# Cataract surgery

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## Description of condition and intervention

Cataract is the most common cause of blindness and vision impairment (VI) globally. Can be occurred due to opaque or clouding of eye lens and ageing. In addition, the risk factors like smoking, alcohol, diabetes mellitus, nutrition, drugs, and ultraviolet radiation can also cause cataract. Blurry vision, unable to see at night, double vision, and colors that seem faded are some of the common symptoms. This problem of blindness can affect the individual quality of life, lead to independency, social activity, and productivity loss. The burden of this disease was higher in adults and older age groups, it has about 97 million prevalence and 6.7 million disability-adjusted life years (DALYs) per 100,000 population among adults 40 years and older, Whereas 45.43 DALYs in high income countries (HICs), 123.54 in low-middle income countries (LMICs) and 47.04 in Sub-Saharan Africa (SSA) in 2019 ((GBD), 2019). It is estimated that 13.5 million individuals were blind and 78.8 million individuals with vision impaired in 2020 (Hashemi, 2020) (Collaborators., 2020).

Surgery is the most common and cost-effective method of treatment for this cause of blindness through removing the affected cloudy natural lens and replacing it by artificial plastic intraocular lens (IOL). The Evidence based guidelines for cataract surgery based on data in European registry of quality outcomes includes the following steps, preoperative and intra operative data (i.e first- or second-eye surgery); outpatient or inpatient surgery; demographic data; preoperative examination (visual acuity, refraction); ocular comorbidity; difficult surgery (complex surgery); type of anesthesia; type of surgery; type of intraocular lens (IOL) material;

premium IOLs; surgical complications; visual outcome; refractive outcome; and postoperative complications. This guideline contents are the same with National institute for health and care excellence (NICE) guidelines in managing cataracts in adults 18 years and over which base the WHO safe surgery checklists. The steps are listed as follows; 1. Patient information, 2. Referral for cataract surgery, 3. Preoperative assessment and biometry, 4. Intraocular lens selection, 5. Preventing wrong lens implant errors, 6. Surgical timing and technique, 7. Anesthesia, 8. Preventing and managing complications, and 9. Postoperative assessment.

## International guidelines

| Organization | Indications/recommendations | Applicability in LIC & Lower MIC settings |
|---|---|---|
| EUREQUO | Evidence-based guidelines for cataract surgery (EUREQUO) | **yes** |
| NICE | NICE Cataract Surgery Guidelines | **yes** |

*Source1:* EUREQUO,NICE

*Source 2:* https://www.nice.org.uk/guidance/ng77

# Intervention attributes

## Type of interventions
Curative

## Delivery platform
This intervention is delivered at referral and specialty hospital.

## Equity
In addition to considerations like cost-effectiveness and health systems factors, dimensions of equity can be relevant for priority setting. The opportunity for a long and healthy life varies according to the severity of a health condition that individuals might have, so there are inequities in individuals' opportunities for long and healthy lives based on the health conditions they face. Metrics used to estimate the severity of illness at an individual level can be used to help prioritize those with less opportunity for lifetime health. FairChoices: DCP Analytics Tool uses Health adjusted age of death (HAAD), which is a metric that estimates the number of years lived from birth to death, discounting years lived with disability. A high HAAD

thus represents a disease less severe in terms of lifetime health loss, while a low HAAD represents a disease that is severe on average, causing early death or a long period of severe disability. It is also possible to estimate the distribution of HAAD across individuals with a health condition. FairChoices shows for each intervention an average HAAD value of the conditions that are affected by respective interventions that have health effects. Additionally, a plot shows HAAD values for around 290 conditions (Johansson KA et al 2020).

## Time dependence

Low level of urgency. Treatment outcomes not highly affected by some days of delay.

## Population in need of interventions

Treated population: Individuals with cataract (prevalent cases) in the age-group of 40 to 99 years, both genders. The treated fraction is assumed as 100%.

Affected population: The affected population are the individuals with cataract (prevalent cases) in the age-group 40 to 99 years, both genders. The affected fraction is 100%, considering all the cases with cataract.

## Disease state/s addressed

This intervention targets to treat cataract in the target population.

# Intervention effectiveness and safety

*Table 1: Effectiveness and safety of cataract surgery*

| What happens? | No intervention | With intervention | Certainty of evidence | Transferability of evidence |
|---|---|---|---|---|
| Disability | | In a CEA of cataract surgery by Baltussen 2004, complications subsequent to surgery were assumed to reduce effectiveness by 5%. Effectiveness rate was computed as surgical effectiveness × (1-Complications) × Patient compliance. | Low | |

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# Model assumptions

*Table 2: Summary of model parameters and values used in FairChoices – DCP Analytical Tool*

| Category | Model parameter | Notes |
|---|---|---|
| **Intervention** | **Cataract surgery** | |
| **Cost calculation** | | |
| Treated population | Adults with condition | Prevalence of cataract from GBD 2019 used to model this population |
| Gender | Both | |
| Age | 40 to 99 years | |
| Treated fraction | 1 | |
| **Effect calculation** | | |
| Affected Population | Adults with condition | Prevalence of cataract from GBD 2019 used to model this population |
| Affected gender | Both | |
| Affected fraction age | 40 to 99 years | |
| Affected fraction | 1 | |
| Comparison | No intervention | |
| Disability Reduction (RRR) | 0.90 | In a CEA of cataract surgery by Baltussen 2004, complications subsequent to surgery were assumed to reduce effectiveness by 5%. Effectiveness rate was computed as surgical effectiveness × (1-Complications) × Patient compliance. |

# Intervention Cost

The total unit cost is estimated to be USD 89.5 (Year: 2012). The unit cost for cataract surgery was based on the mean unit cost per surgical procedure in low-income countries (2012 US$). The unit cost was adjusted using a service delivery platform multiplier of 0.5 (Verguet et al 2015).

The total unit cost is estimated to be $33.18 (Year: 2020) per surgery procedure per person in Ethiopia. The overhead total unit cost (including laundry, cleaning, and security) is estimated to be $1.12 per surgery procedure per person in 2020.

EVIDENCE BRIEF

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# References

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# Appendix

## Literature Review for effectiveness & safety

This literature search is an example of Level 1 search for intervention inputs taken from DCP3 or generated in an ad hoc manner (e.g., quick google search found one study of cervical cancer screening cost-effectiveness that was used to create an effectiveness parameter for that intervention).

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Level of evidence of efficacy studies:

1. low (expert opinions, case series, reports, low-quality case control studies)

2. moderate (high quality case control studies, low quality cohort studies)

3. high (high quality cohort studies, individual RCTs)

4. very high (multiple RCTs, meta-analysis, systematic review, clinical practice guidelines)