

# Towards dog rabies elimination in West and Central Africa

Swiss TPH



Swiss Tropical and Public Health Institute  
Schweizerisches Tropen- und Public Health-Institut

Jakob Zinsstag<sup>1,2</sup>, Assandi Oussigéré<sup>3</sup>, Monique Léchenne<sup>1,2</sup>, Rolande Mindekem<sup>4</sup>, Stephanie Mauti<sup>1,2</sup>, Bassirou Bonfoh<sup>5</sup>, Abdallah Traoré<sup>6</sup>, Mirjam Laager<sup>1,2</sup>, Nakul Chitnis<sup>1,2</sup>

<sup>1</sup>Swiss Tropical and Public Health Institute, Basel, Switzerland; <sup>2</sup>University of Basel, Basel, Switzerland; <sup>3</sup>Institut de Recherches en Elevage pour le Développement, N'Djaména, Chad; <sup>4</sup>Centre de Support en Santé Internationale, N'Djaména, Chad; <sup>5</sup>Centre Suisse de Recherches Scientifiques en Cote d'Ivoire; <sup>6</sup>Laboratoire Central Vétérinaire, Bamako, Mali

## Abstract

**Dog rabies elimination in West and Central Africa is feasible and cost-effective. A science of rabies elimination includes public engagement, integrated surveillance, establishment of low-cost novel diagnostic tests and close interdisciplinary collaboration to work towards the goal of zero rabies deaths by 2030.**

## Background

Dog transmitted rabies still causes the death of more than 25,000 people yearly in Africa. The Global Alliance for Rabies Control has set the ambitious goal to eliminate dog transmitted human rabies by 2030. How can this be achieved in Africa with weak health systems and low levels of funding?

## Objective

Develop a rigorous scientific approach of dog rabies elimination in West- and Central Africa.

## Materials and Methods

Essential components of a science of rabies elimination are:

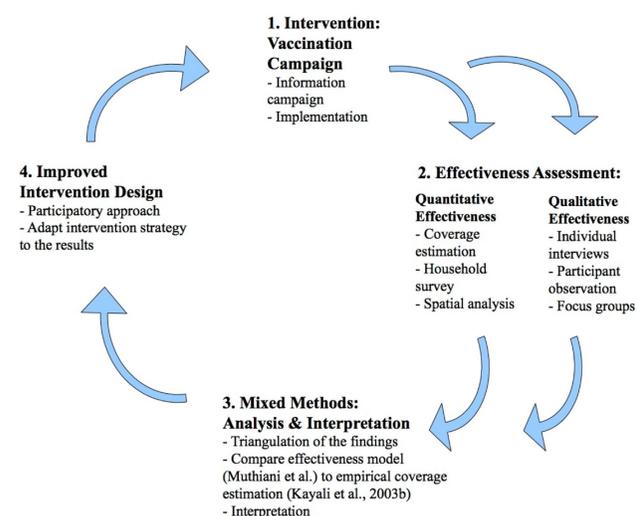
- Social determinants and public engagement: Effective interventions against dog rabies rely on enabling conditions to organize and operate vaccination teams.
- Integrated surveillance seeks to establish a closer intersectoral communication between public health and veterinary diagnostic laboratories and tests novel low-cost diagnostic tests (Figure 1).
- Equity effectiveness of interventions addresses the determinants of successful interventions. This requires a close interdisciplinary collaboration between natural, social and cultural sciences for which we have developed a new mixed method.
- Transmission dynamics and intervention financing assesses the role of heterogeneity of the dog populations and cross-sector economics.



**Figure 1:** Results from Chad, with one negative result (sample 18/12) and four positive results. The upper line visible in the results window is the control.

## Results

First estimates of the burden of rabies in Chad, Mali, Cote d'Ivoire and Liberia show a range between several ten to hundred thousand human exposures per year and country. We validated successfully a lateral flow rabies diagnostic test and demonstrated that availability due to lack of information was a key effectiveness parameter of vaccination campaigns in Bamako, Mali (Figure 2).



**Figure 2:** Intervention Effectiveness Optimization Cycle.

In N'Djaména, Chad, two mass vaccination campaigns of dogs were conducted in 2012 and 2013, reaching a vaccination coverage of 70% in both years. Before the campaigns, there was on average one confirmed case of dog rabies per week. The campaigns interrupted transmission for 8 months. Mathematical modelling of the transmission dynamics suggests that the most likely reason for the resurgence after 8 months is importation. We estimated the cost of rabies elimination for Chad at 28 million Euro over a period of 10 years.

## Conclusions

Effective action depends essentially on political will of African Union and its regional economic organisation, regional coordination using geographical barriers and social acceptance. Novel financial instruments like development impact bonds may play a key role for the roll out.

## References

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