Rapid Assessment of Avoidable Blindness

Report of findings from test

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Contents

Sample representation

Response rate

Table 1: Eligible persons, coverage, absentees and refusals (POP1)

Exam status	Female		Male		Total	
	n	%	*n*	%	*n*	%
Examined*	2520	94.1	1545	91.0	4065	92.9
Refused	5	0.2	2	0.1	7	0.2
Incapable	32	1.2	50	2.9	82	1.9
Unavailable	120	4.5	101	5.9	221	5.1
Total	2677	100.0	1698	100.0	4375	100.0

* The response rate is the percent examined

The response rate indicates the proportion of eligible, enumerated people who were examined. The RAAB sample size calculator includes the expected non-response rate in the sample and increases the sample size accordingly. This ensures that the sample size is powerful enough to estimate the prevalence of blindness with the desired precision.

If the response rate is lower than 80-90%, there is a concern that the conditions under review in the 10-20% who were not examined may be different to those that were examined (non-response bias). For example, non-responders in a RAAB may be younger than responders (e.g., working age vs retired) and may, on average, be less likely to be vision impaired.

If the response rate is over 95%, this might be an indication that eligible participants who were absent or refused to participate were not enumerated but rather replaced by eligible participants in the next household, which would introduce selection bias and mean that results are not representative of the population. For example, people with impaired vision may be more likely to be at home and people with good vision may be more likely to be away and unavailable. In certain settings (e.g., rural or remote) a response rate over 95% is not uncommon – participants may be more compliant with requests to stay home on the day of data collection, or more likely to work in the environment close to their home.

It is important to review this information in relation to the tables on representativeness of the sample below to identify whether a high response rate is valid.

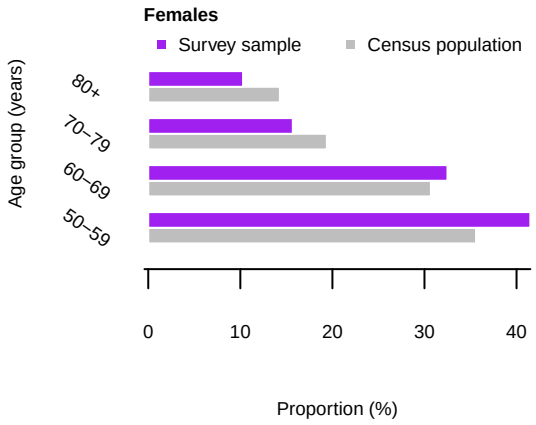
Sample representativeness

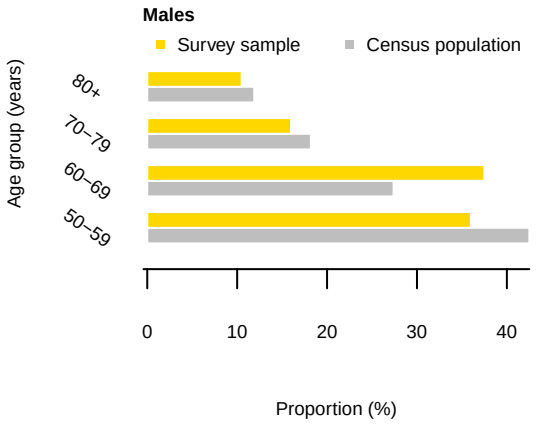
Table 2: Age and gender distribution of people examined in the sample (POP2)

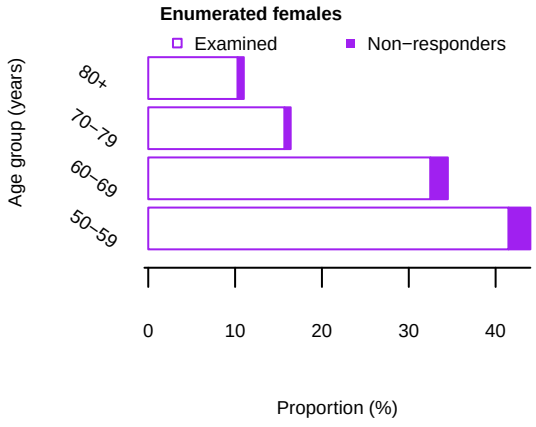
Age group	Female		Male		Total	
Years	*n*	%	*n*	%	*n*	%
50-59	1046	41.5	556	36.0	1602	39.4
60-69	820	32.5	580	37.5	1400	34.4
70-79	395	15.7	247	16.0	642	15.8
80+	259	10.3	162	10.5	421	10.4
Total	2520	100.0	1545	100.0	4065	100.0

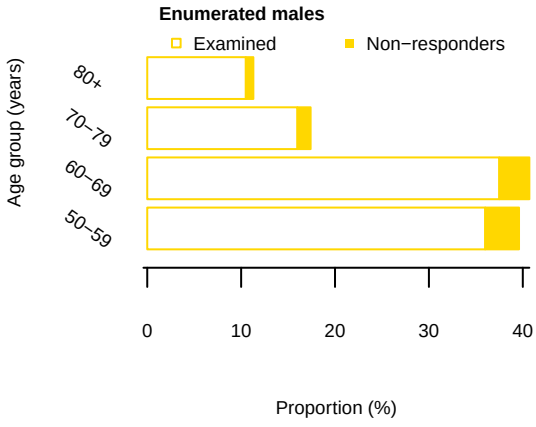
Table 3: Total number of people aged 50+ years in survey area (POP3)

Age group	Female		Male		Total	
Years	*n*	*%*	*n*	*%*	*n*	*%*
50-59	22666	35.6	17752	42.5	40418	38.3
60-69	19568	30.7	11456	27.4	31024	29.4
70-79	12397	19.4	7627	18.2	20024	19.0
80+	9114	14.3	4978	11.9	14092	13.4
Total	63745	100.0	41813	100.0	105558	100.0









For your results to be useful for planning, your sample needs to be representative of the population 50 years and older. After completing the survey, we can assess representativeness by comparing the age-sex composition of the sample to the age-sex composition of the population 50 years and older.

We can also use the age-sex composition of the population 50 years and older to weight (post-stratify) crude estimates and provide age-sex adjusted (ASA) estimates for the population. We apply an 'inflation factor' – derived from sample vs population comparisons – to the counts of our conditions of interest in each sample age-sex group to generate extrapolated values in the population.

Often, there are more older females than younger males in the sample, and less younger males in the sample than in the population, because men are more likely to be away at work when the survey teams visit. If this is the case, use the age-sex adjusted estimates.

Important: if your sample differs from the population because one group was more likely to be unavailable (e.g., younger men, or other seasonal labourers) then you would expect to see this reflected in the response rate (i.e., more people enumerated but unavailable). If the difference between the sample and the population is high, but the proportion of people unavailable is low (e.g., response rate is still above 95%) this might be an indication that eligible participants who were absent or refused were replaced by others, which introduces bias and may mean that results are not accurate.

Prevalence of vision impairment

We report the prevalence of distance vision impairment (VI) in the population 50 years and older using presenting visual acuity (PVA) in the better eye. PVA is visual acuity measured with correction, if available.

Distance vision impairment categories are defined according to the VA thresholds used in the World Health Organization's International Classification of Diseases (ICD-11).

Blindness: PVA less than 3/60 in the better eye

Severe VI: PVA less than 6/60 to 3/60 in the better eye

Moderate VI: PVA less than 6/18 to 6/60 in the better eye

Mild VI: PVA less than 6/12 to 6/18 in the better eye

Distance vision impairment prevalence

Table 4: Crude prevalence of blindness, severe, moderate and mild vision impairment (PREV1)

VI level	**Female**			**Male**			**Total**		
	n	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
Blind	89	3.5	2.7 - 4.4	59	3.8	2.6 - 5.1	148	3.6	2.9 - 4.4
Severe	32	1.3	0.8 - 1.7	25	1.6	0.9 - 2.3	57	1.4	1.0 - 1.8
Moderate	152	6.0	4.9 - 7.2	128	8.3	6.6 - 9.9	280	6.9	5.8 - 7.9
Mild	201	8.0	6.8 - 9.1	124	8.0	6.7 - 9.4	325	8.0	7.1 - 8.9

Table 5: Adjusted prevalence and extrapolated magnitude of blindness, severe, moderate and mild vision impairment (PREV2)

VI level	**Female**			**Male**			**Total**		
	%	*95% CI*	*Extraplotated magnitude*	*%*	*95% CI*	*Extrapolated magnitude*	*%*	*95% CI*	*Extrapolated magnitude*
Blind	4.3	3.5 - 5.2	2764	4.1	2.8 - 5.3	1710	4.2	3.5 - 5.0	4474
Severe	1.6	1.1 - 2.1	1020	1.7	1.0 - 2.4	708	1.6	1.2 - 2.0	1727
Moderate	7.1	5.9 - 8.2	4515	8.7	7.1 - 10.4	3652	7.7	6.7 - 8.8	8167
Mild	8.6	7.4 - 9.8	5484	8.0	6.7 - 9.4	3363	8.4	7.4 - 9.3	8847

These tables show the crude and adjusted prevalence of vision impairment by impairment level and gender. The sample size for RAAB is calculated to provide an acceptable level of precision for the total prevalence of blindness. The accuracy of prevalence estimates for population subgroups is lower and caution should be taken in the interpretation of these data. Table PREV2 shows the estimated magnitude of vision impairment in the study area by gender, calculated by multiplying the crude prevalence by the population count (e.g., census data). Throughout, the 95% confidence intervals are calculated to account for RAAB's cluster sampling design.

Cumulative distance vision impairment prevalence

Table 6: Crude cumulative prevalence of blindness (any PVA <3/60), severe (any PVA <6/60), moderate (any PVA <6/18) and mild (any PVA <6/12) vision impairment (PREV3)

VI level	Female			Male			Total		
	n	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
Blind	89	3.5	2.7 - 4.4	59	3.8	2.6 - 5.1	148	3.6	2.9 - 4.4
Severe or worse	121	4.8	3.9 - 5.7	84	5.4	4.0 - 6.9	205	5.0	4.2 - 5.9
Moderate or worse	273	10.8	9.3 - 12.4	212	13.7	11.5 - 16.0	485	11.9	10.5 - 13.3
Mild or worse	474	18.8	16.7 - 20.9	336	21.7	19.1 - 24.4	810	19.9	18.1 - 21.7

Table 7: Adjusted cumulative prevalence of blindness (any PVA <3/60), severe (any PVA <6/60), moderate (any PVA <6/18) and mild (any PVA <6/12) vision impairment (PREV4)

VI level	Female			Male			Total		
	%	*95% CI*	*Extrapolated magnitude*	*%*	*95% CI*	*Extrapolated magnitude*	*%*	*95% CI*	*Extrapolated magnitude*
Blind	4.3	3.5 - 5.2	2764	4.1	2.8 - 5.3	1710	4.2	3.5 - 5.0	4474
Severe or worse	5.9	5.0 - 6.9	3783	5.8	4.3 - 7.2	2418	5.9	5.0 - 6.7	6201
Moderate or worse	13.0	11.4 - 14.6	8298	14.5	12.2 - 16.8	6070	13.6	12.2 - 15.1	14368
Mild or worse	21.6	19.5 - 23.8	13782	22.6	19.9 - 25.2	9433	22.0	20.2 - 23.8	23215

Unilateral distance vision impairment prevalence

Table 8: Crude prevalence of blind, severe, moderate and mild unilateral vision impairment (PREV5)

VI level	Male			Female			Total		
	n	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
Blind in one eye only	125	5.0	4.1 - 5.8	73	4.7	3.7 - 5.8	198	4.9	4.1 - 5.6
Severe in one eye only	26	1.0	0.6 - 1.5	12	0.8	0.4 - 1.2	38	0.9	0.6 - 1.3
Moderate in one eye only	66	2.6	2.0 - 3.3	42	2.7	1.9 - 3.6	108	2.7	2.1 - 3.2
Mild in one eye only	163	6.5	5.4 - 7.5	99	6.4	5.2 - 7.6	262	6.4	5.6 - 7.3

* Unilateral refers to cases where the other eye has PVA of 6/12

Table 9: Adjusted prevalence and extrapolated magnitude of blind, severe, moderate and mild unilateral vision impairment (PREV6)

VI level	Female			Male			Total		
	%	*95% CI*	*Extrapolated magnitude*	*%*	*95% CI*	*Extrapolated magnitude*	*%*	*95% CI*	*Extrapolated magnitude*
Blind in one eye only	5.2	4.4 - 6.1	3344	4.7	3.6 - 5.8	1963	5.0	4.3 - 5.8	5307
Severe in one eye only	1.1	0.7 - 1.6	712	0.8	0.4 - 1.2	329	1.0	0.7 - 1.3	1041
Moderate in one eye only	3.0	2.3 - 3.6	1891	2.5	1.7 - 3.4	1058	2.8	2.3 - 3.3	2949
Mild in one eye only	6.7	5.7 - 7.7	4262	6.1	4.9 - 7.3	2567	6.5	5.6 - 7.3	6829

* Unilateral refers to cases where the other eye has PVA of 6/12

Cases of unilateral vision impairment acknowledge an additional sight loss burden in the population, not captured in the standard definition of bilateral vision impairment, but with the potential to impact on visual functioning.

Near vision impairment prevalence

Crude and adjusted prevalence of near vision impairment.

Table 10: Crude prevalence of near vision impairment (PREV7)

	Male			**Female**			**Total**		
	n	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
Near VI	0	0.0	0.0 - 0.0	2	0.1	0.0 - 0.4	2	0.0	0.0 - 0.1

Table 11: Adjusted prevalence of near vision impairment (PREV8)

	Male			**Female**			**Total**		
	Adj. %	*95% CI*	*Extrapolated magnitude*	*Adj. %*	*95% CI*	*Extrapolated magnitude*	*Adj. %*	*95% CI*	*Extrapolated magnitude*
Near VI	0.0	0.0 - 0.0	0	0.1	0.0 - 0.4	61	0.1	0.0 - 0.2	61

Causes of distance vision impairment

Principal cause by impairment level

Table 12: Principal cause of blindness, severe, moderate and mild vision impairment (CAUSE1)

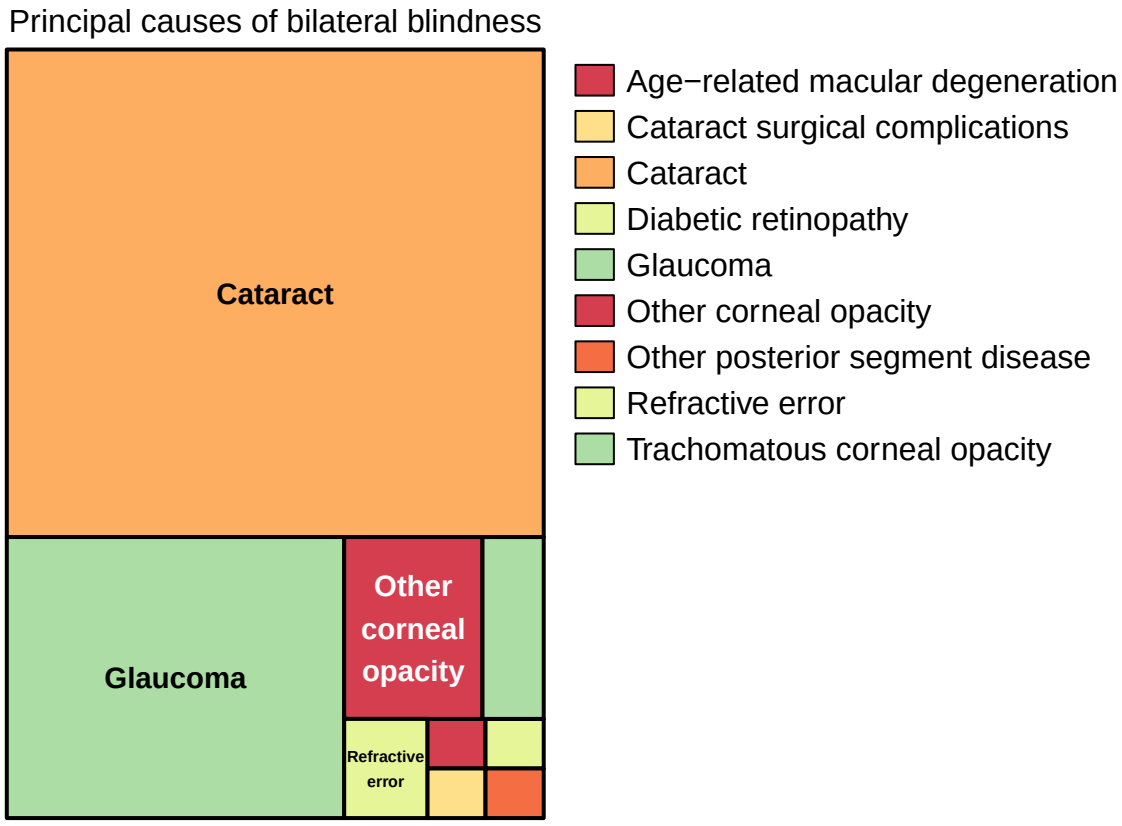
Principal cause	Blind		Severe		Moderate		Mild	
	n	%	*n*	%	*n*	%	*n*	%
1. Refractive error	3	2.0	12	21.1	67	23.9	206	63.4
2. Aphakia	0	0.0	0	0.0	0	0.0	0	0.0
3. Cataract	94	63.5	34	59.6	176	62.9	77	23.7
4. Cataract surgical complications	1	0.7	4	7.0	8	2.9	6	1.8
5. Trachomatous corneal opacity	4	2.7	0	0.0	0	0.0	0	0.0
6. Other corneal opacity	9	6.1	1	1.8	6	2.1	3	0.9
7. Pterygium	0	0.0	0	0.0	0	0.0	0	0.0
8. Phthisis	0	0.0	0	0.0	0	0.0	0	0.0
9. Onchocerciasis	0	0.0	0	0.0	0	0.0	0	0.0
10. Glaucoma	34	23.0	4	7.0	10	3.6	19	5.8
11. Diabetic retinopathy	1	0.7	1	1.8	0	0.0	0	0.0
12. Age-related macular degeneration	1	0.7	0	0.0	0	0.0	1	0.3
13. Other posterior segment disease	1	0.7	0	0.0	11	3.9	11	3.4
14. Myopic degeneration	0	0.0	0	0.0	0	0.0	0	0.0
15. Other globe or CNS abnomalities	0	0.0	1	1.8	2	0.7	2	0.6
Total	148	100.0	57	100.0	280	100.0	325	100.0

Table 13: Principal cause of blindness, severe, moderate and mild vision impairment, by intervention category (CAUSE2)

Category	Blind		Severe		Moderate		Mild	
	n	%	*n*	%	*n*	%	*n*	%
A. Treatable (1, 2, 3)	97	65.5	46	80.7	243	86.8	283	87.1
B. Preventable (PHC/PEC services) (5, 6, 7, 8, 9)	13	8.8	1	1.8	6	2.1	3	0.9
C. Preventable (Ophthalmic services) (4, 10, 11)	36	24.4	9	15.8	18	6.5	25	7.6
D. Avoidable (A + B + C)	146	98.7	56	98.3	267	95.4	311	95.6
E. Posterior segment disease (9, 10, 11, 12, 13, 14)	37	25.1	5	8.8	21	7.5	31	9.5

* PHC: Primary Health Care; PEC: Primary Eye Care

This table compares the main cause of blindness, severe vision impairment, moderate vision impairment and mild visual impairment in the person. The following table shows what proportion of vision impairment is attributable to treatable, preventable and posterior segment disease. From these tables the priorities for intervention can be determined. The distribution of cases of blindness in the sample are visualised below.



Principal cause of blindness by gender

Table 14: Principal cause of blindness in males and females (CAUSE3)

Principal cause	Female		Male		Total	
	n	%	*n*	%	*n*	%
1. Refractive error	2	2.2	1	1.7	3	2.0
2. Aphakia	0	0.0	0	0.0	0	0.0
3. Cataract	56	62.9	38	64.4	94	63.5
4. Cataract surgical complications	1	1.1	0	0.0	1	0.7
5. Trachomatous corneal opacity	3	3.4	1	1.7	4	2.7
6. Other corneal opacity	7	7.9	2	3.4	9	6.1
7. Pterygium	0	0.0	0	0.0	0	0.0
8. Phthisis	0	0.0	0	0.0	0	0.0
9. Onchocerciasis	0	0.0	0	0.0	0	0.0
10. Glaucoma	17	19.1	17	28.8	34	23.0
11. Diabetic retinopathy	1	1.1	0	0.0	1	0.7
12. Age-related macular degeneration	1	1.1	0	0.0	1	0.7
13. Other posterior segment disease	1	1.1	0	0.0	1	0.7
14. Myopic degeneration	0	0.0	0	0.0	0	0.0
15. Other globe or CNS abnomalities	0	0.0	0	0.0	0	0.0
Total	89	100.0	59	100.0	148	100.0

This table shows the principal cause of blindness, disaggregated by gender.

Table 15: Principal cause of blindness (PVA <3/60), by gender and intervention category (CAUSE4)

Category	**Male**		**Female**		**Total**	
	n	*%*	*n*	*%*	*n*	*%*
A. Treatable (1, 2, 3)	58	65.2	39	66.1	97	65.5
B. Preventable (PHC/PEC services) (5, 6, 7, 8, 9)	10	11.2	3	5.1	13	8.8
C. Preventable (Ophthalmic services) (4, 10, 11)	19	21.3	17	28.8	36	24.3
D. Avoidable (A + B + C)	87	97.8	59	100.0	146	98.6
E. Posterior segment disease (9, 10, 11, 12, 13, 14)	20	22.5	17	28.8	37	25.0

Cataract

Cataract coverage

Cataract operations

Table 16: Crude prevalence of people bilaterally and unilaterally cataract operated (CAT1)

Operated cataract	Female		Male		Total	
	n	*%*	*n*	*%*	*n*	*%*
Bilateral operated	22	0.9	12	0.8	34	0.8
Unilateral operated	75	3.0	41	2.7	116	2.9
Total operated	97	3.8	53	3.4	150	3.7

This table reports the prevalence of people in the sample with one or both eyes operated, irrespective of post-operative visual acuity or pinhole acuity in the unoperated eye.

Unmet need for cataract surgery

Table 17: Crude unmet need for cataract surgery at pinhole VA thresholds <3/60, <6/60, <6/18 and <6/12 (CAT2)

Unmet need threshold	Female			Male			Total		
	n	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
PinVA <3/60	46	1.8	1.2 - 2.4	36	2.3	1.4 - 3.2	82	2.0	1.5 - 2.5
PinVA <6/60	67	2.7	1.9 - 3.4	49	3.2	2.2 - 4.2	116	2.9	2.3 - 3.4
PinVA <6/18	142	5.6	4.6 - 6.7	111	7.2	5.7 - 8.7	253	6.2	5.3 - 7.2
PinVA <6/12	210	8.3	6.9 - 9.7	146	9.4	7.6 - 11.3	356	8.8	7.6 - 9.9

Table 18: Extrapolated magnitude of unmet need for cataract surgery at pinhole VA thresholds <3/60, <6/60, <6/18 and <6/12 (CAT3)

Unmet need threshold	Female			Male			Total		
	Adj. %	*95% CI*	*Extrapolated magnitude*	*Adj. %*	*95% CI*	*Extrapolated magnitude*	*Adj. %*	*95% CI*	*Extrapolated magnitude*
PinVA <3/60	2.3	1.7 - 2.9	1443	2.5	1.6 - 3.4	1054	2.4	1.9 - 2.9	2497
PinVA <6/60	3.3	2.6 - 4.0	2115	3.4	2.4 - 4.4	1434	3.4	2.8 - 4.0	3550
PinVA <6/18	7.0	5.9 - 8.1	4443	7.7	6.2 - 9.2	3217	7.3	6.3 - 8.2	7660
PinVA <6/12	10.3	8.8 - 11.7	6544	10.1	8.3 - 11.9	4223	10.2	9.0 - 11.4	10767

The number of people at each PinVA threshold in these tables correspond to the unmet need for cataract surgery in the calculation for effective cataract surgical coverage (see notes). People with unmet need for surgery may have cataract in one or both eyes. Those with cataract in one eye and different cause of VI in the other eye would potentially benefit from cataract surgery. Note, this group with unilateral cataract excludes people with previous cataract surgery, refractive error or uncorrected aphakia in the non-cataract eye.

Unmet need for cataract surgery by bilateral and unilateral cases

In these tables, the unmet need for cataract surgery is broken down by bilateral and unilateral cataract cases at each of the cataract surgical thresholds.

Table 19: Crude prevalence of cataract at surgical thresholds <3/60, <6/60, <6/18 and <6/12 (CAT4)

Cataract surgical threshold	**Female**			**Male**			**Total**		
	n	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
Bilateral									
PinVA <3/60	40	1.6	1.0 - 2.1	26	1.7	0.9 - 2.5	66	1.6	1.2 - 2.1
PinVA <6/60	59	2.3	1.7 - 3.0	38	2.5	1.6 - 3.3	97	2.4	1.9 - 2.9
PinVA <6/18	126	5.0	4.0 - 6.0	98	6.3	5.0 - 7.7	224	5.5	4.6 - 6.4
PinVA <6/12	179	7.1	5.8 - 8.4	120	7.8	6.2 - 9.4	299	7.4	6.3 - 8.4
Unilateral									
PinVA <3/60	162	6.4	5.4 - 7.4	118	7.6	6.2 - 9.1	280	6.9	6.0 - 7.8
PinVA <6/60	187	7.4	6.4 - 8.5	138	8.9	7.4 - 10.5	325	8.0	7.0 - 9.0
PinVA <6/18	229	9.1	8.0 - 10.2	141	9.1	7.7 - 10.6	370	9.1	8.1 - 10.1
PinVA <6/12	232	9.2	8.1 - 10.3	143	9.3	7.9 - 10.6	375	9.2	8.3 - 10.1

* Unilateral cases can have any level of VA in the eye without operable cataract

Table 20: Adjusted prevalence and extrapolated magnitude of cataract at surgical thresholds <3/60, <6/60, <6/18 and <6/12 (CAT5)

Cataract surgical threshold	**Female**			**Male**			**Total**		
	Adj. %	*95% CI*	*Extrapolated magnitude*	*Adj. %*	*95% CI*	*Extrapolated magnitude*	*Adj. %*	*95% CI*	*Extrapolated magnitude*
Bilateral									
PinVA <3/60	2.0	1.4 - 2.6	1270	2.5	1.7 - 3.3	1054	1.9	1.5 - 2.4	2027
PinVA <6/60	3.0	2.3 - 3.6	1884	3.4	2.5 - 4.3	1434	2.8	2.3 - 3.4	2990
PinVA <6/18	6.2	5.2 - 7.2	3963	7.7	6.3 - 9.1	3217	6.4	5.5 - 7.3	6792
PinVA <6/12	8.8	7.5 - 10.1	5594	10.1	8.4 - 11.8	4223	8.6	7.5 - 9.7	9049
Unilateral									
PinVA <3/60	7.4	6.4 - 8.5	4737	8.0	6.5 - 9.4	3333	7.6	6.8 - 8.5	8070
PinVA <6/60	8.5	7.4 - 9.6	5441	9.3	7.7 - 10.8	3886	8.8	7.9 - 9.8	9327
PinVA <6/18	10.5	9.3 - 11.6	6682	9.3	7.8 - 10.8	3893	10.0	9.0 - 11.0	10575
PinVA <6/12	10.5	9.4 - 11.7	6720	9.4	8.1 - 10.7	3934	10.1	9.2 - 11.0	10654

* Unilateral cases can have any level of VA in the eye without operable cataract

These tables enable planning the number of surgeries required to eliminate vision impairment from cataract at a particular PinVA threshold. Assuming services will aim to operate on all eyes of people with vision impairing cataract, two surgeries are required for 'bilateral cases' and one surgery is required for 'unilateral cases'.

Effective cataract surgical coverage

Table 21: Adjusted cataract surgical coverage and effective cataract surgical coverage at the person level (CAT6)

	Female		Male		Total		Relative Quality Gap
	Adj. %	*95% CI*	*Adj. %*	*95% CI*	*Adj. %*	*95% CI*	*%*
Cataract surgical threshold <6/12							
CSC	25.1	19.4 - 30.9	21.8	15.9 - 27.8	23.9	19.5 - 28.3	
eCSC	9.5	6.3 - 12.7	11.7	6.8 - 16.6	10.4	7.3 - 13.4	56.6
Cataract surgical threshold <6/18							
CSC	30.7	23.8 - 37.7	25.6	19.0 - 32.2	28.7	23.7 - 33.6	
eCSC	13.0	8.7 - 17.3	13.7	7.7 - 19.7	13.3	9.4 - 17.1	53.7
Cataract surgical threshold <6/60							
CSC	44.1	33.2 - 54.9	38.9	28.8 - 49.1	42.1	34.4 - 49.9	
eCSC	17.0	10.2 - 23.9	22.3	12.3 - 32.3	19.0	12.7 - 25.4	54.8
Cataract surgical threshold <3/60							
CSC	51.2	39.1 - 63.4	45.9	34.1 - 57.7	49.1	40.3 - 57.9	
eCSC	20.7	12.4 - 29.0	25.8	14.4 - 37.3	22.8	15.3 - 30.2	53.7

* CSC: Cataract Surgical Coverage; eCSC: Effective Cataract Surgical Coverage

Effective cataract surgical coverage (eCSC) measures the number of people in a population who have been operated on for cataract, and had a good outcome (at least 6/12 post-operative presenting VA), as a proportion of all people operated on or still requiring surgery. Therefore, eCSC describes service access (ie, cataract surgical coverage, [CSC]) adjusted for quality. eCSC and CSC are reported at four cataract surgical thresholds. The gap between CSC and eCSC values can be considered a quality gap; the relative quality gap is calculated as (total CSC–total eCSC)/ total CSC, with lower values reflecting better quality of cataract surgical services. See notes section for more details.

Barriers to cataract surgery

Table 22: Barriers to cataract surgery among participants with bilateral cataract and PinVA <6/60 (CAT7)

Barrier	Female		Male		Total	
	n	*%*	*n*	*%*	*n*	*%*
Unaware treatment possible	30	33.0	18	30.0	48	31.8
Surgery denied by provider	0	0.0	0	0.0	0	0.0
Cannot access surgery	21	23.1	14	23.3	35	23.2
Cost	23	25.3	18	30.0	41	27.2
Felt not needed	9	9.9	5	8.3	14	9.3
Fear	4	4.4	3	5.0	7	4.6
Other	4	4.4	2	3.3	6	4.0
Total	91	100.0	60	100.0	151	100.0

* Participants can report 1 or 2 barriers each

The standard RAAB survey protocol does not allow for in-depth interviews to determine why people with cataract have not yet been operated. This preliminary data on barriers to surgery should be regarded as an indication whether more detailed qualitative studies are required.

Cataract quality

Cataract surgical outcomes are reported for all operated eyes in the sample, not at the person level. RAAB gives population based data on post-operative visual outcomes, not specific to one surgeon or one hospital and with follow-up periods ranging from months to decades.

Type of surgery

Table 23: Type of cataract surgery performed, count by eyes (CAT8)

Surgery type	Female		Male		Total	
	n	%	*n*	%	*n*	%
IOL	119	100.0	65	100.0	184	100.0
Non-IOL	0	0.0	0	0.0	0	0.0
Couching	0	0.0	0	0.0	0	0.0
No view	0	0.0	0	0.0	0	0.0
Total	119	100.0	65	100.0	184	100.0

Presenting acuity vs pinhole acuity outcomes

Table 24: Post-operative visual outcome (PVA), count by eyes (CAT9)

Outcome (PVA)	Female		Male		Total	
	n	%	*n*	%	*n*	%
Good (6/12)	40	33.6	37	56.9	77	41.8
Borderline (<6/12 to 6/60)	43	36.1	17	26.2	60	32.6
Poor (<6/60)	36	30.3	11	16.9	47	25.5
Total	119	100.0	65	100.0	184	99.9

Table 25: Post-operative visual outcome (PinVA), count by eyes (CAT10)

Outcome (PinVA)	Female		Male		Total	
	n	%	*n*	%	*n*	%
Good (6/12)	51	42.9	40	61.5	91	49.5
Borderline (<6/12 to 6/60)	35	29.4	15	23.1	50	27.2
Poor (<6/60)	33	27.7	10	15.4	43	23.4
Total	119	100.0	65	100.0	184	100.1

Where there is a higher proportion of good outcomes with PinVA compared to PVA, consider the availability of post-operative refraction services for cataract patients. Correction of residual distance refractive error may improve post-operative outcomes in the population.

Outcomes by place of surgery

Table 26: Post-operative visual outcomes (PVA) in male eyes by place of surgery (CAT11)

Post-surgical VA	Gov. Hosp.		Vol. Hosp.		Priv. Hosp.		Camp Improv.		Trad.	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Good (6/12)	27	61.4	0	0.0	4	66.7	6	40.0	0	0.0
Borderline (<6/12 to 6/60)	10	22.7	0	0.0	1	16.7	6	40.0	0	0.0
Poor (<6/60)	7	15.9	0	0.0	1	16.7	3	20.0	0	0.0
Total	44	100.0	0	0.0	6	100.1	15	100.0	0	0.0

Table 27: Post-operative visual outcomes (PVA) in female eyes by place of surgery (CAT12)

Post-surgical VA	Gov. Hosp.		Vol. Hosp.		Priv. Hosp.		Camp Improv.		Trad.	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Good (6/12)	33	37.9	1	33.3	1	33.3	5	19.2	0	0.0
Borderline (<6/12 to 6/60)	23	26.4	1	33.3	1	33.3	18	69.2	0	0.0
Poor (<6/60)	31	35.6	1	33.3	1	33.3	3	11.5	0	0.0
Total	87	99.9	3	99.9	3	99.9	26	99.9	0	0.0

Variation in outcome by place of surgery allows for monitoring of quality across providers. Where providers are outliers, in terms of poor quality, steps to address this should be incorporated in service planning.

Gov. Hosp. = Government hospital

Vol. Hosp .= NGO hospital

Priv. Hosp. = Private hospital

Camp Improv. = Improvised surgical camp

Trad. = Traditional setting

Refractive error

In population-based surveys, refractive error is often defined by an improvement in visual acuity with correction to a specific VA threshold (rather than e.g., in dioptres of myopia). The definition of refractive error used in RAAB7 is UCVA worse than 6/12 improving to 6/12 with spectacle correction or pinhole. The prevalence of refractive error by age group and gender is shown in the table below.

Prevalence of distance refractive error

Table 28: Crude prevalence of distance refractive error by age group and gender (RE5)

Age group	**Female**			**Male**			**Total**		
Years	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*	*n*	*%*	*95% CI*
50-59	0	0.0	0.0 - 0.0	0	0.0	0.0 - 0.0	0	0.0	0.0 - 0.0
60-69	0	0.0	0.0 - 0.0	1	0.2	0.0 - 0.5	1	0.1	0.0 - 0.2
70-79	0	0.0	0.0 - 0.0	0	0.0	0.0 - 0.0	0	0.0	0.0 - 0.0
80+	0	0.0	0.0 - 0.0	2	1.2	0.0 - 3.7	2	0.5	0.0 - 1.4
Total	0	0.0	0.0 - 0.0	3	0.2	0.0 - 0.6	3	0.1	0.0 - 0.2

This definition of refractive error prevalence includes people with corrected refractive error–who will have an ongoing need for refractive error services–as well as people without correction who are yet to access services.

Note: In contrast to cataract, which predominantly affects the population 50 years and older, refractive error presents across the life course. RAAB does not provide information on the prevalence of refractive error in the population under 50 years of age.

Spectacle use

Table 29: Distance and near vision spectacle use among study participants (RE3)

	Female		**Male**		**Total**	
	n	*%*	*n*	*%*	*n*	*%*
Distance vision spectacles	73	2.9	50	3.2	123	3.0
<2 years	0	0.0	1	2.0	1	0.8
2-5 years	0	0.0	0	0.0	0	0.0
>5 years	0	0.0	2	4.0	2	1.6
Near vision spectacles	131	5.2	92	6.0	223	5.5

This table reports the sample (crude) prevalence of distance and near spectacle use by gender. The categories of distance and near use are not mutually exclusive, i.e., some participants will use both. Distance spectacle ownership is disaggregated by length of time (in years) since the current spectacles were acquired.

Note: Not all participants with spectacles will have a need for correction according to the standard definition in the effective refractive error correction calculation, i.e., some will have 6/12 uncorrected VA.

Distance effective refractive error coverage

Table 30: Adjusted distance effective refractive error coverage and refractive error coverage (RE4)

	Female		Male		Total		Quality gap
	Adj. %	*95% CI*	*Adj. %*	*95% CI*	*Adj. %*	*95% CI*	*%*
Distance eREC	NaN	NaN - NaN	100.0	100.0 - 100.0	100.0	100.0 - 100.0	
Distance REC	NaN	NaN - NaN	100.0	100.0 - 100.0	100.0	100.0 - 100.0	0.0

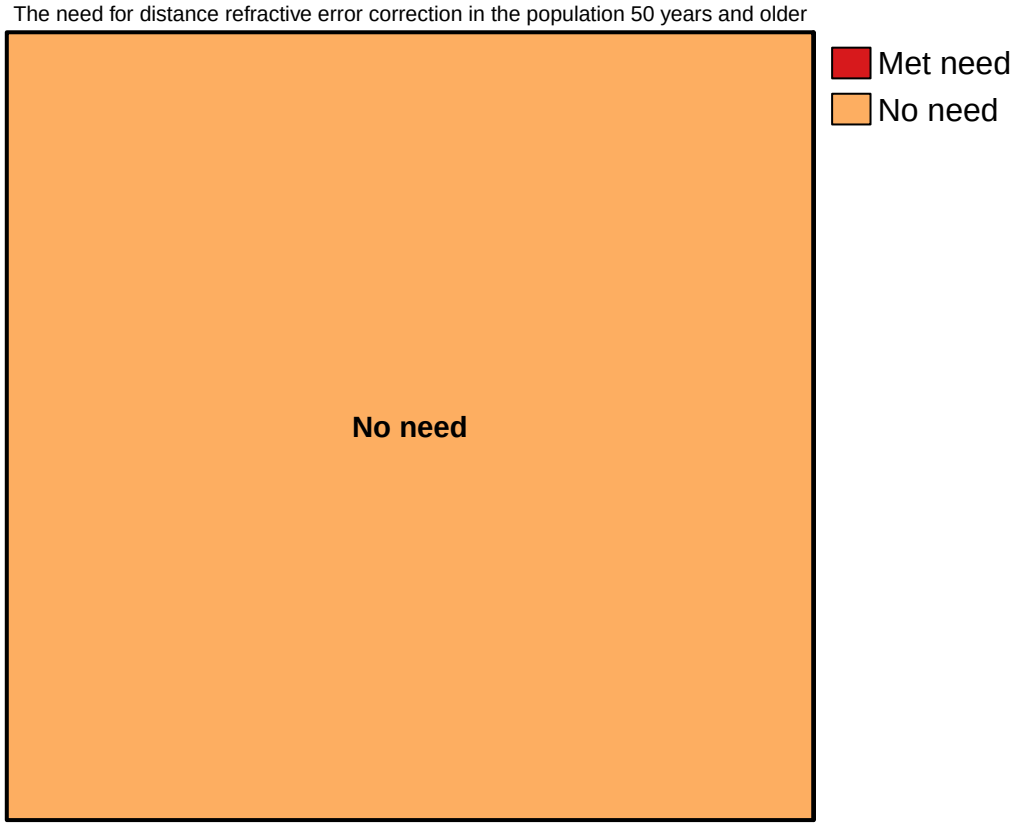
* eREC: Effective Refractive Error Coverage; REC: Refractive Error Coverage

Effective refractive error coverage (eREC) for distance vision measures the number of people in a population in need of distance optical correction who have received correction and had a good outcome (ie, can see at least 6/12 corrected) as a proportion of all people in need of distance optical correction who have accessed correction or still require it. Therefore, eREC describes service access (ie, refractive error coverage, [REC]) adjusted for quality. See notes section for more details.

Need for distance refractive error correction

Table 31: Adjusted prevalence of met need, undermet need, unmet need and no need for distance refractive error correction by gender (RE6)

	Female			Male			Total		
	Adj. %	*95% CI*	*Extrap. magnitude*	*Adj. %*	*95% CI*	*Extrap. magnitude*	*Adj. %*	*95% CI*	*Extrap. magnitude*
Met need	0.0	0.0 - 0.0	0	0.2	0.0 - 0.6	81	0.1	0.0 - 0.2	81
Undermet need	0.0	0.0 - 0.0	0	0.0	0.0 - 0.4	0	0.0	0.0 - 0.1	0
Unmet need	0.0	0.0 - 0.0	0	0.0	0.0 - 0.4	0	0.0	0.0 - 0.1	0
No need	100.0	78.6 - 100.0	63745	99.8	77.7 - 100.0	41732	99.9	78.8 - 100.0	105477



Note: The need for distance refractive error correction in the population under 50 years of age is not addressed here. Estimates for this group should be derived from elsewhere to support service planning.

Near effective refractive error coverage

Table 32: Adjusted near refractive error coverage and effective refractive error coverage (RE7)

	Female		Male		Total		Quality gap
	Adj. %	*95% CI*	*Adj. %*	*95% CI*	*Adj. %*	*95% CI*	*%*
Near eREC	100.0	100.0 - 100.0	24.3	6.6 - 42.1	40.3	21.1 - 59.5	
Near REC	100.0	100.0 - 100.0	62.2	53.3 - 71.0	70.1	60.5 - 79.7	42.6

* eREC: Effective Refractive Error Coverage; REC: Refractive Error Coverage

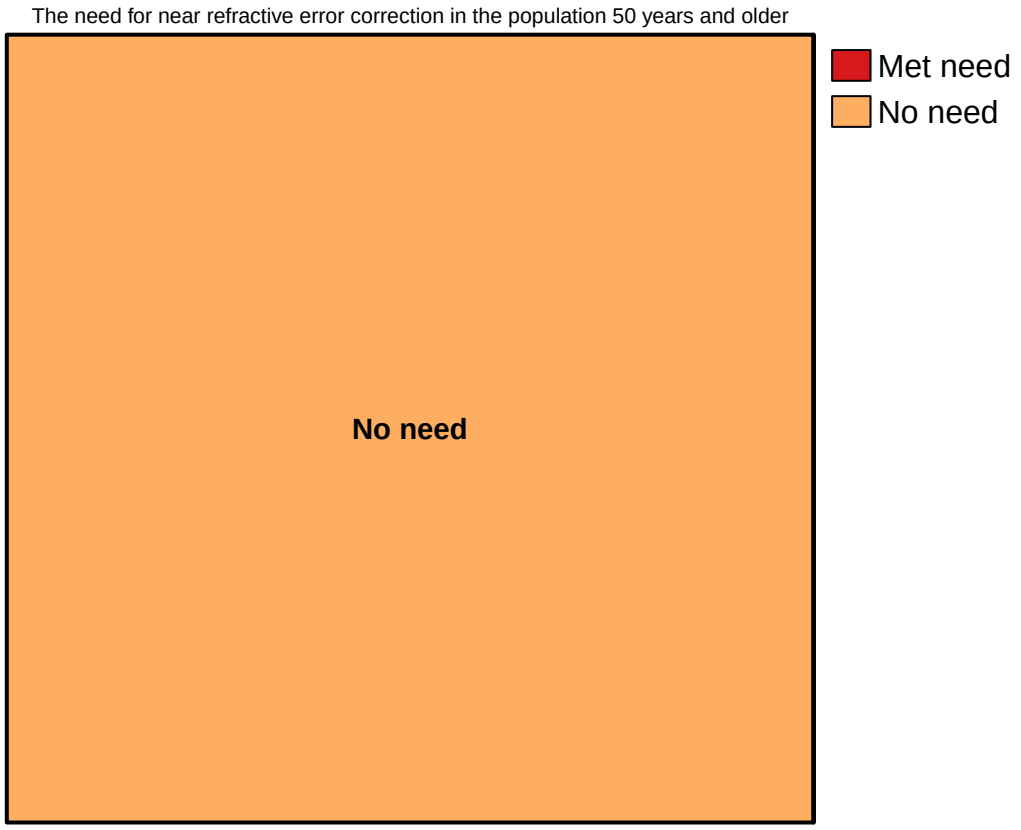
eREC for near vision measures the number of people in a population in need of near optical correction who have received correction and had a good outcome (ie, can see at least N6 at 40cm corrected) as a proportion of all people in need of near optical correction who have accessed correction or still require it.

Note: Undermet need and unmet need for near vision correction is calculated only among people with presenting or pinhole VA of 6/12 to exclude those with reduced near vision due to other non-refractive error causes, eg, cataract or glaucoma.

Need for near refractive error correction

Table 33: Adjusted prevalence of met need, undermet need, unmet need and no need for near refractive error correction by gender (RE8)

	Female			Male			Total		
	Adj. %	*95% CI*	*Extrap. magnitude*	*Adj. %*	*95% CI*	*Extrap. magnitude*	*Adj. %*	*95% CI*	*Extrap. magnitude*
Met need	0.0	0.0 - 0.0	0	0.2	0.0 - 0.6	81	0.1	0.0 - 0.2	81
Undermet need	0.0	0.0 - 0.0	0	0.0	0.0 - 0.4	0	0.0	0.0 - 0.1	0
Unmet need	0.0	0.0 - 0.0	0	0.0	0.0 - 0.4	0	0.0	0.0 - 0.1	0
No need	100.0	78.6 - 100.0	63745	99.8	77.7 - 100.0	41732	99.9	78.8 - 100.0	105477



Note: The majority of the population need for near refractive error correction will be represented by the RAAB population 50 years and older. Some additional need in the age group 40-49 will not be accounted for in these estimates.

Notes

Abbreviations

CI = Confidence interval

CNS = Central nervous system

CSC = Cataract surgical coverage

eCSC = Effective cataract surgical coverage

eREC = Effective refractive error coverage

NGO = Nongovernmental organisation

PinVA = Pinhole visual acuity

PVA = Presenting visual acuity

REC = Refractive error coverage

VI = Vision impairment

Snellen to logMAR conversion

Historic RAAB survey data variables have been updated to align with RAAB7 variable names and levels. RAAB7 records visual acuity in logMAR notation (or a code number representing light perception)

0.3 = Can see 6/12

0.47 = Cannot see 6/12 but can see 6/18

1.0 = Cannot see 6/18 but can see 6/60

1.3 = Cannot see 6/60 but can see 3/60

1.8 = Cannot see 3/60 but can see 1/60

3 = Light perception

4 = No light perception

Bilateral VI

Blindness: PVA less than 3/60 in the better eye

Severe VI: PVA less than 6/60 to 3/60 in the better eye

Moderate VI: PVA less than 6/18 to 6/60 in the better eye

Mild VI: PVA less than 6/12 to 6/18 in the better eye

Unilateral VI

Blindness: PVA less than 3/60 in one eye, PVA 6/12 in the other eye

Severe VI: PVA less than 6/60 to 3/60 in one eye, PVA 6/12 in the other eye

Moderate VI: PVA less than 6/18 to 6/60 in one eye, PVA 6/12 in the other eye

Mild VI: PVA less than 6/12 to 6/18 in one eye, PVA 6/12 in the other eye

Cataract surgical coverage (CSC) and effective cataract surgical coverage (eCSC)

eCSC and CSC are calculated at the person level, not by eyes, and calculated at various cataract surgical thresholds.

CSC is defined as (X + Y) / (X + Y + Z)

eCSC is defined as (A + B) / (X + Y + Z)

where, e.g., at the <6/12 cataract surgical threshold:

A = individuals with unilateral operated cataract attaining 6/12 or better post-operative presenting VA in the operated eye, who have BCVA <6/12 in the other eye

B = individuals with bilateral operated cataract attaining 6/12 or better post-operative presenting VA in at least one eye

X = individuals with unilateral operated cataract (regardless of visual acuity in the operated eye) and BCVA <6/12 in the other eye

Y = individuals with bilateral operated cataract (regardless of visual acuity in the operated eyes)

Z = individuals with BCVA <6/12 in both eyes with cataract as the main cause of vision impairment in one or both eyes

Cataract surgical threshold (operable cataract): PinVA at <3/60, <6/60, <6/18 and <6/12 thresholds plus lens opacity plus untreated cataract as principal cause

Operated cataract: Aphakia (excluding couched eyes) or pseudoaphakia (with or without posterior capsule opacification [PCO]) or no view of lens but cataract surgical complications as cause of vision impairment

Post-operative PVA of 6/12 or better is considered a good outcome at all surgical thresholds reported

For more information see: McCormick, I, Butcher, R, Evans, JR et al. Effective cataract surgical coverage in adults aged 50 years and older: estimates from population-based surveys in 55 countries. Lancet Global Health. 2022. https://doi.org/10.1016/S2214-109X(22)00419-3

Cataract surgical outcomes

Operated eyes: Aphakia or pseudophakia (with or without posterior capsule opacification [PCO]) or no view of lens but cataract surgical complications as cause of vision impairment

Note that couched eyes are excluded from tables reporting on CSC/eCSC (Tables 14-19) but are included in the 'Surgical outcomes' tables (Tables 21-25)

Refractive error coverage (REC) and effective refractive error coverage (eREC)

REC is defined as (A + B) / (A + B + C)

eREC is defined as (A) / (A + B + C)

where:

A = Individuals who present with spectacles or contact lenses for distance and whose UCVA is <6/12 in the better eye and CVA is 6/12 in the better eye (Met Need)

B = Individuals who present with spectacles or contact lenses for distance and whose UCVA is <6/12 in the better eye and whose CVA is <6/12 in the better eye, but who improve to 6/12 on PinVA (Undermet Need)

C = Individuals who present without spectacles and whose UCVA is <6/12 in the better eye and whose PinVA is 6/12 in the better eye (Unmet Need)

Note: This is the 'gold-standard' eREC calculation described here: McCormick I, Mactaggart I, Bastawrous A, Burton MJ, Ramke J. Effective refractive error coverage: an eye health indicator to measure progress towards universal health coverage. Ophthalmic Physiol Opt. 2020;40(1):1-5. https://doi:10.1111/opo.12662

95% Confidence Interval

The 95% confidence intervals are based on standard errors calculated for the clustering of the sample and the variability between clusters, specifically using the formula provided by:

Bennett S, Woods T, Liyanage WM, Smith DL. A simplified general method for cluster-sample surveys of health in developing countries. World Health Stat Q. 1991;44(3):98-106.