Rheumatic heart disease, cardiac surgery

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Description of condition and intervention

Rheumatic heart disease is the most commonly acquired heart disease in children and young people. One or several episodes of rheumatic fever, an autoimmune inflammatory reaction to throat infection with group A streptococci (streptococcal pharyngitis or strep throat) can cause damage to the heart and give rheumatic heart disease. Most often the heart valves are affected. It can lead to death or life-long disability. There is no cure for rheumatic heart disease and the damage to the heart valves are permanent. Patients with severe rheumatic heart disease will often require surgery to replace or repair the damaged valve or valves (WHO (accessed January 2021)).

In this evidence brief, we present the effect and cost of the following intervention being analysed in FairChoices: DCP Analytical tool:

Rheumatic heart disease, cardiac surgery

International guidelines

Organization	Duration of treatment for rheumatic fever or rheumatic heart disease
American Heart Association (2009)	- Australian Guidelines - Fiji Guidelines - New Zealand Guidelines - Indian Guidelines - WHO Technical Report

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Intervention attributes

Type of interventions
Chronic management care

Delivery Platform of intervention
Referral and speciality 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
High level of urgency and treatment outcomes will not be highly affected by some days of delay.

Population in need of intervention
Children, adolescents, and young adults (age 5-39 years) prevalent cases with rheumatic fever and/or rheumatic heart disease are the treated population, and may need intervention. The treated fraction is 0.05. The affected fraction and population are same as treated fraction and population.

Intervention effect and safety

Table 1: Effect and safety of cardiac surgery for RHD

Effect of intervention		Certainty of evidence1
Mortality – due to heart failure or carditis	0.85 reduction (MM Coates et al 2021)	See appendix

Model Assumptions

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

Category	Model parameter	Notes
Intervention	Cardiac surgery, RHD	
Cost parameters		
Treated population Prevalence of RHD from Global Burden of Disease Study 2019		
Gender	Both male & female	
Age	5 to 59 years	
Treated fraction	0.05	
Effect parameters		
Affected population		
Affected gender	Both male & female	
Affected fraction age	5 to 59 years	
Affected fraction	0.05	Those with condition
Comparator	No care	
Mortality Reduction	0.85	MM Coates et al 2021

Intervention cost

The cost per case treated case is estimated to be USD 11000, 2019, Kenya (Coates M et al 2021).

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References

WHO 2021

Johansson KA et al 2020: Johansson KA, Coates MM, Økland JM, Tsuchiya A, Bukhman G, Norheim OF, Haaland Ø. Health by disease categories. Distributional Cost-Effectiveness Analysis: Quantifying Health Equity Impacts and Trade-Offs. 2020 Sep 30:105.

Coates MM, Sliwa K, Watkins DA, Zühlke L, Perel P, Berteletti F, Eiselé JL, Klassen SL, Kwan GF, Mocumbi AO, Prabhakaran D, Habtemariam MK, Bukhman G. An investment case for the prevention and management of rheumatic heart disease in the African Union 2021-30: a modelling study. Lancet Glob Health. 2021 Jul;9(7):e957-e966. doi: 10.1016/S2214-109X(21)00199-6. Epub 2021 May 10. PMID: 33984296.

Appendix

Literature Review for effect & safety
This literature search is an example of Level 2 systematic search for intervention inputs taken.

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)