

## Publication

### Cost-estimate and proposal for a development impact bond for canine rabies elimination by mass vaccination in Chad

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Close to 69,000 humans die of rabies each year, most of them in Africa and Asia. Clinical rabies can be prevented by post-exposure prophylaxis (PEP). However, PEP is commonly not available or not affordable in developing countries. Another strategy besides treating exposed humans is the vaccination of vector species. In developing countries, the main vector is the domestic dog, that, once infected, is a serious threat to humans. After a successful mass vaccination of 70% of the dogs in N'Djaména, we report here a cost-estimate for a national rabies elimination campaign for Chad. In a cross-sectional survey in four rural zones, we established the canine : human ratio at the household level. Based on human census data and the prevailing socio-cultural composition of rural zones of Chad, the total canine population was estimated at 1,205,361 dogs (95% Confidence interval 1,128,008-1,736,774 dogs). Cost data were collected from government sources and the recent canine mass vaccination campaign in N'Djaména. A Monte Carlo simulation was used for the simulation of the average cost and its variability, using probability distributions for dog numbers and cost items. Assuming the vaccination of 100 dogs on average per vaccination post and a duration of one year, the total cost for the vaccination of the national Chadian canine population is estimated at 2,716,359 Euros (95% CI 2,417,353-3,035,081) for one vaccination round. A development impact bond (DIB) organizational structure and cash flow scenario were then developed for the elimination of canine rabies in Chad. Cumulative discounted cost of 28.3 million Euros over ten years would be shared between the government of Chad, private investors and institutional donors as outcome funders. In this way, the risk of the investment could be shared and the necessary investment could be made available upfront - a key element for the elimination of canine rabies in Chad.

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