Preventive chemotherapy for soil-transmitted helminthiasis

Authors: Kaur G, Ahmed S, Watkins D, Coates MM, Økland JM, Haaland ØA, Johansson KA

Date: 2021-08-13,2021-12-02

Description of condition and intervention

Soil-transmitted helminthiasis infections are one of the commonest infections globally, caused by the roundworm (Ascaris lumbricoides), the whipworm (Trichuris trichiura) and the hookworms (Necator americanus and Ancylostoma duodenale). These infect affect the poorest and marginalized communities most. Poor sanitation conditions also accelerate spread of this infection. Albendazole (400 mg) and Mebendazole (500 mg) are the WHO recommended medicines for treatment and can be administered by non-medical personnel like teachers.

International guidelines

Organization	Indications/recommendations
	Soil-transmitted helminthiasis

Intervention attributes

Type of interventions

Curative

Delivery platform

This intervention may be delivered at the community level.

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

Moderate level of urgency. Treatment outcomes may be affected by some days of delay.

Population in need of interventions

Treated population: All individuals (prevalent cases) of soil-transmitted helminthiasis either due to Ascariasis or Hookworm disease in the age group of 0 to 99 years and gender are eligible to receive the intervention. The treated fraction is assumed to 100% for this intervention.

Affected population: The affected population includes those with the soil-transmitted helminthiasis in the age-group of 0 to 99 years, both genders. The affected fraction by this intervention is assumed to be 100%.

Disease states addressed

This intervention targets soil-transmitted helminthiasis due to Ascariasis and Hoookworm disease.

Intervention effect and safety

Table 1: Effect and safety of preventive chemotherapy of soil-transmitted helminthiasis

Effect of interventions		Certainty of evidence
Prevalence	0.39 (relative risk reduction) with the intervention (assumed)	See appendix

Model assumptions

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

Category	**Model parameter**		**Notes**
Intervention	**Preventive chemotherapy for soil-transmitted helminthiasis**		Primary disease state addressed are Ascariasis & Hookworm disease
	Ascariasis	**Hookworm disease**	
Cost calculation			
Treated population	Based on prevalence of Ascariasis	Based on prevalence of Hookworm disease	Global Burden of disease study 2019
Gender	Both	Both	
Age	0 to 99 years	0 to 99 years	
Treated fraction	1	1	
Effect calculation			
Affected Population	Those with condition	Those with condition	
Affected gender	Both	Both	
Affected fraction age	0 to 99 years	0 to 99 years	
Affected fraction	1	1	
Comparison	placebo or other care	placebo or other care	
Prevalence Reduction (RRR)	0.39	0.39	

Intervention Cost

The total unit cost for providing preventive chemotherapy for soil transmitted helminthiasis (STH) caused by Ascariasis and Hookworm disease per person is estimated to be USD 1.71 per person-year in specified population in year 2014 (Lo NC et al. 2015). The cost is calculated based on STH treatment by Albendazole via a school-based delivery system in Cote d'Ivoire.

References

WHO 2021: World Health Organization. Health topics-Schistosomiasis. Available at https://www.who.int/health-topics/soil-transmitted-helminthiases#tab=tab_1(accessed 2 Dec 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.

Lo NC, Bogoch II, Blackburn BG, Raso G, N'Goran EK, Coulibaly JT, Becker SL, Abrams HB, Utzinger J, Andrews JR. Comparison of community-wide, integrated mass drug administration strategies for schistosomiasis and soil-transmitted helminthiasis: a cost-effectiveness modelling study. Lancet Glob Health. 2015 Oct;3(10):e629-38. doi: 10.1016/S2214-109X(15)00047-9. PMID: 26385302.

Appendix

Literature Review for effectiveness & safety

This literature search is an example of a level 1 search of literature and guidelines for preventive chemotherapy for soil-transmitted helminthiasis.

Level 1: 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).

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)