# Performance of Microscopy for the Diagnosis of Malaria and Human African Trypanosomiasis by Diagnostic Laboratories in the Democratic Republic of the Congo: Results of a Nation-Wide External Quality Assessment

## *Performance de la microscopie dans le diagnostic de la Malaria et la Trypanosomiase Africaine dans les laboratoires en République Démocratique du Congo : Résultats d'une évaluation externe de qualité à l'échelle nationale*

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**Summary**

***Background***. With 97% of its population living in areas of stable malaria transmission, the Democratic Republic of the Congo (DRC) is among the countries with the highest malaria burden in Africa. Apart Plasmodium, microscopy diagnostic of stained blood films detects other pathogens, including *Trypanosoma brucei* ssp., some of which cause human African trypanosomiasis (HAT). Half of all people at risk of African trypanosomiasis live in the DRC, where almost 80% of all reported cases have occurred.
The quality of microscopy, however, often remains inadequate because of poor-quality equipment, insufficient training or a lack of quality assurance.
External quality assessments (EQA) are an alternative to cross-checking of blood slides in the quality control microscopy. After two nationwide EQA sessions addressing Giemsa stained blood microscopy organized in DRC which revealed the poor quality, refreshment training of diagnostic laboratories was performed.
***Objectives***. The present third nationwide EQA was organized for (i) to assess correct reading and interpretation microscopy of Giemsa stained thick and thin blood films for the diagnosis of malaria as well as HAT among diagnostic laboratories, (ii) to compare performances of laboratories which participated to the previous and present EQA, and (iii) to assess the quality of sample preparation and staining.
***Results***. The EQ A addressed 445 participants in 10/11 provinces (October 2013–April 2014). Participants were sent a panel of five slides and asked to return a routinely stained slide which was assessed for quality of preparation and staining. Response rate was 89.9% (400/445). For slide 1 (no parasites), 30.6% participants reported malaria, mostly *Plasmodium falciparum*. Only 11.0%participants reported slide 2 (*Plasmodium malariae*) correctly, 71.0% reported "malaria" or "*Plasmodium falciparum*" (considered acceptable). Slide 3 contained *Plasmodium falciparum* (109/µl) and *Trypanosoma brucei brucei* trypomastigotes: they were each reported by 32.5%and 16.5% participants respectively, 6.0% reported both. Slide 4 (Trypanosoma) was recognised by 44.9%participants. Slide 5 (*Plasmodium ovale*) was correctly reported by 6.2% participants, another 68.8%replied "malaria" or "*Plasmodium falciparum*"(considered acceptable). Only 13.6%of routine slides returned were correctly prepared and stained. The proportion of correct/acceptable scores for at least 4/5 slides was higher among EQA-experienced participants compared to first time participants (40.9% versus22.4%, $p = 0.001$) and higher among those being trained < 2 years ago compared to those who were not (42.9% versus 26.3%, $p = 0.01$).
***Conclusion***. Among diagnostic laboratories in DRC, performance of blood parasite microscopy including non-falciparum species and Trypanosoma was poor. Recent training and previous EQA participation were associated with a better performance.

**Keywords**: External quality assessment, microscopy, Plasmodium, DRC, SMS, malaria RDT, Human African Trypanosomiasis