WHO Malaria Technical Updates

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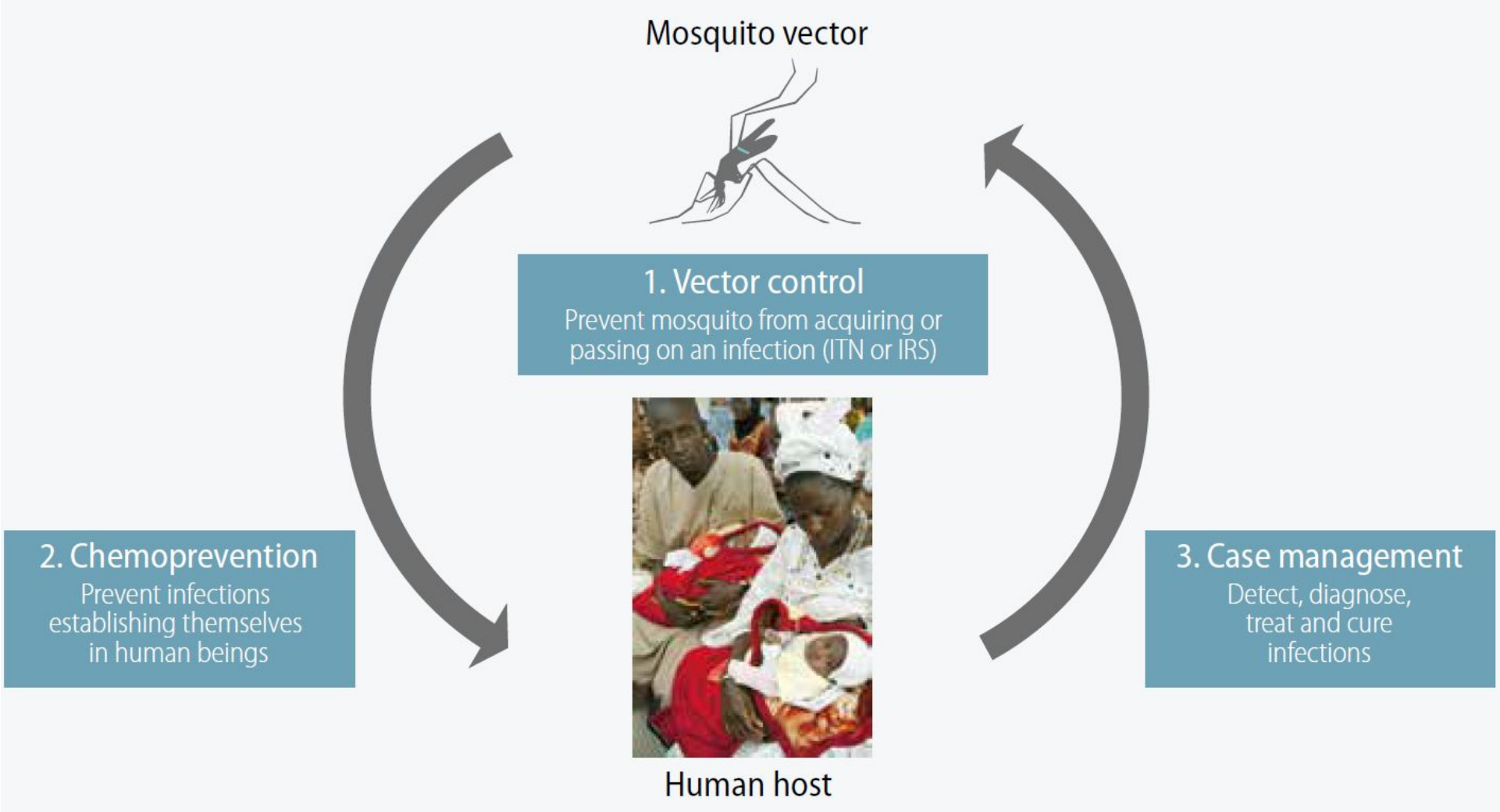
Global **Malaria** Programme

World Health Organization

Main malaria prevention and treatment strategies



Key antimalarial interventions & strategies

Prevention

- Insecticide-treated mosquito nets
- Indoor Residual Spraying

Preventive Chemotherapy

- IPT in pregnancy (IPTp)
- Perennial Malaria Chemoprevention (PMC /IPTi+)
- SMC
- IPT in School Children
- Post Discharge malaria chemoprevention
- MDA

Malaria vaccine

Diagnosis & Treatment

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

Case management service delivery areas::

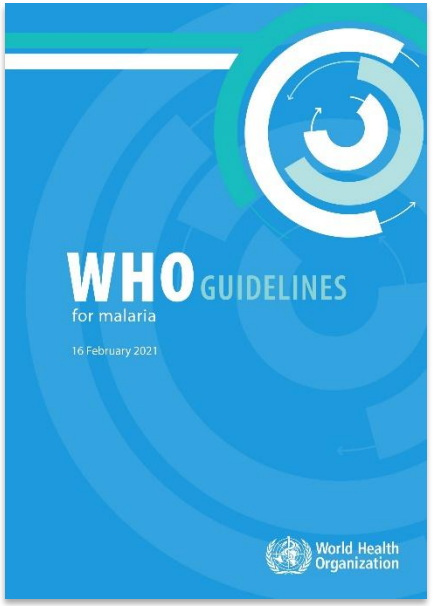
- Health facilities
- Community Case Management
- Private sector

Surveillance, M & E

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

Strengthening health systems in endemic countries

Main malaria prevention and treatment strategies



Malaria Prevention

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Entomology and Vector Control

Interventions recommended for large-scale deployment

- **Pyrethroid-only nets (2019)**
  - WHO recommends pyrethroid-only long-lasting insecticidal nets (LLINs) that have been prequalified by WHO for deployment for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission.
- **Pyrethroid-PBO nets (Conditional recommendation for; 2022)**
  - WHO suggest deploying pyrethroid-PBO nets instead of pyrethroid-only LLINs 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
- **Indoor residual spraying (2019)**
  - WHO recommends IRS using a product prequalified by WHO for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission.

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

- **Larviciding (2019)**
  - WHO conditionally recommends the regular application of biological or chemical insecticides to water bodies (larviciding) for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission as a supplementary intervention in areas where optimal coverage with ITNs or IRS has been achieved, where aquatic habitats are few, fixed and findable, and where its application is both feasible and cost-effective.
- **House screening (2021)**
  - WHO conditionally recommends the use of untreated screening of residential houses for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission.

Recommendations against use

- **Topical repellents (2019)**
  - WHO conditionally recommends against the deployment of topical repellents for the prevention and control of malaria at the community level in areas with ongoing malaria transmission.

- **Insecticide-treated clothing (2019)**
  - WHO conditionally recommends against deployment of insecticide-treated clothing 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.

Potential risks associated with scale-back of vector

- Areas with on-going malaria transmission
  - Irrespective of both the pre-intervention and the current level of transmission, **the scale-back of vector control is not recommended**. Universal coverage with effective malaria vector control of all persons in such should be pursued and maintained
- Areas where malaria transmission has been interrupted
  - The scale-back of vector control should be based on a detailed analysis that includes assessment of receptivity, vulnerability, active disease surveillance, capacity for case management and vector-control response

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Areas **-** *determined by availability of reliable disaggregated active disease surveillance data and feasibility for decisions on vector-control implementation, and not necessarily based on administrative boundaries*

Receptivity *- ability of an ecosystem to allow transmission of malaria*

Vulnerability *- frequency of influx of infected individuals or groups and/or infective anophelines*

Preventive Chemotherapies

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Intermittent preventive treatment of malaria in pregnancy (IPTp)

Strong recommendation for , Moderate certainty evidence

Updated

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.

- *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.*
- *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.*

Perennial Malaria Chemoprevention (former IPTi)

Conditional recommendation for, moderate-certainty evidence

Updated

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.

- 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 (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 *[29]*. These thresholds are indicative and should not be regarded as absolutes for determining applicability of the PMC recommendation.

PMC: Practical information

- WHO recommends a combination medicine for PMC that is different from that used for first-line malaria treatment.

- Evidence is limited on other medicines besides SP; including potential cumulative toxicity, efficacy, adherence to multi-day regimens, and cost-effectiveness in the context of PMC in young children.

- A drug regimen that can be administered as a directly observed single dose, such as SP, is preferable to multi-day regimens

- The EPI platform remains important for delivering PMC, especially in the first year of life, and it may be possible to make use of the EPI or other routine health visits or establish new contacts to reach children over 1 year of age. Research on alternative approaches for PMC delivery beyond the EPI schedules may be warranted.

PMC: Implementation Guidance

- *Please refer to the Intermittent preventive treatment for infants using sulfadoxine-pyrimethamine (IPTi-SP) for malaria control in Africa: implementation field guide.*

Unpacking chemoprevention: PMC

Perennial Malaria Chemoprevention

- Criteria/data for moderate to high perennial transmission
- Criteria/data to identify children at high risk of severe malaria
- Criteria/data for extending IPTi to children >12 months
- Criteria for increasing number of SP cycles (from 4 to 12)
- Protocol for measuring protective effectiveness
- Efficacy and safety of antimalarials alternative to SP
- Protocols/systems to monitor safety of SMC extensions, particularly with new drugs

Implementation guide &SNT manual

IPTi+ studies ongoing

CPES protocol

Need develop -ment

- Updating IPTi field implementation manual, included in section “Practical Info” of WHO guidelines

Planned, Ongoing study results needed

Seasonal Malaria Chemoprevention

Strong recommendation for, moderate-certainty evidence

Updated

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.

- 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. 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 *[182]*.

SMC: Practical information

- WHO recommends a combination medicine for SMC that is different from that used for first-line malaria treatment.

- The component medicines should have closely matched pharmacology, such that no component is present in the absence of other components for more than a minimal amount of time in order to reduce the risk of new infections encountering only a single drug.

- Implementation
  - *Please refer to the Seasonal malaria chemoprevention with sulfadoxine-pyrimethamine plus amodiaquine in children: A field Guide*

Unpacking chemoprevention: SMC

Seasonal Malaria Chemoprevention

- Criteria/data for intensity of malaria transmission
- Criteria/data for seasonality (*during peak transmission*)
- Criteria for number of cycles (3-5)
- Criteria/data for extending to children ≥ 6 years old
- Protocol for measuring protective effectiveness

Guideline Criteria for adoption: current implementation Field Guide being updated.

CPES protocol

- Dosage/therapy packs of AQ for children 6-10 years old
- Efficacy and safety of antimalarials SMC alternative to AQ+SP

Need development

- Updating SMC field implementation manual (2011), “Practical Info” of WHO guidelines, 2022

Update on-going

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

Conditional recommendation for , Low certainty evidence

New

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.

- *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 [31]. 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

New

Post-discharge malaria chemoprevention (PDMC)

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

- *PDMC should be given to children following admission with severe anaemia [138] 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 [31]. These thresholds are indicative and should not be regarded as absolute for determining applicability of the PDMC recommendation.*

Mass Drug Administration (MDA)

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

Overview - implementation guidance documents status update

- SMC
  - Existing Implementation Guides / Field Manuals
    - Available, update in progress
- IPTp at community level
    - New field manual will be developed
- PMC (IPTi+)
  - Projects are now underway to provide the evidence required for expansion of IPTi beyond the current recommendation and transition to PMC.
- IPTsc and PDMC
  - Implementation Guidance document not yet available
  - Deployment studies and experience required to develop implementation guidance documents

Strong recommendation for , High certainty evidence

Malaria vaccine (2021)

The RTS,S/AS01 malaria vaccine should be used for the prevention of *P. falciparum* malaria in children living in regions with moderate to high transmission as defined by WHO.

- *The RTS,S/AS01 malaria vaccine should be provided in a four-dose schedule in children from 5 months of age.*
- *Countries may consider providing the RTS,S/AS01 vaccine seasonally, with a five-dose strategy, in areas with highly seasonal malaria or with perennial malaria transmission with seasonal peaks.*
- *Countries that choose to introduce the vaccine in a five-dose seasonal strategy are encouraged to document their experiences, including adverse events following immunization.*
- *RTS,S/AS01 malaria vaccine should be provided as part of a comprehensive malaria control strategy.*

Malaria Case Management

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World Health Organization

- All suspected malaria cases should have a parasitological test (microscopy or RDT) to confirm the diagnosis.
- Deployment of both microscopy and RDTs should be supported by a quality assurance programme
  - The results of parasitological diagnosis should be available within less than two hours of the patient presenting. In the absence or delay, patients with suspected severe malaria, and other high-risk groups, should be treated on clinical grounds.

Treatment of uncomplicated falciparum malaria

Strong recommendation for, High certainty evidence | **Updated**

Artemisinin-based combination therapy (2015)

Treat children and adults with uncomplicated *P. falciparum* malaria with one of the following ACTs*:

- artemether-lumefantrine (AL)
- artesunate-amodiaquine (AS+AQ)
- artesunate-mefloquine (ASMQ)
- dihydroartemisinin-piperaquine (DHAP)
- artesunate + sulfadoxine-pyrimethamine (AS+SP)
- artesunate-pyronaridine (ASPY) (2022)

**artesunate + sulfadoxine-pyrimethamine and artesunate-pyronaridine are not recommended for use in the first trimester of pregnancy. For details of treatment using ACTs in the first trimester of pregnancy, see details below.*

Treatment of uncomplicated falciparum malaria

Strong recommendation for, High certainty evidence

Duration of ACT treatment (2015)

ACT regimens should provide 3 days' treatment with an artemisinin derivative.

Strong recommendation for, Low certainty evidence

Reducing the transmissibility of treated *P. falciparum* infections (2015)

In low-transmission areas, give a single dose of 0.25 mg/kg bw primaquine with ACT to patients with *P. falciparum* malaria (except pregnant women, infants aged < 6 months and women breastfeeding infants aged < 6 months) to reduce transmission. G6PD testing is not required.

Treatment of Malaria in special populations : 1st trimester of pregnancy

Strong recommendation for, Low certainty evidence

Updated

Treatment in the first trimester of pregnancy (2022)

Treat pregnant women with uncomplicated *P. falciparum* malaria with artemether-lumefantrine during the first trimester.

Remarks

- Limited exposures to other ACTs (artesunate-amodiaquine, artesunate-mefloquine and dihydroartemisinin-piperaquine) suggest that the current evidence is insufficient to make a recommendation for routine use of these other ACTs in the first trimester of pregnancy. However, consistent with the previous WHO recommendation that provided for limited use of ACTs if the first-line recommended medicine was not available, these other ACTs may be used where artemether-lumefantrine is not a recommended ACT for uncomplicated malaria or is not available, given the demonstrated poorer outcomes of quinine treatment, along with the challenges of adherence to a seven-day course of treatment.
- Antifolates are contraindicated in the first trimester of pregnancy. Therefore, ACTs containing sulfadoxine-pyrimethamine are contraindicated during the first trimester of pregnancy.
- There is currently no documented record of the use of artesunate-pyronaridine during the first trimester of pregnancy.
- Continued pharmacovigilance and clinical research, including prospective controlled trials on the efficacy and safety of antimalarial medicines for the treatment of malaria in pregnancy, should be supported and funded.

Treatment of falciparum Malaria in special populations

- Treat infants weighing less than 5 kg with an ACT dosed at the same mg/kg target as for children weighing 5 kg

- In people who have HIV/AIDS avoid AS+SP if on treatment with co-trimoxazole and avoid AS+AQ if on treatment with efavirenz.

- Treat travelers returning to non-endemic settings with uncomplicated *P. falciparum* malaria with an ACT

Treatment of uncomplicated non-falciparum Malaria

- In areas with chloroquine susceptible *P. vivax*, treat using either an ACT or chloroquine.

- In areas with chloroquine resistant *P. vivax*, treat with an ACT*

**For use of ACT in first trimester of pregnancy, same recommendation as for treatment of P.falciparum*

PREVENTING RELAPSE IN P. VIVAX OR P. OVALE MALARIA

- The G6PD status of patients should be used to guide the administration of primaquine for relapse prevention
- Where status is unknown and G6PD testing is unavailable, the decision to prescribe primaquine must be based on an assessment of the risks and benefits of treating versus not treating
- To prevent future relapse, treat people with vivax or ovale malaria (excluding pregnant or women breastfeeding, infants < 6 months of age, and people with G6PD deficiency) with a 14-day course (0.25-0.5mg/kg daily) of primaquine in all transmission setting
- In people with moderate G6PD deficiency, consider relapse prevention with primaquine 0.75 mg base/kg once a week for 8 weeks under close medical supervision.
- In women who are pregnant or breastfeeding, consider weekly chemoprophylaxis with chloroquine until delivery and breastfeeding is complete, then treat with 14 days of primaquine to prevent future relapse.

PREVENTING RELAPSE: Short-course standard dose primaquine treatment

Strong recommendation for, Very low certainty evidence | **New**

Short-course standard dose primaquine treatment (2022)

To prevent relapse, an additional treatment option of using primaquine 0.5 mg/kg/day for seven days is recommended to treat *P. vivax* or *P. ovale* malaria in children and adults (except pregnant women, infants aged < 6 months, women breastfeeding infants aged < 6 months, women breastfeeding older infants unless they are known not to be G6PD deficient, and people with G6PD deficiency).

Remarks

- As recommended previously, the G6PD status of patients should be used to guide administration of primaquine for preventing relapse.
- A shorter regimen can lead to better adherence compared to the standard 14-day regimen and thus to fewer relapses.

PREVENTING RELAPSE: Short-course high dose primaquine treatment

Conditional recommendation against, Very low certainty evidence

New

Short-course standard high-dose primaquine treatment (2022)

To prevent relapse, WHO recommends against an additional treatment option of using primaquine 1.0 mg/kg/day for seven days to treat *P. vivax* or *P. ovale* malaria.

Remarks

- There is a significantly increased risk of serious adverse events (moderate to large undesirable effect) at this daily dosing of the standard high dose.

Severe malaria

- Therapeutic objectives
  - Main objective is to prevent the patient from dying
  - Secondary objectives are to prevent disabilities and prevention of recrudescent infection
- Death from severe malaria often occurs within hours of onset of symptoms or admission to hospital
  - Essential that therapeutic concentrations of a highly effective antimalarial are achieved as soon as possible
- Management of severe malaria comprises four main areas
  - Clinical assessment of patient
  - Specific antimalarial treatment
  - Additional treatments (managements of other complications), and
  - Supportive care

Treatment of severe malaria

- Treat all patients with severe malaria (including infants, pregnant women in all trimester, and lactating women) with intravenous or intramuscular artesunate for at least 24 hours and until able to tolerate oral medication.
- After at least 24 hours of parenteral therapy, AND able to tolerate oral therapy, complete treatment with three-days of an ACT
- Children weighing less than 20 kg should receive a higher dose of artesunate (3 mg/kg/dose) than others (2.4 mg/kg/dose) to ensure an equivalent drug exposure.
- If artesunate is not available, use artemether in preference to quinine for treating severe malaria

Treatment of severe malaria

- Pre-referral treatment
  - In settings where complete treatment of severe malaria is not possible, but injections are available, give children and adults a single dose of intramuscular artesunate and refer to an appropriate facility for further care. Use artemether or quinine if artesunate is not available
  - In settings where intramuscular injections are unavailable, treat children below the age of six years with a single dose of rectal artesunate and refer immediately to an appropriate facility for further care.
  - Where referral is not possible after the initial treatment,
    - pre-referral medication should be continued until the patient can tolerate oral medication, then,
    - administer a complete course of an effective ACT

Community Case Management of Malaria

- CCM of malaria delivered as part of integrated CCM (iCCM), which includes the treatment of pneumonia and diarrheal diseases.
- Trained community providers (CHWs, Medicine Sellers or Retailers) should be provided with:
  - Rapid Diagnostic Tests (RDTs)
  - ACTs for treatment of uncomplicated malaria.
  - Rectal artemisinin suppositories for pre-referral treatment of severe malaria.
  - Information, Education and Communication materials.
  - simple patient registers and reporting forms.

MALARIA ELIMINATION / PREVENTION OF RE-INTRODUCTION

Global **Malaria** Programme

World Health Organization

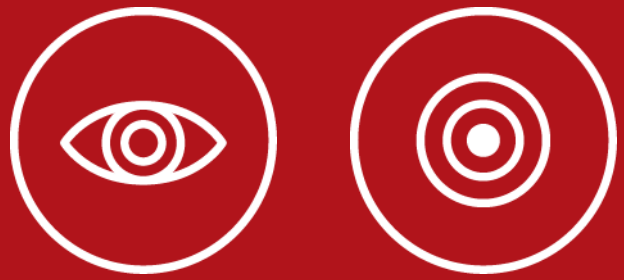
Malaria Elimination Guidelines

Technical area	Strength & evidence	For/against	Recommendation	New/update
Elimination	Conditional, very low-certainty	For	Targeted drug administration to reduce transmission in low/very low transmission	New
Elimination	Conditional, moderate certainty	Against	Mass testing and treatment to reduce malaria transmission	New
Elimination	Conditional, very low-certainty	Against	Testing and treatment of people at increased risk to reduce transmission	New
Elimination	Conditional, low-certainty	For	Reactive drug administration to people near malaria cases to reduce transmission	New
Elimination	Conditional, very low-certainty	For	Testing and treatment of people near malaria cases to reduce transmission	New
Elimination	Conditional, very low-certainty	For	Reactive indoor residual spraying near malaria cases to reduce transmission	New
Elimination	Conditional, very low-certainty	Against	Routine test and treatment of people at points of entry to reduce importation	New
Elimination	Conditional, very low-certainty	For	Testing and treatment of groups from endemic areas to reduce importation	New

Conditional recommendation for

Conditional recommendation against

Surveillance



Surveillance, Monitoring and Evaluation

Surveillance definition:

Public health surveillance is the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice.

One of the 3 pillars of the GTS is to Transform malaria surveillance into a core intervention

Surveillance for malaria

Strong surveillance enables programmes to optimise their operations, by empowering programmes:

- To advocate investment from domestic and international sources, commensurate with the malaria disease burden in a country or sub-national level
- To allocate resources to populations most in need in order to achieve the greatest possible public health impact
- To access regularly whether plans are progressing as expected and where adjustments are needed
- To account for the impact of the resources and demonstrate value for money
- To periodically evaluate the overall programme objectives and achievement and thus plan accordingly

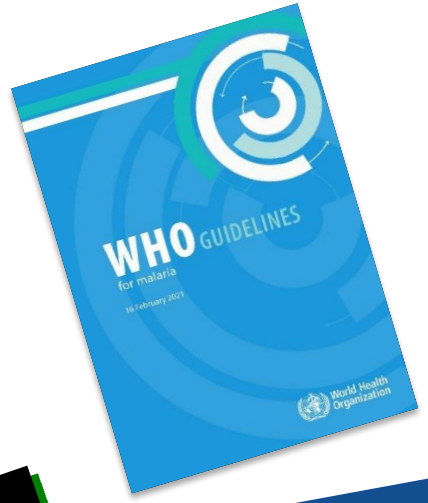
Malaria surveillance

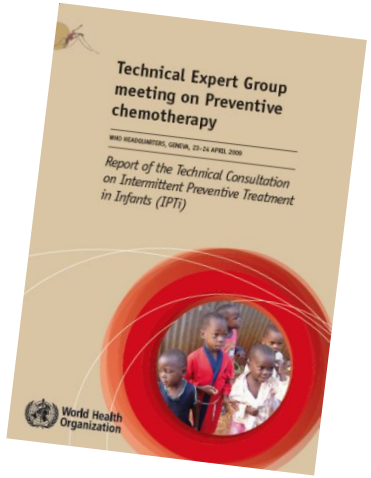
Pillar 3 of the GTS 2016-2030

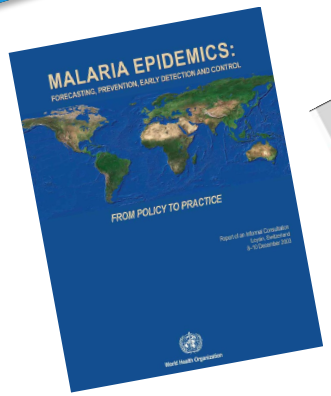
Transform Malaria Surveillance into a Core Intervention

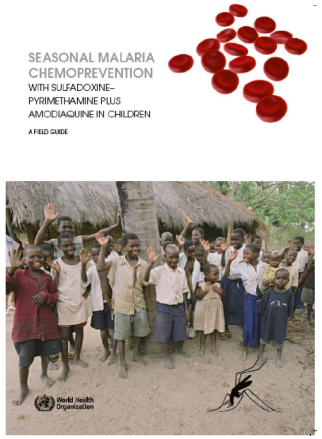
	High	Moderate	Low	Very Low	Zero	Maintaining Zero
Case detection	Passive case detection	Passive case detection	Passive case detection	Passive + Active case detection		
Recording	Outpatient and inpatient registers	Outpatient and inpatient registers	Outpatient and inpatient registers	Individual patient forms		
Reporting frequency	Monthly	Weekly	Weekly	Real Time		
Resolution of reported data	Aggregate case by age	Aggregate case by age	Aggregate case or line listing by age	Case reports with recommended details on patient history		
Data use: health facility	Data analysed and displayed weekly	Data analysed and displayed weekly	Data analysed and displayed weekly	Data analysed and displayed in real time		
Data use: district	Data analysed and displayed monthly	Data analysed and displayed monthly	Data analysed and displayed weekly	Data analysed and displayed weekly		
Data use: province & national	Data analysed and displayed monthly or quarterly	Data analysed and displayed monthly	Data analysed and displayed monthly	Data analysed and displayed weekly		
Response time	Monthly	Monthly or weekly	Weekly	Case & foci investigation within 48 hours, foci response within 7 days		
Feedback frequency to lower level	Annually	Quarterly	Monthly	Every two weeks		
Surveillance system monitoring	Annually	Quarterly	Monthly	Every two weeks		

In summary, effective malaria









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

Thank you