Colloque scientifique paludisme 2026 : Défis, innovations, perspectives

4 Juin 2026

L'INITIATIVE
sida, tuberculose, paludisme

Gestion des freins à la lutte contre le paludisme : recherches opérationnelles sur les stratégies de lutte anti-vectorielle

Cédric Pennetier, pour le consortium REACT

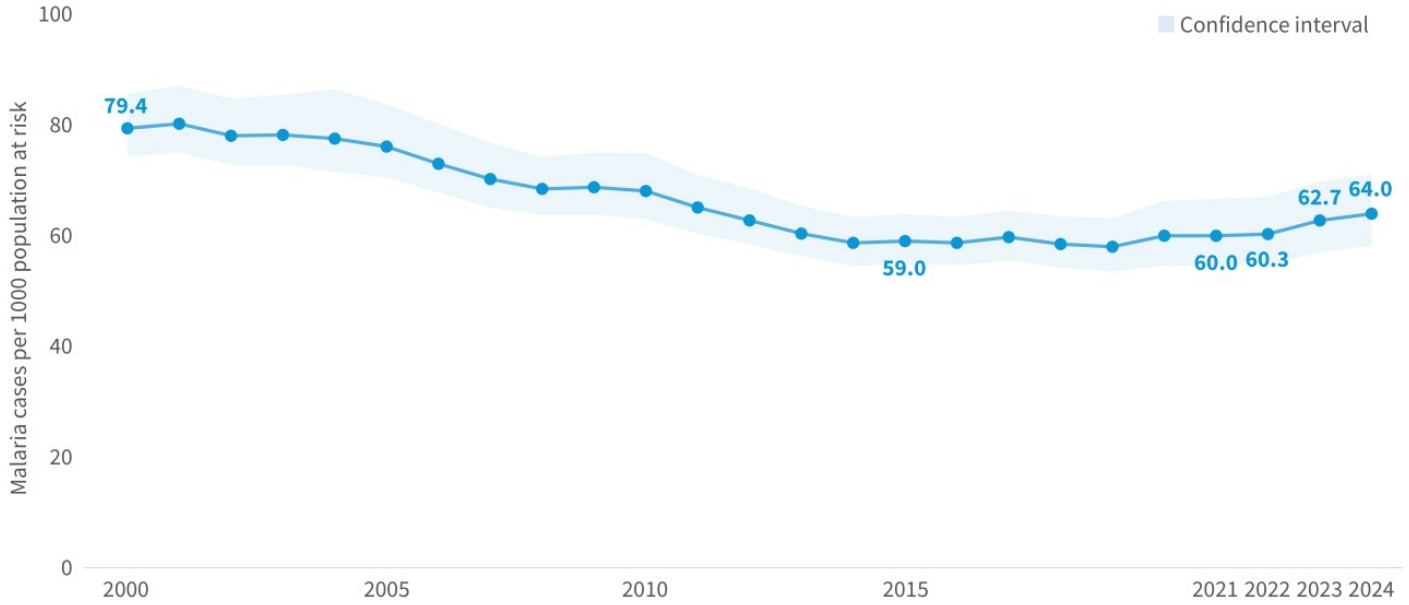
Projet REACT1&2, et peut-être 3

Mise en oeuvre par EXPERTISE FRANCE GROUPE AFD

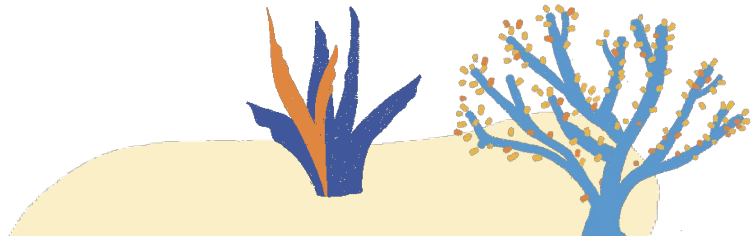
Financée et placée sous la tutelle du MINISTÈRE DE L'EUROPE ET DES AFFAIRES ÉTRANGÈRES

Dans le cadre de la contribution française au LE FONDS MONDIAL

Decreasing trend in malaria burden has stalled



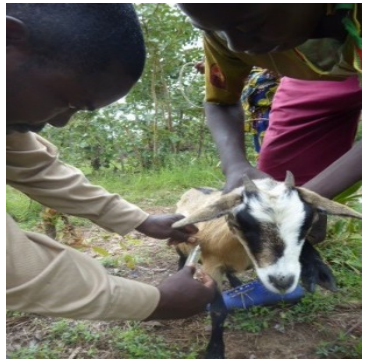
Multiple factors :
- Reduced efficacy of LLINs
- Plateauing LLIN use
- Residual transmission



WHO. World malaria report. 2025

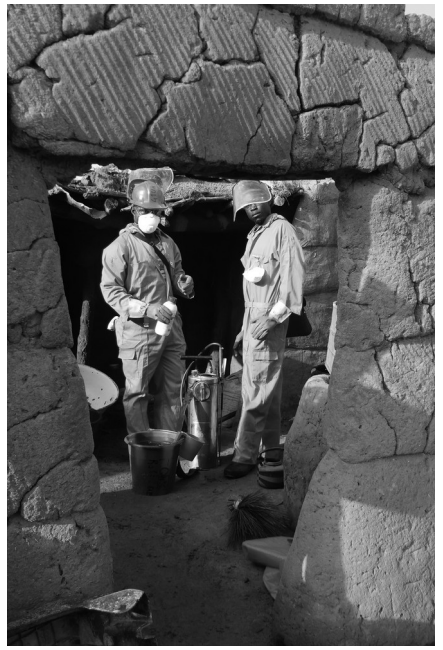
Insecticide REsistAnce management in Burkina Faso & Côte d'Ivoire: Research on innovative vector control Tools (REACT)

- Randomized controlled trial (55 villages) dealing with innovative tools to complement LLINs:
  - LLINs + IRS
  - LLINs + BCC
  - LLINs + Larvicide
  - LLINs + IVM
- Studies on Residual Transmission (Lab + field)
- Capacity building through trainings of 5 master & 6 PhD Students



- # 1. LLINs + IRS

Pyrimiphos-methyl 1000mg/m² (Organophosphates)



IRS with Actellic® 300CS (Syngenta AG, Basel, Switzerland) at a target dosage of 1 g of active ingredient (pirimiphos-methyl) per m² in every house of the selected villages (in September and October 2017). Spray quality control was conducted and adverse effects were documented in health centers during 10 months post-intervention.

Soma et al, Some et al, Tchiekoi et al, Zogo et al.

2. LLINs + BCC

1 CHW → 35 households

Monthly activities :
- 15 home visits (15-20 min)
- 20 interpersonal talks (15-20 min)
- 4 group talks (15-30 min)

(i) everyone sleeps under an LLIN every night
(ii) every household and community member cleans their environment to limit mosquito proliferation
(iii) every pregnant woman seeks and takes intermittent preventive treatment (IPT)
(iv) people in charge of <5 y/o children come to see a health worker within 24h in case of fever.

Save the Children

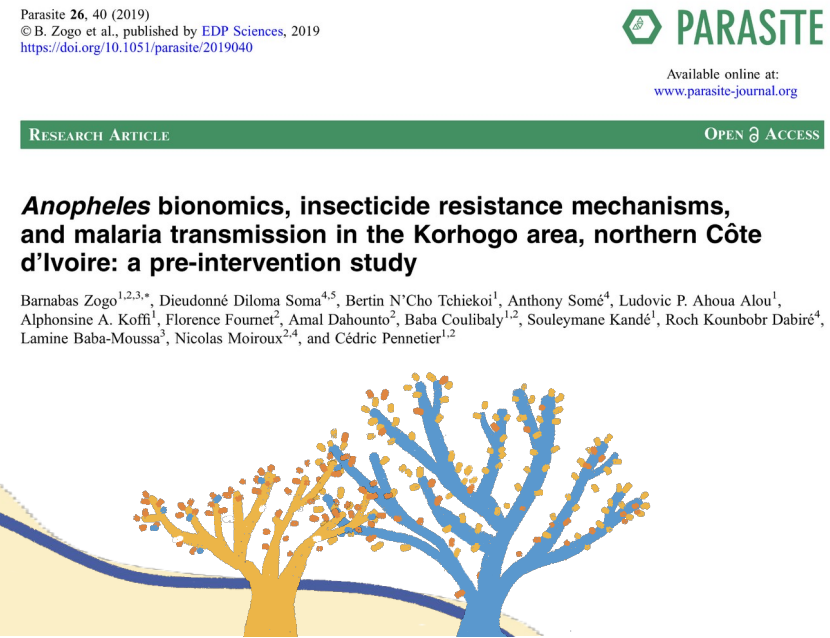
A.I.P

Organisation Non Gouvernementale
Association Ivoirienne pour le Progrès
Notre finalité c'est le bien être social et humanitaire des populations

3. LLINs + Larvicide

Formulation of *Bacillus thuringiensis israelensis* (hereafter *Bti*) within water-dispersible granules, VectoBac®WG (Valent BioSciences Corporation, IL, USA).

Treatments were run weekly between November 16th, 2017 and April, 15th 2018 with a dose of 200 g/ha in each village. Three technicians were trained to treat each water collection at 54meters/minute speed on a 10 meters large border band of each water collection



Parasite **26**, 40 (2019)
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https://doi.org/10.1051/parasite/2019040

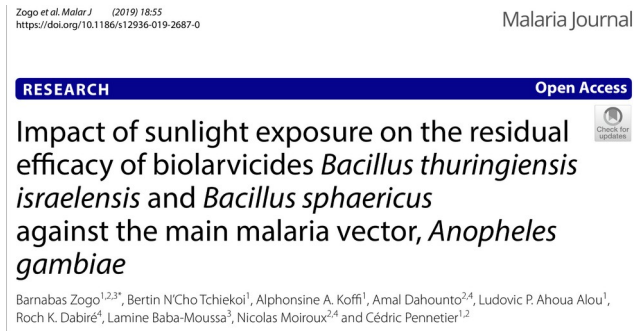
PARASITE

Available online at:
www.parasite-journal.org

RESEARCH ARTICLE — OPEN ACCESS

***Anopheles* bionomics, insecticide resistance mechanisms, and malaria transmission in the Korhogo area, northern Côte d'Ivoire: a pre-intervention study**

Barnabas Zogo[1,2,3,*], Dieudonné Diloma Soma[4,5], Bertin N'Cho Tchiekoi[1], Anthony Somé[4], Ludovic P. Ahoua Alou[1], Alphonsine A. Koffi[1], Florence Fournet[2], Amal Dahounto[2], Baba Coulibaly[1,2], Souleymane Kandé[1], Roch Kounbobr Dabiré[4], Lamine Baba-Moussa[3], Nicolas Moiroux[2,4], and Cédric Pennetier[1,2]



Zogo et al. Malar J (2019) 18:55
https://doi.org/10.1186/s12936-019-2687-0

Malaria Journal

RESEARCH — Open Access

Impact of sunlight exposure on the residual efficacy of biolarvicides *Bacillus thuringiensis israelensis* and *Bacillus sphaericus* against the main malaria vector, *Anopheles gambiae*

Barnabas Zogo[1,2,3*], Bertin N'Cho Tchiekoi[1], Alphonsine A. Koffi[1], Amal Dahounto[2,4], Ludovic P. Ahoua Alou[1], Roch K. Dabiré[4], Lamine Baba-Moussa[3], Nicolas Moiroux[2,4] and Cédric Pennetier[1,2]

Zogo et al. Parasites Vectors (2019) 12:146
https://doi.org/10.1186/s13071-019-3404-0

Parasites & Vectors

RESEARCH — Open Access

Identification and characterization of *Anopheles* spp. breeding habitats in the Korhogo area in northern Côte d'Ivoire: a study prior to a *Bti*-based larviciding intervention

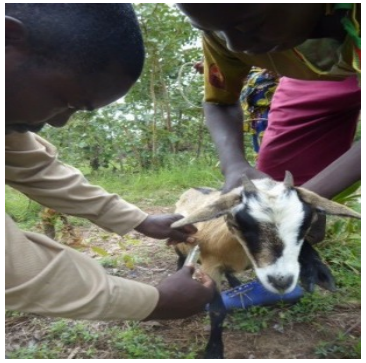
Barnabas Zogo[1,2,3*], Alphonsine A. Koffi[1], Ludovic P. Ahoua Alou[1], Florence Fournet[2,4], Amal Dahounto[2,5], Roch Kounbobr Dabiré[5], Lamine Baba-Moussa[3], Nicolas Moiroux[2,5†] and Cédric Pennetier[1,2†]

Zogo et al. 2019a, b

- **4. LLINs + IVM**

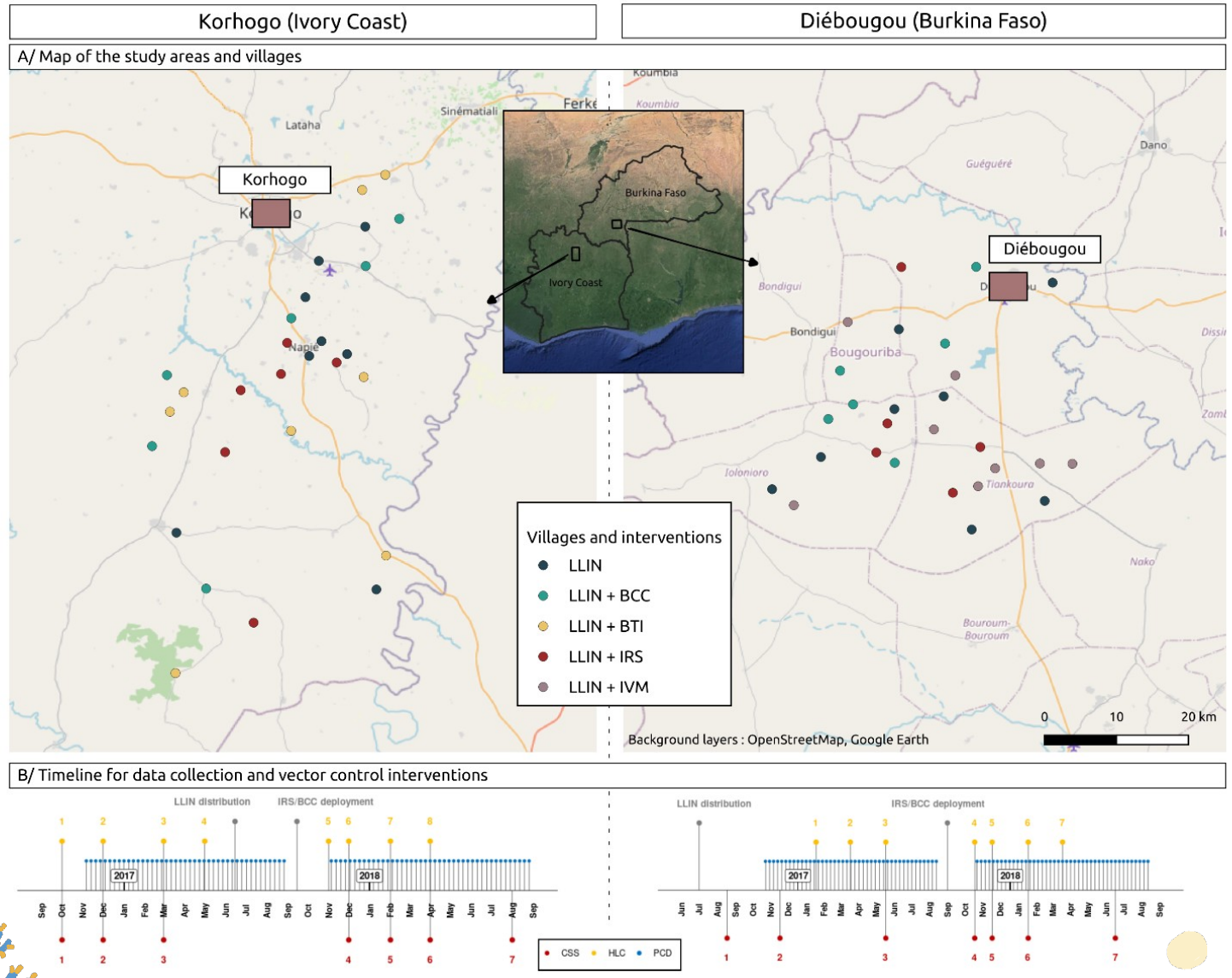
A monthly injection for four consecutive months in peri-domestic animals (cattle) with ivermectin at a dose of 0.2 mg/kg

The human population in the study area receiving ivermectin (IVM) as a preventive treatment against onchocerciasis.



Pragmatic transnational cluster-randomized controlled trial

LLIN (control) – (n=16, 8 in BF,8 in RCI) - Pop. = 4 724
LLIN + IRS - (n=11, 5 in BF, 6 in RCI) - Pop. = 2 565
LLIN + BCC - (n=12, 6 in BF, 6 in RCI) - Pop. = 3 461
LLIN + IVM – (n=8, 8 in BF) - Pop. = 2 169
LLIN + BTI – (n=8, 8 in RCI) - Pop. = 3 078



Moiroux et al. Lancet Global Health, 2025
Pennetier et al. Lancet Reg Health – Africa, accepted

Outcomes

Primary epidemiological outcomes :
- incidence rate
- prevalence of malaria cases in young people

Secondary outcomes :
- Anopheles nightly human biting rate (HBR),
- Infection prevalence in young people

1. LLINs + IRS (BF + RCI) : Incidence **< 23 %** ; Cases' prevalence = Ctrl ; HBR **< 51 %**

2. LLINs + IEC (BF + RCI) : Incidence **< 22 %** ; Cases' prevalence **< 40 %** ; HBR = Ctrl

3. LLINs + LAL (RCI) : Incidence **< 23 %*** ; Cases' prevalence **< 39 %** ; HBR **< 53 %**

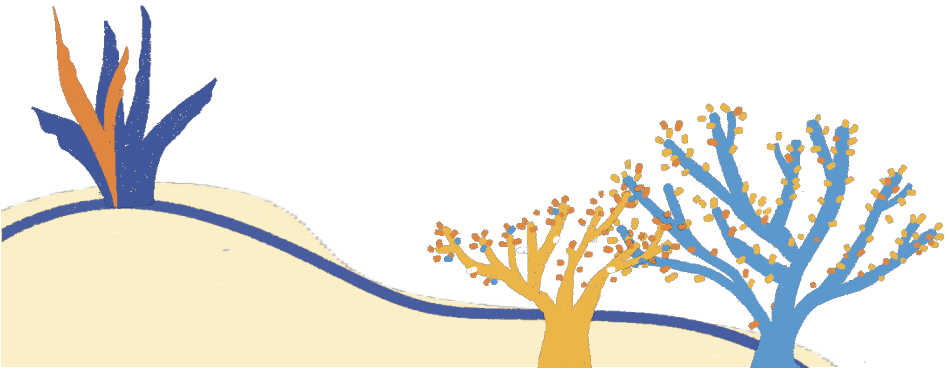
Moiroux et al. Lancet Global Health, 2025
Pennetier et al. Lancet Reg Health – Africa, accepted

Conclusion REACT1

Hypothesis : 1 malaria cases lasting 1 week
Passive detection estimation : 178 medical consultations / week in health centres
Observed passive detection estimation : 32 medical consultations / week
Conclusion : 1 medical consultation / 6 malaria case

Rational REACT 2

Propose strategies to improve access to the full range of therapeutic and preventive tools for target populations, namely pregnant women, children under five years of age, adolescents, and disadvantaged populations, particularly in rural areas where distance to health facilities constitutes an additional barrier to malaria care and management.



Tested intervention in REACT2

- One health worker from the community for a maximum of 35 households
- Diagnostic & treatment by CHWs within communities
- Supervision of CHWs by mobile nurse (under local health authorities)

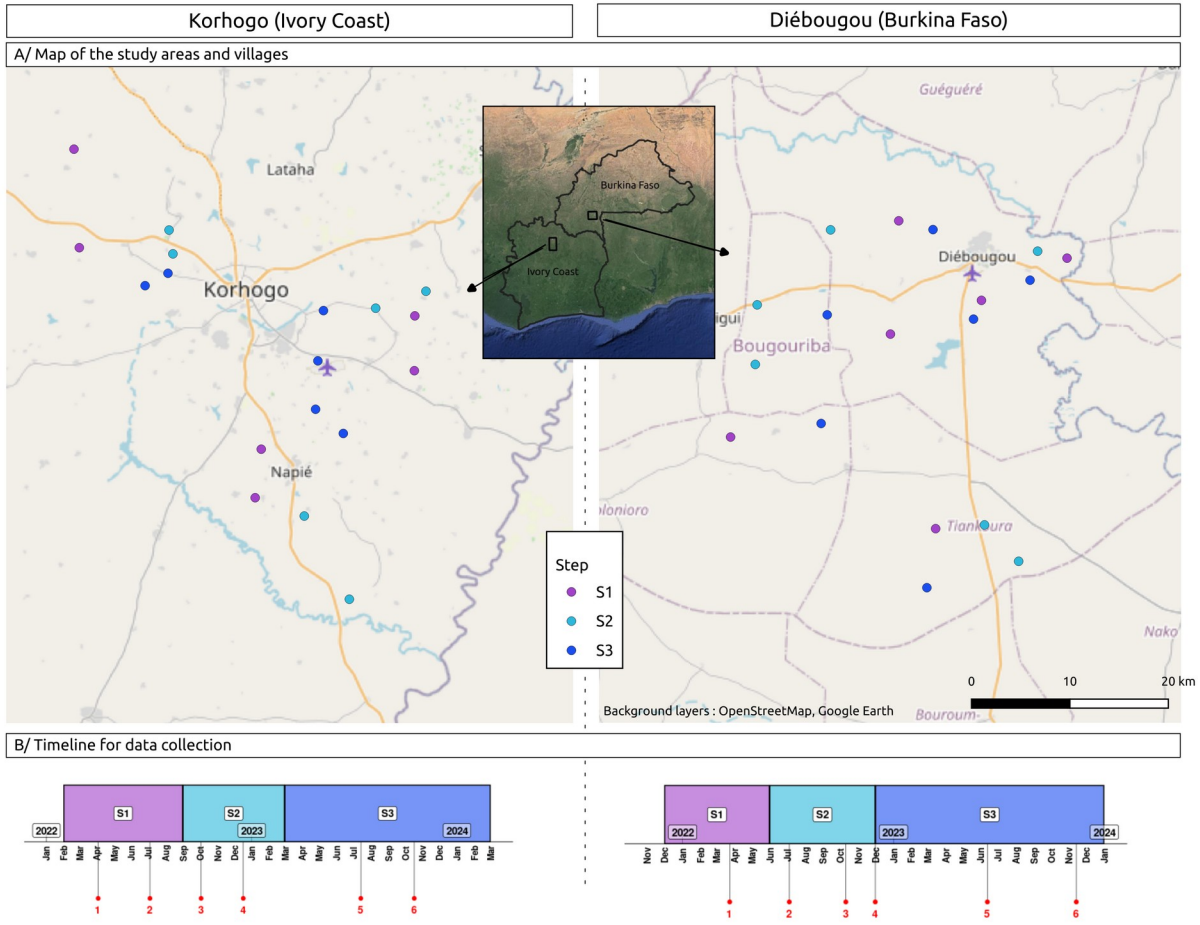
To inform

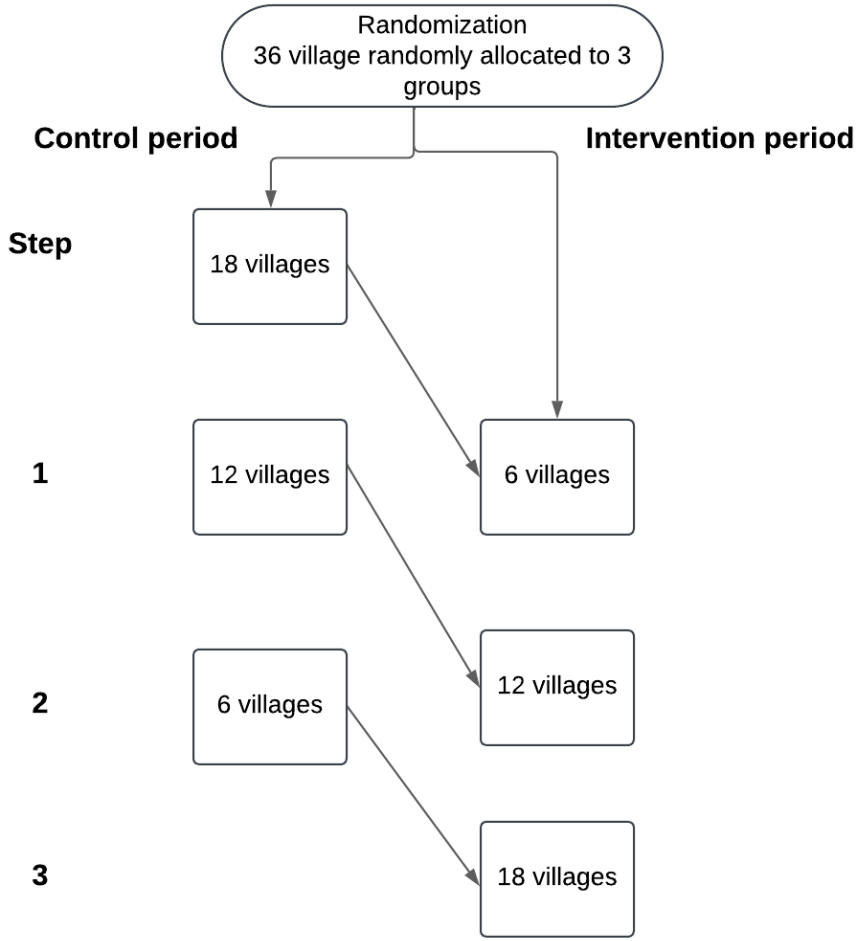
To diagnose

To treat

To supervise

Study design REACT2



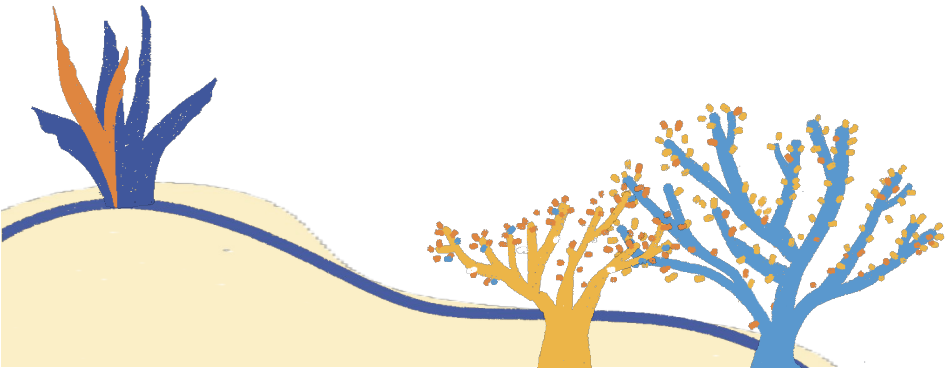


Barro et al. In prep

Outcomes

The primary outcome :
- incidence rate (i.e. number of diagnosed and treated cases per 1000 person-months recorded by PCD at both community and health centre levels)

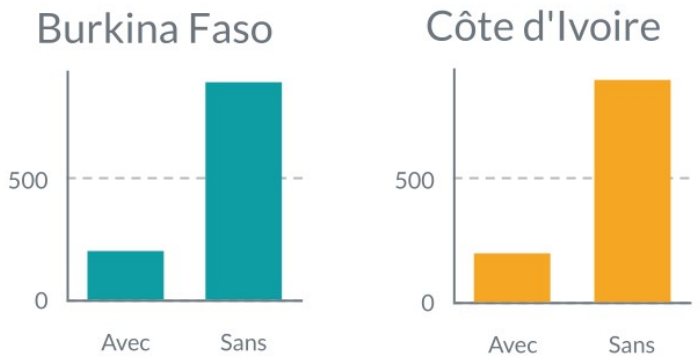
Secondary outcomes :
- incidence of severe malaria cases (i.e. number of severe cases as defined by the WHO[24] per 1000 person-months)
- Consultation workload related to malaria in health (i.e. number of RDT's performed in the health centre per 1,000 person-months)
- Prevalence of malaria cases in young people (proportion of 0-18 y/o tested positive by RDT and showing fever among individuals who attended CSS).



Barro et al. In prep

Results

Nombre de cas de paludisme simple traités par les ASC selon les villages ayant bénéficié de l'intervention (avec) et ceux n'ayant pas bénéficié de celle-ci (sans)



- 461% increase in malaria case management.

- 69% reduction in the number of severe malaria cases.

- Improved linkage between communities and health facilities.

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Rational REACT 3

- One CHW recruited from the local community for a maximum of 35 households.

- Community-based malaria diagnosis and treatment provided by CHWs.

- Regular supervision and support of CHWs by mobile nurses under the oversight of local health authorities.

- Integration of CHWs into **Seasonal Malaria Chemoprevention** (SMC) campaigns to improve treatment adherence and coverage.

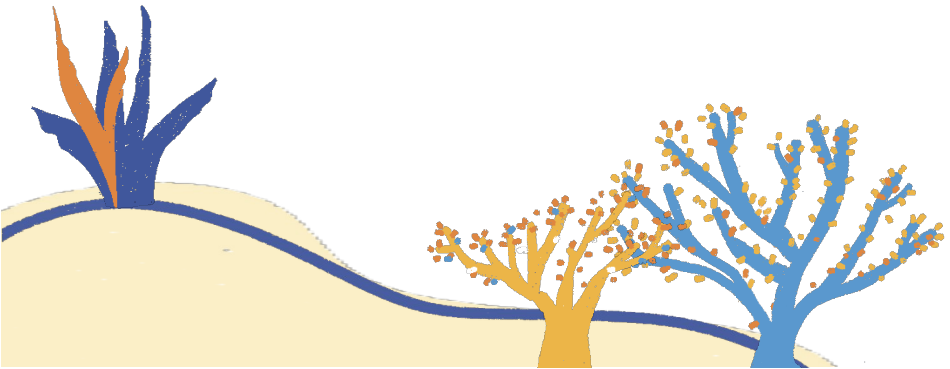
Conclusions

Perspectives :

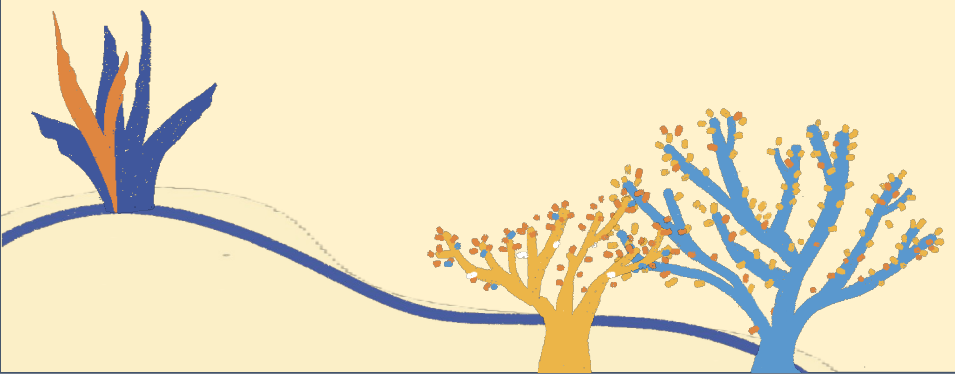
- Cost-effectiveness analysis.
- Environmental and Social Impact Assessment (ESIA).
- Scale-up studies.
- Knowledge transfer and capacity building.

Future Directions:

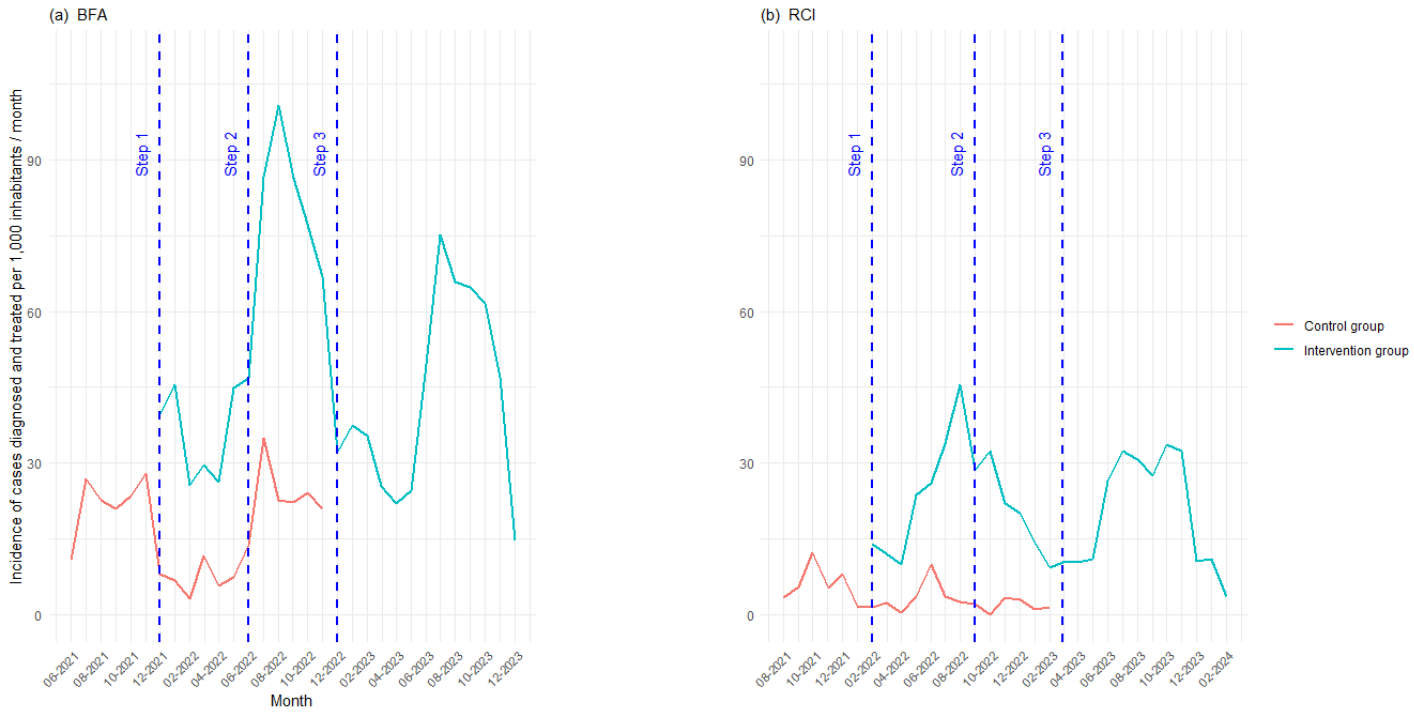
- Explore the expansion of the role of Community Health Workers (CHWs).
- Strengthen and improve CHW supervision.
- Adapt community-based approaches to local contexts and needs.
- Co-design of malaria control strategies with local communities.



Thank you for your attention



Case management incidence



In RCI, the incidence of diagnosed and treated cases in intervention villages was also four times higher than in control villages (SIR=4.60, $CI_{95\%}$= [3.64-5.82], p < 0.001) (Table 3 & Figure 1 in appendix).

Severe malaria cases

The intervention reduced severe malaria incidence by 69% ($CI_{95\%}$=[0.10;0.90], p = 0.032) in the intervention arm compared to the control arm (Table 4).

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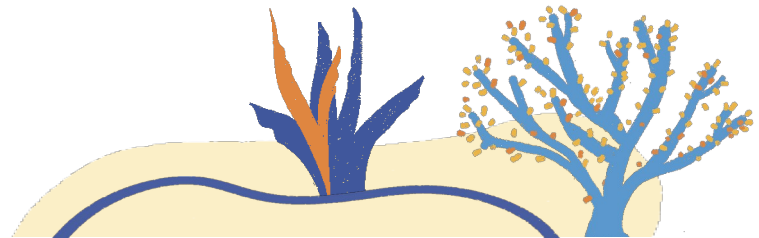

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