

# LAIKIPIA RABIES VACCINATION CAMPAIGN (LRVC)

## 2017 REPORT



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## ACROYNMS AND ABBREVIATIONS

- a) LRVC Laikipia Rabies Vaccination Campaign
- b) MRC Mpala Research Center
- c) LWF Laikipia Wildlife Forum
- d) ILRL International Livestock Research Institute
- e) WHO World Health Organization
- f) KZDU Kenya Zoonotic Disease Unit
- g) OPC Ol Pejeta Conservancy
- h) RVA Rift Valley Adventures
- i) KRWDCP Kenya Rangelands Wild Dog and Cheetah Project
- j) KLEE The Kenya Long-term Exclosure Experiment
- k) VI Veterinarians International
- l) PA Public Address
- m) KSHS Kenya Shillings
- n) USD Dollars
- o) NKCC Northern Kenya Conservation Clubs

## **INTRODUCTION AND BACKGROUND**

### **Rabies Eradication: Science and Policy**

Every year, about 2,000 people die of rabies in Kenya (World Health Organization (WHO), 2014). A viral disease that causes acute inflammation of the brain and spinal cord, rabies kills almost 100% of its human victims and up to 86% of rabid dogs. Other domestic and wild mammals are also vulnerable to rabies; during outbreaks, the disease can threaten livelihoods and conservation efforts. A significant number of livestock, especially cattle, die from rabies annually: between 2011 and 2012, a total of 123 cases were reported in Kenya to the OIE World Animal Health Information System.

Over 98% of human rabies cases in developing countries are caused by a bite from an infected domestic dog. Particularly at risk of the disease are populations in remote rural areas, who may find it difficult to access or pay for rabies treatment, and children, who interact most closely with domestic animals. Mass vaccination of domestic dogs is the most cost-effective intervention to control canine rabies and to prevent transmission of the virus to humans (WHO, 2014). The WHO estimates that vaccinating 70% of domestic dogs for 3 consecutive years are sufficient to eliminate the disease from the domestic dog population and, by extension, humans.

### **Implementation Background**

Due to both logistic and financial hurdles, rabies vaccination is rare in many rural areas of Laikipia. In communities the Laikipia Rabies Vaccination Campaign (LRVC) has not previously visited, almost 100% of animals are unvaccinated, according to surveys of animal owners conducted as part of the campaign. Less than 5% (a very low number of dogs) have been vaccinated by the Laikipia County Government, at least partially because the communities are unwilling to pay the vaccination fees charged.

The canine rabies vaccine used in the LRVC is guaranteed for one year, and must be repeated annually. (Although an alternative vaccine provides “up to 3 years” of immunity, the campaign has not yet used this strain of the vaccine, in part because its 3-year effectiveness is not completely guaranteed.) Vaccinated animals are typically issued a vaccination card or certificate, signed by a veterinary doctor, which documents the immunization and releases the owner from liability in case of a bite. Although the LRVC is focused primarily on dogs, which are the main vector of the rabies virus to humans, the campaign also offers vaccination to domestic cats.

## LRVC History

The LRVC began in 2015 as a localized effort in 5 pastoralist communities around Mpala Research Centre, where Dedan Ngatia, Karatina University MSc. student, and Dr. Adam Ferguson had been researching the spatial ecology of domestic dogs. The two scientists partnered with veterinarian Dr. Dishon Muloi to found the vaccination campaign in September of 2015. In its first year, LRVC vaccinated a total of 821 domestic dogs and cats. In its second year, LRVC took place over 5 weekends, reaching more communities and a total of 4,530 domestic dogs and cats.

The 2017 campaign aimed to vaccinate more than double the previous campaign's coverage, to reach 10,000 dogs and cats across Laikipia. The campaign aimed to do this both by returning to areas where vaccination has previously taken place and expanding coverage into new communities around the County.

## CAMPAIGN GOALS AND OBJECTIVES

The ultimate goal of the Laikipia Rabies Vaccination Campaign is to eradicate rabies from domestic dog populations in Laikipia County as part of the national rabies eradication effort in Kenya. Doing so requires sustaining approximately a 70% vaccination rate for at least 3 consecutive years (Cleaveland *et al*, 2003).

LRVC 2017 specifically aimed to increase the campaign's vaccination coverage to 10,000 domestic dogs and cats across Laikipia County. The campaign's focus is in rural communities with the greatest risk of rabies exposure and least access to rabies vaccination and treatment, but also included semi-urban centres with a relatively large dog population.

## BUDGET EXPENDITURE

Purchases	Budget costs and Expenditure	
	KSHS	USD
Vaccines	0.00	0.00
Supplies	293,595.00	2,935.95
Transport	369,860.00	3,698.60
Allowances	130,117.00	1,301.17
Awareness/Comm. Outreach	109,060.00	1,090.60
Fuel	271,084.03	2,710.8403
Food/Refreshments	423,310.00	4,233.10
LWF supporting expenditure	167,000.00	1,670.00
<b>Totals</b>	<b>1,764,026.03</b>	<b>17640.2603</b>
<b>IN KIND CONTRIBUTION</b>		
Accommodation and food	2,160,000.00	21,600.00
Fuel	0.00	0.00
Supplies	450,000.00	4,500.00
Deficit (Covered by Mpala)	297,133.00	2971.33
Vehicles	420,000.00	4,200.00
Vaccines	612,000.00	6,120.00
<b>Totals</b>	<b>3,939,133.00</b>	<b>39,391.33</b>

## DISCUSSION

### Partners and Team

The 2017 field campaign was coordinated by Dedan Ngatia, campaign co-founder and scientist at Mpala Research Centre. The campaign was conducted by volunteer veterinarians from Nairobi University and students from Karatina University, with staff from Laikipia Wildlife Forum and Mpala Research Centre assisting throughout the campaign.

**The 2017 Campaign partner organizations** included:

- The County Government of Laikipia, which generously donated all pharmaceutical supplies (gloves, syringes, needles, coolers, sterilization spirits, etc.) needed by the campaign.
- The Kenya Zoonotic Disease Unit, which generously provided all 10,000 canine vaccines.
- The International Livestock Research Institute (ILRI), which helped coordinate the volunteer veterinarians.

- Ol Jogi Wildlife Conservancy, which donated \$1,000 and allowed teams to drive across the conservancy property to reach target communities.
- Ol Pejeta Wildlife Conservancy, which contribute staff to the rabies outreach efforts;
- Rift Valley Adventures (RVA), which contributed accommodation at their Rift Valley Adventures site for one weekend of the campaign, during vaccination in the Ol Pejeta area.
- Borana Conservancy and Lolomarik Farm - contributed resources including two vehicles and drivers for one weekend of the campaign, during vaccination in the Borana area.
- Veterinarians International, which contributed \$1,000 to the campaign.
- Kenya Rangelands Wild Dog and Cheetah Project (KRWDCP), which contributed one vehicle and the time of Dedan Ngatia, KRWDCP Project Manager.
- The Kenya Long-term Exclosure Experiment (KLEE) research project contributed the use of one vehicle through Dr. Duncan Kimuyu.
- RAW Africa provided two vehicles and drivers for the duration of the campaign, and fundraising support.
- The Field Museum of Natural History provided support and time for Adam Ferguson, co-founder of LRVC to join the campaign.
- The Smithsonian Institution provided financial support to Adam Ferguson in aid of enhancing scientific research (data collection) in support of the campaign.
- The Rufford Foundation awarded a research grant to Dedan Ngatia in support of the campaign.
- The Ludwig Foundation donated \$3,000 to the campaign.

Numerous individuals donated funds to the campaign through a Kenya-focused M-Changa crowd funding account established by Laikipia Wildlife Forum totalling KSHS. 106,000, and a US-focused crowd funding account established by Mpala Research Center, totalling \$2,296. All fundraising and campaign planning were conducted by a partnership of Mpala and Laikipia Wildlife Forum staff.

### **Accommodation and Meals**

The 2017 campaign was held over six consecutive weekends, from 3<sup>rd</sup> November to 9<sup>th</sup> December, 2017. The vaccination teams consisted of around 50 members: approximately 14 veterinarians, 18 volunteer students, 3 drivers, and 3 Laikipia Wildlife Forum participants, in addition to 5 other volunteers based at Mpala Research Centre, and a security team deployed from Mpala Research Centre. For five of the six weekends, the full vaccination teams were hosted at Mpala Research Centre. On Week 4, during vaccination in the Ol Pejeta area, the team was hosted at the RVA camp at Ol Pejeta Conservancy.

MRC provided all meals for the campaign teams (around 60 people), Thursday evening through Sunday mid-afternoon, for all six weeks of the campaign. MRC also provided accommodation

for 60 people at the Centre for 5 of the 6 weeks. Further, MRC provided two vehicles and one driver for the duration of the campaign, in addition to logistical support.

### **Vaccination Teams Strategy and Methodology**

Each week, the teams arrived at Mpala or RVA on Thursday evening before dinner. In the evening, the volunteers were briefed and grouped into six or seven vaccination teams, plus an additional Public Address team and a security vehicle. Each team included at least two veterinarian doctors or students, who were solely responsible for performing vaccinations and handling the dogs. Each team also included at least three student volunteers, who were responsible for photographing the animals, issuing vaccination cards, and filling in a data sheet listing each vaccinated animal and including the animal's age, sex, reproductive status, whether they were vaccinated before, and whether they received additional treatment such as a multivitamin or deworming injection. The vaccination teams were also accompanied by a human doctor, who delivered human rabies vaccines to any participants or community members suffering bites.

Vaccination centres were chosen to include previous vaccination centres, to cluster around conservancy areas, and to target communities where demand for vaccination was high. The teams departed for the field each morning at around 7:30 a.m., or earlier on weekends with longer travel time to the vaccination centres, such as the Borana and Rumuruti weekends. Most weekends, each of six vaccination teams visited one centre in the morning (~9 a.m. - 1 p.m.) and a new centre in the afternoon (2 p.m. - 6 p.m.), with all the teams taking a break and meeting up for lunch in the field around 1 - 2 p.m. Teams convened again and returned to camp in the evening for dinner.

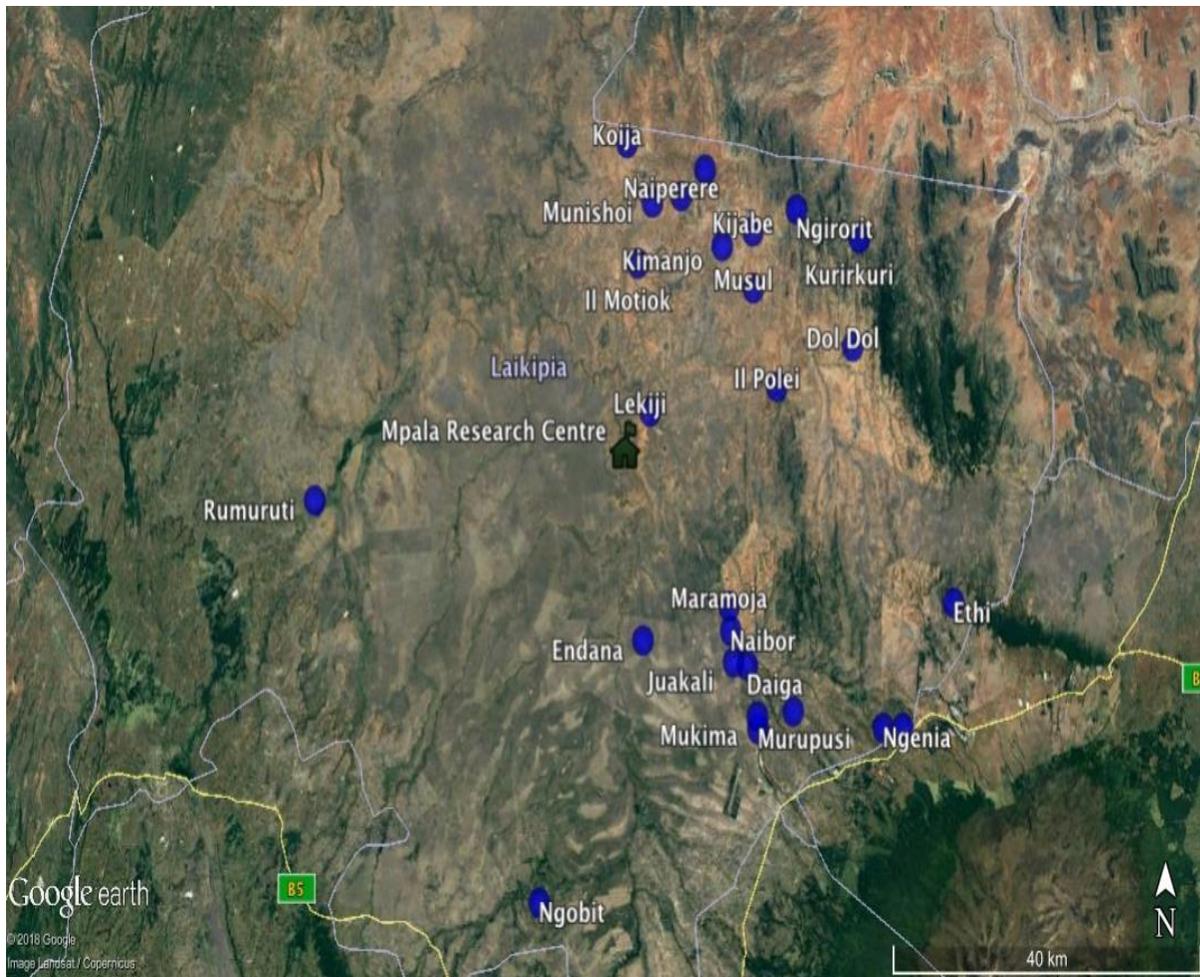
Volunteers typically arrived to Mpala Research Centre on Thursday evening, vaccinated all day on Friday and Saturday, and left Mpala again on Sunday, in the morning or shortly after lunch. Vaccination centres were advertised to communities in advance two days before the campaign by LWF and community organizers and signage, and during the vaccination weekend by the LWF public awareness (PA) vehicle. The PA vehicle drove through the communities playing music and a loudspeaker message urging community members to bring their animals to the vaccination centre. Advance signage was usually posted in the few days preceding vaccinations, with signs mounted on a signpost, wall, or tree at the site of the vaccination centre. These signs typically gave the time for morning centres as 9 a.m., and for afternoon centres as 2 p.m. This caused the highest rush of community members and animals at the beginning of each session, with crowds diminishing over the course of the day.

When turnout was high, the teams adjusted their schedules, adding extra hours to ensure that all animals that arrived at the stations were vaccinated. When turnout was low, teams would sometimes leave stations early, having vaccinated all animals present, and adopt a "roaming" strategy, in which they drove through the communities and visited homes or bomas (pastoralist homesteads) individually to offer vaccination.

## Campaign Calendar and Vaccination Results

	Dates	Cluster	Communities	Total vaccinated
1	Nov. 3-4	Naibunga Group Ranch	Koiya, Il Motiok, Kijabe, Mosul, Tiememut, Nkioriti, Tura, Ewaso	602
2	Nov. 10-11	Naibor and Jua Kali	Naibor, Maramoja, Endana, Makandura, Jua Kali, Lekiji, Tangi Nyeusi, Ngare Nyiro, Muramati, Mukima, etc.	1,738
3	Nov. 17-18	Il Polei; Jua Kali area	Il Polei, Mugumo, Mwireri, Umande, Umande, Nyariginu, Ndemu, Murungai, Milo saba, Milo nane, Milo tisa, etc.	1,498
4	Nov. 24-25	Ol Pejeta	Withare, Ngobit, Mwakinya, Tharua, Riacho, Kijabe, Kahuruko, Mutaru, Muhonia, etc.	1,601
5	Dec. 1-2	Borana	Ngenia, Gitugi, Kongoni, Kairigire, Kahira, Mia Moja, Laragai, Katunga, Murua, Olotasha, Ositat, Olokisiria, Gratton, Bodeni, Naikishomi, Murua-Nairusha, Lokuseru, Sieku, Olkiyei, Ololong'ok, Makurian	1,664
6	Dec. 8-9	Rumuruti	Katutura, Maondo meri, Loroka, Kinamba, Container, Thome, Rumuruti town, Veterinary, Nkiloriti, Kiseriri, Katutura, Masenge, Daraja, Kiseriri, Milimani, Usalama, Sukuroi, Mowarak, Nkoisusu, Nkirashi, Nkalemare	2,210
		<b>TOTAL</b>		<b>9,313</b>

## Map of the Vaccination Sites during LRVC 2017



Two veterinarians (right) vaccinate a young puppy, while a volunteer (far left) prepares to mark the animals with temporary paint to designate that they have been vaccinated.



Community members and their animals assemble at a roadside vaccination centre near Naibor.



Volunteers and community members assemble to hear a local Chief Wangai ,welcome the vaccination campaign at Ngenia area.



Children in Rumuruti bring their animals to a vaccination centre (foreground) while the campaign public awareness vehicle passes through the area publicizing the vaccination centre (background).

## CHALLENGES AND OPPORTUNITIES

In spite of this year's large increase in vaccination rates, further expansion of the LRVC is both possible and necessary. In particular, in certain communities not covered by the 2017 campaign, particularly in Laikipia East around Ol Pejeta Conservancy, Sweetwaters, Matanya, Thome, Mwiyo, and Marura, community members have already expressed their interest in being included in next year's vaccination campaign. We expect this to mean an additional 3000 dogs.

It is also important to consider the campaign's expansion holistically and in a long-term context. It may take 5 years for the campaign to expand to 70% vaccination coverage; this coverage must be maintained for at least 3 years; and it must even continue at a maintenance level thereafter, or rabies will inevitably re-enter Laikipia's domestic dog population from wildlife, and across the county borders. Although we have seen great success in terms of vaccination numbers and extremely high turnout in new communities this year, increasing education and building greater trust alongside vaccination numbers is critical to the LRVC's ultimate success.

In some communities, such as Il Motiok and Il Polei, turnout was very poor, and many community members expressed distrust of the vaccination. The same canine distemper outbreak that devastated Laikipia's endangered wild dog populations last year also had severe impacts on the domestic dog populations in these largely pastoral communities. Because the outbreak took place shortly after LRVC 2016, some members in the communities assumed that the rabies vaccination was the cause of their dogs' deaths. That rumour appears to have spread rapidly throughout the communities. In the Il Polei area, for example, some community members explicitly identified this fear, and vaccination turnout was extremely low. LRVC cannot be successful in the long term if communities do not trust and value the vaccination enough to bring their pets to vaccination centres. The key to improving turnout in these communities is increasing both their knowledge about rabies vaccination, and their trust of the groups and organizations carrying out the campaign. These issues are addressed in the following sections.

### Education

During the campaign, volunteers and vets can make important steps to inform community members about the facts about rabies and the vaccination. For example, although many community members reported having received vaccination previously, few brought their vaccination cards. Community members also may not know that vaccination should be repeated annually.

Before the campaign, LRVC 2018 can expand school programs to inform students about what rabies is, why vaccination is important, and how to treat a bite or scratch. In 2016, the LRVC worked with the Northern Kenya Conservation Clubs to design lessons and teach primary school students about rabies and how to prevent it. This education and outreach effort should be revived as part of the long-term education program essential to the campaign's success.

Dealing with mistrust among the communities about the vaccination, the campaign could expand its reach and turnout by increasing involvement from within the communities themselves. For example, Mpala Research Centre staff might volunteer with the campaign in their home communities (Lekiji, Il Motiok, Rumuruti, etc.). Daraja Academy is also eager to collaborate, and could involve students from the target communities as volunteers. LWF's membership (small holders, pastoralists and ranchers) are all potential assistants in an education and outreach effort supporting rabies vaccination.

### **Addressing Dog Bites and Scratches**

Children form that largest number of dog owners at vaccination centres, and thus treating bites and scratches at the vaccination sites poses a major logistical challenge. Starting the second week of the campaign, we used a combined report form and waiver to document each injury and to release the LRVC from liability. The form is used to ensure that (a) the bite victim receives their first rabies post-exposure prophylaxis shot, (b) the victim understands the necessity and method to obtain the subsequent four shots, and (c) the vaccine doses are delivered to the clinic with refrigeration located nearest to the victim.

The human doctor who travelled with the vaccination teams through the weekends delivered post-exposure prophylaxis where necessary and filled the necessary paperwork. However, there was room for error if the victim - often a young person or child - did not understand the subsequent procedure; if they forget to visit the clinic for their subsequent vaccinations; and/or if the clinic decides to use the vaccines (which are provided free of charge) for profit. Prior to next year's campaign, the LRVC team should conduct a critical assessment of the accident treatment procedure, translate both the waiver and the vaccination information form into Kiswahili, and get a lawyer to assess the waiver and any potential liability carried by the LRVC.

Coordination with local health clinics during these campaigns becomes a major requirement of future campaigns.

### **Scientific**

At this time, several critical questions remain unknown. First, it remains unknown at what rate the animals, which are often sickly, skinny, or malnourished, uptake the vaccine (convert the vaccine into disease resistance). If vaccine uptake rates are low, the LRVC will need to achieve a higher-than-expected vaccination rate in order to eliminate rabies in Laikipia.

Secondly, the prevalence of rabies in wildlife populations, the rate of transfer between wildlife and domestic animals, whether or not the wildlife strain of the disease can be transferred from wildlife, to a domestic animal, to a human are all unknown in the Laikipia context.

Thirdly, although the campaign has been vaccinating some domestic cats alongside dogs, the rabies rate in Laikipia's cat populations is also unknown, meaning it is unknown whether this is an effective strategy or a waste of vaccine.

Finally, one of the most commonly-asked questions about the campaign is how much farther we have to go. How many dogs are in the county - and, thus, how many must we vaccinate to reach the 70% target? In discussion with County authorities, they estimate that there are over 20,000-30,000 dogs in Laikipia.

Ongoing research led by LRVC team member, Wangechi Kiongo, aims to address this question and will guide the LRVC strategy in the coming years. Using this data, we will be able to tell how effective our campaign is over time by conducting further rabies surveillance.

