AcoMVeC

AFRICAN CONSORTIUM IN MODELING
FOR EFFECTIVE VECTOR CONTROL

Short-term grants on Malaria modelling Operational Research Projects (ORPs) launched by the African Consortium in Modelling for Effective Vector Control (ACoMVeC), Cameroon 2024

I-   Introduction and brief description of projects of interest

With funding from the Bill and Melinda Gates Foundation, The African Consortium in Modelling for Effective Vector Control (ACoMVeC) has been established to develop and strengthen the mathematical modelling building capacity in malaria throughout Sub-Saharan Africa. Among the objectives of the ACoMVeC are to: train the next generation of scientist modellers in malaria, and help the National Malaria Control Programs (NMCPs) in implementing optimized control strategies through malaria modelling. Working in collaboration with the NMCP in Cameroon, the ACoMVeC is also dedicated to developing innovative predictive approaches to tackling malaria. It is under the thumb of the latter scope that the Cameroon NMCP and ACoMVeC are launching this call for applications to provide solutions to the pressing needs of the MNCP through the funding of small Operational Research Projects (ORPs) to Cameroonian scientists. We are seeking five (05) highly curious and skilled early career scientists to explore and investigate cutting-edge malaria problems in the Cameroonian context. **Each successful applicant will be awarded a lump sum of $ 4000 USD to carry out his research and deliver the results of his investigations no later than twelve months after the start**. The proposed projects should focus on one of the topics below:

1- Modelling the impact of the distribution of a single type of Long-Lasting Insecticide Treated Nets (LLINs) across the country

Long-lasting insecticidal nets (LLINs) are indeed a key vector control tool used in Cameroon by the National Malaria Control Program (NMCP). However, ensuring the optimal impact of LLIN requires a thorough investigation into the effectiveness of various LLIN distribution strategies and coverage across various regions of the country. Through comprehensive modelling, the project aims to optimize the deployment of a single type of LLIN across the country and maximize its impact on reducing malaria transmission and mortality rates. This research seeks to provide insights into how targeting a single type of LLIN distribution can contribute to reducing disease prevalence and improving public health outcomes nationwide.

2- Modelling the cost-effectiveness of Indoor Residual Spraying (IRS) compared with impregnated mosquito nets

IRS are products that are used on the inside-wall of human houses to prevent mosquitoes from entering or resting within the house. IRS can be used alone or in combination with other vector control tools. In this project, the candidate is expected to evaluate the efficacy of IRS and LLINs control strategies taken independently/alone, and provide the economic impact of each strategy. The results of this investigation shall be used to design the best strategy and help reduce the financial loss associated with malaria control campaigns.

3- Modelling the impact of LLINs coverage and usage on entomological malaria transmission indicators

LLINs are well known to provide effective protection against mosquito bites and reduce malaria transmission. However, universal coverage of LLINs is hard to achieve in Cameroon since all household members or all households in a community may not be adequately using LLINs. This creates a situation where entomological parameters such as vector density, vectorial capacity, vector competence, human biting rate, and Entomological Inoculation Rate (EIR) are constantly changing in a fashion that is not well understood. In this project, the candidate will evaluate how different coverage and usage patterns scenarios affect the Spatio-temporal evolution of malaria entomological indicators in endemic regions.

4- Modelling the risks of emergence of resistance to ACTs in Cameroon

Artemisinin-based combination therapies (ACTs) are drugs of choice for treating malaria, particularly in countries like Cameroon where the disease is endemic. Resistance to ACTs generally results in delayed elimination of malaria parasites from the bloodstream after treatment. ACTs are still effective in Cameroon, yet the situation in other neighbouring countries indicate that this might not last for long. It is therefore ubiquitous to elaborate on preventive control strategies that shall be used to monitor the evolution of malaria parasite resistance to ACTs. This project aims to analyse models that shall be used to anticipate the risks and prevent the spread of parasite resistance to ACTs in Cameroon.

5- Modelling the optimization of SMC in Cameroon

Since 2012, the World Health Organization (WHO) has recommended seasonal malaria chemoprevention (SMC) as a tool to reduce the malaria burden in high transmission settings. SMC typically involves the intermittent administration of a combination of two antimalarial drugs, (namely sulfadoxine-pyrimethamine and amodiaquine (SPAQ)—to children aged 3–59 months) during the peak of the transmission season. In Cameroon, SMC is being deployed in Northern regions since 2016 and the proportion of children who participated in this campaign was 96.6% in 2023. SMC-based strategies are highly effective, but still pose complex challenges such as the scale, time-sensitive delivery, and influence of external factors. This project aims to address these issues to optimize the deployment strategies being used in these regions.

II- The responsibilities of the applicants

In this call, the duties of the applicants include but are not limited to:
- Develop and refine a mathematical model to simulate the impact of vector control interventions on malaria transmission dynamics.
- Analyse epidemiological and entomological data to inform model parameterization and validate model outputs.

- Collaborate with members of ACoMVeC, NMCP, and partner organizations to share knowledge, data, and expertise.
- Translate research findings into actionable recommendations to inform malaria control policies and strategies at national and regional levels.
- Disseminate research findings through scientific publications, presentations at conferences, and engagement with stakeholders to promote evidence-based decision-making in malaria control efforts.

III- Qualifications and requirements

A. Educational Background:

- o A degree in a relevant field such as epidemiology, public health, health economics, or biostatistics is essential.

- o Advanced degrees such as Master's or PhD in Mathematics (Biomathematics, Biostatistics), Physics (Biophysics), Computer Science or related fields.

B. Technical Skills:

- o Quantitative Analysis and proficiency in softwares (e.g., R, Python, Stata, SAS, MatLab, Fortran, Mathematica, Octave)
- o Economic Modelling: Familiarity with decision analysis, Markov models, and other economic modelling techniques.

- o Health Economics: Understanding of health economic concepts, including cost-effectiveness analysis and willingness-to-pay thresholds. o GIS (Geographic Information Systems): Knowledge of GIS tools for spatial analysis (relevant for malaria transmission mapping). o **Have a solid understanding of dynamical systems and their applications in public health.**

C. Research Experience:

- o Prior experience in health-related research, preferably in infectious diseases or vector-borne diseases. Preferences would be given to early career scientists.

- o Familiarity with designing and conducting cost-effectiveness studies. o

- o Understanding of malaria epidemiology, prevention strategies, and vector control methods.

- o Experience in modelling or simulation science, including scientific programming and statistical inference.

- o Experience in infectious disease modelling.

D. Analytical Mindset:

- o Ability to critically evaluate scientific literature, interpret data, and draw meaningful conclusions.

- o Strong problem-solving skills for addressing complex health challenges.

- o Able to take projects from concept to completion.

E. Collaboration and Communication:

- o Effective teamwork and collaboration with multidisciplinary teams.

- o Clear communication skills for presenting findings to stakeholders, policymakers, and the scientific community.

- o Commitment to maintaining confidentiality and informed consent. o

- o **The Working Language in the ACoMVeC is English So the candidate is expected to read, speak and write in English.**

IV-   Application process and deadline

Interested candidates are invited to submit the following documents in **a single <u>PDF</u> file at the e-mail address acomvec@crid-cam.net**

- - Detailed CV **(2 pages max)** highlighting relevant education, experience, and skills
- - Cover letter **(1 page max)** outlining motivation, research interests, and how their expertise aligns with the project goals. **Please specify what topic you are going in for.**
- - One to two recommendation letter
- - Attach a detailed proposal **(2 pages max)** on the research you want to carry out in line with one of the topics highlighted above **(proposal should follow these outlines: Project summary; context and justification – specify the research question to be answered by your project; objectives; methodology- equally specify the tools to be used, modelling or statistical approaches; chronogram of the project; proposed budget.)**

Attach your application materials in a single PDF file named in the format **YourName_ACoMVeC_ORP_1.** (Change the _1 by the number of the ORP you are applying for. For example, if you are applying for the project 5 described above, you replaced the "_1" by "_5"). **All the application materials must be submitted before the 30st June 2024 at 23:59. Incomplete as well as late applications will not be assessed.**

<mark>NB: This call is open only to Cameroonian Scientists</mark>

V-   Selection Process

Applications will be reviewed by a selection committee comprised of representatives from ACoMVeC and the Cameroon NMCP. Shortlisted candidates will be invited for an interview or additional assessments as part of the selection process. On the other hand, we will not provide feedbacks to unsuccessful applications.

VI-   Project Duration and Remuneration

The operational research project is expected to start in July 2024 once the applicant would have signed the **memorandum of understanding and the funds being transferred to the awardees. Each awardee will receive a cumulative sum of $ 4000 USD to embark in this project**. The budget allows a small salary allocation to the grantee and applicants are expected to deliver on their chosen research project between **6-12 months** after the beginning of their ORPs.

VII-   Important notes

1- The Working Language in the ACoMVeC is English. Therefore, any applicant is expected to listen and understand English, read, speak and write in English. All communications will be in English.
2- Applicants are not supposed to apply for two different research projects. Any candidate that submits more than one application would simply and automatically be discarded.
3- The selection process is in twofold. A first selection based your CV, the letter of intent and/or any other documents that prove your fitness for the call. A preselection does not mean that you will be offered the award. All preselected candidates would be invited for an interview. It is only after the interview that the awarded applicants would be contacted by email.
4- **At equal experiences and qualifications, preferences will be given to WOMEN and disadvantageous people. WOMEN are strongly encouraged to apply.**

VIII-   Further Information:

For queries or additional pieces of information, please reach out to **acomvec@crid-cam.net**