



Dying Rabid: Adopting Compulsory Mass Dog Vaccination to Reduce Human Deaths From Dog Rabies in Uganda: Policy brief

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KEY MESSAGES

- Globally canine rabies causes approximately 59,000 human deaths per year.
- An average of 14,865 dog bites and 36 rabies deaths were registered annually in Uganda from 2015-2020.
- Over 90% of the rabies cases are transmitted via domestic dog bites.
- Despite PEP being almost 100% effective, only 2 out of 10 dog bite victims access it.
- WHO recommends 70% dog vaccination for effective rabies control, however only 10% of domestic dogs in Uganda are currently vaccinated.
- Making vaccination of dogs compulsory while targeting a 25% semi-annual vaccination coverage would reduce rabies cases by 94% within 10 years.



Only 10% of the dogs are vaccinated

An average of 14,865 dog bites and 36 rabies deaths were registered annually in Uganda from 2015-2020.

Introduction

Human Rabies is a global public health concern accounting for an estimated 59,000 human deaths annually 95% of which occur in Africa and Asia [1, 2].

Every year we experience rabies from all regions of the country causing an estimated 14,865 dog bites and 36 rabies deaths/year [3]. These numbers could be higher since this disease is severely underreported [2].

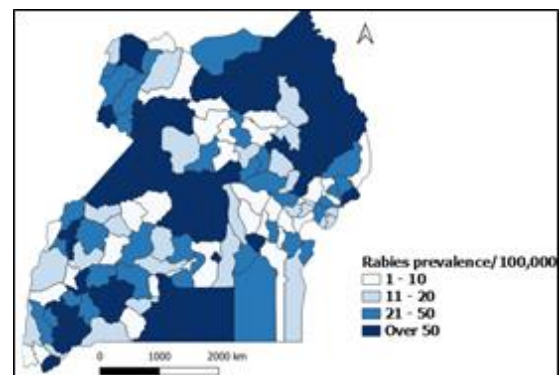


Figure 1: Dog bites (suspected rabies) prevalence in Uganda



Policy Options

In order to prevent and eliminate the ongoing rabies associated disabilities and deaths, there is a need to increase the dog vaccination coverage from 10% which is the status quo (option 1). The subsequent sections present the possible vaccination options.

Option 1 (status quo);

Maintain status quo of ten percent (10%) dog vaccination coverage and administer PEP treatment to 21% of the dog bite victims.

This is the current practice and would require no extra resources in terms of carrying out social mobilization and enforcement. There is currently no penalty to dog owners who do not vaccinate their dogs.

Feasibility is high since it is the current practice and would require no additional resources or enforcement.

Option 2:

Annual vaccination of 70% of dogs and administering PEP to 21% of the dog bite victims.

WHO has recommended 70% dog vaccination coverage sustained over three to seven years to control or eliminate rabies infections. However, the Sustainable Development Goal targets elimination of rabies by 2030.

Feasible but subject to availability of extra resources and law enforcement. However, this option will be carried out using the existing schedules/work plans of the veterinary staff or technicians.

Option 3:

Biannual Vaccination of 25% of dogs and administering PEP to 21% of the dog bite victims.

This option addresses the high population turnover among dog populations in Uganda and would require minimal enforcement.

The targeted vaccination coverage is achievable. However this option will require vaccinating twice in a year which might negatively affect the existing schedules/work plans of the veterinary staff or technicians, this proposed approach is highly feasible.



Results

We conducted an economic evaluation of three policy options to prevent and eliminate rabies in Uganda for a period of ten years. The results are as shown in the table below.

Rabies Control Intervention

Vaccination options	Option 1		Option 2		Option 3	
	10% vaccination of all dogs (Status Quo),		Annual vaccination of 70% of all dogs		Semi-annual vaccination of 25% of dogs	
Transmission scenario	Low	High	Low	High	Low	High
Number of Rabid dogs	431,447	1,062,293	10,621	18,309	33,878	60,229
Human deaths due to Rabies	2,465	6,135	60	104	182	324
Cost per Human death averted	NA	NA	9,751	3,417	7,070	2,437
Cost per DALY averted	NA	NA	978	354	747	263
Political feasibility	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible
Operational feasibility	Feasible	Feasible	Weakly feasible	Weakly feasible	Feasible	Feasible

The results of the model are based on three different dog rabies vaccination options: 10% vaccination of all dogs (Status Quo), annual vaccination of 70% of all dogs, and semi-annual vaccination of 25% of dogs. We included, for each vaccination option, two dog rabies transmission scenarios: low (1.2 dogs infected per infectious dog) and high (1.7 dogs infected per infectious dog).

Low Transmission Scenario

With 10% of dog vaccination, over 10 years there would be a total of approximately 430,000 rabid dogs and 6,135 human deaths.

On the other hand, Bi-annual vaccination of 25% of dogs' results in 10-year reductions of 92% in rabid dogs, and approximately 2,283 human deaths averted, and \$747 per DALY averted. Both the annual vaccination of 70% of dogs and 25% biannual vaccination eliminated dog rabies by the 4th year of implementation of both vaccination strategies.



High Transmission Scenario

With 10% of dog vaccination, over 10 years there would be a total of approximately 1,060,000 rabid dogs and 6,135 deaths. Annually vaccinating 70% of dogs results in On the other hand, Bi-annual vaccination of 25% of dogs' results in 10-year reductions of 94% in rabid dogs, and approximately 5,810 human deaths averted, \$263 per DALY averted.

Conclusion

Using the WHO Cost Effectiveness threshold (Uganda GDP Per Capita of 810 these results indicate that the 25% bi-annual vaccination is very cost effective in comparison to the status quo. On the other hand, the 70% vaccination is very cost effective under a high transmission scenario and moderately cost effective in the low transmission scenario. However, the 25% bi-annual vaccination strategy is more cost effective as it has a lower cost per DALY averted in both low and high transmission scenarios.

Recommendations

- We recommend that the Ministry of Agriculture adopts the 25% semi-annual dog vaccination approach as it is the most cost-effective approach to eliminating human rabies in Uganda; this is politically and operationally feasible.
- The government should educate the public on the dangers of rabies plus the importance of dog vaccination against rabies to ensure public cooperation.
- Currently vaccination of dogs in Uganda is carried out once a year using the static vaccination points, the program is not compulsory dog owners present their animals for vaccination at will.
- The proposed option will require vaccinating twice in a year, it therefore necessitates adjustments in the existing schedules/work plans of the veterinary staff or technicians. It also requires some enforcement
- Resources for mobilization and procurement of vaccines and accessories will be required. Political buy-in to support the mobilization of communities and lobbying of resources required for the implementation of the proposed strategy should also be considered.

Acknowledgement

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