Early detection and treatment of nationally important NTDs: Chagas disease

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

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Description of condition and intervention

Chagas disease or American trypanosomiasis, is a serious illness caused by protozoan parasite Trypanosoma cruzi. The main route of transmission to humans occurs via vector-borne transmission (the insect called triatomine bug). Acute phase of infection is generally mild. However, chronic phase of this disease is marked by development of cardiac disorders in 30% of those with infection while 20% may experience digestive, neurological or mixed disorders. Around 6 million to 7 million people are infected with Trypanosoma cruzi worldwide, primarily in Latin America (WHO 2021).

There are no vaccines available for Chagas disease but vector control is the most effective method of prevention. There are different approaches recommended by WHO prevention and control of Chagas disease which are as follows: (i) improvement and cleanliness of house to prevent vector infestation; (ii) Usage of bed nets, good hygiene practices in handling of good etc., are some of the personal prevention methods; (iii) spraying residual insecticides around dwellings and surrounding areas; (iv) Education, contextualized information and communication activities about preventive measures and surveillance tools; (v) blood donors screening; (vi) regular testing to be done of organ, tissue or cell donors and receivers; (vi) access to diagnosis and treatment of people with medical indication or recommendation to do antiparasitic treatment, especially children and women of child-bearing age before pregnancy; and (vii) new-born screening of infected mother (Source: WHO website). In this evidence brief, we present the effect and cost of the following intervention being analysed in FairChoices:DCP Analytical tool:

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Chagas disease

(DCP4 ID: NTD03-01)
Cluster: Neglected Tropical Diseases

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International guidelines

Organization	Indications/recommendations	Applicability in LIC & Lower MIC settings
World Health Organization 2018	Guidelines for the diagnosis and treatment of Chagas disease	Yes

Intervention attributes

Type of interventions
Curative

Delivery platform
This intervention is delivered at the first level 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. Treatment outcomes may be affected by some days of delay.

Population in need of interventions
Treated population: All individuals (prevalent cases) of Chagas disease in the age group of 0 to 99 years and gender are eligible to receive the intervention. The treated fraction is assumed to

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0.2 for this intervention. Acute cases are asymptomatic and mild. We assume 20% of all cases are chronic infection and need treatment.

Affected population: The affected population includes those with the Chagas disease in the age-group of 0 to 99 years, both genders. The affected fraction by this intervention is assumed to be 0.2.

Disease states addressed

This intervention targets Chagas disease state.

Intervention effect and safety

Table 1: Effect and safety of early detection and treatment of Chagas disease

Effect of intervention		Certainty of evidence
Mortality (due to condition)	Sustained parasitological clearance of 79% at 12 months of follow up in patients treated with benznidazole or with combination as compared to placebo (Torrico F et al 2021).We consider this estimate as a proxy for mortality reduction with the institution of treatment.	See appendix

Model assumptions

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

Category	Model parameter	Notes
Intervention	**Early detect and treat: Chagas disease**	
Cost calculation		
Treated population	Based on prevalence of Chagas disease	Global Burden of disease study 2019
Gender	Both	
Age	0 to 99 years	

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Treated fraction	0.2	
Effect calculation		
Affected Population	Those with condition	
Affected gender	Both	
Affected fraction age	0 to 99 years	
Affected fraction	0.2	
Comparison	placebo or other care	
Mortality Reduction (RRR)	0.79	

Intervention Cost

The cost for early detection and treatment of Chagas Disease (acute phase) is estimated to be 232 USD per patient per year in 2012 in Mexico (Ramsey JM et al 2014).

References

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Appendix

Literature Review for effectiveness & safety

This literature search is an example of a level 1 search of literature and guidelines for early detection and treatment of Chagas disease.

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)