

Effectiveness of indoor residual spraying on malaria morbidity in Kinyinya and Ryansoro health districts, Burundi



R. Ndayisaba¹, S. Colombe², W. Van Bortel², P. Sinarinzi³, Y. Nzomukunda⁴, V. Hermans⁵

¹Médecins Sans Frontières (MSF), Bujumbura, Burundi; ²Institut de Médecine Tropicale, Antwerp, Belgium; ³Malaria National Programme, Bujumbura, Burundi; ⁴MSF, Kinshasa, DRC; ⁵MSF, Brussels, Belgium

Discussion

The impact of indoor residual spraying (IRS) is probably much greater than estimated in this study if the under-reporting/under-diagnosis of symptomatic cases is considered.

The impact of IRS is not only associated with the insecticide used, but:

- Associated with the moment when the IRS is introduced;
- Associated with the rate of transmission in the intervention area;
- Associated with certain logistical aspects such as the accessibility of dwellings, the construction material or certain human aspects.

Context

Despite the various anti-malarial interventions implemented in Burundi, we have not observed any lasting decline in the incidence of malaria, and epidemics are regularly detected. This raises the question of the costs and effectiveness of these interventions.

Conclusions

Overall, IRS is effective in reducing the number of cases very rapidly and is therefore recommended in times of epidemics. They have an additional effect on long-lasting insecticidal nets (LLINs). A period of 12 months between IRS is effective, whereas performing an IRS while the number of cases is still low does not seem to prevent a resurgence of cases. IRS will have a greater impact if carried out in an area of high transmission.



Indoor and around windows residual spraying in Ryansoro MSF, 2021

Results

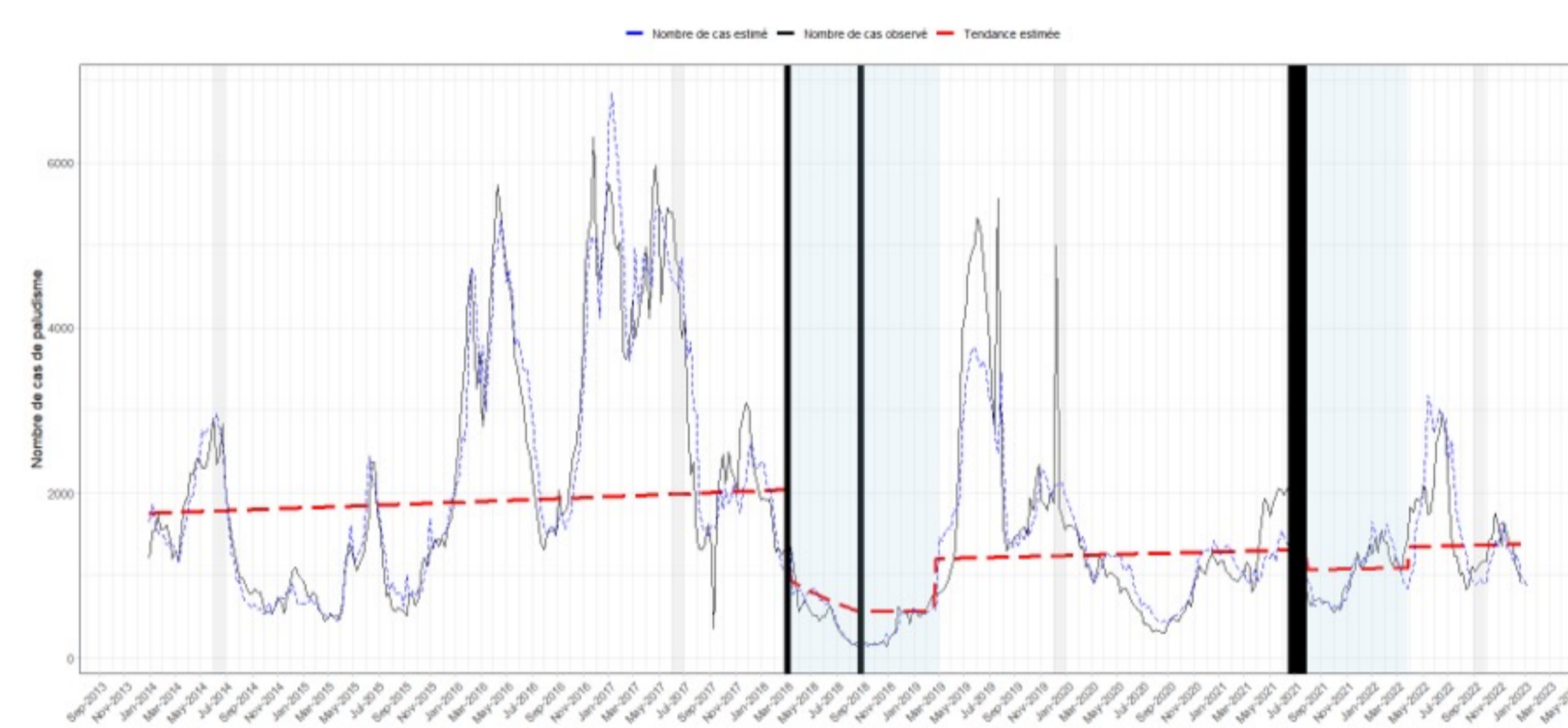
Kinyinya

Rapid reduction in the number of cases of malaria after each IRS
Additional impact on the impact of Mass Campaign of nets distribution
 The number of cases fell immediately by
 -52% after the 2019 IRS
 -28% after the 2020 IRS
 -40% after the 2021 IRS.
 A medium-term reduction in the number of malaria cases was only achieved after the 2019 IRS.

Ryansoro

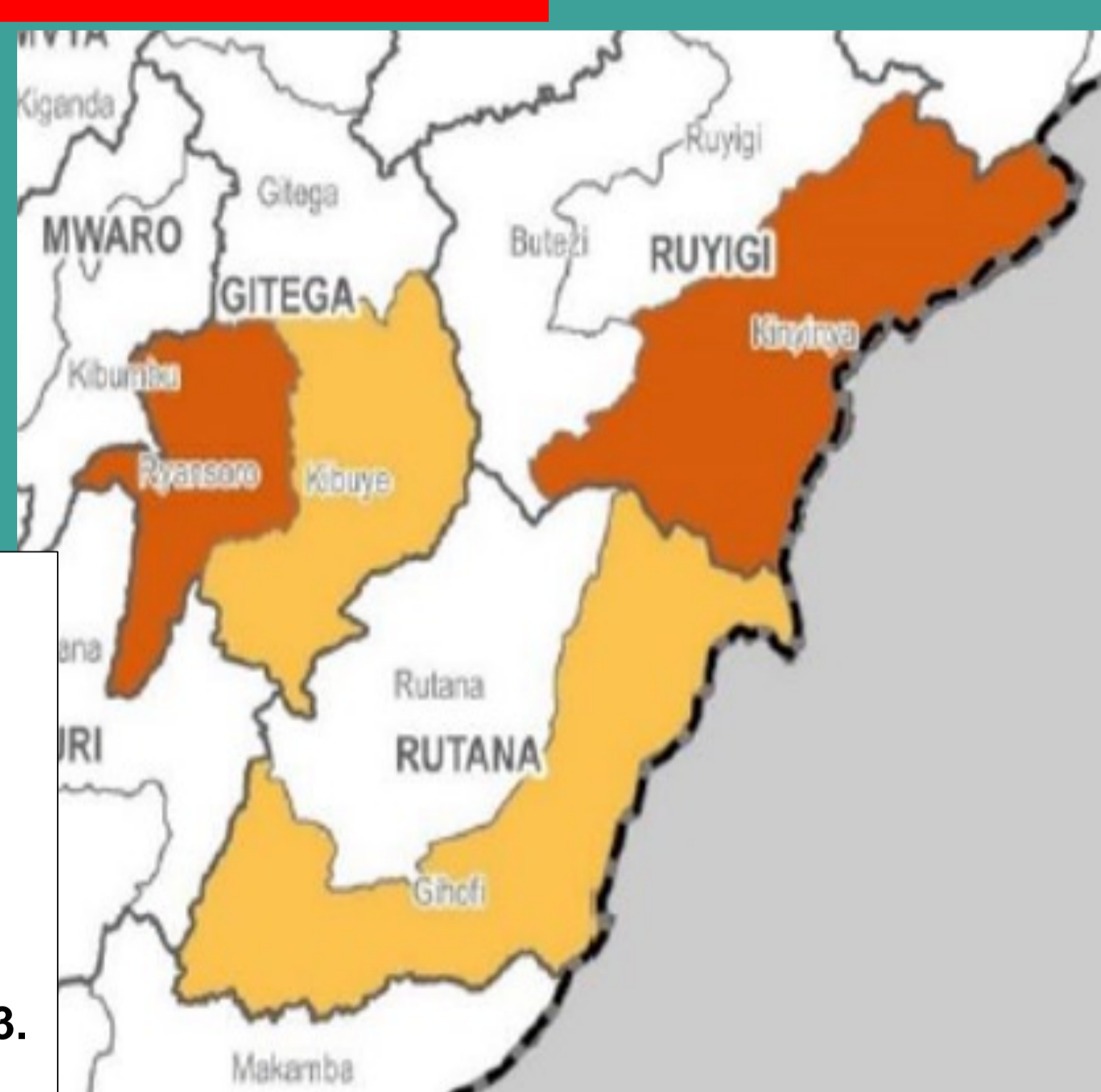
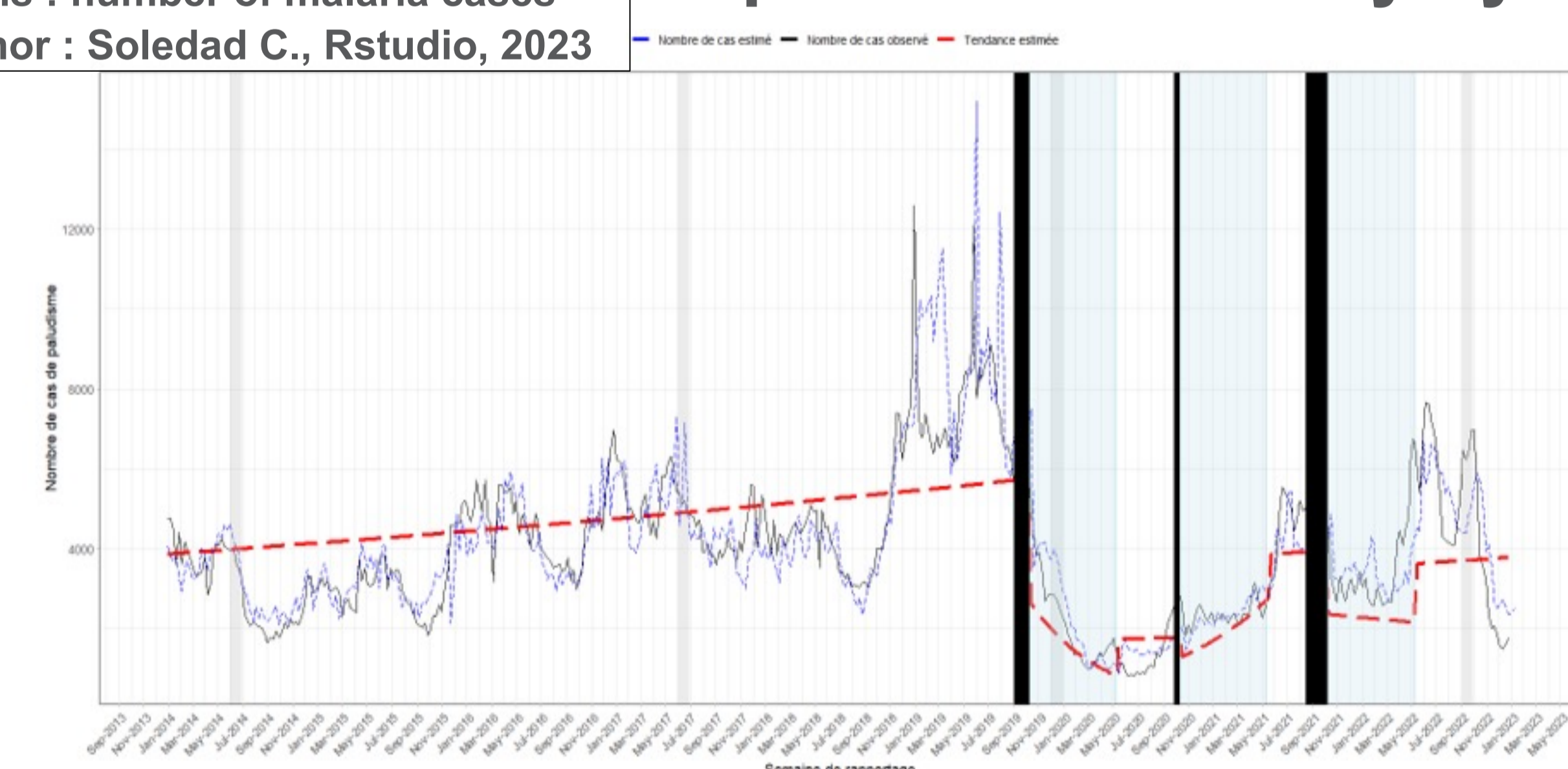
After the first IRS in 2018 (February), there was an immediate reduction in the number of cases (-53%) and a reduction in the medium term (incidence reduced by 2% per week). The next IRS (August 2018) had no effect on the number of cases. IRS in July 2021 led to an immediate reduction in the number of cases (-19%) but no effect in the medium term. Additional impact on the impact of mass campaign of nets distribution.

Impact of IRS in Ryansoro



Axes
 X axis: weeks_year;
 Y axis : number of malaria cases
 Author : Soledad C., Rstudio, 2023

Impact of IRS in Kinyinya



Map for study site : ,
Mustard yellow:
 Kinyinya and Ryansoro,
 intervention zone
 Yellow: Gihofi and Kibuye
 Author : JB Mbaza,
 Publisher: MSF, 2023.



Picture: diluting the product in the pump IRS, MSF, Kinyinya 2021

Methodology

This is a quasi-experimental interrupted time series analysis study with non-equivalent control group using routine data of weekly confirmed malaria cases reported in DHIS2 from January 2014 to December 2022. This analysis considers the seasonality of malaria and uses segmented regressions where pre-intervention trends and intercepts are used as "expected" post-intervention trends and intercepts. As a control group, we selected the district Kibuye for Ryansoro and Gihofi for Kinyinya, where the IRS intervention had not taken place. The trends and seasonality of intervention district were compared to the those of control districts.

- **LLINs (long lasting insecticidal nets)=nets which last an average of 3 yrs**
- **IRS (indoor residual spraying): spraying insecticide inside the walls of houses.**

IRS is more effective in epidemic or outbreak contexts

For questions or comments contact: MSFOCB-Ryansoro-recherche@brussels.msf.org

