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Lessons Learned: Malaria Diagnostic Refresher Training in Africa Francophone Countries

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Introduction

- Since 2010, WHO has recommended testing all suspected malaria cases with a parasitological test and high quality malaria microscopy remains the diagnostic standard.
- Using microscopy, parasite detection (PD) is required to diagnose malaria cases, parasite counting (PC) is required to monitor treatment among severe malaria cases, and species identification (ID) is required to identify and correctly treat malaria based on species and monitor changes in species over time.
- MalariaCare, a President's Malaria Initiative-funded project, assists program countries to improve their accuracy of malaria diagnostic testing.
- We report MalariaCare's experience in implementing five-day malaria diagnostic refresher training (MDRT) for laboratory supervisors and staff in five francophone countries: Burundi, the Democratic Republic of the Congo (DRC), Guinea, Madagascar and Mali.

Methods

- 377 MDRT participants from central and peripheral reference facilities were selected for basic MDRT (bMDRT) and 46 participated in advanced MDRT (aMDRT).
- Participants were trained on PD, ID and PC.
- Training consisted of practice on slide preparation and staining; use of malaria RDTs; and improving quality assurance measures according to WHO guidelines.
- Participants' knowledge and competency were evaluated through written pre- and post-tests and practical skills assessments, with final outcome scores classifying them into one of four performance levels based on a WHO grading scale.
- Scale for national level standards:

National Level Standards	Parasite detection	Species identification	Parasite counting
Level 1 (expert)	≥ 90%	≥ 90%	≥ 50%
Level 2	80% - < 90%	80% - < 90%	40% - < 50%
Level 3	70% - < 80%	70% - < 80%	30% - < 40%
Level 4	< 70%	< 70%	<30%

Figure 1. MDRT training in Democratic Republic of Congo

Results

- Of 377 bMDRT participants, 97 were from Burundi, 84 from the DRC, 20 from Guinea, 59 from Madagascar and 117 from Mali.
- Based on strong performance in the bMDRT, 46 participants (30 from Burundi; 16 from the DRC) were trained in an aMDRT.
- For the bMDRT, significant improvements were seen in slide reading for PD, ID and PC, with average post-test scores at 92, 60 and 35 percent, respectively, representing improvements by 16, 15 and 21 percentage points (Table 1).
- Central or regional level participants showed better performance and improvement in PD, ID and PC than peripheral level participants (Figure 2).
- 75 (20%) of the bMDRT participants obtained national expert level 1 or 2 status across all three competency areas.
- aMDRT participants showed a high level of performance in PD, ID and PC at post-test result (Figure 3), with 38 (83%) obtaining national expert level 1 or 2 status across all three competency areas.

Table 1: Malaria diagnostics refresher training microscopy practical pre- and post-test results, five francophone countries

	Basic MDRT (N= 377)			Advanced MDRT (N= 46)		
Competency area	**Average pre-test score (median [range])**	**Average post-test score (median [range])**	**% point change in average score**	**Average pre-test score (median [range])**	**Average post-test score (median [range])**	**% point change in average score**
Parasite detection	76% (82% [0% - 100%])	92% (94% [18%-100%])	16%	94% (91% [81% - 100%])	99% (100% [93%-100%])	5%
Species identification	45% (45% [0% - 95%])	60% (62% [0% - 100%])	15%	71% (73% [29% - 95%])	93% (94% [76% - 100%])	22%
Parasite counting	14% (0% [0% - 75%])	35% (33% [0% - 100%])	21%	27% (25% [0% - 75%])	65% (69% [19% - 100%])	38%

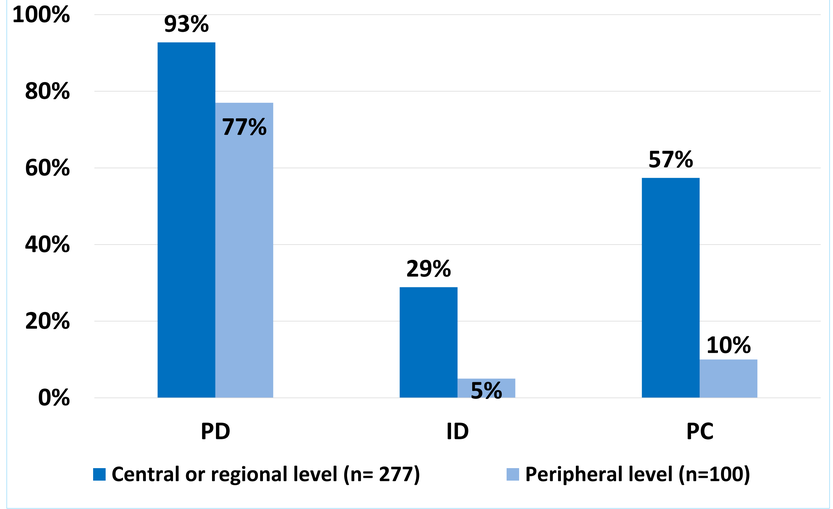

Figure 2: Proportion of basic MDRT participants who reached national level standards (L1 or L2), five francophone countries.

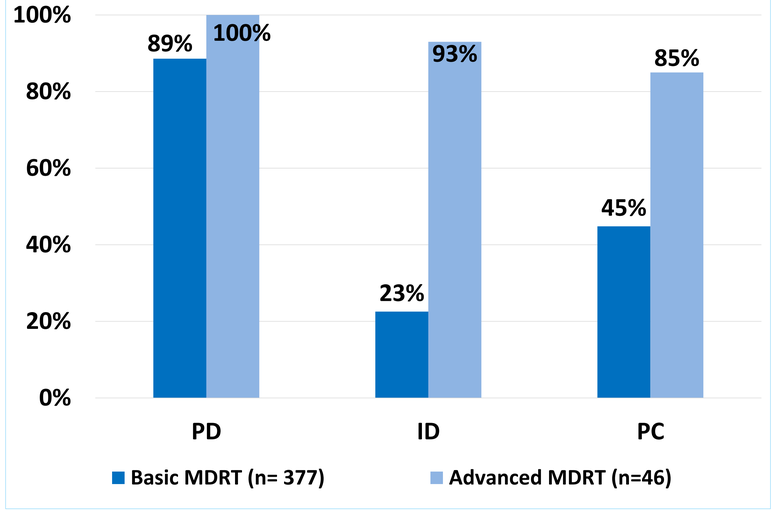

Figure 3: Proportion of basic and advanced MDRT participants who reached national level standards (L1 or L2).

Conclusion

- Following a five-day bMDRT, most participants were proficient in parasite detection, but scores in species identification and parasite counting were still low. Those who participated in an additional five-day aMRDT training improved their scores in these two competency areas.
- Given these results, we recommend a two-part microscopy quality assurance approach where peripheral level laboratory staff attend bMDRTs with the goal of reaching level 1 or 2 national standards for parasite detection alone, and central and regional level staff attend both the basic and advanced MDRTs, with the goal of reaching level 1 or 2 national standards for all three competency areas (PD, ID and PC).
- This approach would represent a more efficient use of limited resources while maintaining high quality of care. Facilities at the central and regional levels have additional responsibilities in the management of severe malaria cases, which requires parasite counting. In addition, given the low levels of non-*P. falciparum* within these countries and the high costs of building and maintaining species identification skills, resources for species identification could be allocated to higher level facilities.

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