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This FY 2021 Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with national malaria control programs and other partners. Funding available to support outlined plans is pending final FY 2021 appropriation. Any updates will be reflected in revised postings.

# U.S. PRESIDENT'S MALARIA INITIATIVE

# Madagascar

# Malaria Operational Plan FY 2021

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Madagascar to end malaria. PMI has been a proud partner of Madagascar since 2006, helping to decrease child death rates by 37 percent through investments totaling almost $312 million (total through FY 2019).

The proposed PMI fiscal year (FY) 2021 planning budget for Madagascar is $25 million. This Malaria Operational Plan (MOP) summary outlines planned PMI activities in Madagascar for FY 2021. See accompanying **FY 2021 Budget Tables** (Tables 1 and 2) for activities and budget amounts, available on pmi.gov. Developed in consultation with the National Malaria Control Program (NMCP) and key stakeholders, proposed activities reflect national and PMI strategies, draw on best-available data, and align with the country context and health system. Proposed PMI investments support and build on those made by the Government of Madagascar as well as other donors and partners. See **Annex A: Gap Analysis Tables** for information on commodities.

To accelerate the journey to self-reliance, PMI developed a programmatic inventory to assess the strengths and persistent challenges of Madagascar's program. See **MOP FY 2020 Madagascar, Annex B: Program Inventory**. The activities proposed in this MOP are tailored to draw on strengths and foster improvements.

Since the FY 2020 MOP was developed, no new data, updated policy and/or strategic priorities relevant for the FY 2021 MOP have become available.

For more information about the malaria situation, malaria control progress, and intervention-specific data in Madagascar, please refer to the FY 2020 MOPs available on pmi.gov.

# Annex A. Gap Analysis Tables

| Insecticide-treated Mosquito Net (ITN) Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| Total targeted population[1] | 23,290,203 | 23,991,238 | 24,713,375 |
| **Continuous Distribution Needs** | | | |
| Channel #1: ANC [2] | 773,468 | 852,889 | 939,726 |
| Channel #2: EPI [3] | 493,343 | 508,192 | 523,489 |
| Channel #3: Continuous distribution at community level [4] | 1,061,656 | 0 | 1,126,529 |
| Channel #4: Social marketing [5] | 495,231 | 519,992 | 545,992 |
| Estimated total need for continuous channels | 2,823,697 | 1,881,073 | 3,135,736 |
| **Mass Campaign Distribution Needs** | | | |
| 2019/2020/2021 mass distribution campaign(s)[6] | 0 | 14,661,312 | 0 |
| Estimated total need for campaigns | 0 | 14,661,312 | 0 |
| **Total ITN Need: Routine and Campaign** | **2,823,697** | **16,542,386** | **3,135,736** |
| **Partner Contributions** | | | |
| ITNs carried over from previous year | 1,387,122 | 334,820 | 0 |
| ITNs from Global Fund [7] | 747,395 | 10,997,122 | 0 |
| ITNs from other donors (UNICEF) | 24,000 | 0 | 0 |
| ITNs planned with PMI funding [8] | 1,000,000 | 3,677,000 | 1,300,000 |
| **Total ITNs Available** | **3,158,517** | **15,008,942** | **1,300,000** |
| **Total ITN Surplus (Gap)** | **334,820** | **-1,533,444** | **-1,835,736** |

[1] Targeted population in 106 districts for ITN (same as 2018). Population 2018 referenced to RGPH3 preliminary report, with growth rate of 3.01% per year. Targeted population in the 106 districts is estimated to 85.47% of total population (total population is 27,249,565).
[2] 4.5% living in the 106 ITN-targeted districts is estimated to be pregnant women. Based on HMIS data, 73.83% of pregnant women are expected to attend ANC in 2020, 79.00% in 2021, and 84.53% in 2021.
[3] Number of children that completed the immunization plan and reported in 2019 (478,927*1.0301) in DHIS2, with growth rate of 3.01% per year for subsequent years.
[4] The current 12 CCD districts, population estimated to 4,328,663. NETCalc software was used during quantification to calculate quantity needed (coverage at 80%, household is 4.5 persons, growth 3.01%). 2021 is the year of the mass distribution campaign.
[5] Based on historical PSI sales data in 2018-2019; average monthly consumption calculated with sales with an increase of 5% per year.
[6] The country plans to conduct a mass distribution campaign in 2021; Estimated quantity is 1 ITN per 1.8 population for universal coverage. Added 10% of buffer stock.
[7] GF grant - NMF2 for procuring ITNs for ANC, EPI, social marketing, and mass campaign.
[8] PMI procured ITN for continuous distribution in 2020 and mass campaign in 2021.

| Sulfadoxine-Pyrimethamine (SP) Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| Total country population | 27,249,565 | 28,069,777 | 28,914,677 |
| Total targeted population | 22,955,034 | 23,645,980 | 24,357,724 |
| **SP Needs** | | | |
| Total number of expected pregnant women [1] | 1,032,977 | 1,064,069 | 1,096,098 |
| Total number of pregnant women expected to attend ANC [2] | 762,647 | 840,615 | 926,531 |
| ANC visit 1 (IPT-1) [3] | 343,191 | 411,901 | 500,327 |
| ANC visit 2 (IPT-2) [3] | 305,059 | 369,870 | 454,000 |
| ANC visit 3 (IPT-3) [3] | 274,553 | 336,246 | 407,674 |
| ANC visit 4 (IPT-4) [3] | 221,168 | 268,997 | 324,286 |
| SP forecasted (in treatments) [4] | 1,143,970 | 1,387,014 | 1,686,287 |
| Buffer stock [5] | 0 | 693,507 | 0 |
| **Total SP Need (in treatments)** | **1,143,970** | **2,080,521** | **1,686,287** |
| **Partner Contributions** | | | |
| SP carried over from previous years [6] | 1,754,490 | 610,520 | 0 |
| SP from Global Fund | 0 | 1,000,000 | 0 |
| SP planned with PMI funding (treatment) | 0 | 500,000 | 1,000,000 |
| **Total SP Available** | **1,754,490** | **2,110,520** | **1,000,000** |
| **Total SP Surplus (Gap)** | **610,520** | **29,999** | **-686,287** |

[1]106 districts in control zone targeted for SP (9 districts are in elimination according to NMCP in 2019). Population 2018 RPGH (national census), with the growth rate of 3.01% per year. 4.5% of the population living in the 105 districts (84.24% out of total population) is estimated to be pregnant women.

[2] Based on service data in HMIS, 69% of pregnant women attended health facilities for ANC1 visit in 2019. As per the quantification exercise, we expect an annual increase of 7% in 2020, in 2021, and in 2022. This expected growth rate is the average of the growth rate of 2017/2018 (2.64%) and growth rate of 2018/2019 (10.88%). Then, 73.83% of pregnant women are expected to attend ANC1 in 2020, 79% in 2021, and 84.53% in 2022. For purposes of SP quantification, ANC1 is assumed to be at ≥13weeks of pregnancy, thus SP would be recommended.

[3] Based on service data in HMIS reported in 2019, 33% of pregnant women took SP for IPT at visit 3 out of women attending ANC1. As per this quantification, we assume that the proportion of women expected to take IPT out of women attending ANC1 will decrease by 10% at visit 2 and at visit 3, respectively. It will decrease by 20% at visit 4. Proportion of women expected for IPT will increase annually by 10% from 2020-2021 and 2022. See table below for details of assumption. The rate have also been compared with ACCESS PMP. ACCESS targets will not apply, as the program is only covering 10 out of 22 regions (triangulation with low rate of the 12 regions).

[4] These numbers reflect the estimate of women requiring SP.

[5] A buffer stock of 6 months for each year is needed to maintain minimum (9 months) and maximum (13 months) stock levels at central level (stock parameters defined in the Manuel de Gestion des intrants, 2017).

[6] This quantity represents stock on hand at central levels as of December 31st 2019. There is a potential transfer of approximately 1,900,000 doses to another country to avoid risk of expiry in 2021or to be used in drug mass administration strategy in 9 districts of Madagascar.

| Rapid Diagnostic Test (RDT) Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| **RDT Needs** | | | |
| Total country population | 27,249,565 | 28,069,777 | 28,914,677 |
| Population at risk for malaria [1] | 27,249,565 | 28,069,777 | 28,914,677 |
| PMI-targeted at-risk population | 27,249,565 | 28,069,777 | 28,914,677 |
| Total number of projected fever cases [2] | 5,338,586 | 6,541,369 | 8,015,139 |
| Percent of fever cases tested with an RDT [3] | 100% | 100% | 100% |
| RDT needs [4] | 5,338,586 | 6,541,369 | 8,015,139 |
| Buffer stock [5] | 0 | 3,270,684 | 0 |
| Other needs [6] | 802,354 | 846,402 | 703,677 |
| **Total RDT Needs** | **6,140,940** | **10,658,455** | **8,718,816** |
| **Partner Contributions (to PMI target population if not entire area at risk)*** | | | |
| RDTs carried over from previous year [7] | 1,904,500 | *6,373,535* | *126,680* |
| RDTs from Global Fund | 8,223,400 | 2,411,600 | 0 |
| RDTs from other donors (UNICEF) | 96,250 | 0 | 0 |
| RDTs planned with PMI funding | 2,290,325 | 2,000,000 | 2,000,000 |
| **Total RDTs Available** | **12,514,475** | **10,785,135** | **2,126,680** |
| **Total RDT Surplus (Gap)** | **6,373,535** | **126,680** | **-6,592,136** |

[1] 100% of population of Madagascar is at risk for malaria.

[2] Based on service data in HMIS, total number of fever cases at national level reported is 4,356,962 in 2019 (this total number is adjusted to reporting rate and proxy for missing data). Number of fever cases increased by 25.37% from 2016 to 2017, 21.46% from 2017 to 2018, and 20.75% from 2018 to 2019; and then, this quantification exercise will consider an average growth rate of 22.53% to apply for 2020-2021 and 2022.

[3] All fever cases should be tested with RDT for malaria.

[4] These numbers reflect the estimate of needs without a buffer stock.

[5] A buffer stock of 6 months in 2021 has been added which is needed to maintain minimum (9 months) and maximum (13 months) stock levels at central level.

[6] These quantities includes blood-bank screening, studies, home based management of simple malaria cases (ProCCM) and active detection of malaria during outbreaks in some areas with a high number of malaria cases as per table below.

| **Other needs** | **2020** | **2021** | **2022** |
|---|---|---|---|
| Blood-bank screening | 95,000 | 109,250 | 125,638 |
| Studies | 197,622 | 198,622 | 8,500 |
| ProCCM | 192,484 | 211,733 | 232,906 |
| Active detection during outbreaks | 317,248 | 326,797 | 336,633 |
| **TOTAL** | **802,354** | **846,402** | **703,677** |

[7] This quantity represents stock on hand at central level as of December 31st 2019.

| Artemisinin-based Combination Therapy (ACT) Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| **ACT Needs[1]** | | | |
| Total country population | 27,249,565 | 28,069,777 | 28,914,677 |
| Population at risk for malaria | 27,249,565 | 28,069,777 | 28,914,677 |
| PMI-targeted at-risk population | 27,249,565 | 28,069,777 | 28,914,677 |
| Total projected number of malaria cases [1] | 2,376,204 | 3,028,000 | 3,190,025 |
| Buffer stock [2] | 0 | 1,514,000 | 0 |
| Other needs [3] | 316,910 | 333,817 | 235,791 |
| **Total ACT Needs** | **2,693,114** | **4,875,816** | **3,425,816** |
| **Partner Contributions (to PMI target population if not entire area at risk)** | | | |
| ACTs carried over from previous year [4] | 443,850 | 2,081,391 | 0 |
| ACTs from Global Fund | 2,281,720 | 922,975 | 0 |
| ACTs from other donors (UNICEF) | 78,700 | 0 | 0 |
| ACTs planned with PMI funding | 1,970,235 | 250,000 | 1,000,000 |
| **Total ACTs Available** | **4,774,505** | **3,254,366** | **1,000,000** |
| **Total ACT Surplus (Gap)** | **2,081,391** | **-1,621,451** | **-2,425,816** |

[1] For uncomplicated malaria cases estimates, the number of malaria cases treated with ACT derived from historical trends on positivity rate to RDT. The assumptions used in this quantification are based on historical data/ trends from 2016 to 2019 (HMIS) at health facility level. In 2019, health facilities reporting rate is almost complete through HMIS and will be only considered to calculate the increase/decrease of positivity rate to RDT. The positivity rate to RDT was: 31.38% in 2016; 40.30% in 2017 (increase of 8.92% compared to 2016); 42.08% in 2018 (increase of 1.78% compared to 2017); and 35.59% in 2019 (decrease of 6.49% compared to 2018). The decrease in 2019 is due to the mass ITN distribution campaign completed in 2018. From 2019, the same increase/decrease rate will apply for 2020-2021-2022 (note that there is an ITN mass distribution campaign in 2021).

[2] A buffer stock of 6 months in 2021 is needed to maintain minimum (9 months) and maximum (13 months) stock levels at central level.

[3] These quantities includes studies, home-based management of simple malaria cases (ProCCM), and active detection of malaria in some areas with a high number of malaria cases as per table below.

| Other needs | 2020 | 2021 | 2022 |
|---|---|---|---|
| Studies and research | 96,712 | 97,027 | 1,635 |
| ProCCM extension | 83,148 | 93,090 | 95,756 |
| Active detection | 137,050 | 143,700 | 138,400 |
| **TOTAL** | **316,910** | **333,817** | **235,791** |

[4] This quantity represents stock on hand at central levels as of December 31st 2019.

| Injectable Artesunate Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| **Injectable Artesunate Needs** | | | |
| Total country population | 27,249,565 | 28,069,777 | 28,914,677 |
| Total projected number of malaria cases [1] | 2,376,204 | 3,028,000 | 3,190,025 |
| Projected number of severe cases [2] | 45,683 | 58,213 | 61,328 |
| Total injectable artesunate vials Needs [3] | 400,559 | 510,433 | 537,745 |
| Buffer stock[4] | 0 | 255,216 | 0 |
| **Total Injectable Artesunate Vials Needs (including buffer stock)** | **400,559** | **765,649** | **537,745** |
| **Partner Contributions** | | | |
| Injectable artesunate vials carried over from previous year [5] | 77,584 | 177,325 | 0 |
| Injectable artesunate vials from Global Fund | 475,300 | 113,150 | 0 |
| Injectable artesunate vials from other donors | 0 | 0 | 0 |
| Injectable artesunate vials planned with PMI funding | 25,000 | 100,000 | 100,000 |
| **Total Injectable Artesunate Vials Surplus (Gap)** | **577,884** | **390,475** | **100,000** |
| **Total Injectable Artesunate vials Surplus (Gap)** | **177,325** | **-375,174** | **-437,745** |

[1] As per ACT Gap Analysis, row '*Total projected number of malaria cases*'.
[2] 3.845% of all malaria cases reported through HMIS from 2017-2018-2019 were severe. As per this quantification, this proportion is used to estimate the number of severe cases of malaria for 2020, 2021, and 2022. Healthcare providers are still prescribing both quinine and artesunate injectable. In this quantification, it was assumed that 50% of severe malaria cases will be treated with injectable artesunate and other 50% with quinine injectable. The NMCP plans to conduct more sensitization and trainings to promote the use of artesunate injection for management of severe malaria.
[3] Quantities of artesunate injectable are calculated in the table below.
[4] A buffer stock of 6 months in 2021 is needed to maintain minimum (9 months) and maximum (13 months) stock levels at central level.
[5] This quantity represents stock on hand at central levels as of December 31st 2019.

| **Table:** | | | **Projected Number of Severe Cases** | | |
|---|---|---|---|---|---|
| ***Calculation of Quantity of Artesunate Injection for Estimated Severe Malaria for 2020-2022*** | | | **2020** | **2021** | **2022** |
| | | | 45,683 | 58,213 | 61,328 |
| **Age group** | **% of Severe Cases Per Age Group** | **# Vials Needed Per Case/ Treatment** | **Number of vials needed** | | |
| 2- 11 months | 7.4% | 5 | 16,888 | 21,520 | 22,672 |
| 1-5 years | 42.9% | 5 | 97,992 | 124,871 | 131,553 |
| 6 - 13 years | 24.0% | 10 | 109,837 | 139,966 | 147,455 |
| 14 years and adult | 25.7% | 15 | 175,841 | 224,075 | 236,065 |
| **# Injectable Artesunate vials (Forecast)** | | | **400,559** | **510,433** | **537,745** |

| Artesunate Suppository Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| **Artesunate Suppository Needs** | | | |
| Total projected number of malaria cases | 2,376,204 | 3,028,000 | 3,190,025 |
| Total projected number of malaria cases at community level [1] | 669,139 | 852,685 | 898,311 |
| Number of severe cases expected to require pre-referral dose at community level [2] | 25,728 | 32,786 | 34,540 |
| Artesunate suppository needed for pre-referral | 47,006 | 59,900 | 63,105 |
| Buffer [3] | 0 | 29,950 | 0 |
| **Total Artesunate Suppository Needs** | **47,006** | **89,849** | **63,105** |
| **Partner Contributions** | | | |
| Artesunate suppositories carried over from previous year | 0 | 19,436 | 0 |
| Artesunate suppositories from Global Fund | 66,442 | 12,100 | 0 |
| Artesunate suppositories planned with PMI funding | 0 | 0 | 34,540 |
| **Total Artesunate Suppositories Available** | **66,442** | **31,536** | **34,540** |
| **Total Artesunate Suppositories Surplus (Gap)** | **19,436** | **-58,313** | **-28,565** |

[1] We considered among total projected number of malaria cases, 28.16% will be at community level. We considered only malaria cases reported at community level by PMI partner projects (Mahefa Miaraka and USAID Mikolo) and extrapolated to estimate a national number of community-based cases among children less than 5 years age. An estimated 431.958 community-based cases of malaria occurred in 2019 among children less than 5 years of age. Details of the extrapolation equations are available on request.

[2] 3.845% of all malaria infections reported from 2017-2018-2019 were severe disease; this proportion was used to estimate the number of severe cases of malaria for 2020, 2021, and 2022.

[3] A buffer stock of 6 months for each year is needed for maintaining minimum (9 months) and maximum (13 months) stock levels at central level.

| Quinine (CQ) Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| **Quinine 300mg Tablets Needs** | | | |
| Total number of projected simple malaria cases in pregnant women [1] | 21,690 | 28,006 | 27,107 |
| Total # of projected malaria cases in pregnant women (1st trimester) [2] | 7,230 | 9,335 | 9,036 |
| Quantity of quinine needed for treatment [3] | 303,655 | 392,079 | 379,493 |
| Buffer [4] | 0 | 196,039 | 0 |
| **Total Quinine 300mg Tablets Needs** | **303,655** | **588,118** | **379,493** |
| **Partner Contributions** | | | |
| Quinine 300mg tablets carried over from previous year [5] | 454,085 | 465,430 | 81,637 |
| Quinine 300mg tablets from Global Fund | 315,000 | 204,325 | 0 |
| **Total Quinine 300mg Tablets Available** | **769,085** | **669,755** | **81,637** |
| **Total Quinine 300mg Tablets Surplus (Gap)** | **465,430** | **81,637** | **-297,856** |

[1]Assumptions used in the national quantification exercise and based on data from 2016 to 2019 (HMIS). From 2016 to 2017, malaria cases among pregnant women in their first trimester increased by 87.27% and from 2017 to 2018 by 29.21%. It decreased by 3.21% in 2019 due to the mass ITN distribution campaign in 2018. In this quantification, we assume that the same trends will apply: increase of 87.27% is expected from 2019 to 2020 and an increase of 29.12% from 2020 to 2021. Since a mass ITN distribution campaign will take place in 2021, a decrease of 3.21% is expected in 2022. The number of reported cases of uncomplicated malaria among pregnant women in 2019 was 11,582.

[2] Uncomplicated malaria case in pregnant woman divided by 3 to obtain number of simple malaria cases in first trimester of pregnancy

[3] Quinine estimates were obtained by applying the national guidelines for treating uncomplicated malaria among pregnant women (6 tablets x 7 days per treatment) to estimates of cases among this population. These numbers reflect the estimate of need and do not account a buffer stock.

[4] A buffer stock of 6 months for each year needed to maintain minimum (9 months) and maximum (13 months) stock levels at central level.

[5] This quantity represents stock on hand at central levels as of December 31st 2019.

| Primaquine (PQ) Gap Analysis | | | |
|---|---|---|---|
| **Calendar Year** | **2020** | **2021** | **2022** |
| **Primaquine Needs** | | | |
| Total number of tests [1] | 5,338,586 | 6,541,369 | 8,015,139 |
| Total number of projected fever cases tested at elimination districts [2] | 841,361 | 1,030,920 | 1,263,186 |
| Total projected number of malaria cases at elimination districts [3] | 20,529 | 25,154 | 30,822 |
| Total projected number of malaria cases without pregnant women at elimination districts [4] | 17,111 | 20,740 | 26,550 |
| Quantity of primaquine needed for elimination districts [5] | 74,037 | 112,166 | 151,630 |
| Buffer [6] | 0 | 56,083 | 0 |
| **Total Primaquine Tablets Needs [5]** | **74,037** | **168,249** | **151,630** |
| **Partner Contributions** | | | |
| Primaquine tablets carried over from previous year | 0 | 50,963 | 0 |
| Primaquine tablets from Global Fund[6] | 125,000 | 75,450 | 0 |
| **Total Primaquine tablets Available** | **125,000** | **126,413** | **0** |
| **Total Primaquine tablets Surplus (Gap)** | **50,963** | **-41,836** | **-151,630** |

[1] Used in quantification exercise: Population of 9 elimination districts represents 15.76% of total population in 2020. We assume that number of elimination districts will be maintained as per the same for 2020, 2021, and 2022.

[2] Based on service data in HMIS, total number of fever cases at national level reported is 4,356,962 in 2019 (this total number is adjusted to reporting rate and proxy for missing data). Number of fever cases increased by 25.37% from 2016 to 2017, 21.46% from 2017 to 2018, and 20.75% from 2018 to 2019; and then, this quantification exercise will consider an average growth rate of 22.53% to apply for 2020-2021 and 2022.

[3] As per this quantification exercise: average positivity rate in 9 elimination districts is estimated to 2.44% in 2019 (HMIS). Total malaria cases is obtained by applying the same positivity rate of 2.44%.

[4]As per NSP, pregnant women with simple malaria at elimination districts are not treated with primaquine. The following numbers of pregnant women in districts in elimination are excluded: 3,418 in 2020, 4,414 in 2021, and 4,272 in 2022.

[5] Percent of each age group calculated from service statistic data (HMIS) between 2017 to 2019, excluding pregnant women; Quantity per treatment (tablet): 1*1*1 for 2-11m and 1-5years; 1*1*2 for 6-13years and 14years and more.

[6] A buffer stock of 6 months in 2021 is needed to maintain minimum (9 months) and maximum (13 months) stock levels at central level.