Outcome of cataract surgery considering the preoperative situation: a study of possible predictors of the functional outcome

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Abstract

***Aim*—To analyse possible predictors of the self assessed functional outcome of a cataract extraction.**

***Methods*—The patients' self assessed visual function was studied by use of a questionnaire, the "Catquest", before and 6 months after surgery. All patients (n=1933, mean age 75.5 years, 66.8% women) who were undergoing cataract surgery in March 1995, in 35 different departments of ophthalmology participating in the National Swedish Cataract Register, were included in the study. A routine ophthalmic examination was performed before and after surgery. The following preoperative variables were studied with regard to a possible relation to the outcome: age, sex, ocular comorbidity, best corrected preoperative vision (better eye), first or second eye surgery, other diseases with a need for long term medication, need for home help, need for subsidised travel by taxi.**

***Results*—Ocular comorbidity was strongly related to a "no benefit" outcome after surgery (p= 0.005). Second eye surgery and young age was related to a "very good benefit" outcome after surgery (p=0.0001 and p<0.0001 respectively).**

***Conclusions*—Patients with an ocular comorbidity in the eye undergoing a cataract extraction were characterised by a significantly higher frequency of deteriorated self assessed visual function after surgery than patients with no ocular comorbidity. The highest degree of improvement was most frequently found in younger patients undergoing second eye surgery.**

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A cataract extraction will usually result in improved visual acuity in the operated eye. Several studies report an improvement of the visual acuity in about 90% of all operated eyes.[1] The improvement may be still greater if only eyes with no other ocular pathology (best cases) are studied.[1] It has been pointed out, however, that the functional outcome is a better measure of the surgical result than visual acuity.[2]

Recently, new methods have been introduced to evaluate the benefit for the patient from a cataract extraction.[2–4] These methods are based upon the patient's self assessed visual function before and after surgery. The functional improvement after surgery according to these reports has been in the range of 80–90% of all operations.

It seems reasonable to believe that the patient's preoperative status may influence the outcome and possible preoperative predictors of the outcome have been suggested.[5] Ocular comorbidity[5 6] and age[5 6] are strongly predictive while preoperative visual acuity has less predictive value.[5] Several authors have emphasised that the timing of surgery is important for the outcome.[7 8] Bilateral cataract surgery has been reported to be more related to a better outcome than first eye surgery alone.[9 10]

The aim of this study is to investigate the outcome of a cataract extraction in patients with regard to different preoperative situations. We also assess whether there is a need for grouping patients based on their preoperative situation when the outcome of cataract surgery in different surgical units is compared.

Method

A new questionnaire, the "Catquest", has been used. This questionnaire is fully described in an earlier publication.[11] In this study the questionnaire was given to the patient before and 6 months after cataract surgery. When the Catquest is used the questions and response options are identical both before and after the operation. No question refers directly to the operation. The questionnaire contains six different sections concerning daily activity level, perceived visual disabilities in everyday life, cataract symptoms, the patient's general opinion about his or her vision, degree of dependence, and questions about other diseases.

Each response option is given a ranking score. The different ranking scales are fully discussed in an earlier publication.[11] The

Table 1 Benefit matrix based on Yager's decision theory[16]

	Item area				
Benefit level	*1 Disability*	*2 Cataract symptom*	*3 Activity*	*4 Car driving*	*5 Off sick?*
5 Very good	+	+	+/±0	+/±0	+/±0
4 Good	+	+			
3 Moderate	+				
or	±0	+			
2 Questionable	±0				
or	-	+	+		
1 No benefit	-				

*In benefit level 5 an improvement of at least one of item areas 3, 4, or 5 is demanded. A conservation of a preoperative activity (= an activity ranking sum < 24 or being a car driver or not being "off sick") is equal to an improvement in this benefit matrix.

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Table 2 Different preoperative variables studied with possible relation to the outcome

Area	*Variable*	*Existent (%)*
Demography	Age (age groups)	
	Sex	F: 66.8
Ocular status	Ocular comorbidity	36.1
	Best corrected preoperative vision (best eye)	
	First or second eye surgery	2nd eye surgery 34.7
General health	Other diseases with a need for long term medication	67.3
	Home help	24.2
	Subsidised travel by taxi	27

responses are evaluated by means of a decision model (Table 1) and are described in detail elsewhere.[12]

As can be seen in Table 1 the outcome is graded in five levels of benefit (very good benefit, good benefit, moderate benefit, questionable benefit, and no benefit).

On each benefit level only areas with a sign (+ or −) are counted; the plus sign means an improvement and the minus sign a deterioration. *Very good* benefit from surgery is when more than areas 1 and 2 have improved. In activity (3), car driving (4), and employment (5), however, a maintenance of a certain preoperative activity is equivalent to an improvement. If areas 1 and 2 have improved, the benefit from surgery is *good*. If only area 1 has improved, the benefit from surgery has been *moderate*. If area 1 is unchanged but area 2 has improved the benefit is also considered as moderate. If item area 1 is unchanged and there is no improvement of area 2, the benefit from surgery is *questionable*. If area 1 has deteriorated and areas 2 and 3 have improved, the benefit is also considered questionable. If area 1 has deteriorated there has been *no benefit* from surgery no matter what result has been achieved in an other *single* area. Item area 1 acts as a barrier between benefit and no benefit.

The outcome has been studied in relation to different preoperative situations. The preoperative variables studied are shown in Table 2. Three of these variables have been chosen to reflect the patient's general health. These variables are other diseases with a need for long term medication, home help, and subsidised travel by taxi. In Sweden home help and subsidised travel by taxi are offered to people with special needs as a result of disease and handicap.

Material

In this study the Catquest was used by cataract surgeons in 35 different departments of ophthalmology participating in the National Swedish Cataract Register.[13 14] In these departments the questionnaire was given to all patients operated upon during the month of March 1995. Cataract extractions as well as combined procedures (cataract extraction + trabeculectomy) were included but not secondary implantations of IOLs. A total of 2970 cataract extractions were performed in these departments during the study period.

The preoperative questionnaire was completed by 2832 patients (95.4%). These patients received a new postal questionnaire to be filled in 6 months after the operation. One reminder letter was sent to the patients 4 weeks after the first letter in case of no response.

The postoperative questionnaire was completed by 2266 patients (76.3%). For final evaluation complete surgical outcome data were requested from the surgeons involved in addition to the receipt of completed preoperative and postoperative questionnaires. These criteria were fulfilled by 1933 patients (65.1% of the total number of patients).

The mean age of the patients was 75.5 years and 66.8% were women. The participating surgeons originally noted some of the studied preoperative variables on two separate forms (age, sex, preoperative best corrected vision, ocular comorbidity, and first or second eye surgery). Ocular comorbidity signifies known preoperative vision threatening ocular disorders in the surgery eye such as glaucoma, macular degeneration, or diabetic retinopathy. The other variables were response options in the Cataract questionnaire[11] submitted by the patients (home help, other diseases with a need for long term medication, and subsidised travel by taxi).

Data from the forms and the questionnaires were later transferred to a database for statistical analysis.

STATISTICAL ANALYSIS

All statistical calculations have been made by use of the SPSS (Statistical Package for the Social Sciences) for MS Windows Release 8.0.

The relation between two alternative outcomes (ranked data) and each preoperative variable were evaluated using the Mann–Whitney U test. The significance of the relation between different preoperative variables and the outcome was studied by use of logistic regression analysis.

Results

The outcome in different benefit levels for all patients and for sex is shown in Table 3.

Table 3 Outcome in different benefit levels (frequency in %) for all patients and sex

		Sex	
Benefit level	*All patients*	*Females*	*Males*
Very good	39.5	37.7	43.1
Good	8.3	9.6	5.8
Moderate	35.9	37.1	33.5
Questionable	7.2	6.3	8.9
Benefit*	90.9	90.7	91.3
No benefit	9.1	9.3	8.7
Number of cases	1933	1292	641

*Benefit = the sum of all four levels of improvement.

BENEFIT VERSUS NO BENEFIT

The outcome in different levels of benefit can be divided into two alternative outcomes: "benefit" (very good benefit + good benefit + moderate benefit + questionable benefit) and "no benefit". The different preoperative situations of these alternative outcomes have been studied separately. In Table 4 these preoperative situations are listed together with the eventual relation (two tailed p value, Mann–Whitney U test) to a certain outcome. The relation between the preoperative situation and

Table 4 Outcome divided into "benefit" or "no benefit" for different preoperative situations. The result for all patients (n=1933) are shown for each preoperative variable as absolute figures (%). The relation between the outcome and the preoperative situation is shown as a two tailed p value using a Mann–Whitney U test

Variable	*Benefit*	*No benefit*	*p Value*
Age group			0.001
20–49	44 (91.7)	4 (8.3)	
50–59	87 (94.6)	5 (5.4)	
60–69	246 (94.6)	14 (5.4)	
70–79	733 (91.5)	68 (8.5)	
80–89	596 (88.4)	78 (11.6)	
90–w	51 (87.9)	7 (12.1)	
Sex			0.692
Female	1172 (90.7)	120 (9.3)	
Male	585 (91.3)	56 (8.7)	
Ocular comorbidity			<0.001
No	1150 (93.1)	85 (6.9)	
Yes	607 (87.0)	91 (13.0)	
Best corrected vision preoperatively, better eye			0.003
≤0.4	538 (89.1)	66 (10.9)	
0.5–0.7	614 (89.8)	70 (10.2)	
≥0.8	605 (93.8)	40 (6.2)	
Second eye surgery			0.131
First eye	1138 (90.2)	124 (9.8)	
Second eye	619 (92.3)	52 (7.7)	
Other diseases			0.073
Yes	1171 (90.1)	129 (9.9)	
No	586 (92.6)	47 (7.4)	
Home help			0.083
Yes	416 (88.9)	52 (11.1)	
No	1341 (91.5)	124 (8.5)	
Subsidised travel by taxi			<0.001
Yes	452 (86.8)	69 (13.2)	
No	1305 (92.4)	107 (7.6)	

Table 5 Logistic regression analysis of relation between certain preoperative circumstances and the outcome divided into "benefit" or "no benefit"

Variable	*Significance*
Age group	p=0.1790
Ocular comorbidity	p=0.0005
Best corrected vision in better eye	p=0.4447
Subsidised travel by taxi	p=0.0170

the alternative outcomes has been tested for each variable separately. Table 4 demonstrates that there is a significant relation between a "benefit"/"no benefit" outcome and all preoperative circumstances except sex, second eye surgery, the existence of other diseases, and having home help. This means that in our material there is a relation between a "no benefit" outcome and older age, existence of ocular comorbidity, a low preoperative best corrected vision, and having subsidised travel by taxi respectively.

When we tested the preoperative situations that had statistically significant linkages to the outcome by multivariate logistic regression analysis the number of significant relations are reduced. This is shown in Table 5. Only two preoperative situations remain that have a significant relation to these alternative outcomes: other eye diseases in the surgery eye (p=0.0005) and having subsidised travel by taxi (p=0.0170).

Table 6 Outcome divided into "benefit" and "no benefit" considering ocular comorbidity and subsidised travel by taxi

Preoperative situation	*Benefit*	*No benefit*
No ocular comorbidity		
No subsidised travel by taxi	903 (94.1)	57 (5.9)
Subsidised travel by taxi	247 (89.8)	28 (10.2)
Ocular comorbidity		
No subsidised travel by taxi	402 (88.9)	50 (11.1)
Subsidised travel by taxi	205 (83.3)	41 (16.7)

In Table 6 the outcome in benefit and no benefit is demonstrated for all patients divided into groups considering the variables ocular comorbidity and having subsidised travel by taxi.

Table 6 shows that patients with no ocular comorbidity and not having subsidised travel by taxi have a "no benefit" outcome in 5.9% of the cases and patients with both ocular comorbidity and having subsidised travel by taxi have a "no benefit" outcome in 16.7% of the cases.

VERY GOOD BENEFIT VERSUS LESS THAN VERY GOOD BENEFIT

The Catquest gives also an opportunity to study which patients that have a very good outcome of surgery. The outcome can be divided in two categories: "very good benefit" (very good benefit) and "less than very good benefit" (good benefit + moderate benefit + questionable benefit + no benefit).

The different preoperative situations can be studied separately regarding a relation to a "very good benefit" outcome. This is shown in Table 7.

As demonstrated in Table 7 all preoperative circumstances except having other diseases have some relation (positive or negative) to a "very good benefit" outcome. These preoperative variables are tested in a logistic regression analysis versus the outcome. This is shown in Table 8 which shows that age group has the strongest relation (p<0.0001) to a "very good benefit" outcome. Also second eye surgery, ocular comorbidity, and having subsidised travel by taxi have a significant relation to a very good outcome. There is no significant relation between a very good benefit and the other preoperative situations (sex, home help, or best corrected preoperative vision).

In Table 9 the outcome in "very good benefit" and "less than very good benefit" is demonstrated for all patients divided into groups considering the variables second eye surgery and age groups. Table 9 shows that a "very good benefit" outcome is not so frequent (45.7%) in the lowest age group (20–49 years) when first eye surgery has been performed. After second eye surgery, on the other hand, the same age group has a very high frequency (76.9%) of a "very good benefit" outcome.

The Catquest describes the outcome in five different levels of benefit. Therefore, the results can be grouped into two alternative outcomes in four different ways by moving the dividing line from highest to lowest benefit level. This gives the following combinations:

- Very good benefit/less than very good benefit
- Good benefit (very good benefit + good benefit)/less than good benefit
- Moderate benefit (very good benefit + good benefit + moderate benefit)/less than moderate benefit and benefit/no benefit.

Table 10 demonstrates these four groups of alternative outcomes tested separately in a logistic regression analysis versus the eight preoperative variables. The most important finding is that ocular comorbidity has a significant relation to the outcome no matter on

Table 7 Outcome divided into "very good benefit" and not "very good benefit" for different preoperative situations. The result for all patients (n=1933) are shown for each preoperative variable as absolute figures (%). The relation between the outcome and the preoperative situation is shown as a two tailed p value using a Mann–Whitney U test

Variable	*Very good benefit*	*Not very good benefit*	*p Value*
Age group			<0.001
20–49	26 (54.2)	22 (45.8)	
50–59	56 (60.9)	36 (39.1)	
60–69	130 (50.0)	130 (50.0)	
70–79	315 (39.3)	486 (60.7)	
80–89	219 (32.5)	455 (67.5)	
90–w	17 (29.3)	41 (70.7)	
Sex			0.023
Female	487 (37.7)	805 (62.3)	
Male	276 (43.1)	365 (56.9)	
Ocular comorbidity			<0.001
No	540 (43.7)	695 (56.3)	
Yes	223 (31.9)	475 (68.1)	
Best corrected vision preoperatively, better eye			<0.001
≤0.4	210 (34.8)	394 (65.2)	
0.5–0.7	251 (36.7)	433 (63.3)	
≥0.8	302 (46.8)	343 (53.2)	
Second eye surgery			<0.001
First eye	455 (36.1)	807 (63.9)	
Second eye	308 (45.9)	363 (54.1)	
Other diseases			0.479
Yes	506 (38.9)	794 (61.1)	
No	257 (40.6)	376 (59.4)	
Home help			0.007
Yes	160 (34.2)	308 (65.8)	
No	603 (41.2)	862 (58.8)	
Subsidised travel by taxi			<0.001
Yes	160 (30.7)	361 (69.3)	
No	603 (42.7)	809 (57.3)	

Table 8 Logistic regression analysis of relation between certain preoperative circumstances and the outcome divided into "very good benefit" and "less than very good benefit"

Variable	*Significance*
Age group	p<0.0001
Sex	p=0.1948
Ocular comorbidity	p=0.0003
Best corrected vision in better eye	p=0.7690
Second eye surgery	p=0.0001
Home help	p=0.7785
Subsidised travel by taxi	p=0.0114

which benefit level the outcome is divided into two groups. Second eye surgery and age group have a significant relation to the outcome if the dividing line is placed between a very good benefit or a good benefit and lower benefit outcomes respectively.

Discussion

The results from this study indicate a relation between certain preoperative circumstances and the outcome. The results are of course strongly associated with our method for evaluating the outcome.

The Catquest questionnaire and the method to evaluate the outcome have been described earlier.[11 12] The "no benefit" outcome means that the patient's self assessed difficulties in performing seven specific daily activities have been worse after the operation compared with before. The "very good benefit" outcome indicates that the patient's self assessed difficulties in performing seven specific activities in daily life, activity level, and cataract symptoms have improved after the operation.

Missing data mostly because of no response to the postoperative questionnaire must be considered a problem. The characteristics of the non-responders were analysed in an earlier publication.[12] Based on this analysis we do not believe that the missing cases are of crucial importance for the present study. Therefore we think that this study produces interesting suggestions about the relation between the preoperative situation and the outcome.

Our choice of preoperative variables to be studied was based on prestudies and the work of Schein *et al*.[5]

As shown in Table 4 there is a relation between the outcome from "benefit" or "no benefit" and some of the preoperative variables (age group, ocular comorbidity, best corrected preoperative vision, other diseases, home help, and subsidised travel by taxi) when tested separately. If these variables are tested by logistic regression analysis only ocular comorbidity (p=0.0005) and subsidised travel by taxi (p=0.0170) remain with a relation to the outcome. This indicates that variables like best vision and age group are dependent on ocular comorbidity for their relation to the outcome.

Only 5.9% of patients with no ocular comorbidity and no subsidised travel by taxi had a "no benefit" outcome from surgery (Table 6). On the other hand, 16.7% of the patients with ocular comorbidity and subsidised travel by taxi had a "no benefit" outcome. Interestingly enough age group is not significantly related to a "benefit"/"no benefit" outcome if the data are corrected for the higher incidence of ocular comorbidity and subsidised travel by taxi in the higher age group. Thus, age as a single variable is not associated with a worse outcome ("no benefit") in our study. It should be noted, however, that the number of patients with a "no benefit" outcome in certain age groups is small (Table 4). Schein *et al*[5] reported that age of 75 years or older was related to not improving one or more outcome measures (visual acuity, V-14 score, and cataract symptom score) in their material where only first eye surgery was studied. Mangione *et al*[6] reported that younger age was a predictor to improved "Activity of Daily Vision Scale" score in their study.

It is also interesting to note that subsidised travel by taxi is the only variable of three concerning the patient's general health that has a relation to a "benefit"/"no benefit" outcome (Table 5). This finding is of course strongly associated with the present healthcare system and social service.

Table 7 shows the outcome separated into very good benefit and less than very good benefit. Very good benefit means that three item areas (the patient's perceived visual disabilities, cataract symptoms, and activity level) have improved after surgery (Table 1). All variables studied except other diseases have a relation to the outcome expressed as these two alternative outcomes. When a logistic regression analysis is performed several variables still have a relation to the outcome. Age group seems to be the most important variable (p<0.0001). Second eye surgery (p=0.0001), ocular comorbidity (p=0.0003) and subsidised travel by taxi (p=0.0114) also have a relation to the outcome.

If the results from all patients are studied the youngest age group (20–49 years) has a less good outcome than some of the higher age

Table 9 Outcome divided into "very good benefit" and "less than very good benefit" and certain preoperative conditions

	Age group					
	20–49	*50–59*	*60–69*	*70–79*	*80–89*	*90–w*
Second eye surgery						
Very good benefit	76.9%	64.5%	59.3%	46.6%	37.0%	25.0%
Less than very good benefit	23.1%	35.5%	40.7%	53.4%	63.0%	75.0%
First eye surgery						
Very good benefit	45.7%	59.0%	45.0%	35.2%	30.2%	31.0%
Less than very good benefit	54.3%	41.0%	55.0%	64.8%	69.8%	69.0%

Table 10 Relation between different preoperative variables and the outcome divided into four pairs of benefit

	Significance p value			
Variable	*Alternative outcomes*			
Code in Table 1	5/(4+3+2+1)[1]	(5+4)/(3+2+1)[2]	(5+4+3)/(2+1)[3]	(5+4+3+2)/1[4]
Age group	<0.0001	<0.0001	0.1260	0.1578
Sex	0.1950	0.9648	0.0805	0.8248
Ocular comorbidity	0.0004	0.0052	<0.0001	0.0005
Best preoperative vision	0.7980	0.6930	0.6244	0.7346
Second eye surg	0.0001	<0.0001	0.5022	0.2309
Other diseases	0.6235	0.2479	0.4062	0.2737
Home help	0.8010	0.7479	0.2903	0.7076
Subsidised travel	0.0103	0.1026	0.1440	0.0204

[1]Very good benefit versus (good benefit + moderate benefit + questionable benefit + no benefit).
[2](Very good benefit + good benefit) versus (moderate benefit + questionable benefit + no benefit).
[3](Very good benefit + good benefit + moderate benefit) versus (questionable benefit + no benefit).
[4](Very good benefit + good benefit + moderate benefit + questionable benefit) versus no benefit.

groups. If the material is separated in first and second eye surgery it is obvious that the youngest age group has a very good outcome from second eye surgery and not so good outcome from first eye surgery (Table 9). Our results indicate that young people have a much better outcome after second eye surgery than after first eye surgery.

The importance of age when a very good outcome is studied is not surprising. A very good benefit outcome in our model favours high activity and both car driving and employment are included as possible positive signs of maintained or improved activity after surgery. Therefore it should be easier to find a very good benefit outcome in young and active patients.

One interesting finding is the very good outcome of first eye surgery in the age group 50–59 years. This may be due to a high frequency of cataract in one eye only, but this has not been analysed.

These findings indicate that possible predictors of the functional outcome may vary depending on which level of a beneficial outcome we are studying. As demonstrated in Table 10 age and second eye surgery are significantly related to the outcome if we include improvement of both perceived disabilities in daily life, cataract symptoms, and activity level in a beneficial outcome. These variables are not related to the outcome if we only include improved perceived disabilities in daily life in a beneficial outcome. On the other hand, on this level of improvement the variable ocular comorbidity is strongly related to the outcome. Ocular comorbidity is related to a worse outcome in our study no matter how a beneficial outcome is defined (Table 10). The more frequent high level of benefit reached after second eye surgery in this study may correspond to the findings of Elliott and co-workers.[15] In their study patients reached visual functions similar to those from age matched normals only after second eye surgery.

Is there a need to separate cataract patients into groups when the outcome is discussed? According to our findings we think that it is appropriate.

Ocular comorbidity is related to a worse outcome independent of both other preoperative variables and how the beneficial outcome is defined in our study. Ocular comorbidity has also been reported as related to a worse outcome by others.[5 6]

Therefore, if the functional outcome from cataract surgery is presented or compared it is important to report the number of patients with ocular comorbidity or to separate the material into two groups, with and without ocular comorbidity.

If the study of a positive outcome from surgery includes improvement in more than one item area (for example, perceived disabilities, cataract symptoms, activity level) it seems relevant to report the number of second eye operations and age groups.

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1 Powe NR, Schein OD, Gieser SC, *et al.* Synthesis of the literature on visual acuity and complications following cataract extraction with intraocular lens implantation. *Arch Ophthalmol* 1994;**112**:239–52.
2 Steinberg EP, Tielsch JM, Schein OD, *et al.* The VF-14: an index of functional impairment in cataract patients. *Arch Ophthalmol* 1994;**112**:630–8.
3 Sloan ME, Ball K, Owsley C, *et al.* The Visual Activities Questionnaire: developing an instrument for assessing problems in everyday visual tasks. *Technical Digest Series-Optical Society of America, Non-invasive assessment of the visual system* 1992;**1**:26–9.
4 Mangione CM, Phillips RS, Seddon JM, *et al.* Development of the activities of daily vision scale. A measure of visual functional status. *Med Care* 1992;**30**:1111–26.
5 Schein OD, Steinberg EP, Cassard SD, *et al.* Predictors of outcome in patients who underwent cataract surgery. *Ophthalmology* 1995;**102**:817–23.
6 Mangione CM, Orav EJ, Lawrence MG, *et al.* Prediction of visual function after cataract surgery: a prospectively validated model. *Arch Ophthalmol* 1995;**113**:1305–11.
7 Obstbaum SA. Indications and timing of cataract surgery (editorial). *J Cataract Refract Surg* 1995;**21**:483.
8 Legro MW. Quality of life and cataracts: a review of patient-centered studies of cataract surgery outcomes. *Ophthalmic Surg* 1991;**22**:431–43.
9 Desai P, Minassian DC, Vafidis G, *et al.* Gains from cataract surgery: visual function and quality of life. *Br J Ophthalmol* 1996;**80**:868–73.
10 Javitt JC, Steiberg EP, Sharkey P, *et al.* Cataract surgery in one eye or both: a billion dollar per year issue. *Ophthalmology* 1995;**102**:1583–93.
11 Lundström M, Roos P, Jensen S, *et al.* Catquest questionnaire for use in cataract surgery care: description, validity and reliability. *J Cataract Refractive Surg* 1997;**23**:1226–36.
12 Lundström M, Stenevi U, Thorburn W, *et al.* Catquest questionnaire for use in cataract surgery care: assessment of surgical outcomes. *J Cataract Refract Surg* 1998;**24**:968–74.
13 Stenevi U, Lundström M, Thorburn W. A national cataract register. *Acta Ophthalmol Scand* 1995;**73**:41–4.
14 Lundström M, Stenevi U, Thorburn W. Assessment of waiting time and priority setting by means of a national register. *Int J Technol Assess Health Care* 1996;**12**:136–40.
15 Elliott DB, Patla A, Bullimore MA. Improvements in clinical and functional and perceived visual disability after first and second eye cataract surgery. *Br J Ophthalmol* 1997;**81**:889–95.
16 Yager RR. Concepts, theory and techniques: a new methodology for ordinal multiobjective decisions based on fuzzy sets. *Decision Sci* 1981;**12**:589–600.