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National Strategy for the Elimination of Canine Mediated Human Rabies in South Africa (2019-2030)

June 2024 (1st revised edition)

Contents

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Mr K Le Roux, Chairperson, National Rabies Advisory Group, June 2024.

ABBREVIATIONS

AHT	-	Animal Health Technician
ARC-OVR	-	Agricultural Research Council - Onderstepoort Veterinary Institute
CCG	-	Community Care Giver
CCS	-	Compulsory Community Service
CHW	-	Community Health Worker
DALRRD	-	Department of Agriculture, Land Reform & Rural Development
DFFE	-	Department of Forestry, Fisheries and Environment
DoH	-	Department of Health
ERIG	-	Equine Derived Rabies Immunoglobulin
FAO	-	Food and Agriculture Organisation
GIS	-	Geographic Information System
M&E	-	Monitoring and Evaluation
NGO	-	Non-Governmental Organisation
NTD	-	Neglected Tropical Disease
WOAH	-	World Organisation for Animal Health
PAHC	-	Primary Animal Health Care
PDoH	-	Provincial Department of Health
PEP	-	Post Exposure Prophylaxis
PrEP	-	Pre-Exposure Prophylaxis
PPP	-	Private Public Partnership
PVS	-	Provincial Veterinary Services
RAG	-	National Rabies Advisory Group
RIG	-	Rabies Immunoglobulin
SA	-	South Africa
SADC	-	Southern African Development Community
SANDF	-	South African National Defence Force
SAPS	-	South African National Police
SAVC	-	South African Veterinary Council
SOP	-	Standard Operating Procedure
VS	-	Veterinary Services

EXECUTIVE SUMMARY

Rabies is defined by the World Health Organisation (WHO) as a neglected zoonotic disease and has an almost 100% case fatality rate in both humans and animals. Despite this, rabies is 100% preventable through rabies awareness education, mass dog vaccinations and the timely and correct administration of post-exposure prophylaxis (PEP) to people exposed to the rabies virus.

The elimination of canine mediated human rabies in South Africa requires a "One Health" approach – a collaborative, multi-sectoral, and trans-disciplinary approach working at local, provincial, national and regional level to achieve optimal health outcomes for people, animals and their shared environment.

Our strategy to eliminate dog-mediated human rabies by 2030 is based on the Global Framework For the Elimination of Dog Mediated Human Rabies ("Zero by 30" strategy) developed jointly by the World Health Organisation (WHO), the World Organisation for Animal health (WOAH), and the Food and Agriculture Organisation of the United Nations (FAO) in Geneva in 2015.

Rabies control and prevention has been conducted by Veterinary Services and Health Services for many years and has been successful in controlling and even eliminating dog-mediated human rabies in the past. However, there are some high-risk endemic dog rabies areas that still remain in the eastern parts of the country, endangering the lives of people and animals. These are the key areas where the national rabies strategy needs to focus and find improved and sustainable ways to control and prevent dog rabies.

Good progress has been made over the last three years through the development and adoption of Provincial Rabies Control Strategies that have been aligned with this national strategy document. Participation of Provincial Veterinary and Health representatives in the national Rabies Advisory Group is securing a good communication and support network. National and provincial rabies day awareness and vaccination campaigns for the month of September has been very encouraging in 2021, 2022 and 2023.

Some additional challenges have emerged since the finalisation of the original national rabies strategy, namely the impact and aftermath of COVID-19, socio-economic challenges resulting in both safety concerns for teams, and limited funding for campaigns. It is important

to note that only three provinces have reported human rabies cases since 2019, namely Eastern Cape, KwaZulu-Natal and Limpopo. The remaining six provinces have not reported human rabies cases in the last five or more years.

Despite ongoing challenges, if given adequate resources and political support, most importantly in the four high-risk endemic dog rabies provinces, South Africa has the knowledge and practical experience to eliminate dog-mediated human rabies by 2030. Disease outbreak trends in humans and animals over the last five years have shown that additional resources will have to be committed and wisely implemented in order to progress toward this goal. If the same or less resources are committed over the next five years, especially pertaining to the four key provinces, the goal of "Zero by 30" will not be reached.

**The revision of the original strategy was deemed necessary to provide updated rabies outbreak maps, to highlight additional high-risk dog-rabies areas requiring attention, to incorporate the lessons learnt from the COVID-19 pandemic and to place emphasis on the increasing impact that crime is having on rabies related activities. Subsequent revisions will take place as required.*

STRATEGIC OBJECTIVES

1. Create countrywide awareness and advocacy regarding rabies, its dangers, and the need for every dog and cat to be vaccinated against rabies.
2. Foster inter-sectoral collaboration (One Health approach).
3. Equip and empower Veterinary Services to be able to conduct mass dog vaccination campaigns in strategic areas.
4. Equip the broader veterinary, animal health and welfare related communities to assist in the fight against rabies.
5. Ensure medical personnel, especially those in the four canine rabies endemic provinces, are well informed regarding rabies risk assessment and PEP procedures.
6. Ensure availability of good quality PEP for treating people exposed to the rabies virus.
7. Animal surveillance and diagnostic laboratory capacity needs to be maintained, and improved upon where required.
8. Coordinate rabies research efforts.
9. Ongoing evaluation of progress towards "Zero by 30".

CHAPTER 1: INTRODUCTION

The WHO classifies rabies as one of several neglected zoonotic diseases and states that the term "neglected" highlights that these diseases affect mainly poor and marginalized populations in low resource settings.

Unfortunately, rabies has a case-fatality rate of almost 100% in humans and animals. In South Africa, between 1981 and 2022, >70% of human cases occurred in children 17 years and younger and the vast majority were caused by the bite of a rabies-infected dog.

Across the world, it has been proven that the most cost effective way to eliminate dog-mediated human rabies is to control and eliminate the disease in the dog population through mass vaccination campaigns. Provincial Veterinary Services have been allocated resources to control rabies in dog (and cat) populations for decades and we have experienced great successes and also major setbacks and challenges. However, rabies remains endemic in the dog populations in some parts of South Africa. This is despite the fact that the necessary tools and knowledge to eliminate the disease in the domestic dog population are readily available in South Africa.

At a joint global meeting held in Geneva in December 2015[1], the World Health Organization (WHO), the World Organization for Animal Health (WOAH) and the Food and Agriculture Organization of the United Nations (FAO) agreed to a framework to eliminate canine rabies with the vision of ending dog-mediated human rabies by 2030 ("Zero by 30").

All 180 Member countries of the WOAH (including South Africa) affirmed this commitment in Resolution N.26 adopted by the World Assembly of Delegates of the WOAH in May 2016.

This commitment is a recognition of the importance of rabies as a human disease, not just due to loss of life, but also due to the economic impact of the disease. Post exposure treatment of humans exposed to canine rabies is far more expensive than the cost of preventing rabies in dogs, and subsequent spillover to humans.

Human treatment has been previously estimated at over $7 million per year (R102 200 000). It has also been noted in large scale campaigns (e.g. in KZN) that costs increase during mass interventions, due to improved awareness. However human cases can be effectively stopped, with long term financial benefits.

Given adequate, continued support and commitment by the central and provincial government, together with strong leadership in high-risk dog rabies areas, South Africa can eliminate dog-mediated human rabies by 2030.

1.1 LEGISLATIVE AND OTHER MANDATES

- The Animal Diseases Regulations (R.2026 of 1986) of the Animal Diseases Act, 1984 (Act No. 35 of 1984), as amended, lists rabies as a controlled animal disease. Control measures are described in Table 2 of the Regulations and state:

Animal disease	Nature, causal organism and symptoms	Susceptible animals	Controlled veterinary act to be performed in respect of-		
			Susceptible animals	Contact animals	Infected animals
1	2	3	4	5	6
Rabies	Contagious viral disease to which man is also susceptible, mainly transmitted by the bite of an infected animal and characterised by salivation, behavioural deviation, aggressiveness, progressive paralysis, high mortality and continuous bellowing in cattle	All mammals	All dogs and cats in the Republic shall be immunised with an efficient remedy by an officer, veterinarian or authorised person at the age of three months followed by a second vaccination within 12 months, at least 30 days after the first vaccination and thereafter every three years. Dogs and cats younger than three months may be vaccinated provided that they are again vaccinated at the age of three months, followed by a third vaccination within 12 months and thereafter every three years	Contact animals shall be isolated and immunised with an efficient remedy by or under the supervision of a veterinarian, an officer or authorised person, unless the State Veterinarian decides to destroy the animals.	Infected animals shall be isolated and be destroyed by the responsible person or an officer, veterinarian or authorised person: Provided that a responsible person who kills such animal shall retain the carcass for the attention of an officer, authorised person or veterinarian.

- Resolution N.26 adopted by the World Assembly of Delegates of the WOAH in May 2016.
- Veterinary and Para-veterinary Professions Act, 1982 (Act No.19 of 1982)
- Animal Protection Act, 1962 (Act No. 71 of 1962)
- Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)

- The National Health Act, 2003 (Act No. 61 of 2003), including the Regulations
- International Health Regulations (2005)
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
- Municipal bylaws on the keeping of animals

CHAPTER 2: VISION AND PURPOSE

2.1 VISION

Zero human deaths from dog-mediated rabies by 2030.

2.2 PURPOSE OF THE NATIONAL STRATEGY FOR THE ELIMINATION OF CANINE MEDIATED HUMAN RABIES IN SOUTH AFRICA

The purpose of this national strategy is to ensure that the National and Provincial Veterinary Services (VS), the National and Provincial Departments of Health (DoH) and other stakeholders, including relevant industries and organisations, have a common vision and understanding of the dog rabies situation in South Africa, and develop a commitment to work together cohesively to achieve the vision of zero human deaths from dog-mediated rabies by 2030.

2.3 VALUES

In conjunction with the vision driving this strategy, the National Strategy for the Elimination of Canine Mediated Human Rabies in South Africa will subscribe to the following values:

- Professionalism
- Responsiveness
- Inclusiveness
- Transparency
- Objectivity

CHAPTER 3: SITUATIONAL ANALYSIS

3.1 HISTORICAL PERSPECTIVE AND BACKGROUND TO RABIES IN SOUTH AFRICA

Although the first confirmed case of rabies in South Africa occurred in an imported dog in the Eastern Cape in 1893, the current occurrence and distribution of canine rabies in the country is mainly as a consequence of two incursions:

3.1.1 In the early 1940's the disease moved south of the Zambezi River and reached the northern Limpopo Province of South Africa in 1950, and

3.1.2 The disease was re-introduced into KwaZulu-Natal (KZN) by an influx of refugees from Mozambique in 1976. (The first introduction from Mozambique in 1961 was contained and eliminated). This last outbreak event in 1976 was not brought under control and the disease spread down the coast, reaching East London by the early 1990s.

3.2 CURRENT SITUATION

Canine rabies is often perceived as a countrywide problem and consequently that a successful strategy must achieve the vaccination of at least 70% of all dogs in South Africa. This, however, is not the complete picture (and often scares decision makers into doing nothing) and a strategic response is required.

Canine rabies is found predominantly in the eastern parts of the country as shown in Figure 1 (based on rabies cases officially reported to DALRRD between 2014 and 2023).

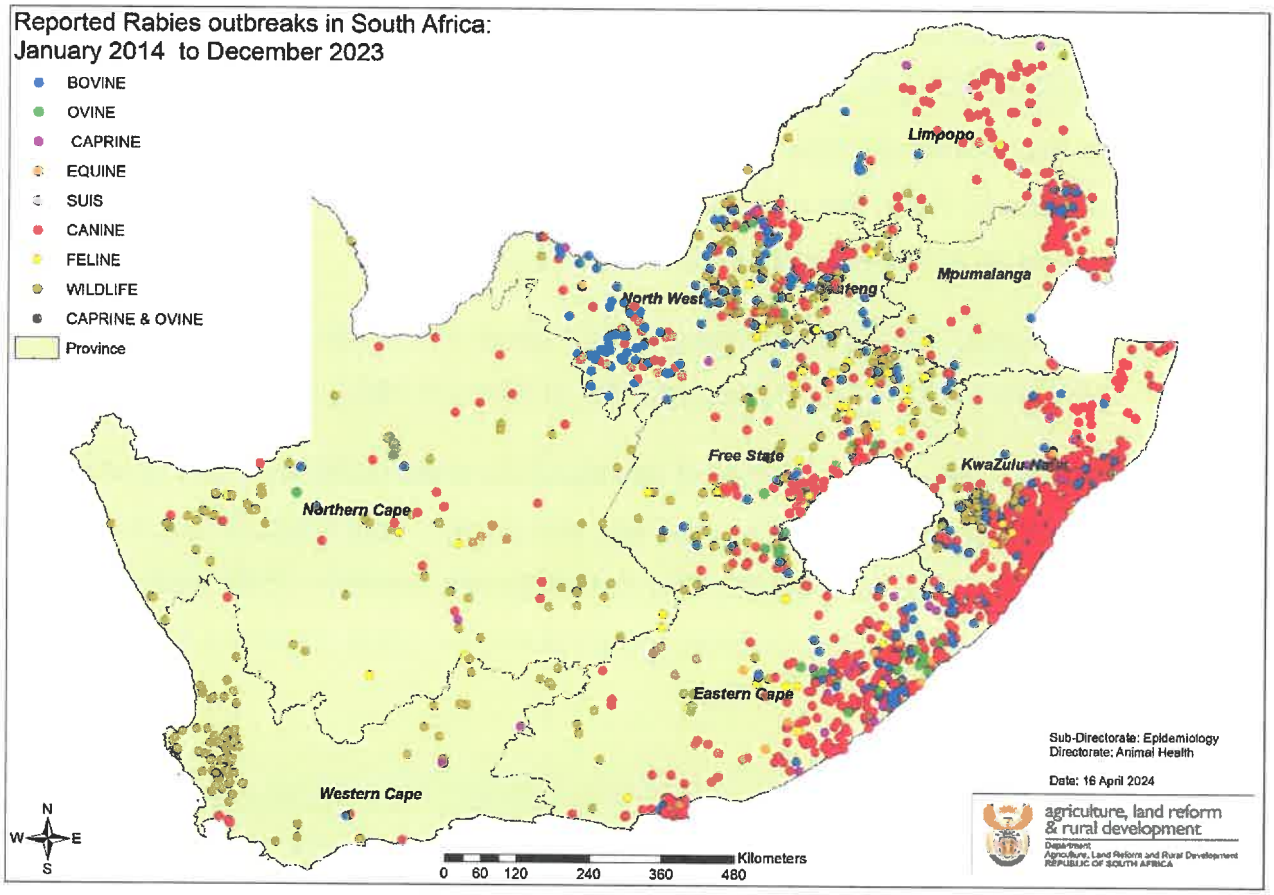


Figure 1: Rabies cases in SA per species (2014-2023) as reported to the Epidemiology Sub-Directorate of DALRRD (red dots are dog cases)

Furthermore, the occurrence of dog rabies cases in the eastern parts of the country can be grouped into four high-risk areas where the disease is endemic in large, free-roaming dog populations. These trends have been consistent over many years and is still applicable based on 2023 laboratory data (Figure 2). If these four areas were correctly and strategically vaccinated, it would eliminate more than 90% of dog rabies in South Africa and would in all likelihood, achieve the goal of zero human deaths due to dog-mediated rabies. Note that sound PEP systems will still play a crucial role, until rabies has been completely eliminated from the animal population, which is unlikely in SA due to wildlife rabies.

In addition, there is an emerging dog cycle in the Free State – Lesotho border area which will require a sustained and coordinated control effort on both sides of the border in order to keep the Free State free of canine rabies.

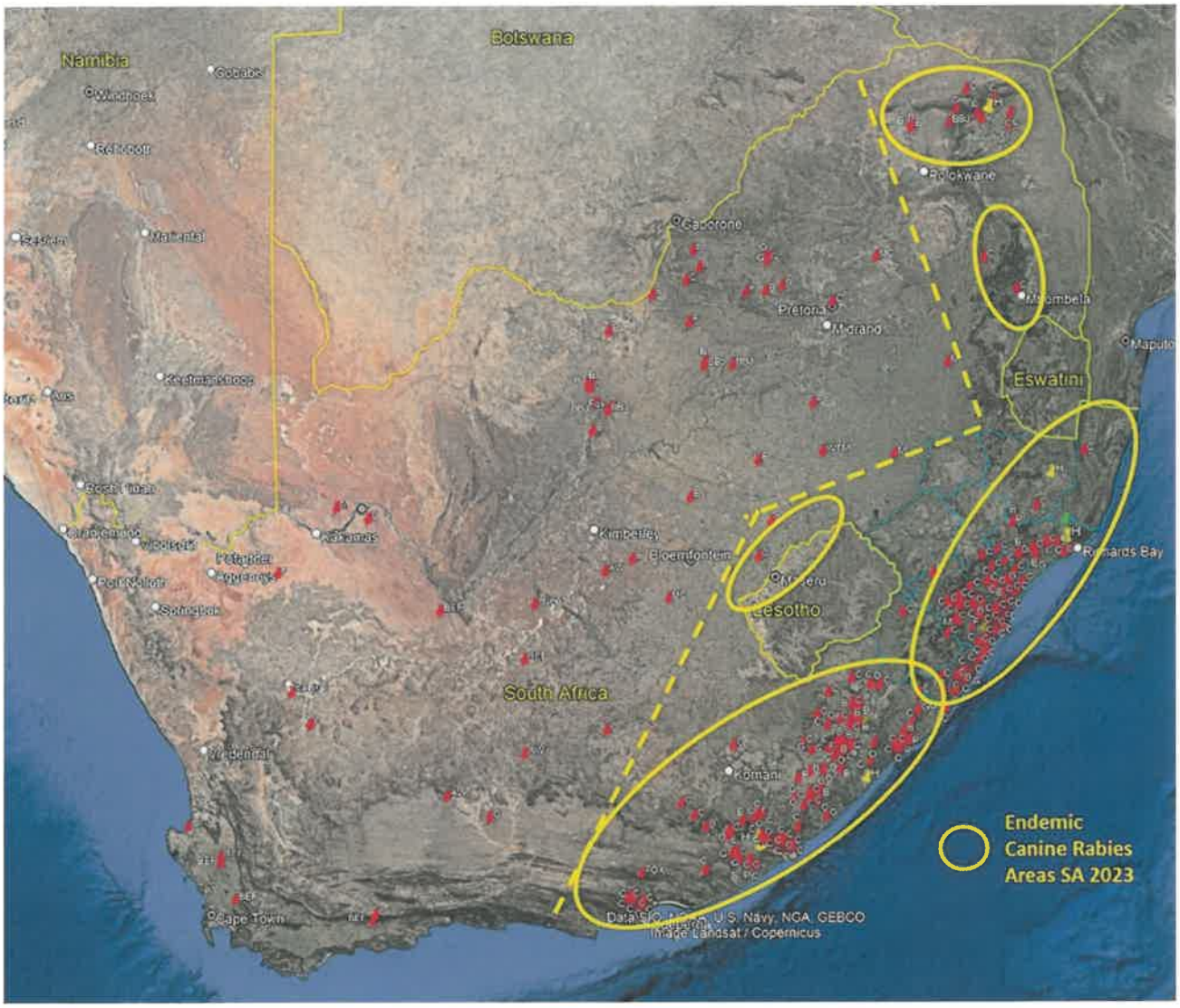


Figure 2: Endemic dog rabies areas in SA (based on 2023 laboratory data)

The three main focal source areas of intervention for canine rabies in SA: Limpopo, KZN and Eastern Cape. Free State - Lesotho border and Mpumalanga require additional attention as potential re-emergent source areas (other areas to the west of the yellow dotted line are predominantly wildlife rabies, or spillover thereof to domestic species)

Although the focus is on high-risk areas for dog rabies, it should be noted that the overall goal to ensure that dogs and cats in South Africa are vaccinated against rabies (as legislated) is vital to maintain to the best of everyone's' ability. A stark reminder was received during the severe rabies outbreaks in Gqeberha and East London in the Eastern Cape Province (which did not fall under the previous "high risk" areas for canine rabies), where rabies was introduced into a very large free-roaming dog population that was not adequately

vaccinated. This outbreak also spilled over into suburban dog populations (fenced in), showing that both public and private dog vaccination efforts have not been sufficient in previous years. This is likely due to an underestimation of the dog population numbers in areas serviced by Government and a lack of perceived risk by dog-owners that can afford private veterinary care.

The COVID-19 outbreak in 2020/ 2021 unfortunately led to a decrease in rabies vaccination and awareness campaigns across the country, due to movement restrictions. Further resultant socio-economic challenges, job-losses, local instability and escalating crime rates created further challenges in rabies control. The aftermath was particularly evident in eThekwini (KZN), Qeberha and East London (Eastern Cape) which recorded massive dog rabies outbreaks in 2021 and 2022. These outbreaks have been brought under control by 2023, but serve as reminders of what can go wrong very quickly.

A notable positive impact was seen after the 2021, 2022 and 2023 national and provincial rabies day campaigns that were held in the month of September.

3.3 A One Health Approach

The One Health concept recognizes that the health of people is connected to the health of animals and the environment. It proposes a collaborative, multi-sectoral and trans-disciplinary approach working at local, national, regional and even global levels to achieve optimal health outcomes for people, animals and their shared environment[2].

A One Health approach to rabies is a necessity because the protection of humans from rabies is most effectively achieved by addressing the source of the disease. This in turn is best achieved by eliminating the disease in domestic dogs using targeted mass vaccinations. This is primarily the responsibility of the Veterinary Services. However, until the elimination of dog rabies is fully achieved, human rabies has to be prevented through the efficient delivery of PEP to potentially exposed individuals. This is primarily the responsibility of the DoH with the DFFE playing a supportive role. Note that sound PEP systems will continue to play a crucial role, as rabies is unlikely to be completely eliminated in SA due to wildlife rabies.

This perfectly fits the WHO concept of addressing the occurrence of neglected zoonotic diseases, i.e. preventing and mitigating their occurrence in humans requires control and, where feasible, elimination of the disease in their animal reservoirs.

In terms of One Health, it is particularly important that people working in close contact with animals and are at risk of being exposed to rabies (e.g. veterinarians, animal health technicians, welfare workers, kennel staff, etc.) have to receive PrEP treatment to protect them. This is in line with the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). It is the employer's responsibility to ensure that their staff are protected against hazards that emanate from the working environment.

Education and awareness are key elements that will lead to an increase in reporting and surveillance. Any countrywide campaign to control the disease while creating awareness can result in a dramatic increase in the demand for PEP treatment in humans, which could carry significant costs to provinces. After elimination, the cost-benefits ratio will improve as the disease risk decreases, provided that the elimination strategy in the dog population is maintained, and proper risk assessment of exposed individuals (animal bites, scratched) are conducted. Note that education and awareness should remain continuous, as people tend to become lax if there hasn't been a recent rabies outbreak.

Ever-changing human population dynamics need to be continually assessed and addressed. This has become evident over the last couple of years and has been exacerbated by the COVID-19 pandemic. This includes urbanisation trends which have many associated risks, including people travelling to and from high-risk dog-rabies areas and adopting or moving high-risk animals (unknown vaccination status), and people moving into high-walled areas and security complexes where they are much harder to reach through conventional awareness and vaccination campaigns.

Although the VS and DoH are perhaps the major players in this strategy, numerous other parties will continue to play important, even vital, roles in the overall effort to eliminate human deaths from dog-mediated rabies. These range from other government departments such as the DFFE, numerous NGOs, university researchers, volunteers, etc. These relationships need to be nurtured and expanded so that a broad spectrum of society has a similar vision, and collective resources and knowledge from each can contribute to elimination. More emphasis needs to be placed on Public Private Partnerships (PPP) to expand the reach of awareness and vaccination programs and to ensure a collective responsibility for rabies control. From a human health perspective, all role-players need to be actively engaged, as the health sector has a much wider reach than the veterinary sector. The involvement of the private health sector, traditional healers and Community Care Givers

(CCGs)/ Community Health Workers (CHWs) can play a massive role in rabies awareness and disease prevention in humans.

CHAPTER 4: CONSTRAINTS AND CHALLENGES AND PROPOSED SOLUTIONS

Although a number of constraints and challenges are identified separately and highlighted below, they are in fact all interlinked, and thus addressing one of the challenges is unlikely to benefit the situation as a whole if the others are not also addressed.

4.1 National vs Provincial vs Municipal Structures

There are nine different Provincial Veterinary Services together with the National Veterinary Services and nine different Provincial Departments of Health together with the National Department of Health in South Africa. Both health and veterinary services are provincialized based on the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) - Each structure has their own independent budget, leadership and priorities.

Furthermore, some of the traditional functions of both the PVS's and PDOH's have been further devolved to municipal level, although this varies from province to province. This often creates further leadership, communication and accountability challenges.

This fractured nature of the country's veterinary and health services structures and the consequent lack of a direct chain of command from the national offices (DALRRD and DoH) to staff in the field, makes communication, cooperation and coordinating efforts across provincial boundaries and between the two departments unnecessarily problematic, complicated and often virtually impossible.

Solution = The South African Veterinary Strategy (2016 – 2026) recognizes this and has, as part of one of its strategic objectives, set the goal of restoring the national chain of command for all aspects of veterinary services. Whether this will be achieved or not, we need to foster relationships between relevant stakeholders and agree on the responsibilities and accountabilities of each. This can be achieved through Provincial rabies Strategies, Provincial One Health Groups, Memorandums of Understanding, etc.

4.2 LACK OF POLITICAL, INSTITUTIONAL AND FINANCIAL SUPPORT FOR ELIMINATING CANINE RABIES

Given that the necessary tools and knowledge to eliminate rabies in the domestic dog population have been readily available in South Africa for years, the lack of progress in eliminating the disease can be attributed to a break in the chain of command, a lack of political will and commitment to get the job done, lack of strong leadership and limited resource allocation to veterinary services. Political will and commitment plays a defining role when it comes to resource allocation to veterinary services, and ensuring that the technical leadership are held accountable for executing their duties and ensuring that the necessary work gets done. In provinces where there have been rabies control success stories, this was usually driven by strong technical leadership, together with political support and commitment to the cause (e.g. KZN success achieved during the Bill & Melinda Gates Foundation project).

This lack of political will is reflected in the following two major obstacles:

- Failure to address the functional and structural challenges faced as a result of a provincialized system for veterinary services (based on the Constitution of the Republic of South Africa, 1996). This also leads to inconsistencies in rabies control efforts between provinces.

- Failure to provide adequate resources and budgets for rabies elimination at local, provincial and national levels. The structure of Veterinary Services is not being adapted to changing populations fast enough, with the added challenge of vacancies in crucial posts.

Each of these two main factors gives rise to a cascade of related and interconnected issues that negatively impact on our ability to overcome this disease. We need to be mindful of the current socio-economic climate in the country, realising that general challenges such as restricted budgets, high crime rates, growing informal settlements, etc. will have an influence on rabies control measures as well.

While rabies has to compete with a whole range of other diseases that affect humans in South Africa e.g. Tuberculosis, HIV, etc., it should be noted that the cost of eliminating dog-mediated human rabies is miniscule when compared to the amount of money being spent on these other diseases.

Solution = The South African Veterinary Strategy (2016 – 2026) needs renewed attention to address the general challenges faced by Veterinary Services. Furthermore, Veterinary Services needs to learn how to lobby for support and resources in a limited economy. The impact of rabies prevention and control measures needs to be effectively proven communicated to the relevant Provincial Head of Department and Member of the Executive Council. One Health as an approach is receiving a lot of attention, especially after COVID-19, and this momentum needs to be utilised to drive rabies control and prevention programmes. Furthermore, Veterinary and Health Services should lobby for each other as well, realising that both sectors are required to function well to prevent dog-mediated rabies deaths in humans.

4.3 LACK OF AWARENESS OF THE DISEASE IN BOTH THE PUBLIC DOMAIN AND PROFESSIONAL HEALTH CARE SYSTEMS

Given the modern media's propensity for sensationalism and the seemingly collective short memory of the public body, keeping rabies awareness high in the public domain is an ongoing battle.

Awareness amongst the public typically peaks after a human fatality is reported in the press but quickly dissipates as other news headlines distract attention away from rabies. It is therefor important that awareness and education persists, so people know when and where to seek PEP treatment.

In the human health care system, rabies is rarely at the top of any Differential Diagnosis list unless the individual health practitioner has encountered rabies before. PEP is thus often not given at all or is given incorrectly. There should be an improved and continuous focus on training for risk assessment and proper PEP administration. Proper risk assessment will help ensure that funds aren't being wasted administering PEP to patients when it is not required, and rather focussing these resources on patients that need it. It is also vital to ensure proper patient follow up to ensure that the PEP course is completed.

Solution = Ensure that undergraduates are adequately versed on important zoonotic diseases such as rabies and have resources available to refer to. Continued education and training is required to refresh knowledge and to counter for staff turnover rates. Information and a contact number should be available at all health facilities to guide on PEP risk assessment and treatment.

4.4 LACK OF VETERINARY EXPERIENCE AND KNOWLEDGE OF HOW TO IMPLEMENT AND SUSTAIN A RABIES CONTROL PLAN

The South African Veterinary Strategy (2016 – 2026) states the following: "Prior to 1990, South Africa was amongst the leading nations in veterinary research and diagnostics worldwide. The Onderstepoort Veterinary Institute (ARC-OVR) is accredited by the OIE as a reference diagnostic centre for a number of animal disease causing agents. This status is at risk of being lost because the diagnostic and research capacity has been steadily declining."

The same can be said for our ability to implement and sustain a rabies control plan across multiple geographic regions and role-players. A lot of institutional knowledge has been lost over the past two decades when it comes to effectively operating in the field. However, some of this required expertise does still exist but is currently not being harnessed and utilised to best effect. One also needs to take into consideration the fatigue of vaccination teams (if this is the only job the officials do day in and day out) – this needs to be managed accordingly.

There is also a lack of epidemiological expertise in many provinces, as most do not have epidemiological units within their structures. This expertise is crucial to understand the origin and movement of a disease like rabies within a province, and to plan preventative and outbreak containment measures accordingly. In many provinces Monitoring and Evaluation only focuses on the number of rabies vaccinations that were administered and do not consider if it was applied in the correct populations for effective disease prevention and control.

Further more, the ever-changing human population dynamics need to be considered, as this impacts associated dog populations and movements. This includes urbanisation trends which have many associated risks, including people travelling to and from high-risk dog-rabies areas and adopting or moving high-risk animals (unknown vaccination status), and people moving into high-walled areas and security complexes where they are much harder to reach through conventional awareness and vaccination campaigns. Rabies control plans need to take these evolving trends into consideration.

Solution = Utilise the expertise still available within Provincial Veterinary Services (rabies campaign coordinators, epidemiologists) to conduct training sessions for officials

(knowledge transfer). Consider even getting retired officials to assist with training sessions if required. It should be a regularly evaluated core competency that CAHTs and State Veterinarians know how to organise and conduct awareness and vaccination campaigns – Provincial leadership should take responsibility in ensuring that these officials are adequately trained and supported.

4.5 INSUFFICIENT ANIMAL RABIES SURVEILLANCE

Two SANAS accredited and DAH approved rabies veterinary laboratories exist in South Africa, one in KZN (Allerton Provincial Veterinary Laboratory) and the other in Gauteng province (ARC-OVR). Geographical access to diagnostics is a major challenge - There is a direct correlation between distance to the laboratory and quality of surveillance[2] with areas located closer to laboratories showing much better surveillance. This is usually an access and courier challenge.

This is a major consideration in the call for improving rabies diagnostics in the areas where the disease is most prevalent, as well as equipping laboratories/ post mortem facilities in more remote areas to receive and correctly package samples for sending to rabies diagnostic laboratories. Carcass and waste disposal needs to be adequately catered for as well.

During the major rabies outbreaks in Gqeberha and East London in the Eastern Cape in 2021-2022, the rabies testing capacity of the Allerton Provincial Veterinary Laboratory in KwaZulu-Natal was completely overwhelmed, and highlighted the need for a laboratory in the Eastern Cape, as a high-risk canine rabies province. Queenstown Veterinary Laboratory in the Eastern Cape has made good progress on trying to establish rabies diagnostics, which will greatly benefit both the province and the country in terms of surveillance. Efforts are ongoing and included in the Eastern Cape Rabies Strategy.

Surveillance and awareness go hand in hand and increased awareness leads to increased surveillance (more samples submitted).

Solution = Improved awareness efforts will improve reporting and surveillance. Sampling issues (where present) need to be addressed (equipment, facilities, courier, etc.). Establish agreements and incentives with stakeholders to assist with sampling (e.g. private veterinary practices, welfare organisations).

4.6 INADEQUATE HUMAN AND LOGISTICAL RESOURCES TO FULLY IMPLEMENT AND SUSTAIN CONTROL ACTIVITIES

In order to successfully eliminate dog-mediated rabies in humans from any given area, sustained and targeted mass dog vaccination campaigns need to be undertaken.

These types of campaigns require a long-term and ongoing commitment by the government to fund and support the necessary human and logistical requirements needed to carry out these campaigns well beyond the apparent disappearance of the disease[2,3]. Public private partnerships are also required to help fill gaps.

Procurement challenges need to be addressed as this often leads to failure of acquiring the tools needed to conduct vaccination campaigns, when budget is actually available.

Solution = The South African Veterinary Strategy (2016 – 2026) needs renewed attention to address the general challenges faced by Veterinary Services. Furthermore, Veterinary Services needs to learn how to lobby for support and resources in a limited economy. The impact of rabies prevention and control measures needs to be effectively proven communicated to the relevant Provincial Head of Department and Member of the Executive Council.

4.7 INADEQUATE CASE MANAGEMENT FOR HUMANS IN MANY AREAS

Several challenges exist, especially in many of the endemic dog rabies areas of South Africa and may be a result of the following:

(a) Due to poor surveillance in animals and apparent "absence" of the disease (and therefore lack of public awareness), human treatment is not prioritised or even sought for dog bites (example: In Limpopo more than 25 human patients died before the disease was recognised as rabies due to a lack of awareness of the disease in the area).

Solution = see previous section on animal surveillance.

(b) Poor planning leading to an inability to maintain stocks of the required vaccine and Human Rabies Immunoglobulin (RIG).

Solution = Improve planning for PEP procurement and maintain and communicate a real time stock register.

(c) Poor infrastructure leading to an inability to maintain a suitable cold chain (storage facilities at treatment centres). The additional challenge of loadshedding has a major impact. Some facilities don't have generators and others struggle to e.g. procure diesel and maintaining the generator.

Solution = The parties responsible for maintenance of infrastructure should be held accountable. Ensure that backup plans are available.

(d) Manufacturing problems in SA leading to a shortage of RIG. The replacement Equine Derived Rabies Immunoglobulin (ERIG) is restricted to only being used in medical facilities with resuscitation capabilities (due to the possibility of anaphylactic reactions in patients administered ERIG).

Solution = Address local manufacturing challenges. Maintain and communicate a real time stock register, and ensure that patients can be transported to a hospital facility to receive RIG/ERIG.

(e) Failure of health facility personnel to conduct a proper risk assessment of the presenting patient and failure to correctly administer PEP.

Solution = see previous section on health care systems.

(f) The high turnover of health professionals in poor rural areas means that many of these professionals are not exposed to any rabies awareness training because: (a) they are not in one place long enough to receive training, or (b) if they do receive training, they move away and that knowledge is lost to the facility where they were working. The frequency of training needs to be assessed in these situations.

Solution = see previous section on health care systems.

(g) Patient follow up is essential to ensure that they complete the full PEP course. In many instances there are socio-economic challenges that make it difficult for patients to repeatedly access a health care facility.

Solution = CCGs/ CHWs to follow up with patients to ensure that PEP course is completed.

4.8 GEOGRAPHICAL LOCATIONS OF DISEASE HOTSPOTS

The four main areas in which dog rabies is hosted (see Figure 3 below) are areas that feature predominantly rural communities and dense semi-formal urban areas where poverty levels are often high and people seek work outside the areas. Furthermore, service delivery is often poor in these areas, there are severe infrastructural inadequacies and crime rates are often high. These areas are often difficult to access and not safe. Large outbreaks often occur in dense urban settlements contiguous to a source area, which are easier to contend with and bring under control, however leaving the rural source areas ill-attended. (*Note that this is a generalised observation and may not apply precisely to all sub-areas).

Generally, these areas also feature large owned but free-roaming dog populations with limited access to animal welfare or primary health care veterinary services. In South Africa, there is a gross lack of dog population management and little or no restrictions are placed on dog movements through the implementation of (existing) regulations.

Note that the map of Figure 3 overlaps with the map of Figure 2 – these are the high-risk areas where dog-rabies is endemic and where people are still dying of rabies. This shows that general challenges in governance of densely populated rural and semi-urban areas with large free-roaming dog populations are impacting our ability to control rabies. These challenges include the sheer number of dogs that need to be vaccinated, access to dog owners and their pets during office-hours, safety issues, physical access to areas with bad roads, lack of private veterinary services, etc.

Vaccination of "buffer zones" between "higher-risk" and "lower-risk" areas may be feasible if it just depends on a dog's movement, but a major risk-factor to be considered is the transport of unvaccinated dogs (from "high-risk" areas) over vast distances to a different town or province. The recent outbreaks in the Eastern Cape also highlighted the importance of ensuring that large high-density dog populations are adequately vaccinated in "lower-risk" areas, as the introduction of rabies could lead to large scale outbreaks.

Solution = Gain community support to get dogs vaccinated through awareness and education. Lobby political leadership and local leaders to realise what a big difference rabies prevention and control will make in these areas. Don't work in isolation – stakeholders must work together and very importantly, ensure safety of officials (involve SAPS, SANDF, private security services if needed).

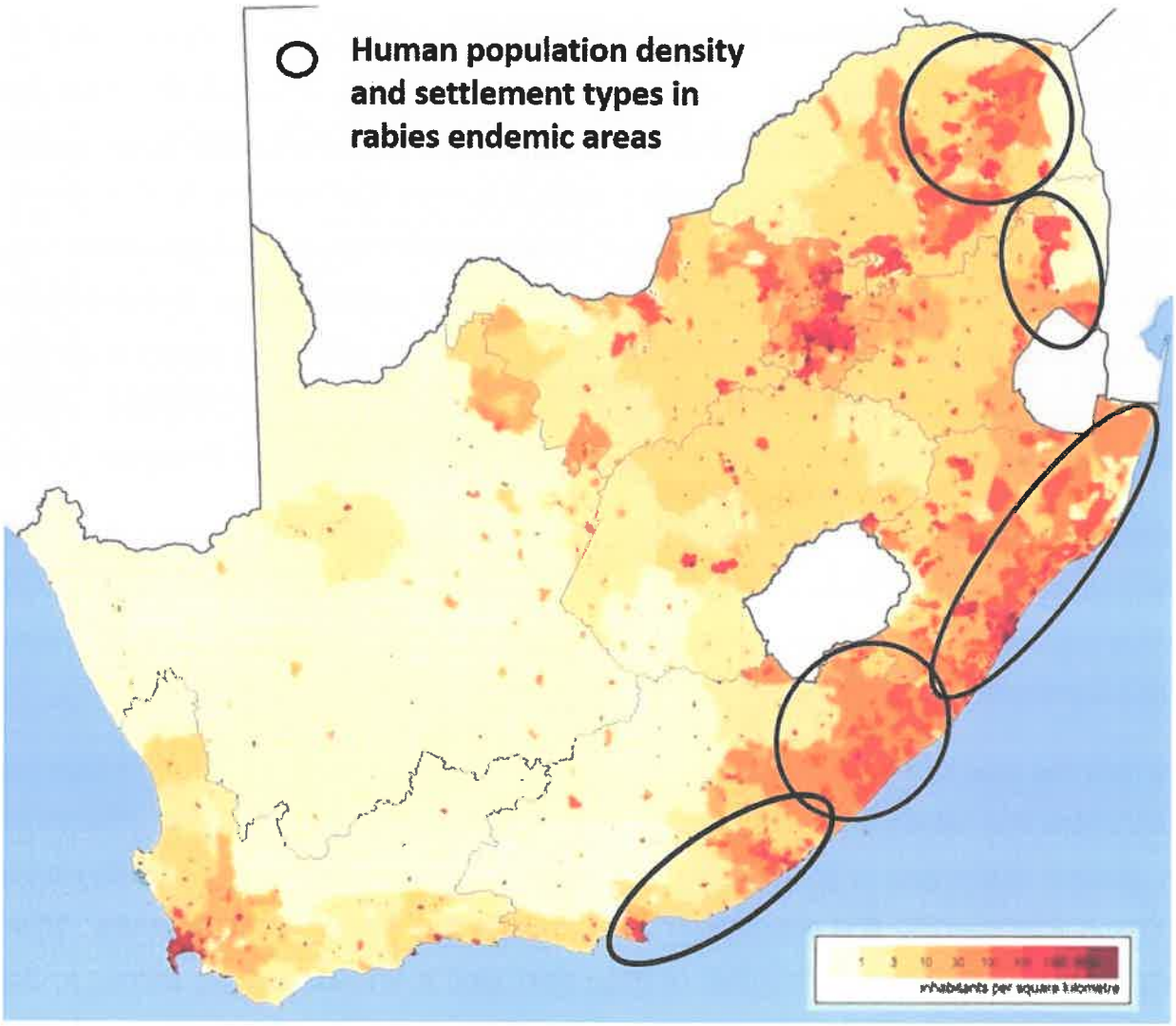


Figure 3: Human population densities in rabies endemic areas

4.9 Dog rabies vaccine selection, procurement and availability

While all dog rabies vaccines registered for use in SA meet the minimum standards prescribed for registration, this does not mean that all of them are always suitable for use in the various field situations that rabies vaccinators encounter[4].

In addition, the cost of the vaccine itself represents a very small percentage[5] of the total cost of vaccinating an animal. Thus, the selection of a rabies vaccine should not be based on cost alone, but rather on its suitability to be effective in the field, as a lot of money is spent on accessing dog populations for vaccination (manpower, vehicles, fuel, equipment, etc).

These "in field factors" include vaccine heat tolerance, age at which the vaccine can be given to an animal, and the range of species the vaccine can cover and the respective dosages. All these factors affect the efficiency and effectiveness of mass vaccination campaigns, if not assessed and addressed.

Government procurement systems often pose challenges and vary greatly between provinces. This requires proper planning in advance and diligent follow up on orders. In an outbreak situation, large quantities of rabies vaccine need to be immediately available in the affected area in order to mount an effective response. Recent countrywide procurement challenges have been experienced due to the expiry of the RT-10 procurement contract and an unnecessarily long lag period in establishing a renewed contract - challenges like this reach far beyond the corrective actions of veterinary services alone and require improved governance in general to ensure that service delivery is made possible.

Solution = A national rabies vaccine bank has been established at Allerton Provincial Veterinary Laboratory and has been functioning well. There is a generator that ensures that the cold chain can be maintained, and an official responsible for handling official requests from Provincial VS. The bank helps to ensure that rabies vaccine is available to meet the immediate requirements to tackle an outbreak in any province. Constant replenishment is essential to ensure that an emergency stockpile of vaccine remains available - provinces are required to restock the vaccine bank after their procurement orders are received (i.e. vaccine doses are "loaned"). DALRRD also restocks the vaccine bank if funds are available. Additionally, officials need to plan ahead to procure sufficient vaccine and diligently follow up on orders – if procurement problems persist, this needs to be elevated to higher levels and all stakeholders need to be informed.

4.10 Dog population management

Existing municipal bylaws on the keeping of animals needs to be implemented and enforced. It is a public health hazard to have dogs free roaming in communities where children can be bitten and a deadly disease like rabies can be transmitted. Dogs are kept for many reasons, including companionship, hunting, security and fighting. Socio-economic circumstances influences these reasons.

Dog population management should be guided by awareness and education of animal owners. Sterilisation of dogs and cats is not a feasible solution due to cost, but this mindset needs to be established wherever possible to prevent unnecessary breeding. Looking after a pet, feeding and sheltering them properly and keeping them healthy, is also a key aspect to longevity of pets (reduce the population turnover). The human-animal bond needs to be fostered, as this builds a foundation for pet care which will include vaccinating a pet against rabies (and other diseases).

Solution = Involve municipalities in rabies control efforts and lobby for the implementation of bylaws, where possible. Awareness campaigns need to emphasize pet care and the value of the human-animal bond, to promote responsible pet ownership.

4.11 Safety and Security

Over the last couple of years, crime has been increasing across the country and challenges have been experienced with vaccination and awareness campaigns. There have been numerous vehicle hi-jackings and officials have been robbed. These events typically happen in informal settlements. This has led to certain areas being declared unsafe for officials to enter and subsequently these dog populations cannot be reached. Unfortunately these events have occurred in some of the highest risk areas for dog rabies, namely eThekwini and Nelson Mandela Bay Metro. This is a cause for great concern.

Solution = Involve SAPS and SANDF where possible. Engage community leaders. Do not risk the lives of officials.

Overall, rabies control needs a solid foundation of functional veterinary and health services. General cracks in these foundations will negatively impact rabies control programmes.

CHAPTER 5: INTERVENTIONS REQUIRED AND RECOMMENDATIONS

In chapter 4 individual problems were described and solutions suggested. In this chapter, a way forward is proposed. While a One Health approach to the elimination of dog-mediated human rabies makes sense, some actions and responsibilities remain the mandate of a specific group within the One Health spectrum.

These are outlined below in 5.1 – the proposed veterinary control strategy for dog rabies, which will be driven by the veterinary authorities; and 5.3 – the proposed public health approach for the prevention of human rabies, which will be driven by the health authorities.

The One health approach demands that these two aspects of the overall strategy do not take place independently of each other, but are inclusive of as broad a coalition of interested and capable parties as is practical and effective.

5.1 PROPOSED VETERINARY CONTROL STRATEGY

The rabies control strategy for dogs is divided into two parts – one for the dog rabies endemic provinces (the high-risk critical areas, i.e. Eastern Cape, KZN, Mpumalanga and Limpopo Provinces) and one for the other provinces which experience mainly wildlife rabies (Western Cape, Northern Cape, Gauteng, North West and Free State Provinces) as depicted in Figure 4 below.

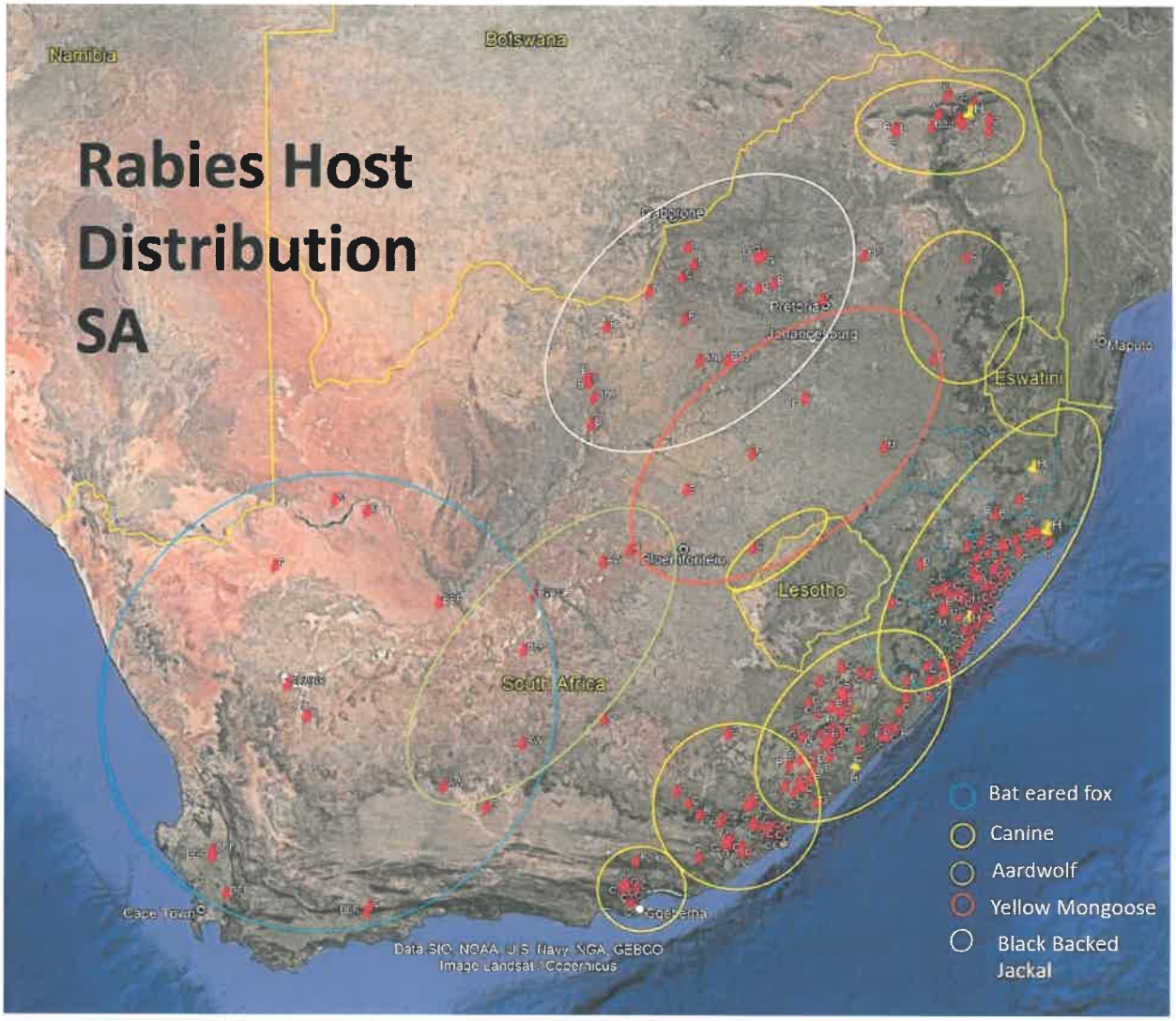


Figure 4: Geographic overview of main animal host species in SA (2023) based on the characteristics of the outbreaks and species distribution

5.1.1 PROPOSED CONTROL STRATEGY FOR THE DOG RABIES ENDEMIC PROVINCES

Overview:

Eliminating dog rabies from an area has been shown to be possible in many settings all over the world and in several areas of SA. It hinges on the use of and availability of good quality rabies vaccines and being able to mass vaccinate an adequate percentage of the dog population until the area can be declared free[7]. However as is the case in any elimination strategy it is the critical factors surrounding the implementation of these control measures that are the real obstacle to success[3]. This includes sustainability.

SA is in a unique position to be able to lead the way in Africa in rabies control. Proof of

concept interventions have successfully reduced canine rabies and removed human deaths in KwaZulu-Natal and Mpumalanga Provinces. Therefore, the foundation of knowledge already exists in the country to adequately control dog rabies to prevent human cases:

a. Target key focal areas for mass dog vaccination campaigns

Vaccination of 70% of the entire dog population of South Africa is neither feasible nor sustainable, given the current socio-economic climate and limited resources. However, as outlined in this document, this approach is unlikely to be necessary to eliminate dog-mediated human rabies in South Africa.

Below (Table 1 and Figures 4-7) are the key focal areas of SA's dog rabies cycle, which represents a fraction of the country's total dog population. Furthermore, if careful evaluation and planning is undertaken, it is possible that sub-populations within these areas could be targeted as source areas, instead of the whole area having to be vaccinated. This requires thorough investigation and understanding of the local rabies epidemiology and movement of the disease between areas. Veterinary and Health Services within the provinces have the responsibility of continuously analysing the rabies epidemiology within the province and responding to it accordingly. These responsibilities and actions should be captured in the provincial rabies strategies.

If these targeted areas were properly vaccinated, most of SA's dog rabies could be eliminated, as this kind of approach will have a significant knock-on effect in neighbouring areas where the disease was spilling over to. Table 1 below provides an overview of estimated figures for key areas to be vaccinated. The provincial rabies strategies needs to address and amend these figures, as required.

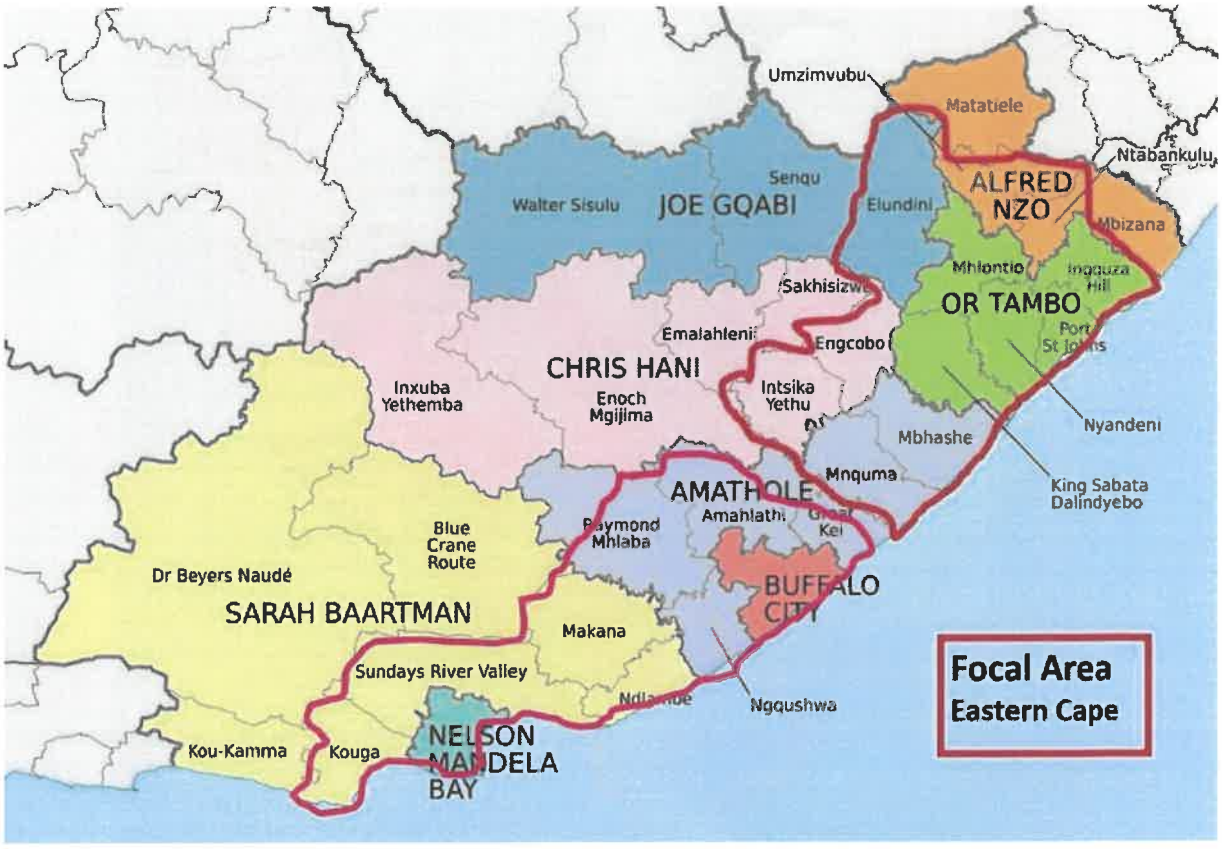
Table 1: Key focal areas of South Africa's canine rabies cycle

Province	Districts – Municipalities (See Maps below)	Human Population	Dog Pop estimate	Target (70%) minimum
Eastern Cape	OR Tambo – All 5 municipalities	1364943	189575	132702
	Nelson Mandela Bay	1190496	56690	39683
	Alfred Nzo – Umzimvubu municipality	191620	26613	18629

	Amatole – Mbashe; Mnguma; Amahlathi; Ngqushwa; Raymond Mhlaba.	905886	125817	88071
	Buffalo City	975255	46440	32508
	Chris Hani – Intsika Yetu and Engcobo	300885	41789	29252
	Joe Gqabi - Elundini	138141	19186	13430
Total		**5 067 226**	**506 110**	**354 275**
KZN	Ethekweni – (Only portions required ratios taken from survey)	3442361	163921	114744
	Illembe- 4 municipalities	606809	84279	58995
	King Cetshwayo – 4 municipalities	752367	104495	73146
	Zululand – Ulundi and Nongoma	383225	53225	37257
	Umgungundlovu – Mkhambathini; Richmond; Umsunduzi; Umshwathi	1060617	72674	50871
	Ugu – Ray Nkonyeni and Umdoni	387550	53826	37678
Total		**6 632 929**	**532 420**	**372 691**
Mpumalanga	Enhlanzeni - Bushbuck ridge	546215	75863	53104
	Enhlanzeni - Mbombela	695913	96654	67658
	Enhlanzeni - Nkomazi	410907	57070	39949
Total		**1 653 035**	**229 587**	**160 711**
Limpopo	Vhembe- 4 municipalities	1294722	179822	125875
	Mopani- 5 municipalities	1092507	151737	106215
	Capricorn – Lepele/Molemole/Pol	967670	134398	94079
Total		**3 354 899**	**465 957**	**326 169**
Grand Total		**16 708 089**	**1 734 074**	**1 213 846**

**Due to a lack of accurate dog-census data within SA, the estimations of dog population sizes are based on the ratio of the number of humans per dog (rural vs. urban) from Wallace et al 2017 (Elimination of dog-mediated human rabies deaths by 2030: Needs Assessment and Alternatives for Progress Based on Dog Vaccination). Ideally, South African studies should be conducted to fine-tune these ratios for different settings, where possible. E.g. informal settlements in urban/ peri-urban areas have not specifically been assessed to comply with published formulae. Human population statistics in these areas may also not be very accurate as settlements may grow rapidly, people move frequently, many don't have proper housing structures, etc.*

Figure 5: Focal municipalities of Eastern Cape province



Due to spread of the disease south into Buffalo City and Nelson Mandela Bay, additional areas have been added to where essential campaigns are required.

Figure 6: Focal municipalities of KwaZulu-Natal province

Additional municipalities to the North and South have been added due to recent spread of the disease.

Figure 7: Focal municipalities of Mpumalanga province

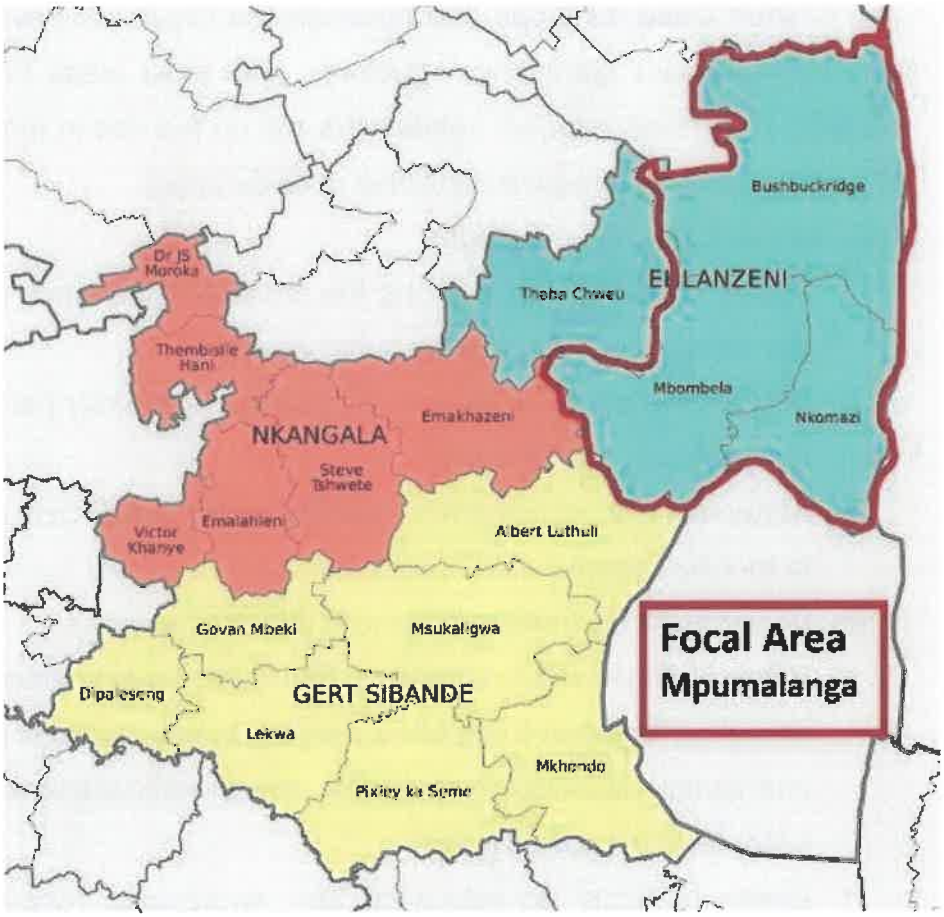
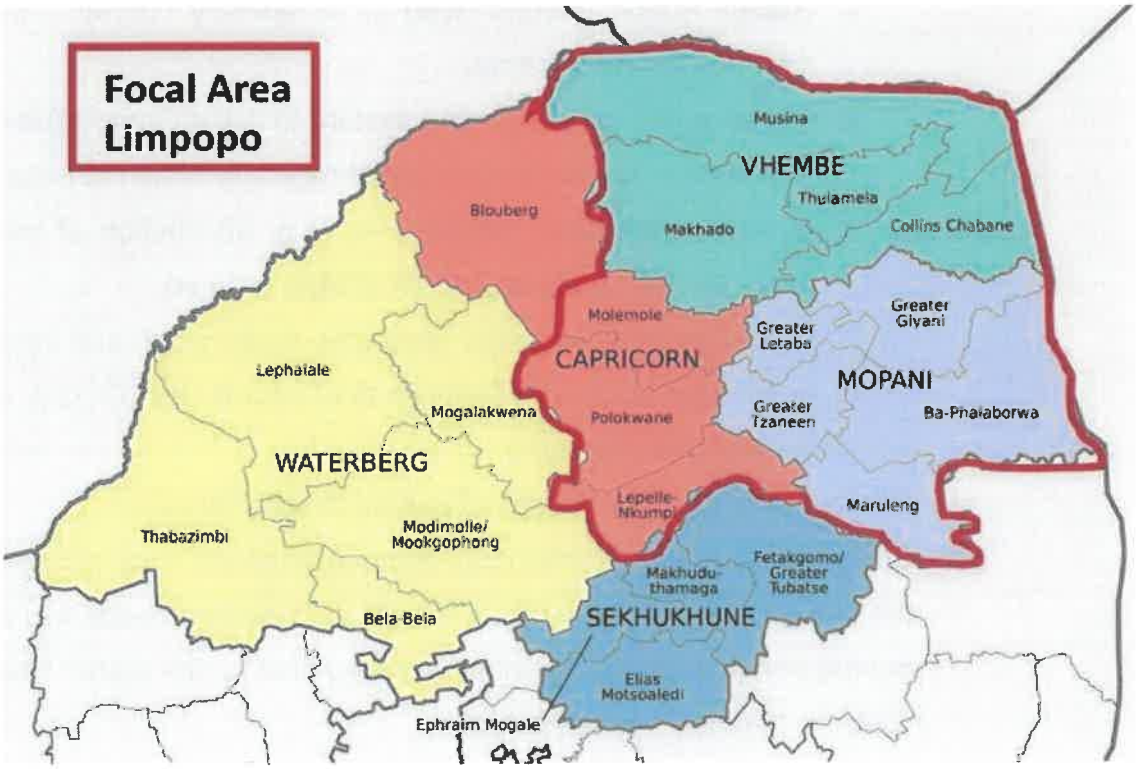


Figure 8: Focal municipalities of Limpopo province



b. Further observations regarding these areas and targeting specific focal areas

i. The Eastern Cape, Limpopo and Mpumalanga Provinces have unique and very advantageous community structures, with most areas having defined villages. (*However, informal settlements are on the rise in most urban and peri-urban areas and require additional consideration).

ii. This has the following advantages:

    i. Allows for compartmentalizing the areas of importance and selecting key vaccination barriers and buffer zones.

    ii. Villages are easier to work in with better community participation and movement to central points.

    iii. Better use of local authorities, traditional and civil society organisations to mobilize people.

    iv. Easier planning (refer to provincial rabies strategies).

    v. Easier to improve the provision of PEP biologicals to these focus areas as well as to improve dog bite surveillance, notification of human cases and sample submissions to NICD, due to well-structured health care services in the communities.

    vi. Easier to focus on education and awareness. Awareness in the communities should include:

        1. Rabies Action Groups need to be actively operating in each province and focus area.
        2. Set up a real-time reporting system to disseminate rabies case information across sectors (veterinary and health services) and down to community health level (e.g. distribution of real-time maps through professional WhatsApp groups).
        3. Utilization of all available resources (both health and veterinary authorities) for the dissemination of information (CCG's, animal welfare, schools, etc.)

    vii. Easier to train smaller groups of people in communities.

    viii. Easier to establish and maintain local partnerships. E.g., expansion of the Rabies Day initiative where the SAVC was approached to ask all private veterinarians to vaccinate pets against rabies (either free or at cost) for the month of September.

KZN Province lacks these formal village structures and is more difficult to approach and facilitate. Households are widely spread out and informal settlements are growing rapidly in urban and semi-urban areas (e.g. eThekwini). However, a system has been developed that will work if supported by the correct management and logistics.

Informal settlements also lack formal structures and often consist of people from various areas, cultures and countries that are seeking work close to city centres. such settlements often expand very quickly and free-roaming dog population numbers usually increase as well. To complicate matters further, violent crime tends to establish in informal settlements, which endangers health officials and veterinary officials.

c. Further Considerations

i. Training of local vaccinators - This function/ activity can be authorized (has been done in KZN), and needs to be supervised by the local State Veterinarian. This greatly assists in increasing effective manpower.
    1. Utilize local vaccinators for a short period in the focal areas to assist with campaigns and continue mop-up vaccinations after campaigns have finished.
    2. Livestock associations, welfare organisations NGO's, etc. need to help identify people to be trained and deployed for vaccination.

ii. Sequence epidemiologically significant positive animal rabies cases to better understand the epidemiology of canine rabies in the endemic areas. Ideally all provinces should have an epidemiological section with relevant expertise to assist with analysing and understanding outbreak trends.

5.1.2 PROPOSED CONTROL STRATEGY FOR NON-CRITICAL PROVINCES

a. Identification of potential points of entry of dog-rabies into a province through natural (on foot) movement of dogs (e.g. Western Cape border with Eastern Cape Province and the Free State Province's Lesotho border). Vaccinate buffer zones along these key borders and in areas of frequent on foot migration from source areas

b. A major risk-factor to be considered is the transport of unvaccinated dogs (from "high-risk" areas) over vast distances to a different town or province. Identify large high-density dog populations in "lower-risk" areas that need to be adequately vaccinated - the introduction of rabies could lead to large scale outbreaks in inadequately protected dog-populations.
c. Also vaccinate key areas where there is frequent contact with wild animals where known wildlife cycles exist.
d. Education/Education/Education = Will lead to improved surveillance.
e. This should be funded by these provinces and should remain within their capacity to cover. PPP are also important considerations.

5.2 REQUIREMENTS TO UNDERTAKE THE PROPOSED STRATEGY

5.2.1 NATIONAL RABIES ADVISORY GROUP

The National RAG is a working group that consists of veterinary services representatives from each province and at national level, health services representatives from each province (Communicable Disease Coordinators) and at national level, representatives from human and animal rabies diagnostic laboratories, representatives from environmental services (national level), a representative from GARC, a representative from the private veterinary sector, and other rabies experts.

Mandate: RAG is mandated by the MinTech Veterinary Working Group of DALRRD. The main purpose of RAG will be to advise the MinTech-VWG on structures and processes with regard to the State Veterinary Services and rabies control, as well as coordination and oversight of the implementation of the "National Strategy for the Elimination of Canine Mediated Human Rabies in South Africa (2019-2030)", as originally approved by MinTech on 9 September 2021. The RAG will make recommendations regarding these matters to the Min Tech-VWG.

Provinces are being encouraged to establish provincial level RAGs to improve One Health communication and collaboration for rabies prevention and control. This has been established in some provinces, but not all.

5.2.2 PROVINCIAL RABIES STRATEGIES AND IMPLEMENTATION PLANS

Each province (through Veterinary Services) had been tasked with developing a provincial rabies strategy and implementation plan, aligned with this national strategy document. This is necessary to ensure that the unique epidemiology of rabies in each province can be addressed as required, and to ensure that the province will allocate resources and commit accordingly, on a provincial level. Each province has also identified a provincial rabies champion (RAG representative) that helps to coordinate and drive this strategy.

Strategies have been developed for all provinces. At the time of finalisation of this revised document 5/9 have been finalised and signed while others are still under revision, however implementation has begun at varying degrees within all provinces. Feedback is requested annually from each province through RAG and progress and challenges are reviewed.

5.2.3 STAFFING

Adequate human resources are essential for successful and sustained campaigns. It is often true that AHTs are not uniformly distributed and key rural areas have less staff, as posts are difficult to fill due to the reluctance of many young people to work away from the cities. This is true for both veterinary and health services, and incentives need to be considered at a higher governance level.

Veterinary services staff can be temporarily moved within provinces to assist in major vaccination and awareness campaigns, however this is a very costly undertaking (transport, accommodation, etc.) and other options need to be explored. E.g. KZN intends to re-employ dip-tank assistants from local communities who can be trained to vaccinate animals around their dip-tank area. Such options need to be explored as part of the provincial rabies strategy development.

The larger pool of human resources of the provincial health departments need to be called on to assist with disease awareness (e.g. Community Care Givers/ Community Health Workers). CCGs and CHWs have a far reaching access to communities that can make a huge difference in spreading awareness on rabies. Private medical staff,

pharmacists, traditional healers, etc. should all be included in rabies education and training activities, as they are often the first practitioners that a patient may seek guidance from for a bite wound.

Other organizations:

i. Animal welfare organizations can play a significant role in surveillance and so these relationships should be strengthened.
ii. Animal welfare groups can also be authorised and trained to vaccinate and can play an important role in boosting vaccination numbers in key areas (under State Veterinary supervision).
iii. Agricultural extension services need to be utilised and trained to conduct rabies awareness activities.

5.2.4 RABIES VACCINE

To get the maximum result for the effort and expense of running vaccination campaigns, particularly in the rabies endemic areas, the vaccine used should ideally meet the following requirements:

- **Thermo-stabile** (supported by peer-reviewed published research), safeguarding against a potential break in the cold chain, especially in rural areas. (Case in point - the development of a thermo-stable vaccine was the key to the success of the Rinderpest eradication program[3]).
- Have antigen levels of above 1 IU per ml of vaccine.
- Registered for use in dogs, cats, cattle, sheep, goats, equines & wild carnivores to ensure coverage of multiple species as required.
- Require the same dose (1ml) for all registered species.
- Registered for use in animals less than 3 months old.
- Safe for use in pregnant bitches.

These thermos-stabile requirement has been added to the Transversal Contract RT-10 specifications of National Treasury.

5.2.5 RABIES VACCINE BANK

A vaccine bank[6] has been established and is being maintained to ensure a continuous flow of rabies vaccine during outbreaks and to alleviate the effect of procurement breakdowns, which appear to be common across the rabies endemic provinces. Ideally, the vaccine stock should only be utilised in emergencies and when procurement systems hamper timeframes. Stock used under these circumstances by provinces should be replaced a.s.a.p. to ensure that a continuous emergency stockpile is available.

5.2.6 VEHICLES

NB - The availability of suitable vehicles at all times is a key element in controlling rabies successfully in our focus areas! Additional vehicles would help improve all aspects of animal disease control by Veterinary Services (not just rabies) and should be seen as a worthwhile investment.

An informal survey conducted by RAG in 2017 indicated that in most provinces, less than 50% of staff have vehicles that are assigned solely for their use. While a full complement of vehicles is the ideal, if e.g. 20 extra vehicles could be dedicated to rabies in each of the four critical provinces for utilisation by existing or additional staff, much could be achieved. Funds to cover fuel costs and maintenance of vehicles should be available as well (in many provinces the kilometres allowed for travel per month is not sufficient by far). Depending on the terrain, 4x4 vehicles may be required to reach some villages and communities. Sufficient and sustained access to communities and their dog populations is the key to rabies control. Also consider installation of loudhailers into official vehicles, as these make a big difference with door-to-door vaccination campaigns and when creating awareness driving through communities.

The additional complication of vehicle hi-jacking needs to be addressed, as this is becoming an increasing phenomenon, especially in some of the informal settlements in the high-risk endemic dog rabies areas.

5.2.7 Logistics

Each of the critical provinces should consider establishing and maintaining central stores of needles, syringes, certificates, cooler boxes, ice bricks, etc. situated close to their focal areas to ensure a smooth and unbroken supply of consumables needed to conduct vaccination campaigns. Responsible person(s) should be delegated to ensure that stocks are maintained and distributed timeously as required.

Public address systems (loudhailers) should be built into vehicles and become the cornerstone for communicating with the public during campaigns. This would greatly improve the efficiency of communication during awareness and vaccination campaigns.

Accommodation and food needs to be provided for any additional vaccinators brought into an area. Ensure that state veterinarians and CAHTs are fully trained and capable of organising and executing efficient campaigns.

5.2.8 Public awareness & compliance

Although vaccinating dogs would seem a simple enough procedure, several factors can adversely influence vaccine coverage in an area. Some of these factors are:

- Lack of awareness of the dangers of the disease to both animals and humans, especially if there have not been recent rabies cases.
- Many rural populations believe that the rabies vaccine is dangerous for their dogs! This could be because of e.g. distemper disease outbreaks following vaccination campaigns where dogs were congregated. This belief adversely affects vaccinated dog numbers in high-risk areas.
- Pet owners are not at home when vaccinators are working in an area, especially if this is conducted during office hours (their dogs and cats are then not vaccinated). Alternatives need to be considered, e.g. vaccination campaigns during school holidays (when kids are at home) or over weekends.
- Increasingly, anti-vaxxers do want to vaccinate their pets. It is important to share accurate information on the deadly consequences of rabies and to inform them of their legal obligation to ensure their dogs and cats are vaccinated.

This is not an exhaustive list but illustrates the fact that rabies education and good communication with dog owners is one of the cornerstones of a successful rabies campaign. The One Health approach of utilising all relevant sectors could greatly assist in this awareness need. Training of Health CCG's could be one of the greatest assets, as they are able to reach numerous community members.

5.2.9 Training of veterinary staff in the provinces

Prior to embarking on any mass vaccination and awareness campaigns, training workshops should be held regularly in all provinces, but prioritizing the four focus provinces, for:

- Campaign planning and management.
- Developing an awareness strategy.
- Animal handling and vaccination training.
- NB - Ensure all animal handlers and vaccinators are vaccinated sufficiently against rabies.

5.2.10 Lobbying for political support and resources in the provinces

Provincial Veterinary Services and Health Services need to ensure that their Head of Department and Member of the Executive Council fully understand the deadly consequences of rabies if it is not controlled. Clear resource requirements need to be listed and the importance of this activity in the communities need to be highlighted. Here the necessity of the One Health approach should be highlighted as well and Provincial Veterinary Services and Health Services need to lobby together and support each other to achieve the final outcome of zero dog-mediated human rabies deaths.

5.3 Proposed public health approach for the prevention of human rabies (Supplied by DoH)

This section was developed in line with current national strategies and guidelines, as well as international recommendations and standards, including: The Global Strategic Plan for

Elimination of Dog Mediated Human Rabies; the National Master Plan for the Elimination of Neglected Tropical Diseases (2019 - 2025); the National Strategic Plan for Implementation of the One Health Approach in South Africa (2020-2024); and the Updated Human Rabies Prophylaxis Guideline (14 September 2018).

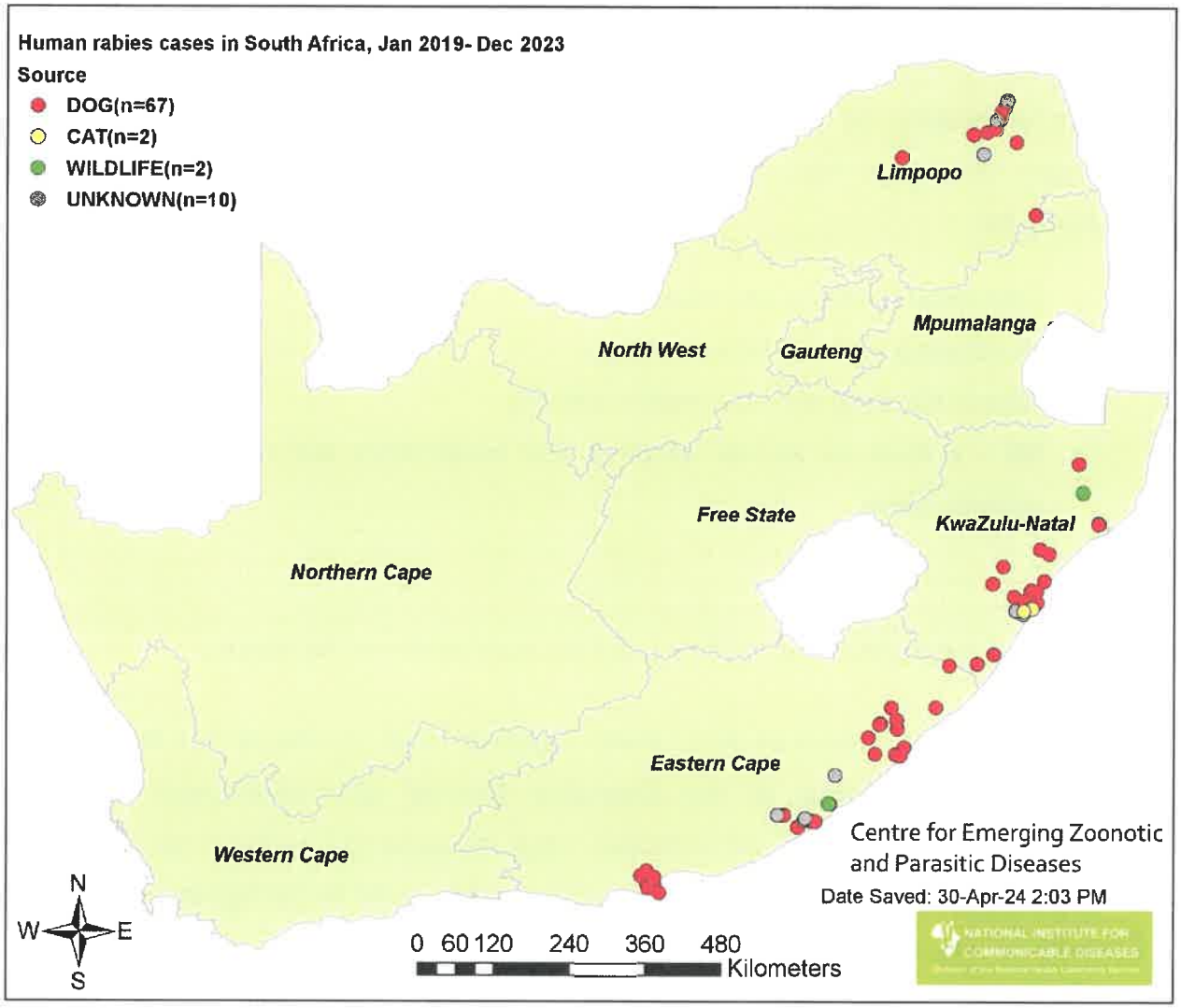


Figure 9: Map showing the location of human rabies cases reported in 2019-2023

Table 2: Requirements for an effective strategy for rabies prevention in humans

OBJECTIVE	STRATEGY	ACTIVITY

1. Foster inter-sectoral collaboration (One Health approach)	Ensure optimal multisector preparedness and effective response for rabies at all levels (national, provincial, local) through policies, guidance and governance.	Develop a multisector response plan/SOP for investigating human rabies cases. Strengthen the official reporting systems/ procedures between veterinary and health services.
		Include rabies in the training agenda of outbreak response teams and adopt the One Health approach.
	Ensure alignment of guidelines with existing policies adopting the One Health approach.	Align rabies control activities to the National One Health Strategy and other policies such as the National NTD Strategy.
		Conduct rabies awareness campaigns targeting all relevant stakeholders.
2. Ensure medical personnel, especially those in the four canine rabies endemic provinces, are well versed in rabies – both the disease and PEP procedures.	Ensure universal access to quality human rabies diagnosis.	Ensure timely specimen collection and transport to the designated laboratory.
	Ensure there is an appropriately trained and skilled workforce in place to maximise the reach and impact of rabies elimination interventions.	Ensure routine training and supervision of all relevant staff at all levels.
	Ensure there is reliable data available to enable effective decision-making by strengthening surveillance for human rabies.	Ensure that healthcare worker training agenda includes surveillance for rabies.
3. Ensure availability of good quality PEP for treating people	Establish a collaboration mechanism with pharmaceutical procurement to ensure consistent supply of	Establish communication channels with the rabies vaccine supplier(s).
		Establish communication channels with the rabies immunoglobulin supplier(s).

exposed to the rabies virus.	rabies vaccines and immunoglobulin.	Develop an annual commodity quantification and forecast plan.
	Ensure availability of rabies vaccines and immunoglobulin at all health facilities.	Strengthen stock management and reporting systems to include rabies.
		Establish mechanism to monitor the availability of rabies PEP in all designated health facilities.
4. Coordinate Rabies research efforts.	Strengthen coordination of research among stakeholders to generate the required information to guide policy development and implementation.	Identify and prioritize research gaps in the fields of rabies, including the ecological and environmental factors.
		Assist in creating synergies and facilitate the sharing of data between human, animal and environmental disciplines (researchers and research groups) in order to utilize resources cost effectively for the benefit of everyone.
5. Ongoing evaluation of progress towards "Zero by 30".	Strengthen partnerships and coordination to support the planning, execution and monitoring of elimination efforts.	Establish collaboration with relevant government departments and jointly review rabies elimination targets at all levels.
		Integrate rabies planning and coordination with local councils and community-based structures and monitor progress towards rabies elimination targets.
		Participate in rabies advisory group meetings and One Health initiatives at all levels.
		Conduct impact assessment activities (e.g. KAP studies) in Rabies endemic districts.
	Ensure participation of the private sector in rabies elimination efforts.	Include the private sector in rabies control efforts such as training workshops, communication on rabies matters, etc.

5.4 CRITICAL SUCCESS FACTORS

Critical to the success of the implementation of this strategy is to ensure:

(a) Lobby for sustained political, institutional and financial support for the elimination of

dog-mediated human rabies by 2030.

(b) A clear chain of command for animal disease management as identified in "The South African Veterinary Strategy (2016 – 2026)". There needs to be a clear understanding, agreement and commitment to hold all provincial authorities accountable to achieve the national goal of "zero by 30" across departments (Veterinary Services, Health Services) and at all levels (national, provincial, local). That being said, if the provincial authorities are to be held accountable, they need to be adequately resourced to perform the required function. Active encouragement of the participation of all other relevant stakeholders should constantly be conducted.

(c) Identify, support and empower a dedicated operational person (plus a backup) to head up the rabies control programme within each province and to drive the processes necessary to achieve "Zero by 30". It is important to consider staff capacity and workload, to ensure that the rabies champions can dedicate sufficient time to rabies control. Ideally, these operational persons within each of the four target provinces should be able to dedicate most of their time to rabies control.

(d) Strengthen provincial Rabies Action Groups for provincial One Health mobilization: Include DoH, state veterinarians, private veterinarians, animal welfare organisations, schools, local authorities, laboratory services, NGO's etc.

(e) Identification of key target areas and tailoring dog (and cat) vaccination and awareness campaigns to specific areas based on local knowledge and local rabies epidemiological data.

(f) Adequate budgets, staff, vehicles, rabies vaccine, syringes, needles, cool boxes, etc. should be readily and continuously available to adequately vaccinate dogs (and cats) in a targeted area. Ensure an efficient and reliable supply of a thermo-stable dog rabies vaccine (this includes an efficient procurement process).

(g) Assess safety of the area prior to conducting awareness and vaccination campaigns. Addressing security threats in communities to ensure that awareness and vaccination campaigns can be conducted in key areas. If necessary, arrange for SAPS, SANDF or private security to accompany campaigns.

(h) A vigorous and ongoing rabies awareness campaign in dog rabies endemic areas -

Include all stakeholders. Mass public awareness drive prior to vaccination campaigns to encourage owners to vaccinate their pets (to boost vaccination numbers).

(i) Ongoing training and oversight of Veterinary Services personnel involved in rabies vaccination campaigns, as well as vaccination of campaign staff before campaign commences. Ensure on the ground daily supervision of vaccinating staff by dedicated and trained supervisors.

(j) Post-campaign evaluation to assess the level of success and make improvements for future campaigns.

(k) Specific rabies training for medical students just before they undertake their community service year and ongoing/repeated rabies training for health personnel in the dog rabies endemic areas of the country. Also focus on risk assessment training.

(l) Strengthen PEP systems through regular education, awareness and training of health professionals. Ensure an uninterrupted supply of human rabies biologicals (PEP) and the correct utilization thereof by health professionals in both the public and private sectors. Ensure that PEP stock is available, monitored and distributed where required. Patient follow up is crucial to ensure they complete the PEP course.

(m) Strategically increase the capacity of animal rabies diagnostic services to improve surveillance and diagnostic turn-around time and reduce transport costs (Eastern Cape, Mpumalanga, and Limpopo Provinces). This may include strengthening local laboratory capacity to receive and correctly package samples to be sent to accredited laboratories as a matter of priority.

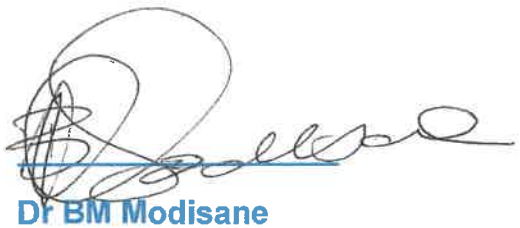
(n) Establishing and maintaining one or more dog rabies vaccine banks for emergency use.

5.5 Monitoring and Evaluation

A Monitoring and Evaluation policy will be developed once the implementation plans for the nine provinces have been finalised. The indicators selected should be broadly applicable across the country as well as being in line with the M&E requirements of the SADC Strategy for the Elimination of Dog – Mediated Human Rabies.

6. Conclusion

Despite ongoing challenges, if given adequate resources and political support, most importantly in the four high-risk endemic dog rabies provinces, South Africa has the knowledge and practical experience to eliminate dog-mediated human rabies by 2030. Disease outbreak trends in humans and animals over the last five years have shown that additional resources will have to be committed and wisely implemented in order to progress toward this goal. If the same or less resources are committed over the next five years, especially pertaining to the four key provinces, the goal of "Zero by 30" will not be reached.



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Date: 29/08/2024

7. References

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7. WOAH Chapter on Rabies – Article 8.14.2

8. Additional documents for reading:

- Veterinary Strategy of South Africa (206-2026) – available at https://old.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Health/information/press-release
- NICD Rabies prevention guidelines 2021 – available at https://www.nicd.ac.za/diseases-a-z-index/rabies/
- South African rabies guide for the medical veterinary and allied professions – available at https://www.nicd.ac.za/diseases-a-z-index/rabies/
- National Rabies Advisory Group TOR (available on request)
- RAG template for the Provincial Rabies Strategies (available on request)