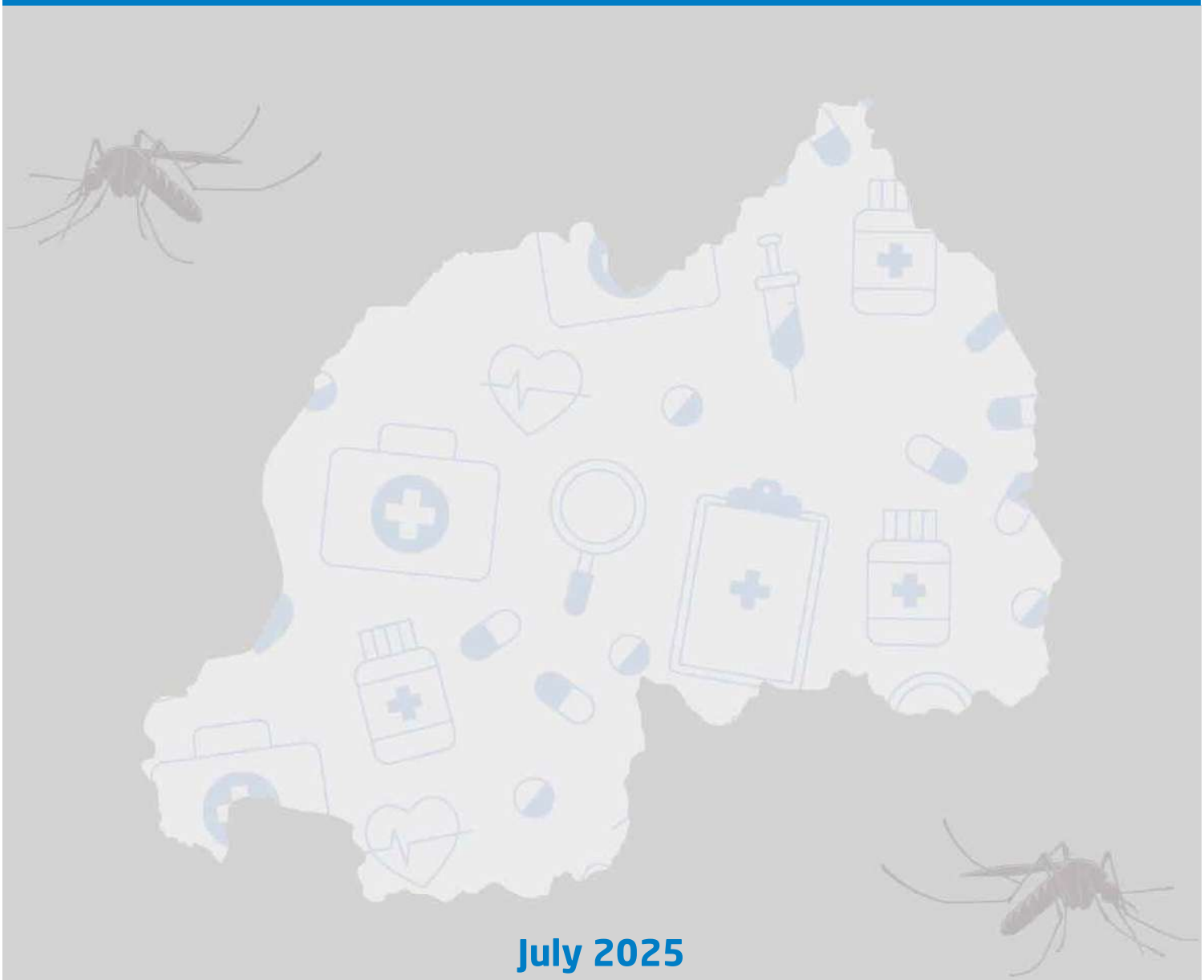
Republic of Rwanda
Ministry of Health

Rwanda Biomedical Centre
Healthy People, Wealthy Nation

# Rwanda Multiple First-Line Therapies (MFT) Implementation Guide



July 2025

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# Acronyms

| Acronym | In full |
|---|---|
| ACT | Artemisinin-based Combination Therapies |
| ADR | Adverse Drug Reactions |
| AL | Artemether- Lumefantrine |
| ASPY | Artesunate Pyronaridine |
| BCC | Behavior Change Communication |
| BS | Blood Smear |
| BUFMAR | Bureau des Formations Médicales Agréées du Rwanda |
| CHAI | Clinton Health Access Initiative |
| CHW | Community Health Worker |
| CPDS | Coordinated Procurement and Distribution System |
| CSO | Civil Society Organization. |
| DBS | Dried blood spots |
| DG | Director General |
| DHAP | Dihydroartemisinin-Piperaquine |
| DHMT | District Health Management Team |
| DHS | Demographic and Health Survey |
| e-LMIS | Electronic Logistics Management Information System. |
| EMR | Electronic Medical Record. |
| e-CBS | electronic Community-Based Surveillance |
| GHSC-PSM | Global Health Supply Chain program – Procurement and Supply Management project |
| HBM | Home-Based Management (Malaria) |
| HC | Health Center |
| HF | Health Facility |
| HMIS | Health Management Information System |
| HQ | Headquarter |
| HP | Health Post |
| IRS | Indoor Residual Spraying |
| ITN | Insecticide-Treated Net |
| LLIN | Long Lasting Insecticide treated Nets |
| LMIS | Logistics management information system |
| M&E | Monitoring and Evaluation |
| MCCH | Maternal, Child and Community Health |
| MEDIASOL | Medical & Allied Service Solutions |
| MFT | Multiple First- Line Therapy |
| MIS | Malaria Indicator Survey |
| MOH | Ministry of Health |
| MOPDD | The Malaria, Neglected Tropical Diseases and Other Parasitic Diseases Division |
| NGO | Non-Governmental Organization |

| | |
|---|---|
| NMSP | National Malaria Strategic Plan |
| NRL | National Reference Laboratory |
| NTG | National Malaria Treatment Guidelines |
| PMI | President's Malaria Initiative |
| PViMS | Pharmacovigilance Information Management System |
| Q&A | Questions and Answers |
| QAT | Quantification Analytics Tool |
| RBC | The Rwanda Biomedical Centre |
| RDT | Rapid Diagnostic Test |
| RFDA | The Rwanda Food and Drug Authority |
| RMS | Rwanda Medical Supply |
| SAE | Serious Adverse Events |
| SBC | Social Behavior Change |
| SmPC | Summary of Product Characteristics |
| SOPs | Standard Operating Procedures |
| TES | Therapeutic Efficacy Study |
| TWG | The Malaria Technical Working Group |
| WHO | World Health Organization |

# Executive Summary

Since the emergence of artemisinin-resistant malaria in Rwanda in 2020, the Ministry of Health (MOH) has taken decisive steps to preserve the ecacy of antimalarial therapies. One of the key strategic responses is the adoption of a Multiple First-Line Therapy (MFT) approach, a proactive, evidence-based measure to prevent the spread of resistance and sustain eective treatment outcomes. The Rwanda MFT strategy aligns with the second pillar of the World Health Organization's (WHO) 2022 Strategy to Respond to Antimalarial Drug Resistance in Africa, which calls for optimizing the use of diagnostics and therapeutics. It also adheres to Rwanda's National Malaria Treatment Guidelines and is supported by updated clinical protocols and surveillance data.

In 2025, the MFT implementation will roll out across the country using a geographic rotation model. Rwanda will be divided into three blocks, each assigned one of the three recommended Artemisinin-based Combination Therapies (ACTs): Artemether-Lumefantrine (AL), Dihydroartemisinin-Piperaquine (DHAP), and Artesunate-Pyronaridine (ASPY) as the first-line treatment for one year. Each block will rotate to a dierent ACT annually over a three-year cycle. This approach reduces drug pressure and helps delay the development of resistance.

The implementation will be led by the Ministry of Health and the Rwanda Biomedical Centre (RBC) through The Malaria, Neglected Tropical Diseases and Other Parasitic Diseases Division (MOPDD). These teams will coordinate planning, training, supervision, and partner engagement at national and district levels.

The Rwanda Medical Supply (RMS) will manage forecasting, procurement, and distribution of ACTs using national supply chain systems. Logistics networks, including drone delivery services (Zipline) will ensure ecient, timely delivery and help prevent stockouts in hard-to-reach areas.

A critical preparation phase in 2024–2025 will include:

- Nationwide training of healthcare providers at all levels.
- Distribution of updated treatment guidelines and visual job aids.
- Engagement of private sector providers under clear national guidance.
- Upgrades to Health Management Information System (HMIS) and logistics tools to track drug allocation and consumption by block and ACT.

The private sector plays a crucial role in malaria case management in Rwanda and must be actively engaged to ensure the eective implementation of the MFT. To facilitate this, the private sector, will be integrated into the rollout through clear communication, aligned guidelines, and supervision.

A comprehensive Monitoring and Evaluation (M&E) framework will track key indicators monthly via HMIS, including drug availability, treatment adherence, side eects, and patient/provider feedback. A national-level review will be conducted six months after the rollout to assess progress and inform mid-cycle improvements.

Through the implementation of the MFT strategy, Rwanda aims to maintain the eectiveness of malaria treatments, delay resistance, and strengthen the national response to malaria setting an example of adaptive, evidence-based public health strategy in the region.



Kigali, 22nd July 2025

**Prof MUVUNYI MAMBO Claude**

**Director General**



# I. Introduction and Purpose of the Guide

## 1. Background and Rationale

Malaria remains a major public health concern in Rwanda, despite the substantial progress made over the past decade. As shown in the following figures (Figure 1 and Figure 2), between 2016 and 2024, malaria incidence has significantly declined, thanks to strengthened prevention strategies, improved access to diagnosis and treatment, and expanded community-based interventions. However, Rwanda still faces challenges due to its heterogeneous malaria transmission patterns and emerging threats of drug resistance.

### Figure 1: Malaria Incidence in Rwanda in 2016

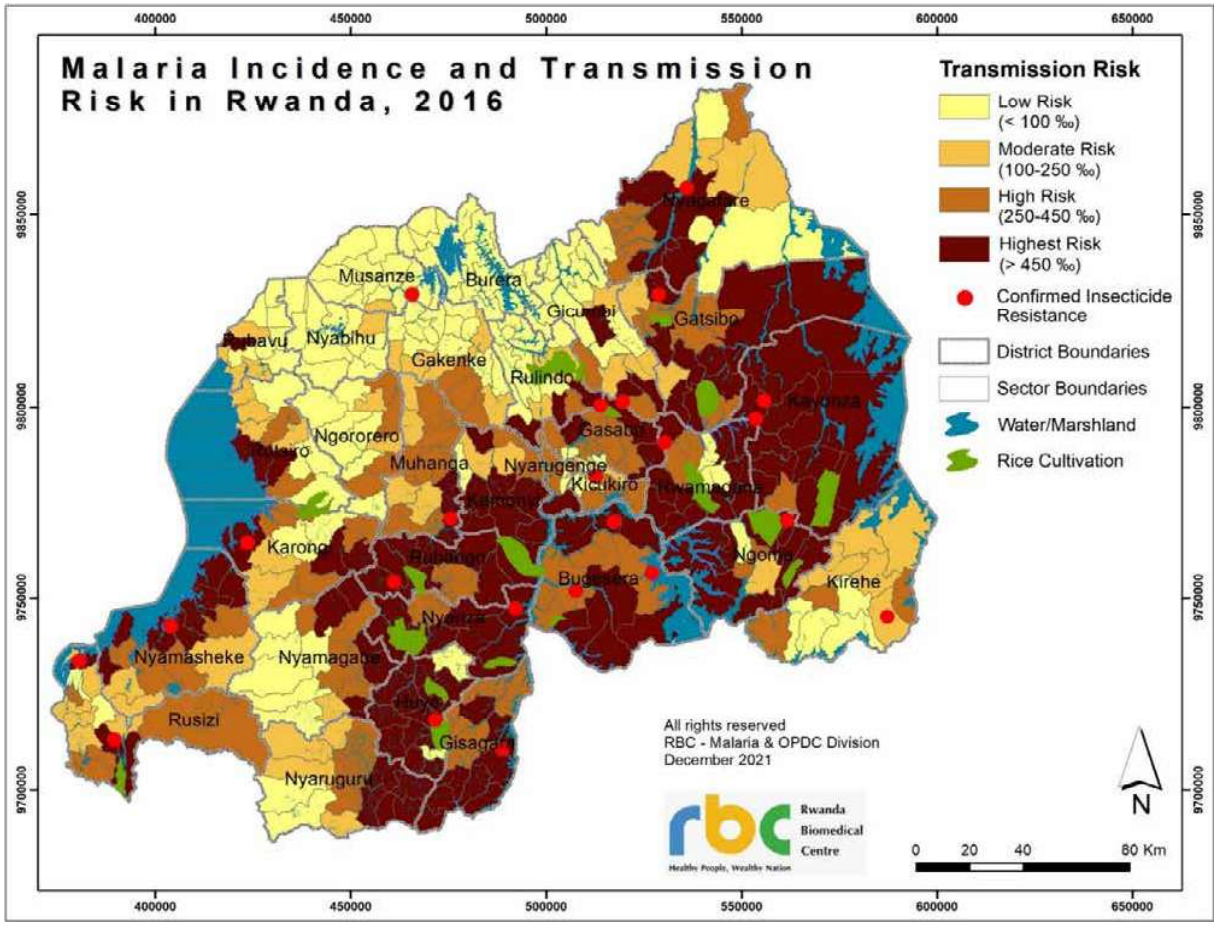
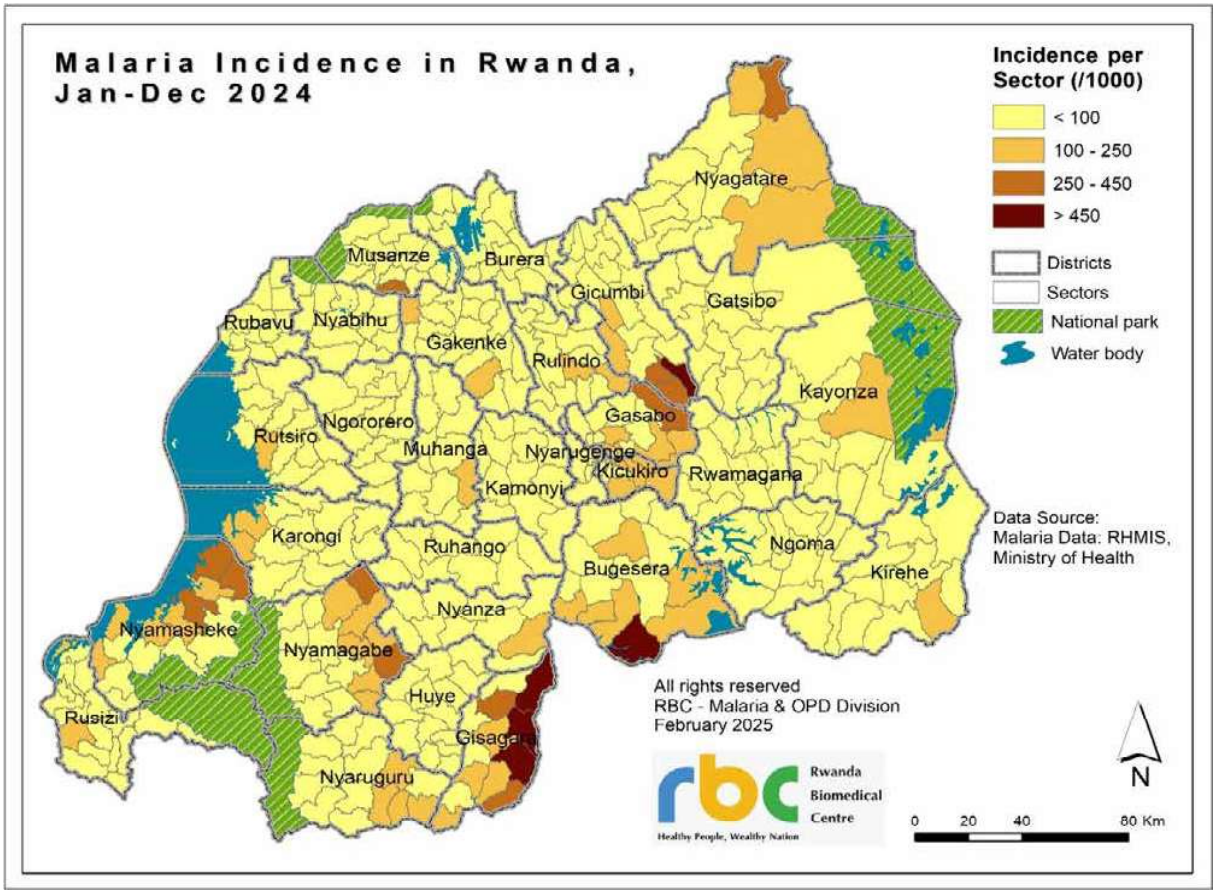


Figure 2: Malaria Incidence in Rwanda in 2024




Since 2006, ACTs have served as the first-line treatment for uncomplicated malaria in Rwanda. ACTs combine fast-acting artemisinin derivatives with longer-acting partner drugs, offering a high cure rate when properly used. However, their effectiveness is now being challenged.

Since 2020, routine molecular surveillance led by RBC, in collaboration with national and international partners, has detected mutations associated with artemisinin resistance in *Plasmodium falciparum*, most notably in the PfK13 gene including R561H mutation, which has been confirmed in some regions of Rwanda and other markers linked to partial resistance. These findings are supported by delayed parasite clearance times observed in clinical settings and by results from Therapeutic Efficacy Studies (TES) conducted at selected sentinel sites.

This evidence is aligned with the study by Uwimana et al. (2020), which demonstrated the emergence and clonal expansion of artemisinin-resistant parasites carrying the R561H mutation in Rwanda, raising serious concerns about resistance spread if not addressed early.

A subsequent correction published in Nature Medicine (2021) reaffirmed these findings and strengthened their scientific robustness.

While treatment failure rates remain below the WHO-defined threshold for immediate change, the emergence of resistance markers and early signals of declining efficacy represent a serious threat to malaria control efforts.

If not addressed proactively, resistance could spread and compromise the effectiveness of the limited arsenal of ACTs currently available. Learning from other regions where drug resistance led to treatment failure and disease resurgence, Rwanda has chosen to act **early and decisively**.

In light of these developments, the MOH, through an inclusive review process with RBC and its

technical partners, conducted a strategic assessment of national treatment policy options. Drawing from both national evidence and global guidance, the adoption of the **MFT strategy** was identified as the most appropriate and forward-looking approach.

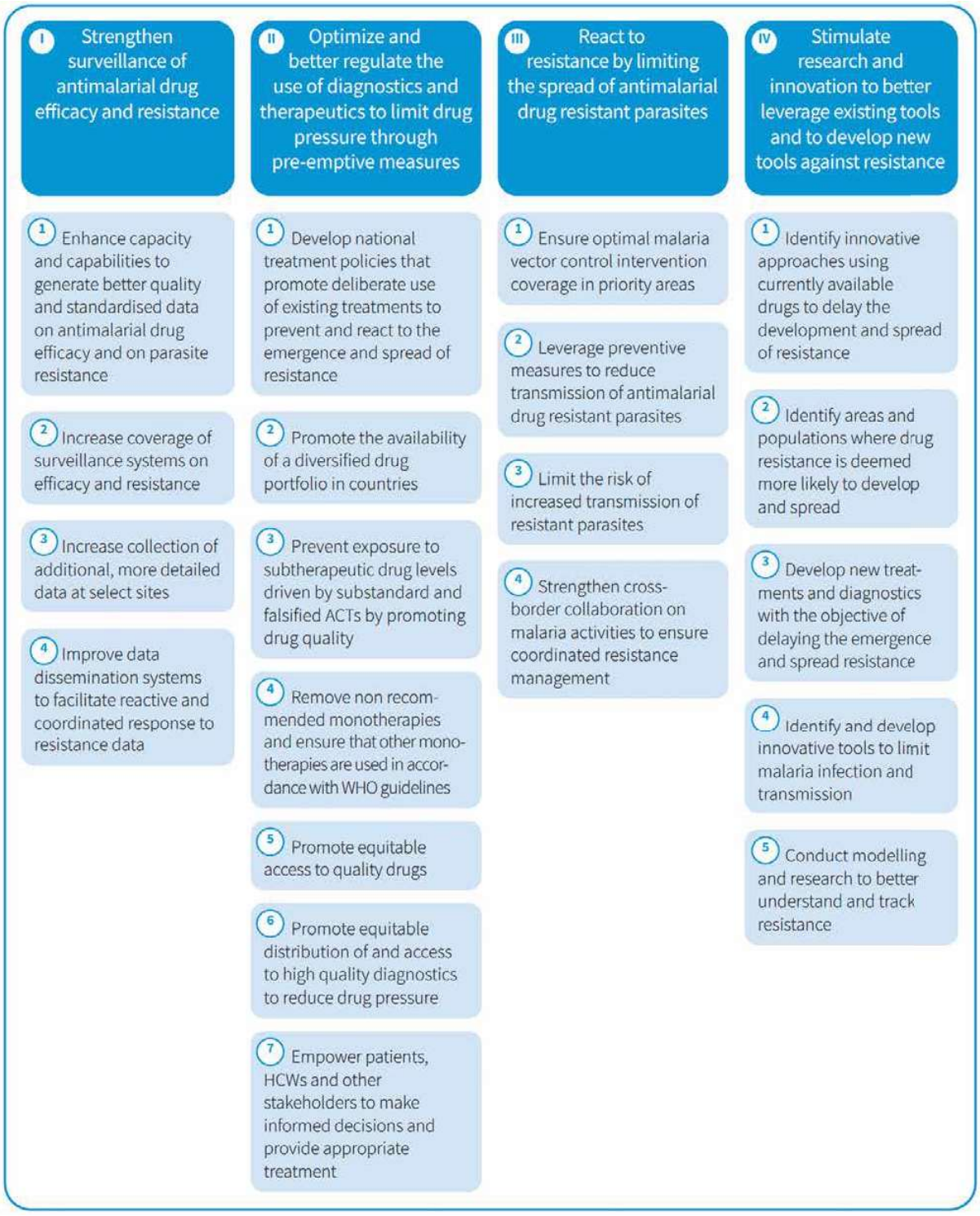
**MFT**, as defined by WHO, involves the use of **two or more effective first-line ACTs** to treat uncomplicated malaria across the population; either **simultaneously**, or through **rotation (cycling)** to reduce selective pressure on any single drug. By diversifying the therapeutic landscape, MFT disrupts the evolutionary advantage of resistant parasites and helps prolong the useful therapeutic life of available ACTs.

This strategic choice aligns with **Pillar 2 of WHO's 2022 Strategy to Respond to Antimalarial Drug Resistance in Africa (Figure 3)**, which encourages countries to **optimize the use of therapeutic tools to extend their efficacy**.

Recent Global guidance further reinforces this approach: the 2024 WHO Implementation Guide on Multiple First-Line Therapies (MFT) recommends introducing MFT in settings where early signs of resistance are emerging, but where treatment failure rates remain below the 10% threshold.

This guidance closely reflects Rwanda's current malaria situation. By proactively deploying MFT before widespread treatment failures occur, countries can reduce drug pressure, slow the spread of resistance, and sustain the effectiveness of ACTs over time (WHO, 2024).

**Figure 3: Twenty interventions clustered into the Strategy's four pillars to address resistance**




In preparation for the national MFT roll-out, the MOH of Rwanda relied on evidence from routine TES conducted at sentinel sites to monitor the performance of existing ACTs and detect early signs of antimalarial resistance. These studies provided critical evidence on the continued efficacy of key treatments and informed strategic decisions regarding the design and operationalization of the MFT approach.

The TES data, combined with experience from countries such as Burkina Faso and Kenya that have piloted MFT strategies, and WHO technical guidance, helped define the structure for MFT implementation in Rwanda. These sources informed decisions around the rotation of ACTs across geographic blocks, stock management strategies, and clinical alignment with existing treatment protocols. While not all ACTs included in the MFT strategy have been locally tested through TES (e.g., ASPY), global evidence and WHO recommendations supported their inclusion and justified a cautious, phased deployment.

Based on this evidence and expert consultation, the Government of Rwanda officially adopted the MFT strategy as a core component of its national malaria response. The strategy is now embedded within the National Malaria Strategic Plan (NMSP) 2024–2027 and guided the 2024 revision of Rwanda's National Malaria Treatment Guidelines (NTG).

All cases of suspected malaria should have a parasitological test (Microscopy or Rapid Diagnostic Test (RDT)) to confirm the diagnosis.

The new NTGs recommend tree different ACTs for treatment of uncomplicated malaria:

- Artemether-Lumefantrine (AL)
- **Dihydroartemisinin-Piperaquine (DHAP)**
- **Artesunate-Pyronaridine (ASPY)**

These ACTs will be deployed through a **three-block geographic rotation model**, with each block assigned a specific ACT as first-line treatment for one year, followed by annual rotation according to a national calendar. Within each block, facilities will maintain access to the other two ACTs to serve as second or third option in case of **treatment failure**, **contraindications**, or **specific clinical conditions**, ensuring patient safety and continuity of care.

By adopting MFT **before treatment failures become widespread**, Rwanda is embracing a **preventive and resilient approach** to malaria case management. This decision reflects the government's commitment to **health system strengthening**, **national ownership** of evidence-based interventions, and alignment with **global best practices**. It also positions Rwanda as a **regional leader** in the operationalization of MFT; one of the first countries in Africa to scale this strategy proactively at national level.

## 2. Purpose of the Implementation Guide

This guide provides a comprehensive and practical framework to operationalize the Rwanda MFT Strategy across all levels of the health system. It complements the strategic directions of the NMSP 2024-2027 and the MOH MFT Strategic Document (April 2025) by translating policy commitments into concrete, actionable steps for field implementation. It is fully aligned with the updated *Integrated Malaria Control Guidelines* (2024), which outline the clinical, operational, and surveillance standards for MFT deployment in Rwanda.

The guide is intended for a wide range of stakeholders involved in the implementation of malaria case management and the MFT strategy in Rwanda, including:

- National and district health authorities, responsible for policy oversight and coordination.
- Public and private healthcare providers involved in malaria diagnosis and treatment.
- Community Health Workers (CHWs) who are the first point of contact for many malaria patients.
- Supply chain managers and logisticians, who ensure timely availability and distribution of medicines.
- Pharmacovigilance and surveillance officers, tasked with monitoring drug safety and efficacy.

- Non-governmental organizations, academic institutions, and implementing partners.
- Donors and technical partners supporting Rwanda's malaria control efforts.

This guide is designed to support the effective implementation of the core objectives of the MFT strategy:

- Preserve the efficacy of ACTs by reducing selective drug pressure through a coordinated MFT rotation mechanism.
- Delay the emergence and spread of resistance, particularly to artemisinin derivatives and partner drugs.
- Strengthen malaria case management and ensuring the correct and rational use of ACTs at all levels of the health system, including public and private sectors.
- Promote pharmacovigilance and timely reporting of ADR.
- Support operational learning and adaptation through robust M&E systems.
- Foster community engagement and patient adherence through effective Social Behavior Change (SBC) strategies.

## 3. Operationalization of MFT in Rwanda

The implementation of MFT in Rwanda follows a structured, phased approach, designed to preserve ACT efficacy and ensure high-quality malaria case management.

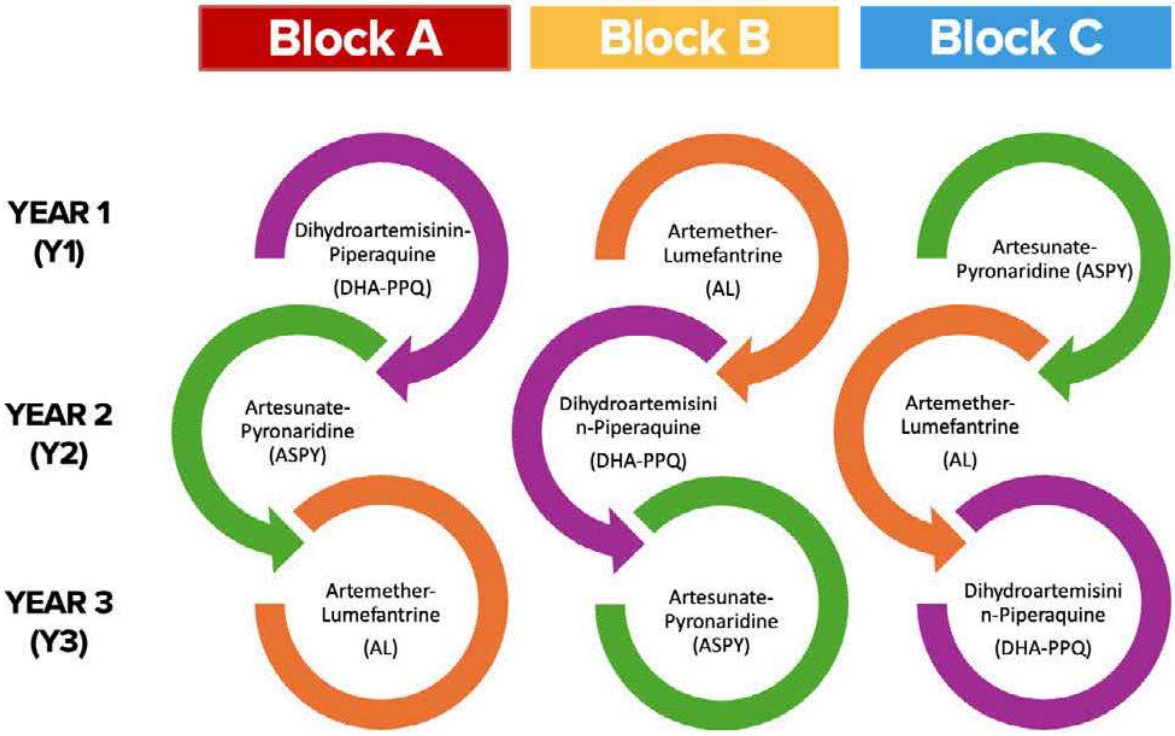
The operationalization of MFT is based WHO guidance, routine TES data, and lessons learned from pilot studies conducted in Burkina Faso and Kenya. It also builds upon Rwanda's existing health system capacities, supply chain infrastructure, and community-based malaria interventions.

The country has been divided into three blocks of districts, each with similar malaria transmission dynamics and resistance profiles.

Each block will use a designated ACT as its first-line treatment for one year, after which the drugs will rotate to a different block, following a three-year cycle (2025-2027). This rotational design shifts selective pressure across the parasite population, minimizing the advantage of any single resistant strain.

The annual rotation cycle is defined as shown in figure 4.

Figure 4: Rotation of MFT by Block and Year




This model was informed by:

- Molecular surveillance data on resistance markers
- TES results
- District-level operational capacity
- WHO guidance on MFT implementation

To ensure clinical safety and continuity of care, all three ACTs remain available in every block. While one ACT is designated as the routine first-line treatment, alternatives are accessible in cases of treatment failure, contraindications, or specific clinical considerations (e.g., pregnancy).

The operationalization of MFT is embedded within Rwanda's broader, integrated health system.

Key components include:

- Supply Chain Adaptation
    1. Adjust procurement and stock distribution to match the rotation schedule.
    2. Ensure availability of all three ACTs in all districts, with priority given to the designated first-line drug.
    3. Strengthen stock monitoring and management to prevent stockouts or wastage.
- A cascading training and supervision system to ensure all health providers understand and adhere to MFT protocols

**Health Information Systems**

4. Adapt HMIS to capture data by ACT and geographic block.
5. Track drug consumption, treatment outcomes, and adverse drug reactions (ADR) in real time.

- Strong community and provider engagement to promote understanding, acceptance, and adherence to the new treatment strategy

**Monitoring and Evaluation**

6. Conduct routine TES and molecular surveillance to assess ACT efficacy.
7. Implement periodic reviews of MFT performance to inform adjustments.

Importantly, the national MFT strategy is not conceived as a temporary or emergency measure, but as a long-term shift within Rwanda's malaria control and elimination agenda. It aligns with broader strategic priorities, including vector control, community-based treatment, and drug resistance surveillance. The integration of MFT into updated National Malaria Treatment Guidelines ensures consistency across all levels of care and fosters intersectoral coordination.

Beyond improving malaria case management, MFT serves as a catalyst for broader health system strengthening. It supports enhanced pharmacovigilance, encourages data-driven decision-making in clinical and supply management, and promotes alignment between public and private sector actors.

Ultimately, the success of the MFT strategy depends on the coordinated efforts of all actors in the malaria response ecosystem. This guide is a cornerstone in that process enabling Rwanda to protect the effectiveness of life-saving malaria treatments, anticipate emerging threats, and maintain the gains made over years of dedicated malaria control efforts.

# II. Geographic Mapping and Phasing

The core operational feature of Rwanda's MFT strategy is the rotation of multiple ACTs across predefined geographic zones, referred to as "blocks". This deployment model aims to create controlled variation in treatment exposure across the country, thereby reducing uniform drug pressure and slowing the emergence and spread of resistant malaria parasites.

## 1. Geographic Block Definition

Rwanda is divided into three geographic blocks, each comprising several districts. The division is based on:

- Malaria transmission intensity (epidemiological data from MOPDD at RBC)
- Molecular surveillance findings (PfK13 mutations and partner drug resistance markers)
- Operational capacity (district readiness, supply chain, supervision coverage)
- Geographic contiguity to facilitate supply chain management and supervision

This geographic rotation model was selected because it allows Rwanda to:

- Diversify drug pressure at the population level; this will minimized drug pressure and ensure no ACT is used continuously in a given area.
- Leverage operational feasibility (district-level training, supervision, supply chain management).
- Facilitate monitoring of resistance trends by geographic zone, and enable adjustments based on surveillance data and TES outcomes.
- Align with WHO recommendations for MFT operationalization in settings with emerging resistance markers.

Figure 5: Block composition

| Block A | Block B | Block C |
|---|---|---|
| • Nyagatare<br>• Gicumbi<br>• Gatsibo<br>• Gasabo<br>• Nyarugenge<br>• Kicukiro<br>• Rwamagana<br>• Kayonza<br>• Bugesera<br>• Ngoma<br>• Kirehe | • Muhanga<br>• Kamonyi<br>• Ruhango<br>• Nyanza<br>• Nyamagabe<br>• Huye<br>• Nyaruguru<br>• Gisagara | • Rusizi<br>• Nyamasheke<br>• Karongi<br>• Rutsiro<br>• Ngororero<br>• Gakenke<br>• Nyabihu<br>• Rubavu<br>• Musanze<br>• Burera<br>• Rulindo |

## 2. Assignment of ACTs and Rotation Schedule

MFT is implemented through a three-year rotation cycle, with each block assigned a different ACT as first-line treatment each year.

The first year assigned ACT is as follows:

- **Block A:** Prioritizing the use of DHAP, this block is where partial resistance has been identified
- **Block B:** Prioritizing the use of AL

- **Block C:** Prioritizing the use of ASPY

Each block will rotate through the three ACTs in a three-year cycle (2025-2027), with careful planning of drug supply, provider training, supervision, and community engagement.

Within each block, facilities will maintain access to the other two ACTs to serve as second or third option in case of **treatment failure**, **contraindications**, or **specific clinical conditions**, ensuring patient safety and continuity of care.

### Figure 6: Rotation schedule per block

| Year | Block A | Block B | Block C |
|---|---|---|---|
| Year 1: 2025-2026 | DHAP | AL | ASPY |
| Year 2: 2026-2027 | ASPY | DHAP | AL |
| Year 3: 2027-2028 | AL | ASPY | DHAP |

### Figure 7: MFT Implementation in Year One (Y1)

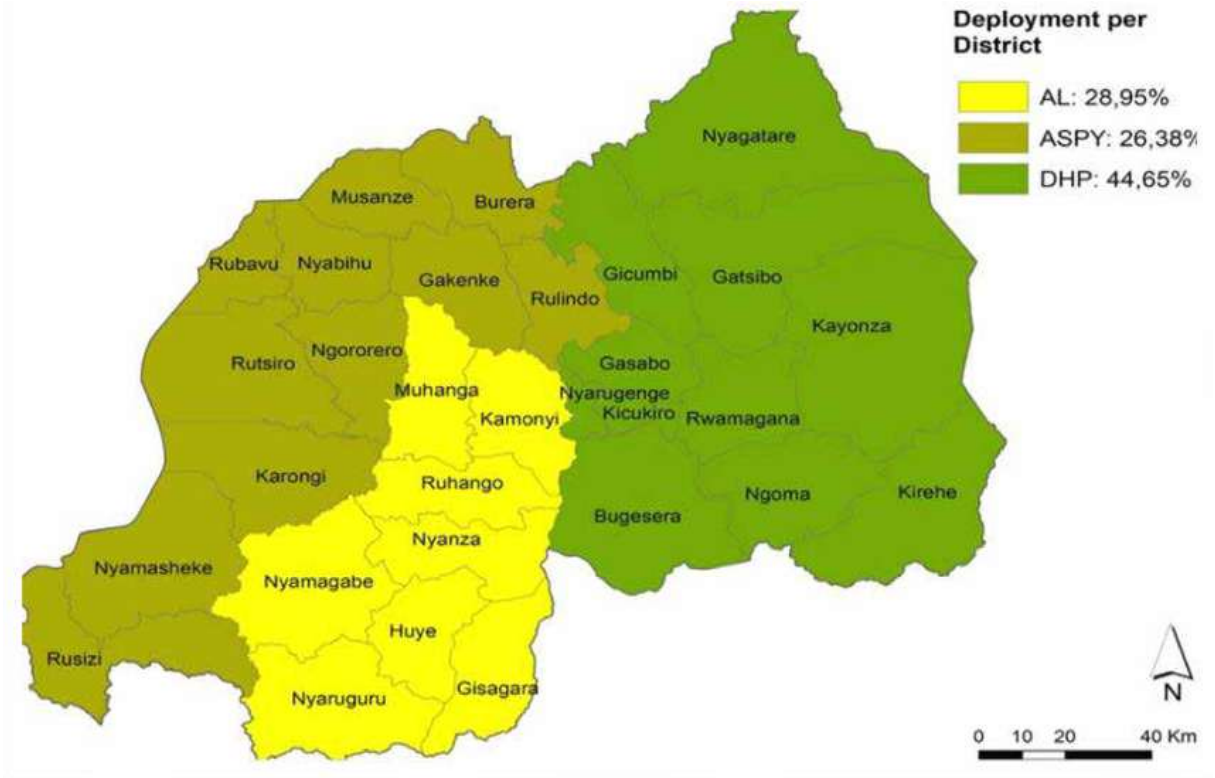


Figure 8: MFT Implementation in Year Two (Y2)

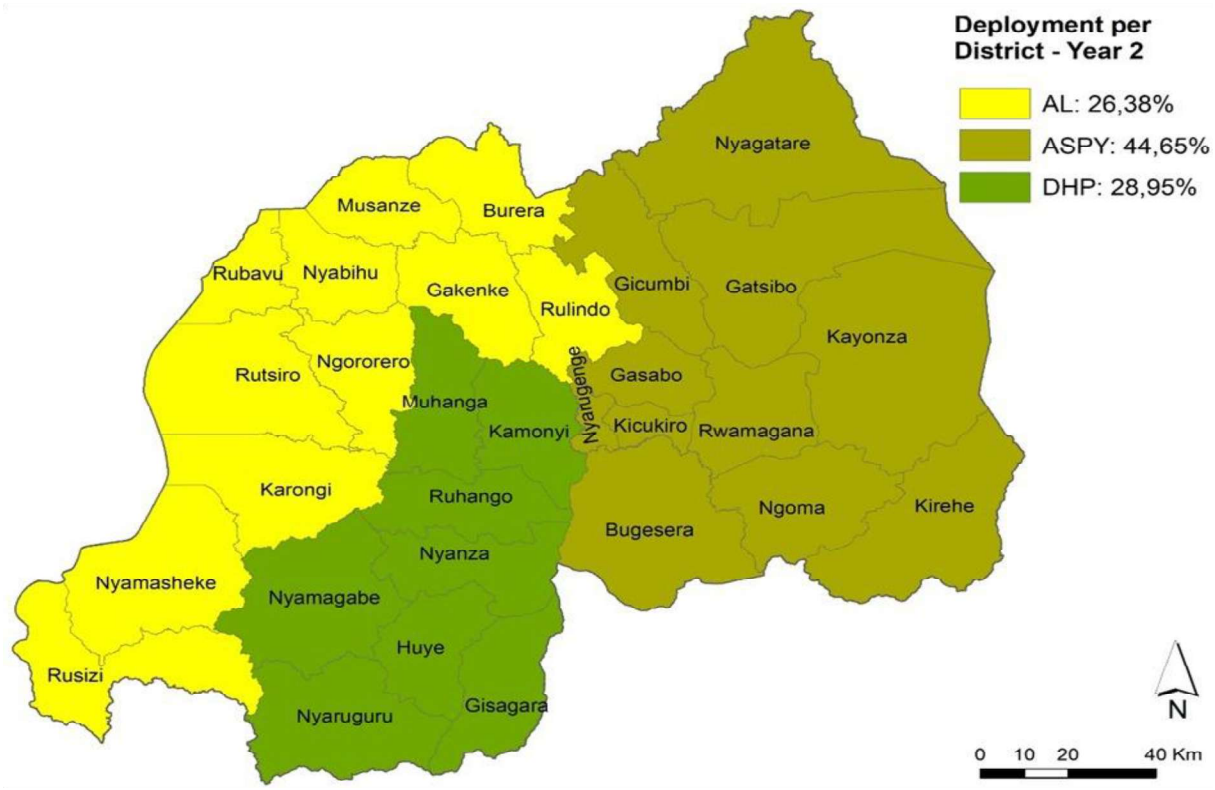
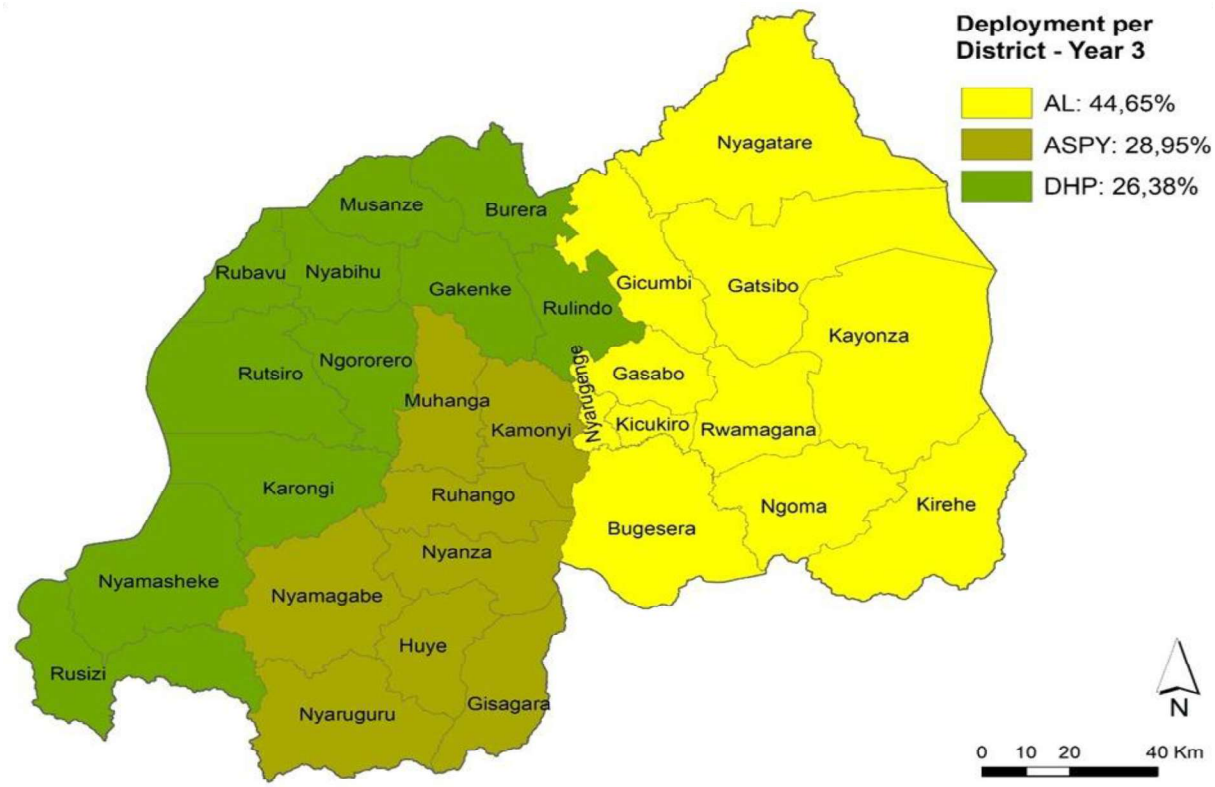



Figure 9: MFT Implementation in Year Three (Y3)



While the initial rotation plan is set for 2025-2027, Rwanda's MOH will apply an adaptive management approach during MFT implementation:

- Continuous monitoring through molecular surveillance and TES will inform adjustments.
- The RBC and the Malaria Technical Working Group (TWG) will review data annually to consider:
    8. Adjusting block composition if needed.
    9. Modifying the rotation schedule if resistance trends evolve.
- Stakeholders (public and private) will be engaged in reviewing and refining the MFT strategy.

# III. Drug Allocation, Product Management, Supply Chain and Distribution

The year 2025 marks the official **launch of Rwanda's Multiple First-Line strategy**, with the first rotation cycle scheduled to begin in September. Success depends heavily on a robust and well-functioning system for **drug forecasting, procurement, allocation, distribution, and monitoring**. Ensuring that the correct ACTs are delivered to the right blocks, at the right time, in the right quantities, while minimizing stockouts and wastage is a core operational requirement for MFT.

The MFT supply chain builds upon Rwanda's robust national supply chain, logistics infrastructure, coordinated by **RMS**.

RMS plays the central role in managing ACT procurement, storage, and distribution to ensure alignment with the MFT rotation calendar. The MOPDD provides technical oversight and ensures coordination across all levels of the health system.

MFT Malaria commodities will follow the same supply chain channel as for other health commodities.

There are three levels in the supply chain of malaria commodities in Rwanda:

Central Medical Store (RMS Ltd) / Private Wholesalers

This is the first level of supply chain in charge of procurement, distribution, and storage of health commodities at national level. RMS central warehouse (Headquarter) distributes malaria commodities to its district branches, the second level of the supply chain in Rwanda. BUFMAR (Bureau des Formations Médicales Agréées du Rwanda) and MEDIASOL (Medical & Allied Service Solutions) also distribute commodities to RMS branches following the agreement signed with RMS headquarter.

The private wholesalers and/or retailers provide health commodities not available at RMS Headquarter (HQ), BUFMAR and MEDIASOL.

District Level (RMS Branches)

This is the intermediate level of the supply chain which oversees the supply chain of malaria commodities at district level. All the RMS branches should request malaria commodities through RMS HQ or must obtain a written notice to buy in private sector when RMS do not have product.

Health Facilities

The third level of the supply chain includes provincial hospitals, district hospitals, Health Centers and private clinics. All public health centers and hospitals as well as accredited private facilities receive commodities from the public sector that are supplied by RMS branches. Private clinics are supplied by the private wholesalers. The third level of the supply chain is responsible for receiving, storing, inventory management and distributing malaria commodities to the end user directly or indirectly through community health workers or health posts.

## 1. ACTs Products in the MFT Strategy

Malaria is diagnosed with an RDT in community and by microscopy at higher-lever health centres and private clinics.

The NTG were updated in 2024, three ACTs were endorsed for first line use under MFT approach. Each ACT has been selected based on its clinical efficacy, molecular surveillance data, ease of administration, and WHO recommendations.

All ACTs included in Rwanda's MFT strategy are WHO-prequalified, approved by MOH and properly

registered by the Rwanda Food and Drug Authority (RFDA).

Drugs are used in accordance with weigh-based dosing protocols (see dosage schedule below by molecule):

### Artemether- Lumefantrine (AL)

A well-established ACT used in Rwanda since 2006 and well-known by healthcare providers and CHWs.

- **AL Posology and method of administration**

Figure 10: AL weight bands and Posology

| Body Weight | Number of Tablets (20/120) per Dose | Total Tablets Over 3 Days | Schedule & Number of tablets of AL per dose * | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Day 1 | | Day 2 | | Day 3 | |
| | | | First Dose (0 h) | 8h after | 24h after | 36h after | 48h after | 60h after |
| 5kg to <15kg | 1 tablet | 6x1=6 | 1 | 1 | 1 | 1 | 1 | 1 |
| 15kg to <25kg | 2 tablets | 6x2=12 | 2 | 2 | 2 | 2 | 2 | 2 |
| 25kg to <35kg | 3 tablets | 6x3=18 | 3 | 3 | 3 | 3 | 3 | 3 |
| ≥35 kg (adults & children) | 4 tablet | 6x4=24 | 4 | 4 | 4 | 4 | 4 | 4 |

*The prescribed or dispensed treatment must correspond to the dosage based on the patient's weight, ensuring the patient receives the correct number of doses to complete the full 3-day course.

AL tablets should be taken twice a day for three days (total six doses).

The first dose should be followed by a second dose after 8 hours. The following two days the doses of AL should be given twice daily, morning and evening (i.e. 12 hours apart).

To increase absorption, AL should be taken with food or a milky drink. If a patient is unable to tolerate food, AL should still be administered, but the systemic exposure may be reduced.

Patients who vomit within 1 hour of taking the medication should repeat the dose.

If a dose is missed, it should be taken as soon as realized and then the recommended regimen continued until the full course of treatment has been completed.

Caution is advised when administering AL to patients with severe renal or hepatic impairment.

***Pregnancy Note:*** AL is indicated during all trimesters of pregnancy.

*For full prescribing information, please refer to the official AL Summary of Product Characteristics (SmPC).*

- **Contraindications**

- patients with known hypersensitivity to artemether, lumefantrine or to any of the excipients.

- patients with severe malaria according to WHO definition.

- patients with a personal or family history of congenital prolongation of the QTc interval or sudden death, or with any other clinical condition known to prolong the QTc interval, such as patients with a history of symptomatic cardiac arrhythmias,clinically relevant bradycardia or severe cardiac diseases.

- patients taking drugs that are known to prolong QTc interval.

- patients with known disturbances of electrolyte balance e.g. hypokalaemia or hypomagnesaemia

- patients taking any drug which is metabolized by the cytochrome enzyme CYP2D6 (e.g.flecainide, metoprolol, imipramine, amitriptyline, clomipramine

- patients taking drugs that are strong inducers of CYP3A4 such as rifampicin, carbamazepine, phenytoin, St John's wort.

- **Summary of Undesirable Effects**

A full list of undesirable effects, with frequency by system organ class and for adults/children, is provided at the end of this section.

- Serious (rare, seek emergency medical help): Allergic reaction: rash, face/lip swelling, difficulty breathing

- Very common (≥1 in 10): Fast heartbeat, headache, dizziness, nausea, vomiting, muscle aches, fatigue, insomnia.

- Common (≤1 in 10): Involuntary muscle spasm, QT prolongation, rash, diarrhea, tingling/numbness, abnormal gait.

- Uncommon (≤1 in 100): Coordination issues, drowsiness, decreased skin sensitivity, Delayed hemolytic anemia

### Dihydroartemisinin-Piperaquine (DHAP)

The newer ACT recommended as new option to diversify therapeutic pressure and manage evolving resistance patterns.

- **DHAP Posology and method of administration**

Figure 11: DHAP weight bands and Posology

| Body Weight | Target daily dose (mg) – Once daily for 3 days | Indicative Number of Tablets* |
|---|---|---|
| 5kg to <8kg | 20 + 160 | A daily dose of 1 tablet 20 mg / 160 mg |
| 8kg to <11kg | 30 + 240 | A daily dose of 1 tablet 30 mg / 240 mg |
| 11kg to <17kg | 40 + 320 | A daily dose of 2 tablets of 20 mg / 160 mg<br>Or 1 tablet of 40 mg / 320 mg daily |
| 17kg to <25kg | 60 + 480 | A daily dose of 3 tablets of 20 mg / 160 mg<br>Or 2 tablet of 30 mg / 240 mg daily |
| 25kg to <36kg | 80 + 640 | A daily dose of 4 tablets of 20 mg /160 mg<br>Or 2 tablets of 40 mg / 320 mg daily |
| 36kg to <60kg | 120 + 960 | A daily dose of 6 tablets of 20 mg /160 mg<br>Or 4 tablets of 30 mg / 240 mg daily<br>Or 3 tablets of 40 mg / 320 mg per day |
| 60kg to <80 kg | 160 + 1280 | A daily dose of 8 tablets of 20 mg / 160 mg<br>Or 4 tablets of 40 mg / 320 mg daily |
| Above 80kg | 200 + 1600 | A daily dose of 10 tablets of 20 mg /160 mg<br>Or 5 tablets of 40mg / 320 mg daily |

*The prescribed or dispensed treatment must correspond to the dosage based on the patient's weight, ensuring the patient receives the correct number of doses to complete the full 3-day course.

DHAP should be administered over 3 consecutive days for a total of 3 doses taken at the same time each day.

DHAP should be taken orally with water and without food (high-fat meals can alter absorption of piperaquine):

- Each dose should be taken no less than 3 hours after the last food intake.

- No food should be taken within 3 hours after each dose.

For patients unable to swallow the tablets, DHAP may be crushed and mixed with water. The mixture should be swallowed immediately after preparation.

Dispersible formulations may be preferred in children if available.

If a dose is missed, it should be taken as soon as realized and then the recommended regimen continued until the full course of treatment has been completed.

- If a patient vomits within 30 minutes of taking DHAP, the whole dose should be re-administered.

- if a patient vomits within 30-60 minutes of administration, half the dose should be re-administered.

Re-dosing with DHAP should not be attempted more than once. If the second dose is vomited, alternative antimalarial therapy should be started.

No more than 2 courses of DHAP may be given within a 12-month period.

A second course of DHAP should not be given within 2 months after the first course due to the long

elimination half-life of piperaquine.

Caution is advised when administering DHAP to patients with moderate or severe renal or hepatic insufficiency.

***Pregnancy Note:*** DHAP is indicated during all trimesters of pregnancy.

*For full prescribing information, please refer to the official DHAP SmPC.*

- **Contraindications**

- Hypersensitivity to the active substances or to any of the excipients.

- Severe malaria according to WHO definition.

- Inherited long QT syndrome (congenital prolongation of the QTc interval) or a family history of this condition or of sudden death.

- Any other clinical condition known to prolong the QTc interval.

- History of symptomatic cardiac arrhythmias or with clinically relevant bradycardia.

- Any predisposing cardiac conditions for arrhythmia such as severe hypertension, left ventricular hypertrophy (including hypertrophic cardiomyopathy) or congestive cardiac failure accompanied by reduced left ventricle ejection fraction.

- Electrolyte disturbances, particularly hypokalaemia, hypocalcaemia or hypomagnesaemia.

- Taking medicinal products that are known to prolong the QTc interval.

- Recent treatment with medicinal products known to prolong the QTc interval that may still be circulating at the time that DHAP is started, taking into account their elimination half-life (e.g. mefloquine, halofantrine, lumefantrine, chloroquine, quinine and other antimalarial medicinal products).

- **Summary of Undesirable Effects**

A full list of undesirable effects, with frequency by system organ class and for adults/children, is provided at the end of this section.

- Most side effects are mild and resolve in few days or week.

- Serious allergic reactions: rash, facial swelling of the face, lips, tongue or difficulty in breathing → seek emergency care immediately.

- QT prolongation (heart rhythm issue) risk:

  - ECG monitoring may be required.
  - Report palpitations or irregular heartbeat.

- Common side effects in adults: anaemia, headache, fever, palpitations, ECG changes, weakness.

- Very common side effects in children: fever, cough, flu-like symptoms.

### Artesunate-Pyronaridine (ASPY):

Once daily ACT, recently validated by WHO and adopted for rotation.

- **ASPY Posology and method of administration**

Figure 12: ASPY weight bands and Posology

| Body Weight | Target daily dose (tablets/Sachets) – Once daily for 3 days | Total doses* Over consecutive 3 Days |
|---|---|---|
| 5kg to <8kg | **1 sachet** (of 20mg/60mg per day) | 3 Sachets |
| 8kg to <15kg | **2 sachets** (of 20mg/60mg per day) | 6 sachets |
| 15kg to <20kg | **3 sachets** (of 20mg/60mg per day) | 9 sachets |
| 20kg to <24kg | **1 tablet** (of 60mg/180mg per day) | 3 tablets |
| 24kg to <45kg | **2 tablets** (of 60mg/180mg per day) | 6 tablets |
| 45kg to <65kg | **3 tablets** (of 60mg/180mg per day) | 9 tablets |
| ≥65 kg | **4 tablets** (of 60mg/180mg per day) | 12 tablets |

*The prescribed or dispensed treatment must correspond to the dosage based on the patient's weight, ensuring the patient receives the correct number of doses to complete the full 3-day course.

The dose should be taken orally once a day as a single daily dose for three consecutive days with or without food.

A granule formulation is available for children weighing between 5 kg to under 20 kg.

In the event of vomiting within 30 minutes of administration after the first dose, a repeat dose should be given. If the repeat dose is vomited, the patient should be given an alternative antimalarial drug. In the event of non-severe diarrhea normal dosing should be continued.

If a dose is missed, it should be taken as soon as realized and then the recommended regimen continued until the full course of treatment has been completed.

- **Contraindications**

- Known hypersensitivity to pyronaridine or artesunate or any component of the formulation.

- Patients with clinical signs or symptoms of hepatic injury (such as nausea and/or abdominal pain associated with jaundice) or known severe liver disease (i.e. decompensated cirrhosis, Child-Pugh stage B or C).

- Severe renal impairment

***Pregnancy Note:*** ASPY is contraindicated during first trimester but indicated in second and 3rd trimester of pregnancy.

- **Summary of Undesirable Effects**

A full list of undesirable effects, with frequency by system organ class and for adults/children, is provided at the end of this section.

- Rare but serious: Monitor LFTs and ECG if clinically indicated and if risk factors exist

  - QT prolongation,
  - Hepatic injury (ALT >5x ULN)
  - Hypersensitivity reactions (rash, urticaria)

Common (>1-10%):

  - Headache, vomiting, nausea,
  - Anaemia, neutropenia, transaminase ↑
  - Bradycardia, dizziness, abdominal pain, fatigue, cough, pyrexia
  - Hypoglycaemia, eosinophilia

Very common (>10%)

  - Increased ALT/AST

## Summary Table of Undesirable Effects of Recommended ACTs

### Figure 13: Undesirable Effects of Recommended ACTs

| Undesirable effects | AL | | DHAP | | ASPY |
|---|---|---|---|---|---|
| | Adults | Children | Adults | Children | Both (Adults & Children) |
| **Infections and infestations** | | | | | |
| P. falciparum infection | | | Common | Very common | Rare |
| Respiratory tract infection | | | Uncommon | Common | |
| Influenza | | | Uncommon | Very common | |
| Ear infection | | | | Common | |
| Gastroenteritis | | | | | Uncommon |
| Malaria | | | | | Uncommon |
| Oral Herpes | | | | | Uncommon |
| Respiratory tract infection, upper respiratory tract infection | | | | | Uncommon |
| Tinea capitis | | | | | Uncommon |
| Urinary tract infection | | | | | Uncommon |
| Bronchitis, bronchopneumonia, pneumonia, rhinitis, tracheobronchitis | | | | | Rare |
| Infection parasitic | | | | | Rare |
| Pharyngitis, pharyngotonsilitis | | | | | Rare |
| Subcutaneous abscess | | | | | Rare |
| **Cardiac disorders** | | | | | |
| Palpitations | Very common | Common | | | Uncommon |
| QT prolongation (ECG) | Common | Common | Common | Common | |
| Tachycardia | | | Common | | |
| Irregular heart rate | | | | Common | |
| Cardiac conduction disorders | | | Uncommon | Uncommon | |
| Sinus arrhythmia | | | Uncommon | | Rare |
| Bradycardia | | | Uncommon | | Common |
| Ventricular extrasystoles | | | | | Uncommon |
| Arrhythmia, atrioventricular block first degree | | | | | Rare |
| Cardiac murmur | | | | Uncommon | |
| **Nervous system disorders** | | | | | |
| Headache | Very common | Common | Common | Uncommon | Common |
| Dizziness | Very common | Common | Uncommon | | Uncommon |
| Paraesthesia | Common | | | | Uncommon |
| Ataxia, Hypoaesthesia | Uncommon | | | | |
| Clonic movements | Common | Uncommon | | | |
| Dysgeusia | | | | | Uncommon |
| Somnolence | Uncommon | Uncommon | | | Rare |
| Convulsion | | | Uncommon | Uncommon | |
| **Ear and labyrinth disorders** | | | | | |
| Vertigo | | | | | Uncommon |
| Ear pain, hearing impaired, tinnitus | | | | | Rare |
| **Eye disorders** | | | | | |
| Conjunctivitis | | | | Common | Rare |
| **Respiratory , thoracic and mediastinal disorders** | | | | | |
| Cough | Common | Very common | Uncommon | Very common | Uncommon |
| Rhinorrhoea; Epistaxis | | | | Uncommon | Rare |
| Asthma, haemoptysis | | | | | Rare |
| **Gastrointestinal disorders** | | | | | |
| Vomiting | Very common | Very common | Uncommon | Common | Common |
| Abdominal pain | Very common | Very common | Uncommon | Common | Common |
| Nausea | Very common | Common | Uncommon | Uncommon | Uncommon |
| Diarrhoea | Common | Common | Uncommon | Common | Uncommon |
| Stomatitis | | | | Uncommon | |
| Constipation, dyspepsia, gastritis | | | | | Uncommon |
| Abdominal tenderness, aphthous stomatitis, stomach discomfort, tongue ulceration | | | | | Rare |
| **Skin and subcutaneous tissue disorders** | | | | | |
| Rash | Common | Common | | Common | Uncommon |
| Dermatitis | | | | Common | Rare |
| Pruritus | Common | Uncommon | Uncommon | Uncommon | Uncommon |
| Urticaria | Uncommon | Uncommon | | | |
| Angioedema* | Not known | Not known | | | |
| Acanthosis | | | | Uncommon | |
| Hyperhidrosis | | | | | Uncommon |
| Blister, urticaria papular | | | | | Rare |
| **Musculoskeletal and subcutaneous tissue disorders** | | | | | |
| Arthralgia | Very common | Common | Uncommon | Uncommon | Rare |
| Myalgia | Very common | Common | Uncommon | | Uncommon |
| Back pain | | | | | Rare |
| **General disorders and administration site conditions** | | | | | |
| Asthenia | Very common | Common | Common | Common | Uncommon |
| Fatigue | Very common | Common | | | Uncommon |
| Gait disturbance | Common | | | | |
| Pyrexia | | | Common | Very common | Rare |
| Chest pain, chills, hypothermia | | | | | Rare |
| **Immune system disorders** | | | | | |
| Hypersensitivity | Not known | Rare | | | Rare |
| **Blood and lymphatic system disorders** | | | | | |
| *Delayed haemolytic anaemia#* * | Not known | Not known | | | |
| Anaemia | | | Common | Common | Common |
| Thrombocytopenia; Leukopenia; Leukocytosis | | | | Common | Uncommon |
| Thrombocytosis; Lymphadenopathy; Hypochromasia | | | | Uncommon | |
| Neutropenia | | | | Common | Common |
| Eosinophilia | | | | | Common |
| Splenomegaly | | | | Uncommon | Uncommon |
| Increased platelet count** | | | | | Common |
| Basophilia, Lymphocytosis, Monocytosis | | | | | Uncommon |
| Lymphopenia, pancytopenia | | | | | Rare |
| **Metabolism and nutrition disorders** | | | | | |
| Decreased appetite | Very common | Very common | | | Rare |
| Hypoglycaemia | | | | | Common |
| Hyperkalaemia | | | | | Uncommon |
| Hyperglycaemia | | | | | Rare |
| Anorexia | | | Uncommon | Common | Uncommon |
| **Hepatobiliary disorders** | | | | | |
| Liver function tests abnormal | Uncommon | Common | Uncommon | Uncommon | |
| Hepatitis | | | Uncommon | Uncommon | |
| Hepatomegaly | | | Uncommon | Uncommon | Uncommon |
| Jaundice | | | | Uncommon | |
| Hepatosplenomegaly, liver tenderness | | | | | Rare |
| **Pregnancy, puerperium and perinatal conditions** | | | | | |
| Abortion complete | | | | | Rare |
| **Psychiatric disorders** | | | | | |
| Sleep disorders | Very common | Common | | | |
| Sleep talking | | | | | Rare |
| Insomnia | Common | Uncommon | | | Uncommon |
| **Renal and urinary disorders** | | | | | |
| Haematuria, proteinuria | | | | | Uncommon |
| Ketonuria | | | | | Rare |
| **Reproductive system and breast disorders** | | | | | |
| Vulvovaginal pruritus | | | | | Rare |
| **Vascular disorders** | | | | | |
| Hypertension, hypotension | | | | | Rare |

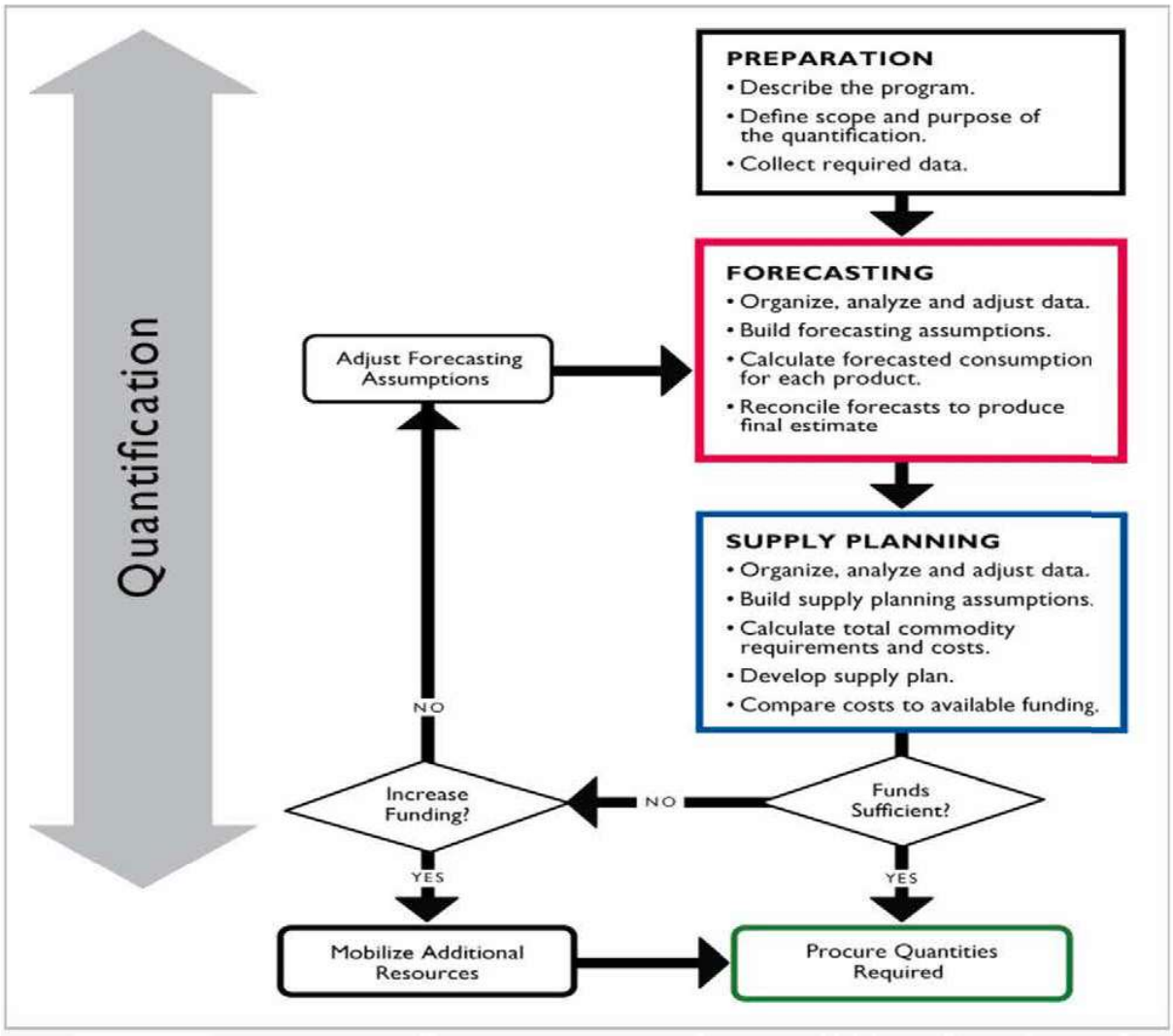
## 2. Quantification Assumptions and Forecasting Approach

The MOH, in collaboration with relevant agencies, will ensure the consistent availability of all three recommended ACTs for the treatment of uncomplicated malaria.

Drug quantification and forecasting for the MFT rollout was conducted as part of the Integrated "Coordinated Procurement and Distribution System" (CPDS) Quantification Report for public health commodities finalized in May 2025. The report presents the national forecasted results for the period covering October 2024 to June 2029 as well as commodity Supply Plan for the financial year 2025/2026, aligning with the first year of MFT implementation.

Forecasting was conducted using the Quantification Analytics Tool (QAT) supported by GHSC-PSM (Global Health Supply Chain program – Procurement and Supply Management project) with funding from USAID and validated by the national Quantification Committee.

Figure 14: Rwanda Quantification Flow




A continuous monitoring to ensure uninterrupted availability of malaria commodities and to avoid losses due to expiry is done through quarterly supply plan reviews and monthly stock status

assessment.

ACT forecasts are based on:

- Estimated number of uncomplicated malaria cases per district.
- Population distribution by block.
- MFT block assignment and rotation schedule of first-line treatments.
- Historical consumption trends and expected weight band distributions.
- Buffer stock needs 25-30% and wastage estimates.

Rwanda has been divided into three implementation blocks (A, B, C), each will use a different first-line ACT per year, rotating over a three-year cycle. Although each block has a designated ACT per year, all three ACTs will remain available in all districts to cover treatment failures, contraindications, and special cases (e.g., pregnancy).

Block A was selected to start with DHAP due to surveillance evidence of reduced AL efficacy.

## 3. Assumptions and Drug Forecasting

Malaria cases were categorized in two: Simple (Uncomplicated) Malaria (98.77%) and complicated (Severe) Malaria (1.23%). This breakdown results from the repartition of cases as observed from September 2022 to September 2023. Following the resistance emergence to AL, the MOPDD proposed the management of uncomplicated Malaria with AL: 28. 95%, DHAP: 44.65% and ASPY: 26.38%.

By increasing the number of molecules in the Malaria treatment guideline, the MOPDD expects to reduce the pressure on AL and reduce the observed resistance to this molecule. AL and DHAP will be managed under four formulations, whereas only two formulations for ASPY will be considered.

Figure 15: Summary of projection of Malaria Cases and Treatment Courses July 2025-June 2029

| ACTs | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 |
|---|---|---|---|---|
| Number of malaria cases to be treated | 1 156 140 | 1 156 140 | 1 098 333 | 1 043 417 |
| **Total ACTs needs** | **1 644 625** | **1 557 313** | **1 166 320** | **1 536 744** |
| AL 1 x 6 | 30 955 | 26 560 | 37 663 | 38 405 |
| AL 2 x 6 | 47 623 | 40 861 | 57 943 | 59 084 |
| AL 3 x 6 | 40 480 | 34 732 | 49 252 | 50 222 |
| AL 4 x 6 | 119 059 | 102 153 | 144 858 | 147 711 |
| **Total AL** | **238 117** | **204 306** | **289 716** | **295 422** |
| ASPY 20/160 mg | 99 858 | 150 994 | 85 181 | 121 138 |
| ASPY 60/180mg | 457 127 | 691 218 | 389 940 | 554 545 |
| **Total ASPY** | **556 985** | **842 212** | **475 121** | **675 683** |
| DHAP 20mg/160 mg | 72 922 | 43 846 | 34 463 | 48 554 |
| DHAP 30 mg/240 mg | 178 659 | 107 423 | 84 434 | 118 957 |
| DHAP 40 mg/320 mg | 275 273 | 165 514 | 130 093 | 183 285 |
| DHAP 80 mg/640 mg | 322 669 | 194 012 | 152 493 | 214 843 |
| **Total DHAP** | **849 523** | **510 795** | **401 483** | **565 639** |

**Breakdown of ALs:** The historical trend of AL breakdown was analyzed to appreciate changes and decide which breakdown to use for future AL use. After discussion with the CPDS team and the

MOPDD leadership, the breakdown to be used for AL was agreed to be calculated by taking the average of breakdown of 2019 to 2023. This decision was motivated by the fact that the exact breakdown couldn't be estimated as a combination of different AL weight bands had occurred since 2019 to avoid wastage.

### Figure 16: Breakdown of Als

| AL Breakdown | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 |
|---|---|---|---|---|
| AL 1 x 6 | 13% | 13% | 13% | 13% |
| AL 2 x 6 | 20% | 20% | 20% | 20% |
| AL 3 x 6 | 17% | 17% | 17% | 17% |
| AL 4 x 6 | 50% | 50% | 50% | 50% |

**Breakdown of DHAPs:** DHAP is one of the six ACTs recommended by MOH for the management of uncomplicated malaria. For people living in Africa, DHAP was reported to cure more cases and to prevent more re-infection long after treatment in comparison with other ACTs. In addition, its mode of administration (once a day) has significantly reduced treatment failure among Africans. In Rwanda, DHAP was introduced in the NTG as first line treatment for the management of uncomplicated malaria along with AL and ASPY. DHAP will treat 44.65% of total uncomplicated malaria cases starting from September 2025 of which is the first year of the MFT plan.

### Figure 17: Breakdown of DHAPs

| DHAP Breakdown | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 |
|---|---|---|---|---|
| DHAP 20mg/160 mg | 9% | 9% | 9% | 9% |
| DHAP 30 mg/240 mg | 21% | 21% | 21% | 21% |
| DHAP 40 mg/320 mg | 32% | 32% | 32% | 32% |
| DHAP 80 mg/640 mg | 38% | 38% | 38% | 38% |

**Breakdown of ASPY:** ASPY has been tested, and its efficacy has been demonstrated by many randomized controlled trials. In 2019, it was labelled by the WHO as a "safe and efficacious ACT for the treatment of uncomplicated malaria in adults and children weighing 5 kg or more in malaria-endemic areas". In contrast to AL, it has not yet shown emergence of resistance and does not require the intake of fatty acid to improve its bioavailability. ASPY is considered as an alternative drug to AL and DHAP for the Management of uncomplicated Malaria. Out of total uncomplicated malaria cases in Rwanda, 26.4% of them will be treated using ASPY. **Warning:** Pregnant women in their first trimester in ASPY districts will receive DHAP, which is safe in early pregnancy.

### Figure 18: Breakdown of ASPY

| ASPY Breakdown | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 |
|---|---|---|---|---|
| ASPY 20/160 mg | 18% | 18% | 18% | 18% |
| ASPY 60/180mg | 82% | 82% | 82% | 82% |

## 4. Procurement Planning and Budgeting

Procurement planning was conducted by MOH, MOPDD and RMS, in collaboration with Global Fund, WHO, PMI, and partners.

**Procurement Steps:**

- Annual quantification using QAT and e-LMIS data
- Tendering and supplier contracting based on both WHO criteria and funding partners' specific regulations.
- Buffer stock (25-30%) and expiry adjustment built into delivery schedule
- Coordination with private wholesalers to procure ACTs for private clinics and pharmacies.

ACT Procurement costs for FY2025-2026:

- Total Estimated Cost: USD 2.91M
    10. AL: USD 113,580
    11. ASPY: USD 1.16M
    12. DHAP: USD 1.64M

Figure 19: Total malaria annual forecasted cost (USD) July 2025-June 2029

| ACTs | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 |
|---|---|---|---|---|
| **Number of malaria cases to be treated** | 1 156 140 | 1 156 140 | 1 098 333 | 1 043 417 |
| **Total ACTs needs** | **$ 2 910 487** | **$ 3 731 663** | **$ 3 107 964** | **$ 3 814 031** |
| AL 1 x 6 | $ 6 810 | $ 7 253 | $ 7 724 | $ 8 226 |
| AL 2 x 6 | $ 16 675 | $ 17 758 | $ 18 913 | $ 20 142 |
| AL 3 x 6 | $ 19 835 | $ 21 124 | $ 22 498 | $ 23 960 |
| AL 4 x 6 | $ 70 261 | $ 74 827 | $ 79 691 | $ 84 871 |
| **Total AL** | **$ 113 580** | **$ 120 963** | **$ 128 826** | **$ 137 199** |
| ASPY 20/160 mg | $ 46 634 | $ 75 098 | $ 45 119 | $ 68 336 |
| ASPY 60/180mg | $ 1 112 191 | $ 1 791 046 | $ 1 076 066 | $ 1 629 776 |
| **Total ASPY** | **$ 1 158 825** | **$ 1 866 143** | **$ 1 121 185** | **$ 1 698 112** |
| DHAP 20mg/160 mg | $ 64 288 | $ 68 467 | $ 72 917 | $ 77 657 |
| DHAP 30 mg/240 mg | $ 219 322 | $ 233 578 | $ 248 761 | $ 264 930 |
| DHAP 40 mg/320 mg | $ 518 112 | $ 551 790 | $ 587 656 | $ 625 854 |
| DHAP 80 mg/640 mg | $ 836 359 | $ 890 722 | $ 948 619 | $ 1 010 280 |
| **Total DHAP** | **$ 1 638 082** | **$ 1 744 557** | **$ 1 857 953** | **$ 1 978 720** |

Following the quantification process, RMS launched a public tender for the procurement of the two new ACT molecules (DHAP and ASPY) in 2024. The full procurement cycle was completed, including supplier selection, contract negotiation, and placement of orders.

Early 2025, the ordered treatments have been received in-country and are stored at the RMS Central Warehouse. Distribution preparations are underway for nationwide deployment in line with the MFT launch.

A key principle is equitable distribution: all districts must begin MFT with the correct ACT, in sufficient quantities, and with access to limited amounts of the two alternate ACTs.

## 5. Transition and Implementation Phase

The implementation of MFT across Rwanda will begin simultaneously nationwide in September 2025, with all three blocks starting their respective ACT rotations on the same date. Therefore, it is essential that each block receives the correct first-line ACT in advance of the launch, along with sufficient quantities of alternative ACTs to manage exceptions (e.g., treatment failure, contraindications, or pregnancy).

Each block (A, B, C) must be ready to implement its assigned first-line ACT on Day 1 of the transition, in accordance with the national rotation calendar.

This synchronized rollout requires early and precise adjustments of existing antimalarial stocks particularly AL, which remains widely stocked in facilities due to its former status as the sole first-line treatment.

**Central Stock Adjustment Process**

The MOPDD, in coordination with RMS Central and Branch Warehouses, has established the following approach:

- A detailed district- and block-level quantification was produced by MOPDD to estimate required stock levels of each ACT (DHAP, AL, ASPY) for Year 1 of MFT.
- In Blocks A and C, where AL is no longer the first-line treatment: any AL stock exceeding the MOPDD forecasted needs (for alternative use) will be recalled and transferred to:
    13. Block B districts (where AL is the first-line ACT),
    14. RMS regional warehouses for buffer management,
    15. Or RMS Central Warehouse as part of the national reserve.
- Reverse logistics processes will be activated and guided by RMS operational SOPs to ensure traceability, rapid stock rebalancing, and minimal expiry risk.
- For Block C that prioritize ASPY as their initial treatment option, rescue therapy will be employed as the first-line treatment for pregnant women during their first trimester.

This stock balancing must be completed before the start of MFT in September, to avoid delays or inconsistencies in drug deployment across the country.

**Facility and CHW-Level Readiness**

Each health facility receives:

- The designated first-line ACT for their block, in quantities sufficient for at least the first quarter.
- A minimum buffer stock of the other two ACTs for:
    16. Rescue therapy (treatment failures, side effects),
    17. Pregnancy-specific regimens (e.g., DHAP in ASPY blocks),
    18. Clinical contraindications.

CHWs will receive:

- Only the designated first-line ACT for their block, in sufficient quantities for their expected caseload.

Facilities will not delay MFT initiation based on remaining AL stock. Instead, any unneeded quantities

will be flagged for return during the pre-launch stock reconciliation process.

CHWs will be trained and instructed to:

- Begin using the new ACT as of the launch date.
- Complete AL returns (if applicable) via their health facility or local coordination structure.
- Maintain records of remaining stock, consumption, and transfers via standard MFT reporting forms.

**Private Sector Engagement and Coordination**

The private sector plays a crucial role in malaria management in Rwanda and must be actively engaged to ensure the effective implementation of MFT. For successful execution of this strategy, the private sector must adhere to its guidelines. To facilitate this, a ministerial instruction will be developed and disseminated across existing platforms, including associations of private pharmacists, private healthcare facilities, and other relevant stakeholders, to ensure proper adoption and implementation of the MFT strategy.

The MOPDD, has proactively engaged with them, the inclusive dialogue aims to ensure:

- Adherence on MFT protocols within private facilities
- Clear understanding of ACT allocation by block,
- Alignment of private sector procurement with the national rotation schedule

In Block B, where AL remains the only authorized first-line treatment, private pharmacies may experience reduced revenue due to the lower price of AL compared to DHAP and ASPY. This limitation on higher-cost ACTs may affect turnover and business sustainability. To address this:

- The MOH and MOPDD will continue consultations with private sector representatives to evaluate the financial impact,
- Public-private mechanisms will be explored to maintain engagement and mitigate losses, such as access to other high-demand public health commodities.

Pharmaceutical wholesalers, as key supply chain actors, will be engaged to:

- Adjust ACT distribution by block,
- Prevent cross-district or off-protocol circulation,
- Participate in inventory risk-sharing discussions (e.g., buy-backs, slow-moving stock exchanges).

A national MOH directive will outline private sector expectations and restrictions under the MFT strategy. Joint supervision involving MOH, RFDA, and district inspectors will monitor adherence to ACT allocation.

## 6. Storage and Distribution by Block

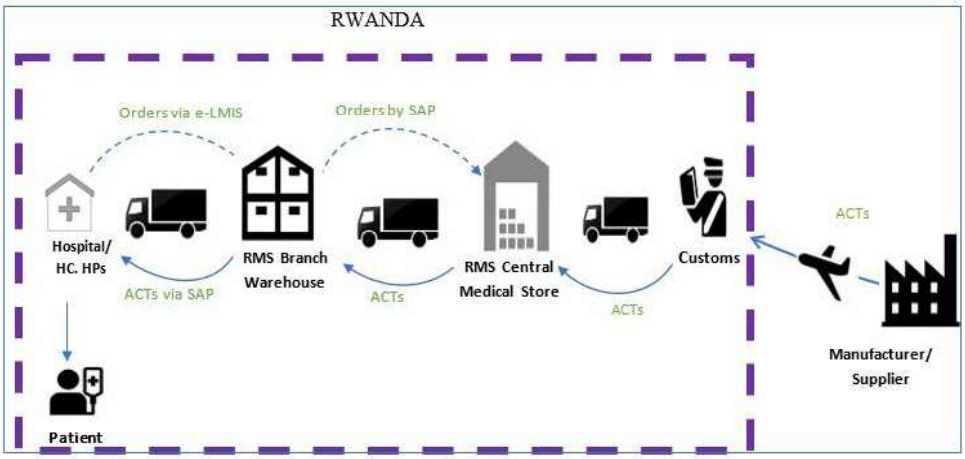
The distribution of ACTs under MFT follows a block-based model, ensuring that each block receives its assigned first-line ACT in line with the national rotation calendar.

RMS Supply Chain Team leads all storage and distribution operations, supported by district pharmacists and facility-level staff.

The supply chain flow is structured as follows (Figure 20):

- At the central level: RMS HQ receives ACT shipments from suppliers and stores them under proper conditions. Once received, medicines are prepared for allocation according to the national distribution plan validated by MOPDD.
- At the regional level: Following the procurement and availability of new treatment molecules, RMS branches will submit requisitions to the RMS HQ. They will request the new molecules designated for their specific block in accordance with the MOPDD distribution plan. ACTs are transferred then to RMS Regional Warehouses, prepared for block-specific disaggregation. They coordinate the movement of products to district pharmacies and health facilities according to their assigned ACT. If applicable, they will manage reverse logistic either by redistributing AL to other blocks or to RMS HQ.
- At the district level: ACTs are delivered to RMS branches, which manage local stock allocation to health facilities and CHWs operating within the district.
- At Health Posts level: Health posts will place orders for Malaria medicines and rapid diagnostic tests through the RMS branches that serve their respective catchment areas.
- At community level: CHW will convene at the cell level to collaboratively redistribute any remaining stock among themselves before introducing the new treatment molecules. Monthly reports from cell coordinators should accompany requisitions for the new molecules allocated to their blocks.

Figure 20: Rwanda Supply Chain Flow




**ACT Distribution in Rwanda**

LEGEND

1. Government of Rwanda and partners procure Artemether Combined Treatment (ACTs) from pharmaceutical firms of Suppliers
2. Through customs, Rwanda Biomedical Center staff and Rwanda Medical Supply received ACTs and send them to central medical stores of RMS
3. RMS branches request ACTs via new tool (SAP) from RMS CMS and the later deliver ACTs to RMS Branches using SAP as well
4. Health facility (Hospital, health center and health posts) request ACTs via electronic Logistics Management Information System (e-LMIS)
5. RMS Branches convert e-LMIS orders into SAP and serve these orders through SAP
6. RMS branches send shipments served via e-LMIS and
7. Health facilities received them into e-LMIS and serve the clients

**Distribution Plan Highlights:**

The distribution of medicines will follow established national distribution channels. The MOPDD will formulate a comprehensive distribution plan based on projected Malaria cases in each block, detailing

the specific quantities of medicines required. This plan will be communicated to the central warehouse of RMS, which will subsequently share it with its branches.

RMS branches will submit their requisitions through the standard requisition channels, adhering to the quantities outlined in the distribution plan. Health facilities will use the established requisition tools, such as the e-LMIS or any newly approved logistics tool, to place their orders.

Following the initial distribution, subsequent requisitions will reflect the actual consumption recorded at each health facility and branch. Orders will continue to be placed through the usual channels, primarily via e-LMIS. When necessary, Zipline may be employed as a transportation method to prevent stockouts, ensuring that medicines are delivered promptly from RMS to the facilities.

The current tool utilized for requisitions between the RMS Central Warehouse and RMS branches is e-LMIS. This same system is employed for transactions between RMS branches and health facilities. To streamline the ordering process, RMS will generate specific codes for the new medicines. These codes will be communicated to both health facilities and RMS branches to facilitate efficient ordering through e-LMIS.

MOPDD with RMS HQ will ensure that:

- All health facilities and CHWs received their designated ACT before September 2025.
- Backup stock of the two alternate ACTs is included in every distribution to ensure readiness for clinical exceptions.
- Requisition and reporting well managed via e-LMIS, with unique product codes for each ACT and formulation.
- Facilitate Zipline drone deliveries in hard-to-reach or urgent locations to prevent stockouts.

Facility readiness will be confirmed through pre-launch supervision and district validation.

**Figure 21: Distribution Plan and Timeline for Year 1**

| Activity | Responsible | Target Date |
|---|---|---|
| Final validation of block ACT allocations | MOPDD / RMS | August 2024 |
| Receipt and central storage of ACTs | RMS Supply Chain Team | May 2025 |
| Block-specific distribution to districts | RMS | Early June 2025 |
| Distribution to health facilities and CHWs | RMS branches at District level | June 2025 (prior to MFT launch) |

Transition procedures are being established to manage reverse logistics at the end of each rotation year, ensuring that residual ACT stocks are recovered and reallocated appropriately.

RMS and RBC/ MOPDD will collaborate to perform the reverse logistics and redistribution of residual stock as needed.

Reverse Logistics Process for Malaria Drugs in the Context of MFT Implementation

The reverse logistics of malaria drugs refers to the systematic return of malaria commodities from Health Facilities or Community Health Workers (CHWs) to RMS Branches, RMS Headquarters, or other designated Health Facilities, as directed by RBC/MOPDD. This process is undertaken for redistribution purposes in response to various factors, including the risk of product expiration, localized stock shortages, quality control concerns, or any other reasons as determined by RMS Ltd.

Reverse logistics may be required at the onset of the Multiple First-Line Treatment (MFT)

implementation or during transitional phases, to ensure the reallocation of residual stock in alignment with the designated treatment blocks, thereby promoting the rational use of malaria products.

**Reverse Process Flow:**

Community Level:

CHWs, under the coordination of the Cell Environmental Health Officer (CEHO) at the Health Center, will assess and identify excess stock for return. These products will be returned to the Health Center during the monthly coordination meetings, which coincide with report compilation.

Health Facility Level:

At the Health Center, the head of the facility will approve the reverse logistics request after a thorough analysis of stock levels against projected consumption, based on malaria transmission trends. Approved products will be transported by the Health Facility to the RMS Branch. This activity will be carried out under the coordination of the District Malaria Task Force and the RBC/MOPDD supervisor assigned to the respective district.

RMS Level:

Upon receipt, RMS Branches will follow the Reverse Logistics Standard Operating Procedures (SOPs) established by RMS Ltd. Depending on stock redistribution needs, RMS Branches may either:

19. Transfer the received stock to other RMS Branches in accordance with the MFT rotation strategy, or
20. Redistribute the commodities to other Health Facilities within the same district facing shortages.

This process should be conducted promptly to mitigate the risk of product expiration and to avoid stockouts at the receiving facilities. All stakeholders involved must ensure efficient coordination and adherence to established SOPs to maintain the integrity of the supply chain and support the effective implementation of MFT

**Private Clinics and pharmacies in MFT implementation**

To ensure the effective implementation of the Multi First Line Treatment (MFT) as outlined in the deployment plan for each block, all private clinics and retail pharmacies must submit their requests to pharmaceutical wholesalers. These requests should align with the medicines allocated to their respective blocks and follow the rotation schedule established by the Malaria and Other Parasitic Diseases Division (MOPDD).

**Dispensing of MFT Medicines in Public and Private**

Malaria medications (AL, ASPY, DHAP) will be dispensed only after a confirmed diagnosis of Malaria, which must be established through either a Rapid Diagnostic Test or a microscopy blood smear (BS).

It is strictly prohibited to dispense Malaria medications without a valid medical prescription in both public and private healthcare settings.

## 7. Tracking Drug Flow and Consumption

Accurate tracking of ACT stocks and consumption is a critical priority for MFT implementation.

Two national systems support MFT implementation:

**eLMIS:** Provides real-time tracking of ACT stock levels and movements from the central warehouse

down to CHW level. It supports:

- Monitoring stock on hand by ACT and block
- Tracking ACT shipments and distribution timelines
- Triggering alerts when stock thresholds are breached.

**HMIS:** Tracks malaria case management and ACT consumption data by block and facility. It enables verification that:

- The correct ACT is being used in each block
- Consumption patterns align with the rotation calendar.

At each level of the health system:

- District Pharmacists: Oversee stock management and reporting for RMS branch and health facilities.
- Health Facility Staff: Manage stock at facility level and ensure compliance with block-specific ACT use.
- CHWs: Record ACT use at the community level, and report through standard tools.

Monthly MFT Stock Review Meetings will be convened by MOPDD and RMS to:

- Analyze stock trends and consumption patterns.
- Ensure rotation compliance
- Identify supply risks or stock imbalances.
- Plan adjustments or need for redistribution or reallocation.

## 8. Planning for Year 2 and Year 3 Implementation

To manage the annual rotation of ACTs, RMS and the MOPDD at RBC conduct advance planning to assess remaining stocks, coordinate redistribution, and ensure timely delivery of the new ACTs. Health facilities receive clear guidance on stock management and the use of residual stocks as second-line treatments where appropriate.

For Year 2 (2026-2027), RMS and MOPDD will update district-level forecasts based on actual consumption and updated case trends. Reverse logistics for Year 1 ACTs will begin in Q2 of 2026 to allow smooth transition.

Procurement planning will factor in revised quantities, shelf-life considerations, and any emerging resistance data. Year 2 deployments will follow the block rotation schedule:

- Block A: ASPY
- Block B: DHAP
- Block C: AL

The same preparation processes used in Year 1 will be replicated: supplier contracts extension or rebid as necessary; RMS will plan deliveries and distribution targets; and district readiness will be verified through supervision.

For Year 3 (2027–2028), the rotation continues:

- Block A: AL
- Block B: ASPY
- Block C: DHAP

Lessons learned during Year 1 and 2 including supply chain risks, stock variability, consumption patterns, and clinical feedback will be analyzed and integrated into Year 3 planning to improve forecasting accuracy and efficiency. Ongoing stakeholder engagement, particularly with the private sector and RMS branches, will remain key.

# IV. Training and Capacity Building

Effective training and capacity building is critical to ensure the successful implementation of Rwanda's MFT strategy. Given that Year 1 of MFT is launching in September 2025, a structured training plan was rolled out from 2024 to early 2025 to prepare healthcare providers, supervisors, and CHW for the new therapeutic approach.

A national cascade model was applied from central to community level with strong partner support and coordination by MOPDD and RBC.

The training content was aligned with national treatment guidelines, MFT strategy and WHO recommendations.

The training process was designed to flow seamlessly from the central level down to the community level, ensuring comprehensive knowledge transfer and effective implementation at all stages. The methodology section outlines the training delivery approach, while a draft agenda is included for each respective level to guide the training sessions.

The methodology combines theoretical learning with practical application:

- Lectures and Presentations to deliver in-depth knowledge.
- Interactive Workshops and Case Studies to develop problem-solving and leadership skills.
- Hands-on Exercises and Role-Playing to reinforce operational tasks.
- Peer Learning and Field Visits for contextual learning and adaptation.

Training was delivered using standard national materials, including:

- Revised National Malaria Treatment Guidelines.
- Job Aids, Flipcharts, and Q&A Booklets.
- Weight-band dosing charts and ACT decision algorithms.
- Training manuals and supervision tools.

## 1. Training Modules by Level

Training was delivered through a mix of formats of virtual trainings and face-to-face sessions conducted at hospital and health center levels where feasible.

Training materials have been tailored to the specific needs of different levels of the health system, ensuring that all actors understand their roles in MFT implementation.

Figure 22: Training planning and Timeline for Year 1

| Level | Target Audience | Key Training Modules | Timeline |
|---|---|---|---|
| Central | MOPDD staff, Maternal child and community health (MCCH) division, MOH, RFDA, Civil Society Organizations (CSOs) and partners (Ministry of local government, WHO, PMI, TUBEHO Project/Jhpiego, UNICEF, CHAI) | Overview of MFT rationale and objectives.<br>National MFT rotation calendar and block assignments.<br>Procurement, storage, and distribution procedures for ACTs under MFT.<br>Monitoring and evaluation frameworks.<br>Coordination and supervision mechanisms. | December 2024 |
| District | Hospital DGs, Clinical & Nursing Directors, CHW Supervisors, Pharmacists | Block-specific ACT assignment and compliance.<br>District-level supply chain management for MFT.<br>Clinical management of uncomplicated malaria under MFT.<br>Data collection and reporting requirements (eLMIS, HMIS).<br>Supervision tools and supportive supervision techniques. | November -December 2024, 2 Weeks |
| Sector Level | Heads of Health Centers, HC Nurses, HP nurses, Community & Environmental Health Officers, Data Managers | Sector-level MFT implementation strategies<br>Training of CHWs on MFT protocols<br>Adherence monitoring and patient education<br>Data management and reporting<br>Basic epidemiology and public health principles | February, March 2025 |
| Community | CHWs, Volunteers, Local Leaders | Basics of Malaria and MFT Importance<br>Proper Administration of the three ACTs<br>Educating Patients on Treatment Adherence and Side Effects<br>Community-Based Monitoring and Reporting<br>Engaging Community Leaders and Volunteers | April 2025 |

## 2. Clinical and Product-Specific training

A core component of MFT training is equipping clinical providers with the knowledge and skills required to correctly prescribe and manage all three ACTs included in the national MFT strategy:

- Artemether-Lumefantrine (AL)
- Dihydroartemisinin-Piperaquine (DHAP)
- Artesunate-Pyronaridine (ASPY)

Clinical training modules cover:

- Pharmacology and administration protocols for each ACT.
- Block-specific assignment of ACTs.
- Patient counselling for adherence and management of potential side effects.
- Identification and management of contraindications and drug interactions.
- Treatment of special populations (pregnant women, infants, patients with comorbidities).
- Transition management during ACT rotations.

Given that MFT involves the introduction of two ACTs that are new to most frontline providers (DHAP and ASPY), significant emphasis is placed on ensuring that providers feel confident in using all three ACTs and in explaining the rotation rationale to patients. A digital prescription support tool has been developed to assist clinicians in accurately prescribing the newly introduced ACTs in regions where these treatments have been deployed.

## 3. Pharmacovigilance Integration

Strengthening pharmacovigilance is a critical priority for MFT, given the expanded therapeutic portfolio and the goal of preserving ACT efficacy.

Training in pharmacovigilance is being integrated across all levels of the training cascade. It covers:

- The importance of monitoring and reporting ADRs.
- Standard procedures for identifying, managing, and documenting ADRs.
- Use of the national pharmacovigilance reporting forms and channels (linked to RFDA).
- Roles and responsibilities of health providers, supervisors, and CHWs in ADR reporting.
- Procedures for escalating serious adverse events (SAEs).

Emphasis is placed on building a culture of proactive reporting, rather than fear of blame, and on ensuring that all actors understand the importance of pharmacovigilance in supporting the long-term success of MFT.

Facility-based and CHW training includes practical exercises and case studies to build skills in ADR recognition and reporting. Supervisors are also trained to monitor and support adherence to pharmacovigilance protocols during routine supervision visits.

Health facilities can use the digital channel to report ADR to Rwanda FDA through online PViMS system accessible on:

https://pvims.rwandafda.gov.rw/security/landing.

Or Vigimobile system accessible on:

https://vigiflow-eforms.who-umc.org/rw/adr.

Or using paper-based reporting forms (Figure 23), CHWs will report through HCs.

## Figure 23: Adverse Drug Reactions reporting form




P O. Box 1948 Kigali
info@rwandafda.gov.rw
www.rwandafda.gov.rw

QMS N°: DIS/FOM/129
Rev. N°: 1
Effective date : 28/09/2021
Ref. Doc. : PSM/GDL/011

**ADVERSE DRUG REACTION/ADVERSE EVENT FOLLOWING IMMUNIZATIONREPORTING FORM**

| Type of Report | Seriousness of ADR/AEFI | Category of Suspected Product |
|---|---|---|
| Initial☐ Follow up☐ | Serious☐Not Serious☐ | Medical product☐ Vaccine☐ |

**I.PATIENT INFORMATION**

Patient ID/initials: _____Gender: Male ☐Female ☐Weight(kg)_____

Height (m): _____Pregnancy Status: YES ☐ NO ☐Date of birth: ____/____/____

Patient Address:Village _____Cell: _____

Sector: _____District: _____ Phone N° _____

Patient's Medical History(Provide any relevant medical history and laboratory results including dates (if done):
.....
.....
.....
.....
.....

**II. INFORMATION ON ADVERSE EVENT(S)**

Brief description of the ADR/AEFI:

(a) Information on Onset:
Date of ADR/AEFI onset: ____/_____/_____(dd/mm/yyyy)
Time of onset: _____/____/_____ (hours, Min, Sec)
Date ADR/AEFI stopped: _____/ ____/_____(dd/mm/yyyy)

(d) Adverse Event Evolution/ Outcome:
Recovered ☐ Recovering ☐ Recovered with sequelae ☐
Not recovered ☐ Congenital abnormality ☐ Death ☐ Unknown ☐

(b)Severity of the ADR/AEFI: Mild ☐ Moderate ☐ Severe ☐ Unknown ☐

Reason for seriousness: Prolonged hospitalization☐Disability ☐Congenital abnormality☐Death☐Life threatening☐

(e)Causality of the ADR/AEFI (If performed):
Certain☐Probable/Likely ☐Possible ☐Unlikely ☐Unclassifiable ☐

(c) Action Taken:
Drug withdrawn ☐ Dose increased ☐ Dose reduced ☐Dose not changed ☐Substituted ☐Antidote ☐Other☐( Specify): .....
.....
.....

(f) Optional information:
☐Therapeutic Failure *(Provide information on medicine (s) or vaccine (s) that showed lack of efficacy*.....
☐Medication errors *(Provide details of medication errors)*
.....

**III. INFORMATION ON SUSPECTED PRODUCT**

**A. Details of suspected medicinal product** Source/Supplier:.....

| Product brand name&manufacturer | Generic name/ /Strength/ Dosage form | Route of Administration | Dose and frequency | Starting Date and Time | Stopping Date and Time | Batch N°. & Expiry date | Indications (Reason for use) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Other medicines used at the same time and/ or in the last one month (including herbal medicines) | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**B. Details of Suspected Vaccine**

| Name of vaccine | Date of vaccination | Time of vaccination | Dose (1st, 2nd, 3rd etc.) | Batch/Lot N° &Expiry date | Diluent (if applicable) Name of diluent | Batch/Lot N°& Expiry date | Date & time of re-constitution |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**IV. REPORTER INFORMATION**

| Name of reporter: | | Qualification: | | Phone number | |
|---|---|---|---|---|---|
| Health Facility Name: | | District: | | Report Reference N° | |
| E mail Address of Reporter: | | Contact/Tel N°: | | Date of report: | |

*Note: Reporters and patients' identity are held in strict confidentiality by Rwanda FDA and protected to the fullest extent of the Law. Once this form is completed please send it to Rwanda FDA via the following email: pv_sm@rwandafda.gov.rw*

## 4. Monitoring, Evaluation and Post-Training Follow-up

To assess effectiveness, all training modules incorporated knowledge tests and feedback forms.

Supervisory teams at district and sector level reviewed implementation progress through observation, report validation, and supportive mentorship visits. Gaps identified during these visits are flagged for follow-up through peer coaching or targeted refreshers.

A national plan for continuous learning was developed to address potential knowledge decay due to the time lag between training and the MFT launch. Healthcare workers retain access to training modules, and refresher materials are available on-demand.

From the third quarter following the start of implementation, hospitals will lead refresher trainings, with tailored sessions for sectors preparing to switch ACTs. These refreshers are required in advance of each annual ACT rotation to ensure readiness and protocol adherence.

Refresher coverage and knowledge indicators will be tracked via national supervision checklists and linked to facility performance metrics.

The blended cascade training approach adopted by Rwanda enabled inclusive, cost-effective, and scalable preparation for MFT implementation. With early investments in both digital and face-to-face formats, all levels of the health system were reached. Built-in mechanisms for follow-up, refresher training, and performance tracking ensure that MFT knowledge remains current and actionable throughout Year 1 and during each ACT rotation in the future.

# V. Social Behavior Change Communication

## 1. Purpose and Strategic Objectives

Community and provider engagement is a critical pillar of Rwanda's MFT strategy. As the first rotation cycle scheduled to begin by September 2025, concerted efforts are underway to ensure that communities, health providers, and CHWs understand the rationale for the strategy and are prepared to support its effective implementation.

Early experiences from MFT pilot studies in other countries along with international guidance from the WHO MFT Implementation Guide (2024), underline the importance of building trust, clarity, and transparency when introducing a rotation of first-line antimalarial drugs. Confusion or poor adherence at the community level can undermine both the operational and public health goals of MFT.

The national engagement approach is based on a multi-level strategy that combines SBC, provider and CHW counseling, and targeted interventions to promote treatment adherence across all population groups. It aims to:

- Increase awareness among communities, health providers, and the private sector about the rationale and benefits of the MFT strategy.
- Promote adherence to the full treatment regimen.
- Ensure correct use of all antimalarial drugs per block assignment.
- Build trust in new ACTs and reduce potential spread of resistance to antimalarial drug.

## 2. Target Audiences

The SBC strategy identifies specific audiences for tailored messaging and engagement:

- General public, patients and caregivers and community members
- Community Health Workers
- Public and private healthcare providers
- Local leaders and influencers
- Local leaders
- Medias

## 3. Social Behavior Change tools

A comprehensive package of SBC tools has been developed to support community engagement during MFT rollout.

SBC tools will include:

- Malaria & MFT Flipchart for Health Care Providers and CHW-led education sessions, designed to explain the MFT strategy in simple, visual terms.
- Q&A Booklet to be used by health facility staff and CHWs, providing clear answers to common questions about MFT and malaria management.
- Printed and digital posters and leaflets to reinforce key messages at health facilities and in community spaces through community dialogues forum, home visit by CHW.
- Mass media: Radio and TV talk shows, Radio and TV spots, DJ motion and local media messages,

to ensure consistent public messaging across channels.

- Social media and SMS Alerts for urban populations and youth engagement.
- Announcement to the decentralized level, churches, and community service day (Umuganda)

Key messages conveyed through these channels may include:

"Malaria medicines may change each year; this is part of the national strategy to protect effective treatment."

"All malaria medicines used are tested, safe, and effective."

"Patients must complete the full treatment course, even if the medicine changes from previous years."

## 4. Counseling strategies for rotating drugs

Health providers and CHWs play a central role in explaining the MFT strategy to patients during clinical encounters. Training modules at all levels emphasize the importance of consistent and clear counseling messages.

Counseling during consultations must include:

- Explaining that Rwanda is introducing the concept of rotation of malaria treatments to ensure long-term protection against drug resistance.
- Reinforcing that malaria treatment is only given after a confirmed positive test (via RDT or microscopy).
- Reassuring patients that the treatment they receive is safe, effective, and approved by the Ministry of Health.
- Emphasizing weight-based dosing and the need to complete the full treatment course, even if symptoms improve before the last dose.
- Giving guidance on correct administration: for instance, AL should be taken with fatty food to enhance absorption.
- Addressing concerns about receiving a different drug from a previous visit or other districts.
- Reinforcing key messages about prevention, such as the continued importance of mosquito net use.
- Instructing patients to return to the facility or CHW if symptoms persist or worsen, as this could indicate drug resistance or require follow-up treatment.

Special attention is given to preparing providers and CHWs to handle community misconceptions, including:

- Fears that a new drug may be less effective.
- Misunderstandings about why different drugs are used in different places or at different times.
- Potential confusion if patients cross block boundaries and encounter different treatment protocols.

To support counseling quality, job aids and visual tools will be distributed to providers and CHWs. Supervisors will monitor counseling practices during routine supervision visits and provide on-the-job coaching as needed.

## 5. Promoting and Ensuring adherence at community level

Promoting and supporting adherence to treatment is a core priority under MFT, as adherence is essential both to achieving clinical cure and to preventing the emergence of drug resistance.

CHWs and facility-based providers are the frontline actors in promoting adherence.

Their responsibilities include:

- Providing clear instructions on dosing schedules at the time of treatment.
- Using Flipcharts and QA materials to reinforce adherence messages.
- Conducting follow-up visits at community level.
- Monitoring for signs of non-adherence, ADR or treatment failure and reporting concerns through established channels.

Community engagement activities including radio messaging and local leader involvement further reinforce adherence messages at population level.

Monitoring adherence during Year 1 implementation will rely on:

- Routine supervision visits with direct observation of counseling practices.
- CHW reports on patient follow-up and treatment completion.
- Community feedback mechanisms integrated into ongoing MFT monitoring and evaluation efforts.

Strengthening adherence promotion remains an ongoing focus area for MFT implementation. Lessons from the first rotation cycle will inform adjustments to SBC strategies, supervision approaches, and community mobilization efforts.

## 6. Private Sector Engagement and Messaging

The private sector plays an important role in malaria case management. To ensure alignment with MFT, targeted messaging and coordination will be implemented with private clinics, pharmacies, and wholesalers.

In Block B, where AL is the exclusive first-line treatment, private providers must not dispense DHAP or ASPY unless indicated for treatment failure or clinical exception. Given the lower cost of AL, this shift may affect turnover, raising concerns about reduced revenue.

To mitigate this, the MOH and MOPDD are engaging stakeholders through:

- Circulars and official guidance letters.
- Digital messaging.
- Engagement with pharmacy and medical councils.
- Dialogue with wholesalers on managing supply flows and adjusting inventory risk.

Private providers will receive the same Q&A and visual tools as the public sector to ensure unified messaging.

## 7. Community Engagement and Feedback

Community engagement is not just a messaging activity it is a participatory process. CHWs and local leaders host group sessions and household visits to clarify doubts and promote two-way dialogue. Parents, faith groups, and women are involved in spreading trusted messages.

Feedback is gathered through:

- Monthly CHW reports.
- Focus groups and interviews.
- Community scorecards.
- Hotline/WhatsApp feedback loops.

RBC and MOPDD will integrate this feedback into rolling updates of SBC materials and to adapt outreach strategies based on district-level needs.

## 8. Monitoring and SBC Indicators

Monitoring of SBC implementation and results is built into the MFT rollout.

Key indicators include:

- % of CHWs using job aids correctly.
- % of patients reporting understanding of their assigned ACT.
- Community knowledge about the MFT rationale.
- Private sector compliance with assigned molecules.
- Treatment adherence rates from CHW and facility reports.

Indicators will be reviewed quarterly through MFT stock and supervision meetings and reported into national malaria dashboards.

The SBC component of Rwanda's MFT strategy ensures that all stakeholders from health workers to households are informed, confident, and empowered to implement the rotation strategy effectively. It uses a layered, adaptive approach combining interpersonal counseling, mass media, community mobilization, and digital outreach.

Through clear messaging, community trust-building, and consistent counseling including a strong emphasis on testing before treatment, weight-based dosing, appropriate drug administration, and follow-up for unresolved symptoms Rwanda's MFT strategy is positioned to achieve both operational success and long-term protection of malaria drug efficacy.

During Year 1, the focus is on equipping providers and CHWs with the tools and skills they need to engage effectively with communities, while laying the foundation for continuous improvement in communication and adherence support as the strategy evolves.

# VI. Case Management Procedures

The implementation of Rwanda's MFT strategy requires a clear and consistent framework for the clinical management of malaria cases at all levels of the health system. As the first rotation cycle begins in September 2025 to August 2026, updated guidelines and operational guidance are being disseminated to health providers and CHWs to ensure quality of care across the country.

## 1. Clinical guidelines for uncomplicated malaria

The national Integrated Malaria Control Guidelines (2024) provide the foundation for the management of uncomplicated malaria under MFT. The parasitological confirmation of Plasmodium by either BS or rapid diagnostic test (RDT) is compulsory without exception. Signs of severity and other illnesses must be systematically looked for and excluded before proceeding with treatment.

All patients with suspected malaria must undergo parasitological confirmation. Only confirmed malaria cases are eligible for treatment.

For uncomplicated malaria, first-line treatment is provided with the ACT assigned to the patient's block, according to the national MFT rotation calendar. The three ACTs used in the MFT strategy are:

- Artemether-Lumefantrine (AL)
- Dihydroartemisinin-Piperaquine (DHAP)
- Artesunate-**Pyronaridine (ASPY)**

Providers must strictly adhere to the ACT assignment for their block, unless there is a clinical justification for using an alternative ACT (e.g. treatment failure, pregnant women or contraindication).

In addition to the selection of the correct ACT, the guidelines emphasize:

- Appropriate weight-based dosing.
- Ensuring the full treatment course is completed.
- Identifying and managing contraindications (including pregnancy considerations ASPY is contraindicated in the first trimester of pregnancy; in such cases, alternative ACT is recommended).
- Prompt referral of severe cases or treatment failures to higher-level facilities.
- Report suspected ADRs via national pharmacovigilance tools.

Updated clinical algorithms and job aids reflecting MFT block assignments will be distributed to all providers and CHWs prior to the September 2025 launch.

## 2. Transition Management Between ACT Rotations

A key operational challenge of MFT is ensuring that transitions between ACT rotations are well-managed at facility and community levels. To minimize confusion and ensure continuity of care, structured transition guidance supports the annual rotation of ACTs:

Before each rotation cycle:

- MOPDD and RMS communicate the new ACT assignments to districts and facilities.
- Providers receive updated clinical algorithms and charts indicating the ACT to be used in their block and provide refresher training.
- District and facility teams are instructed on the **stock transition process**:

    - » Prioritize use of remaining stock of the outgoing ACT during the transition window (typically 4–6 weeks prior to the transition period).
    - » Ensure that no mixing of ACTs occurs in new patient treatments once the transition is finalized.
- Supervisors conduct monitoring visits during the transition period to verify correct ACT use.

For clinical management, transition guidance stresses that providers must:

- Clearly explain any change in treatment to patients who may notice they are receiving a different ACT from a previous visit.
- Ensure that the clinical rationale for rotation (protection against drug resistance) is communicated consistently.
- Maintain vigilance for ADRs or unexpected treatment outcomes during the transition period.

## 3. Role of CHWs in diagnosis and treatment

CHWs play an essential role in the delivery of malaria case management under MFT, particularly at the community level and hard-to-reach areas where they serve as the first point of contact for many patients.

According to the Integrated Malaria Control Guidelines (2024) and MFT operational plans:

- CHWs conduct RDT for all suspected malaria cases at community level.
- CHWs provide first-line treatment using the ACT assigned to their block:
- CHWs provide adherence counselling, using Flipcharts and QA materials, to ensure that patients complete the full course of treatment.
- CHWs monitor for treatment failure and ADRs:
    - » Any suspected treatment failure must be referred to the health facility for further management.
    - » CHWs are trained to report ADRs through the national pharmacovigilance system.
- CHWs report malaria case data and ACT consumption through established community health reporting channels, contributing to the HMIS system.

The role of CHWs is particularly important in ensuring equity of access to effective malaria treatment and in supporting community engagement with the MFT strategy.

Importantly, CHWs also implement active case detection strategies. When a case is confirmed at the community level, the CHW initiates a household visit to:

- Screen family members or cohabitants for malaria through RDT testing,
- Treat all positive cases in the household using the assigned ACT,
- Reinforce preventive messages (e.g., use of LLINs, adherence to treatment),
- Monitor the household for any further suspected malaria cases or treatment issues.

This proactive model enhances early detection, supports prompt treatment, and contributes to reduced transmission within communities.

# 4. Drug Efficacy and Resistance Monitoring in MFT

Monitoring the efficacy of antimalarial treatments and resistance patterns in the context of Rwanda's Multiple First-Line Treatment (MFT) strategy is essential for ensuring optimal patient outcomes and preserving the long-term effectiveness of ACT regimens. These surveillance efforts provide critical baseline and follow-up data to guide ACT rotation decisions across the three MFT blocks, identify the most effective treatments, and detect early signs of drug resistance that could jeopardize national malaria control goals.

This data is also fundamental for shaping broader public health strategies and policies, guiding resource allocation and research priorities. Ongoing monitoring supports early detection of ADRs, informs the introduction of new molecules, and ultimately strengthens malaria case management and public health outcomes nationwide.

Two key surveillance mechanisms support this process: Therapeutic Efficacy Studies (TES) and an expanded molecular surveillance system embedded within integrated malaria surveillance sites.

**Therapeutic Efficacy Studies (TES)**

TES are essential for evaluating the clinical and parasitological efficacy of current antimalarial drugs, particularly Artemether-Lumefantrine (AL) and Dihydroartemisinin-Piperaquine (DHAP), as well as Artesunate-Pyronaridine (ASPY), which has recently been introduced into the national protocol.

Currently, TES are conducted at three sentinel sites: Rukara, Masaka, and Bugarama with each site located in a different MFT block. To strengthen representativeness and coverage, the program plans to expand the network by establishing six additional TES sites, ensuring at least two per block.

Key features:

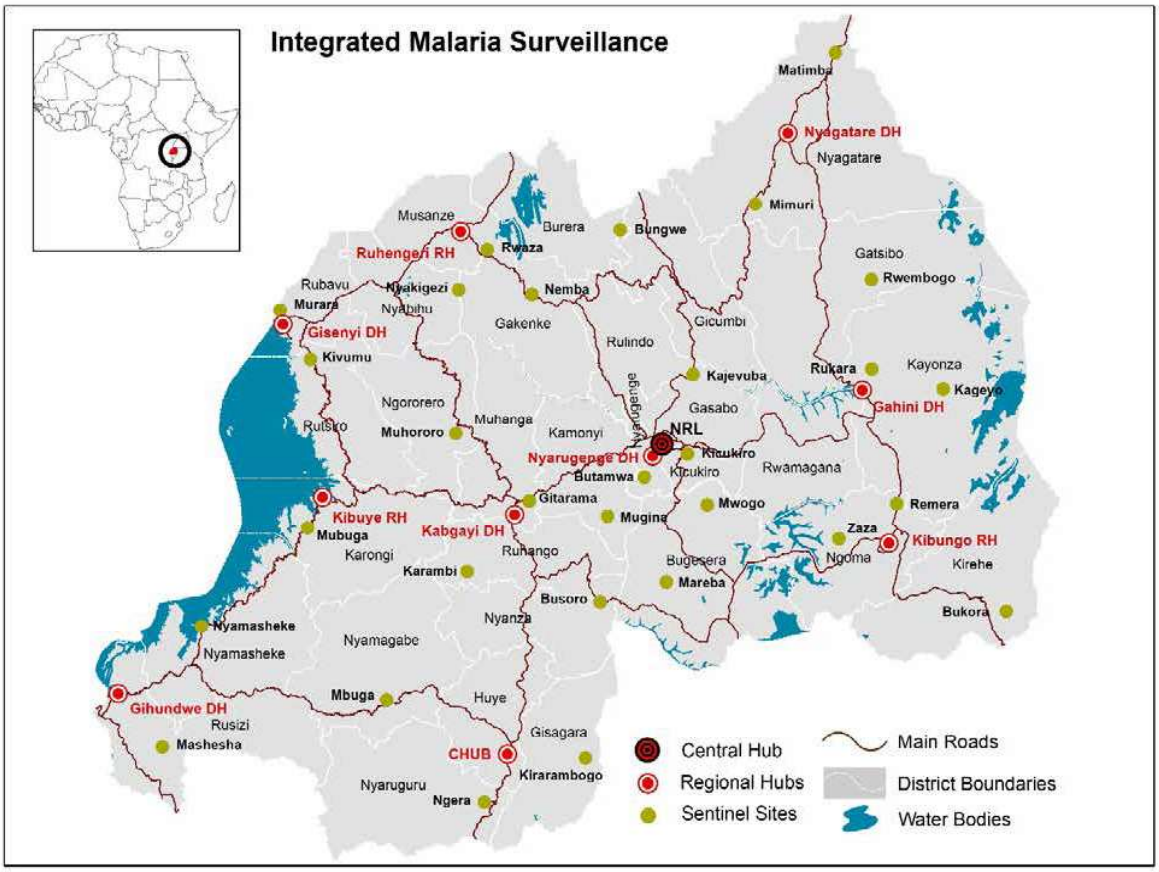
- TES are conducted every two years, in line with WHO guidelines.
- The three ACTs assessed are AL, DHAP, and ASPY.
- Collected samples, including dried blood spots (DBS) and microscopy slides, are analyzed at the Malaria Molecular Laboratory for resistance markers and treatment efficacy.
- Enrollment criteria are based on the transmission intensity of the district or block, and the study design adheres to WHO standard protocols.
- Specific indicators for efficacy and resistance are detailed in the national TES protocol.

The findings from these studies feed directly into ACT rotation planning and provide an early warning system for emerging resistance.

**Integrated Molecular Surveillance**

To complement TES and ensure broader geographic and epidemiological coverage, Rwanda is establishing an Integrated Malaria Molecular Surveillance System, built around 15 surveillance coordination centers.

Figure 24: Integrated Malaria Surveillance




**Cross-sectional surveillance**

Fifteen surveillance coordination centers will be set up in strategically selected locations: Mimuri, Rukara, Kicukiro, Kajevuba, Bungwe, Busoro, Nyabikenke, Rwaza, Kivumu, Mubuga, Mashesha, Mbuga, Kansi, and Karambi. Each center will be responsible for covering at least two districts, with dedicated infrastructure, trained staff, and operational capacity.

Functions of the surveillance centers include:

- Coordinating and conducting case detection, foci mapping, and entomological surveillance
- Overseeing vector control interventions
- Collecting samples for drug efficacy and resistance monitoring

At each coordination center, collection sites will be equipped with tools and supplies to collect DBS and staffed with trained personnel.

Cross-sectional surveys will take place during peak malaria transmission seasons (typically May-June and November-December). Samples will be collected under two main scenarios:

- All patients with confirmed malaria diagnoses attending the centers during the peak seasons will have DBS samples collected for molecular analysis of resistance markers and treatment efficacy.

- Day 3 returnees: Patients who return on day 3 of treatment with ongoing symptoms will be tested by microscopy. If parasitemia is still present, a DBS will be collected for further molecular analysis.

All DBS samples will be sent to the National Reference Laboratory (NRL) or the Malaria Molecular Laboratory, and the resulting data will be consolidated and analyzed by the RBC. Findings will be disseminated via the national Malaria Technical Working Group (TWG) to inform programming and policy decisions.

**Routine Surveillance for Treatment Failure**

In addition to cross-sectional surveys, a system of routine surveillance for treatment failure is being implemented at coordination centers and collection sites. This system relies on passive case detection, triggered when patients present to health facilities or CHWs after initiating treatment.

- If a patient exhibits persistent symptoms on Day 3 post-treatment, they undergo microscopy to confirm the presence of malaria parasites.
- Upon confirmation, a DBS sample is collected for molecular resistance analysis.
- Rapid Case Investigation Forms are used by providers to document all relevant clinical and epidemiological information.

If such a patient presents at a facility outside the surveillance or collection sites, referral procedures are in place to direct them to the nearest surveillance coordination center for proper sample collection and follow-up.

This routine mechanism ensures that suspected treatment failures are captured, investigated, and factored into national surveillance datasets.

# VII. MFT Monitoring and Evaluation

Rwanda's MFT strategy is supported by a robust and integrated monitoring infrastructure that combines real-time data collection, enhanced supervision mechanisms, and evidence-informed learning. This framework ensures adherence to treatment protocols, rapid identification of implementation bottlenecks, and supports adaptive management. These functions are embedded within the national Health Management Information System (HMIS), routine supervisory structures, and strategic surveillance studies.

## 1. Strengthening Information Systems for MFT

Malaria surveillance in Rwanda is integrated into a broader system of health information or communicable disease surveillance. At the health facility level, case-based surveillance of malaria inpatient cases and deaths is undertaken with the aim of responding to cases of severe disease and attaining a target of zero malaria deaths. Cases are graphed weekly and monthly to assess the extent to which control measures are reducing the incidence of malaria.

The main sources of data are the following:

- Registers and forms at all levels of care and treatment
- Rwanda Health Management Information System (R-HMIS)
- Sentinel Surveillance Systems
- Household Surveys (DHS, MIS, Other specific surveys)
- Health Facility Surveys
- MOPDD Monitoring System (ITN, HBM, IRS)
- Community Health Workers Activity monitoring system
- Electronic Logistics Management Information(eLMIS)
- Electronic Medical records (eMR) at Community and Facility levels

With the introduction of MFT, the HMIS will be updated to allow for the disaggregation of malaria case data by ACT used (AL, DHAP, ASPY) and to enable precise tracking of block-specific ACT usage and adherence to the national rotation calendar.

This update includes:

- Revised outpatient forms capturing the specific ACT administered.
- Integration of CHW community reporting tools to reflect ACT use and treatment outcomes.
- Training for data clerks and CHW supervisors on MFT-specific fields.

From Health center level to Referral level, R-HMIS will serve as the main source of data. R-HMIS is an integration of different platforms such as SISCOM, DHIS2, eIDSR, eTB which can be accessed as one comprehensive database. At national level, HMIS will be triangulated by other sources of data (including surveillance sites, pharmacovigilance reports...) for more comprehensive understanding of the progress of programs and stratification.

At the same time, eLMIS dashboards will track stock movements, monitor months of stock remaining by ACT and location, and generate alerts when minimum thresholds are breached. CHWs and health facilities will report on ACT dispensing, ADRs, and household-level active testing through harmonized paper and digital tools linked to HMIS and RapidSMS.

**Data collection and reporting tools:** refer to National Integrated Malaria Control Guidelines (Edition 2024) for more details.

- **The tools include** report forms (hardcopies and softcopies), tally sheets, registers, patient files, computer hardware and software, documentation and training materials.
- **Procedures include** case definitions, reporting frequency, pathways of information flow, data quality checks, incentive schemes, data analysis, mechanisms for review of performance, methods for disseminating results, using data for making decisions, supervision and planning.
- **The people include** decision-makers both inside and outside the health service who use data from surveillance systems, the health facility staff and CHWs who gather or use the data and the community whose details are registered.
- **The structures include the** ways staff are organized to manage, develop and use the system.

The reporting channel is structured by level of health care from the entry of the patients to the national level. The patient's point of entry may be the CHW, HP, HC or the Hospital. Data from CHWs are captured manually or cEMR, compilated and transmitted to the Health Center for entry in National Health Information System. Data from Health Facilities are collected by clinicians and immediately entered into HMIS by data managers.

At the community level, CHWs report:

- Number of suspected, tested, confirmed, and treated malaria cases
- ACT used for each confirmed case.
- Stock levels and stock-outs of ACTs
- Treatment outcomes and any ADR
- Case referred to HC

At the health center level, staff report:

- Number of suspected, tested, confirmed, and treated malaria cases
- Disaggregated data on ACT used, aligned with block assignments.
- Stock levels and stock-outs of ACTs.
- Treatment outcomes and any ADR.
- Cases referred to District hospital

At the district level, District Health Management Teams (DHMT) and District Pharmacists compile:

- Aggregate malaria case and ACT use data from facilities and CHWs.
- Stock management reports from RMS branches.
- **Compile and analyze aggregated malaria case data and ACT usage data from facilities and CHWs**
- **Generate stock level reports from health facilities.**

At the national level, MOPDD consolidates data from all districts to produce:

- National MFT implementation dashboards.

- ACT consumption reports by block and ACT type.
- Alerts on deviations from rotation plans or stock issues.
- Stock status from all RMS branches.
- Total suspected, tested, confirmed and treated malaria cases.
- Treatment outcomes and any ADR.

Reporting templates and data collection tools have been harmonized across HMIS and eLMIS platforms to facilitate integrated data analysis and reduce the reporting burden on providers.

Figure 25: ACT consumption report

| Indicators | Stock on Hand | Remaining Month of Stock (Estimated Duration of Stock Availability) | Number of Treated cases | Number of dispensed blisters | Frequency |
|---|---|---|---|---|---|
| Availability of ASPY | ✓ | ✓ | ✓ | ✓ | Monthly |
| Availability of DHAP | ✓ | ✓ | ✓ | ✓ | Monthly |
| Availability of AL | ✓ | ✓ | ✓ | ✓ | Monthly |

Figure 26: Malaria Indicators report

| Indicators | Indicator definitions | Data sources | Frequency |
|---|---|---|---|
| % of suspected Malaria cases that receive the parasitological tests | N: # of fever cases tested for Malaria<br>D: # of fever patients | HMIS | Monthly |
| Tests positivity rate (Total) | N: # Tests positives<br>D: # of fever cases tested for Malaria | HMIS | Monthly |
| Tests positivity rate by RDT | N: # RDT test positives<br>D: # RDT test total | HMIS | Monthly |
| Tests positivity rate by BS | N: # BS test positives<br>D: # BS test total | HMIS | Monthly |
| % of positives mal cases treated by any drug | N: # of positive malaria cases treated by any drug (DHAP, ASPY, AL)<br>D: # Total malaria positive cases | HMIS | Monthly |
| % of positives mal cases treated by DHAP | N: # of positive malaria cases treated by any drug (DHAP)<br>D: # Total malaria positive cases | HMIS | Monthly |

| Indicators | Indicator definitions | Data sources | Frequency |
|---|---|---|---|
| % of positives mal cases treated by ASPY | N: # of positive malaria cases treated by any drug (ASPY)<br>D: Total malaria positive cases | HMIS | Monthly |
| % of positives mal cases treated by AL | N: # of positive malaria cases treated by any drug (AL)<br>D: # Total malaria positive cases | HMIS | Monthly |
| % of positives mal cases treated by DHAP which recovered after the treatment course | N: # Number of positive malaria cases treated by DHAP which recovered<br>D: # Total posit malaria cases treated by DHAP | Survey/sentinel sites monitoring | Monthly |
| % of failure mal cases after treatment by treatment regime<br>(suspected, Confirmed failure HMIS) | | | Routine (# return within...days BS positive). HMIS reporting form |
| % of failure mal cases referred by CHWs | | | |
| % of positives mal cases treated by ASPY which recovered after the treatment course | N: Number of positive malaria cases treated by DHAP which recovered<br>D: Total posit malaria cases treated by ASPY | Survey/sentinel sites monitoring | Monthly |
| % of positives mal cases treated by AL which recovered after the treatment course | N: Number of positive malaria cases treated by DHAP which recovered<br>D: Total posit malaria cases treated by AL | Routine | Monthly |
| % of mal cases who received appropriate treatment according to MFT protocol | N: # malaria cases receiving appropriate treatment/ Total number of malaria cases | Survey/sentinel sites monitoring | Six months after initiation |
| # severe malaria cases | # severe malaria | HMIS | Monthly |
| Number of malaria deaths | Number of malaria deaths | HMIS | Monthly |
| % patients who completed the 3 days regiment according to protocol (by drug) | N: # patients who completed the 3 days regiment according to protocol (by drug)<br>D: # total malaria cases | Survey/sentinel sites monitoring | Six months after initiation |
| % of patients treated by type of HF (CHW, Public, Private, HP) | N: # malaria cases by HF type<br>D: # Total Malaria cases | HMIS | Monthly |

| Indicators | Indicator definitions | Data sources | Frequency |
|---|---|---|---|
| % of patients who developed a side effect (by Type drug, Symptoms) | N: # of side effect (type)<br>D: # of malaria cases receiving the specific drug | Survey or<br>Case based surveillance into sentinel sites? | Six months after initiation |
| % of public HF with no stock out (by Type of drug) | N: # HF with no stock out of the drug<br>D: # HF Total | HMIS | Monthly |
| Acceptability of MFT (efficacy, ...) before the rotation | Preference order | Survey<br>Focus group discussion | Six months after initiation |
| Sentinel sites for case-based surveillance (adherences, side effect, Day4 clinical/parasitological follow up...DBS). Sentinels site selected according to the existing | Select 3 Sentinel sites in each treatment blocs, and Health workers and CHWs to monitor extra information (side effects, adherence to treatment, follow up of efficacy) | EMR | EMR in sentinel sites |
| D3 parasitemia for failure cases | | TES | Every 2 years |
| DBS: monitoring the process and results | | TES | Yearly |
| Malaria cases not responding to the assigned first line treatment at HF level and notified to CHWs for follow-up. | | e-CBS (electronic Community-Based Surveillance) | daily |

## 2. Supervision and Quality Assurance

Supportive supervision plays a central role in ensuring fidelity to MFT protocols. National and district-level supervisory teams conduct routine visits to assess compliance, provide coaching, and resolve issues in real time.

Supervision checklists will include MFT indicators:

- Verification of ACT use by block
- Assessment of correct weight-based dosing for DHAP and ASPY

Data quality assessment

- Data triangulation between of case, diagnosis and ACTs
- External diagnostic quality control
- Assessment of stock management and reporting completeness
- Observation of patient counseling and adherence support
- Pharmacovigilance and ADR documentation
- Drug stock and availability, and the transition protocol during rotation

Supervision is carried out at all levels:

Figure 27: Supervision per level

| Supervisor level | Location | Frequency | Comments |
|---|---|---|---|
| Central level (MOPDD, Partners) | Hospitals | Visit each hospital quarterly | Develop tool for supervision |
| District Hospital (Team from DH and Partners) | Health centers<br>Health posts | Monthly | |
| Health center | In each Cell CHWs | Monthly | |

Figure 28: Data Element for Sentinel Sites

| Proposed case level data to collect at sentinel sites for monitoring MFT implementation | | |
|---|---|---|
| **Data Element** | **TES** | **Questionnaire** |
| MFT Block | | x |
| MFT Block treatment (AL/DHAP/ASPY) | | x |
| National ID | | x |
| Patient Initials | x | x |
| Age (years) | x | x |
| Age (months) | x | x |
| Date of birth (dd/mm/yy) | x | x |
| Sex (M/F) | x | x |
| Pregnant (Y/N) | | x |
| Residence District | | x |
| District where treated | | x |
| Source of treatment (Public HF, Private HF, Pharmacy, CHW) | | x |
| | | |
| Case Management | | x |
| Sought care within 24 hours of illness (Y/N) | | x |
| RDT Positive (Y/N) | | x |
| Microscopy Positive (Y/N) | | x |
| Malaria diagnosis (uncomplicated/severe--referred) | | x |
| Treatment given (AL/DHAP/ASPY) | | x |
| Completed full treatment regimen (Y/N) | | x |
| Adverse reactions/side effects (Y/N) | x | x |
| Specify side effects (free text or select from list) | | x |
| Fully recovered at first line treatment regimen completion (Y/N) | | x |
| 2nd Line Treatment given (Y/N) | | x |
| 2nd Line Treatment (AI/DHAP/ASPY) | | x |
| Fully recovered at 2nd line treatment regimen completion (Y/N) | | x |
| | | |
| Signs and Symptoms (Day 0) | x | x |
| Fever | x | x |
| Asthenia | x | x |
| Headache | x | x |
| Dizziness | x | x |
| Abdominal pain | x | x |
| Anorexia | x | x |
| Nausea | x | x |
| Vomiting | x | x |
| Diarrhea | x | x |
| Others (free text) | x | x |

| | | |
|---|---|---|
| Signs and Symptoms (Day 4) | x | x |
| Fever | x | x |
| Asthenia | x | x |
| Headache | x | x |
| Dizziness | x | x |
| Abdominal pain | x | x |
| Anorexia | x | x |
| Nausea | x | x |
| Vomiting | x | x |
| Diarrhea | x | x |
| Others (free text) | x | x |

## 3. Real-Time Data Use and Adaptative Management

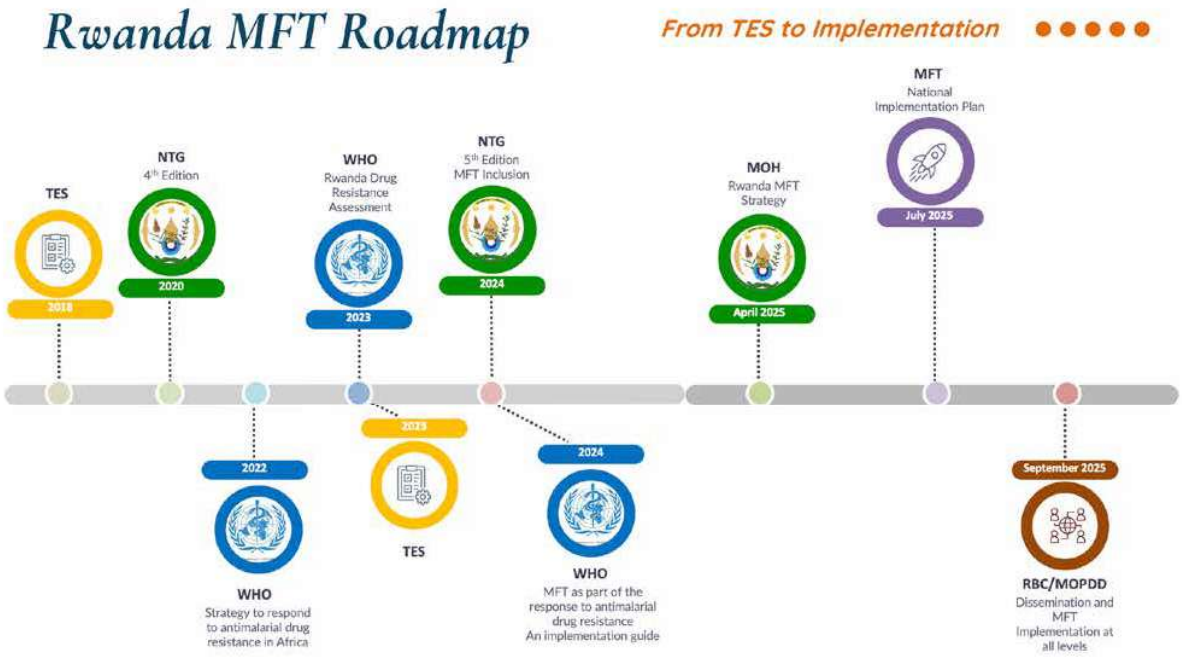
A core principle of Rwanda's MFT strategy is active use of data for real-time decision-making. Monthly and quarterly review meetings are held at facility and district levels to analyze data on ACT consumption, case management, stock status, and community adherence. These meetings serve as platforms to resolve operational bottlenecks, validate trends, and escalate any emerging issues requiring national attention.

At the national level, the MOPDD consolidates HMIS and eLMIS data from all districts to inform policy adjustments, procurement decisions, and clinical guideline updates. Early signs of deviations from ACT protocols, treatment failure clusters, or supply chain weaknesses are flagged and addressed swiftly through coordinated actions.

# VIII. Timeline and Milestones

Rwanda's Multiple First-Line Treatment (MFT) strategy is guided by a structured and time-bound implementation plan, spanning a three-year rotation cycle from September 2025 through August 2028. This timeline integrates therapeutic rotations, annual quantification, coordinated distribution, refresher training, active pharmacovigilance, and continuous program review. These elements are aligned to ensure high-quality malaria case management, preserve ACT efficacy, and generate data to support adaptive implementation.

Figure 29: Rwanda MFT Roadmap




## 1. MFT Three-Year Rotation Cycle

The MFT model is based on a geographical block system, with the country divided into three blocks (A, B, and C). Each block is assigned a specific first-line ACT for a 12-month period, after which ACT assignments rotate according to the national rotation calendar.

This system is designed to reduce drug pressure and delay the emergence of antimalarial resistance.

Figure 30: MFT Rotation Cycles

| Year | Block A | Block B | Block C |
|---|---|---|---|
| 2025-2026 (Year 1) | DHAP | AL | ASPY |
| 2026-2027 (Year 2) | ASPY | DHAP | AL |
| 2027-2028 (Year 3) | AL | ASPY | DHAP |

The assignment of ACTs per block is informed by efficacy data, resistance markers, operational feasibility, and treatment needs. All ACT transitions are carefully managed to ensure uninterrupted care, with national guidance issued annually.

## 2. Year-by-Year Operational Milestones

Year 1 (September 2025–August 2026): MFT Launch and Baseline Deployment

The first year marks the full-scale rollout of MFT. It begins with national quantification and ACT procurement completed by Q1 2025, followed by cascade training, SBC rollout, and stock distribution.

Block assignments are confirmed, and facilities are stocked according to the designated ACT for their region. By September 2025, treatment begins using the block-specific ACTs.

Stock transition from AL to new ACTs is closely coordinated. AL inventories are assessed in end-August 2025.

Any surplus stock above forecast is redirected to Block B or returned to RMS regional hubs or HQ.

All facilities are required to deplete AL stock to the forecast level before new ACTs are introduced. A safety buffer of 20–25% is maintained.

The year includes intensive supervision, monthly monitoring of ACT use, pharmacovigilance data collection, refreshment trainings and adjustment if needed.

By Q4 2025, a mid-year performance review is conducted at national and district levels.

Year 2 (September 2026 – August 2027): First Rotation and Midline Review

In Year 2, each block transitions to its second ACT. By June 2026, updated quantification, and procurement are completed. Training refreshers are delivered in July – August 2026.

Between June and August 2026, facilities report remaining stock of the outgoing ACT.

Redistribution and reverse logistics occur during this period (June – August 2026), with new stock introduced in July.

Supervision focuses on correct adoption of the new ACT, adherence monitoring, and management of transition-related confusion. The second round of TES and cross-sectional surveys are conducted in Q2 and Q4. Midline operational research, including acceptability and adherence surveys, is implemented to evaluate community and provider experience.

Year 3 (September 2027 – August 2028): Second Rotation and Strategic Evaluation

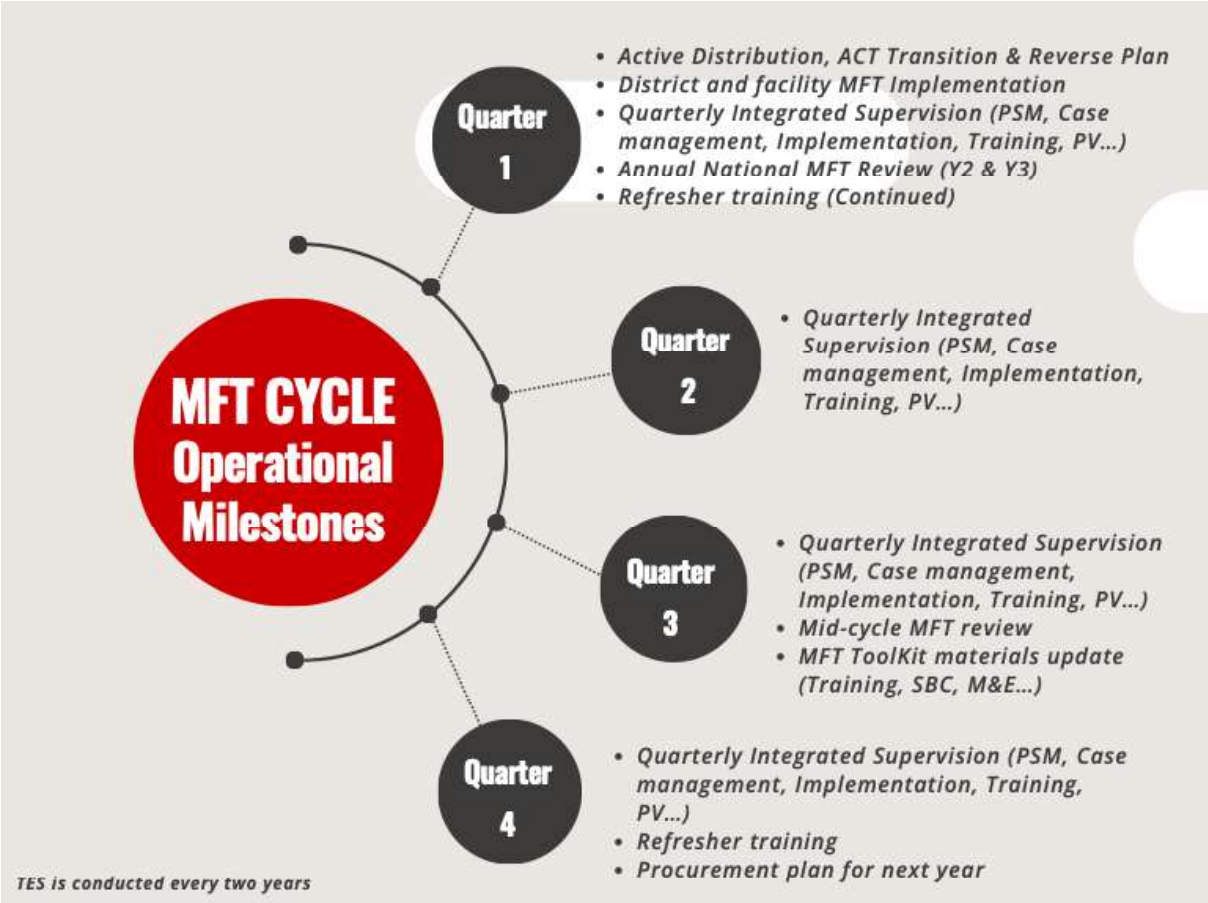
By the third year, the full MFT cycle will have been completed across all blocks. This final phase focuses on executing the third ACT rotation and preparing for policy and strategic adjustments.

During Q2 2027, TES and resistance data will inform whether to maintain the current rotation sequence, introduce new molecules, or shift to targeted ACT deployment.

Strategic evaluation workshops are held in Q2 2028 to assess performance, cost-effectiveness, and sustainability and to determine whether the current rotation sequence should continue or be adjusted based on updated surveillance data, operational lessons, and partner feedback.

In summary, each year of the MFT is governed by a calendar of key operational milestones:

Figure 31: MFT Annual Operational Calendar




## 3. Transition Management and Stock Synchronization

ACT transitions are time-sensitive and require synchronized efforts between MOPDD, RMS, district pharmacists, and health facilities. Each transition window spans approximately 6–8 weeks.

The following process applies:

- **April–May (Pre-Rotation):** Final ACT assignment for the new fiscal year is confirmed. Training refreshers are conducted. Facilities report stock balances of the outgoing ACT.
- **May-June:** Redistribution and reverse logistics are implemented. ACTs exceeding forecasted levels are returned to regional stores. Emergency shipments are dispatched to blocks with shortages.
- **July:** New ACTs are introduced. Stock visibility is updated in eLMIS. Monitoring begins immediately for adherence to new protocols.
- A set of transition SOPs is applied to manage product recall, stock rebalancing, and buffer stock distribution. Zipline and RMS support emergency deliveries to minimize delays.

## 4. Review Mechanisms

In addition to the 3-year rotation framework, the MFT implementation is supported by a series of monthly, **quarterly and annual review mechanisms** designed to promote continuous quality improvement and adaptive management.

Key sources of data that will used for the review mechanisms include:

- Therapeutic efficacy studies (TES) conducted in sentinel sites.
- Molecular surveillance of resistance markers.
- HMIS and eLMIS data on ACT consumption patterns and stock trends.
- Supervision and findings on clinical practice and community adherence.
- Pharmacovigilance data on ADR.
- Operational feedback from district teams, CHWs, and implementing partners.

Monthly Reviews:

Each health center and district hospital conduct monthly data reviews through formal coordination meetings. These sessions assess stock status, consumption by ACT and block, eLMIS reporting compliance, and CHW data completeness. Issues such as potential misuse of ACTs, local shortages, or stock imbalances are identified and resolved locally or escalated as needed.

Quarterly Reviews:

Each quarter, district health teams and national MFT core team (MOPDD, RMS, Partners) convene to review key indicators, including ACT stock levels, drug consumption trends, resistance alerts, and case management adherence. These reviews are grounded in data extracted from HMIS and eLMIS platforms and supported by routine supervision data reports.

During these reviews, challenges such as stock-outs, protocol non-compliance, and community confusion are discussed. Action plans are formulated, assigning responsibility and timelines to specific actors.

Annual Reviews:

At the end of each year, a national strategic review workshop is organized with participation from MoH, RBC/ MOPDD, partners, and key implementing stakeholders. This forum validates whether rotation protocols have been followed, evaluates block-specific performance and resistance data, and assesses adherence and provider feedback. Procurement plans and training priorities for the next rotation are aligned based on these findings. These reviews also serve to update standard operating procedures (SOPs), supervision tools, and SBC materials.

**Adjustments Based on Data and Feedback:** Feedback loops are built into the system at every level. Sentinel site data and TES outcomes influence ACT assignment decisions. If resistance is detected or if community adherence to a specific ACT declines significantly, the MOPDD may revise rotation plans or modify training and communication strategies. Supervision findings also inform updates to checklists, quantification and stock distribution processes. Data dashboards and periodic reports disseminate these insights to all stakeholders and health facilities to ensure transparency and promote adaptive learning.

Potential adjustments that may be made based on this evidence include:

- Revising the rotation schedule or ACT assignments if resistance patterns change.
- Modifying stock management practices to optimize distribution and minimize wastage.
- Updating clinical guidelines and counseling materials to reflect emerging lessons.
- Adjusting **training and supervision priorities** to address identified gaps.

**End-of-Cycle Evaluation:** A comprehensive end-of-cycle evaluation is scheduled for Q2–Q3 2028 to assess the overall success and feasibility of continuing MFT. This will include an assessment of cost-effectiveness, acceptability, operational challenges, and the potential integration of new molecules into the next national malaria treatment strategy. Findings will be validated by stakeholders and used to shape the next phase of national malaria policy.

The review structure ensures that MFT implementation remains **dynamic and responsive**, with learning cycles built into the operational model.

# IX. Roles and Responsibilities

MFT implementation success depends on coordinated action across multiple levels of Rwanda's health system and its partners. The table below outlines roles and responsibilities:

Figure 32: Roles and Responsibilities by actor

| Actor/Entity | Key Responsibilities |
|---|---|
| Ministry of Health (MoH) | • Provides national policy direction and strategic leadership for MFT.<br>• Oversees intersectoral coordination, including private sector engagement and regulatory compliance.<br>• Mobilizes domestic and external resources to support MFT implementation<br>• Advocacy on government to include malaria in Imihigo program at the district level |
| RBC/MOPDD | • Leads technical planning, Program design, and monitoring of the MFT strategy.<br>• Coordinates ACT quantification, rotation planning, sentinel surveillance and TES coordination, and pharmacovigilance systems.<br>• Develops guidelines, supervision tools, and supports data use at all levels<br>• Build capacity on MFT at all levels<br>• Develop and disseminate supervision tool |
| RMS HQ and Branches | • Manages the procurement, storage, and efficient distribution of ACTs and related malaria commodities to prevent stockout and expiries<br>• Oversees reverse logistics during ACT launching and transitions and ensures alignment with stock thresholds.<br>• Updates eLMIS with ACT flows and facilitates regional redistribution as needed. |
| District Health Management Teams | • Coordinate local implementation of MFT.<br>• Oversee training rollout, stock management, CHW performance, and supportive supervision.<br>• Lead monthly review meetings and supervise adherence to MFT protocols. |

| Actor/Entity | Key Responsibilities |
|---|---|
| Health Facilities | • Responsible for accurate malaria diagnosis, administration of the assigned ACT, patient counseling, and treatment outcome reporting.<br>• Ensure compliance with ACT protocols and contribute to HMIS and eLMIS data systems.<br>• Oversee training rollout, stock management, CHW performance, and supportive supervision and mentorship for CHWs |
| Community Health Workers (CHWs) | • Provide frontline RDT testing and treatment services using the ACT designated for their block.<br>• Conduct household follow-ups, adherence counseling, and adverse event monitoring.<br>• Participate in active testing strategies and contribute community-level reports.<br>• Engage the community in early treatment through existing platforms (inteko z'abaturage, umuganda) |
| Rwanda Food and Drugs Authority (RFDA) | • Registration of qualified ACTs<br>• Coordinates national pharmacovigilance activities.<br>• Ensures ACT quality and safety standards are met through post-market surveillance.<br>• Investigates ADR and maintains the national reporting system. |
| Private Sector (Clinics, Pharmacists, Wholesalers) | • Dispense ACTs in line with block-specific guidelines and national policy.<br>• Receive guidance on drug pricing, procurement, and substitution protocols.<br>• Report ACT dispensing data and ADR. |
| NGOs, Civil Society Organizations and implementing partners | • Support community engagement, BCC campaigns, and feedback loops.<br>• Provide supervision support and assist in training delivery.<br>• Collaborate in operational research and cross-sector coordination. |
| Community Leaders & Community Members | • Mobilize local support for MFT through sensitization, adherence promotion, and community monitoring.<br>• Serve as liaisons between the health system and households, especially during ACT rotations.<br>• Participate in awareness campaigns and support referral compliance. |

| Actor/Entity | Key Responsibilities |
|---|---|
| WHO | • Provides technical guidance and global best practices for MFT design and implementation.<br>• Supports training and supervision planning aligned with WHO protocols.<br>• Assists in therapeutic efficacy study design and reviews findings with MOPDD.<br>• Disseminate key fundings cross MFT countries |
| Government of Rwanda Global Fund, and other funding partners | • Major funders of malaria commodities, training, and system strengthening components.<br>• Requires regular performance reporting and supports procurement planning and stock forecasting.<br>• Monitors financial accountability and compliance with MFT investment frameworks. |
| Other Partners | • Offers strategic and technical support across planning, training, SBC, and supervision.<br>• Funds quantification exercises, dashboard development, and logistics optimization.<br>• Provides in-country technical assistance through implementing partners.<br>• Supports quantification, supply planning, and costing for MFT scale-up.<br>• Contributes to market intelligence on ACT pricing and supply chain improvements.<br>• Provides technical input on M&E tools and operational research.<br>• Leads community health training initiatives and job aid development.<br>• Strengthens CHW supervision and quality of care.<br>• Supports integration of MFT protocols into routine community health services.<br>• Supports innovative delivery models and introduction of new malaria tools.<br>• Provides catalytic funding for pilot studies and ACT rotation evaluations.<br>• Works closely with MoH and partners to scale novel interventions. |

# X. Conclusion

The Rwanda Multiple First-Line Therapy (MFT) strategy represents a bold, proactive, and technically sound response to the emerging threat of antimalarial drug resistance. Grounded in strong national leadership, rigorous scientific evidence, and inclusive multi-sectoral collaboration, the MFT approach offers a sustainable path to preserving ACT efficacy and maintaining treatment effectiveness across the country.

By rotating three WHO-recommended ACTs Artemether-Lumefantrine, Dihydroartemisinin-Piperaquine, and Artesunate-Pyronaridine across three geographic blocks, Rwanda's strategy reduces uniform drug pressure and disrupts the selection of resistant parasite strains. Through the implementation of this carefully phased three-year rotation model, Rwanda is ensuring that the right treatment is available, in the right place, at the right time, for every confirmed malaria case.

This guide presents a detailed roadmap for operationalizing the MFT strategy, from procurement and logistics to training, supervision, pharmacovigilance, and community engagement. Each component from training healthcare workers and CHWs, to strengthening HMIS and eLMIS, to embedding therapeutic efficacy studies and molecular surveillance has been designed to ensure program quality, data-driven adjustments, and long-term sustainability.

Implementation is already well underway. All stakeholders from central government to community leaders, from international partners to private providers have a defined role to play. Their shared responsibility and synchronized efforts are essential to achieving the ambitious goals of the MFT strategy.

The Rwanda MFT implementation plan does not stand alone; it is embedded within the broader National Malaria Strategic Plan and linked to health system strengthening efforts more broadly. Through this approach, Rwanda aims not only to mitigate resistance but also to ensure high-quality, equitable malaria care for all.

With continued commitment, adaptive learning, and strong partnerships, the Rwanda MFT strategy has the potential to serve as a model for other countries navigating similar resistance threats. This implementation guide is both a technical blueprint and a testament to Rwanda's leadership in regional malaria control.

# XI. References:

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