Malaria Policy Advisory Group Meeting
4–5 March 2024, Yaoundé, Cameroon
Background document for Session 4

Guiding principles for prioritizing malaria interventions in resource-constrained country contexts to achieve maximum impact

In line with the goals of the *Global technical strategy for malaria 2016–2030 (1)* and with Sustainable Development Goal 3, to ensure healthy lives and promote well-being for all at all ages, the World Health Organization (WHO) Global Malaria Programme continues to promote the principle of leaving no one behind and to ensure access to effective malaria interventions for all those in need.

Due to the heterogeneous distribution of malaria transmission and its determinants, subnational tailoring (SNT) provides an analytical framework to facilitate the targeting of each population with appropriate intervention packages for maximum impact to inform national strategic planning and prioritization based on resources available. The WHO Global Malaria Programme recommends the use of subnational data on disease epidemiology and other relevant local contextual factors to facilitate the process of SNT. Once the strategies and intervention mixes have been defined, programmes can proceed to the prioritization of interventions for effective programming, based on available resources.

In response to ever increasing financial constraints, the WHO Global Malaria Programme and Regional Offices, in consultation with selected national malaria programme managers and technical partners,[1] have developed these guiding principles for prioritizing interventions in resource-constrained countries to achieve maximum impact for national malaria control programmes. Prioritization is the process of subnationally selecting the most impactful mixes of interventions for implementation and de-prioritizing others because of financial constraints, considering equity and programmatic feasibility. This process requires difficult choices to be made to minimize the negative impact of withholding some interventions included in the national strategic plan. It differs from optimization – the process during planning and implementation by which programmes ensure that the strategies and effective interventions deployed achieve the maximum impact with the most efficient use of available resources.

Prioritization must be guided by the basic principles of primary health care and universal health coverage: patient-centredness, community empowerment, self-determination, accessibility, acceptability, equity, quality, intersectoral collaboration, value and sustainability, accountability and transparency. It should be aligned with the broader national health prioritization processes and the development of health benefit packages, consistent with the principles of country ownership, cost-effectiveness, financial risk protection and political acceptability *(2)*.

The guiding principles for prioritizing (or de-prioritizing) can be applied to interventions targeting the same populations or different vulnerable groups at risk of malaria in the same or different geographical areas. For example, in a district that is eligible for seasonal malaria chemoprevention (SMC), case management and vector control should be prioritized over introducing or scaling up SMC. In addition, vector control could be de-prioritized in an area with low baseline transmission, and funds could be

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invested to support introduction of SMC in a different eligible area, because the net benefit (impact) would be higher with the limited resources available.

Prioritization decisions must be informed by a good understanding of the baseline (historical) transmission intensity and knowledge of the main determinants of current disease burden in a given area, as the current situation may reflect the impact of interventions already being deployed. The magnitude of change from the baseline that is likely due to the interventions will help to determine the level of risk of resurgence and, by extension, the potential impact of the decision to remove the interventions, particularly in areas where the underlying environmental and socioeconomic factors driving malaria remain the same. The baseline period is considered the time before preventive interventions were scaled up.

This document provides guiding principles for prioritizing high-impact interventions, in particular early diagnosis and treatment, insecticide-treated nets (ITNs), indoor residual spraying (IRS), malaria vaccines and chemoprevention options with specific focus on areas of moderate to high transmission[2], in situations where resources are limited. While several principles in this document may also apply to areas of low to very low transmission, specific guidance for prioritizing malaria interventions under resource constraints should be developed for these settings, as well as for countries nearing malaria elimination.

Prioritization of interventions

In the face of limited resources, the following principles should guide the prioritization of malaria interventions:

1. The primary objective is to prevent and minimize malaria-related deaths. This is assured by providing access to early diagnosis and effective treatment of all malaria cases, irrespective of the malaria transmission intensity. Providing prompt access to malaria diagnosis and treatment by maintaining existing services across all levels of the health care delivery system, including at community level, should be prioritized and guaranteed for all as a basic human right. Scaling back access to early diagnosis and treatment is not an option under any level of financial constraint. Surveillance of antimalarial drug resistance and histidine-rich protein 2 (HRP2) deletions is essential for selecting effective medicines and diagnostics for malaria case management.
2. Investments in improving epidemiological and entomological surveillance, and the quality and effectiveness of interventions should not be reduced as part of prioritization, as these are essential to inform the timely investments required to achieve impact. This includes resources to secure the coverage and competence of health workers to provide quality care, and social behaviour change communication to increase public awareness on care seeking and increase the acceptance and use of interventions. National malaria control programmes should always consider what needs to be prioritized from the malaria budget to ensure optimization of implementation, assuring timely and effective access to malaria interventions (e.g. procurement, training, supervision and surveillance) and the enabling health services components that depend on the national health development plan (e.g. staff salary, supply management and distribution, private sector engagement, institutionalization of community health workers).

[2] In this document, the following WHO definitions of levels of malaria transmission are used:
- high: > 450 cases per 1000 population per year or *Plasmodium falciparum* prevalence rate (PR) > 35%
- moderate: 250–450 cases per 1000 population per year or *P. falciparum/P. vivax* PR = 10–35%
- low: 100–250 cases per 1000 population per year or *P. falciparum/P. vivax* PR = 1–10%
- very low: < 100 cases per 1000 population per year or *P. falciparum/P. vivax* PR = > 0 and < 1%

3. Chemoprevention for pregnant women, i.e. intermittent preventive treatment, should be prioritized in the ante natal care service at health facility level , and scaling it back is not an option in the case of resource constraints.
4. Expansion of case management of acute febrile illnesses at the community level to reach the unreached should be prioritized in remote areas, in all transmission settings; it should be considered, as the expansion of community services is dependent on the primary health care system, the level of community engagement and the degree of institutionalization of community health workers. Similarly, new investments to improve malaria case management in the private sector should be part of the national private sector engagement strategy *(3)*.
5. Malaria vector control interventions recommended for large-scale deployment are: i) ITNs that are prequalified by WHO; and ii) IRS with a product prequalified by WHO *(4)*. The choice of which of these two interventions to deploy should be informed by contextual data, such as insecticide susceptibility, vector behaviour and intervention use, as well as relative cost-effectiveness. WHO does not recommend co-deployment of both IRS and ITNs.
6. The vector control strategy selects at subnational level the most effective interventions at a scale and frequency that optimizes impact. When funding is insufficient, trade-offs must be made between the choice of effective interventions and coverage targets, as more effective ITN or IRS products are often more expensive per unit compared to the existing pyrethroid-only nets. Surveillance of insecticide resistance is essential for selecting effective vector control interventions, and programmes should deploy products that contain active ingredients that are effective against their vector populations.
7. For countries or parts of countries where deployment of ITNs is considered to be the appropriate choice, the priority is to ensure access of pregnant women and children under 5 years of age through routine ITN distribution in all malaria risk areas.
8. If resources are constrained, all areas with very low current and historical malaria transmission (e.g. < 1% *P. falciparum* prevalence rate) can be excluded from ITN campaigns. This applies to most urban areas, with the exception of areas where *Anopheles stephensi* has been reported. In urban areas, other appropriate means of vector control, including larviciding, should be considered, based on micro-stratification *(5)*.
9. Decisions on ITN replacement in areas where vectors are resistant to pyrethroids should be guided by the following principles *(4)*:
    a. Pyrethroid-chlorfenapyr, pyrethroid-PBO and pyrethroid-pyriproxyfen should be prioritized over pyrethroid-only ITNs. Programs should consider targeting the pyrethroid-chlorfenapyr ITNs to areas with the highest transmission with the aim of maximizing impact. Pyrethroid-PBO ITNs, and potentially pyrethroid-pyripropxyfen ITNs could then be distributed elsewhere, e.g. areas of low and moderate transmission.
    b. Resistance status of malaria vectors, cost of ITNs, and durability of the ITNs should be monitored to inform future procurement decisions. Funding gaps that impede effective coverage with ITNs that control pyrethroid-resistant vectors should be identified and this information should be shared with potential funders. The situation should be reassessed on a regular basis as the market prices of ITNs evolve and price and availability have a major impact on programmatic coverage.
10. At current prices, IRS is relatively more expensive than ITNs per population at risk protected. Under resource-constrained conditions, scaling up IRS should not be considered. IRS should be maintained in countries that are prone to epidemics, as part of preparedness and response. For areas with stable transmission, countries need to carefully consider the resource implications of sustaining IRS instead of transitioning to ITNs. If countries are unable to

maintain their IRS campaigns at the right times with effective coverage, in areas of pyrethroid resistance, it may be advisable to switch to pyrethroid-chlorfenapyr, pyrethroid-PBO or pyrethroid-pyriproxyfen ITNs and invest in social and behaviour change communication to ensure the effective use of ITNs.

11. When changes are made in vector control strategies that lead to decreased/suboptimal intervention coverage of either IRS or ITNs, or when a vector control intervention such as IRS is withdrawn, establishment of strong surveillance and response capacity should be prioritized to mitigate a potential malaria increase.
12. WHO recommends the RTS,S/AS01 and R21-Matrix M malaria vaccines for the prevention of *P. falciparum* malaria in children living in malaria-endemic areas, prioritizing areas of moderate to high transmission. Decisions on expansion to low transmission settings should be considered at country level, based on the overall malaria control strategy, affordability, cost-effectiveness and programmatic considerations, such as whether it would simplify delivery to include such areas. At country level, vaccine introduction is led by the national immunization programme with technical support of partners; the vaccine should be considered complementary to other malaria control interventions and part of a lifesaving multi-intervention approach to prevent malaria. R21-Matrix M has been prequalified by WHO and it is expected that with two malaria vaccines available, supply will be sufficient to meet demand. During the period of constrained supply of RTS,S/AS01, a framework was developed and endorsed by WHO for prioritizing the allocation of limited malaria vaccine doses *(6)*.
13. There is no evidence to inform when to scale back SMC and countries should do their utmost to maintain the intervention. However, if resources are not available, scale-down should be based on the principle of "least harm", de-prioritizing areas where incidence was lowest at the pre-SMC baseline. Deployment of effective ITNs, expansion of case management, and better epidemiological and entomological surveillance, preparedness and response should be prioritized in these areas.
14. New chemoprevention strategies should not be prioritized over and above case management and vector control in any given population. Geographical or age expansion of SMC, community deployment of intermittent preventive treatment of malaria in pregnancy, perennial malaria chemoprevention, post-discharge malaria chemoprevention and intermittent preventive treatment of malaria in school-aged children should not be implemented at scale if resources to ensure access to case management and coverage of effective vector control are limited.

These guiding principles provide a framework for country decision-making to define the most appropriate mix of malaria interventions for specific geographical areas or risk groups when resources are constrained. This process should be complemented at national level by a budget optimization analysis to estimate the health impact of the different scenarios under consideration.

Prioritization is an iterative process, and it will need to be continuously revised as costs and funding opportunities change over time; as malaria epidemiology changes due to various factors, including man-made and natural disasters; when surveillance does not show the expected impact; when assessment of programme performance shows changing requirements to ensure the effectiveness of interventions; when new tools and knowledge become available; or as new threats emerge. Accordingly, the WHO Global Malaria Programme will ensure that these guiding principles are reviewed on an annual basis, as required, to maintain their accuracy and to support malaria programmes in their decision-making processes.

Mobilizing additional resources is a continuous effort that should be pursued during and after the prioritization planning, based on the evidence-informed national strategic plan. In addition to planning operations based on existing/known resources, national programmes are encouraged to conduct further analyses to identify priority interventions that could be funded should additional resources

become available. Such scenario planning will provide the basis to support resource mobilization efforts, including for domestic resources.

References

1. Global technical strategy for malaria 2016–2030, 2021 update. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/342995, accessed 11 February 2024).

2. Principles of health benefit packages. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/340723, accessed 11 February 2024).

3. Towards better engagement of the private sector in health service delivery: a review of approaches to private sector engagement in Africa. Geneva: World Health Organization; 2022 (https://iris.who.int/handle/10665/352905, accessed 11 February 2024).

4. WHO guidelines for malaria, 16 October 2023. Geneva: World Health Organization; 2023 (https://iris.who.int/handle/10665/373339, accessed 11 February 2024).

5. Global framework for the response to malaria in urban areas. Geneva: World Health Organization; 2022 (https://iris.who.int/handle/10665/363899, accessed 11 February 2024).

6. Framework for the allocation of limited malaria vaccine supply. Geneva: World Health Organization; 2022 (https://www.who.int/publications/m/item/framework-for-allocation-of-limited-malaria-vaccine-supply, accessed 11 February 2024).

Annex. Additional reading

ITN ownership and usage to achieve personal and community protection

Lines J, Chitnis N, Paintain L. How insecticide-treated nets (ITNs) work: the biological mechanisms by which ITNs give personal- and community-level protection against malaria, version v1. Zenodo. 2022. doi:10.5281/zenodo.6393253.

Interventions recommended for large-scale deployment: insecticide-treated nets. In: WHO guidelines for malaria, 16 October 2023. Geneva: World Health Organization; 2023:42–3 (https://www.who.int/teams/global-malaria-programme/guidelines-for-malaria , accessed 11 February 2024).

ITN requirements at population level

Insecticide-treated nets: practical info. In: WHO guidelines for malaria, 16 October 2023. Geneva: World Health Organization; 2023:62–3 (https://www.who.int/teams/global-malaria-programme/guidelines-for-malaria , accessed 11 February 2024).

ITN campaigns and continuous distribution

Koenker H, Yukich J, Erskine M, Opoku R, Sternberg E, Kilian A. How many mosquito nets are needed to maintain universal coverage: an update. Malar J. 2023;22(1):200. doi:10.1186/s12936-023-04609-z.

Insecticide-treated nets: practical info. In: WHO guidelines for malaria, 16 October 2023. Geneva: World Health Organization; 2023:62–3 (https://www.who.int/teams/global-malaria-programme/guidelines-for-malaria , accessed 11 February 2024).

Access to ITNs or IRS at optimal coverage levels

Co-deploying ITNs and IRS: practical info. In: WHO guidelines for malaria, 16 October 2023. Geneva: World Health Organization; 2023:75 (https://www.who.int/teams/global-malaria-programme/guidelines-for-malaria , accessed 11 February 2024).

No scale-back of vector control in areas with ongoing malaria transmission

No scale-back in areas with ongoing local malaria transmission: practical info. In: WHO guidelines for malaria, 16 October 2023. Geneva: World Health Organization; 2023:73 (https://www.who.int/teams/global-malaria-programme/guidelines-for-malaria , accessed 11 February 2024).

SMC distribution strategies

Seasonal malaria chemoprevention with sulfadoxine–pyrimethamine plus amodiaquine in children: a field guide, second edition. Geneva: World Health Organization; 2023 (https://iris.who.int/handle/10665/368123 , accessed 11 February 2024).