Malaria treatment with ACT preceded by rapid diagnostic test

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Description of condition and intervention

In all malaria-endemic countries, diagnosis with rapid test (RDT) or microscopy (including speciation) followed by treatment with artemisinin-based combination therapy (ACT) or current first-line combination. This treatment can provide parasite-based diagnosis in places where microscope is not available. It is easy to use by health workers and gives the result in about 15 minutes, this helps the patient to begin the medication right away. RDT is very useful to identify the patients who really have the malaria infection and preventing unnecessary use of ACT on patients who do not have the disease. This evidence brief includes health interventions involving case-finding based on RDT and subsequent treatment with ACT in children stratified by age groups 0 to 4 years and 5 to 14 years; pregnant women and adults. In this evidence brief, we present the effect and cost of the following intervention being analysed in FairChoices:DCP Analytical tool:

Malaria treatment with ACT preceded by rapid diagnostic test

International guidelines

Organization	Indications/recommendations	Applicability in LIC & Lower MIC settings
World Health Organization 2021	WHO guidelines for the treatment of malaria	yes

Malaria treatment with ACT
Preceded by RDT
(DCP4 ID: MALR02)
Cluster: Malaria

FairChoices
DCP Analytic Tool

Intervention attributes

Type of interventions
Curative

Delivery platform
This intervention may be delivered through the community platform.

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 highly affected by some days of delay.

Population in need of interventions
Treated population: All incident cases of malaria irrespective of the age and gender receive the rapid diagnostic test intervention to determine the case load due to malaria. Incident cases of malaria in the age group 0 to 99 years receive the treatment with ACT. The treated fraction is assumed to be 0.62.

Affected population: The affected population is same as the above-mentioned treated population. However, health outcomes are considered in the affected population because of the treatment with ACT. The case finding for malaria involves primarily costs.

Disease states addressed

This intervention targets to prevent malaria in the population under consideration.

Intervention effect and safety

Table 1: Effect and safety of treatment with ACT for malaria

Effect of intervention		Certainty of evidence
Prevalence	A meta-analysis by Gebreyohannes EA et al 2017 reported treatment success of 98.1% (97.0-99.2) for Plasmodium falciparum malaria patients, treated with artemether-lumefantrine in Ethiopia. Pooled event rate of treatment failure with P. falciparum patients was 7.8% (95% CI: 2.1-13.6), but with AL treatment, failure was noted in 21/1497 patients (n/N). These outcomes were assessed at 28 days.	See appendix

Model assumptions

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

Category	**Model parameter**	**Notes**
Intervention	**Malaria treatment with ACT preceded by rapid diagnostic testing**	
Cost parameters		
Treated population	Incidence	Based on incident cases of Malaria from GBD study 2019
Gender	Both	
Age	0 to 99 years	
Treated fraction	7.15	
Effect parameters		
Affected Population	With condition	
Affected gender	Both	

Affected fraction age	0 to 99 years	
Affected fraction	1	
Comparison	No intervention	
Mortality Reduction (RRR)	0.98	

Intervention Cost

The total unit cost for malaria treatment with ACT preceded by rapid diagnostic testing is estimated to be USD 1.29 (Year: 2011).

References

Gebreyohannes EA et al 2017: Gebreyohannes EA, Bhagavathula AS, Seid MA, Tegegn HG. Anti-malarial treatment outcomes in Ethiopia: a systematic review and meta-analysis. Malar J. 2017 Jul 3;16(1):269. doi: 10.1186/s12936-017-1922-9. PMID: 28673348; PMCID: PMC5496337.

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.

Watkins DA, Qi J, Kawakatsu Y, Pickersgill SJ, Horton SE, Jamison DT. Resource requirements for essential universal health coverage: a modelling study based on findings from Disease Control Priorities, 3rd edition. Lancet Glob Health. 2020 Jun;8(6):e829-e839. doi: 10.1016/S2214-109X(20)30121-2. PMID: 32446348; PMCID: PMC7248571.

Appendix

Literature Review for effectiveness & safety

This literature search is an example of a structured, focused review of literature and guidelines. You can choose to do one of the following literature reviews for your Evidence Brief:

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, metaanalysis, systematic review, clinical practice guidelines).