WHO Malaria Technical Updates

- *Malaria Prevention strategies*

Joint Annual Meetings of the SMC Alliance and the Alliance for Malaria Prevention

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World Health Organization

Key antimalarial interventions & strategies

Prevention

- Insecticide-treated mosquito nets
- Indoor Residual Spraying
- Larviciding

Preventive Chemotherapy

- IPT in pregnancy (IPTp)
- Perennial Malaria Chemoprevention
- Seasonal Malaria Chemoprevention
- IPT in School Children
- Post Discharge malaria chemoprevention
- Mass Drug Administration

Malaria vaccine

Diagnosis & Treatment

- Parasite based diagnosis
  - Microscopy
  - Rapid Diagnostic Tests
- Artemisinin-based combination therapies (ACTs)
- Severe Malaria
  - Artesunate

Case management service delivery areas::

- Health facilities
- Community Case Management
- Private sector

Surveillance, M & E

- Routine HMIS
- Malaria surveillance and response systems
- Household surveys
- Health Facility Surveys

Strengthening health systems in endemic countries

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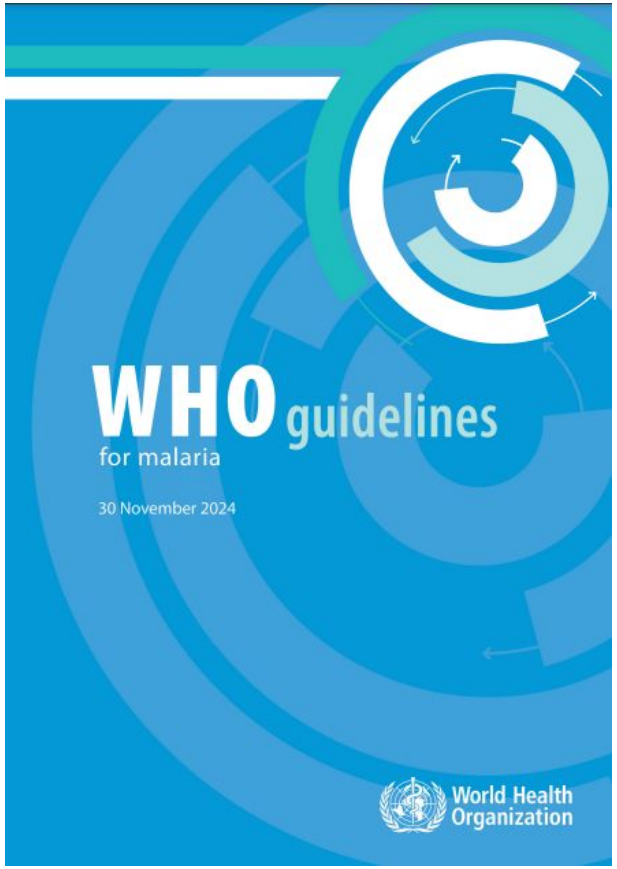
Main malaria prevention and treatment strategies



** Not developed following the WHO guidelines development process*

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Malaria Prevention

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Vector Control

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Interventions recommended for large-scale deployment

Strong recommendation for , High certainty evidence

Pyrethroid-only nets (2019)

Pyrethroid-only long-lasting insecticidal nets (LLINs) should be deployed for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission.

Conditional recommendation for , Moderate certainty evidence

Pyrethroid-PBO ITNs (2022)

Pyrethroid-PBO ITNs instead of pyrethroid-only LLINs can be deployed for the prevention and control of malaria in children and adults in areas with ongoing malaria transmission where the principal malaria vector(s) exhibit pyrethroid resistance.

Strong recommendation for , Moderate certainty evidence

Pyrethroid-chlorfenapyr ITNs vs pyrethroid-only LLINs (2023)

Pyrethroid-chlorfenapyr ITNs should be deployed instead of pyrethroid-only LLINs for prevention of malaria in adults and children in areas with pyrethroid resistance.

Interventions recommended for large-scale deployment

Conditional recommendation for , Moderate certainty evidence

Pyrethroid-chlorfenapyr ITNs vs pyrethroid-PBO ITNs (2023)

Pyrethroid-chlorfenapyr ITNs can be deployed instead of pyrethroid-PBO ITNs for prevention of malaria in adults and children in areas with pyrethroid resistance.

Conditional recommendation for , Moderate certainty evidence

Pyrethroid-pyriproxyfen ITNs vs pyrethroid-only LLINs (2023)

Pyrethroid-pyriproxyfen ITNs can be deployed instead of pyrethroid-only LLINs for prevention of malaria in adults and children in areas with pyrethroid resistance.

Conditional recommendation against , Moderate certainty evidence

Pyrethroid-pyriproxyfen ITNs vs pyrethroid-PBO ITNs (2023)

Pyrethroid-pyriproxyfen ITNs are not recommended for deployment over pyrethroid-PBO ITNs for prevention of malaria in adults and children in areas with pyrethroid resistance.

Interventions recommended for large-scale deployment

Strong recommendation for , Very low certainty evidence Updated

Indoor residual spraying (2025)

IRS should be deployed for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission.

IRS is considered to be an appropriate intervention where:

- the majority of the vector population feeds and rests indoors;
- people mainly sleep indoors at night;
- the malaria transmission pattern is such that the population can be protected by one or two rounds of IRS per year; and
- the majority of structures are suitable for spraying.

Deploying ITNs and IRS

Conditional recommendation for , Moderate certainty evidence

Prioritize optimal coverage with either ITNs or IRS over combination (2019)

The co-deployment of ITNs and IRS is not recommended for prevention and control of malaria in children and adults in areas with ongoing malaria transmission. Priority should be given to delivering either ITNs or IRS at optimal coverage and to a high standard, rather than introducing the second intervention as a means to compensate for deficiencies in the implementation of the first intervention.

Practice Statement

Access to ITNs or IRS at optimal coverage levels (2019)

Access to effective vector control using ITNs or IRS at optimal coverage levels should be ensured for all populations at risk of malaria in most epidemiological and ecological settings.

No scale-back in areas with ongoing local malaria transmission (2019)

In areas with ongoing local malaria transmission (irrespective of both the pre-intervention and current level of transmission), vector control interventions should not be scaled back. Ensuring access to effective malaria vector control at optimal levels for all inhabitants of such areas should be pursued and maintained.

Interventions recommended for Humanitarian emergency

Strong recommendation for , High certainty evidence

Insecticide-treated nets: Humanitarian emergency setting (2022)

WHO recommends that insecticide-treated nets (ITNs) be deployed for the prevention and control of malaria in children and adults in areas with ongoing malaria transmission affected by a humanitarian emergency.

Conditional recommendation for , Very low certainty evidence

Indoor residual spraying: Humanitarian emergency setting (2022)

WHO suggests deploying indoor residual spraying (IRS) for the prevention and control of malaria in children and adults in areas with ongoing malaria transmission affected by a humanitarian emergency.

Supplementary interventions

Conditional recommendation for , Low certainty evidence

Larviciding (2019)

Insecticides can be regularly applied to water bodies (larviciding) for the prevention and control of malaria in children and adults as a supplementary intervention to ITNs or IRS in areas with ongoing malaria transmission where aquatic habitats are few, fixed and findable.

Conditional recommendation for , Low certainty evidence

House screening (2021)

Screening of residential houses can be used for the prevention and control of malaria in children and adults in areas with ongoing malaria transmission.

Conditional recommendation for , Moderate certainty evidence New

Spatial emanators (2025)

Spatial emanators can be deployed for the prevention and control of malaria in children and adults in areas with ongoing malaria transmission.

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Recommendations against use

Conditional recommendation against , Low certainty evidence

Topical repellents (2023)

The deployment of topical repellents in areas with ongoing malaria transmission is not recommended if the aim is to prevent and control malaria at the community level.

Conditional recommendation against , Very low certainty evidence

Space spraying (2019)

Space spraying is not recommended for the prevention and control of malaria in children and adults in areas with ongoing malaria transmission; IRS or ITNs should be prioritized instead.

Conditional recommendation against , Low certainty evidence

Insecticide-treated clothing (2019)

Deployment of insecticide-treated clothing is not recommended for the prevention and control of malaria at the community level in areas with ongoing malaria transmission; however, insecticide-treated clothing may be beneficial as an intervention to provide personal protection against malaria in specific population groups.

Preventive Chemotherapies

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Chemoprevention Strategies

- ✔ Intermittent Preventive Treatment of Malaria in Pregnancy (IPTp)
- ✔ Seasonal Malaria Chemoprevention (SMC)
- ✔ Perennial Malaria Chemoprevention (PMC)
- ✔ Intermittent Preventive Treatment of Malaria in school children (IPTsc)
- ✔ Post Discharge Malaria Chemoprevention (PDMC)
- ✔ Mass Drug Administration (MDA)

Intermittent preventive treatment of malaria in pregnancy (IPTp)

Strong recommendation for , Moderate certainty evidence

Intermittent preventive treatment of malaria in pregnancy (2022)

In malaria-endemic areas, pregnant women of all gravidities should be given antimalarial medicine at predetermined intervals to reduce disease burden in pregnancy and adverse pregnancy and birth outcomes.

Remark:

- Sulfadoxine-pyrimethamine (SP) has been widely used for malaria chemoprevention during pregnancy and remains effective in improving key pregnancy outcomes.
- IPTp-SP should start as early as possible in the second trimester and not before week 13 of pregnancy.
- Doses should be given at least one month apart, with the objective of ensuring that at least three doses are received.
- Antenatal care (ANC) contacts remain an important platform for delivering IPTp. Where inequities in ANC service and reach exist, other delivery methods (such as the use of community health workers) may be explored, ensuring that ANC attendance is maintained and underlying inequities in ANC delivery are addressed.
- IPTp is generally highly cost-effective, widely accepted, feasible for delivery and justified by a large body of evidence generated over several decades.

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Perennial Malaria Chemoprevention (former IPTi)

Conditional recommendation for , Moderate certainty evidence

Perennial malaria chemoprevention (2022)

In areas of moderate to high perennial malaria transmission, children belonging to age groups at high risk of severe malaria can be given antimalarial medicines at predefined intervals to reduce disease burden.

Remark:

- Perennial malaria chemoprevention (PMC) schedules should be informed by the age pattern of severe malaria admissions, the duration of protection of the selected drug, and the feasibility and affordability of delivering each additional PMC course (see "Practical info").
- Sulfadoxine-pyrimethamine (SP) has been widely used for chemoprevention in Africa, including for PMC. Artemisinin-based combination therapies (ACTs) have been effective when used for PMC, but evidence is limited on their safety, efficacy, adherence to multi-day regimens, and cost-effectiveness in the context of PMC.
- Previously, PMC was recommended in infants (<12 months of age) as intermittent preventive treatment in infants (IPTi). Since the initial recommendation, new data have documented the value of malaria chemoprevention in children aged 12 to 24 months.
- The Expanded Programme on Immunization (EPI) platform remains important for delivering PMC. Other methods of delivery can be explored to optimize access to PMC and integration with other health interventions.
- Moderate to high perennial malaria transmission settings are defined as areas with *P. falciparum* parasite prevalence greater than 10% or an annual parasite incidence greater than 250 per 1000 *[30]*. These thresholds are indicative and should not be regarded as absolutes for determining applicability of the PMC recommendation.

Seasonal Malaria Chemoprevention

Strong recommendation for , Moderate certainty evidence

Seasonal malaria chemoprevention (2022)

In areas of seasonal malaria transmission, children belonging to age groups at high risk of severe malaria should be given antimalarial medicines during peak malaria transmission seasons to reduce disease burden.

Remark:

- Eligibility for seasonal malaria chemoprevention (SMC) is defined by the seasonality of malaria transmission and age groups at risk of severe malaria. Thresholds for assessing these criteria change over time and location. Malaria programmes should assess the suitability of SMC based on the local malaria epidemiology and available funding (see "Practical info"). The added value of a seasonally targeted intervention is likely to be greatest where transmission is intensely seasonal.
- Monthly cycles of sulfadoxine-pyrimethamine plus amodiaquine (SP+AQ) have been widely used for SMC in African children under 5 years old and have been shown to be efficacious, safe, well tolerated, available and inexpensive (Thwing *et al unpublished evidence)*.

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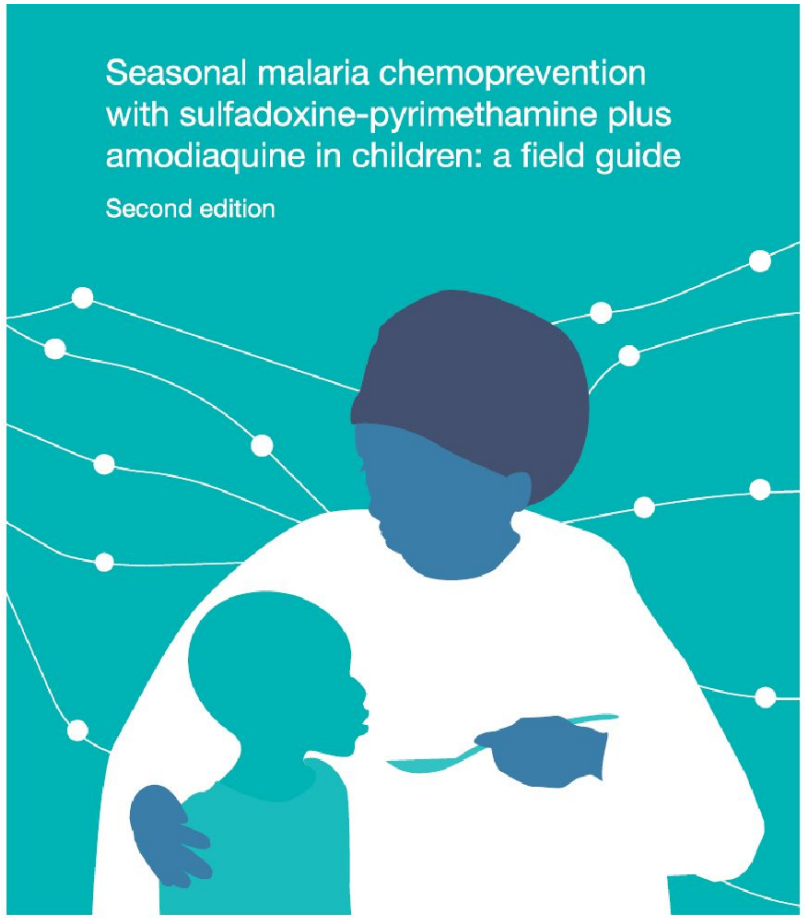
Implementation field guide



- Update implementation field guide (2013) to reflect current Guidelines recommendation
  - specify age groups, transmission intensity thresholds, numbers of doses or cycles, or specific drugs.

26 May 2023

https://www.who.int/publications/i/item/9789240073692

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further guidance (Field Guide 2nd ed, 2023)

- Target area:
  - malaria transmission is highly seasonal and the majority (>60%) of clinical malaria cases occur within 4 consecutive months
  - the clinical attack rate of malaria (without SMC) is at least 0.1 episodes per child during the transmission season in the target group

- Target population
  - Children in age groups at high risk of severe malaria are eligible. In most countries with intense seasonal malaria transmission, these are children below 5 years of age.

further guidance (Field Guide 2nd ed, 2023)

- Number of cycles
  - SMC courses should be given at 28-day intervals, beginning at the start of the transmission season and continuing for 3–5 cycles, depending on the local context.
    - In some settings, three cycles may be sufficient.
    - Add a fifth cycle if a month on either side of the 4-month season contributes more than 10% of the annual burden
    - Gains from adding a sixth SMC cycle appear to be minimal and not cost effective
- Recommended medicines
  - The combination of SP+AQ is currently recommended for SMC.

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Intermittent preventive treatment of malaria in school-aged children (IPTsc)

Conditional recommendation for , Low certainty evidence

Intermittent preventive treatment of malaria in school-aged children (2022)

School-aged children living in malaria-endemic settings with moderate to high perennial or seasonal transmission can be given a full therapeutic course of antimalarial medicine at predetermined times as chemoprevention to reduce disease burden.

Remark:

- Intermittent preventive treatment in school-aged children (IPTsc) has been evaluated in children aged 5–15 years. The burden of malaria and benefits of IPTsc may vary across this age range, but evidence is limited.
- National malaria programmes can consider IPTsc if resources allow for its introduction among school-aged children without compromising chemoprevention interventions for those carrying the highest burden of severe disease, such as children < 5 years old.
- Schools may provide a low-cost means to deliver chemoprevention to school-aged children. However seasonal variation in malaria transmission and the timing of school terms, as well as equity concerns, may mean alternative delivery channels are needed to maximize impact.
- First- and second-line malaria treatments should not be used for IPTsc if safe and effective alternatives are available (see "Practical info").
- The dosing schedule for IPTsc should be informed by the local malaria epidemiology and timed to give protection during the period of greatest malaria risk (see "Practical info").
- Moderate to high malaria transmission settings are defined as areas with *P. falciparum* parasite prevalence greater than 10% or an annual parasite incidence greater than 250 per 1000 *[30]*. These thresholds are indicative and should not be regarded as absolutes for determining applicability of the IPTsc recommendation.

Post-discharge malaria chemoprevention (PDMC)

Conditional recommendation for , Moderate certainty evidence

Post-discharge malaria chemoprevention (2022)

Children admitted to hospital with severe anaemia living in settings with moderate to high malaria transmission can be given a full therapeutic course of an antimalarial medicine at predetermined times following discharge from hospital to reduce re-admission and death.

Remark:

- Post-discharge malaria chemoprevention (PDMC) should be given to children following admission with severe anaemia *[153]* that is not due to blood loss following trauma, surgery, malignancy or a bleeding disorder.
- PDMC implementation should be tailored to admissions of children with severe anaemia and consider the duration of protection of the selected antimalarial, and the feasibility and affordability of delivering each additional PDMC course (see "Practical info").
- Moderate to high perennial malaria transmission settings are defined as areas with a *P. falciparum* parasite prevalence greater than 10% or an annual parasite incidence greater than 250 per 1000 *[30]*. These thresholds are indicative and should not be regarded as absolute for determining applicability of the PDMC recommendation.

Overview - implementation guidance documents status update

- SMC
  - Existing Implementation Guides / Field Manuals
    - Published
- IPTp at community level
    - Published
- PMC (IPTi+)
  - In process / expected in 2026.
- IPTsc and PDMC
  - Implementation Guidance document not yet available
  - Deployment studies and experience required to develop implementation guidance documents

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Mass Drug Administration (MDA) for burden reduction

Technical area	Strength & evidence	For/against	Recommendation	New/update
MDA	Conditional, low-certainty	For	MDA in moderate-high transmission for short-term *P. falciparum* burden reduction	New
MDA	Conditional, low-certainty	For	MDA in emergency settings for short-term *P. falciparum* burden reduction	New
MDA	Conditional, low-certainty	For	MDA to reduce *P. falciparum* transmission in very low to low transmission	New
MDA	Conditional, very low-certainty	Against	MDA to reduce *P. falciparum* transmission in moderate to high transmission	New
MDA	Conditional, very low-certainty	For	MDA with antimalarial medicine to reduce *P. vivax* transmission	New
MDA	Conditional, very low-certainty	Against	MDA with 8-aminoquinoline alone to reduce *P. vivax* transmission	New

Conditional recommendation for

Conditional recommendation against

World Health Organization

Strong recommendation for , High certainty evidence Updated

Malaria vaccines (2023)

WHO recommends the use of malaria vaccines for the prevention of *P. falciparum* malaria in children living in malaria-endemic areas, prioritizing areas of moderate and high transmission.

- As of October 2023, WHO recommends two vaccines for the prevention of Plasmodium falciparum malaria in children:
  - *RTS,S/AS01 (RTS,S) in 2021, and*
  - *R21/Matrix-M (R21) in October 2023.*

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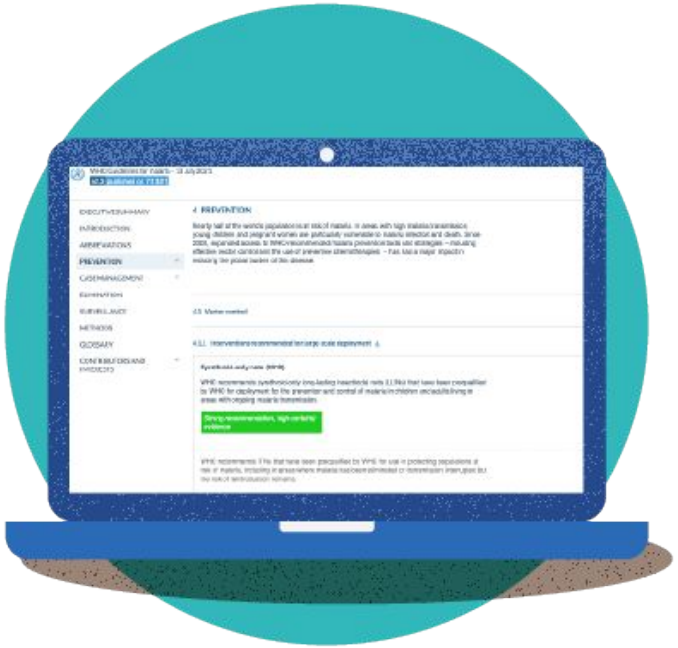
How to access WHO malaria guidance



1 [WHO Global Malaria Programme website]

2 [MAGICapp]

3 [WHO Malaria Toolkit app]

Keep our eye on the prize: a world free of malaria

Thank you

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