

**NAIROBI CITY COUNTY**



**FOOD, AGRICULTURE AND FORESTRY SECTOR**

**ELIMINATION OF DOG-MEDIATED RABIES IN  
NAIROBI CITY COUNTY**

**CONCEPT NOTE**

**APRIL 2020**

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## 1.0 Purpose

The World Organization for Animal Health (OIE) and its partners are championing the Global Framework for the Elimination of Dog-Mediated Rabies with the goal of eradication of dog-mediated rabies by the year 2030. The Kenya National Rabies Elimination Strategy, 2014-2030, is plugging into the global framework with the following strategies:

- a. Increasing community awareness and education on rabies prevention and control;
- b. Conducting mass dog vaccination targeting greater than 70% of dog population coverage annually for three consecutive years;
- c. Dog population management comprising legislation, education, registration, sterilization, holding facilities, euthanasia and controlling access of dogs to garbage and left overs.
- d. Providing timely access to appropriate post-exposure treatment to all human cases of dog-bites suspected to be rabid and increasing knowledge and skills among animal and human health workers on the same.
- e. Strengthening surveillance and control actions to outbreaks, including preparedness and response.
- f. Strengthening capacity for planning, partnerships and coordination.
- g. Mobilization resources to support the rabies elimination program.

Nairobi City County is implementing both the Global Framework for the Elimination of Dog-Mediated Rabies and the National Rabies Elimination Strategy, 2014-2030, as guided by the Nairobi City County Dog Control and Welfare Act, No. 10 of 2016, the Rabies Act, Cap. 365, and the OIE Standards on Stray Dog Population Control, Chapter 7.1 of the Terrestrial Animal Health Code.

A stock of 3,000 doses of rabies vaccine has been provided by the national Directorate of Veterinary Services to support the enhancement of mass vaccination of dogs and more doses would need to be availed as the programme requires.

The population of dogs in Nairobi City County is unknown; however, basing the estimation on the urban ratio of 0.31 dogs per household<sup>1</sup> and the results of 2009 National Population Census where there were 985,016 households<sup>2</sup>, the population is around 300,000. There is also an unknown population of domestic cats; though this species will not be specifically targeted in the programme it will benefit from the project activities.

Rabies and dog bites are frequently reported in the city. **Table 1** lays out the annual confirmed cases of rabies and **Table 2** the number of human dog-bite victims. The diseases has been reported in all the last 6 consecutive years in many animal species including in human with most cases in the dog. Further, the number of persons reporting to hospitals that are under the county government management with bite wounds, largely by dog, is 5,000 per year, of which around 1,000 are children under 5 years of age.

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<sup>1</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3534358/pdf/1746-6148-8-236.pdf>

<sup>2</sup> Kenya National Bureau of Statistics, 2010, 2009 Population and Housing Census Results

**Table 1: Number of confirmed cases of rabies per year**

Year	Species							Total
	Humans	Dogs	Cats	Goat	Sheep	Horse	Leopard	
2018	1	9	3	-	-	-	1	13
2017	-	2	1	1	-	-	-	4
2016	-	7	1	-	-	-	-	8
2015	-	4	1	-	1	-	-	6
2014	1	15	-	1	-	-	-	16
2013	-	24	-	-	-	1	-	25
<b>Total</b>	<b>2</b>	<b>61</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>72</b>

Source: Kabete Central Veterinary Laboratories Records

**Table 2: Number of human bite victims per year**

Year	Older than 5 years	Younger than 5 years	Total
2018	4,454	872	5,326
2017	4,240	903	5,143
2016	5,243	1,448	6,691
2015	4,148	991	5,139
2014	3,147	934	4,081

Source: Nairobi City County Public Health Reports

This concept note underlines how the ecology of urban dog population and the epidemiology of urban rabies will be understood to inform the eradication programme and how public health education, mass vaccination, dog control and a monitoring and evaluation programme will be instituted in the city. The goal is eradication of dog-mediated rabies in the city by the year 2030.

## **2.0 Nairobi Plan of Elimination of Dog-Mediated Rabies**

The programme activities are chronologically elaborated in the 5-Point Plan below:

### **2.1 Establishment of Nairobi Urban Dog Ecology and Epidemiology of Urban Rabies**

Proper planning of the control programme will entail documentation of dog ecological and rabies epidemiological knowledge and information. Information is needed on where the dogs are, how many, how they are kept, how they are managed by their owners, including their vaccination statuses, their sex, age and breed profiles and whether they interact with known sylvatic carriers of rabies such as the yellow mongoose and jackals. With respect to epidemiology, rabies passive surveillance is necessary to identify cases while active surveillance will be necessary to establish risk factors in dog and human populations and the quantity of the disease in the dog population.

A registration cum census of all owned dogs will be done at the beginning of the programme. Field veterinary staff and partners will carry out door to door interviews and observations in the

city, starting with one subcounty before moving on as a team to the next subcounty. A registration cum census form will be used to capture data on the name of dog owner, his / her locality (in subcounty, ward, village, street and house or plot number), individual dog identification (with name, breed, sex, age, colour(s), neuter-status, rabies vaccination status and any unique identification number, mark or license), and the status of dog-proofing of owner's dwellings. The enumerators will separately observe or inquire on the presence or absence of stray dogs and their estimated numbers and that of the sylvatic carriers of rabies such as the yellow mongoose and jackals. The data will be analyzed to give knowledge and information of Nairobi urban dog ecology. The register will be updated annually based on the dog-licensing programme of the county government.

Nairobi residents will be empowered through public health education to report suspected cases of rabies to their area veterinary inspector or administration officer, which in any case is their legal obligation in accordance with the provisions of section 4 (1) (b) of the Animal Diseases Act, Cap. 364. These reports will be immediately investigated by the veterinary inspector to ascertain if indeed the dog is rabid through kenneling and observing the dog for at least 14 days, whether there are human bite victims and whether other dogs or animals have been bitten by the suspected rabid dog. Field veterinary staff will be trained and refreshed once a year on the official protocols of handling suspected rabid dogs, confirmed rabid dogs, persons bitten by suspected rabid dog, persons bitten by confirmed rabid dog, and other animals bitten by suspected and confirmed rabid dog. The investigation report will be submitted to the County Director of Veterinary Services and also captured in the immediate notification and also weekly surveillance reports that will be presented to the national Director of Veterinary Services.

An active rabies surveillance protocol will be implemented once a year by field veterinary staff. It will be designed to capture the risk factors for rabies and to quantify risk. It will also identify pathways for incursion and spread of rabies as well as the serological immunity status of urban dogs. Active cases will be identified historically from passive surveillance and the annual prevalence and incidence of rabies determined. The active surveillance report will be submitted to the Nairobi City County Assembly, the national Director of Veterinary Services and also published in peer-reviewed journals.

The lessons from the dog ecological and rabies epidemiological studies will be incorporated in the rest of the programme activities which will be revised as necessary.

## **2.2 Public Health Education on Rabies and Dog Control**

The residents of Nairobi will be empowered through public health education on rabies and dog control that will be carried out by veterinary and human health field staff and partners. Annually, an intense public engagement programme will be carried out for 7 consecutive days on television and radio. A video-clip will be used for television advertisement; a similar one for radio will be designed and aired targeting local area radios. County veterinary staff will also seek to participate in media interviews and talk shows and will also use social media outlets of the county for the purpose.

The television and radio engagements will be timed to be carried out a few days ahead of the mass vaccination programs. They will be augmented with video-shows as well as handbills, pamphlets, posters, banners and notices distributed during and after community meetings held with veterinary and human health field staff and partners. Community meetings will be in churches and mosques, social halls, schools, chief's barazas and other fit venues. These engagements will also be augmented with a road-show conducted by veterinary and human health field staff and partners.

Public education messages for various audiences and for various fora will be designed, developed and produced by veterinary and human health staff at county headquarters with participation of any partners. The messages will be revised as necessary every year with lessons from the epidemiological studies.

### **2.3 Mass vaccination of dogs**

A mass vaccination campaign will be carried out once a year targeting the rabies vaccination of all the unvaccinated dogs such that the immunization coverage will be over 70% of the city dog population (i.e. over 210,000 dogs). Owners of cats will also be asked to present their animals for rabies vaccination. The vaccine and other resources for its delivery to animals will be sourced from the county and national governments and from partners. An annual vaccination programme will be developed and published and may consider the carrying out of the activity during school holidays, a systematic approach from one sub-county to another and the involvement all veterinary staff and other personnel supported by partners.

Each vaccinated dog will be issued with a vaccination certificate which will be updated every year after booster vaccination. All vaccination certificates will be entered in a manifest that will be filed in the subcounty veterinary offices.

A special report of each mass rabies vaccination programme will be prepared and submitted to the county and national veterinary headquarters and to any participating partner. The report will include the percentage of the dog population vaccinated through the mass campaign and also through other vaccinators such as private veterinary clinics; for this purpose all private veterinary clinics will be expected to submit monthly reports of all rabies vaccinations they have carried out for their clients.

### **2.4 Dog Control Measures**

The dog control measures for consideration are the physical controls through housing and other restraint as well as breeding control through neutering. Stray dogs are likely to encounter rabid dogs or the sylvatic carriers of rabies. Dogs stray to look for food if hungry and also to breed; dogs are also highly social animals and may stray to temporarily join their packs at night. The objective of dog restraint measures is to therefore prevent straying of dogs from their owners' premises and also to control the population of stray dogs. Stray dogs will be impounded at the Nairobi City Dog Pound pending their disposal as guided by law.

The public health education programme will include messages of dog control measures which will be the obligatory dwelling-proofing for dogs and the voluntary but encouraged neutering of dogs as set out in the Nairobi City County Dog Control and Welfare Act. Dwelling-proofing for dogs is a prerequisite to acquiring a dog-license in the city while licence fees for one year are waived for a neutered dog.

Neutering is expected to be done on request by the private veterinary clinics but may also be done in campaigns run by partners under the supervision of the veterinary officer.

## **2.6 Monitoring and Evaluation of Elimination of Dog-Mediated Rabies**

A weekly, monthly, quarterly and annual report of activities of the Programme for the Elimination of Dog-Mediated Rabies will be submitted to county and national veterinary headquarters for the purpose of supplementing a monitoring and evaluation (M&E) plan that will be established and implemented. The M&E tool that will be used will be an annotated logical framework capturing objectives, outputs and activities against specific targets. The tool will be administered once a year by the County Director with participation of any partners.

The lessons from the M & E Plan will be used to revise the Nairobi Programme for the Elimination of Dog-Mediated Rabies, as necessary for the subsequent years.

## **3.0 Programme Outcomes and Outputs**

The outcome of the programme is improved public health and safety as a result of elimination of dog-mediated rabies, the control of dogs and the reduction of stray dog population in the city community. The expected outputs of the programme are the annual vaccination of over 70% of dog population of the city, prudent keeping of dogs and the reduced population of stray dogs.

## **4.0 Programme Beneficiaries and Benefits**

The beneficiaries of the programme are the general members of the public whose health and safety is comprised in situations of prevalence of rabies and large populations of neglected and stray dogs. Dog owners will benefit with the service provided by dogs such as guarding and companionship without concurrent risks to the health and welfare of members of their households and their neighbours.

The value of various benefits of the interventions such as those in the programme has been estimated. An analysis of the benefits of extra earnings from the licensing programme that is provided in the Nairobi City County Dog Control and Welfare Act, which has a prerequisite of dog control and vaccination and of the costs saved from illnesses and deaths from dog bites and rabies against the costs of implementing the licensing programme and of revenue foregone from waived revenue from neutered dogs gave a benefit / cost ratio of 1.4<sup>3</sup> indicating that such a

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<sup>3</sup> Nairobi City County Director of Veterinary Services, 2017, Cost / Benefit Analysis of proposed Nairobi City County Dog Control and Welfare Regulations (Unpublished)

programme is worthwhile. Zinsstag (2007)<sup>4</sup> found that rabies vaccination of dogs alone had a cost-efficiency ratio of \$837 (about Ksh 83,700/=) per averted human exposure and \$52 to \$525 (Ksh 5,200/= to 52,500/=) per averted human death. Shim (2009) is reported by Anothaisintawee (2019)<sup>5</sup> as having estimated the cost per rabid dog prevented as USD 555 (about Ksh 55,500) on “willingness to pay basis” in Tanzania. Bilinski (2016) found that canine vaccination every year with 70% coverage in agro-pastoral areas would cost 2,785 USD per Disability Adjusted Life-Year (DALY) averted<sup>6</sup> in Sub-Saharan Africa, which is cost-effective at the threshold of 1-3 times the GDP per capita that is promoted by the World Health Organization<sup>7</sup>. From the foregoing, the elimination of dog-mediated rabies in the city would be a worthwhile programme.

## 5.0 Budget

The roll out of the programme will require additional human, material and financial resources that will be provided by the government and partners. The veterinary professional and paraprofessional capacity of the County Directorate of Veterinary Services will have to be aligned with the programme alongside other official duties. At present the Directorate does not have any serviceable vehicles, its fleet of 3 cars being older than 20 years. The ceilings ordinarily placed on the Directorate in the budgetary cycle avails only about Ksh 10 million for procurements of vaccines for all animals and another 2 million to provide for equipment and reagents.

The global budget for the programme is estimated as Ksh 149,976,300 for the first year and Ksh 80,050,600 for each of the subsequent years are elaborated in *Table 3*.

**Table 3: Global Budget for Programme for Elimination of Dog-Mediated Rabies**

Item	Notes	Budget / Ksh	
		Year 1	Each subsequent year
Registration cum census of dogs	Mobilization of a team of 1,000 personnel for 7 days, lunches, fuel, enumeration books	8,550,700	0
Epidemiological surveys	Missions for passive and active surveillance and serological surveys	1,561,000	1,561,000
Public health education	Messages, distribution and engagements	18,950,000	18,950,000
Mass dog vaccination	Procurement of vaccines, syringes, vehicle fuel and staff lunches, certificates	27,100,000	21,100,000
Dog control / licensing campaign	Vehicle fuel and staff lunches	2,305,000	2,305,000
Stray dog population management practices	Capture, re-homing processes, euthanasia, disposal	1,774,000	1,774,000
M&E missions	Vehicle fuel and staff lunches	40,600	40,600

<sup>4</sup> Zinsstag, J., et al, (2007) Human Benefits of Animal Interventions for Zoonosis Control, Emerging Infectious Diseases, [www.cdc.gov/eid](http://www.cdc.gov/eid), Vol. 13, No. 4.

<sup>5</sup> Anothaisintawee, T., et al, (2019), Cost-effectiveness modelling studies of all preventive measures against rabies: A systematic review, Vaccine 37 (2019) A146–A153.

<sup>6</sup> Anothaisintawee, T., et al, (2019), Cost-effectiveness modelling studies of all preventive measures against rabies: A systematic review, Vaccine 37 (2019) A146–A153.

<sup>7</sup> WHO at <https://www.who.int/bulletin/volumes/93/2/14-138206/en/>

Personal protection equipment	Gloves and over-coats	720,000	720,000
Capacity building	5 vehicles	25,000,000	0
	Additional permanent 5 staff	3,600,000	3,600,000
	Stationary / licenses and tags	30,000,000	30,000,000
	Expansion of animal pounds	15,000,000	0
	Installation of incinerator	15,000,000	0
	Dog capture kits / traps and catchers	175,000	0
	20 coolboxes, 1 deep freezer	200,000	0
<b>TOTAL</b>		<b>149,976,300</b>	<b>80,050,600</b>

### Annexes (to be developed)

- a. Dog registration cum census enumeration form
- b. County dog register
- c. Rabies investigation form
- d. Public education message for television
- e. Public education message for radio
- f. Public education message for handbills and pamphlets
- g. Public education message for banners
- h. Public education message for road show
- i. Annual vaccination program
- j. Vaccination certificate
- k. Manifest for vaccination certificates
- l. Active surveillance protocol
- m. Rabies M&E Plan
- n. Detailed budget