienced improvements in the longer term. These data have implications for two key issues related to quality assurance for cataract surgery: (1) Was the procedure justified to begin with for a given patient? (2) Did the procedure have positive results? Each is discussed in turn.

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## Medical Necessity for Cataract Surgery

A cataract is a clouding of the lens of an eye. Although there may be many causes, most cataracts among the Medicare population are the result of biochemical changes to the fibers of the lens that occur gradually over time. The lens becomes less uniform, creating variations in its refractivity at different points. This in turn makes the light traveling through the lens scatter, so that the lens is less transparent. These changes are a nearly universal product of aging, with 95 percent of people over 65 losing some clarity in one or both lenses.

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<sup>3</sup>The comparable facility-based record for outpatient surgery is maintained by the hospital outpatient department or free-standing surgical center where the procedure was performed.

<sup>4</sup>PROs are private organizations that contract with the Health Care Financing Administration (HCFA) under the Department of Health and Human Services to monitor the quality of care provided to Medicare beneficiaries in each state. Following instructions outlined by HCFA, the PROs review the medical records of selected cases and perform other functions designed to ensure that all services provided to Medicare beneficiaries are both medically necessary and performed competently.

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In most cases, surgical removal of the obscured natural lens, usually combined with the insertion of an artificial lens implant, is the only treatment option available. However, depending on what part of a lens is most affected, and how far along the process has gone, the effect of the cataract on vision can range from minimal to catastrophic. Many people, particularly in less developed parts of the world, become blind from cataracts. Others with some degree of lens opacity experience no appreciable loss of vision. Therefore, the presence of a cataract does not in itself demonstrate the need for surgery.

Although the risk that cataract surgery will lead to complications impairing the patient's vision is generally quite low, the consequences can be severe. Therefore, a judgment has to be made in each case as to whether the likely benefits of surgery will exceed its risks. The less a cataract affects a patient's vision, the less reason there is to incur those risks by undergoing the surgery. When the probable benefits do not exceed the risks of surgery, the cases are said to lack "medical necessity" or to be "medically inappropriate" for cataract surgery. While there may be financial savings from not performing a cataract surgery that lacks medical necessity, the assessment of necessity does not involve a weighing of medical benefits against financial costs. Rather, looking only at the relative probabilities of both positive and negative effects from the surgery, such patients are considered medically better off if they do not have the operation performed—at least at a given point in time.<sup>5</sup>

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## Outcomes of Cataract Surgery

Thus, the rationale for performing cataract surgery, given its risks, is the likelihood that a patient's vision will improve following the operation. Once the operation has been performed and sufficient time has passed for the patient to recover from the surgery, one can determine if that prediction proved accurate. Variations in outcome may result from a number of causes, including—but not limited to—the technical competence with which the procedure was performed. Nonetheless, outcome represents a logical "bottom line" for assessing the ultimate effectiveness of a procedure—as implemented—for individuals and groups of patients. The key question is whether the patient has experienced positive change in the visual impairments that prompted surgery in the first place, without introducing complications.

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<sup>5</sup>This conclusion may well change if the cataract begins to affect the patient's vision more noticeably.

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## Assessing Medical Necessity and Outcome

Ophthalmologists assess the need for, and results of, cataract surgery along two distinct dimensions. One is by clinical examination, including the familiar Snellen visual acuity score.<sup>6</sup> The point is to determine how well the patient can see under highly controlled conditions. The second dimension concerns the effect of any visual impairments on the patient's daily activities. In other words, has the patient been unable to carry out activities or had difficulty doing them because of the cataract? Different patients with the same level of clinically assessed acuity may vary widely in the limitations to their daily life, depending on their occupations and interests. For example, sensitivity to glare (a common symptom of cataracts) may affect a taxi driver much more than someone who does not drive.

The importance of both clinical assessments and functional limitations in determining the medical necessity of a cataract operation is underscored in practice guidelines published by the American Academy of Ophthalmology (AAO). These guidelines specify three criteria:

- the patient should perceive a visual disability, relative to the types of activities that he or she otherwise would normally undertake;
- the patient's clinically measured best correctable visual acuity should be 20/50 or worse on the Snellen scale;<sup>7</sup>
- the patient should have been informed of the risks and benefits of surgery and made his or her own decision that the benefits outweigh the risks.<sup>8</sup>

The guidelines state that all three criteria must be met for the surgery to be considered appropriate.<sup>9</sup>

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<sup>6</sup>The Snellen scale (20/20, 20/40, etc.) assesses distant visual acuity in terms of the patient's ability to identify alphabetic letters of decreasing size.

<sup>7</sup>Or 20/40 or worse with a patient's complaints of disabling glare.

<sup>8</sup>American Academy of Ophthalmology, "Cataract in the Otherwise Healthy Eye," September 16, 1989, p. 6.

<sup>9</sup>There are two other circumstances in which the guidelines note that cataract surgery would be indicated: (1) patients with lens-induced diseases and (2) situations where the ophthalmologist needs to be able to see through the lens more clearly to treat other eye problems.

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## Objective, Scope, and Methodology

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### Objective

The objective of this portion of our study was to describe (1) the extent of visual symptoms and functional limitations perceived by Medicare cataract patients prior to surgery and (2) the change in those symptoms and functional limitations experienced by patients following the procedure. The emphasis on patient perceptions as opposed to clinical assessments of medical necessity and outcome reflected the aim of the larger study to supplement the information already collected by the PROs, which is primarily clinical.

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### Scope

We focused our study on California, Massachusetts, Pennsylvania, and Texas, rather than attempting to collect information from patients nationally. This focus stemmed from our objective in the other part of this study to compare patient-provided information with the results of PRO reviews. Thus, we took for our random sample of patients the sample of Medicare cataract surgery patients drawn by the PROs in each of the four states.

We intentionally picked four relatively large states, so that the patients the PROs selected to review at a specified time point would provide us with a reasonably large number of patients to survey. At the same time, one would expect to find a good deal of variation within and among these states, given their size and geographic dispersion, with respect to patient characteristics and physician practice styles.

This focus on four states means that we cannot generalize our findings to the nation as a whole. The descriptive statistics generated by the study on the level of eye symptoms and functional limitations prior to cataract surgery and the distribution of favorable and adverse outcomes following surgery apply only to those four states.

In this report, we present the data provided by our respondents in the four states as a whole. This approach allows for greater clarity in examining relationships in the data generated by the survey, since all the respondents had the same procedure and answered the same questions about their individual experiences. However, we point out the instances in which the pattern of responses differed significantly among the states.



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## Methodology

We chose a survey as our basic data collection strategy because most of the data we wished to gather concerned patients' experience and perceptions, and the survey has long served as a primary means for investigating such things. A survey can obtain the information directly from individuals, using standardized questions and response categories to maximize the comparability of the data produced over large numbers of respondents.

Nonetheless, surveys can, under certain circumstances, produce misleading results. We identified several factors that could have affected the ability of our specific survey instrument to produce accurate information. These included the content and wording of survey questions and the potential for biased results arising from any systematic differences between respondents and nonrespondents, problems in recall, or variations among respondents in their willingness to report certain kinds of events or perceptions. Appendix I examines in detail the potential effect of each of these methodological issues on our analyses. In general, we found that none of these factors is likely to have biased our results to a substantial degree.

We sent our survey to the Medicare cataract surgery patients in the four states that had been selected by the PRO for ambulatory surgery review in November 1990.<sup>10</sup> The vast majority of these (97 percent) involved a single procedure, extracapsular extraction of a cataract with insertion of an artificial lens (HCPCS code 66984).<sup>11</sup> To ensure that our comparisons across cases were not biased by differences in the procedure performed, we limited our analyses to the cases that involved this specific procedure.

Our findings from the survey of patients are strengthened by a relatively large sample and high response rate. Of the 1,964 cataract cases selected for review by the four PROs, usable responses were obtained from 1,488, or 75.8 percent.<sup>12</sup> This rate is calculated from the total set of cases selected by the PROs. Therefore, nonresponse includes all those for whom no survey

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<sup>10</sup>One exception should be noted; the Massachusetts PRO selected cases for postsurgery review from among those that had required prior authorization (primarily cataracts and bunionectomies) twice a year rather than every month. It therefore included cases from roughly the same time period as in the other states but with somewhat greater dispersion with respect to the date on which the procedure was performed.

<sup>11</sup>HCPCS stands for the HCFA Common Procedure Coding System. It refers to the comprehensive list of individual medical procedures for which HCFA reimburses physicians under Medicare.

<sup>12</sup>The breakdown among the states was 638 sent with 461 returned from California, 445 sent with 349 returned from Massachusetts, 403 sent with 318 returned from Pennsylvania, and 478 sent with 360 returned from Texas.

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results were obtained for any reason (death, mental infirmity, inaccurate mailing address, and so on).

These samples and response rates are large enough that standard errors are quite small—between .258 and 1.30—for the group of cataract patients as a whole, and still modest—.558 to 2.80—for the smallest sample from an individual PRO.<sup>13</sup> This means that the results obtained from our samples should accurately represent the populations from which they were drawn to within a few percentage points.<sup>14</sup>

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## Strengths and Limitations of the Survey

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### Previous Studies of Cataract Surgery

The strengths of our study can best be discussed in the context of other studies on the appropriateness and outcomes of cataract surgery. While these studies have generated information on these issues, their research objectives differed considerably from ours. As a result, they have collected less extensive data from patients concerning their condition before and after surgery. Moreover, the design of these studies sometimes complicates the interpretation of these data with respect to appropriateness and outcomes.

For example, the most closely related study was produced by the office of the inspector general in the Department of Health Human Services (HHS).<sup>15</sup> This study involved a survey of Medicare outpatient surgery patients that included cataract operations along with endoscopy, colonoscopy, and bunionectomy. The survey contained a limited number of questions on symptoms, functional limitations, and complications of surgery and an overall assessment on whether the patient's vision had improved. The

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<sup>13</sup>These standard errors are calculated for percentages—for example, the percentage of cases that experience a given type of outcome. The range of standard errors reflects the fact that standard errors increase, for a given sample size, as the results move from the extremes (1 percent or 99 percent) toward an even split (50 percent).

<sup>14</sup>For example, a rate of 10 percent with a standard error of 1.68 means that there is a 95 percent chance that the actual rate in the population from which the sample was selected is somewhere between 6.70 percent and 13.30 percent (10 plus or minus 1.68 x 1.96).

<sup>15</sup>U.S. Department of Health and Human Services, Office of Inspector General, Patient Satisfaction with Outpatient Surgery: A National Survey of Medicare Beneficiaries (Washington, D.C.: December 1989), p. 8.

primary purpose of this study was to compare hospital outpatient departments and free-standing ambulatory surgery clinics. The sample was therefore structured to include patients from 11 states with relatively large numbers of clinics and then stratified to provide equal numbers of patients from each type of facility. This makes it difficult to interpret the results reported for the group of patients as a whole, because they were not weighted to take account of the much larger number of patients treated in hospital outpatient departments.

A second survey of ambulatory surgery patients, including cataract procedures, was conducted by the American Association of Retired Persons.<sup>16</sup> This study included several questions replicated from the HHS inspector general study on postsurgical complications and overall improvement in vision (but not those on presurgical symptoms and functional limitations), as well as some additional items regarding patients' condition at time of discharge. The main focus of this instrument was on the extent of burden imposed on patients and their families by having recovery take place at home rather than in the hospital. Limited information on outcomes, and none on presurgical conditions, emerged from this study.

A third study addressed the appropriateness of cataract surgery more directly but did so using the same methodology currently employed by PROS—peer review of medical records.<sup>17</sup> This was another HHS inspector general study, a companion to the one mentioned above, in that it assessed records for the same sample of patients as was sent the questionnaire in the first study. Therefore, the particular structure of that sample poses equivalent problems of interpretation for the population as a whole, as distinct from specific comparisons of hospital outpatient departments and free-standing ambulatory surgery clinics.

Our study builds on these prior research efforts by collecting more detailed information from patients on specific symptoms and functional impairments both before and after their cataract surgery. Moreover, our subsequent report will link these data to the results of the existing system for assuring quality of care for Medicare patients undergoing cataract surgery.

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<sup>16</sup>Shelah Leader, The Outpatient Surgical Experiences of Aged Medicare Enrollees, American Association of Retired Persons, Public Policy Institute (Washington, D.C.: August 1990).

<sup>17</sup>U.S. Department of Health and Human Services, Office of Inspector General, Outpatient Surgery, Medical Necessity, and Quality of Care (Washington, D.C.: February 1991), pp. 6 and B-1.

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## Patient Reports

The primary strengths and limitations of the study both derive from the fact that the information comes directly from patients. To understand these strengths and limitations it is helpful to review the issues regarding medical necessity and outcomes that patient-based reports, on their own, can address.

As mentioned above, AAO has issued guidelines on when cataract surgery is appropriate. These guidelines require that visual function be impaired as a necessary condition for surgery. Since the patients are the best source of information on their ability to perform activities of daily living, the reports of patients (either directly or secondhand through a physician) are essential for assessing adherence to the AAO's guidelines for appropriateness. The major contribution of our survey is that, compared to previous studies, it has gathered more comprehensive information directly from large numbers of patients on the extent to which their visual function was limited prior to cataract surgery. Therefore, it provides the best currently available data on the degree of adherence to this part of the AAO guidelines.

Obtaining comparable information directly from these patients on their postsurgical experiences also enabled us to analyze the short-term and long-term outcomes of cataract surgery from the patient perspective. These outcomes included reactions to the surgery itself (pain, swelling, and so on) as well as changes in symptoms and visual capacity. In particular, we collected detailed information on the extent to which patients found that specific functional impairments and symptoms changed for the better or worse after surgery.

However, as with the assessment of appropriateness, patient-reported data are highly relevant but not all-inclusive. Both clinical observations or tests and patient perceptions of their own experience play a role in measuring the results of cataract surgery. Clearly, it is with respect to the perceptual dimension that our study presents more comprehensive and reliable data than has yet been available.

Thus, interpretation of the survey results needs to take account of two points: (1) other (primarily clinical) data are also germane in making a full assessment of the appropriateness of cataract surgery and its outcomes and (2) patient-reported information on its own provides stronger evidence regarding some aspects of these issues than others.

The AAO guidelines require both clinical and patient-based information to establish the appropriateness of surgery. That means that reports by patients indicating little or no diminution of visual functioning prior to the surgery are sufficient to put into question the appropriateness of the procedure. However, the opposite is not true—that is, reports by patients of poor visual functioning would not suffice to ensure appropriateness. Patients reporting major visual limitations prior to surgery might still not meet the test for appropriateness if their clinically measured visual acuity exceeded the specified threshold. Therefore, our estimates of potentially inappropriate cataract surgery may be somewhat conservative, in that they will miss any cases that met the functional criterion but not the clinical one.

It is also important to keep in mind that some important outcomes of surgery will not necessarily affect a patient's perceptions of symptoms or visual functioning. For example, glaucoma may emerge or worsen following cataract surgery without causing immediate problems that the patient would notice. Thus, the changes in symptoms and functional impairment reported by patients, while critical to an examination of overall outcomes, do not encompass all dimensions relevant to a comprehensive assessment.

A related issue concerns the evaluation of the process of care. Basically this refers to the extent to which the treatment given patients corresponds to patterns of approved practice within the medical community. Both outcome and process are considered components of the overall quality of care but the two are not necessarily linked. Closely following accepted medical practices will not always lead to favorable outcomes, while divergence from those standards will not always have negative consequences.

Patients can generally provide better information on outcomes, at least those that reflect changes in symptoms and functional capacity, than they can on adherence to standards of medical practice.<sup>18</sup> This is of greatest consequence in attempting to answer the question of why adverse outcomes occurred. We did collect data in the survey that could be used to identify patients who have a higher than average risk of poor outcomes (for example, those with other medical conditions, poor overall health status, and the like). However, a key question for quality assurance is how

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<sup>18</sup>By contrast, patients are the primary source for data on a different dimension of health care process, the quality of personal interactions.

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the physician treating each of those patients responded to those factors. Only a medical record review can adequately address that issue.

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## **Report Overview**

Chapter 2 describes the nature and extent of eye symptoms and visual limitations that our survey respondents reported they had prior to surgery and relates these responses to the issue of medical necessity. Chapter 3 examines the outcomes of these procedures in terms of the long-term changes reported by patients in their symptoms and functional abilities following surgery, as well as more interim outcomes related to the surgery itself. Chapter 4 then analyzes how patients with more substantial functional impairments and symptoms fared in terms of long-term outcomes compared to those patients whose relatively mild symptoms or functional difficulties made the appropriateness of their cataract surgery more questionable.

# The Condition of Patients Prior to Cataract Surgery

A key objective of the survey was to obtain detailed information about the patients' eye symptoms and visual impairments before the surgery took place. In this chapter we begin by simply describing the distribution of eye symptoms and functional impairments reported by our respondents. Next we examine the implications of those symptoms and impairments for the appropriateness of the cataract surgery in light of the AAO guidelines described in chapter 1.

## Functional Impairment and Symptoms Before Surgery

Our survey inquired about vision problems in two broad categories: functions and symptoms. Because visual functioning relates most directly to the AAO guidelines, we discuss it first.

## Extent of Impaired Visual Functioning Prior to Surgery

The survey assessed visual functioning through a set of questions that asked respondents to describe their difficulty prior to surgery in watching television, reading, and driving.<sup>1</sup> Respondents could choose among four levels of difficulty: no, little, moderate, and great, plus a "not applicable" category for those who did not engage in the specified activity. For each of these three areas, four questions addressed specific aspects of that activity:

- watching television: seeing the picture at all, seeing colors, recognizing people and objects, and reading words on the screen;
- reading: headlines, large-print books, standard text, and telephone books;
- driving: short distances in daytime, long distances in daytime, short distances at night, and long distances at night.

The responses to these questions, shown in table 2.1, indicate two overall patterns. First, except for the visually most stressful activities, the majority of patients reported relatively unimpaired eye function.<sup>2</sup> Those experiencing little or no difficulty substantially outnumbered those having moderate to great difficulty in 8 of the 12 activities. For 2—reading words

<sup>1</sup>While certain other activities are sometimes used to assess visual functioning (such as needlework), we judged that reading, watching television, and driving would be relevant to the largest proportion of patients.

<sup>2</sup>The relatively large number of "not applicable" responses makes this finding more tentative for driving than for reading and watching television. The "not applicable" response may or may not indicate a respondent's eyesight: some may have such poor vision as to preclude driving, while others may not drive for reasons quite extraneous to eyesight. The fact that women were more than twice as likely to respond "not applicable" for each type of driving than men (both before and after surgery) suggests that much of the "not applicable" response may not relate to eyesight.

on television and driving short distances at night—about as many reported moderate to great difficulty as little or none. Only for reading telephone books and driving long distances at night did the group experiencing moderate to great difficulty clearly predominate.

**Table 2.1: Extent of Impaired Visual Functioning Prior to Surgery Reported by Patients**

Activity	Amount of difficulty				Not applicable
	None	Little	Moderate	Severe	
<b>Watching TV</b>					
Seeing picture at all	57.1%	21.6%	14.0%	5.3%	2.0%
Seeing colors	63.8	16.8	10.7	7.2	1.5
Recognizing people	45.2	25.1	19.3	8.9	1.5
Reading words on screen	23.2	24.6	27.7	21.5	3.0
<b>Reading</b>					
Headlines	61.1	14.9	10.7	9.6	3.7
Large print	64.1	13.1	8.7	4.3	9.8
Standard text	29.1	26.3	20.7	18.6	5.3
Telephone books	16.0	24.5	20.9	32.9	5.6
<b>Driving</b>					
Short distances daytime	41.5	13.1	7.9	3.0	34.5
Long distances daytime	24.6	16.7	10.2	5.4	43.0
Short distances night	11.4	15.0	10.9	15.6	47.1
Long distances night	5.7	9.0	10.9	18.5	55.8

Second, patients varied considerably in the degree of difficulty that they reported within each of these activities. Ten to 20 percent indicated substantial impairment, having moderate to great difficulty, even with such basic tasks as recognizing colors or reading large-print books. Conversely, a somewhat larger group, 15 to 40 percent, indicated little or no difficulty on the 2 activities that the group as a whole found most taxing. On several items, we found an almost even split among those experiencing none, a little, moderate, and great difficulty.

This pattern held for each of the four states but with variation among them. For example, a somewhat higher proportion of respondents in Texas reported moderate to severe difficulty in performing 11 of these functions than those in the other states.

**Extent of Eye Symptoms Prior to Surgery**

In addition to functional limitations, cataracts often have symptomatic effects that may affect patients more or less severely. We asked



respondents whether they had experienced any of the following six symptoms in the 4 weeks prior to their surgery and, if so, how much it bothered them on a scale ranging from not at all to severely:

- fuzzy, blurred, or clouded vision;
- vision restricted by glare or excessive sensitivity to light;
- double vision;
- itching or burning in the eye;
- floaters (small visual obstructions);
- a feeling of something in the eye.

The first three are classic symptoms of cataracts; the last three are other problems that could emerge either before or following surgery. Table 2.2 shows the proportion of patients in the four states who reported having each of these symptoms immediately prior to their cataract surgery and the extent to which they were bothered by them.

**Table 2.2: Extent of Presurgery Eye Symptoms Reported by Patients**

Symptom	Patient did not have symptom	Patient had symptom and was bothered			
		Not at all	A little	Moderately	Severely
Blurred vision	12.0%	5.2%	23.7%	31.7%	27.4%
Sensitivity to glare	23.4	6.0	25.4	26.3	18.8
Double vision	75.5	3.2	9.9	7.7	3.8
Itching	55.0	8.2	20.2	12.2	4.4
Floaters	40.3	15.4	24.1	14.4	5.7
Feeling of something in eye	52.5	6.9	20.8	13.1	6.7

Blurred vision and excessive sensitivity to glare were, as expected, the two most common symptoms reported by our respondents. They appeared in 88 and 77 percent of these patients, respectively. However, the extent to which these symptoms affected patients varied markedly. A few, 5 to 6 percent, had these symptoms but were not bothered by them at all. Another 25 percent, approximately, experienced little bother. Fifty-nine percent had moderate to severe difficulty with blurred vision, 45 percent with glare.

As we found for functional impairments, the broad pattern of these results was the same in each state. Still, the proportion of patients reporting that they were bothered by one of these symptoms moderately or severely prior to their surgery was consistently highest in Texas and lowest in Massachusetts for all six symptoms.

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## Relationship of Patient-Reported Condition to Appropriateness of Surgery

As the preceding section made clear, patients experience symptoms and functional limitations prior to surgery to a greater or lesser degree. How much is enough to justify surgery? In order to draw any inferences about the appropriateness of cataract surgery from patients' reports on eye functions and symptoms, one has to have some standard that distinguishes appropriate from inappropriate. The AAO guidelines provide no specific guidance on this point, leaving it, rather, to the patients to judge whether they have visual disabilities whose likely improvement from cataract surgery would produce a benefit that exceeds those risks. However, the data from our survey allow one to see the proportion of procedures currently performed that would appear to have questionable necessity at different thresholds or standards for appropriateness.

Generally, our analysis considers two thresholds of appropriateness:

- a permissive standard that accepts any level of reported problems involving symptoms or functional impairments as indicative of the need for surgery and
- a more restrictive standard that calls for one or more symptoms or functional limitations at a moderate or severe level.

The group of patients who meet the first standard but not the second are those who have only "slight" problems involving eye symptoms or functional capacity. The choice between the permissive and restrictive standards would rest on a judgment weighing the likely benefits of surgery for this group against the risks inherent in the surgery itself.

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## Appropriateness Based on Functional Impairments

We assessed the appropriateness of the cataract surgery with respect to functional limitations by determining the maximum difficulty for any of the 12 functional activities. Next, we applied our two appropriateness standards as follows. The permissive standard raises questions about the appropriateness of cataract surgery if the patient had no difficulty at all in any of the 12 activities. The restrictive standard, by contrast, questions the appropriateness of surgery for all cases in which the patient reported no more than slight difficulty with any of these activities.

The results of this analysis are presented in table 2.3. Just 6 percent of all respondents had no difficulty before surgery with any of the activities. That figure increases to almost 10 percent if one excludes the two most difficult activities: reading telephone books and driving long distances at night. However, setting the threshold of appropriate surgery at moderate

or severe difficulty for at least one activity increases the questionable group to 24 percent (6 percent plus 18 percent), or 32 percent excluding the 2 most difficult tasks. Thus, a clear majority reported substantial functional impairment, but a sizable minority did not.

**Table 2.3: Highest Level of Presurgery Visual Impairment Reported by Patients for Any of Twelve Functional Activities**

	Amount of difficulty			
	None	Little	Moderate	Severe
Greatest difficulty reported for any of 12 functions	6.0%	18.0%	25.4%	50.5%
Greatest difficulty reported for any of 10 functions <sup>a</sup>	9.7	22.3	29.0	39.1

<sup>a</sup>Excludes driving long distances at night and reading telephone books.

**Appropriateness Based on Reported Symptoms**

We performed a parallel analysis on the data we collected from patients regarding the extent to which they experienced certain eye symptoms prior to surgery. Thus, we established for each patient the greatest degree of bother that he or she reported for any of the six symptoms. We also did this for just the three classic cataract symptoms—blurred vision, sensitivity to glare, and double vision. These figures appear in table 2.4.

**Table 2.4: Highest Level of Presurgery Eye Symptoms Reported for Any of Six Symptoms<sup>a</sup>**

Symptom	Patient did not have symptom	Patient had symptom and was bothered			
		Not at all	A little	Moderately	Severely
Most severe response among all six symptoms	3.0%	6.2%	20.9%	34.9%	35.1%
Most severe response among blurred vision, glare, and double vision	6.0	5.6	21.5	33.6	33.3

<sup>a</sup>The six symptoms are blurred vision, sensitivity to glare, double vision, itching, floaters, and a feeling of something in the eye.

As before, we gauged appropriateness according to a permissive and restrictive standard. The permissive standard raised questions about operations only when the patient either did not have or was not bothered at all by any of the six symptoms. The restrictive standard added to the questionable group those who experienced no more than a slight degree of bother from any of the symptoms.

Generally, somewhat more cataract operations would appear to have questionable appropriateness based on symptoms than functional

limitations. In terms of the permissive standard, 3 percent of patients did not have any of the symptoms, and another 6.2 percent was not bothered at all by any of them, for a total of 9.2 percent. That figure increases to 11.6 percent if one considers only the three classic cataract symptoms of blurred vision, sensitivity to glare, and double vision. Adding cases that were bothered only slightly by their symptoms increases the proportion of questionable cases to 30.1 percent for all six symptoms and 33.1 percent for the three classic symptoms.

**Visual Functioning and Eye Symptoms Combined**

Finally, we examined the overlap between reported problems involving visual functioning and symptoms. We did this using both the permissive standard we outlined above, where a minor problem on one or more symptoms or functional activities is sufficient to justify the procedure, and the more restrictive standard, which requires a moderate or severe problem on at least one symptom or functional activity. The proportion of patients who would be considered appropriate under each standard for both functions and symptoms taken together, compared to what it would be for functional impairments and symptoms separately, is shown in table 2.5.

**Table 2.5: Proportion of Cataract Patients Meeting Permissive and Restrictive Standards for Appropriateness Based on Patient-Reported Eye Symptoms and Functional Impairments**

Standard for medical necessity	Threshold met for			
	Functions	Symptoms	Either symptoms or functions	Neither symptoms nor functions
Permissive <sup>a</sup>	94.0%	90.8%	97.5%	2.5%
Restrictive <sup>b</sup>	75.9	69.9	83.7	16.3

<sup>a</sup>The permissive standard considers cataract surgery appropriate whenever the patient reports any problem involving symptoms or functional impairments, including those of little or slight magnitude.

<sup>b</sup>The restrictive standard considers cataract surgery appropriate if the patient reports at least one problem at a moderate or severe level involving symptoms or functional impairments.

Under the permissive standard, the vast majority of cases would appear appropriate whether one looks solely at functional impairments (94 percent), solely at symptoms (90.8 percent), or at both together (97.5 percent). Considering both functional limitations and symptoms makes more of a difference under the restrictive standard, with 83.7 percent of cases meeting the standard compared to 75.9 percent looking at functions alone. This means that taking account of both

patient-reported visual impairments and symptoms but excluding cases with no more than minor problems, approximately 16 percent of respondents had operations of questionable appropriateness.

Under both standards, the pattern was similar across the four states, though with some variation in the proportion of cases that did not meet the threshold of medical necessity for both symptoms and functions. This group ranged from 3.2 percent in Pennsylvania to 1.4 percent in Texas under the permissive standard and from 21 percent in Massachusetts to 12 percent in Texas under the more restrictive standard.

## Conclusion

The proportion of cataract procedures identified as having questionable appropriateness ranges substantially—from a few percent to about a quarter—depending on the threshold applied and the scope of relevant indications (functional limitations and symptoms). Since the AAO guidelines focus on functional limitations, at least for the component based on information provided by patients, one can look in the first instance at the survey questions relating to driving, reading, and watching television. However, one may wish also to consider relief of symptoms as a rationale for surgery, regardless of whether they adversely affect the patient's ability to function in daily life. This would argue for an approach that took account of both functions and symptoms. However, as table 2.6 makes clear (at least for the population we sampled), this choice has less effect on the overall estimate of inappropriate surgery than does the decision on whether to consider problems that the patient views as minor or slight to be sufficient to justify surgery.

**Table 2.6: Estimates of the Proportion of Inappropriate Cataract Surgeries Based on More or Less Restrictive Criteria**

Surgery considered inappropriate when severity of patient's worst problem is no greater than	Type of problem considered	Estimate of inappropriate procedures
None	Functions and symptoms	2.5%
None	Functions only	6.0%
Slight	Functions and symptoms	16.3%
Slight	Functions only	24.0%

Because of the magnitude of total Medicare expenditures for cataract surgery, even small changes in the rate of inappropriate surgery might have notable financial implications. Exactly how much money could be "saved" on a continuing basis by reducing inappropriate cataract surgeries

is difficult to estimate. That figure would require, at a minimum, knowledge of how many cataracts would later progress to the point where they did cause functional impairment (and when that occurred), trends in the incidence of cataracts in upcoming years, and changes in the costs of the procedure. However, to provide a sense of how much was spent in a recent year on inappropriate surgery for cataracts, we did the following:

- we hypothesized that the data from the four states were not unrepresentative of current practice in the nation as a whole,
- we applied the permissive criterion that a patient must have reported no functional impairment for the surgery to be considered inappropriate, and
- we calculated that every 1 percent of cataract surgeries represented approximately \$34 million in expenditures for the Medicare program as a whole.<sup>3</sup>

Under this scenario, Medicare would have spent approximately \$200 million in 1991 for inappropriate cataract surgery.

The actual expenditures on unnecessary cataract surgery in 1991 is uncertain, as is the long-range savings that could be obtained through a decline in inappropriate cataract surgery in future years. However, any success in reducing the level of inappropriate cataract surgery has the clear advantage of combining potential financial benefits with enhanced quality of care, since fewer patients would be exposed unnecessarily to the risks of surgery.

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<sup>3</sup>Medicare expenditures for cataract surgery in 1991 were estimated to total \$3.4 billion. Denis M. O'Day et al., *Cataract in Adults: Management of Functional Impairment* (Washington, D.C.: U.S. Department of Health and Human Services, Agency for Health Care Policy and Research, February 1993), p. 21.

# Outcomes of Cataract Surgery

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This chapter examines the outcomes of cataract surgery from the patient's perspective. Here we take as a baseline the presurgical symptoms and visual limitations described by the respondents to our survey and assess the long-term vision outcomes of the surgery in terms of any changes reported in those symptoms and limitations by each patient. In addition, we consider a number of transient symptoms and adverse events to evaluate potential interim outcomes of the procedure, such as pain, swelling, infection, required periods of recovery, and so forth. These may be considered part of the "cost" of the surgery to the patient, against which to weigh the potential benefits of improved vision over the longer term.

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## Long-Term Outcomes

Although in individual cases other long-term outcomes may ensue from cataract surgery, the main question is how much better can patients see once they have recovered from the operation. We can address this issue by comparing what our respondents reported about their symptoms and functional capabilities when they completed the survey to their assessment of their condition on the same dimensions prior to surgery. These responses should reflect the final outcome of the surgery, since the shortest interval between the date of the operation and completion of the questionnaire was 4.8 months (median 7.3 months).

Tables 3.1 and 3.2 show, for all respondents, the proportion reporting that their functional capabilities and symptoms improved, stayed the same, or got worse. Change in this analysis represents any increase or decrease in the extent to which the patient had difficulty with a functional activity or was bothered by a symptom.

**Table 3.1: Proportion of Patients Who Reported Their Visual Functioning Improved, Stayed the Same, or Worsened After Surgery**

Activity	Change after surgery		
	Better	Same	Worse
<b>Watching TV</b>			
Seeing picture at all	36.1%	60.6%	3.2%
Seeing colors	30.2	67.2	2.6
Recognizing people	44.4	51.9	3.7
Reading words on screen	62.3	33.3	4.4
<b>Reading</b>			
Headlines	32.0	65.7	2.3
Large print	24.1	73.9	2.0
Standard text	56.2	38.4	5.4
Telephone books	59.6	35.9	4.4
<b>Driving</b>			
Short distances daytime	34.1	64.2	1.8
Long distances daytime	47.0	48.9	4.1
Short distances night	61.9	33.9	4.3
Long distances night	61.1	35.7	3.1

**Table 3.2: Proportion of Patients Who Reported Their Eye Symptoms Improved, Stayed the Same, or Worsened After Surgery**

Symptom	Change after surgery		
	Better	Same	Worse
Blurred vision	77.8%	18.8%	3.4%
Sensitivity to glare	53.1	35.8	11.1
Double vision	21.8	75.6	2.6
Itching	34.1	58.8	7.1
Floater	44.8	50.8	4.5
Feeling of something in eye	37.9	55.8	6.2

A majority of patients reported an improvement in 5 of the 12 functional activities. The largest improvement was noted in reading words on television and driving at night, followed closely by reading telephone books and standard sized text. Most of those who did not indicate improvement in a given activity remained unchanged, but between 2 and 5 percent said that they got worse after the surgery.

Much the same pattern emerged for symptoms. Improvement was most striking for blurred vision, where over three quarters said they got better. A little over half reported less sensitivity to glare, and somewhat less than half indicated improvement with “floaters.” While most of the rest



remained unchanged, between 3 and 11 percent reported getting worse. Sensitivity to glare was the symptom most likely to worsen after surgery.

Patients may improve in some symptoms or functions and worsen in others. To get a sense of how symptoms and functional abilities changed overall, we divided our respondents into four groups:

- those reporting clear improvement (one or more items improved with none worsening),
- those that experienced no change (no items either improving or worsening),
- those reporting a clear deterioration (one or more items worsening with none improving), and
- those with mixed results (some items improved and others worsened).

The distribution for functions, symptoms, and functions and symptoms together is shown in table 3.3.

**Table 3.3: Cumulative Change in Symptoms and Functions: Cataract Patients Who Experienced Improvement, No Change, Worsening, or Mixed Outcomes**

	Cumulative change			
	Better	No change	Worse	Mixed
Functions	74.1%	9.7%	4.6%	11.7%
Symptoms	71.4	5.3	5.0	18.3
Functions and symptoms	65.9	1.7	2.4	30.0

The results are clearly favorable for a substantial majority of patients. In terms of change in visual functioning, symptoms, and both taken together, about three fourths to two thirds of the patients responding to our survey indicated some level of improvement with no offsetting worsening on another symptom or function. The next largest group, between 12 and 30 percent, improved in some areas and worsened in others. Uniformly adverse outcomes were limited to between 4 and 5 percent of patients for functions and symptoms and only a little more than 2 percent considering functions and symptoms together. Another 1.7 percent indicated no change for any symptoms or functions.

## Interim Outcomes

Interim outcomes may seem less consequential because they are explicitly temporary. However, if the long-term gains in eyesight to be won are small, it may make a difference to patients how much discomfort and inconvenience they have to endure in order to achieve them. In this section, we look at the standard effects of any surgery (pain, swelling, and

so on), plus temporary flare-ups in eye-specific symptoms, such as itchiness and floaters. We also examine the overall amount of time patients needed to return to a normal pattern of daily living after surgery as well as the incidence of complications (such as infections and the need for repeated procedures).

One basic issue about any outpatient procedure is whether patients are discharged before they are “ready,” particularly in terms of recovery from the anesthesia. Therefore, we asked our respondents whether they had any of the following symptoms at discharge or immediately thereafter: nausea, pain, sleepiness, dizziness, or breathing problems. The large majority indicated that they either experienced them not at all or else only slightly (see table 3.4). However, 10 percent did report leaving the surgical clinic with moderate to severe pain or sleepiness—a somewhat notable result when 2 out of 3 patients undergoing the same procedure reported no pain or sleepiness. Taking all five symptoms into account, 22 percent of patients experienced at least one symptom to a moderate or severe degree compared to 42 percent reporting no symptoms at all and 36 percent experiencing one or more of the symptoms only slightly.

**Table 3.4: Proportion of Patients Who Experienced Symptoms at Discharge or Immediately After**

Symptom	None	Slight	Moderate	Severe
Nausea	89.4%	6.2%	2.3%	2.1%
Pain	66.2	23.4	8.5	2.0
Sleepiness	65.9	23.6	9.1	1.4
Dizziness	77.7	16.8	4.2	1.2
Breathing problems	92.6	4.6	1.9	0.9
Most severe response among five symptoms	41.7	36.2	16.3	5.8

Once past the initial point of discharge, certain symptoms typically accompany any surgery. We asked about numbness, pain or soreness, swelling, and bleeding (see table 3.5). Most patients said that they did not have these symptoms, although pain was relatively common, with about 11 percent indicating a moderate to severe level followed by 8 percent with swelling. About 17 percent had at least one of these symptoms to a moderate or severe degree. However, these symptoms rarely continued for very long (see table 3.6). Pain was the most enduring symptom, but only 5.5 percent reported it lasted more than 2 weeks.

**Table 3.5: Proportion of Patients With Symptoms That Generally Accompany Surgery**

Symptom	None	Slight	Moderate	Severe
Numbness	82.7%	12.5%	4.0%	0.8%
Pain	56.0	33.5	8.3	2.2
Swelling	73.1	18.5	7.0	1.4
Bleeding	93.2	5.9	0.7	0.3
Most severe response among four symptoms	43.6	39.1	13.6	3.7

**Table 3.6: Proportion of Patients Who Experienced Various Durations of Symptoms That Generally Accompany Surgery**

Symptom	None	1-2 days	3-14 days	2-4 weeks	1-2 months	More than 2 months
Numbness	84.9%	11.8%	1.9%	0.6%	0.2%	0.6%
Pain	58.8	24.3	11.3	2.1	1.9	1.5
Swelling	76.3	11.2	8.5	1.8	0.9	1.2
Bleeding	93.6	4.3	1.5	0.3	0	0.3
Longest duration of any of four symptoms	48.9	26.7	15.8	3.8	2.3	2.6

Beyond the general symptoms that accompany all surgery, one could expect a temporary increase in the symptoms specific to vision that we have already examined for long-term changes. These symptoms proved to be both more intense and longer lasting than those related to surgery in general (see tables 3.7 and 3.8). Most common was sensitivity to glare, which affected 26 percent moderately or severely. Overall, 13 percent of patients were bothered severely by at least one of these symptoms following surgery and another 24 percent were moderately bothered. They also persisted longer than the general surgery symptoms. Eighteen percent reported being troubled by glare more than 2 months after surgery, 11 percent by blurred vision and by floaters. Overall, 29 percent reported having at least one of these symptoms 2 months after the surgery.

**Table 3.7: Proportion of Patients With Eye Symptoms Following Surgery**

Symptom	Patient did not have symptom	Patient had symptom and was bothered			
		Not at all	Little	Moderately	Severely
Blurred vision	56.8%	9.7%	18.6%	10.0%	4.9%
Sensitivity to glare	31.4	13.2	29.0	18.3	8.1
Double vision	86.5	3.7	5.6	2.9	1.3
Itching	61.3	11.9	18.1	7.2	1.6
Floaters	59.0	16.0	17.3	6.3	1.4
Feeling of something in eye	53.8	12.5	22.9	8.3	2.6
Most severe response among six symptoms	14.8	16.0	32.5	24.1	12.6

**Table 3.8: Proportion of Patients With Various Durations of Eye Symptoms Following Surgery**

Symptom	None	1-2 days	3-14 days	2-4 weeks	1-2 months	More than 2 months
Blurred vision	60.7%	10.5%	10.9%	4.3%	3.0%	10.5%
Sensitivity to glare	38.7	13.4	18.7	7.7	3.9	17.7
Double vision	88.8	3.3	2.6	1.1	0.8	3.4
Itching	63.6	14.8	12.0	3.3	2.0	4.3
Floaters	63.1	8.4	9.1	4.6	3.4	11.4
Feeling of something in eye	58.9	12.8	12.3	5.3	3.0	7.7
Longest duration of any of six symptoms	21.1	15.3	18.5	10.6	5.5	28.9

These symptoms should also be assessed relative to the degree that patients were bothered by them prior to the surgery. As table 3.9 shows, for the group of patients as a whole, all the eye symptoms were substantially reduced relative to the period immediately prior to the cataract operation. Each continued to improve, so that the proportion of patients bothered either moderately or severely was still lower when the surveys were completed.

**Chapter 3**  
**Outcomes of Cataract Surgery**

**Table 3.9: Proportion of Patients Who Experienced Eye Symptoms Before Surgery, Following Surgery, and at Time of Survey**

Symptom	Patient did not have symptom	Patient had symptom and was bothered			
		Not at all	A little	Moderately	Severely
<b>Itching</b>					
Before	55.0%	8.2%	20.2%	12.2%	4.4%
Following	61.3	11.9	18.1	7.2	1.6
At survey	75.6	6.8	13.5	3.4	0.7
<b>Sensitivity to glare</b>					
Before	23.4	6.0	25.4	26.3	18.8
Following	31.4	13.2	29.0	18.3	8.1
At survey	43.5	12.9	25.9	12.0	5.8
<b>Blurred vision</b>					
Before	12.0	5.2	23.7	31.7	27.4
Following	56.8	9.7	18.6	10.0	4.9
At survey	72.4	4.8	13.3	6.4	3.1
<b>Double vision</b>					
Before	75.5	3.2	9.9	7.7	3.8
Following	86.5	3.7	5.6	2.9	1.3
At survey	92.6	1.6	2.9	1.8	1.1
<b>Floaters</b>					
Before	40.3	15.4	24.1	14.4	5.7
Following	59.0	16.0	17.3	6.3	1.4
At survey	68.0	16.2	11.6	3.4	0.8
<b>Feeling of some thing in eye</b>					
Before	52.5	6.9	20.8	13.1	6.7
Following	53.8	12.5	22.9	8.3	2.6
At survey	77.3	7.1	11.2	3.5	0.9
<b>Most severe among six symptoms</b>					
Before	3.0	6.2	20.9	34.9	35.1
Following	14.8	16.0	32.5	24.1	12.6
At survey	29.3	16.8	29.2	16.9	7.8

Thus, there appears not to have been a substantial incidence of adverse interim outcomes reported by patients that involved either general symptoms of surgery or changes in eye-specific symptoms. However, a small number deviated substantially from this overall positive pattern.

For a more general measure of the cost of surgery, we asked our respondents how long it took them to begin to function normally and to get fully back to normal. Table 3.10 shows the considerable variation in recovery times reported by cataract patients. Although 61 percent had started to recover within a week, and had fully recovered within 2, nearly a quarter took more than a month to get fully back to normal and 9 percent more than 2 months.

**Table 3.10: Proportion of Patients Who Reported They Needed Various Lengths of Time to Recover From Surgery**

Length of time	Time needed to	
	Begin to function normally	Get fully back to normal
Less than 1 day	23.1%	13.5%
1-7 days	37.8	27.8
1-2 weeks	16.9	19.2
2-4 weeks	11.7	17.0
1-2 months	5.9	13.5
More than 2 months	4.6	9.0

Finally, we asked about a series of specific adverse events that can occur to patients on their way to full or partial recovery. Although they may be unavoidable in particular circumstances, these events are inherently negative outcomes; that is, they are not considered part of the normal course of treatment. They include episodes of infection, recurrence of the original problem, needing a second operation “related to this surgery,” and hospitalization for complications of the surgery (see table 3.11). All these should be rare events but how rare may indicate the quality of care provided. For our respondents, the incidence of these events ranged from 13 percent having a second procedure to 1.5 percent hospitalized for complications.<sup>1</sup> Almost a fifth reported one of these events. There were no substantial differences in incidence across the states.

<sup>1</sup>Many of the second procedures were probably outpatient laser capsulotomies for posterior capsular opacification. This is a relatively frequent complication of cataract surgery, and the laser treatments are routinely used to treat the condition. It is even fairly common for patients to have a laser capsulotomy performed as a preventive measure. However, recently published research has shown that laser capsulotomies increase the risk of other complications, such as retinal detachment. See J.C. Javitt et al., “National Outcomes of Cataract Extraction: Increased Risk of Retinal Complications Associated With Nd:YAG Laser Capsulotomy,” *Ophthalmology*, 99:10 (October 1992), 1487-98.

**Table 3.11: Proportion of Patients With Various Adverse Events**

<b>Event</b>	<b>Percent</b>
Infection	4.5%
Recurrence of problem	6.6
Second procedure	13.1
Hospitalization for complications of surgery	1.5
One or more of the four events	19.5

## Conclusion

Overall, a large majority of patients perceived a clear benefit from their cataract surgeries. Our survey responses indicate that the intended benefits of cataract surgery are in fact reaching the general population served by the Medicare program. Still, the outcomes obtained from surgery varied among patients. While approximately two thirds of patients reported only positive changes in terms of symptoms and functions, most of the rest reported mixed results. Even for this second group the net change following cataract surgery might be positive but to a lesser extent than for others.

Such variations in outcomes can be used to explore possible areas for further improvement. For example, comparing patients who reported mixed results to similar patients with more uniformly favorable outcomes might help identify more effective practices and surgeons providing higher quality services. Analogous efforts could help find the reasons why some patients had severely adverse interim outcomes, such as pain and relatively long periods needed to return to normal functioning.

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# The Effect of Presurgical Conditions on Outcomes of Cataract Surgery

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The description of outcomes in chapter 3 considered the overall distribution of outcomes for the entire group of patients we surveyed. However, in examining outcomes (especially long-term changes in visual impairment and symptoms), it is important to take account of where people start from. This chapter compares outcomes for patients who reported having moderate or severe problems prior to surgery with outcomes for patients who reported having no more than slight problems before they had their cataract surgery.

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## Change in Individual Symptoms and Functional Impairments

Tables 4.1 and 4.2 show the proportion of patients reporting that their symptoms and functional capabilities improved, stayed the same, or got worse. For each symptom and function, we compare the results of patients who crossed the threshold for the restrictive criterion in chapter 2 (moderate or severe problems for symptoms or functions prior to surgery) to those who did not. Change in this analysis represents any increase or decrease in the extent to which the patient was bothered by a symptom or had difficulty with a functional activity.



**Chapter 4**  
**The Effect of Presurgical Conditions on**  
**Outcomes of Cataract Surgery**

**Table 4.1: Proportion of Patients Who Reported Their Visual Functioning Improved, Stayed the Same, or Worsened by Difficulty Experienced Before Surgery**

Activity	Difficulty before surgery	Change after surgery		
		Better	Same	Worse
<b>Watching TV</b>				
Seeing picture at all	Moderate to great	89.5%	9.4%	1.1%
	Little or no	23.2	73.1	3.7
Seeing colors	Moderate to great	91.4	7.8	0.8
	Little or no	16.9	80.1	3.0
Recognizing people	Moderate to great	87.5	10.2	2.3
	Little or no	27.4	68.3	4.2
Reading words on screen	Moderate to great	87.4	10.9	1.7
	Little or no	36.3	56.5	7.2
<b>Reading</b>				
Headlines	Moderate to great	89.0	9.6	1.4
	Little or no	17.2	80.3	2.5
Large print	Moderate to great	84.6	13.0	2.4
	Little or no	14.6	83.5	2.0
Standard text	Moderate to great	86.2	12.5	1.3
	Little or no	35.4	56.4	8.3
Telephone books	Moderate to great	78.5	19.6	1.9
	Little or no	34.9	57.3	7.8
<b>Driving</b>				
Short distances daytime	Moderate to great	95.5	4.5	0
	Little or no	22.7	75.2	2.1
Long distances daytime	Moderate to great	90.6	8.9	0.5
	Little or no	30.7	63.9	5.5
Short distances night	Moderate to great	84.7	14.4	1.0
	Little or no	39.8	52.8	7.5
Long distances night	Moderate to great	74.8	24.3	0.9
	Little or no	34.9	57.7	7.4

**Table 4.2: Proportion of Patients Who Reported Their Eye Symptoms Improved, Stayed the Same, or Worsened by Condition Before Surgery**

Symptom	Condition before surgery	Change after surgery		
		Better	Same	Worse
Blurred vision	Moderate to severe	91.4%	7.4%	1.2%
	Little or none	58.0	35.4	6.5
Sensitivity to glare	Moderate to severe	78.8	19.0	2.2
	Little or none	31.5	49.9	18.6
Double vision	Moderate to severe	89.2	10.1	0.6
	Little or none	13.2	84.0	2.8
Itching	Moderate to severe	89.6	8.7	1.7
	Little or none	23.3	68.6	8.1
Floaters	Moderate to severe	91.8	7.4	0.7
	Little or none	32.8	61.8	5.4
Feeling of something in eye	Moderate to severe	88.8	10.5	0.7
	Little or none	25.5	66.9	7.6

As might be expected, patients who reported having moderate or severe visual impairment prior to surgery were much more likely to report an improvement after surgery than those who reported having no impairment or slight impairment. For each of the 12 activities, large majorities in the former category reported improvement afterward (a range of 75 to 96 percent), compared to a minority of those having little or no difficulty presurgery (15 to 36 percent). Most of the group without substantial impairment prior to surgery experienced no change.

The same pattern emerged for five of the six symptoms. For all except blurred vision, large majorities (79 to 92 percent) of those who indicated moderate to severe problems before surgery reported improvement, compared to a minority (13 to 33 percent) of those with no more than slight problems prior to surgery. Blurred vision was the one symptom in which a majority of both groups said that they got better, though still a much larger proportion among those with moderate to severe problems prior to surgery—91 versus 58 percent.

The pattern observed in both tables, then, is that those who started out worse off were more likely to report improvement than those with few initial problems. Our data indicate the extent to which this pattern holds true for our samples of cataract patients. More importantly, however, the reports from the patients show that the likelihood of an adverse outcome (that is, the patient's getting worse after the surgery) follows the same logic. That is, the numbers of patients who reported being worse after the

procedure was consistently higher among those who reported having few problems prior to surgery.<sup>1</sup> This demonstrates that the risks that argue against surgery in the absence of actual visual impairment are not solely hypothetical.

## Change in Overall Symptoms and Functional Impairment

Table 4.3 shows what happens when the focus shifts from the individual functional activities and symptoms to cumulative change across functions and symptoms. It compares the patients who did or did not meet the more restrictive threshold in terms of the proportion that fell into the four categories of reported change outlined in chapter 3: change uniformly for the better, no change at all, change uniformly for the worse, and a mixture of favorable and adverse change. The table presents these results first for functional impairments, then for symptoms, and finally for both functions and symptoms together.

**Table 4.3: Cumulative Change in Symptoms and Functions: Percent of Cataract Patients Who Experienced Improvement, No Change, Worsening, or Mixed Outcomes by Condition Before Surgery**

	Condition before surgery <sup>a</sup>	Change after surgery			
		Better	Same	Worse	Mixed
Functions	Moderate to severe	81.4%	2.3%	3.5%	12.8%
	Little or none	50.9	33.0	7.8	8.3
Symptoms	Moderate to severe	77.1	1.8	2.9	18.2
	Little or none	58.3	13.4	9.8	18.6
Functions and symptoms	Moderate to severe	67.6	0	1.8	30.6
	Little or none	57.0	10.6	5.1	27.2

<sup>a</sup>The highest level of difficulty or problem reported by the patient for any functional activities or symptoms (as relevant) before surgery.

These figures reveal several broad patterns. First, half or more of each group reported a uniformly positive change for functions and symptoms, both separately and together. By contrast, fewer than 10 percent of either group reported uniformly negative changes following surgery. As with the analysis of individual functional impairments and symptoms, the patients who had moderate to severe problems before surgery were more likely to report positive changes and less likely to report negative ones. However, the difference between the two groups narrows as the focus shifts from the individual items to functions and symptoms overall and then both taken together. It is also apparent that mixed outcomes—in which a

<sup>1</sup>The single exception among the six symptoms and 12 functional activities was reading large print, where patients with substantial problems prior to surgery were slightly more likely to get worse (2.4 versus 2.0 percent).

patient reports that some functional impairments or symptoms improved and others worsened—are fairly common for both groups of patients, especially when the full range of functional activities and symptoms is considered.

These overall patterns were replicated in the four states, with generally minor variations. The largest discrepancy occurred in the area of functional limitations, where 62 percent of the patients in Texas with no more than minor symptoms or functional impairments prior to surgery had uniformly better outcomes compared to a range of 44 to 53 percent in the three other states. A correspondingly lower percentage of these patients remained unchanged in Texas compared to the rest. However, the difference was not statistically significant, reflecting the relatively small number of cases in this category.

The analysis so far has looked only at the direction of change and not at its magnitude. To see how the amount of favorable and adverse change varied between patients who did or did not report substantial problems prior to surgery, we examined the number of dimensions in which these changes took place. That is, we determined the number of individual functions and symptoms that each patient reported had improved and the number that got worse. For functions this could range from 0 to 12, for symptoms from 0 to 6. The distribution of these results across both sets of patients are presented in tables 4.4 to 4.7.

**Table 4.4: Number of Functions That Patients Reported Improved Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery**

Number of functions reported to improve	Patients reporting substantial problems before surgery	Patients reporting only minor problems before surgery
0	8.3%	44.9%
1	10.2	21.2
2	10.6	9.7
3	12.0	10.2
4	9.9	3.8
5	10.1	5.5
6	10.6	2.1
7	9.6	1.3
8	7.9	0.8
9	3.4	0
10	3.4	0.4
11	2.7	0
12	1.2	0

**Chapter 4**  
**The Effect of Presurgical Conditions on**  
**Outcomes of Cataract Surgery**

**Table 4.5: Number of Functions That Patients Reported Got Worse Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery**

Number of functions reported to worsen	Patients reporting substantial problems before surgery	Patients reporting only minor problems before surgery
0	83.7%	83.9%
1	8.8	8.9
2	3.6	3.0
3	1.5	2.5
4	1.2	0.8
5	0.6	0.4
6	0	0
7	0.3	0.4
8	0.2	0

**Table 4.6: Number of Symptoms That Patients Reported Improved Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery**

Number of symptoms reported to improve	Patients reporting substantial problems before surgery	Patients reporting only minor problems before surgery
0	7.4%	24.1%
1	16.9	36.3
2	21.8	19.8
3	20.5	10.5
4	15.5	5.9
5	11.9	3.4
6	5.9	0

**Table 4.7: Number of Symptoms That Patients Reported Got Worse Following Surgery by Whether Patients Reported Having Substantial or Minor Problems Before Surgery**

Number of symptoms reported to worsen	Patients reporting substantial problems before surgery	Patients reporting only minor problems before surgery
0	76.5%	77.6%
1	16.6	16.0
2	4.4	3.4
3	1.8	2.5
4	0.4	0.4
5	0.2	0
6	0.1	0

Thus, the patients who started with a higher level of functional and symptomatic problems prior to surgery tended to perceive improvement in a larger number of areas than patients who had no more than slight problems prior to surgery. The former group of patients reported a median

of 4 functions and 3 symptoms that got better, while patients without substantial visual problems prior to surgery reported a median of 1 for both functions and symptoms. However, the two groups of patients reported almost identical distributions for the number of functions and symptoms that deteriorated, with the large majority (83.7 to 83.9 percent for functions and 76.5 to 77.6 percent for symptoms) indicating that none had changed for the worse.

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## Summary

Clearly, the patients who had substantial functional difficulties or symptoms prior to surgery generally experienced greater improvement in those conditions than patients who started out with fewer problems. At the same time, it is notable how consistent even that second group of patients was in reporting positive outcomes from the surgery. Evidently, their physicians were highly successful in preventing adverse developments across the full range of symptoms and functions, while achieving consistent, if necessarily small, improvements in areas where these patients had experienced minor problems. Most commonly, this involved the elimination of slight problems with blurred vision.<sup>2</sup>

In sum, we found that a patient's condition prior to surgery was related to the long-term outcomes that he or she could expect from the procedure. For specific functional limitations and symptoms, patients who reported substantial problems before surgery were most likely to indicate a more favorable status afterward. Looking broadly at functional impairments and symptoms overall, the two groups of patients were more comparable. Most reported uniformly positive changes, while a substantial minority indicated mixed outcomes and a few described uniformly negative results. In this case, the main difference between patients who had substantial presurgical problems and those who did not was in the number of functions and symptoms that they reported got better after surgery.

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<sup>2</sup>Sixty-three percent of this group reported some blurred vision prior to surgery (although it bothered them no more than slightly), and 91 percent of them experienced improvement after surgery.



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# Interpreting Survey Data on Patients' Experiences Before and After Surgery

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In using surveys to collect data on patients' experiences, it is important to address factors that might affect the ability of a specific survey instrument to produce accurate information about a patient's condition both before and after the surgery. What follows is a discussion of several such issues. These include the content and wording of survey questions and the potential for biased results arising from any systematic differences between respondents and nonrespondents, problems in recall, or variations among respondents in their willingness to report certain events or perceptions.

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## Content of the Survey Instrument

The value of any survey instrument fundamentally depends on the specific content of the questions it contains. There are two major concerns. First, validity: Have the subjects of interest been fully addressed? Second, reliability: Are the questions worded so that the respondents interpret them as intended? In developing our instrument, we took a number of steps to deal with both these concerns.

To make sure we addressed the right topics, we consulted both physicians and patients involved in outpatient cataract surgery. We queried a number of surgeons about relevant symptoms and complications for cataract surgery. Then we organized a series of focus groups with patients to get a detailed sense of how their cataract had affected their eyesight and daily activities before the operation, what they experienced during convalescence, and how their vision had changed since the surgery. The core questions of our survey relating to eye symptoms and visual functioning before and after the surgery were based on both sets of discussions.

We drew on the focus groups as well to ensure that our questions were worded in ways that made sense to patients. For more general questions on overall health and physical functioning, we adopted items from the "MOS 36-Item Short-form General Health Survey," a frequently used and well-tested instrument.<sup>1</sup> Then, once our survey was drafted, we conducted pretests with additional cataract patients to uncover any remaining ambiguities in the wording of the questions.

For a final check, we sent the questionnaire to a sample of 144 Medicare outpatient eye surgery patients from Pennsylvania. Factor analyses and

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<sup>1</sup>John Ware and Cathy Sherbourne, "The MOS 36-Item Short-form Health Survey," *Medical Care*, 30:6 (June 1992), 473-81.



reliability tests of the responses showed that they clustered in patterns that were consistent with the substantive content of the questions.

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## Differences Between Respondents and Nonrespondents

The 76 percent response rate for the survey minimizes the possibility that our results are biased by any differences between respondents and nonrespondents. Moreover, comparing respondents to nonrespondents by state, age, sex, and race (the personal characteristics for which information on both respondents and nonrespondents was available from HCFA), we found little difference between the two groups except for race. Thus, 77 percent of male cataract patients responded to the survey as did 76 percent of the females. Response rates from the four states varied from a high of 79 percent in Pennsylvania to a low of 72 percent in California. Even across different age groups, the response rates are surprisingly uniform. The lowest response rate, 54 percent, came from the small under-65 group (2.3 percent of the total), composed largely of disabled people. For all others, the response rate declined slowly from 79 percent for the 65- to 70-year-old group to 72 percent for those 90 years old or older. These response rates from the older age groups are particularly striking given that nonresponse includes any who had died or become mentally infirm.

The most notable difference between respondents and nonrespondents appeared on the dimension of race. Unfortunately, HCFA's data only distinguish between whites and blacks, plus an "other" category that presumably includes Asians and some, but not all, Hispanics.<sup>2</sup> Whites responded to our cataract survey at a rate of 77 percent, compared to 62 percent for both blacks and "other." While these differences are important, their effect on the representativeness of the respondents for the overall sample is limited by the small number of nonwhites in the original universe. Blacks, for example, constituted just 4.8 percent of those identified by the PROS as having received cataract surgery, and "others" even less, 3.2 percent. Thus, with a still reasonably high response rate of 62 percent, both nonwhite groups are only slightly underrepresented in the group of respondents. Our respondents are 3.9 percent black (compared to 4.8 in the original sample) and "other" are 2.6 percent (compared to 3.2).

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<sup>2</sup>In responding to the 1990 U.S. census, which asked separately about race and Hispanic origin, 51.7 percent of Hispanics identified themselves as white, 3.4 percent as black, and 42.8 percent as "other."

## Potential Errors in Recall

Another potential concern with our survey data is that patients may have trouble remembering how well they could see and function some time in the past. Survey research has documented the difficulty that respondents can have in accurately recalling past events or attitudes. It seems likely that memories would fade about prior visual impairments as well, particularly for those who responded to our survey months after the surgery was performed.<sup>3</sup> However, there are a number of reasons to expect recall to pose less of a problem in this instance than is often the case for survey research.

First, the question of how well one sees after a cataract operation, compared to before it was performed, is a highly salient question to anyone who has undergone the procedure. The importance of this question to the respondents personally means that their interest in how they saw prior to the surgery is likely to be strong. Moreover, the type of information we ask for concerns patient experiences directly over an extended period of time. By contrast, prior research has demonstrated problems in recalling quite different kinds of information, such as the number and timing of particular events that occurred. Further, there is no stigma attached to the information we sought and therefore more or less unconscious distortion may not be as likely as with more sensitive topics. Of course none of these factors guarantees accuracy, but together they should decrease the likelihood of distortion for at least some aspects of recall.

In addition, the slowness with which cataracts often develop means that patients' assessments of their own visual impairments prior to the surgery may be better grounded after the surgery than before it. It is only after the cataract has been removed and recovery from the surgery largely complete that the patient can experience what he or she had been missing visually beforehand. This general phenomenon is known as a "response shift." It occurs when the intervention of interest (in this case, the cataract surgery) affects the frame of reference employed by the respondent to assess a change. In this circumstance, methodologists have concluded that it is more valid to use assessments of the preintervention situation made after the intervention has taken place.<sup>4</sup>

<sup>3</sup>The median time between the operation and completion of the survey was 7.3 months. The shortest interval was 4.8 months. Fewer than 7 percent of the respondents had been operated on more than 10 months previously. Normally it takes about 3 months for a patient's eyesight to stabilize after cataract surgery.

<sup>4</sup>See James R. Terborg and Gregory A. Davis, "Evaluation of a New Method for Assessing Change to Planned Job Redesign as Applied to Hackman and Oldham's Job Characteristic Model," Organizational Behavior and Human Performance, 29 (1982), 112-28.

As we were developing our questionnaire, we conducted a small-scale pilot study that produced results consistent with the concept of response shift. Working through local area physicians, we recruited 16 patients to complete a questionnaire just prior to their cataract surgery, including questions about eye function (reading, watching TV, and driving). Several months later we followed up with a second questionnaire that asked about the same topics, both then (after surgery) and before. Comparing the two sets of "presurgery" responses (contemporaneous and recalled), we found that for 11 of 12 functional items, the 15 patients who responded to both questionnaires rated their presurgery eyesight worse after the surgery than they had before. The small size of the patient sample meant that only 2 of these 12 comparisons were statistically significant. However, the consistency of these results across items lends support to the expectation that a response shift would occur with cataract surgery. (No such pattern was found for other items not related to visual functioning.) Therefore, we concluded that the use of patient assessments of presurgical visual impairments collected after the surgery has occurred is not only legitimate but preferred, to improve accuracy, despite the somewhat greater risk of blurred recall.

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## Possible Bias in Patient Responses

Patient-reported information is relatively subjective and variable, compared to physicians' observations based on physical examinations and diagnostic test results. Consequently, patients can describe similar circumstances or situations quite differently. For example, some are likely to be more sensitive to pain or to glare than others. However, since information about outcomes is often lacking in the facility medical records currently reviewed for outpatient surgery, patient-reported data may provide the most feasible alternative source of information for judging the effect of the care provided. Also, to the extent that patients' perceptions themselves are of interest, this variation among individuals is not a source of error but is, rather, part of the phenomenon being measured.

However, patients may vary as well in their willingness to acknowledge the perceptions that they have. Some may, for example, prefer to minimize any problems they experience while others find solace in recounting every difficulty. We expect that this kind of response bias had some effect on the individual responses recorded in our survey.

Because we analyzed these data collectively, rather than case by case, these biases in individual responses should have diminished effect. As the number of cases analyzed increases, such differences across individuals

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**Appendix I  
Interpreting Survey Data on Patients'  
Experiences Before and After Surgery**

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(for example, minimizing or exaggerating pain) will tend to cancel each other out. Nevertheless, the possibility remains in any given analysis that biases in one direction may outweigh biases in another.

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