



REPUBLIC OF KENYA

Ministry of Health and  
Ministry of Agriculture, Livestock and Fisheries



# Strategic Plan for the Elimination of Human Rabies in Kenya 2014 - 2030





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Ministry of Health and  
Ministry of Agriculture, Livestock and Fisheries

Zoonotic Disease Unit  
September 2014

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# List of Abbreviations

<b>AMREF</b>	African Medical and Research Foundation
<b>ANAW</b>	Africa Network for Animal Welfare
<b>AU-IBAR</b>	African Union Inter-African Bureau of Animal Resources
<b>CDC</b>	Centers for Disease Control and Prevention-Kenya
<b>CRWG</b>	County Rabies Working Group
<b>CRECC</b>	County Rabies Elimination Coordination Committee
<b>CORT</b>	County Outbreak Response Team
<b>CVL</b>	Central Veterinary Laboratories
<b>DALYs</b>	Disability Adjusted Life Years
<b>DSRU</b>	Disease Surveillance and Response Unit
<b>DFZ</b>	Disease Free Zone
<b>SCMOH</b>	Sub-County Medical Officer of Health
<b>dRIT</b>	Direct Rapid Immunohistochemistry Test
<b>UVIS</b>	Unit of Vaccines and Immunization Services
<b>SCVO</b>	Sub-County Veterinary Officer
<b>FAO</b>	Food and Agriculture Organization
<b>dFAT</b>	Direct Fluorescent Antibody Test
<b>FMD</b>	Foot and Mouth Disease
<b>HMIS</b>	Health Management Information System
<b>IEC</b>	Information, Education and Communication
<b>IPR</b>	Institute of Primate Research
<b>KALRO</b>	Kenya Agricultural and Livestock Research Organisation
<b>KEMRI</b>	Kenya Medical Research Institute
<b>KEVEVAPI</b>	Kenya Veterinary Vaccine Production Institute
<b>SPERK</b>	Strategic Plan for Elimination of Human Rabies in Kenya
<b>KSPCA</b>	Kenya Society for the Protection and Care of Animals
<b>KVB</b>	Kenya Veterinary Board
<b>KWS</b>	Kenya Wildlife Service
<b>MALF</b>	Ministry of Agriculture, Livestock and Fisheries
<b>MOH</b>	Ministry of Health
<b>NGO</b>	Non-Governmental Organizations
<b>NRECC</b>	National Rabies Elimination Coordination Committee
<b>OIE</b>	World Organization for Animal Health
<b>PEP</b>	Post Exposure Prophylaxis
<b>PET</b>	Post Exposure Treatment
<b>PPB</b>	Pharmacy and Poisons Board
<b>RVIL</b>	Regional Veterinary Investigation Laboratories
<b>RT-PCR</b>	Reverse Transcriptase Polymerase Chain Reaction
<b>SARE</b>	Stepwise Approach to Rabies Elimination
<b>SCRECC</b>	Sub-County Rabies Elimination Coordination Committee
<b>SEARG</b>	Southern and Eastern African Rabies Group
<b>SOP</b>	Standard Operating Procedure
<b>UoN</b>	University of Nairobi
<b>VEEU</b>	Veterinary Epidemiology and Economics Unit
<b>WHO</b>	World Health Organization
<b>ZDU</b>	Zoonotic Disease Unit
<b>ZTWG</b>	Zoonoses Technical Working Group

# Foreword

This document describes Kenya's strategic plan for the elimination of human dog-mediated rabies, an invariably fatal disease in humans, livestock and other mammals by 2030. Rabies is a classic example of a zoonotic disease that is preventable in humans by controlling the disease in animals. Elimination is achievable through mass dog vaccination because dogs are responsible for transmission of over 98% of all human rabies.

Rabies causes approximately 60,000 human deaths worldwide annually, with one person dying of rabies every 10 minutes. The burden associated with rabies remains highest in the developing world, with more than 95% of all human deaths occurring in Africa and Asia. Rural populations, especially children aged below 15 years are at greatest risk of rabies exposure. The cost associated with post-exposure prophylaxis in humans is high and exceeds the cost of rabies control in animals through dog vaccinations.

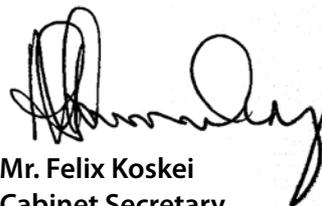
In comparison to other communicable diseases, rabies is preventable yet incurable; therefore focus should be given to control and eventual elimination. Eliminating rabies from the dog population is the key to stopping human rabies. Success in canine rabies elimination has been demonstrated in developing countries including Latin America and Asia, where sustained mass vaccination of dogs was shown to be the single most cost effective intervention for controlling and eliminating canine rabies and consequently human rabies.

In Kenya, the profile of zoonotic diseases has risen following implementation the WHO International Health Regulations 2005 (IHR) and more so after the establishment of a National One Health office (referred to as Zoonotic Disease Unit). Rabies is among the top five priority zoonotic diseases in Kenya.

This rabies elimination strategy will guide systematic reduction of the disease risk through sustained mass dog vaccinations, pre and post-exposure prophylaxis in humans and public education. This strategy is based on activities planned in accordance with the Stepwise Approach to Rabies Elimination (SARE) for the country to move from an endemic state to a disease free status. Successful implementation of this strategy requires a multi-sectoral collaborative approach with involvement and support of many stakeholders. We are optimistic that each of our partners will join hands and play their role in eliminating human dog-mediated rabies in Kenya by 2030.



**Mr. James Macharia**  
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**Mr. Felix Koskei**  
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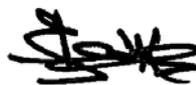
This strategy plan was developed through an elaborate consultative process involving key stakeholders in rabies prevention and control. The commitment, technical support and overall stewardship from the members of Zoonoses Technical Working Group and partners in rabies control are highly appreciated. We would like to thank staff of the Zoonotic Disease Unit for coordinating the process and in particular the drafting team, comprising Austine Bitek, Thumbi Mwangi, Eric Osoro, Penina Munyua, Kariuki Njenga and Grace Wanjau.

We would specifically want to acknowledge the institutions listed below whose representatives participated in the development of this strategy. A full list of contributors has been included in annex 3.

- Centers for Disease Control and Prevention
- County Governments
- Field Epidemiology and Laboratory Training Program
- Food and Agriculture Organization
- Global Implementation Solutions
- International Livestock Research Institute
- Kenya Medical Research Institute
- Kenya Society for Protection of Animals
- Kenya Veterinary Association
- Kenya Veterinary Vaccines Production Institute
- Kenya Wildlife Service
- Neglected Tropical Diseases Programme
- Sharon's Rabies Foundation
- University of Glasgow
- University of Nairobi
- Veterinaires Sans Frontieres – Germany
- World Animal Protection
- Washington State University
- Zoonotic Disease Unit



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# Executive Summary

Rabies is a neglected zoonotic disease which is almost invariably fatal in humans, livestock and other mammals. It kills up to 60,000 people a year, most of them (95%) in Africa and Asia. It is estimated that up to 2,000 human deaths due to rabies occur annually in Kenya.

In Kenya, rabies has been ranked as one of the top five priority zoonotic diseases with the goal of eliminating human dog-mediated rabies in the country. Success in rabies elimination has been demonstrated in developing countries including Latin America and Asia, where sustained mass vaccination of dogs has been shown to be the single most cost effective intervention to control and eliminate canine rabies and consequently human rabies. Studies conducted in sub-Saharan Africa show that most of the rabies cases in animals and humans are caused by canine rabies virus, transmitted by domestic dogs. Wildlife including wild carnivores plays an insignificant role in maintenance of the virus. Consequently, comprehensive and sustained dog vaccination is sufficient intervention in reduction and eventual elimination of human rabies in a region.

This strategy aims at eliminating human dog-mediated rabies by the year 2030 in Kenya. The strategy provides a guide for systematic reduction of rabies risk through sustained mass dog vaccinations, pre and post-exposure prophylaxis and public education until the country is completely free of human dog-mediated rabies. This strategy is based on activities planned in accordance with the Stepwise Approach to Rabies Elimination (SARE) for the country to move from an endemic state to a disease free status. SARE is a stepwise progression towards becoming a rabies disease-free country, consisting of 6 stages (Stage 0 to 5), each with a set of activities that build on each other to continuously reduce the risk of disease, with the country being declared completely free of human dog-mediated rabies when it reaches Stage 5.

The critical steps in the various stages include; (i) developing and adopting a national rabies elimination strategy, (ii) starting implementation of elimination plan in pilot areas, (iii) implementation of the elimination strategy throughout the country and (iv) maintaining freedom from human dog-mediated rabies and canine rabies. To move from one stage to the other, a set of targets must be reached and confirmed. The implementation of the strategy will begin with selected pilot areas to gain valuable lessons in creating and maintaining a rabies-free zone that will be used during the roll-out of the elimination campaign in the rest of the country.



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Director of Medical Services**



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Ag. Director of Veterinary Services**

# Chapter One



## 1.1 Introduction

Rabies is a viral infectious disease of mammals including humans, characterised by the development of severe nervous symptoms that lead to paralysis and death. Once symptoms of the disease develop, rabies is invariably fatal. The disease affects domestic and wild animals, and is spread to humans through close contact with infectious material, usually via bites or scratches.

Rabies is present on all continents of the world with the exception of the Antarctica; however, more than 95% of human deaths due to the disease occur in Asia and Africa. Human mortality from canine rabies is estimated to be 60,000 per year worldwide, with about 56% of the cases occurring in Asia and 43.6% in Africa, mostly in rural areas. This translates to 1 death due to rabies every 10 minutes in the two continents. Official data on human rabies deaths submitted to World Health Organization (WHO) from Africa are a gross under-estimate of the true burden of the disease. The reasons for this include: rabies victims are often too ill to travel to hospital or die before arrival; families recognize the futility of medical treatment for rabies; misdiagnosis of rabies and laboratory confirmation of clinically suspected cases is difficult.

In addition to human mortality, the economic burden attributable to rabies is significant. The high cost of post exposure prophylaxis in human creates a heavy burden to both government and household budgets. At the household level, costs of post-exposure prophylaxis (PEP) arise directly from anti-rabies vaccines and indirectly from costs associated with travel, medical fees and income loss. The indirect household losses represent more than 50% of total costs. The total PEP costs have been estimated at US\$40 per patient in Africa and US\$ 49 in Asia, accounting for 6% and 4% of annual per capita Gross National Income, respectively. In Kenya, the direct medical cost associated with a complete regime of PEP is estimated at \$85 per person. Poor households face difficulties paying for PEP, which results in considerable financial hardship and substantial delays or failure in PEP delivery. Shortages of PEP are also common in many rural remote locations of Africa, further increasing the costs as victims are forced to travel to far flung centres to obtain treatment. In addition, victims of rabid dog bites and their families suffer from psychological trauma resulting from the uncertainty and resignation to the inevitable outcome.

Weak surveillance and lack of reliable data on the number of animal rabies cases is a major constraint to assessing the economic impact of rabies on the local communities when livestock and working animals die due to rabies or infect humans. In addition, the control of rabies in dogs

protects wildlife from rabies including the endangered wild dogs whose existence is threatened by rabies.

Successful elimination of human rabies has been demonstrated in many countries, including in developing countries such as the Philippines, Mexico and Indonesia. In the Philippines, a rabies elimination programme was launched in 2007 involving mass dog vaccination, dog population control, improved dog bite management, public education, and improved diagnosis surveillance and monitoring. Within three years, human deaths due to rabies were reduced from eight persons per million annually to zero. Similar control efforts are underway in the south-eastern part of the United Republic of Tanzania and Kwa-Zulu Natal in South Africa.

In Kenya, it is estimated that up to 2,000 human deaths occur annually due to rabies occur annually. Progress in preventing human rabies through control of the disease in the dogs has been slow due to a number of barriers including; limited information and awareness about the extent of the problem, lack of suitable diagnostic and managerial capacity, lack of appropriate and sustainable strategy for prevention and control, lack of inter-sectoral collaboration and organizational and financial challenges. Successful elimination of human rabies in Kenya will require a multi-sectoral and collaborative approach. Prevention of dog rabies, effective surveillance in humans and animals, better public awareness and improved access to human rabies vaccines are essential for the elimination of human rabies.

Due to the threat of emerging and re-emerging zoonotic diseases globally and the emphasis on these threats through the International Health Regulations (IHR), Kenya has established a One Health coordinating office, referred to as Zoonotic Disease Unit (ZDU), with the focus on prevention and control of zoonotic diseases. The ZDU is nestled between the Ministry of Health (MOH) and Ministry of Agriculture, Livestock and Fisheries (MALF) with each ministry deploying an epidemiologist as the joint coordinator of the unit. The mission of ZDU is to establish and maintain active collaboration at the animal-human ecosystem interface towards better prevention and control of zoonotic diseases. The ZDU also serves as a secretariat for the multi-sectoral Zoonoses Technical Working Group (ZTWG), which advises the government on prevention and control of zoonotic diseases. The ZDU, therefore, presents an opportunity to promote inter-sectoral collaboration for the national rabies elimination strategy.

There is also increased interest in rabies elimination by various partners and ongoing control programmes in Tanzania and South Africa that Kenya can borrow from. In the early 1970s, Kenya had successfully suppressed rabies through sustained dog vaccination campaigns. However, a breakdown of these efforts allowed the disease to spread to a point where it is now endemic in every region of the country. Both the Ministry of Health and the Ministry of Agriculture Livestock and Fisheries are committed to this rabies elimination strategy and look towards a rabies-free Kenya.

## 1.2 Cost Effectiveness of Rabies Elimination

The current efforts for rabies prevention and control in Kenya are restricted to human post-exposure prophylaxis (PEP), voluntary and ad hoc dog vaccinations. This approach has not been successful in bringing down the cases of rabies in animals and humans, owing to inadequate vaccination coverage and unavailable or unaffordable PEP for most of the affected individuals. There are three main strategies for the control of rabies; a) Prevention in human through intensified post-exposure treatment, b) Controlling the disease in the reservoir host, c) Combination of the two. To determine the most cost-effective method of the three studies have been conducted in Chad and Philippines.

In the Philippines, cost–benefit analysis of mass dog vaccination versus human PEP over a six year period indicated that the use of intensified human PEP alone was associated with increased medical costs to the government over the years in the absence of a dog vaccination program. In Chad, the cumulated cost of the combined strategy of human PEP and dog vaccination was found to be more cost effective than the human PEP alone in the first four years, and then it became lower than human PEP cost after the fifth year of the program. The studies also showed that the cumulated cost of PET alone would be greater than the combined approach after the sixth year of the elimination program<sup>1,2</sup>. Lessons from these studies indicated that rabies control using the current strategy (ad hoc vaccinations without reaching the optimal 70% supply of PEP to dog-bite victims) is less cost-effective compared to an elimination strategy that focuses on mass dog-vaccinations (reaching the 70% vaccination coverage) accompanied by residual PEP for dog-bite victims. The economic benefit of mass dog vaccination and elimination of rabies in the animal reservoir will result to saving human lives, elimination of expenditures on human PEP and additional income from livestock whose death is prevented.

## 1.3 Epidemiology of Rabies

### 1.3.1 Reservoir

In Africa, evidence indicates that the primary rabies virus maintenance cycle is among domestic dogs, although other carnivores may be involved as non-maintenance populations<sup>3</sup>. This finding suggests that mass vaccination targeting domestic dogs would have the greatest impact in reducing the risk of infection in all other species including humans, livestock and wildlife<sup>4</sup>. In the Americas, bats are the source of most human rabies deaths while deaths following exposure to foxes, raccoons, skunks, jackals, mongoose and other wild carnivores host species are rare. The role of bats and other carnivores in human rabies transmission in Africa appears minimal.

### 1.3.2 Transmission

Humans are usually infected following a bite or scratch by an infected animal. Transmission can also occur when infectious material – usually saliva – comes into direct contact with human mucosa or fresh skin wounds. Human-to-human transmission through bite is possible but rare. In rare cases, rabies may be contracted via transplantation of an infected organ. Ingestion of raw meat or other tissues from animals infected with rabies is not a source of human infection.

### 1.3.3 Clinical Features

#### 1.3.3.1 Clinical features in animals

The incubation period in animals can vary considerably. In dogs and cats, it is between 2 to 12 weeks, although longer incubation periods have been reported.

<sup>1</sup>Knobel, D. L., S. Cleaveland, et al. (2005). “Re-evaluating the burden of rabies in Africa and Asia.” *Bull World Health Organ* 83(5): 360-368

<sup>2</sup>Lembo, T., Hampson, K., Kaare, M. T., Ernest, E., Knobel, D., Kazwala, R. R., Haydon, D. T., et al. (2010). The feasibility of canine rabies elimination in Africa: dispelling doubts with data. *PLoS neglected tropical diseases*, 4(2), e626. doi:10.1371/journal.pntd.0000626

<sup>3</sup>Lembo, T., Hampson, K., Kaare, M. T., Ernest, E., Knobel, D., Kazwala, R. R., Haydon, D. T., et al. (2010). The feasibility of canine rabies elimination in Africa: dispelling doubts with data. *PLoS neglected tropical diseases*, 4(2), e626. doi:10.1371/journal.pntd.0000626

<sup>4</sup>Lembo, T., Hampson, K., Haydon, D. T., Craft, M., Dobson, A., Dushoff, J., Ernest, E., et al. (2008). Exploring reservoir dynamics: a case study of rabies in the Serengeti ecosystem. *The Journal of applied ecology*, 45(4), 1246–1257. doi:10.1111/j.1365-2664.2008.01468.x

There are two distinct forms of rabies in animals; furious and dumb forms. Furious form of rabies is the classic “mad-dog syndrome”, and may be seen in all species. The animal becomes irritable and may viciously and aggressively use its teeth, claws, horns, or hooves to attack humans and other animals, without provocation. Such animals lose caution and fear of humans and other animals.

Dumb/paralytic form of rabies manifests with ataxia and paralysis of the throat and jaw muscles, often with profuse salivation and the inability to swallow. These animals may not be vicious.

Rabid dogs or cats die within 10 days of onset of symptoms.

### 1.3.3.2 Clinical features in humans

In humans, the incubation period for rabies is typically 1–3 months, but may vary from below one week to more than one year. The initial symptoms of rabies are fever and often pain or an unusual or unexplained tingling, pricking or burning sensation (paraesthesia) at the bite site. As the virus spreads through the central nervous system, progressive, fatal inflammation of the brain and spinal cord develops.

Two forms of the disease can follow; furious or paralytic rabies. People with furious rabies exhibit signs of hyperactivity, excited behaviour, and hydrophobia (fear of water) and death after a few days. Paralytic rabies accounts for about 30% of the total number of human cases. This form of rabies runs a less dramatic and usually longer course than the furious form. The muscles gradually become paralyzed, starting at the site of the bite or scratch. A coma slowly develops, and death eventually occurs. The paralytic form of rabies is often misdiagnosed, contributing to the under-reporting of the disease. Once symptoms of the disease develop, the disease is fatal.

## 1.4 Diagnosis of Rabies

In animals: the direct Fluorescent Antibody Test (dFAT) is the recommended diagnostic test. This test detects the presence of rabies antigens in brain tissue. Other diagnostic techniques include reverse Transcription Polymerase Chain Reaction (RT-PCR), direct Rapid Immunohistochemistry Test (dRIT) and serological tests (fluorescent antibody neutralization test, rapid fluorescent focus inhibition test).

In humans, the recommended test is dFAT on brain tissue. Other diagnostic tests that have been used are RT-PCR and dRIT.

## 1.5 Prevention and Elimination of Rabies

Prevention and elimination of rabies in humans can be achieved by eliminating rabies in dogs and other reservoirs. Rabies in dogs can be eliminated through sustained mass vaccination programs, control of dog population and responsible dog ownership. To prevent human rabies, rapid intervention following a dog bite incident, consisting of appropriate bite wound management and administration of post exposure prophylaxis where indicated is important. Also critical is an efficient and effective surveillance system that detects cases in humans and animals and adopting an integrated approach in the management of the disease prevention and control strategies.

## 1.6 Rabies Situation in Kenya

### 1.6.1 History of Rabies in Kenya

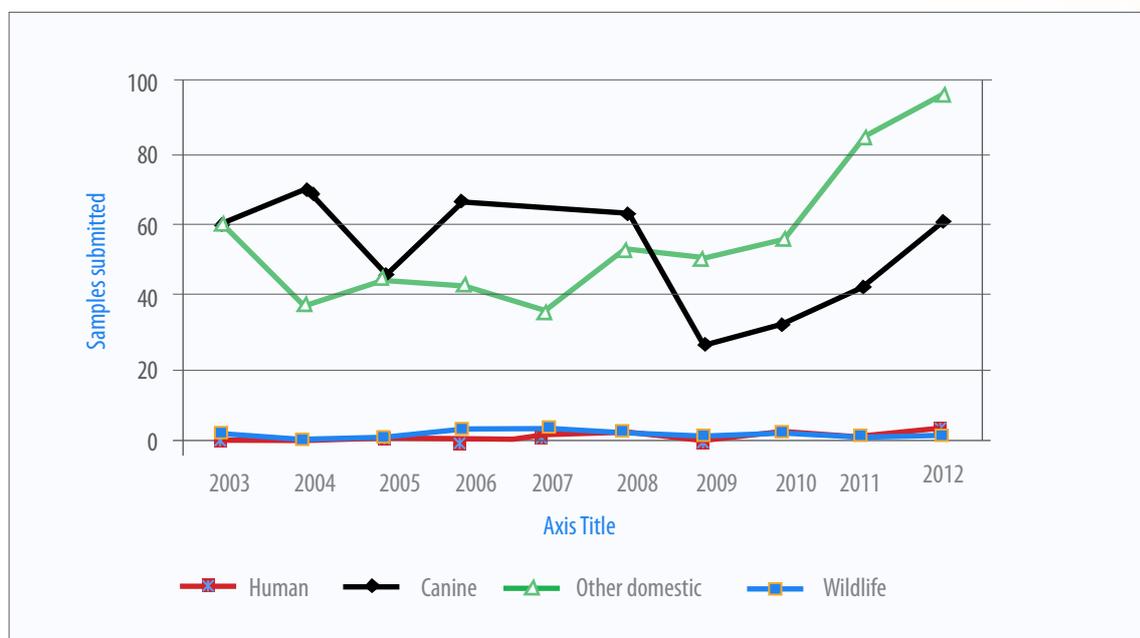
Rabies is endemic in Kenya and it has been reported in varying levels since 1912 when the first case was diagnosed in a dog in the outskirts of Nairobi city. In 1928, the first case of human rabies was documented in a woman from the Lake Victoria basin region in Western Kenya<sup>5</sup>.

The records at the Directorate of Veterinary Services showed that the country experienced rabies epidemics in the 1930s, 1940s, and 1950s. Following these epidemics, there was systematic and sustained vaccination of dogs in the 1950s and 1960s that controlled the disease such that by 1973, the disease was almost eliminated in the country. However, the collapse of the vaccination program in the 1970s changed the rabies situation such that by the 1980s, the disease had spread starting from the Tanzanian border region to most parts of the country. To date, rabies is more widespread in the country than at any time in its history.

### 1.6.2 Burden of Rabies

Lack of effective surveillance systems and diagnostic capacity has resulted in underestimation of the burden of rabies in Kenya. The current figures captured by the passive surveillance system underestimate the incidence and burden of the disease by 70 times in animals and 200 times in humans<sup>6,7</sup>.

Between 1983 and 1990, domestic dogs accounted for 63% of the 2,149 confirmed animal rabies cases whereas between 2002 and 2012, they accounted for 45% of the 858 confirmed cases. Figure 1 below shows the number of samples submitted between 2003 and 2012.



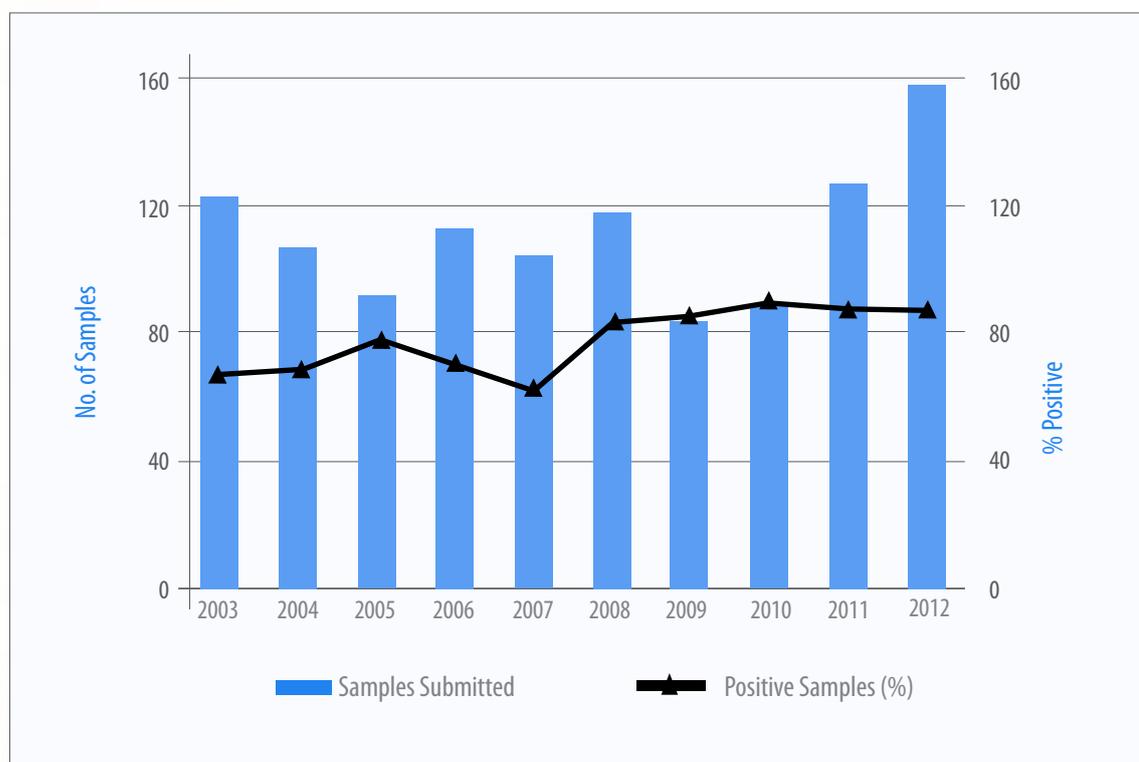
**Figure 1: Number of samples submitted for rabies diagnosis by species in Kenya for the period between 2002 and 2012. Source: Central Veterinary Laboratories**

<sup>5</sup>Hudson, J.R. – 1944 - A short note on the history of rabies in Kenya. *East African Medical Journal*, **21**, 622-627

<sup>6</sup>Kitala, P. M., J. J. McDermott, et al. (2000). "Community-based active surveillance for rabies in Machakos District, Kenya." *Prev Vet Med* 44(1-2): 73-85

<sup>7</sup>Cleaveland, S., E. M. Fevre, et al. (2002). "Estimating human rabies mortality in the United Republic of Tanzania from dog bite injuries." *Bull World Health Organ* 80(4): 304-310

Figure 2 shows the total number submitted and positive samples during that period. The data shows an average of 65% positivity over the 10 year period. The high proportion suggests that the laboratory surveillance system captures the cases which have a high clinical indicator of disease.



**Figure 2: Trends in samples submitted for rabies diagnosis and proportion of samples positive for rabies, 2003-2012. Source: Central Veterinary Laboratories**

Between 2011 and 2012, five human cases that had been missed by the existing surveillance system were confirmed through an outbreak investigation carried out by the ZDU. During the same period the incidence of animal bites was 330/100,000 population (Table 1).

**Table 1: Number of human rabies cases reported and bites captured in the human surveillance system**

	2010	2011	2012	Remarks
Confirmed cases	2	1	4	Missed by surveillance system
Bites (incidence per 100,000 population)	38,944 (97/100,000)	133,150 (333/100,000)	146,362 (336/100,000)	recorded as animal and snake bites

Evidence from the study conducted in Machakos showed that the annual incidence of rabies in humans was 2.5 per 100,000 people. Findings from a study in Tanzania determined the incidence of human rabies at 5 per 100,000<sup>7</sup>. Extrapolating figures from these studies, the annual incidence of human rabies is estimated to be in the range of 1,000 to 2,000 in Kenya, which are underestimated by the existing surveillance system by at least 200 times.

### 1.6.3 Availability of anti-rabies vaccines

Kenya imports cell culture based animal and human anti rabies vaccines. In 2012, the Ministry of Health procured 60,000 doses against an estimated need of 500,000 doses per year based on

reported animal bites. Only 123, 000 doses of animal vaccines were procured by the Directorate of Veterinary Services against an estimated dog population of five million in the same year. While some of the gaps in vaccine supply are filled by non-public practitioners, many humans and animals in need of vaccination are unable to obtain vaccines.

#### 1.6.4 Rabies Surveillance System

Currently, rabies surveillance is carried out by two separate systems; one within the Ministry of Agriculture, Livestock and Fisheries (MALF) and the other within the Ministry of Health (MOH).

##### 1.6.4.1 Ministry of Agriculture, Livestock and Fisheries (MALF)

Although rabies in animals is a notifiable disease, surveillance is primarily passive. Suspected cases of rabies in the sub-county are reported to the Sub-County Veterinary Officer (SCVO) who immediately notifies the Director of Veterinary Services (DVS). A standard form (ND1 form) is used by the SCVO to collect epidemiological data on the suspected animal cases and submitted to the DVS. A standard form (LB1 form) is also filled when samples are collected and submitted to Central Veterinary Laboratory (CVL).

There are six Regional Investigation Laboratories (RVILs) namely; Kericho, Eldoret, Garissa, Karatina, Nakuru and Mariakani and the CVL at Kabete, Nairobi. Samples from suspected rabies cases are collected across the country and submitted to the RVILs or directly to CVL. The direct Fluorescent Antibody Test (dFAT) confirmatory test is carried out in three laboratories: CVL, Kericho RVIL, and Mariakani RVIL. When the other four RVILs receive rabies samples, they send them to CVL for testing.

##### 1.6.4.2 Ministry of Health

Rabies is a priority disease under the Integrated Disease Surveillance Response (IDSR) system. Dog bites are used as proxy for suspected rabies and reported through the weekly standard reporting form (MOH 505) at the health facility level and a copy sent to the Sub-County Disease Surveillance Coordinator (SCDSC). The SCDSC summarize all health facility reports and sends a copy to the Disease Surveillance & Response Unit (DSRU) by Wednesday of the following week. A case based surveillance system also exists within IDSR where a standard form (MOH 502) is used to collect epidemiological data on the suspected human cases and accompanies the specimen (brain) to the laboratories for testing.

Dog bites are also captured as part of animal bites in the routine monthly health facility reporting through Health Management Information System (HMIS). These data are summarised at the sub county level and submitted to the national level before 15th of the following month.

None of the laboratories in the Ministry of Health conduct tests for rabies. Instead, all human samples (primarily brain biopsies) are tested at the CVL. The number of human samples submitted for laboratory confirmation of rabies is usually very low.

### 1.6.5 Legal Framework for Rabies Control

Rabies in animals is notifiable and there are a number of laws regulating the prevention and control of rabies in Kenya. These Acts of Parliament include;

#### **Rabies Act -Chapter 365**

- The rabies act was enacted with the intention of suppressing rabies in case of outbreak(s) in rabies control areas - areas which are declared by the Director of Veterinary Services, by notice in the *Kenya Gazette*.
- The act gives powers to the DVS, an administrative officer or a police officer of the rank of inspector or above to seize, impound or destroy stray dogs and cats.
- The act also explains the duties of owners of suspected rabid animals in a rabies control areas and orders on owner of dog or cat. The act gives powers for the DVS to lay baits and poison in case of an outbreak or expected outbreak of rabies in the area.

#### **Animal Diseases Act -Chapter 364**

- Provides the legislative framework and power to carry out all necessary disease control actions needed to control notifiable diseases in Kenya.

#### **Public Health Act - Chapter 24**

- Grants power to protect the health of members of the public, including compulsory reporting of notifiable infectious diseases.

#### **Local Authority by-laws on Animal Control**

- Provides for licensing and impoundment of dogs by the local authorities.

### 1.6.6 Current Rabies Control Activities

Rabies control in animals is under the mandate of the DVS and various methods have been put in place to control the disease. Limited dog vaccinations and issuance of certificates is conducted by the SCVOs. Dog vaccinations are also conducted by private Animal Health Service Provider (AHSPs) at a fee and by animal welfare organizations. However, these efforts are largely uncoordinated and disjointed and have minimal impact on rabies control.

There are also ongoing activities to raise public awareness on rabies in humans and animals and to provide information and advice on how to prevent the disease. This is mainly through AHSPs both in public and private service in conjunction with other stakeholders; Ministry of Health, Kenya Veterinary Association (KVA), Kenya Medical Association (KMA), United States Centers for Disease Control and Prevention (CDC), Kenya Society for Protection and Care of Animals (KSPCA), Global Alliance for Rabies Control (GARC) and Africa Network for Animal Welfare (ANAW) among others. The climax of public awareness and free dog vaccination against rabies is during the World Rabies Day celebrations, an annual event held on 28th September every year. This brings together all stakeholders to share various efforts, achievements, research and way forward in rabies control.

There are ongoing efforts to control dog populations through neutering, carried out by the private and public veterinarians. Culling usually conducted by the SCVOs also reduces the stray dog populations. However, these efforts are minimal and have little impact on rabies elimination.

In Humans, the MOH through the Unit of Vaccines and Immunization Services (UVIS) provides limited anti-rabies vaccines to health facilities and is in the process of developing guidelines on the management of dog bites and administration of PET.

## 1.7 Challenges in Rabies Control in Kenya

There are a number of challenges in the prevention and control of rabies in Kenya as listed below:

### 1.7.1 Inadequate laboratory capacity

- Human rabies diagnosis and management is largely dependent on diagnosis of rabid animals.
- Countrywide, there are only three animal laboratories that have the capacity to confirm rabies in humans or animals. However, these laboratories often lack reagents for timely testing of specimens.
- At the grass root level, there are inadequate resources for sample collection, packaging and shipping to diagnostic laboratories.
- There are no public health laboratories which carry out human rabies diagnosis

### 1.7.2 Inadequate Surveillance

- In the IDSR system, dog bites are used as a proxy for suspect rabies cases in humans. However dog bites are under-reported in health facilities resulting in missed cases and misclassification of deaths due to rabies.
- There is underreporting of suspected rabies cases in dogs and other livestock due to the passive nature of the surveillance system.
- There is inadequate sharing of surveillance data between the human and animal health sectors at both local and national levels, often resulting in loss of opportunities to prevent human rabies, early detection and timely response to rabies outbreak.
- The national surveillance data is unreliable, meaning that the true burden of the disease in the country or high risk areas remains undefined; making it difficult to target prevention and control measures.

### 1.7.3 Inadequate inter-sectoral collaboration and partnerships

- There is little coordination and collaboration between the human and animal health sectors and other agencies responsible for rabies control.
- Most of the rabies control and prevention activities in the country have been ad hoc, uncoordinated (carried out by line ministries, NGOs, private practitioners), and without well-defined objectives or evaluation of progress (e.g. vaccination coverage, goals and indicators to measure success and the costs of these control activities).

#### 1.7.4 Low awareness on rabies prevention and control

- There is low awareness among the public, human and animal health workers on management of dog bite wounds, and pre- and post-exposure prophylaxis.
- Most patients who die from rabies are either misdiagnosed or do not receive timely and appropriate post-exposure treatment. In particular, many dog bites in children are not reported and may go completely unrecognized or be discovered late by both parents and health care providers.
- Knowledge of the benefits of responsible dog ownership and dog population management among the public is low. In addition, there is little understanding among the public of the value of timely response following dog bites and the value of timely PET.
- Compliance with completion of PEP regimens is low. Factors affecting PEP compliance of patients are not well known
- There is low awareness among policy makers on the importance and burden of rabies and the cost-effectiveness of rabies control through dog vaccination.

#### 1.7.5 Inadequate Enforcement of Laws and Regulations

- Whereas there is adequate legislation requiring mandatory registration of, licensing of, and vaccination of dogs and cats against rabies, and responsible dog ownership, there is inadequate implementation and enforcement of the law. There are also county laws on responsible animal ownership that are not adhered to. This laxity in enforcement has resulted in a large population of unvaccinated dogs.
- Another weakness in legislation is that the rabies act applies only to designated rabies control areas, which are supposed to be gazetted. At the moment there are no gazetted rabies control areas.

#### 1.7.6 Inadequate Research on Rabies

- There is inadequate research that can enhance rabies control. Data on important topics such as the economic benefits of rabies control, dog demographics and ecology, and alternative dog population management methods is lacking.

#### 1.7.7 Limited supply of anti-rabies vaccine

- There is limited supply of animal rabies vaccine in the animal sector and also inadequate PET and PEP biologics in public health. Whereas these biologics may be available in private facilities, the cost is prohibitive. The possibility of producing rabies vaccines locally have been explored but never implemented. The table below shows the number of vaccines procured by MALF and MOH for use in public facilities.

The table below shows the number of vaccines procured by MALF and MOH for use in public facilities.

**Table 2: Number of animal and human vaccines procured by the MOH and MALF, 2003-2013**

Year	No. of animal vaccine doses	No. of human vaccine doses
2003	193,318	-
2004	50,000	-
2005	255,000	-
2006	108,060	-
2007	50,700	-
2008	115,000	-
2009	1,000	-
2010	13,000	42,000
2011	113,000	42,000
2012	123,000	42,000
2013	125,000	42,000

### 1.7.8 Funding Constraints

The current funding for rabies control activities, particularly dog vaccination, by the line ministries is insufficient. Most rabies control activities are ad hoc, confined to small areas and dependent on unreliable donor support, resulting in little impact on rabies control.

### 1.7.9 Lack of Integrated National Guidelines on Rabies Prevention and Control

The country does not have guidelines on rabies control that capture the requisite integrated approach that involves all the stakeholders. This inadequacy has resulted in uncoordinated and largely ineffective activities, including those carried out annually during the world rabies day celebrations.

## 1.8 Opportunity for Rabies Elimination

A number of factors have come together to make this an opportune time to undertake a rabies elimination strategy in Kenya. These factors include the establishment of a One Health office in the country, increased interest in rabies elimination by partners and upcoming ability for in-country production of rabies vaccine.

### 1.8.1 Establishment of One Health coordination structures

The institutionalization of One Health in Kenya has created a unique chance for undertaking the rabies elimination strategy. In 2008, Kenya established the Zoonoses Technical Working Group (ZTWG) which is a multi-sectoral, multidisciplinary body that advises the ministries responsible for animal and human health on zoonotic disease prevention and control. The ZTWG has listed rabies as a priority disease for the country and has enhanced collaboration among One Health stakeholders in the country.

In 2011, the country established a One Health coordinating office referred to as the Zoonotic Disease Unit (ZDU), which forms a link between human and animal health sectors. The ZDU

therefore presents an opportunity to promote inter-sectoral collaboration for the national rabies elimination strategy.

### **1.8.2 Increased Interest in Rabies Elimination by Partners**

The burden of rabies and the fact that rabies is a neglected zoonotic disease that affects almost all mammalian species has resulted in many different agencies working together towards its control. There is general recognition that human rabies is primarily caused by canine rabies and that it can be eliminated by sustained mass dog vaccination. Available data indicate that more than 70% of dogs in Kenya are owned and are accessible for parenteral vaccination.

The partners interested in rabies prevention include major international agencies such as WHO, FAO and OIE, all working towards its elimination. Regional organisations like Southern and Eastern African Rabies Group (SEARG) and vaccine manufacturing companies are also working towards elimination of rabies.

### **1.8.3 In-country Animal Vaccine Production**

Kenya Veterinary Vaccines Production Institute (KEVEVAPI) plays a great role in production and marketing of high quality livestock vaccines used in control of major diseases in cattle, small ruminants and poultry thus contributing to the food security and sustainable livelihoods of Kenyans. The Institute has embarked on plans to start manufacturing animal rabies vaccines by the year 2015 and this capacity will be enhanced to ensure adequate stocks of high quality vaccines are produced and made available for the implementation of this strategy.

# Chapter Two



## The Strategic Framework

### 2.1 Guiding Principles of the Strategy

- Rabies control is a public good (for the benefit or well-being of the public); elimination of human rabies in Kenya requires a multi-sectorial collaborative approach.
- Rabid domestic dogs transmit at least 98% of human rabies in Kenya
- In East Africa, domestic dogs maintain the rabies cycles; there is no documented evidence that wildlife maintain rabies virus.
- Sustained annual mass dog vaccination (for at least three consecutive years) of greater than 70% of dog population eliminates rabies in domestic dogs, and subsequently in humans and other domestic animals
- More than 80% of dogs in Kenya are owned and are accessible for parenteral (by injection) vaccination
- Rabies elimination through mass dog vaccination is a cost-effective strategy, saves lives and results in decline in the use of costly human post exposure prophylaxis (PEP)

### 2.2 Vision

A nation free from rabies

### 2.3 Mission

To progressively reduce and ultimately eliminate human rabies in Kenya through sustained mass dog vaccination and appropriate post-exposure treatment.

## 2.4 Goal

To eliminate human dog-mediated rabies in Kenya

## 2.5 General Objective

To eliminate human dog-mediated rabies by the year 2030

## 2.6 Strategies for Rabies Elimination

The following strategies will be deployed in the rabies elimination plan.

1. Elimination of rabies in dogs
  - By conducting mass dog vaccination targeting greater than 70% of dog population coverage annually for three consecutive years.
  - Dog population management comprising education, legislation, registration, sterilization, holding facilities, euthanasia and controlling access to garbage and left overs.
2. Prevention of rabies in humans
  - By Providing timely access to appropriate Post Exposure Treatment (wound cleaning, vaccination and rabies immunoglobulin) to all human cases of dog-bites suspected to be rabid.
  - By Increasing knowledge and skills among animal and human health workers on rabies in general and post-exposure management
3. Strengthen Surveillance and response to outbreaks
  - By strengthening surveillance to monitor and evaluate key indicators
  - By strengthening preparedness and response to rabies outbreaks
4. Conduct and promote operational research
  - By conducting and promoting operational research to support implementation
5. Advocacy, communication and social mobilization
  - By increasing community awareness and education on rabies prevention and control
  - Through enhancing community participation in rabies control activities
6. Enhance partnerships and coordination
  - Through strengthening capacity for planning, partnerships and coordination of the National Rabies Elimination Strategy
  - By strengthening capacity in program management in order to achieve rabies elimination objectives at all levels
7. Resource mobilisation
  - Through mobilization resources to support rabies elimination program

- By inviting interested development partners to participate and manage aspects of the program.

### 2.6.1 Elimination of Rabies in Dogs

Domestic dogs are the main source of infection to humans, with at least 98% of human rabies cases attributable to rabid domestic dogs. The principal method of dog rabies control is mass vaccination, and has been successfully used to eliminate human dog-mediated rabies in areas including Malaysia, Philippines, Tunisia, Western Europe and North America among others.

The World Animal Health Organisation (OIE) and the World Health Organization (WHO) recommends the critical percentage of dogs that need to be vaccinated to prevent rabies cases and outbreaks should be at least 70%. This target coverage has been supported by empirical evidence and theoretical observations worldwide investigating the relationship between vaccination coverage and reduction in rabies incidence<sup>8,9</sup>. A study conducted in Tunisia achieved greater than 70% dog vaccination coverage through parenteral vaccination in most regions of the country resulting in elimination of the disease<sup>10</sup>. In areas with high dog turn-over (large number of births and deaths) such as many regions in Kenya, high coverage is especially important to maintain the population-level immunity. Evidence from work in the Serengeti ecosystem in Tanzania suggests that domestic dogs are the only population essential for rabies maintenance<sup>4</sup>. From experiences in Western Europe and North America, rabies elimination in dogs has been successful despite the presence of wildlife hosts capable of transmission.

Rabies elimination in Kenya will therefore be achieved through mass dog vaccinations, targeting 70% and above vaccination coverage annually for at least 3 years followed by a maintenance phase. Dogs of all ages will be vaccinated annually and responsible dog ownership practices such as registration will be promoted.

Specific activities will include:

- Mass dog vaccination campaigns
- Dog population management
- Promotion of responsible dog ownership

### 2.6.2 Prevention of Rabies in Humans

Strategies for the prevention of human rabies are aimed at protecting those at highest risk of exposure, post exposure treatment and supportive management for the clinically ill. Specific activities will include;

- a. Early and appropriate post-exposure treatment
  - i. Local treatment of wounds; reducing the rabies virus at the site of bite by washing the wound using soap and water for 15 minutes

<sup>8</sup>Coleman, P. G. and C. Dye (1996). "Immunization coverage required to prevent outbreaks of dog rabies." *Vaccine* 14(3): 185-186.

<sup>9</sup>Fitzpatrick, M. C., K. Hampson, et al. (2012). "Potential for rabies control through dog vaccination in wildlife-abundant communities of Tanzania." *PLoS Negl Trop Dis* 6(8): 21

<sup>10</sup>Touihri L, Zaouial L, Elhili K, Dellagi K, Bahloul C. Evaluation of mass vaccination campaign against rabies in dogs in Tunisia. *Zoonoses and Public Health* 58:110-118, 2011

- ii. Rabies Immunoglobulin (RIG); the anti-rabies immunoglobulin provides passive immunity before vaccine takes effect.
  - iii. Human anti- rabies vaccines; use of the cell culture vaccines based on the management guidelines will be enhanced.
- b. Pre-exposure vaccination; this will be provided to high risk groups including animal health workers, animal handlers and catchers, wildlife wardens, and laboratory staff handling the virus and potentially infected material.
  - c. Training health workers on proper dog bite wound cleaning and management- Continuous education of health professionals on proper dog bite wound cleaning and management and administration of PEP is necessary to provide effective prevention of human rabies.

### 2.6.3 Strengthen Surveillance and Response

Surveillance is a critical element in the elimination of rabies. Effective rabies surveillance in humans and animals enhances early detection and reporting of cases, vital for initiating timely responses and enabling informed decisions about when and where to intensify rabies control efforts.

Once rabies interventions are implemented, surveillance is essential in generating data to monitor progress or impact of the control efforts, which is essential for their sustainable implementation. As control efforts progress towards rabies elimination, surveillance becomes even more critical in ascertaining rabies free status.

Outbreak response will be coordinated to involve both human and animal health personnel.

Activities will include:

- Strengthening of existing surveillance system and linkage between veterinary and medical surveillance systems. This will involve enhancing collecting and reporting data on animal bites, rabies cases in humans and animals as well as surveillance for adverse events following vaccinations. Cross border surveillance will also be a key component
- Involvement of government, private sector, NGOs and the community as partners in surveillance (explore use of toll free line provided nationally manned at ZDU and the use of mobile phone technology to enhance surveillance)
- Development of the outbreak preparedness and response plan
- Strengthening capacity for field sample collection and laboratory diagnosis for humans and animal rabies

### 2.6.4 Conduct and Promote Operational Research

Operational research will be used to gather evidence to inform the design of the implementation of the program, document best practices and guide optimal solutions to program challenges. The output will ensure the best use of available resources and provide evidence on what is achievable in community-based settings.

Priority research areas include;

- Rabies baseline surveys to determine disease burden, demographics, knowledge attitude and practices

- Studies on the basic parameters of dog populations including number owned per household, turnover, accessibility and ownership status in different dog sub-populations
- Post vaccination surveys to assess vaccination coverage
- Impact assessment surveys to determine reduction in rabies incidence, PEP usage and cost analysis
- Assessment of best approaches to increase awareness about rabies and to improve health-care-seeking behavior for PEP.
- Evaluation of diagnostics, drugs recommended for the rabies elimination programme
- Evaluation of the rabies surveillance system
- Socio-economic impact of rabies elimination
- Health utilization survey

### 2.6.5 Advocacy, Communication and Social mobilization

Raising awareness on rabies prevention and control is essential in preventing exposures, increasing public awareness and practices on proper dog-bite wound management and seeking medical attention and increasing support (political, financial and technical) for the program. Enhanced awareness can also improve rabies control efforts in animals by increasing reporting of potential rabid animals, and practices of responsible dog ownership. The objectives of this strategy will therefore be:

- To raise public awareness about the risk of rabies
- To improve awareness and practices on dog-bite management
- To mobilize resources to support the rabies elimination program.
- To inform and educate at risk groups including public health workers, veterinarians, animal handlers and catchers, wildlife wardens, and laboratory staff handling the virus and potentially infected material.

A communication plan will be developed to implement this strategy. The process of developing the communication plan will include identifying the target audience(s), developing and testing the messages, selecting media and channels of distribution of messages and implementation plan.

### 2.6.6 Enhance Partnerships and Multi-sectoral Coordination

Partnerships and multi-sectoral collaboration among national and county governments, NGO's and private sector will be required for successful implementation of the rabies elimination program and for best utilization of the available resources. There is Intergovernmental Relations Act number 2 of 2012 that establishes a framework for consultation and co-operation between the national and county governments and amongst county governments; to establish mechanisms for the resolution of intergovernmental disputes pursuant to Articles 6 and 189 of the Constitution, and for connected purposes. This act provides mechanisms of collaboration between national and county governments.

Government agencies involved in rabies control include; ministries (health, livestock, education, finance, interior and coordination of national government), regulatory bodies responsible for human and animal health, wildlife service and state law office. International organizations like World Health Organization (WHO), World Organization for Animal Health (OIE), Food and Agriculture Organization (FAO) and CDC are also important in giving technical and financial support for the planning and implementation of the program.

A National Rabies Elimination Coordination Committee (NRECC), with representation from the various sectors will be established to coordinate rabies implementation of the rabies elimination strategy at the national level. Similar coordination committees will be established at county and sub county levels. At the county level the committee will be referred to as the County Rabies Elimination Coordination Committee (CRECC) and Sub County Rabies Elimination Coordination Committee (SCRECC).

### **2.6.7 Resource Mobilization**

Implementation of the rabies elimination strategy requires resources in a sustainable manner including human resources, infrastructure and finances. Areas of spending include procurement of diagnostics, vaccines, immunoglobulins, animal birth control, operational research, surveillance, monitoring and supervision. A funding plan will be developed to ensure that funds are available for every stage of the plan.

Funding will be sourced from the line government ministries (Ministry of Agriculture, Livestock and Fisheries and Ministry of Health), County Governments as well as local and international partners. Partners, regional and international organizations and NGOs interested in dog rabies control will be invited to support and sustain rabies elimination program in the country.

# Chapter Three



## Implementation Plan of the Strategy

This strategy is based on the Stepwise Approach to Rabies Elimination (SARE). SARE is a comprehensive risk based model that proposes a progressive reduction of disease risk, allowing for regional or synchronized activities towards disease elimination. The Rabies SARE consists of six stages (stage 0 to 5).

Each stage has a set of activities that build on each other to continuously reduce the risk of disease, with the country being declared completely free of human dog- mediated rabies when it reaches stage 5.

The 6 stages are summarised below;

- Stage 0:** Rabies suspected to be present but limited information is available,
- Stage 1:** Development and adoption of the National Rabies Elimination Strategy
- Stage 2:** Implementation of the National Rabies Elimination Strategy in pilot areas,
- Stage 3:** Rabies risk reduction through full scale implementation of the strategy
- Stage 4:** Maintaining freedom from human dog-mediated rabies and canine rabies
- Stage 5:** Declaration of freedom from canine rabies.

Kenya is currently at stage 1. For the country to move from one stage to the next one, a set of targets must be reached and verified. For example, to move from stage 1 to stage 2, the country must have developed a national rabies elimination strategy. Figure 3 below summarises the SARE for rabies.

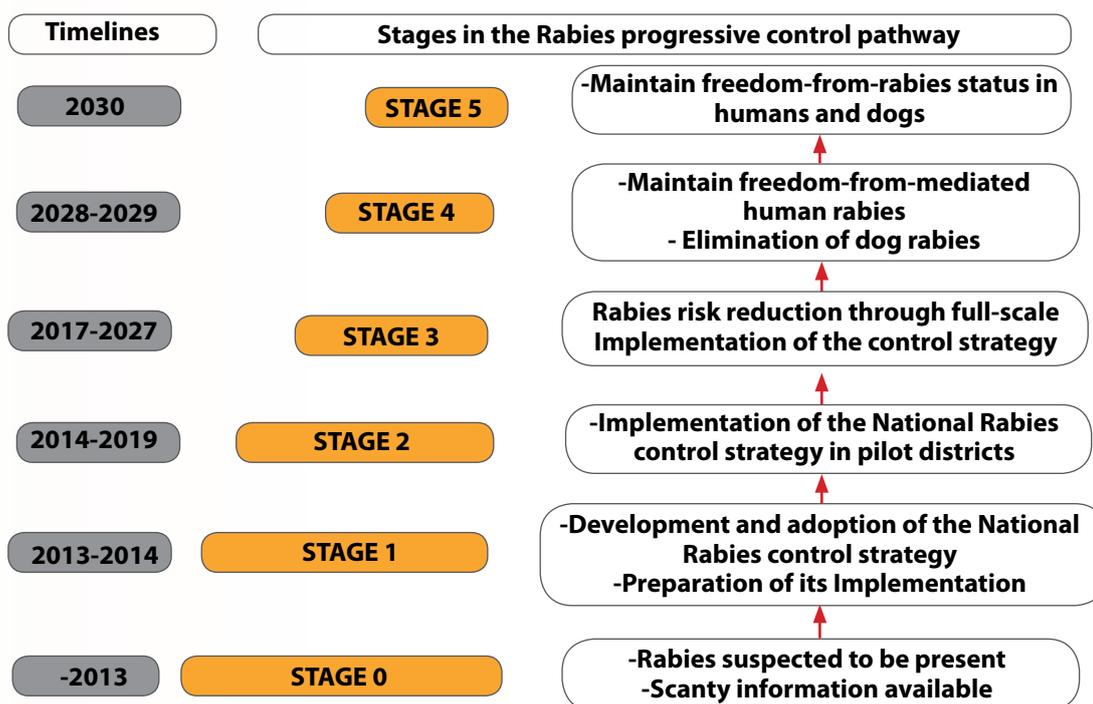


Figure 3: Showing the 6 stages of the stepwise approach for the elimination of rabies

### 3.1 Stage 1 (2013-2014): Planning for implementation of the strategy

#### 3.1.1 Establishment of a National Rabies Elimination Coordination Committee (NRECC)

The elimination of rabies requires the working together of different sectors within government, non-government organizations, teaching and research institutions, international partners and the public. To coordinate the implementation of the strategy, an inter-sectoral NRECC will be established, comprising of representation from various organizations including;

- Ministry of Health
- The National Treasury
- Ministry of Interior and Coordination of National Government
- Ministry of Agriculture, Livestock and Fisheries
- Kenya Wildlife Service (KWS)
- State Law Office
- Ministry of Devolution and Planning
- Ministry of Education, Science and Technology
- Ministry of Information Communication and Technology
- Research/Training institutions/ Non-Governmental Organizations involved in rabies activities

- Representation from International and regional organizations e.g. FAO,WHO, OIE, CDC, AU-IBAR, SEARG,GARC
- Human and animal health professional associations.
- Rabies Champions

NRECC will be a technical sub-committee of the ZTWG. ZDU will be the secretariat to the NRECC.

To implement the rabies elimination strategy at sub-national level, technical teams will be formed at the county and sub-county levels. These will include the County Rabies Elimination Coordination Committee (CRECC) at county level and Sub-County Rabies Elimination Coordination Committee (SCRECC) based at sub-county level. The NRECC will coordinate activities with CRECC and SCRECC to ensure implementation of the strategy (Figure 4).

### **Roles of the NRECC**

- These will include: Overall responsibility for implementing rabies elimination strategy.
- Provide guidance to CRECC and SCRECC.
- Resource mobilization.
- Training and capacity building.
- Internally monitor (progress reports) implementation of the strategy.
- Receive and review reports from sub-committees.
- Provide technical advice on rabies to ZTWG.
- Provide regular update to the public and stakeholders on implementation of the rabies elimination strategy.
- Propose changes and amendments of regulations and laws on rabies.

### **3.1.2 Establishment of County Rabies Elimination Coordination Committee (CRECC)**

CRECC will be formed at the county level to coordinate activities of the rabies elimination strategy. The co-chairs of the CRECC shall be the county directors for health and veterinary services.

The CRECC will comprise of the following;

- County Executive Committee member for Health
- County Executive Committee member for Agriculture, Livestock and Fisheries
- County Secretary
- County Director for Health Services
- County Director for Veterinary Services
- County Commissioner
- County Director of Education

- County Director of Information and Communication
- Non-Governmental Organizations/ Community-Based Organizations/ Faith Based organisations
- Representative from professional and paraprofessionals groups (private veterinarians/ clinicians/ pharmaceutical companies)
- Representative from the community

#### **Roles of CRECC**

- Coordinate rabies elimination strategy activities at the county level
- Provide progress report to the NRECC
- Resource mobilization
- Advocacy
- Supervise activities of the SCRECC
- Provide regular updates to the public on progress of the rabies elimination strategy

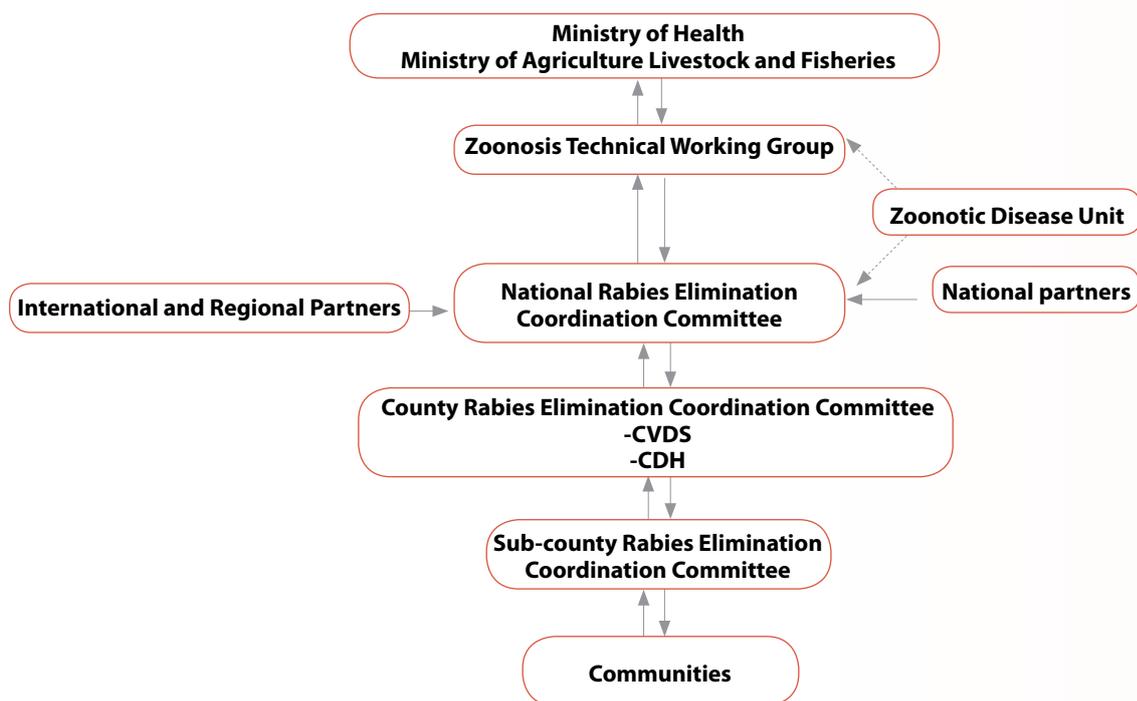
### **3.1.3 Establishment of Sub-County Rabies Elimination Coordination Committee (SCRECC)**

SCRECC shall be formed at the sub county and will be co-chaired by the Sub County Medical and Veterinary Officers. The members of SCRECC will include:

- Sub County Medical Officer of Health
- Sub County Veterinary Officer
- Deputy County Commissioner
- Sub-county Education Officer
- Sub-county administrator
- Community representatives
- NGO's
- CBO's

#### **Roles and responsibilities of SCRECC**

- Implement activities of the Rabies Elimination strategy at the sub-county level
- Publicity and awareness creation
- Resource mobilization
- Provide regular reports on the progress of the rabies elimination strategy



**Figure 4: Schematic diagram showing the coordination structure of the National Rabies elimination strategy**

### 3.1.4 Selection of focal pilot areas

- The initial implementation of the strategy will be done in pilot areas to demonstrate success before scaling up to the rest of the country.
- The pilot areas have been selected based on presence or absence of natural barriers e.g. water bodies, mountains which may reduce the transmission of rabies in and out of the selected areas
- The first pilot area will be Lake Victoria region which includes Kisumu and Siaya counties. These areas have natural barriers (Lake Victoria to the West and Nandi escarpment to the East)
- The second pilot area will be Machakos, Kitui and Makueni Counties which have no defined natural barriers but have reported high numbers of cases of human rabies.

Challenges and best practices in these two areas will be documented and used to inform subsequent program scale up to the rest of the country. Following implementation in the first pilot phase (pilot area 1 & 2); other areas will be added based on proximity of counties to the focal pilot areas.

### 3.1.5 Strengthen Surveillance for Rabies

Existing surveillance systems within the MoH and MALF will be enhanced to collect accurate and reliable data on rabies in the country. In the MoH, rabies surveillance is implemented within the IDSR system. In MALF, surveillance is done using the Notifiable Disease reporting system (ND1 form) and laboratory surveillance systems.

These surveillance data to be collected are illustrated in the table below.

**Table number 3: Types of surveillance data and their sources**

<b>Data type</b>	<b>Data sources</b>
Data on dog bites and suspected human and animal rabies cases	SCVO, health facilities, private practitioners, NGO's, community
Dog vaccination data and PEP usage	SCVO, SCMOH, NGO's, private practitioners, chemists
Number of suspect rabies samples submitted and confirmed in the laboratory	VILs, public and private laboratories

Data from members of the community will be channelled to the sub-counties, counties and then to the national level. The NRECC will give regular feedback based on the surveillance data. Other activities include:

- Establishing a national database on rabies based on the existing surveillance data.
- Improving capacity of the veterinary laboratories for rabies diagnosis.

### 3.1.6 Development of Guidelines

Guidelines will be developed to standardize implementation of the rabies activities across the counties. These will include:

- Guidelines for dog ecology surveys
- Guidelines for animal restraint and handling
- Guidelines for dog vaccine storage and administration Dog vaccination campaigns and animal handling guidelines
- Guidelines for post-vaccination surveys
- Guidelines on bite wound management
- Guidelines for human prophylaxis
- Guidelines for dog population management
- Guidelines for assessing public health and economic burden of rabies
- Guidelines for rabies surveillance, sample collection and laboratory diagnosis
- Guidelines on dog population management
- Guidelines for communicating public health information

### 3.1.7 Supply and Distribution of Human and Animal Vaccines and RIG

- An assessment on human and dog anti-rabies vaccine requirements will be conducted.
- Procurement and proper storage of required numbers of human and dog anti-rabies vaccine.
- Production of dog anti-rabies vaccine locally by KEVAVAPI will be explored to support program implementation. Currently all anti-rabies vaccines are imported.

Development of a supply plan to determine distribution of human and dog anti-rabies vaccine will be developed.

- Following elimination, appropriate level of vaccine production should be maintained for outbreak responses and routine vaccinations.

### 3.1.8 Conduct and promote Operational Research

To support the implementation of rabies control strategy, research on the following will be conducted: Baseline survey on animal bites and rabies cases

- Household surveys on dog ecology and demographics
- Socio-ecological studies, socio-cultural factors, dog management and ownership practices
- Assessment of the healthcare seeking behaviour of the community
- Promote research on adherence on PEP schedule and PEP follow-up studies
- Dog vaccination coverage studies
- Mapping of rabies biological supply chains

### 3.1.9 Develop Communication Plan

A communication strategy to ensure responsible accurate and informative reporting that promotes awareness and prevention of rabies locally and nationally.

Key components of the communications plan will include:

- Agreed key messages that cover several strands (awareness, risk reduction, context and proportionality, acceptance and support for government interventions)
- Public awareness campaigns to increase knowledge of the risks and the various risk reduction measures that people can take
- Targeted communications aimed at dog owners and those at higher risk of coming into contact with suspect cases to facilitate cooperation with control measures, either voluntary or compulsory.
- Appropriate channels of communication will be identified for relaying key information to various audiences.
- Communications plan for each stage of an outbreak including onset, during the outbreak and post the outbreak stages.

#### **To move from Stage 1 to 2 the following will be the key indicators:**

- Development and adoption of rabies elimination strategy.
- Existence of NRECC and CRECC in pilot counties
- Establishment of an up-to-date database on rabies
- Existence of guidelines supporting implementation of the strategy.
- Approved budget plan for vaccine procurement and distribution

## 3.2 Stage Two (2014-2019): Implementation of the elimination strategy in pilot areas

This stage describes how the strategy activities will be rolled out in pilot areas of the country.

The following activities will be conducted in the pilot areas:

- Advocacy, communication and social mobilization
- Training of human and animal health staff
  - This will be conducted as part of building capacity for the implementation of the strategy. The guidelines for trainings will be developed by NRECC and implemented by the CRECC and SCRECC.
  - The trainings will target animal and human health workers. These trainings will focus on: Dog vaccination campaigns, rabies surveillance, dog bite wound management, laboratory diagnosis, community mobilization and sensitization, dog population management and responsible dog ownership
- Resource mapping of laboratory diagnostic and health facilities, human resource capacity and cold chain facilities
- Procurement and distribution of human and animal vaccines and other supplies
- Collating existing rabies related baseline data
- Enhancing existing rabies surveillance system in the pilot areas. This should incorporate modern technology including use of mobile phone based surveillance to improve reporting.
- Conducting mass dog vaccinations based on the guidelines
- Operational research
  - Post vaccination surveys
  - Impact assessment - the outcome measure in humans will be the number of animal bite cases, PEP usage and human rabies cases. In animals, the outcome measure will be the number of confirmed animal cases.
  - Cost Analysis - Accurate records of all expenditures on rabies control efforts will be useful to perform the cost analyses during the implementation or at the end of the programme.
- Cross border engagements to reduce the risk of re-introduction of disease in the implementation areas
- Pre-positioning of the vaccines and other biologicals to sub-counties with vaccine storage facilities.
- Outbreak response in areas within and outside the pilot zone

### **To move from stage 2 to 3, the following are the indicators**

- Over 70% dog vaccination coverage annually for the three years
- Over 70% reductions in incidence of dog rabies after the first campaign and over 95% after the second campaign.
- No human deaths due to rabies reported for 12 months in the pilot areas

### 3.3 Stage 3 (2017-2027): Implementation of the rabies elimination strategy outside the pilot areas

In this stage, rabies control and elimination activities conducted in the pilot areas will be extended progressively to rest of country. From the pilot areas, the country will be zoned into two based on proximity to pilot areas and as well as presence of geographical barriers (Figure 5). The elimination activities conducted in the pilot areas will be rolled out in zone 1 (central and western parts of the country) covering counties that are in close proximity to the pilot areas. On completion of zone 1, the activities will then be systematically implemented in zone 2 covering counties that are further away from the pilot areas (mainly in the Northeastern and coastal strip)

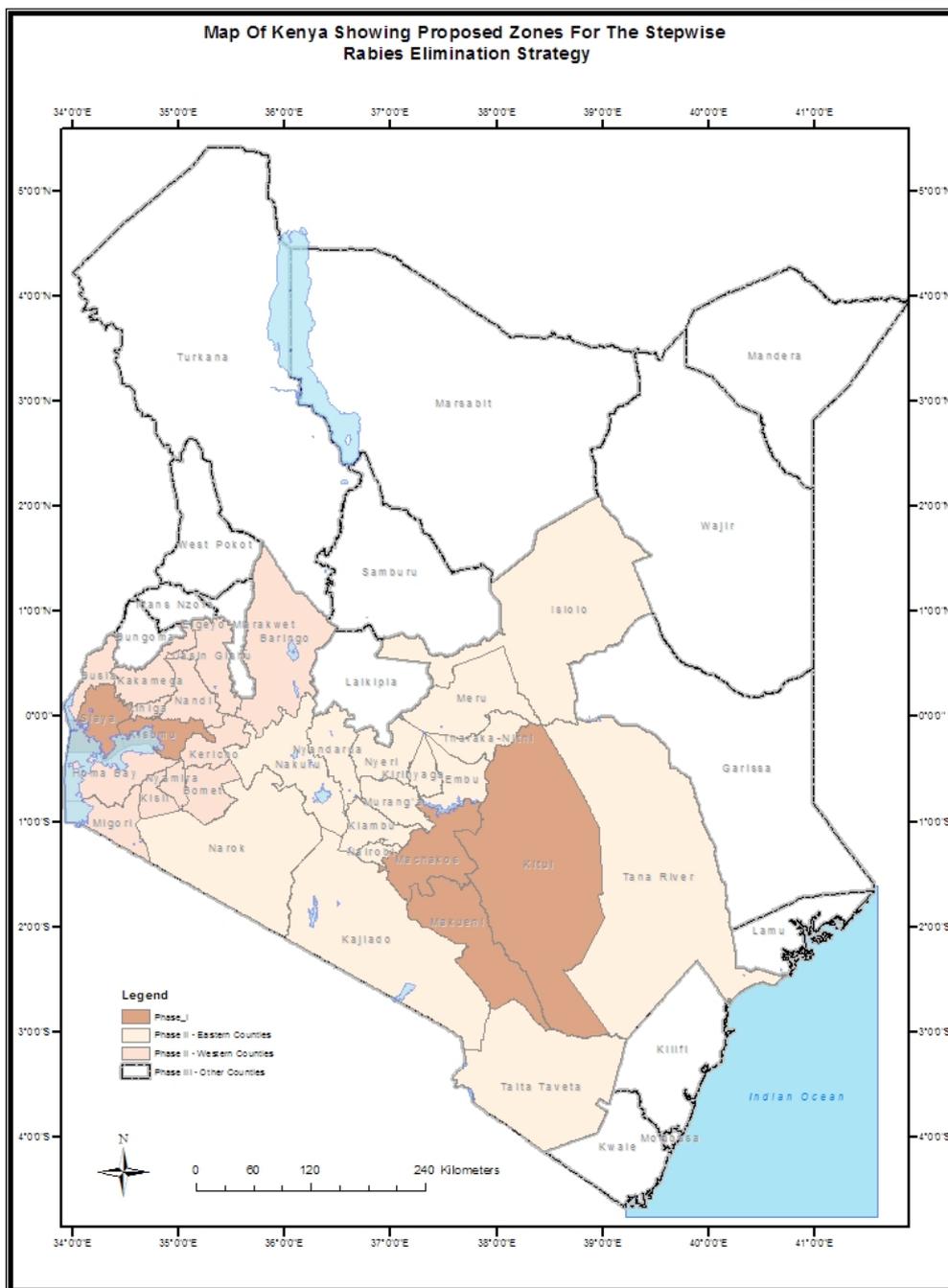


Figure 5: Map of Kenya showing proposed zones for the Stepwise Approach to Rabies Elimination

Activities to be conducted in this stage include:

- Rabies elimination activities similar to those conducted in the pilot areas.
- Routine dog vaccinations in the pilot areas.
- Adoption of best practices and lessons from implementation of the strategy in the pilot areas.

Other measures will include:

- **International Cross Border Engagements**

Livestock controls at border crossings and ports of entry (e.g. zoo-sanitary inspection points, police check-points, harbours and airports) and road checks for evidence of vaccination against rabies.

- **Identification of Rabies Free Zones**

Vaccination of dogs can be discontinued in defined areas where no incidences of dog rabies has been reported for two consecutive years, provided adequate surveillance is in place. If there are no rabies cases within six months when vaccinations have been discontinued within an area/ zone, then the area can be declared as having achieved “freedom from rabies”. This will be self-declaration of freedom by the Director of Veterinary Services as guided by the regulations for self-declaration as stipulated in the Rabies Act.

Surveillance for rabies will be sustained and there should be adequate vaccine stocks and resources for emergency response for containment of new outbreaks if they occur.

Advocacy, communication and social mobilization will continue in this phase.

#### **Indicator to move from stage 3 to 4**

- No human-dog-mediated rabies cases for 12 months
- Over 70% reductions in incidence of dog rabies after the first campaign and over 95% after the second campaign.

### **3.4 Stage 4 (2028-2029) - Maintaining freedom from human dog-mediated rabies and elimination of canine rabies**

Based on WHO/OIE guidelines an area that is free of risk for dog rabies is defined as one in which:

- No case of indigenously acquired infection due to a dog rabies virus has been confirmed in humans, dogs or cats or any other animal species at any time during the previous 2 years.
- Any indigenous positive case must be shown by molecular characterization to be a spill over from wildlife. If an imported case in carnivores is confirmed, the status of the country or area shall not be affected if molecular characterization confirms a non-indigenous source of the virus and epidemiological tracing backwards and forwards reveals no evidence of secondary dog infections.

The following additional requirements apply before an area is declared rabies free, based on OIE/WHO guidelines:

- Rabies in all animal species and humans is notifiable, and a continuous, effective surveillance system is in operation.

- The system has or has ready access to a rabies diagnostic laboratory in which WHO or OIE recommended techniques for rabies diagnosis are used.
- An adequate number of samples from suspected cases in the main susceptible domestic and wild animal species in the country are tested.
- National authorities should ensure that samples are collected throughout the country.
- An effective import policy; i.e. measures to prevent the importation of rabies are in place.

Once elimination of dog rabies from a given area has been achieved, efforts will be geared to keeping the area free from rabies (**maintenance phase**).

A risk assessment taking into account the prevalence of dog rabies in neighbouring areas, the effectiveness of import regulations and the quality of surveillance will inform decisions on the necessity of maintaining high vaccination coverage in dogs once the region is declared free from dog rabies.

For example, continued dog vaccination in transport hubs and border areas to ensure buffer zones will be necessary in the initial stages of the maintenance phase, while maintaining intensive surveillance and implementing prompt response strategies (i.e. containment vaccination) following new introductions.

Other measures include:

- Encouraging and supporting efforts towards control of rabies in dogs through increased cross-border collaborations involving relevant ministries
- Dog vaccination campaigns will be maintained in zones where dog rabies is still present or where justified otherwise
- Modify protocols on criteria for PEP administration for rabies free areas
- All professionals at risk of contracting rabies will be immunized
- Establish long-term plan, including emergency response to outbreaks following re-introduction
- Continue awareness programs, focus on elimination efforts and maintenance of rabies free status
- Continuous review of epidemiological status of the disease (including wildlife) and responding appropriately.

### **Actions to be undertaken if rabies is re-introduced into an area after a period of absence**

If rabies is re-introduced into area rabies control and elimination strategies will be conducted to re-establish a rabies free status.

Surveillance measures will include:

- Tracing the origin of the infection (how and when the disease entered an area).
- Investigation of dog bites cases and identification of humans and animals at risk for administration of PEP. Collection of brain tissues of suspect animals (dead or euthanized) and prompt submission to reference laboratories for confirmation.
- Clear definition of reporting and notification procedures.

Measures to limit the spread of the disease and ensure protection of people will include:

- Declaration of infected areas with clear establishment of the boundaries of the infected area.
- Control of dog movements into and out of infected areas/places to reduce opportunities for potentially infected animals to come in contact with susceptible animals.
- Mass dog vaccination.
- Seizure and detention of suspect animals.
- Ensure provision of supplies, including human biologicals and timely prophylactic vaccination
- Health education to raise public awareness

**Indicator for movement from stage 4 to 5**

- No human rabies cases or deaths for at-least two years.
- No dog rabies cases for two years months

### **3.5 Stage 5 (2030) – Maintain Freedom from rabies in humans and dogs**

In this stage, the country will be declared to be free from rabies and the DVS will apply for certification from international bodies. Surveillance will also be enhanced to detect new cases and timely response mounted.

# Chapter Four



## Monitoring and Evaluation

Routine monitoring, periodic assessment and evaluation will be done under the program at all levels to ensure implementation as per plan. A set of objectively verifiable indicators will be used to measure progress and assess the achievement of elimination program in line with regional strategy. External independent evaluation will be done to assess the progress and thereby indicate necessary modification in strategies of program implementation.

A separate monitoring and evaluation plan for the first 5 years is attached in Annex 1.

**Monitoring:** The NRECC will conduct quarterly performance monitoring meetings to review progress of implementation against targets in the annual work plan, address implementation bottlenecks and refocus as necessary.

Bi-annual stakeholder performance monitoring and review meetings at county and national levels will also review performance against targets, address any constraints to implementation and refocus activities if needed.

**Data audit:** The NRECC will conduct annual data quality audits and make official routine rabies surveillance data available.

**Annual review meeting:** As part of the commitment to performance monitoring, all stakeholders will meet annually to review achievements against targets and milestones in the strategic plan and annual work plans. These meetings will also define and finalize priorities for the following year.

# Chapter Five



## Annexes

### ANNEX 1: MONITORING AND EVALUATION PLAN (2014-2018)

#### IMPLEMENTATION OF THE STRATEGIC PLAN IN SELECTED PILOT AREAS, KENYA

#### ESTIMATED DURATION; 5 YEARS (2014-2019)

Summary of objectives/activities	Objectively Verifiable Indicator(s)	Means of verification	Source of information
GOAL: To eliminate dog transmitted human rabies in pilot areas	Reduction to below 1% of the incidence of rabies in the defined pilot geographical		
PURPOSE- Adoption and implementation of the strategies outlined in the rabies elimination document to eliminate and prevent rabies	% decrease in rabies in humans	Surveillance records	Annual reports, surveillance reports
	% decrease in rabies in animals	Surveillance records	Annual reports, surveillance reports
	Increase in surveillance system sensitivity and data quality and adoption of a national rabies outbreak response plan	Evaluation study report	Evaluation report
	Number of rabies studies whose results have been disseminated	Annual report, study report	Meeting records
	% of households who are aware about rabies, its prevention and control	Study report	Annual report
	Formation of NRECC, CRECC, SCRECC		
<b>STRATEGY OUTPUTS</b>			
<b>1. PREVENTION OF RABIES IN HUMANS</b>			
1.1. To increase timely and appropriate post exposure treatment to rabies exposed persons in 5 years			

1.1.1. To increase awareness on importance of local wound treatment after bite within households in pilot area by 95% in 5 years	% of patients that present at facilities having washed the wound with soap and water for at least 15 minutes	Hospital records	SPERK reports
1.1.2. To increase proportion of people washing bite wounds presenting in health facilities by 80%	% of people who have knowledge on proper wound washing after bites	KAP study	Annual SPERK report
1.1.3. To increase RIG use in 80% of the designated health facilities	% of designated health facilities with no RIG stock-outs	Review of annual report on RIG use in the pilot area	
1.1.4. To avail PEP in 90% of vaccination facilities	% of eligible cases receiving RIG	Hospital records	Unit of Vaccine and Immunization Services (UVIS) report
1.1.5. To increase PEP completion rate among eligible rabies exposed cases by 80 % in 5 years	% of vaccination facilities with no PEP stock outs	PEP stock cards	Supervision reports from CRECC
	% of eligible cases with PEP completed	Review of annual report on PEP coverage	Annual report on implementation of KREPS
1.2. To provide Pre-exposure Prophylaxis to 95% of most at risk population in pilot areas in 5 years	% of most at risk occupational groups personnel that receive complete dose of Pre-exposure prophylaxis	PrEP vaccination register	
1.3 To train staff in 100% of the health care facilities on proper dog bite wound cleaning and management in 5 years	Number of staff trained in facilities	Number of certificates issued Participants List	Training logs
	% of facilities with trained staff with the bite wound management guidelines	Regular supervision reports	SPERK annual report

## 2. ELIMINATION OF RABIES IN DOGS

2.1 To vaccinate more than 70% of dog population in the pilot areas for 3 consecutive years from the start of implementation	Proportion of dogs vaccinated in pilot areas	Post vaccination surveys in each of the sub-counties.	Sub-county veterinary officer vaccination reports
	% of sub-counties with 70% vaccination coverage within the pilot counties	Number of doses of rabies vaccine	Study reports
2.2 To reduce proportion of stray dogs by 25% in 5 years	Proportion of stray dogs	Ecology study report	Study reports
	% of sub-counties with reduced dog populations	Ecology study report	Study reports
2.3 Raise awareness on responsible dog ownership in the implementation areas in 5 years	% households aware of responsible dog ownership	KAP survey done every 3 years	Survey report

## 3. STRENGTHEN SURVEILLANCE AND RESPONSE

3.1 To improve sensitivity of the surveillance human surveillance system to 80% in 5 years	Improved surveillance system attributes-sensitivity and representativeness	Surveillance system evaluation report / Records review	DSRU/VEEU annual report
3.1.1 To improve sensitivity of the animal surveillance to 90% in 5 years	% of rabies cases captured by surveillance system	Surveillance system evaluation report / Records review	Sub-county Veterinary and Medical officer reports
3.1.2 To improve representativeness of the animal and human surveillance systems by 80% in 5 years	% of facilities reporting in the surveillance system	Surveillance system evaluation report / Records review	Training logs

3.1.3 To respond to 100% of the reported dog bite/ rabies outbreaks in the implementation areas	Proportion of the outbreaks responded to in time	Outbreak reports	SPERK annual report
	% of CORT staff trained		
3.2 Development of a rabies outbreak response plan by end of 2014	Rabies outbreak response plan		
3.3 To increase laboratory diagnostic capacity for humans and animal rabies in 5 years	% of laboratories equipped with diagnostic facilities in the pilot areas	Laboratory assessment reports	
	Number of samples submitted and tested		
	Number of staff trained	Training logs	
<b>4. CONDUCT AND PROMOTE OPERATIONAL RESEARCH</b>			
4.1. Baseline surveys in pilot areas - To be completed in first year of implementation	% of applicable studies done in each pilot area	Study reports	Dissemination of results Manuscript
4.2 Conduct studies to support implementation of the strategy	Number of the studies done in each pilot area	Study reports	Dissemination of results Manuscript
<b>5. ADVOCACY, COMMUNICATION AND SOCIAL MOBILIZATION</b>			
To increase public awareness to 95% about the risk of rabies and dog-bite prevention behaviours in 5 years	% of population aware of rabies and its prevention and control	KAP survey	KAP survey results
<b>6. ENHANCE PARTNERSHIPS AND INTER-SECTORAL COORDINATION</b>			
6.1 To establish partnerships and multi-sectoral collaboration among line ministries the ZDU, other government agencies, NGO and private sectors for successful implementation of the rabies control program	No. of international organizations/ funding agencies providing support to the project	Memorandum of Agreement with ZDU by the funding agency	Records of fund allocation
6.2 To have a functional NRECC in the first year of implementation	Number of meetings	List of nominated persons	SPERK annual report
6.3 To have functional CRECC in implementing counties by end of the first year	Number of meetings	Terms of reference	
		NRECC meeting minutes	
Formation of SCRECC in each sub-county in the pilot areas	Number of meetings	Terms of reference	
<b>7. RESOURCE MOBILISATION</b>			
7.1 To mobilize resources to support the rabies elimination program	Budget for rabies prevention and control provided to the ZDU for SPERK	Approved budget and record of budget allocation to ZDU for SPERK	Records of fund allocation for SPERK
	% of counties in the pilot areas allocate funds for SPERK	SPERK pilot areas budget	SPERK Monitoring Reports
7.2 To invite interested development partners to participate and manage aspects of the project	Numbers of partners involved in the project	Budget report	SPERK Annual reports

## ANNEX 2: BUDGET OF THE RABIES ELIMINATION STRATEGY

### PHASE I: 2014-2018

#### PROJECTED BUDGET 2014 – 2018 IN PILOT COUNTIES (KES)

STRATEGY	ACTIVITIES	2014	2015	2016	2017	2018
<b>ENHANCE PARTNERSHIPS AND INTER-SECTORAL COORDINATION</b>						
Localize program implementation	Launching of the strategy	3,000,000				
	Formation of NRECC	700,000				
	Formation of CRECC & SCRECC in pilot counties	2,000,000				
<b>ELIMINATION OF RABIES IN DOGS</b>						
To conduct mass dog vaccination targeting 70% of the dog population	- Logistics management - Estimated dog population in the pilot counties 500,000 Target of 70% = 350,000 dogs Vaccination cost approx \$2.5 USD per dog	10,000,000	77,000,000	77,000,000	77,000,000	25,000,000
	To promote responsible dog ownership and population management (Counties)	0	0	0	0	0
<b>3. PREVENTION OF RABIES IN HUMANS</b>						
Prevention of human rabies	Provision of anti-rabies vaccines, RIG and other supplies	152,064,000	253,440,000	278,784,000	278,784,000	152,064,000
Capacity building	Conduct Training Needs Assessment	450,000	0	0	0	0
	Training of staff in the pilot counties	0	12,000,000	15,000,000	15,000,000	2,000,000
<b>4. STRENGTHENING SURVEILLANCE AND RESPONSE</b>						
Strengthening surveillance	Strengthen surveillance in the 5 pilot counties	5,000,000	8,200,000	4,000,000	2,500,000	2,150,000
	Strengthen laboratory diagnostic capacity (CVL and RVIL-Kericho)	10,000,000	0	0	0	0
<b>5. CONDUCT AND PROMOTE OPERATIONAL RESEARCH</b>						
Surveys	Conduct base-line survey in pilot counties	8,000,000	0	0	0	0
	Impact assessment surveys in pilot counties	1,100,000	1,200,000	1,500,000	1,500,000	1,500,000
<b>6. ADVOCACY, COMMUNICATION AND SOCIAL MOBILIZATION</b>						
Health promotion	Conduct ACSM	2,500,000	8,000,000	8,000,000	8,000,000	8,000,000
<b>7. RESOURCE MOBILISATION</b>						
Raise resources from Government and partners		0	0	0	0	0
<b>SUB-TOTALS</b>		<b>194,814,000</b>	<b>359,840,000</b>	<b>384,284,000</b>	<b>382,784,000</b>	<b>190,714,000</b>
<b>GRAND TOTAL</b>		<b>1,512,436,000 (US\$ 17.8 million)</b>				

## PROJECTED BUDGET FOR PHASE II: 2019 -2030

S/No.	Strategy/Activities	2019/2020 Mill (KES)	2021/2022 Mill (KES)	2023/2024 Mill (KES)	2025-2030 Mill (KES)
1.	Partnerships and collaboration	5	5	5	5
2.	Nationwide mass dog vaccination (4.67 million dogs)	1,005	1,005	1,005	10
3.	Prevention of Rabies in humans	300	300	300	50
4.	Surveillance, Laboratory strengthening and Research	11	11	11	5
	<b>Total</b>	<b>1.32 Bill</b>	<b>1.32 Bill</b>	<b>1.32 Bill</b>	<b>490</b>

## BUDGET SUMMARY

S/No.	Details	Amount (KES/USD)
1.	Phase I: Pilot phase in 5 counties (Kisumu, Siaya, Makueni, Machakos and Kitui)	1.51 Billion (US\$ 17.8 M)
2.	Phase II: Roll out in other counties over 12 years (national mass dog vaccination 4.67 mill dogs/year for 3 rounds)	3.96 Billion [US\$ 46.6 M]
3.	Total for maintenance and consolidation phase (2025 – 2030)	490 Million [US\$ 5.77 M]
	<b>GRAND TOTAL</b>	<b>5.97 Billion [US\$ 70.2 Mill]</b>

## BUDGET BREAKDOWN

S/No.	Description	Proportions (%)
1.	First 5 years [Kshs 1.51 bill]	Cost of coordination, surveillance, & dog vaccination – <b>29</b> Cost of human prevention – <b>71</b>
2.	Next 5 years [Kshs 3.96 bill]	Cost of coordination, surveillance, & dog vaccination – <b>76</b> Cost of human prevention – <b>24</b>

## PROPOSED RESOURCE SOURCES

S/No.	Institutions
1.	Government of Kenya ( National, County)
2.	International partners - GoK's assistance + prioritization - WHO, FAO, OIE – technical assistance
3.	Funding agencies (ZDU/CDC to write grants) - BMGF, - Other sources
4.	Professional organizations KVA , KVB- Vaccinators KMA – Human case management Universities - Vaccinators
5.	NGOs and other organizations - GARC, WAP, KSPCA, - Sanofi pasteur, - Sharon's Project

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