

**VACANCY / TERMS OF REFERENCE  
ENTOMOLOGIST  
MALARIA STUDY DRC**

Médecins Sans Frontières (MSF) is an independent, medical, emergency relief organisation that provides assistance to people worldwide, regardless of their background, religion or political convictions. Above all, we aim to save lives and to offer medical care to victims of disasters, wars and epidemics. Working together with local staff, we give direct support to the population. MSF also appeals to those in power, including governments and international organisations, and speaks out about the abuses we encounter in the course of our work. The Dutch organisation 'Artsen zonder Grenzen' (MSF-Holland) is a member of the international organisation 'Médecins Sans Frontières'.

MSF Operational Centre Amsterdam (OCA) currently operates medical humanitarian interventions in 25 countries. On a yearly basis MSF-Holland deploys approximately 900 international staff and employs 6,100 national staff. At headquarters in Amsterdam, around 180 employees offer their support to the projects.

**Per immediate effect we are looking for an Entomologist for a Malaria Study in the Democratic Republic of the Congo, 4 to 6 months.**

**CONTEXT:**

The Democratic Republic of the Congo (DRC) is a country affected by on-going violent conflict, a recurrent humanitarian crisis, acute health needs, limited access to humanitarian assistance and violations of basic rights and freedoms.

In particular high morbidity and mortality are observed in areas affected by conflict where the institutional health system has been disrupted and few actors, whether Ministry of Health (MoH) or International Non-Governmental Organisations (INGOs), are providing basic healthcare services.

Médecins Sans Frontières-Operational Centre Amsterdam (MSF-OCA) has been working in the provinces of North Kivu, South Kivu and Katanga for many years. MSF-OCA operates 3 health programmes in Mweso (North Kivu), Baraka (South Kivu) and Bukama (Katanga, South DRC). The North Kivu project comprises primary Health Care with 2 supported Health Centres and Secondary Care in the Mweso Hospital. The South Kivu project comprises primary Health Care with 3 supported Health Centres and Secondary care in Baraka Hospital. The Katanga project is currently in a uncertain pahse as due to security the population of Shamwana are displaced. In Shamwana MSF still support the Hospital in order to provide free secondary Health Care and more than 4 Health Centres. However, due to the uncertainty the study location will be Bukama, where MSF is running a malaria intervention since Mid April 2012.

**Malaria control**

Malaria is considered a major public health problem in DRC, a high transmission country ( $\geq 1$  per 1000 population)<sup>1</sup>. In 2011 DRC reported distributions of confirmed malaria cases of between 10 and  $\geq 100$  cases per 1000 population<sup>1</sup>.

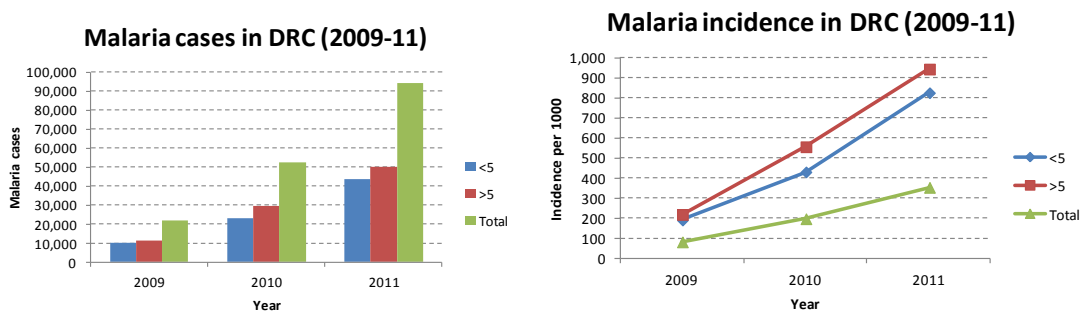
*Plasmodium falciparum* is the major plasmodium species and *Anopheles (A.) gambiae*, *A. funestus*, *A. nili* and *A. moucheti* are the major *Anopheles* vectors in DRC<sup>1</sup>.

The WHO-recommended strategies for malaria control fall into two major areas, prevention and case management. Taken together, these strategies work against both the transmission of the parasite from mosquito vector to humans (and from humans to mosquitoes) and the development of illness and severe disease in humans<sup>1</sup>. The former is achieved through long-lasting insecticide-treated bednet (LLIN) distribution and indoor residual spraying (IRS) of dwellings and the latter through Artemisinin-Combination Therapy (ACT) treatment of confirmed malaria cases.

## **BACK GROUND TO MALARIA STUDY:**

According to the OPD data for the year 2011, malaria represents the more common diagnosis, accounting for 23% of the total consultations during the year, with peaks of over 35%, 53% and 64% in Baraka<sup>1</sup>, Mweso<sup>2</sup> and Shamwana<sup>3</sup> projects respectively during the rainy season. A significant percentage of those malaria cases were diagnosed in children under the age of five years. In addition, according to the IPD data, 26.9%, 7.3% and 53% of total admissions in Baraka, Mweso and Shamwana projects respectively were due to severe malaria.

Since 2010 confirmed malaria cases observed in MSF-OCA programmes have almost doubled and since 2009 a 5-fold increase in the number of malaria cases has been observed (Figure 1). In Shamwana and Baraka the increase in malaria incidence has been particularly evident in under-5 year olds but similar in <5 and >5 year olds in Mweso (though the population figures for Shamwana, Katanga are likely underestimated and hence the incidences should be treated with caution).



**Figure 1: Confirmed malaria cases and estimated incidence in MSF-OCA programmes 2009-2011. The Katanga populations are likely underestimated hence the incidences should be treated with caution**

In addition 2-3 recurrent malaria episodes have been observed in the same individuals, it is not known if these are treatment failures or re-infections.

This was an alarming increase in malaria incidence which cannot be explained by displacement of non-immune populations from non-endemic regions (mountains) to endemic malaria regions as the populations have been relatively stable since 2008.

Kashuga (Mweso) is characterised by poor housing and high population densities in villages and IDP camps situated in a swampy region of North Kivu. In response to the increase in malaria cases an indoor residual spraying (IRS) campaign was carried out in April 2010 and repeated every 4-6 months since then using alpha-cypermethrin (Fendona). The target coverage of 100% of dwellings in Kashuga was achieved. In addition LLINs were distributed to every household and canals were emptied in order to avoid stagnating water in the camp.

In Baraka MSF-OCA has been distributing LLINs in a targeted manner (ANC programmes and <5 year old malaria patients at OPDs). Although no IRS was carried out in Baraka, MSF-OCA's strategy of community health education targeted LLIN distribution and ACT treatment of confirmed malaria cases does not seem to be having an impact on malaria incidence. A similar pattern is observed in Katanga where despite similar control activities as Baraka, malaria incidence has increased since 2009.

There are several potential reasons related to LLIN and insecticide used for IRS that could explain why MSF-OCA is having little impact on malaria incidence:

1. Mosquitoes have developed a resistance to currently used insecticide,
2. Existing mosquito nets are of poor quality or have depleted insecticide activity to a level considered insufficient to be insecticidal.

## **LOCATIONS FOR STUDY IMPLEMENTATION:**

<sup>1</sup> South Kivu

<sup>2</sup> North Kivu

<sup>3</sup> Katanga

**METHODOLOGY:**

- Through field assessment, trapping and analysis (morphologically) identify down to sub-species level the main vector responsible for the transmission of malaria in the areas studied,
- Collection of a suitable sample of the identified vector for transport to a lab for identification down to sub-species level, presence/absence of knockdown resistance gene (*kdr*) and enumeration of circum-sporozoite infection rate,
- Establish whether or not this vector displays resistance to the family of chemicals (pyrethoid) used in LLINs and IRS and others that not currently being used,
- Establish the residual insecticidal level of the bednets (LNs) distributed and used in the communities.

**GENERAL OBJECTIVES OF THE POST:**

- To organise, design, implement and report on all aspects of the study,
- Analyse the results of the study, present results and give recommendations.

**SPECIFIC OBJECTIVES:**

- Carry out an assessment of the environment of the study site appropriate to achieving a better understanding of malarial transmission,
- Identify the principal malaria vector down to sub-species level in the study area,
- Assess the feasibility (through trial) of successfully catching and rearing the larvae of the principal malaria vector,
- Establish a baseline for the susceptibility of the vector to one or several organochlorine (OC), pyrethoid (PY) and carbamate (OP/C) based insecticides using bio-assays carried out on field reared mosquitoes,
- Assess a suitable (randomly selected) sample of the Long-lasting Nets (LNs) used by the population using a simple field based chemical assay test,
- Assess the correlation between the results of the above tests with a ‘gold-standard’ lab test on another sample of LNs,
- Determine the most appropriate insecticide based measures used in the control of malaria transmission in MSF projects in DRC,
- Together with the other studies to be or having been carried out in the areas (KAP survey, ACT efficacy study and ACT adherence study), interpret the increase in malaria cases in the study areas.

**ACTIVITIES:**

For the study the following will be expected, although exact details may change depending on informed advice of the candidate, discussion with the study focal point(s)/supervisor(s), feasibility and context:

**Part 1:**

**Short Desk Based Study/Assessment**

- Literature review of similar studies in the area (if they exist) and review of methodologies of any other similar studies, wherever they might have been carried out,
- Study the malaria data from the study site to gain an overall impression of the public health issue and help (potentially) to better guide the study,
- Study the results of the KAP<sup>1</sup> survey carried out on LN coverage and usage,

- Establish precise methodology (sample sizes, techniques etc.) of the study in conversation with the relevant advisors,
- Establish a list of all materials beyond those that will be provided and might already have been procured which are necessary for the completion of the study as defined below or as adapted,
- Produce a simple study plan including details of the activities to be carried out.

### **Initial Field Based Assessment**

- Carry out a thorough environmental survey of the study site to establish the breeding sites of potential vectors and risks to the population from that vector based on proximity to concentrations of population.

### **Part 2:**

#### **Vector trapping and identification**

- In randomly selected houses and other sites trap mosquitoes,
- Identify morphologically<sup>2</sup> the trapped mosquitoes down to species level or, if possible, to sub-species level,
- Establish the likely principal malaria vector in the area based on species identification and results of the environmental survey (of breeding sites and other factors),
- Train a local staff member to carry out some of the basic operations of this activity.

#### **Vector packing, transport and further testing**

- Establish a suitable sample number of trapped and inactivated (i.e. dead) mosquitoes for transport to the identified lab facility for further testing,
- Establish a suitable protocol and all necessary labelling for the above, training local staff to carry out the practice correctly,
- Trap, inactivate, pack and label the samples and arrange for their transport.

#### **Lab based testing**

*Although the field entomologist will not be carrying out the lab tests they will be involved in the presentation and analysis of the results. The following will be carried out on the sample:*

- Identification using PCR down to sub-species level,
- Presence/Absence test for the *kdr* gene, indicating possible resistance to pyrethroid based chemical insecticides,
- Enumeration of the circum-sporozoite infection rate.

### **Part 3:**

#### **Assess the feasibility of rearing larvae in the field**

- Provide input into the design of a simple facility in an appropriate location for the rearing of mosquito larvae to adulthood,
- Make a first attempt to raise some larvae in suitable conditions to adulthood.

#### **Rear larvae and carry out bio-assay tests on adulthoods**

*Assuming that the above feasibility test has a positive outcome the following should be carried out:*

- Larvae of the principal malaria vector in the study area will be captured at sites deemed from investigation to be the most suitable,

- Larvae will be raised under 'lab' conditions (correct/appropriate temperature, humidity, light level etc.) to adulthood,
- Young, female, sugar solution fed mosquitoes will be exposed to a suite of insecticide treated papers – DDT 4% (OC), Bendiocarb 0.1% (OP/C), Deltamethrin 0.05% and Permethrin 0.75% (PY) – using the standard WHO bio-assay procedure<sup>3</sup>,
- Inactivate, pack and label appropriately all the surviving mosquitoes from the above test for transport to a lab for testing for presence/absence of the *kdr* gene,

**Part 4:**

**Quality of the mosquito net and their insecticide level**

- Analyse results of the DRC KAP survey to establish the prevalence of various makes of LNs in the community,
- Select two of the most popular nets in the study area,
- Take (and replace by a new one if necessary) 30 randomly selected nets of each of the two types identified above (thus 60 nets),
- Using a simple chemical assay test (developed by LSTHM and called 'Net Test'<sup>4</sup>), assess the levels of insecticide on 2 randomly selected panels (of the 4 testable ones – head panel excluded) of each net (thus 120 tests),
- Take samples out of 10% of the nets (thus 6 samples), pack and label them adequately and send them to a lab to be tested using gold standard testing.

**Part 5:**

**Assessment of need to carry out further studies**

- Consider, present and justify any recommendation to carry out further tests to increase the relevance and/or accuracy of the study/research, e.g. bio-assay on LNs.

**EXPECTED OUTPUT:**

- Regular updates and progress reports will be expected,
- All test results are to be tabulated and compiled into a readable/usable format,
- Production of a solid report with description of all activities as well as results of all tests. Results should also be analysed and presented with a discussion and recommendations.

**COMMUNICATION LINES AND REPORTING**

The study is being overseen by one Water and Sanitation Advisor, the Epidemiology Advisor and Health Advisor (HA) based in Amsterdam. Furthermore full cooperation and communication will be necessary with the North Kivu mission's Medical Coordinator (MedCo). At field level the candidate is expected to detail and discuss all proposed activities with the Project Coordinator (PC) of the study site area.

**PROPOSED SCHEDULE**

To be determined based on start date and length of contract and any more local factors that might affect the study.

**REQUIREMENTS OF THE POST**

- Qualified Entomologist with field experience prepared to travel and work in a challenging context,
- A reasonable level of French, both spoken and written, is desired,
- Proven research and reporting skills.

## **WE ARE OFFERING**

A Specialist hybrid contract in field scale B with a gross salary of a minimum € 1,446.60 and € 3,282 maximum depending on relevant professional work experience, for a full-time appointment for the specified period. The report writing will be done in Amsterdam, The Netherlands in our HQ, a stimulating, professional working environment in an international organisation.

## **INFORMATION AND APPLICATION**

If you would like additional information regarding this Entomologist position, please contact Jean-Francois Fesselet (Coordinator Water & Sanitation) phone + 31 (0)20 520 8770.

If you're interested in this Entomologist position and believe that you fit the profile and meet the requirements, please send your application letter in English or French with your CV **before Sunday December 2** to [officejobs@amsterdam.msf.org](mailto:officejobs@amsterdam.msf.org) mentioning "Entomologist" for the attention of Ms Jaline Wijkhuizen (Personnel Officer HQ). Please also mention where you read about this vacancy.

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<sup>1</sup> This survey has already been conducted and full results should be available by the end of September 2012

<sup>2</sup> The Anophelinae of Africa South of the Sahara, by Authors GILLIES, M. T.; DE MEILLON, B could serve as a guide for this part of the study

<sup>3</sup> Test procedures for insecticide resistance monitoring in malaria vectors, bio-efficacy and persistence of insecticides on treated surfaces, Report of the WHO Informal Consultation, 28-30 September 1998, WHO/HQ, Geneva.

<sup>4</sup> <http://malaria.lshtm.ac.uk/facilities/analytical-service-measuring-antimalarials-drugs-and-insecticides>