State Action Plan for Rabies Elimination by 2030 In Rajasthan

सत्यमेव जयते
राजस्थान सरकार
Government of Rajasthan

State Action Plan for Rabies Elimination by 2030 in Rajasthan

October 2023

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CHIEF MINISTER
RAJASTHAN

CM/Message/PRO/2023
Jaipur, 20 September 2023

Message

Rabies is a disease that knows no boundaries and spares no one. It has, for far too long, cast a shadow over the health and happiness of our communities. Every life lost to rabies, every child who suffers, and every beloved pet that succumbs to this preventable disease is a heart-wrenching reminder of the work that lies ahead.

The importance of rabies control cannot be overstated. Rabies does not discriminate; it affects rural and urban areas, the young and the old, and our animals. But we refuse to accept rabies as an Inevitable fate. Instead, we choose to see it as a challenge we can overcome, a battle we are determined to win.

This State Action Plan for Rabies Elimination is a testament to bur commitment to the health and safety of our citizens and our animals. It is a roadmap towards a future where rabies is a relic of the past, where no one lives in fear of a dog bite, and where every life is valued.

This plan is not just a document; it is a call to action. It calls upon healthcare professionals, veterinarians, government agencies, municipalities, community leaders, and every citizen to join hands in this fight. It emphasizes the need for collaboration, education, and vigilance in our efforts to eliminate rabies.

I urge you to read this action plan carefully, understand its significance, and actively participate in its implementation. Together, we will create a healthier, safer Rajasthan for all, where rabies is nothing more than a distant memory.

(Ashok Gehlot)

परसादी लाल मीणा
मंत्री
चिकित्सा एवं स्वास्थ्य,
चिकित्सा स्वास्थ्य सेवाऐं (ईएसआई) एवं
आबकारी विभाग, राजस्थान सरकार

सत्यमेव जयते

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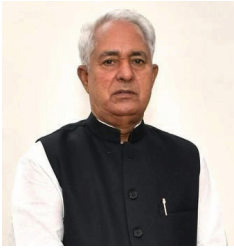

-: Message :-

I am deeply pleased to present the State Action Plan for Rabies Elimination, a significant milestone in our relentless pursuit of better health and well-being for the people of Rajasthan.

This devastating disease has, for too long, taken a toll on our communities, causing pain, suffering, and loss. Yet, I firmly believe that by working together, we can overcome this challenge.

The importance of addressing rabies cannot be overstated. It is a disease that impairs both human and animal populations, transcending age, gender, and socio- economic boundaries. Rabies has no place in our vision for a healthier Rajasthan, and it is our collective responsibility to ensure its elimination.

This action plan embodies our unwavering commitment to this cause. It is a comprehensive strategy that outlines our approach to combatting rabies from every angle, leaving no room for this disease to persist. It is rooted in science, compassion, and the understanding that the health of our citizens and the well-being of our animals are interconnected.

Rajasthan is a land of resilience, rich culture, and compassion. It is these very qualities that will drive our efforts to eliminate rabies and build a healthier, happier future for our state.

I urge you to actively participate in its implementation. By doing so, you become a part of our shared vision for Rajasthan where the fear of rabies no longer lingers, where health and safety are guaranteed, and where every life is precious.

(Parsadi Lal Meena)

Usha Sharma, I.A.S.
उषा शर्मा, आई.ए.एस.

सत्यमेव जयते

Chief Secretary
मुख्य सचिव
GOVERNMENT OF RAJASTHAN
राजस्थान सरकार

Message

I am delighted to learn that the Department of Medical & Health, Rajasthan is unrolling the State Action Plan for Rabies Elimination under the National Rabies Control Programme.

Rabies has persistently challenged our society, affecting both the human population and animals. This occasion therefore signifies a critical juncture, where the proposed strategy promises to curb this dreadful zoonotic disease in the State.

The importance of the Rabies control plan cannot be overstated. It is a roadmap to safeguard public health, protect our cherished animals, and enhance the overall well-being of our communities.

I hope that all the stakeholders will diligently pursue and participate in the implementation of the action plan.

I congratulate the Department on this occasion and wish all the success to this venture.

With Best Wishes

(Usha Sharma)

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Shubhra Singh, I.A.S.
शुभ्रा सिंह, आई.ए.एस.

सत्यमेव जयते

Additional Chief Secretary
Medical, Health & F.W. Department
Chief Resident Commissioner, New Delhi
Government of Rajasthan

Message

Rabies is a disease that respects no boundaries, affecting humans and animals alike. It poses a significant threat to public health, particularly in regions with a substantial stray dog population like ours. The importance of this action plan cannot be overstated, as it serves as our blueprint for a healthier and safer Rajasthan.

The fight against rabies is not merely a matter of health; it reflects of our values as a society. It embodies our compassion for all living beings and our determination to protect the health and well-being of our citizens.

This plan is anchored in several core principles:

- Prevention: Our first line of defense against rabies is the provision of immediate access to post-exposure prophylaxis (PEP) for those bitten by potentially rabid animals.
- Vaccination: We recognize the vital role of vaccination in controlling rabies. Through vaccination campaigns, we aim to immunize our animals and reduce the stray dog population's risk of infection.
- Awareness: Empowering our communities with knowledge is paramount. Through comprehensive awareness programs, we will ensure that every citizen is well-informed about rabies and knows how to respond to potential exposures.
- Collaboration: Success in this endeavor requires the collective efforts of healthcare professionals, veterinarians, government agencies, and local authorities. Collaboration will be the cornerstone of our rabies elimination strategy.

I urge you to study this action plan carefully, understand its significance, and actively participate in its implementation. By doing so, you become a vital part of our vision for Rabies free Rajasthan by 2030.

(Shubhra Singh)

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Vikas S. Bhale
I.A.S.

सत्यमेव जयते

Principal Secretary,
Labour, Fectory & Boiler, ESI (Medical & Health)
and, Animal Husbandry, Fisheries & Gopalan
Government of Rajasthan

Message

Animal husbandry is not just an essential component of our state's economy; it is intrinsically tied to the health, sustenance, and livelihoods of our people. The well-being of our animals, livestock, domestic animals, and the safeguarding of our wildlife are all critical facets of our responsibility.

This comprehensive action plan underscores our dedication to fostering a robust and integrated approach in the veterinary sector, one that reflects the evolving needs of our state and aligns with best practices.

The Importance of State Action in Veterinary Advancement:

1. Reach the unreached population.
2. Vaccination of both animals and high-risk population.
3. Enhancing Laboratory testing.
4. Create awareness in society on rabies.

This plan has been meticulously crafted to address these aspects comprehensively. It outlines strategies to enhance veterinary infrastructure, strengthen disease surveillance, promote animal healthcare, and elevate the standards of animal husbandry practices across the state.

I want to assure you of my unwavering commitment to the successful implementation of this action plan. It is not just a document; it is a promise to our people, our animals, and our state. We will work diligently to ensure that every objective outlined in this plan is achieved, and the benefits extend to all corners of our state.

I extend my gratitude to all the stakeholders, including our dedicated veterinarians, farmers, animal welfare organizations, and government officials, who have contributed to shaping this plan. Your expertise and dedication will be pivotal in making our vision a reality.

I call upon all of us to work together, with synergy and determination, to realize the goals of this action plan. We assure you our support and cooperation to implement the state action plan in Rajasthan.

Yours Sincerely

(Vikas S. Bhale)
Principal Secretary

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Mission Director
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Preface

Rabies, a zoonotic disease, has been a silent menace lurking in our midst for far too long. But silence shall not define our response any longer. With State Action Plan for Rabies Elimination, we rise united to eliminate the threat it poses to both human and animal lives across Rajasthan.

This plan is not just a document; it's a promise. It is the culmination of tireless efforts, meticulous planning, and unwavering dedication from experts, health professionals, veterinarians, and passionate individuals who understand that rabies knows no borders or boundaries.

Within these pages, you will discover a comprehensive roadmap that outlines our commitment to prevention, promotion, and partnership. SAPRE is founded on the principles of data-driven decision-making, community engagement, and cross-sector collaboration. It encompasses strategies for data collection and analysis, prevention and control, laboratory diagnosis, dog population management, and information dissemination.

We acknowledge that our success in this endeavor hinges on the active involvement of every citizen, every community, and every stakeholder. Together, we can create a Rajasthan where the fear of rabies is replaced by the assurance of safety.

(Dr. Jitendra Kumar Soni)

Rajendra Singh Shekhawat, IAS

Municipal Commissioner
Nagar Nigam
Jaipur heritage

Preface

Rabies is not a standalone issue but a multidimensional urban challenge that necessitates precise planning and synchronized actions to protect our residents.

Within our municipalities rabies presents a substantial threat to public health. Given the close quarters in which our residents live, effective control measures are imperative to prevent outbreaks and ensure the safety of our urban population. Successful rabies control necessitates a collaborative

Health approach, involving our municipal health departments, animal control agencies, and public health divisions. This underscores the need for concerted efforts and coordination within our urban landscape.

Our urban areas often serve as interfaces between wildlife and human populations, increasing the risk of rabies transmission. Effective management of urban wildlife populations is paramount in rabies control within our municipalities.

This action plan has been meticulously structured to address these intricacies of urban rabies control. It focuses on refining surveillance and reporting mechanisms, enhancing rapid response protocols, strengthening the urban healthcare infrastructure, and disseminating awareness within our urban communities.

As we embark on this technical voyage to combat rabies within our municipalities. Together, we will elevate urban health standards, shield our residents, and minimize the repercussions of rabies within our urban landscape.

Rajendra Singh Shekhawat (IAS)

डॉ. रवि प्रकाश माथुर
निदेशक (जन स्वास्थ्य)

सत्यमेव जयते

चिकित्सा एवं स्वास्थ्य सेवायें
स्वास्थ्य भवन, तिलक मार्ग
राज. जयपुर 302005
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Preface

Rabies is not just a disease; it is a complex public health challenge with far-reaching consequences. It necessitates a comprehensive and evidence-based approach to mitigate its impact on our communities and healthcare systems.

Rabies is a deadly disease; almost always fatal once clinical symptoms appear. It poses a severe threat to human health and is a matter of deep concern for healthcare providers and policymakers alike. Beyond its direct health effects, rabies Imposes a substantial economic burden on our healthcare system through the provision of post exposure prophylaxis (PSP) and associated medical care. Rabies epitomizes the" One Health" concept, as it is intricately linked to the health of animals and humans. Effective rabies control requires collaboration among human health, veterinary, and wildlife sectors.

It Is very important to eliminate rabies through robust surveillance, rapid response, and awareness to prevent human cases.

Our action plan has been meticulously developed to address these complexities. It focuses on enhancing surveillance, improving diagnostics, strengthening healthcare infrastructure, and promoting community awareness. It also emphasizes collaborative efforts with the animal husbandry department to tackle rabies at Its source.

This plan is not just a document; it is a precise roadmap that integrates epidemiological data, vaccination strategies, laboratory capabilities. It outlines the roles and responsibilities of healthcare professionals, outlines the steps for elective post exposure prophylaxis, and sets measurable targets for rabies control.

I extend my gratitude to all the professionals and stakeholders who have contributed their expertise to this endeavor. Your dedication to public health is vital in making this plan a reality.

As we embark on this technical journey to combat rabies, I urge everyone involved to adhere to the plan's strategies with rigor and precision. Together, we will advance public health, protect our citizen, and mitigate the Impact of rabies in our state.

Ravi Prakash Mathur

Dr. Lokesh Chaturvedi
Director (RCH)

सत्यमेव जयते

Director (RCH)
DMHS

Preface

Rabies, a relentless and deadly viral disease, has cast a shadow over public health in '' Rajasthan, as it has in many regions around the world. For far too long, its impact has reached deep into our communities, causing unnecessary suffering and loss of life. However, as we gather the collective will and knowledge to confront this challenge, we are poised to change the course of history.

The "State Action Plan for Rabies Elimination" (SAPRE) represents a significant turning point in our journey to eradicate this preventable disease. It is a testament to our unwavering commitment to the well-being of our citizens, both human and animal alike. With SAPRE, we have set a bold vision to eliminate all human deaths caused by dog-mediated rabies in Rajasthan by the year 2030.

Our success in achieving a rabies-free Rajasthan relies not only on the wisdom and dedication of our experts but also on the active participation of our communities. SAPRE recognizes the importance of engaging the public, local authorities, and organizations in this endeavor.

We extend our deepest gratitude to all those who have contributed to the development of SAPRE and to those who will play a pivotal role in its implementation. With your support, we are confident that we can overcome the challenges that lie ahead and realize our vision of a rabies-free Rajasthan.

Dr. Lokesh Chaturvedi

Dr. Rajeev Bagarhatta
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Preface

Rabies is a viral disease that has haunted humanity and animals for centuries. Caused by the rabies virus, it is primarily transmitted through the saliva of infected animals, usually via bites. Once symptoms manifest in humans or animals, rabies is almost invariably fatal, underscoring the gravity of this zoonotic disease. Its impact extends across human and animal populations, transcending boundaries, demographics, and socio- economic strata. Our responsibility is to tackle this challenge comprehensively and effectively.

Our Medical College stands at the forefront of this battle against rabies through our laboratory support, enabling the accurate and timely detection of rabies cases. This capability is instrumental in the rapid initiation of post-exposure prophylaxis (PEP) for those at risk.

Our academic community can engage in rabies research, exploring innovative diagnostic's, vaccines, and treatment modalities. Our findings contribute to the global body of knowledge on rabies management.

We also train the next generation of healthcare professionals, instilling in them the knowledge and skills required for effective rabies prevention, diagnosis, and treatment. These professionals have become the vanguard of rabies control within our state.

Our partnership with the Public Health Department is central to the success of this State Action Plan. Together, we are advancing a unified approach that encompasses Surveillance, Community Awareness, and Bite management.

We provide our commitment to implementing the state action plan in Rajasthan with our hard work.

Dr Rajeev Bagarhatta

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Prof. (Dr.) Sheela Choudhary
DEAN

Post Graduate Institute of Veterinary Education and Research, Jaipur
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Preface

Rabies is a zoonotic disease, and its impact on the animal kingdom is profound. Its control within our domestic and wild/stray animal populations is paramount. Rabies poses an acute threat to animal health and well-being. Infected animals endure immense suffering, and the prevention of rabies is an ethical obligation we uphold. The close interaction between humans and animals underscores the zoonotic potential of rabies. The health of our animal populations directly influences the risk of human exposure, making effective rabies control crucial for public health.

Our Veterinary College, equipped with advanced laboratory facilities, plays a pivotal role in the fight against rabies. We are also engaged in capacity building of veterinarians and animal health professionals, equipping them with the knowledge and skills necessary for effective rabies prevention, diagnosis, and treatment.

We conduct awareness campaigns, empowering communities to recognize rabies symptoms and seek prompt medical attention following potential exposure, ensuring the early identification of cases in animals and participates in mass animal vaccination campaigns, playing a pivotal role in reducing the risk of rabies transmission among animals.

We assure our full support and dedication to implement state action plan in Rajasthan.

(Sheela Choudhary)

Prof. (Dr.) D.S. Meena
Principal Investigator
CDSRZ

सत्यमेव जयते

Preface

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Our Centre for Diagnosis, Surveillance & Response of Zoonotic Diseases (CDSRZ), Post Graduate Institute of Veterinary Education and Research (PGIVER), Jaipur, equipped with advanced laboratory facilities, plays a major role in the fight against zoonotic diseases. We are also engaged in capacity building of veterinarians, para veterinarians and animal health professionals, equipping them with the knowledge and skills necessary for prevention, diagnosis, and treatment of zoonotic diseases including rabies.

Our collaboration with the Public Health Sector and municipal corporation is pivotal for success of this State Action Plan. We jointly conduct awareness campaigns, enhance zoonotic diseases diagnosis, surveillance and reporting mechanisms, ensuring the early identification of cases in animals and participates in mass animal vaccination campaigns, playing a pivotal role in reducing the risk of zoonotic diseases including rabies transmission.

We assure our full support and dedication to implement state action plan in Rajasthan.

Prof. (Dr.) D.S. Meena
Principal Investigator
CDSRZ

Acronyms

ABC	Animal Birth Control
ANM	Auxiliary Nurse Midwives
ARS	Anti-Rabies Serum
ARV	Anti-Rabies Vaccine
ASCAD	Assistance to State for Control of Animal Disease
ASCAT	Animal Science Communication Assessment Tool
ASHA	Accredited Social Health Activist
AWBI	Animal Welfare Board of India
AWW	Anganwadi Worker
BPHL	Block Public Health Laboratories
CDSRZ	Centre for Diagnosis, Surveillance and Response of Zoonotic Disease
CHC	Community Health Centre
CME	Continuing Medical Education
CMO	Chief Medical Officer
CVAS	College of Veterinary and Animal Sciences
DAHD	Department of Animal Husbandry and Dairying
DPM	Dog Population Management
ELISA	Enzyme-Linked Immunosorbent Assay
EQAS	External Quality Assurance System
FAT	Fluorescent Antibody Test
GIS	Geographic Information System
HR	Human Resources
ICAR	Indian Council of Agricultural Research
ICMR	Indian Council of Medical Research
ID	Infectious Disease
ID	Intradermal
IDSP	Integrated Disease Surveillance Programme
IHIP	Integrated Health Information Platform
IPHL	Integrated Public Health Laboratories
IQAS	Internal Quality Assurance System

IT	Information Technology
KAP	Knowledge, Attitudes, and Practices
LBs	Local Bodies
MDV	Mass Dog Vaccination
MO	Medical Officer
MoEF&CC	Ministry of Environment, Forest, and Climate Change
MoHFW	Ministry of Health and Family Welfare
NADRES	National Animal Disease Referral Expert System
NADRS	National Animal Disease Reporting System
NAPRE	National Action Plan for Rabies Elimination
NCDC	National Centre for Disease Control
NGO	Non-Governmental Organization
NHM	National Health Mission
NPO	National Program Officer
NRCP	National Rabies Control Programme
OPD	Outpatient Department
PCR	Polymerase Chain Reaction
PEP	Post-Exposure Prophylaxis
PGIVER	Post Graduate Institute of Veterinary Education and Research
PHC	Primary Health Centre
PIP	Program Implementation Plan
PrEP	Pre-Exposure Prophylaxis
PRI	Panchayati Raj Institutions
RFID	Reference identification
RIG	Rabies Immune Globulin
RRT	Rapid Response Team
SAPRE	State Action Plan for Rabies Elimination
SIHFW	State Institute of Health and Family Welfare
SMS	Medical College Sawai Man Singh Medical College
SOP	Standard Operating Procedure
TPL	Triple Packaging for Laboratory
ULBs	Urban Local Bodies
VRDL	Virus Research and Diagnostic Laboratory
WHO	World Health Organization

Acknowledgement

We extend our heartfelt gratitude to all individuals and organizations whose unwavering commitment and dedicated efforts have brought the State Action Plan for Rabies Elimination (SAPRE) to fruition. This collaborative endeavor reflects the collective determination to eliminate the scourge of rabies from the State of Rajasthan.

We would like to express our sincere gratitude to the National Centre for Disease Control (NCDC) for their invaluable guidance and support in the development of SAPRE. Their expertise and adherence to rabies control guidelines have been instrumental in shaping this comprehensive plan.

We extend our heartfelt appreciation to all dedicated stakeholders, including the municipal corporations, the Department of Animal Husbandry and Dairying, veterinary colleges, medical colleges, PATH as our technical support partner, urban and rural governing bodies, and the Forest and Wildlife Department. Your unwavering commitment and collaboration have been pivotal in the creation and implementation of SAPRE.

We also acknowledge the pivotal roles played by the state and district nodal officers, who served as the linchpins in bridging the gap between human and animal health sectors. Your diligence and cooperation have been indispensable for SAPRE's seamless execution.

Finally, SAPRE reflects the dedication of the State of Rajasthan to public health and animal welfare, aligning with global efforts to eliminate rabies and establish a safer, rabies-free environment. We thank each and every participant for their unwavering commitment to this noble mission, safeguarding the health and well-being of our citizens and animals.

Executive Summary

The State Action Plan for Rabies Elimination (SAPRE) is a comprehensive and ambitious initiative of the State of Rajasthan, which is aimed at eradicating rabies, a deadly viral disease affecting humans and animals. This multifaceted plan addresses both human and animal health aspects, providing a roadmap to eliminate rabies by 2030.

To secure funding for the human health component, SAPRE leverages the National Health Mission (NHM) Program Implementation Plan (PIP). To support mass dog vaccination (MDV) efforts and the overall animal-health aspect, resources will be mobilized from municipal corporations and state veterinary departments.

SAPRE capitalizes on existing health care and veterinary infrastructure, forging partnerships with the Department of Animal Husbandry and Dairying (DAHD), urban and rural governing bodies, non-governmental organizations (NGOs), and municipal cooperation. These collaborations ensure the efficient delivery of essential services.

Recognizing the presence of the National Rabies Control Programme (NRCP) for human health, SAPRE appoints state and district nodal officers to facilitate seamless coordination between the human and animal health sectors. This cooperative approach enhances the plan's effectiveness.

Monitoring and evaluation are integral components of SAPRE, encompassing joint monitoring mechanisms, component-wise assessments, and stakeholder engagement. These measures are vital for tracking progress, identifying challenges, and advocating for necessary solutions.

SAPRE envisions a Rajasthan where rabies is eliminated, safeguarding the health and well-being of both its human and animal populations. This commitment underscores Rajasthan's dedication to public health and animal welfare, aligning with global efforts to combat rabies and create a safer, rabies-free Rajasthan. The SAPRE initiative reflects the state's determination to leave no stone unturned in the fight against this deadly disease, setting a commendable example for others to follow.

Dr. M.L. Salodia
S.N.O
National Rabies Control Program

Contents

Introduction

Rabies is a very old and deadly disease that can be transmitted from animals to humans. It has an extremely high fatality rate and causes excruciating pain in those who are infected. People with rabies can suffer from painful muscle spasms and eventually die because they cannot drink or eat due to a condition called hydrophobia.

The good news is that rabies can be prevented through timely and appropriate treatment after exposure. Many countries in Latin America and Europe have successfully eliminated rabies, and there is a global effort to have zero deaths from rabies by the year 2030.

According to the World Health Organization (WHO), India has a significant problem with rabies, but the number of cases is likely underreported. In fact, India accounts for about 36 percent of all rabies-related deaths in the world. This underreporting happens for various reasons. To tackle the rabies issue, India has a National Rabies Control Programme in place, which was initiated during the 12th Five Year Plan. This program has established standard definitions for identifying and reporting rabies cases in humans, and it uses an Integrated Health Information Platform (IHIP) to track human deaths caused by rabies.

To eliminate rabies from a specific area, there is need for a strong system of surveillance and reporting of the disease. This will help public health officials take the right actions and make necessary policies.

Recognizing the urgency of this situation, the State of Rajasthan has developed a comprehensive Action Plan for Rabies Elimination. The goal is to make Rajasthan a rabies-free region, protecting both humans and animals. This plan involves various government departments, including the departments of health, animal husbandry, and forest and wildlife, as well as municipal corporations, medical education, Urban Local Bodies (ULBs), and Panchayati Raj Institutions (PRIs). It recognizes that fighting rabies is a collective effort.

This plan is designed to help professionals, including veterinarians and medical practitioners, diagnose, treat, and prevent rabies effectively. It also involves the Directorate of Medical and Health Services and Department of Animal Husbandry and Dairying (DAHD), which play key roles in rabies control. Municipalities are crucial in managing stray dog populations, which is a significant part of rabies control. This plan provides them with tools and strategies to address rabies-related challenges.

The Action Plan for Rabies Elimination in Rajasthan follows a multi-pronged approach, including:

- **Prevention:** This involves widespread vaccination of dogs, which is the cornerstone of rabies prevention. The plan outlines how to organize vaccination campaigns and ensure that the targeted population is immunized.
- **Surveillance:** Early detection of rabies cases is crucial. The plan includes measures to improve reporting, data collection, and analysis to track the prevalence of the disease.
- **Awareness:** Educating the public about rabies prevention and responsible pet ownership is essential. The plan includes comprehensive awareness campaigns to inform citizens about the risks of rabies and the importance of vaccination.
- **Post-Exposure Prophylaxis (PEP):** Quick and appropriate treatment after potential rabies exposure is vital. The plan provides protocols for PEP administration to ensure that medical professionals can handle such cases effectively.

Current measures under Rajasthan rabies control program include:

- Government support for financial resources, training, information, education, communication, personnel, and infrastructure for rabies control and prevention.
- Establishment of model anti-rabies clinics in districts to provide wound management, anti-rabies vaccines, and serum, along with PEP.
- Initiatives to make cities rabies-free, including Ajmer, Jodhpur, Kota, Jaipur, and Bikaner.
- Collaboration between the veterinary department and municipal corporations for dog vaccination, animal birth control, and testing of rabid animals for rabies control and prevention.
- Engaging with local communities through awareness programs, mobilizing health workers, and promoting responsible pet ownership to contribute significantly to rabies control.
- Collaborative efforts between various government departments, such as health, animal husbandry, and local municipalities, to streamline rabies control initiatives and optimize resource utilization.

By combining these measures and involving all stakeholders, Rajasthan can greatly reduce and eventually eliminate rabies in dogs, making the state safer and rabies-free. This action plan aligns with national and global efforts to eliminate rabies by 2030 and demonstrates the state's commitment to a safer and healthier future for everyone.

Epidemiology of Rabies in the State

Rabies poses a significant threat to public health in the State of Rajasthan. It is crucial to study and understand the patterns of rabies in the state because this knowledge informs public health policies and actions aimed at controlling this dangerous disease, which can be transmitted from animals to humans. Rajasthan's diverse population, substantial livestock, and a large number of stray dogs emphasize the urgent need for comprehensive data and surveillance on rabies.

Rajasthan faces a substantial issue with stray dogs, and only a limited number of these dogs are vaccinated against rabies. This situation contributes to the spread of the rabies virus among animals.

Furthermore, there is a serious concern about human rabies cases in Rajasthan, often resulting from dog bites. This highlights the immediate necessity for public health measures to prevent and manage dog bites and the transmission of rabies from animals to humans.

As per data for the year 2022–23, there were a staggering 2,78,244 reported cases of dog bites in Rajasthan, treated at government health facilities.

Gathering and analyzing existing data on rabies in Rajasthan are essential for comprehending how the disease operates. The state collects data from districts through the health departments, which includes:

- Information on cases of animal or dog bites
- Categorization of bite cases
- Usage of Anti-Rabies Vaccine (ARV) and Anti-Rabies Serum (ARS), along with Post-Exposure Prophylaxis (PEP)
- Confirmed and suspected rabies cases
- Cases resulting in death.

In addition, the DAHD and municipal corporations across the state collect data on the following parameters:

- Details of rabid animal
- Details of vaccination records
- Information on animal birth control centers
- Data on animal sterilization

Laboratories in human health and animal sectors play a crucial role as well. Rabies diagnosis relies on laboratory testing. Data from rabies testing centers, including the number of samples tested and positivity rates, provide insights into the extent of rabies in both animals and humans.

To effectively combat rabies in Rajasthan, the following epidemiological information is indispensable:

- Incidence and prevalence: Accurate data on how often and how widely rabies occurs in both animals and humans are crucial for assessing the burden of the disease and its trends over time.
- Geographic distribution: Information on where rabies cases are most concentrated helps identify areas with the highest disease prevalence, enabling targeted interventions.
- Seasonal patterns: Understanding how rabies incidence varies with the seasons can inform the timing of vaccination campaigns and public health awareness efforts.
- Demographics: Data on the age, gender, and occupation of human rabies cases can help tailor public health messaging and strategies to the specific needs of different groups within the population.

Rabies Biological

Rabies virus

Rabies is a disease caused by a virus known as the rabies virus. This virus is a member of the Lyssavirus genus and belongs to the Rhabdoviridae family. Once a person shows symptoms of rabies, it is often deadly. The rabies virus has a unique shape, resembling a bullet, and it contains a single strand of RNA.

How rabies spreads

Rabies mainly spreads through the saliva of an infected animal. The most common way for humans to get rabies is through bites or scratches from infected animals. Here is how it happens:

- **Animal reservoirs:** Many mammals can carry the rabies virus without getting sick themselves. These include dogs, cats, bats, raccoons, and foxes, among others.
- **Transmission to humans:** The virus can pass to humans in a few ways:
  - Bites: This is the most common of rabies infection. When an infected animal bites a human, the virus in its saliva can enter the person's body and attach itself to the peripheral nervous system.
  - Scratches and open wounds: In some cases, if the saliva of an infected animal touches an open wound or mucous membranes, like the eyes, nose, or mouth, of a person, the virus can also spread.

Rabies vaccines for dogs and humans

For dogs

- **Type of vaccine:** Dogs are typically given a rabies vaccine that contains killed or inactivated virus particles.
- **Purpose:** This vaccine is essential to prevent rabies from spreading among dogs and thereby reduce the risk of transmission to humans. It is a crucial part of rabies control programs.
- **Administration:** This vaccine is usually administered as an injection.
- **Schedule:** Dogs are vaccinated at around 3 to 4 months of age and receive booster shots at regular intervals, usually yearly or as recommended by local authorities.
- **Availability:** These vaccines for dogs are readily available.

For humans

- **Type of vaccine:** Humans receive a rabies vaccine that also contains killed or inactivated virus particles.
- **Purpose:** In India, the human rabies vaccine serves two main purposes:
- **Pre-Exposure Prophylaxis (PrEP):** It is given to individuals at high risk of rabies exposure, like veterinarians, animal handlers, wildlife staff, and travelers to areas where rabies is common.
- **Post-Exposure Prophylaxis (PEP):** It is given to individuals who have been bitten or scratched by animals suspected of carrying rabies.
- **Administration:** The human rabies vaccine is injected into the arm (specifically deltoid region). The number of doses and the schedule vary depending on whether it is given before or after exposure.
- **Availability:** Rabies vaccines for humans are available at all government health care facilities in Rajasthan, playing a crucial role in rabies prevention and management.

- **PrEP schedule:** Typically, three doses of the rabies vaccine are administered:
- **Day 0:** The first dose
- **Day 7:** A second dose one week later
- **Day 21 to 28:** A third and final dose between day 21 and 28 after the first dose
- **PEP schedule:** After exposure, a series of rabies vaccine shots are administered, usually over 14 days:
- **Day** 0: The first dose is given on the day of exposure
- **Days 3, 7, and 14:** Additional doses are administered on these days
- **Day 28 (if applicable):** In some cases, a fifth dose may be given on day 28, especially for individuals with compromised immune systems

Rabies Immune Globulin

If the bite or scratch is severe i.e., category-3 bite or in a high-risk area (like the head or neck), a Rabies Immune Globulin (RIG) may also be administered as soon as possible after exposure. RIG provides immediate passive immunity.

Strengthening Infrastructure for Rabies Control

This chapter focuses on the essential elements needed for effectively combating rabies, a deadly disease caused by the rabies virus that primarily spreads through animal bites. This chapter discusses the key components of infrastructure, training, and laboratory support necessary for rabies control. Furthermore, it addresses the specific needs and actions need to combat the disease in the State of Rajasthan.

Health sector infrastructure

Model anti-rabies clinic

These clinics serve as dedicated areas within district health facilities or medical colleges, where individuals who have been bitten by animals are evaluated and provided with clinical care. These clinics are designed to ensure compassionate patient management. They offer animal bite treatment, provide counseling to the victims, offer referral services for suspected rabies patients, conduct risk assessments, and enhance intersectoral coordination between various state departments such as the DAHD, PRI, municipal corporations and NGOs.

Data on Rabies Cases in Rajasthan: Rajasthan previously had 34 districts where model anti-rabies clinics were established in district hospitals, serving over 300 patients of dog and animal bite cases in the outpatient department (OPD). Presently, 17 new districts have been added, and model anti-rabies clinics will be established in these areas as per established norms. These clinics are equipped with storage facilities for vaccines and serums, staffed by physicians and nurses for immediate treatment, and provide necessary drugs and wound care.

Anti-rabies clinics

These designated areas are set up in community and primary health centers to manage animal bite cases effectively. These clinics are equipped with facilities for storing vaccines, have medical officers, staff nurses or Auxiliary Nurse Midwives (ANM), and necessary medications.

Training

To ensure that health care professionals are well-prepared to manage rabies cases, training programs are conducted. The Deputy Chief Medical Officer (Dy. CMO) of Health, epidemiologists, and medical officers receive training at the State Institute of Health and Family Welfare (SIHFW), in Jaipur, on animal/dog bite management under the National Rabies Control Programme (NRCP). These master trainers then train staff at the block level in various districts via a cascade model. This training is planned twice a year at both the state and district levels.

Laboratory network

For accurate diagnosis of rabies, a robust laboratory network has been set in place. For human rabies testing, the:

- In Rajasthan, SMS Medical College and AIIMS Jodhpur have been designated as the State Reference Laboratories (SRLs) responsible for conducting rabies testing on humans. These facilities have a well-trained workforce capable of performing diagnostic tests for rabies cases.
- Both SRL laboratories are entrusted with the responsibility of upholding internal quality assurance

systems (IQAS) and external quality assurance systems (EQAS).

- Once the Integrated Public Health Laboratories (IPHL) and Block Public Health Laboratories (BPHL) become operational, IPHL will serve as central hubs while all BPHLs will function as satellite facilities.
- Microbiologists working at district hospitals, IPHLs, and BPHLs will undergo phased training in rabies diagnosis, facilitated by these two SRL labs.
- District-level laboratories will be strategically aligned with their respective SRLs for rabies diagnosis, taking into account accessibility and operational convenience.
- To train designated personnel in the diagnosis of human rabies cases, comprehensive learning resources such as training manuals, standard operating procedures (SOPs) for laboratory diagnosis, biomedical waste management guidelines, and spill management protocols will be provided. Additionally, laboratory staff will receive pre-exposure prophylaxis for rabies.
- Both SRLs will also collaborate closely with state-level animal husbandry laboratories to conduct sero-surveillance activities.

Animal sector infrastructure

- With regard to infrastructure for animal vaccination and sterilization, municipal corporations have established Animal Birth Control (ABC) centers across districts and the state. These centers focus on animal vaccination and sterilization to control the spread of rabies (See Table 1).
- A robust laboratory network of the DAHD oversees rabies testing through Enzyme-Linked Immunosorbent Assay (ELISA) and Polymerase Chain Reaction (PCR) methods. A state laboratory in Jaipur is the primary testing center for rabies, with three regional labs in Udaipur, Kota, and Jodhpur conducting ELISA testing. Each of the 34 districts also has a dedicated lab for rabies testing.
- Veterinary colleges, including PGIVER, CVAS Bikaner, and CVAS Navania in Udaipur, offer training programs for veterinary officers and laboratory technicians in rabies diagnosis and control.

Infrastructure	No. of facilities
Polyclinic	48
First-grade veterinary hospital	479
Block veterinary health officer	352
Veterinary hospital	2,096
Sub-center	6,332
DM veterinary unit	102
Laboratories	
District diagnostic laboratories	27
Regional Disease Diagnostic Center	6
State Disease Diagnostic Center	1
Training Institutes	
Livestock Assistant Training Institute	4
Rajasthan State Livestock Training Institute	1
Poultry	1

Laboratory Diagnosis

Rabies is a deadly viral disease that affects both humans and animals, and accurate diagnosis is crucial for its effective control and prevention. In Rajasthan, a robust laboratory network exists to diagnose rabies in both humans and animals. This chapter explores the laboratory diagnostic facilities available in the state, including the types of tests used and the current state of rabies cases in India. Additionally, we discuss the importance of developing a state-specific action plan for rabies elimination in Rajasthan.

Laboratory diagnosis of rabies

Rabies diagnosis relies on specialized laboratory tests that detect the presence of the rabies virus in samples taken from humans and animals. There are two primary diagnostic tests used for rabies, which are ELISA and PCR.

1. **Laboratory network for human rabies diagnosis:** In Rajasthan, the SMS Medical College and AIIMS Jodhpur are designated institutions for testing rabies in humans. These institutions employ advanced diagnostic techniques to accurately identify the presence of the virus in samples. Early and accurate diagnosis of rabies in humans is vital to initiate timely treatment and prevent the disease from progressing to its fatal stages.
2. **Laboratory network for animal rabies diagnosis:** The animal husbandry department in Rajasthan plays a critical role in diagnosing rabies in animals. In Jaipur, the state laboratory is equipped with ELISA and PCR testing capabilities, enabling accurate detection of rabies in animals. Furthermore, three regional laboratories in Udaipur, Kota, and Jodhpur conduct ELISA testing. Additionally, each of the 34 districts in the state has its laboratory for rabies diagnosis. To enhance diagnostic capacity, three government veterinary colleges—PGIVER, CVAS Bikaner, and CVAS Navania, Udaipur—also offer ELISA and PCR testing services for rabies.

Detection of rabies in humans

1. Diagnostic tests:

- The Direct Fluorescent Antibody (DFA) test is the gold standard for diagnosing rabies in humans. It involves staining brain tissue samples with fluorescent antibodies that bind to the rabies virus antigens, making them visible under a fluorescent microscope.
- Reverse Transcription Polymerase Chain Reaction (RT-PCR) can also be used to detect rabies virus RNA in human samples, such as cerebrospinal fluid or skin biopsy specimens.

2. Sample collection (pre-mortem):

- Cerebrospinal Fluid (CSF) can be collected via lumbar puncture to detect viral RNA or antigens.
- A skin biopsy from the nape of the neck or hairline can be taken if CSF is not available.

3. Sample collection (post-mortem):

- The most definitive diagnosis is made by examining brain tissue. A portion of the brain, typically the brainstem, is collected post-mortem.

4. Triple-layer packaging for transportation:

- Place the sample container in a leak-proof primary container.
- Put the primary container in a secondary container with absorbent material.
- Finally, place the secondary container in a durable, outer packaging labeled with biohazard markings.

5. Quality assurance:

- Ensure that the laboratory staff are trained in proper sample handling and test procedures.
- Internal Quality Assurance System (IQAS) and External Quality Assurance System (EQAS) should be followed for ensuring quality parameters.
- Maintain proper chain of custody for samples to prevent contamination.
- Regularly calibrate and validate laboratory equipment.
- Appropriate disposable samples after testing as per recent guidelines released by competent authorities like Indian Council of Medical Research (ICMR) and National Centre for Disease Control (NCDC).

6. Reporting:

- Results should be reported, if case of positive sample result, should be reported promptly to public health authorities and health care providers.
- Ensure confidentiality and privacy of patient information.
- Report both positive and negative results in the L Form of IHIP.

Detection of rabies in animals

1. Diagnostic tests:

- Direct Fluorescent Antibody (DFA) test is commonly used for animal samples, as in human cases.
- Polymerase Chain Reaction (PCR) test can also be used for detecting rabies in animal tissues.

2. Sample collection (pre-mortem):

- Collect saliva samples using specialized swabs from suspect animals.

3. Sample collection (post-mortem):

- Brain tissue should be collected for definitive diagnosis.

4. Triple-layer packaging for transportation:

- Follow the same triple-layer packaging guidelines as for human samples.

5. Quality assurance:

- Ensure that laboratory personnel are trained and adhere to standardized testing protocols.
- Maintain a clean and controlled laboratory environment to prevent cross-contamination.

6. Reporting:

- Report positive results to relevant animal control authorities and public health agencies.
- Ensure records are accurate and complete.

Status of the State:

Journey from being a Neglected Tropical Disease to a Priority Zoonosis

Rabies, a zoonotic disease that can spread from animals to humans, demands a comprehensive approach involving multiple sectors. It is not solely the responsibility of the health care sector; the veterinary and wildlife sectors also play pivotal roles. For many years, rabies received inadequate attention until 2006 when the Nerve Tissue Vaccine was phased out, significantly boosting rabies prevention and control efforts in India. This chapter provides information on the initiatives undertaken by various sectors in India.

Human health sector efforts

At the national level

- **Control of Human Rabies – Pilot Project:** During the 11th Five Year Plan, the Ministry of Health and Family Welfare (MoHFW), Government of India, approved a pilot project for rabies prevention and control. The NCDC executed this project in five cities—Delhi, Ahmedabad, Pune, Bangalore, and Madurai—from January 2008 to 2012.
- **National Rabies Control Programme:** Building upon the lessons learned from the pilot project, the ministry approved NRCP during the 12th Five Year Plan (2014–2017) for nationwide implementation. The program aimed to prevent human deaths from rabies by enhancing capacity, advocating vaccination, increasing community awareness, strengthening animal bite and rabies case surveillance, and promoting intersectoral coordination. This program continues with the expanded goal of eliminating human rabies by 2030, backed by financial and technical support to state governments.
- **Rabies Free City Initiative:** This initiative, as outlined in the directive issued by the Honorable Secretary of Health on 21 January 2023, calls upon states to give precedence to densely populated tier-1 and tier-2 cities in their efforts to eradicate rabies and attain the esteemed status of a Rabies Free City. In alignment with the National Action Plan for Rabies Elimination (NAPRE), it is envisioned that all health care facilities must be equipped with provisions for ARV and ARS. They should also be staffed by adequately trained personnel to address the needs of individuals suffering from animal bites. Furthermore, a vital component of this strategy involves the annual execution of strategic MDV campaigns within specified regions, with the aim of achieving a minimum of 70 percent vaccination coverage among the canine population.

At the state level

- **Supply of ARV and ARS:** Rajasthan Medical Services Corporation Limited ensures a continuous supply of ARV and ARS up to the community health center (CHC) level and ARV at the primary health center (PHC) level to provide timely anti-rabies PEP for all animal bite victims.
- **Model anti-rabies clinics:** A total of 34 such clinics are being developed at the district level, and 17 more districts will follow suit.
- **Training and awareness:** Training on appropriate animal bite management, rabies prevention, and control, surveillance, and intersectoral coordination is provided to the Dy-CMO and medical officers at the district level.
- **Surveillance strengthening:** Efforts are underway to improve surveillance of animal bites and reporting of deaths due to rabies.
- **Awareness campaigns:** Public awareness campaigns are conducted to educate the population on rabies

prevention.

- **Intersectoral coordination:** Collaboration with the veterinary sector, municipal corporations, and PRIs is being strengthened.
- **Program operationalization:** Support is provided to districts for the operationalization of program activities as envisioned under NAPRE.
- **Ongoing actions:** Initiatives such as declaring rabies as a notifiable disease and forming a Joint Steering Committee are in progress.

Veterinary sector efforts

At the national level

- **Assistance to States for Animal Diseases (ASCAD):** The DAHD initiated this scheme in 2003–04, providing grants-in-aid to state governments for anti-rabies vaccination, strengthening state biological production centers and disease diagnostic labs, training of veterinarians, conducting workshops and awareness programs, ensuring surveillance, and maintaining cold chains.
- **Notifiable disease:** Animal rabies is a notifiable disease in India under the Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009.
- **Animal welfare initiatives:** The Animal Welfare Board of India (AWBI) supports registered NGOs and civic bodies for MDV and stray dog sterilization.

At the state level

- **Rabies testing laboratories:** These laboratories are established at the state, regional, and district levels, utilizing ELISA and PCR techniques.
- **Training and awareness:** Training sessions are conducted at veterinary colleges, and awareness campaigns are executed with the help of interns and officers.

Wildlife sector efforts

The National Tiger Conservation Authority of India, under the Ministry of Environment, Forest and Climate Change (MoEF&CC), issued a SOP in December 2020 to address emergencies related to stray and feral dogs in tiger reserves. This ensures timely vaccination, testing, and protection for wildlife animals.

Efforts of municipal corporations

In urban areas, municipal corporations manage stray dogs in compliance with the Animal Birth Control (Dogs) Rules, 2001. This includes capturing unsterilized dogs, performing neutering/sterilization, vaccinating with the anti-rabies vaccine, and returning them after a few days marked with a clipped right ear to signify sterilization.

Efforts by NGOs and the private sectors

NGOs, animal welfare organizations, and private veterinarians actively participate in dog population management (DPM) and vaccination programs.

State Legislation and Public Health Laws

In 2022, Rajasthan introduced a significant piece of legislation known as the Rajasthan Right to Health bill. This bill grants people from the state the fundamental right to access health care services. It encompasses the provision of cost-free health care services at all clinical facilities for state residents. Moreover, the bill imposes certain responsibilities on the state government to safeguard the right to health and uphold public health. To accomplish this, health authorities will be established at both state and district levels. These authorities will be tasked with devising, executing, monitoring, and creating mechanisms to ensure top-notch health care and effective management of public health crises.

Rabies is a serious public health concern in India, including Rajasthan. According to data from the NHM, in 2020, there were 88 reported cases of rabies in Rajasthan. This highlights the pressing need for a robust state action plan to eliminate rabies.

In relation to the prevailing state legislation and public health laws in Rajasthan, here are 12 key points:

1. The Rajasthan Right to Health Bill, 2022 is a pivotal step in ensuring access to health care for all residents.
2. The Rajasthan Public Health Act, 2022 emphasizes public health maintenance and disease control.
3. The Rajasthan Epidemic Diseases Act, 2020 grants the state the authority to manage epidemic outbreaks.
4. The Rajasthan Food Safety and Standards Act, 2006 guarantees the availability of safe food.
5. The Rajasthan Pollution Control Board works to protect public health and the environment.
6. The Rajasthan Prohibition of Smoking and Non-Smokers Health Protection Act, 2000 promotes non-smokers' health.
7. The Rajasthan Nursing Council Act, 1981 maintains health care standards in nursing.
8. The Rajasthan Medical Act, 1952 regulates medical practitioners and institutions.
9. The Rajasthan Mental Health Act, 1997 safeguards the rights of mentally ill individuals.
10. The Rajasthan Essential Commodities Act, 1973 ensures the availability of essential goods.
11. The Rajasthan Clinical Establishments (Registration and Regulation) Act, 2011 maintains quality of health care in the state.
12. The Rajasthan Maternity Benefit (Adaptation) Act, 1962 protects the health of pregnant women and women employees.

These laws collectively contribute to the well-being and health of the people of Rajasthan by addressing various aspects of health care and public health.

One Health Approach for Rabies Elimination

The One Health approach is a cooperative, interdisciplinary strategy that operates at various levels—local, regional, national, and global—to achieve the best possible health outcomes. It acknowledges the complex interactions among humans, animals, plants, and their shared environment

The challenge of rabies

Rabies presents a classic example of a One Health challenge because more than 96 percent of human rabies cases result from encounters with rabid dogs. While vaccines exist for both dogs and humans, there are gaps in awareness and inconsistent access to PEP, resulting in human rabies deaths. Rabies, being a zoonotic infection, does not neatly fit into the jurisdiction of any single department. Although it originates in animals, its impact primarily affects human lives. Therefore, effective rabies prevention, control, and elimination require coordinated efforts involving the animal husbandry sector, human health sector, local governing bodies, communities, and other stakeholders.

Historically, efforts to eliminate rabies have been disjointed and uncoordinated across sectors. In 2015, the World Health Organization (WHO), Food and Agriculture Organization (FAO), and World Organization for Animal Health (WOAH) set a vision for global dog-mediated rabies elimination by 2030, with the aim of zero human deaths from dog-mediated rabies by 2030. This aligns with Sustainable Development Goal (SDG) - 2 and the broader commitment to “leave no one behind” because rabies disproportionately affects impoverished and rural communities.

Role of the One Health approach

The One Health approach has been successful and embraced by many countries in their efforts to eliminate rabies. Achieving this goal requires continuous commitment and support from all levels of government down to local communities. The One Health approach is a globally recognized method for addressing complex challenges by harnessing the expertise of stakeholders across sectors.

Challenges in India

However, implementing the One Health approach for rabies prevention and control in India is challenging due to differing administrative structures and priorities at the national and sub-national levels. Key challenges include:

- Limited understanding of the One Health concept among stakeholders.
- Divergent priorities across sectors leading to inadequate resource allocation
- Fragmented animal health activities, such as DPM and vaccination
- Weak surveillance and reporting of human and animal rabies cases with a lack of data-sharing mechanisms
- High numbers of stray dogs in urban, peri-urban, and rural areas
- Complex wildlife dynamics at the urban-rural interface, leading to spillover
- Insufficient logistics and supply chain management for human and animal health components
- Limited awareness among professionals and communities about the legal framework
- A lack of administrative and political will to drive forward rabies elimination efforts

Addressing these challenges and adopting the One Health approach is crucial for achieving the goal of rabies elimination, aligning with global health objectives and safeguarding vulnerable communities.

State action plan for rabies elimination

The state action plan for rabies elimination recognizes the crucial role of an effective communication plan in achieving its goal of eradicating rabies. Involving multiple stakeholders from various sectors, such as public health, veterinary medicine, and municipal bodies, requires a comprehensive communication plan. This plan should encompass several key elements and considerations

Comprehensive communication plan

It is essential to develop a clear and comprehensive communication plan for effectively conveying information, raising awareness, and engaging stakeholders in the State Action Plan for Rabies Elimination. The steps required for developing the plan are as follows:

1. **Set clear objectives:** Define specific and measurable communication objectives that align with the overall goal of rabies elimination, such as increasing pet vaccination rates by 20 percent within one year.
2. **Identify target audiences:** Identify and understand the key stakeholder groups involved, including the public, pet owners, health care professionals, veterinarians, government agencies, and animal welfare organizations.
3. **Conduct audience research:** Through research, gain insights into each target audience's needs, attitudes, knowledge gaps, and communication preferences related to rabies.
4. **Develop key messages:** Create clear and tailored messages that address the unique concerns and motivations of each target audience, emphasizing the importance of rabies prevention, vaccination, and reporting animal bites.
5. **Choose communication channels:** Select appropriate communication channels to reach each audience, including social media, television, newspapers, community events, local clinics, and government websites.
6. **Create content and materials:** Develop engaging and informative content, including brochures, posters, infographics, videos, and website resources, ensuring cultural sensitivity and accessibility.
7. **Establish a content calendar:** Create a content calendar outlining when and where each message will be disseminated through the chosen communication channels.
8. **Determine resource allocation:** Allocate budget and resources for the communication plan, including design, printing, advertising, and event coordination, seeking partnerships and sponsorships if necessary.
9. **Identify spokespersons and influencers:** Designate credible spokespersons or influencers who can effectively convey the campaign's messages.
10. **Launch the campaign:** Launch the communication campaign with a coordinated and attention-grabbing event or announcement, ensuring consistency in messaging across all channels.
11. **Monitor and engage:** Continuously monitor the campaign's performance, including engagement metrics, media coverage, and audience feedback. Respond to questions and concerns promptly.
12. **Evaluate the campaign:** Regularly assess the campaign's impact by measuring changes in awareness, knowledge, behavior, and vaccination rates.

Parameters for evaluating the campaign and its impact

1. **Awareness and knowledge levels:** Measure the increase in awareness on and knowledge of rabies and its

transmission and prevention as well as the importance of vaccination. Assess if there has been a positive shift in public understanding of rabies and its risks.

2. **Vaccination rates:** Determine the percentage increase in pet vaccination rates and compare pre-campaign and post-campaign rates.
3. **Reporting of animal bites:** Track the number of reported animal bites before and after the campaign and evaluate whether the campaign has encouraged prompt reporting, crucial for rabies prevention.
4. **Engagement metrics:** Monitor the level of engagement on social media platforms, website visits, and attendance at community events related to rabies.
5. **Media coverage and reach:** Measure the campaign's media reach through metrics like impressions, clicks, shares, and media coverage.
6. **Behavioral change:** Examine whether there has been a positive change in behaviors related to rabies prevention, such as avoiding contact with stray animals, seeking PEP after a potential rabies exposure, and ensuring pet vaccination.

By following these steps and maintaining flexibility to adapt to changing circumstances, the communication plan can play a vital role in supporting the State Action Plan for Rabies Elimination and ultimately contribute to the successful eradication of rabies. The primary purpose of the communication plan is to disseminate essential information, raise awareness, and foster collaboration among stakeholders to effectively combat rabies, serving as a roadmap to guide communication efforts throughout the program.

Additionally, interpreting survey results should involve a thorough analysis to draw meaningful conclusions. Key parameters for evaluating the campaign and guidelines for interpreting survey results include:

1. **Demographic analysis:** Analyze survey data by demographics, such as age, gender, and location, to identify variations in awareness, knowledge, and behaviors and tailor future communication efforts accordingly.
2. **Comparative analysis:** Compare survey data collected before and after the campaign to identify significant changes and determine whether the campaign had a statistically significant impact.
3. **Correlation analysis:** Explore correlations between different survey questions, such as whether increased awareness about rabies correlates with higher vaccination rates among pet owners.
4. **Qualitative insights:** Supplement quantitative data with qualitative insights from open-ended survey questions or focus group discussions to understand the reasons behind certain behaviors or attitudes.
5. **Long-term impact:** Consider the sustainability of the campaign's impact and plan for ongoing communication efforts to ensure lasting effects.

Interpreting survey results should be a comprehensive process that goes beyond simple numerical analysis, providing insights into the campaign's strengths and weaknesses, informing strategic decisions, and contributing to the ongoing refinement of communication efforts in the rabies elimination program.

State Action Plan for
Dog-mediated Rabies Elimination based on Thematic Areas

Approach for rabies elimination

Rajasthan's state action plan for eliminating rabies transmitted by dogs has been developed through extensive consultations with various stakeholders and by learning from ongoing initiatives in the state. The successful execution of this plan relies on five major pillars.

Vision and Mission of the NAPRE

Vision: The aim is to eliminate all human deaths caused by dog-mediated rabies by the year 2030.

Mission: To progressively reduce and eventually eliminate human rabies in India by implementing MDV programs and providing appropriate post-exposure treatment.

Key principles of NAPRE

NAPRE is based on three key principles:

1. **Prevention:** This involves introducing cost-effective public health interventions to improve the accessibility, affordability, and availability of PEP for all individuals who require it after an animal bite.
2. **Promotion:** Increasing awareness and understanding of rabies through advocacy, education, awareness campaigns, and operational research.
3. **Partnership:** Collaborating with the community, urban and rural civil society, government bodies, the private sector, and international partners to support efforts against rabies.

Core components of NAPRE

NAPRE comprises two core components.

1. **Human health component**

- To prevent human deaths due to rabies by ensuring timely access to PEP for all animal bite victims
- Establishing a responsive public health system

2. **Animal health component**

- Achieving at least 70 percent mass dog vaccination coverage against rabies among dogs in specific geographical areas annualy for three consecutive years.

Strategies for NAPRE

Thematic area 1: data collection and analysis

Human sector

- Enhance the surveillance system for human rabies by involving private hospitals and clinics in data capture
- Develop SOPs for case management by doctors and frontline workers
- Standardize reporting formats for private hospitals and clinics
- Conduct refresher training on IHIP for districts and private health care facilities
- Establish a dedicated helpline number for reporting rabies incidents and dog bites
- Train call center personnel in dog bite management and first aid
- Conduct virtual Continuing Medical Education (CME) sessions for medical officers
- Develop SOPs for sample collection and transportation and train all government and private laboratory staff
- Expand regional- and district-level labs for rabies testing

Animal sector

- Implement digital reporting of rabies cases under NDRS 2.0.
- Develop SOPs for dog management, case investigation, and response
- Establish quarantine centers for rabies cases in high-risk cities
- Conduct sero-surveillance to assess the prevalence of rabies in different dog populations
- Introduce RFID tagging for identifying vaccinated and sterilized dogs
- Establish a toll-free helpline number for animal husbandry
- Develop SOPs for the helpline facility
- Involve veterinarians in joint investigation task forces
- Share rabies cases with relevant departments
- Deploy mobile vans for house-to-house surveys
- Provide training on animal rabies, sample collection, and surveillance for veterinarians
- Develop a standard training manual for all colleges
- Ensure routine testing through veterinary colleges
- Establish an Animal Science Communication Assessment Tool (ASCAT)

Thematic area 2: prevention and control

- Assess vaccine demand and manufacturing quantities for both government and private sectors
- Ensure availability of ARV and ARS at health facilities.
- Establish model anti-rabies clinics
- Provide refresher training to health care providers
- Implement alerts for PEP due dates

- Administer PrEP to high-risk groups on World Rabies Day
- Develop treatment cards for PrEP administration
- Extend PrEP availability to all health facilities
- Replicate the MDV campaign.
- Utilize oral vaccines for human and animal sectors

Thematic area 3: laboratory diagnosis

- Strengthen PGIMER for rabies testing by procuring kits and reagents
- Offer staff training in testing procedures
- Seek funds from ASCAD for hands-on training in support of NIMHANS, Bengaluru.
- Allocate funds for human sector HR

Thematic area 4: dog population management

- Propose funds for dog catching, vaccination, and sterilization
- Develop a strategy for DPM with census data
- Train dog catchers and veterinarians
- Organize workshops and seminars for field workers
- Review and update SOPs for DPM
- Promote community involvement in ABC programs
- Develop SOPs for collecting used vaccine vials
- Conduct regular inspections and impose penalties for improper waste disposal

Thematic area 5: information, education, and communication

- Conduct awareness programs in schools, colleges, and community centers
- Launch a comprehensive public awareness campaign
- Incorporate the private sector and NGOs in information and education efforts

Thematic area 6: cross-cutting issues

- Establish a joint steering committee for rabies control
- Develop a monitoring and evaluation framework
- Conduct impact assessments
- Organize regular workshops for coordination and decision making
- Implement the Rabies Free City initiative in five districts of Rajasthan

Stakeholders involved in SAPRE

Rajasthan's State Action Plan for Rabies Elimination (SAPRE) involves multiple stakeholders working together to prioritize, prevent, and control rabies in the state. Each department and organization has specific responsibilities aimed at achieving the goal of rabies elimination.

Role of the Public health department: The human health department plays a crucial role in Rajasthan's SAPRE. Their responsibilities include the following:

- **Advocacy:** Advocate for the prioritization of rabies prevention and control at all levels and work towards securing necessary resources
- **Treatment accessibility:** Ensure that treatment for animal bites and rabies is rapidly available to victims
- **Capacity building:** Train health professionals at all levels in managing animal bites and administering rabies prophylaxis
- **Information dissemination:** Create informative materials for widespread distribution
- **Data management:** Maintain a database on rabies control programs and share this information with other stakeholders
- **Public-private partnership:** Strengthen collaboration with professional organizations involved in rabies control
- **Diagnostic laboratories:** Enhance the capabilities of rabies diagnostic laboratories
- **Inter-sectoral coordination:** Facilitate information exchange between the human health, animal health, and wildlife health sectors
- **Technical guidelines:** Regularly update technical guidelines on rabies
- **Regulation:** Ensure compliance with regulations related to rabies sera and pharmaceuticals
- **Monitoring and evaluation:** Assess the effectiveness of rabies control programs
- **Research:** Coordinate and conduct operational research on rabies with various institutions

Role of the Animal Husbandry department: The responsibilities of this department towards SAPRE include:

- **Advocacy:** Advocate for the elimination of animal rabies and secure the necessary resources
- **Risk mapping:** Collaborate with other departments to identify high-risk areas for rabies and prioritize vaccination efforts
- **Logistics:** Ensure a steady supply of resources for mass vaccination activities
- **Capacity building:** Train veterinary professionals and allied personnel
- **Diagnostic laboratories:** Strengthen veterinary rabies diagnostic capabilities
- **Information dissemination:** Develop informative materials for wider distribution
- **Inter-sectoral coordination:** Collaborate with health and wildlife departments
- **Joint Investigations:** Participate in the investigations of human rabies cases or increasing dog bite incidents

- **National reporting:** Explore the integration of the national animal disease reporting system with health information platforms
- **Guidelines:** Regularly update technical guidelines on animal rabies
- **Regulation:** Ensure compliance with pharmaceutical regulations
- **Monitoring and evaluation:** Assess the performance of field units and conduct research
- **Infrastructure:** Establish or strengthen check posts and quarantine centers
- **Education:** Include animal rabies in veterinary curriculum and involve students in rabies-control activities

Role of the Wildlife department: The wildlife department's responsibilities in SAPRE include:

- Technical guidelines: Develop guidelines for wildlife rabies management
- Surveillance: Identify rabies-endemic areas near wildlife conservation areas
- Surveys: Conduct surveys of wildlife populations
- Capacity building: Train zoo personnel in handling wildlife rabies cases
- Prophylaxis: Ensure PrEP for zoo personnel and animals
- Information dissemination: Distribute information to zoo workers and visitors
- Research: Study wildlife reservoirs, transmission patterns, and spillovers of the rabies virus
- Surveillance: Actively monitor wildlife for Lyssa virus reservoirs
- Risk assessment: Assess the risk in areas near forests, sanctuaries, and national parks.
- Predator-proof sheds: Enforce shelters to prevent interactions between wildlife and domestic animals
- Vaccination: Administer rabies vaccinations to dogs and livestock near wildlife areas
- Carcass disposal: Ensure proper disposal of animal carcasses near wildlife areas
- Agro-forestry: Implement agro-forestry to prevent wildlife–domesticated animal conflicts
- Stray dog control: Control stray dog populations around wildlife sanctuaries

Role of the Agriculture department: The role of the agriculture department includes:

- **Technical guidelines:** Develop guidelines and SOPs for rabies elimination
- **Research:** Collaborate with institutions to conduct operational research
- **Community awareness:** Undertake awareness programs

Role of the Animal Welfare Board of Rajasthan: The role of the board involves:

- **Animal Welfare Act:** Ensure compliance with animal welfare laws
- **Dog population management:** Coordinate with local bodies for DPM
- **Assistance:** Utilize animal welfare organizations for certain aspects of rabies control

Role of urban and rural local governing bodies: Local governing bodies play a critical role by:

- **Advocacy:** Train and build capacity of their members in rabies prevention
- **Public awareness:** Inform the public about rabies and mitigation measures
- **Reporting:** Report unusual dog bite incidents and ensure proper medical treatment
- **Data management:** Maintain records of animal bite victims and monitor MDVs

- **Pet registration:** Encourage pet registration and vaccination
- **Waste management:** Manage waste to prevent stray dog congregation
- **Information-sharing:** Share information on animal bites and rabies cases with relevant departments
- **Logistics support:** Provide logistical support for DPM and vaccination
- **Slaughterhouses:** Monitor waste generated from slaughterhouses
- **Waste collection:** Ensure proper waste collection to prevent attracting stray dogs

Role of the Education department: The education department's role includes:

- **School programs:** Incorporate rabies prevention and animal bite management in school health programs and curricula
- **Teacher training:** Build capacity of teachers to providing first aid for animal bites
- **Vaccination:** Ensure that dogs around schools are vaccinated
- **Awareness camps:** Conduct awareness camps against rabies
- **World Rabies Day:** Observe World Rabies Day in schools
- **Waste management:** Promote proper waste management in school compounds

Role of Public Health and Engineering (PHED) and housing and urban affairs departments: These departments focus on:

- **Clean water supply:** Provide clean water supply
- **Infrastructure:** Develop infrastructure and sanitation
- **Waste management:** Ensure proper waste management to control stray dog population

Role of the IT department: The IT department provides technical support for operational research activities.

Role of private partners, non-government sectors, professional organizations: These stakeholders contribute in the following:

- **Volunteer network:** Establish volunteer networks for community engagement
- **Awareness Campaigns:** Promote anti-rabies vaccination campaigns and responsible pet ownership
- **Surveillance:** Report suspected animal and human rabies cases
- **Animal Bite Management:** Ensure proper management of animal bites in humans and animals

Rabies Surveillance under SAPRE

Surveillance is the systematic process of gathering, organizing, and analyzing data to inform relevant actions. In the context of the rabies control and elimination program, the success relies heavily on the implementation of an effective GIS-enabled surveillance system. This system should capture information on ongoing activities related to both the human and animal health components and their impact on the epidemiological trends of animal bites and rabies-related deaths in the state. Surveillance plays a pivotal role in SPARE for Rajasthan, enabling the identification of problems and timely intervention.

To achieve this, the IHIP has been developed for real-time surveillance. Within the Rabies Surveillance Network for SAPRE, an integrated data-sharing mechanism has been established at block, district, and state levels. This system allows for strategic responses to rabies and animal bite cases by providing essential real-time information on animal and human rabies cases, dog bites, and the availability of rabies vaccines and immunoglobulins. This information is accessible to various stakeholders, including states and partner organizations.

Before embarking on SAPRE efforts in a specific geographic area, it is imperative to establish a dedicated surveillance system for both human and animal health components, including veterinary and wildlife aspects. This system should have appropriate linkages and systematic data-sharing mechanisms based on defined parameters.

Table 2 shows the components of the surveillance system in place for human rabies and domestic/wildlife animal rabies.

Table 2: Components of surveillance systems.

S No	Components of the surveillance system	Human rabies	Domestic/wildlife rabies
1	Priority events and data parameters	**Surveillance of animal bites in human** Surveillance of deaths due to rabies (suspected and confirmed) Surveillance to estimate coverage of ARV and ARS	**Monitoring rabies in animals** **Clinical Observation:** Monitoring all animals, including livestock, pets, stray animals, and wildlife, displaying symptoms of rabies or experiencing unexplained sudden deaths, which have not been conclusively confirmed through laboratory testing. ***Laboratory-based monitoring:*** Utilizing laboratory tests to confirm the cause of animal deaths, particularly focusing on virological surveillance. This involves examining brain tissue samples from carcasses, primarily those of dogs and cats, using rapid antigen detection tests and Fluorescent Antibody Test (FAT) to identify cases of rabies. In instances where FAT results are positive, these samples can be preserved for further molecular analysis and research purposes, aiding in the identification of the prevalent rabies virus strains within the region.
2	Disease notification	By the state government: Epidemic Diseases Act Clinical Establishment Act Public Liability Insurance Act, 1991 The Protection of Human Right Act (to provide immediate relief by accident or animal bites)	The Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009

S No	Components of the surveillance system	Human rabies	Domestic/wildlife rabies
3	Data nodes and data-generation points	For Animal bites and ARV/ARS coverage: Anti-Rabies Clinic Model Anti-Rabies Clinics Animal bite management facilities at PHC and block levels to be sent to district hospitals and medical colleges Private health facilities	▸ Block Veterinary Clinic ▸ District Veterinary Clinic, AWOs ▸ State AH Departments, State Veterinary Colleges, AH Department of Local Governments (urban and rural) ▸ Private Veterinary Clinics For lab-based surveillance: ▸ RDDL, SDDLs/Regional Coordinator under NOHPPCZ, laboratory undertaking rabies diagnosis in state veterinary colleges under Virus Research and Diagnostic Laboratory (VRDL) of the ICMR and DBT
4	Responsible officers	At the village level: ASHA, ANM, AWW At PHCs: PHC medical officers At the block level: Block-level medical officer At the district level: Designated district nodal officers, nodal officers of ID hospitals, and tertiary-care institutes At the state level: SNO, NRCP At the national level: NPO, NRCP	▸ At the village level, individuals known as Pashu Sakhi, Pashu Mitra, AI officers, forest guards, and members of the local volunteer network play crucial roles. ▸ At the block level, the block veterinary officer assumes responsibility. ▸ At the district level, various positions include the designated district nodal officer, district veterinary officer, district wildlife warden, and director of national park or wildlife sanctuary. ▸ At the state level, designated state nodal officer, state AHC, and Chief Wildlife Warden. ▸ On the national scale, the designated national program officer at DADF in the MoEF&CC, who serves as the designated officer in the wildlife department. ▸ Designated nodal officer, AWBI
5	Recording and reporting mechanism	State health departments are strongly encouraged to implement the standard recording and reporting formats in all health facilities offering animal bite management services. These formats include: ▸ Real-time or near real-time reporting of animal bite or suspected rabies death cases data from all the health facilities like sub-health centers, PHCs, urban PHCs, community health centers, district hospitals, and medical colleges in IHIP ▸ An animal bite exposure register ▸ Duplicate copies of rabies PEP cards (one for the animal bite victim and one for the health facility's records) ▸ A monthly reporting format for health facilities ▸ A human rabies case report form for use in infectious disease hospitals (ID hospitals) and other health facilities ▸ An outbreak investigation form	It is recommended that all state veterinary and animal husbandry departments employ the standardized recording and reporting formats in all animal health facilities that offer veterinary services. These formats include the following: ▸ Reporting format for suspected rabies cases ▸ Reporting format for lab-confirmed rabies cases ▸ Recording and reporting format for the activities of the animal health component (MDV and DPM) ▸ Outbreak Investigation Form
6	Monitoring and evaluation	The surveillance system will be monitored in terms of Timeliness, Completeness, and usefulness of the data	The surveillance system will be monitored in terms of timeliness, completeness, and usefulness of the data

S No	Components of the surveillance system	Human rabies	Domestic/wildlife rabies
7	Support functions	The National Program Management Unit of NRCP under MOHFW will be responsible for creating standard guidelines and SOPs, as well as arranging training sessions.	Standard guidelines and SOP preparation, as well as organization of training will be done by the designated nodal department or National Program Management Unit at MoFAHD
8	Data sharing and inter-sectoral coordination	The human health sector will regularly provide analysed reports on incidents of animal bites and Rabies-related deaths, including details on time, location, and individuals involved, to the relevant veterinary and wildlife departments for the purpose of facilitating necessary actions.	The veterinary and wildlife sectors will regularly exchange information on mass vaccination campaigns and DPM activities conducted in the region. Additionally, they will collaborate with the health department to report incidents of animal deaths caused by rabies.
		Joint monitoring, evaluation, and review report for sharing with international agencies	
9	Infrastructure and logistics	The respective state government needs to establish a surveillance mechanism for rabies elimination, which requires the deployment of web-based GIS-enabled IT systems, mobile applications, and the necessary infrastructure and workforce support. Additionally, Joint Investigation Task force should be formed in case of rabies-related fatalities or clusters of animal bites in both the human and animal health sectors. Furthermore, the government should set up a functional helpline number or toll-free numbers to help the public.	
10	Information Education and Communication	Properly showcasing suitable IEC materials alongside contact numbers for the target audience to report any observed rabies-related incidents.	

Surveillance of the human health component on SAPRE

The surveillance program for human rabies includes clinical/physical, laboratory, and serological surveillance, following the standard guidelines set by the MoHFW. Recording and reporting of all cases of animal bites and rabies in the community are crucial for maintaining surveillance. This is facilitated through a dedicated portal for SAPRE, linked with the existing Integrated Disease Surveillance Programme (IDSP) and Integrated Health Information Platform (IHIP) portal. Various recording and reporting formats have been developed at different levels of health facilities to strengthen surveillance activities.

Surveillance of the animal health component on SAPRE

The surveillance program for animals involves laboratory and serological surveillance, following standard guidelines set by DAHD. Recording and reporting of all events related to animal bites and animal rabies cases in the community are essential for surveillance. This is accomplished through a dedicated portal for the National Animal Prevention and Rabies Elimination (NAPRE) program, which is linked to the National Animal Disease Reporting System (NADRS 2.0) and the National Animal Disease Referral Expert System (NADRES) of the Indian Council of Agricultural Research (ICAR). Various recording and reporting formats, in line with DAHD guidelines, are available on the NAPRE, NADRS, and NADRES portals. These formats are accessible at all animal health facilities at the block, district, and state levels.

Given that the rabies virus can be present in a wide range of wild animals, there is a possibility of disease transmission at the domestic-wildlife interface in areas near forests. Collaboration between the livestock and forestry sectors is crucial for disease surveillance, sharing disease outbreak information, and implementing

prevention and control programs. The State Forest Department, in coordination with the veterinary department, local governing bodies, and NGOs, is responsible for activities in this regard.

- Free-ranging wild animals: If clinical signs or pathological lesions indicative of rabies are detected in any susceptible free-ranging wild animal, the respective wildlife/forest authorities should inform the veterinary department. Samples will be referred to regional/state/national referral laboratories.
- Captive wild animals: If suspected signs of rabies are detected in any captive susceptible wild animal, zoo authorities should inform the veterinary department. Similarly, samples will be referred to regional/state/national laboratories.

Table 3: District-wise dog population as per the 20th livestock census.

S.No.	District	Total number of dogs	S.No.	District	Total number of dogs
1	Ajmer	13,412	18	Jaisalmer	2,310
2	Alwar	10,601	19	Jalore	5,474
3	Banswara	5,356	20	Jhalawar	2,792
4	Baran	8,280	21	Jhunjhunu	10,561
5	Barmer	2,235	22	Jodhpur	7,424
6	Bharatpur	2,766	23	Karouli	2,972
7	Bhilwara	4,767	24	Kota	9,085
8	Bikaner	6,974	25	Nagaur	7,141
9	Bundi	8,544	26	Pali	6,586
10	Chittorgarh	1,929	27	Pratapgarh	4,601
11	Churu	4,142	28	Rajsamand	1,009
12	Dausa	3,700	29	Sawai Madhopur	1,481
13	Dholpur	3,794	30	Sikar	9,742
14	Dungarpur	8,680	31	Sirohi	3,157
15	Ganganagar	50,014	32	Tonk	4,067
16	Hanumangarh	18,002	33	Udaipur	9,589
17	Jaipur	32,405		Total population in the state	273,592

Source: 20th livestock census

In both cases, active surveillance should determine:

- Whether other wild animals in the area show clinical signs or pathological lesions of suspected rabies
- Whether domestic animals in the vicinity have been bitten by wild animals
- Whether there are suspected, probable, or confirmed cases of animal rabies in free-roaming dogs, pet dogs, or community-owned dogs in local communities near wildlife areas and forests
- Community leaders should notify local wildlife/forest authorities and the veterinary department in such cases

Events-based surveillance system and public health actions for the animal health sector

Observed abnormal behavior in stray animals: If there are signs of abnormal behavior in stray animals, such as dogs running amok or causing unprovoked bites, the following actions should be taken:

- Conduct a complete epidemiological investigation of the event and actively search for cases in the surrounding areas

- Follow up on the animal that bit livestock or pet animals to determine if it is alive or dead
- Notify authorities using standard formats at the block/district, with a unique case ID, and at the state/national levels
- Perform a risk assessment and ensure PEP for individuals who came in contact with the suspected animal.
- In case of the animal's death, send biological samples to the laboratory with TPL.
- Issue advisories and conduct Information, Education, and Communication (IEC) campaigns regarding the disposal of dead bodies and the use of milk or meat in the case of livestock animals.

Death of a pet or livestock following animal bite or unexplained death: If a pet or livestock animal dies following an animal bite or unexplained circumstances, the following actions should be taken:

- Conduct a complete epidemiological investigation of the event and inquire about the vaccination status.
- Follow up on the animal that bit the livestock or pet animal to determine whether it dead or alive.
- Send appropriate biological samples to the laboratory with TLP, including saliva or brain tissue if the animal is deceased.
- Issue advisories and conduct IEC campaigns regarding the disposal of dead bodies and the use of milk or meat in the case of livestock animals.
- Notify the respective authorities and conduct a risk assessment, ensuring PEP for those in contact with the deceased animals.

Unexplained death of wild animals (captive and free-roaming): If the unexplained death of a wild animal is observed by various individuals, including forest dwellers, wildlife officers, or health care workers, the following actions should be taken:

- Immediately inform the concerned wildlife officer or panchayat raj official.
- Conduct a complete epidemiological investigation of the event through a Rapid Response Team (RRT).
- Send appropriate biological samples to the laboratory with TLP, including saliva or brain tissue if the animal is deceased.
- Issue advisories and conduct IEC campaigns regarding the disposal of dead bodies and the use of milk or meat in the case of livestock animals.
- Notify the respective authorities and conduct a risk assessment, ensuring PEP for those in contact with the deceased animals.

Death of any stray animal (dogs): If the death of a stray animal (dogs) is observed, the following actions should be taken:

- Immediately inform the municipal corporation officials or PRI.
- Remove the animals from the community promptly to prevent further exposure risk, confine them, and take appropriate actions following local laws.
- Collect appropriate biological samples, particularly from the central nervous system, for laboratory diagnosis if available.
- Conduct an active case search for cases and exposed animals in the surrounding area.
- Conduct a risk assessment and ensure full rabies PEP for those exposed to stray animals.

Events-based surveillance system and public health actions for the human health sector

Death of a human following an animal bite: In cases where a human dies following an animal bite, particularly neuro-encephalitic cases with a history of an animal bite or when a person dies after reporting an animal bite to a health facility (ID hospital, tertiary care hospital, or suspected death in the community), the following actions should be taken:

- Conduct a complete epidemiological investigation, including searching for cases in the surrounding areas and determining if they were bitten by the same animal.
- Follow up on the suspected source (animal) to determine its status (alive or dead).
- Collect appropriate biological samples (brain tissue) and transport them to the laboratory with TLP.
- Notify the authorities about the human death.
- Conduct a risk assessment and ensure PEP for contacts of suspected or confirmed human rabies cases.
- Share data with the animal husbandry and municipal authorities.

Cases of animal bites in humans: In cases where humans are bitten by animals, the following actions should be taken:

- Ensure timely provision of complete PEP.
- Provide counseling to the animal bite victims.
- Monitor and follow up to ensure the completion of PEP.
- Analyze all cases of animal bites reported on IHIP and in NRCP forms and formats on a weekly basis, considering time, place, and person to identify clustering and assess the quality parameters.
- Share data periodically with the respective animal husbandry, veterinary department, and local government authorities—municipalities or PRIs.

Standard case definition to be used for surveillance systems

Standard case definitions for human rabies

Rabies surveillance under NRCP and the IDSP is of three types (See Table 4):

1. A suspected case must be reported by a frontline health care worker using an S Form
2. A probable case must be reported by a medical officer using a P form
3. A lab-confirmed case must be reported by all laboratories with confirmatory test facilities for rabies using the L form.

Table 4: Standard case definitions for human rabies.

Case	Definition
Suspect case	Death of a human with a history of dog bite a few weeks/months preceding death. Wherever available, the details of such cases should be shared in a line list: name, age, gender, address.
Probable case	A suspected human case plus history of exposure* to a suspect** or probable*** rabid animal.
Laboratory-confirmed case	A suspect or a probable human case that is laboratory-confirmed by one or more of the following tests: ▸ Rabies viral antigens by direct FAT ▸ ELISA in clinical specimens, preferably brain tissue (collected postmortem) ▸ FAT on skin biopsy (ante-mortem) ▸ FAT-positive after inoculation of brain tissue, saliva, or CSF in cell culture, or after intracerebral inoculation in mice or in suckling mice ▸ Detectable rabies-neutralizing antibody titre in the serum or the CSF of an unvaccinated person ▸ Detection of viral nucleic acids by PCR on tissue collected postmortem or intra vitamin a clinical specimen—brain tissue or skin, cornea, urine or saliva

Notes:

* Exposure is usually defined as a bite or scratch from a rabies-susceptible animal (usually dogs). It could also be licking exposure to open wounds, abrasion, mucous membranes of the patient.

** A suspect rabid animal is a rabies-susceptible animal (usually dogs) that presents with any of the following signs at the time of exposure or within 10 days following exposure: unprovoked aggression (biting people or animals or inanimate objects), hypersalivation, paralysis, lethargy, abnormal vocalization, or diurnal activity of nocturnal species. Whenever the history of mentioned signs cannot be elicited, the history of exposure to a rabies-susceptible animal would be considered adequate.

*** A probable rabid animal is a suspect rabid animal (as defined above) with additional history of a bite by another suspect/probable rabid animal and/or is a suspect rabid animal that is killed, died, or disappeared within 4–5 days of observing illness signs.

Standard case definitions for animal rabies

In accordance with WHO guidelines, the proposed case definitions and surveillance activities for veterinary officers in cases of suspected, probable, and lab-confirmed animal rabies are outlined in Table 5.

Laboratory surveillance: Lab-based surveillance is done when the suspected/confirmed animal is dead and postmortem is done, and laboratory confirmation is needed to confirm whether the case was that of rabies. This is especially important when the dog is known to cause dog bites in an area.

Virological surveillance: Brain tissue samples from carcasses (especially dogs and cats) shall be collected and subjected to a rapid antigen detection test and FAT to check for rabies. Samples tested positive to FAT could be archived for molecular analysis and research purposes to identify the circulating virus in the region.

Table 5: Standard case definitions for animal rabies.

Case	Definition
Suspected animal rabies	▸ A case that is compatible with a clinical case definition of animal rabies ▸ An animal that presents with any of the following signs: Hyper salivation, paralysis, lethargy, unprovoked abnormal aggression (biting two or more people or animals and/or inanimate objects), abnormal vocalization, and diurnal activity of nocturnal species ▸ Any animal showing the signs of dumb form of rabies
Probable animal rabies	▸ A suspected case along with a reliable history of contact with a suspected, probable or confirmed rabid animal and/or ▸ An animal with suspected rabies that is killed, dies, or disappears within 4–5 days of observation of illness
Confirmed animal rabies	A suspected or probable animal case confirmed in a laboratory
Not a case	A suspected or probable case that is ruled out by laboratory tests or epidemiological investigation (i.e., appropriate quarantine period in eligible animals)

Cross-cutting Issues

1. **Declaration of rabies as a notifiable disease**

- Establish rabies as a notifiable disease in the State of Rajasthan to ensure mandatory reporting by health care facilities, veterinarians, and laboratories.
- Develop a reporting mechanism for quick data collection and analysis.

2. **Establishment of joint steering committees**

- Constitution of a state-level joint steering committee for rabies elimination, including representation from the health, animal husbandry, forest and municipality departments and PRIs.
- District-level joint steering committees to be formed with representatives from various relevant departments.
- These committees will provide strategic guidance, monitor progress, and facilitate interdepartmental coordination.

3. **Coordination committees at the ward or zone level**

- Form coordination committees at the ward or zone level in cities and municipalities, comprising members from local government, health care, and animal welfare organizations.
- These committees will oversee rabies control efforts at the grassroots level, ensure community engagement, and address local challenges effectively.

4. **Budget development and funding allocation**

- Develop a comprehensive budget for short-term, medium-term, and long-term rabies-elimination activities.
- Secure funding from government allocations, grants, and other potential sources.
- Allocate funds specifically for vaccination campaigns, public awareness campaigns, laboratory strengthening, and emergency response.

5. **Emergency funds mechanism**

- Establish a mechanism for mobilizing emergency funds dedicated to rabies control.
- Collaborate with the DAHD to reingfence unspent funds under ASCAD for infectious disease emergencies, including rabies.
- Ensure that these emergency funds are easily accessible for rapid response to rabies outbreaks.

6. **State- and district-level zoonotic committees**

- Utilize the existing state- and district-level zoonotic committees to integrate rabies-control efforts into broader zoonotic disease management strategies.

7. **Strengthening of laboratory facilities**

- Allocate funds for the strengthening of laboratory facilities for both animal and human rabies diagnosis.
- Ensure that laboratories have the necessary equipment, trained personnel, and the capacity for timely testing.

8. Short-term action plan development

- Develop a short-term action plan collaboratively with all stakeholders by incorporating their feedback.
- Finalize the action plan for immediate implementation, focusing on priority areas such as mass vaccination, public education, and surveillance.

By incorporating these cross-cutting areas and detailed activities into SAPRE, Rajasthan can enhance its efforts to eliminate rabies and protect the health and well-being of its citizens and animals. Regular monitoring and evaluation of the plan's implementation will be essential to ensure its success.

Table 6: Micro plan for MDV and the ABC program with approximate budget for the State of Rajasthan.

Micro Planing for Mass Dog Vaccination and Animal birth Control program for the state of Rajasthan														
State/ District	Dog population	70% of total dog population	Vaccine vials*	Vaccine doses	Vaccine carrier**	Refrigerato r***	vaccinator	Dog catcher/ month	ABC Target	Booster dose	Total cost for vaccination without micro chip installation (Rs. 200 per dog)	Total cost for vaccination of 70% of dogs out of total population (In Rs.) (Rs. 450 per dog this includes vaccination plus microchip cost)	Total cost including MDV + ABC (in Rs.) (Rs. 1520 this includes ABC + Vaccination + Micro chip installation + 5 days dog stay)
State	273592	191514	38303	191514	1915	48	319	319	191514	191514	₹ 38,302,880	₹ 86,181,480	₹ 291,101,888
AJMER	13412	9388	1878	9388	94	2	16	16	9388	9388	₹ 1,877,680	₹ 4,224,780	₹ 14,270,368
ALWAR	10601	7421	1484	7421	74	2	12	12	7421	7421	₹ 1,484,140	₹ 3,339,315	₹ 11,279,464
BANSWARA	5356	3749	750	3749	37	1	6	6	3749	3749	₹ 749,840	₹ 1,687,140	₹ 5,698,784
BARAN	8280	5796	1159	5796	58	1	10	10	5796	5796	₹ 1,159,200	₹ 2,608,200	₹ 8,809,920
BARMER	2235	1565	313	1565	16	0	3	3	1565	1565	₹ 312,900	₹ 704,025	₹ 2,378,040
BHARATPUR	2766	1936	387	1936	19	0	3	3	1936	1936	₹ 387,240	₹ 871,290	₹ 2,943,024
BHILWARA	4767	3337	667	3337	33	1	6	6	3337	3337	₹ 667,380	₹ 1,501,605	₹ 5,072,088
BIKANER	6974	4882	976	4882	49	1	8	8	4882	4882	₹ 976,360	₹ 2,196,810	₹ 7,420,336
BUNDI	8544	5981	1196	5981	60	1	10	10	5981	5981	₹ 1,196,160	₹ 2,691,360	₹ 9,090,816
CHITTORGARH	1929	1350	270	1350	14	0	2	2	1350	1350	₹ 270,060	₹ 607,635	₹ 2,052,456
CHURU	4142	2899	580	2899	29	1	5	5	2899	2899	₹ 579,880	₹ 1,304,730	₹ 4,407,088
DAUSA	3700	2590	518	2590	26	1	4	4	2590	2590	₹ 518,000	₹ 1,165,500	₹ 3,936,800
DHOLPUR	3794	2656	531	2656	27	1	4	4	2656	2656	₹ 531,160	₹ 1,195,110	₹ 4,036,816
DUNGARPUR	8680	6076	1215	6076	61	2	10	10	6076	6076	₹ 1,215,200	₹ 2,734,200	₹ 9,235,520
GANGANAGAR	50014	35010	7002	35010	350	9	58	58	35010	35010	₹ 7,001,960	₹ 15,754,410	₹ 53,214,896
HANUMANGA	18002	12601	2520	12601	126	3	21	21	12601	12601	₹ 2,520,280	₹ 5,670,630	₹ 19,154,128
JAIPUR	32405	22684	4537	22684	227	6	38	38	22684	22684	₹ 4,536,700	₹ 10,207,575	₹ 34,478,920
JAISALMER	2310	1617	323	1617	16	0	3	3	1617	1617	₹ 323,400	₹ 727,650	₹ 2,457,840
JALORE	5474	3832	766	3832	38	1	6	6	3832	3832	₹ 766,360	₹ 1,724,310	₹ 5,824,336
JHALAWAR	2792	1954	391	1954	20	0	3	3	1954	1954	₹ 390,880	₹ 879,480	₹ 2,970,688
JHUNJHUNU	10561	7393	1479	7393	74	2	12	12	7393	7393	₹ 1,478,540	₹ 3,326,715	₹ 11,236,904
JODHPUR	7424	5197	1039	5197	52	1	9	9	5197	5197	₹ 1,039,360	₹ 2,338,560	₹ 7,899,136
KAROULI	2972	2080	416	2080	21	1	3	3	2080	2080	₹ 416,080	₹ 936,180	₹ 3,162,208
KOTA	9085	6360	1272	6360	64	2	11	11	6360	6360	₹ 1,271,900	₹ 2,861,775	₹ 9,666,440
NAGAUR	7141	4999	1000	4999	50	1	8	8	4999	4999	₹ 999,740	₹ 2,249,415	₹ 7,598,024
PALI	6586	4610	922	4610	46	1	8	8	4610	4610	₹ 922,040	₹ 2,074,590	₹ 7,007,504
PRATAPGARH	4601	3221	644	3221	32	1	5	5	3221	3221	₹ 644,140	₹ 1,449,315	₹ 4,895,464
RAJSAMAND	1009	706	141	706	7	0	1	1	706	706	₹ 141,260	₹ 317,835	₹ 1,073,576
SAWAI MADH	1481	1037	207	1037	10	0	2	2	1037	1037	₹ 207,340	₹ 466,515	₹ 1,575,784
SIKAR	9742	6819	1364	6819	68	2	11	11	6819	6819	₹ 1,363,880	₹ 3,068,730	₹ 10,365,488
SIROHI	3157	2210	442	2210	22	1	4	4	2210	2210	₹ 441,980	₹ 994,455	₹ 3,359,048
TONK	4067	2847	569	2847	28	1	5	5	2847	2847	₹ 569,380	₹ 1,281,105	₹ 4,327,288
UDAIPUR	9589	6712	1342	6712	67	2	11	11	6712	6712	₹ 1,342,460	₹ 3,020,535	₹ 10,202,696

SAPRE Plan for Implementation

To implement SAPRE in Rajasthan, we need funding for both human and animal health aspects. We will obtain funds for the human health part from the NHM and its PIP. Meanwhile, for the animal health aspect, we will utilize resources available within municipal corporations or the state veterinary departments, and also request for funds from ASCAD for MDVs in the state.

For delivering animal health services, we will utilize the existing veterinary infrastructure and established channels, such as health dispensaries, health post, veterinary hospitals, urban and rural governing bodies, NGOs, and municipal cooperation.

In India, the NRCP is already in operation for human health. Therefore, the identified state nodal officers and district nodal officers will continue overseeing the implementation of human health activities.

In the context of the animal health component, every state will appoint state and district nodal officers whose role will be to collaborate with the state nodal officers and district nodal officers responsible for the human health component. This collaboration will facilitate the efficient implementation of tasks related to animal health.

Table 7:Brief on the implementation plan for both animal and human components.

Title	Human Health Component	Animal Health Component
Nodal agency for planning and execution at the state level	The State Health Department and the State NHM have designated a state nodal officer for NRCP to oversee and manage the associated activities	The director of the state animal husbandry department appoints a state nodal officer for the animal health component. The State Veterinary Department, in collaboration with municipal bodies in urban areas and PRIs in rural areas, will carry out the animal health component activities. The state animal husbandry department is tasked with developing a methodology and delegating responsibilities to participating officers for overseeing surveillance activities.
	Develop the State Action Plan as per activities envisaged under National Action Plan.	
District level	The district health officer has appointed a district nodal officer for NRCP to oversee and manage activities.	Nominate the district nodal officers (district veterinary officers) and have them collaborate with local governing bodies, local authorities, and NGOs.
	Develop micro, district, and block action plans as per activities envisaged under the State Action Plan.	
Block level	Block medical officers are responsible for: ▸ Executing the program on the field in coordination with HWC/PHC/CHC staff ▸ Collaborating with the block veterinary officer ▸ Providing updates to the district nodal officer ▸ Seeking input from the district nodal officer for program enhancement based on the field situation.	The veterinary officer at the block level or a similar position, responsible for: ▸ Executing the program on the field ▸ Collaborating with the block's medical officer ▸ Providing updates to the animal husbandry district nodal officer ▸ Seeking inputs from district nodal officer (from animal husbandry) for program enhancement based on field conditions ▸ Kennel facilities: Establishing a purpose-built facility with kennels capable of housing a minimum of 20 dogs. These kennels will serve as temporary shelters for stray and captured dogs, facilitating their isolation, observation, and vaccination. ▸ Post-mortem room: The construction of a dedicated post-mortem room is essential for collecting brain samples from suspected rabies-infected animals. This room will be equipped with the necessary tools and equipment for safe sample collection and handling.

Title	Human Health Component	Animal Health Component
Block level		▸ Dormitory for dog handlers: Provide suitable accommodations for 3–4 trained dog handlers who are essential for the safe capture and handling of potentially rabid dogs. These dormitories will ensure that handlers are readily available for rapid response efforts. ▸ Catching nets: Supply the required number of high-quality catching nets to facilitate safe and humane capture of stray dogs for assessment and vaccination. ▸ Dedicated Mobile Medical Unit (MMU): Allocate a dedicated MMU equipped with provisions for carrying cages. This vehicle will enable the swift transportation of captured dogs, especially those suspected of rabies, to the designated facilities.
	Human resource	To establish an effective Rapid Response Team (RRT) tasked with responding to suspected dog rabies cases within their respective jurisdictions, the following human resources are essential: ▸ Veterinarian: Appoint a qualified veterinarian to oversee and perform critical activities such as rabies surveillance, quarantine, brain sampling, and mass dog vaccination. This expert will be instrumental in diagnosing and managing rabies cases among dogs. ▸ Trained dog handlers: Assemble a team of 3–4 well-trained dog handlers who possess the necessary skills for capturing, handling, and safely restraining dogs during vaccination and examination procedures. ▸ Para-veterinarian: Employ a trained para-veterinarian to conduct MDV campaigns. This individual will work under the guidance of the veterinarian to ensure the widespread immunization of dogs.
Personnel and infrastructure for rabies surveillance, dog catching, and vaccination		▸ ABC centers: Strengthen and expand ABC centers throughout municipalities, corporations, and gram panchayats concurrently with vaccination efforts. These centers will play a pivotal role in controlling the stray dog population and reducing the risk of rabies transmission. ▸ Clustered ABC centers: Establish ABC centers in district headquarters ULBs, strategically clustered with other ULBs in the district for operational efficiency. ▸ Identification of NGOs: Identify and collaborate with suitable NGOs to facilitate the operation of ABC centers and outreach programs focused on dog population control. ▸ Setting targets: Establish monthly targets for ABC operations based on the local dog population, ensuring a systematic and sustainable approach to animal birth control. ▸ Fund mobilization: Seek and mobilize funds for the establishment and operation of ABC centers. Explore opportunities for support from the Government of India and the Animal Welfare Board of India (AWBI) to facilitate these critical activities.

Overview of proposed implementation plan

Aligned with the NAPRE, the State of Rajasthan must incorporate the following activities into its SAPRE during the short-term (2023–2025), medium-term (2025–2027), and long-term (2028–2030) phases.

Short-term plan (2023–2025)

Preparatory phase

- **Advocacy and awareness:** Launch a targeted campaign for the public to disseminate information on rabies. Involve community structures like Mahila Arogya Samitis and Jan Arogya Samitis and frontline workers for awareness generation, utilizing social media platforms.
- **Data gathering:** Analyze data from the past five years to identify potential hotspots for dog/animal bite cases. Plan interventions such as MDVs and birth control measures based on this analysis.
- **Dedicated call center:** The establishment of a dedicated call center at the state level in Rajasthan will serve

as a crucial component of the rabies-elimination implementation plan. It will provide a centralized platform for reporting and responding to rabies-related incidents, ensuring swift and coordinated action in emergencies, and facilitating public awareness and education campaigns to enhance community engagement in rabies prevention and control efforts.

- **Funding** search: Conduct an analysis of available funds in the public health department and animal health department at the state level. Evaluate the availability of funds under central schemes like Animal Welfare Bureau of India (AWBI) and Assistance to States for Control of Animal Disease (ASCAD). Develop grant proposals with scientific rigor to secure funds for vaccine procurement, training programs, and public awareness campaigns.
- **Training initiative:** Implement evidence-based training programs for medical professionals, veterinarians, and support staff, incorporating the latest scientific knowledge on rabies management and vaccination protocols.
- **SOPs:** Develop and disseminate SOPs rooted in scientific best practices for responding to animal bites, conducting mass vaccinations, and managing dog populations effectively.
- **Risk assessment:** Utilize GIS and epidemiological modeling to identify high-risk areas with a history of frequent animal bites, aiding in the strategic allocation of resources.
- **Collaborative efforts:** Facilitate interdepartmental collaboration among government agencies through Memoranda of Understanding (MoUs), ensuring a multidisciplinary approach to rabies control based on scientific consensus.
- **Coordination committees:** Establish scientifically informed committees at various administrative levels to oversee program implementation and ensure adherence to best practices.
- **Lab-capacity enhancement:** Assess existing lab networks in human health and animal husbandry departments and leverage IPHLs, block public health units, medical college microbiology labs, and veterinary college, district & regional level labs. Accordingly develop plans for lab-capacity enhancement.
- **Capacity building:** Conduct a desk review of existing training material for all cadres in both human and animal health departments. Perform a training needs assessment and create tailor-made training packages for different cadres across the department. Implement scientifically rigorous training programs to enhance the technical proficiency of individuals involved in rabies control, focusing on the latest diagnostic and vaccine administration methods.
- **Localized action plan:** Develop a scientifically grounded action plan tailored to the specific rabies control needs of Rajasthan. Initiate a pilot project in a selected city or district for empirical assessment.
- **Population estimate:** Employ systematic sampling and census techniques to accurately estimate the dog population within the selected test areas, using statistical methods to ensure precision.
- **Vaccine needs' assessment:** Calculate the exact quantities of human and animal rabies vaccine required, taking into consideration demographic and epidemiological factors.
- **Vaccination campaigns:** Scientifically design and implement dog vaccination campaigns, considering vaccination coverage thresholds to establish herd immunity in the canine population.
- **Strategic MDV:** Prioritize scientifically identified high-risk areas for targeted MDVs, optimizing vaccine distribution strategies based on epidemiological models.
- **Coverage evaluation:** Continuously monitor vaccination coverage using scientific surveys and data analysis, aiming for a minimum of 70 percent coverage to achieve herd immunity.

- **Outbreak response teams:** Train rapid response teams with a deep understanding of rabies epidemiology and diagnostic methods, ensuring prompt intervention in the event of an outbreak.

Medium-term plan (2025–2027)

Scaling up actions

- **Advocacy and awareness:** Extend and intensify scientifically informed advocacy and awareness campaigns to maintain public engagement and understanding of rabies control efforts.
- **Lab strengthening:** Continue to enhance laboratory infrastructure, incorporating advanced diagnostic technologies to improve rabies testing sensitivity and specificity.
- **Surveillance systems:** Implement an integrated surveillance system supported by modern information technology, facilitating real-time data sharing and collaboration among health and veterinary agencies.
- **Sustain vaccination:** Expand and sustain dog vaccination programs, utilizing scientific research to assess the evolving rabies threat and adapt vaccination strategies accordingly.
- **Pet registration:** Develop scientifically rigorous systems for registering owned dogs, incorporating microchipping and database management to improve population control.
- **Continued surveillance:** Maintain a scientifically robust surveillance system for monitoring human and dog rabies cases and animal bites, employing predictive modeling to anticipate outbreaks.
- **Canine population count:** Conduct periodic scientifically grounded dog population counts in all relevant areas, employing random sampling techniques to ensure data accuracy.
- **Early reporting:** Promote scientifically informed public reporting mechanisms for dog bites, enabling swift response and prophylactic interventions. Use of IHIP platform for real-time or near real-time reporting.
- **Lab capacity:** Continue to improve and update laboratory capacity with the latest diagnostic technologies to ensure accurate and timely rabies diagnosis.
- **Rabies-free zones:** Declare scientifically confirmed rabies-free zones based on continuous surveillance and epidemiological data analysis.

Long-term plan (2028–2030)

Sustaining efforts and certification

- **Advocacy and awareness:** Maintain scientifically accurate advocacy and awareness campaigns to ensure long-term public support for Rabies control.
- **Rabies-free declarations:** Persist in declaring and maintaining Rabies-free areas, aligning with international standards, and utilizing rigorous scientific evidence.
- **Enhanced surveillance:** Continuously enhance surveillance methods, including wildlife and domestic animal monitoring, to detect potential reservoirs and prevent resurgence.
- **Population management:** Sustain scientifically-based dog population management strategies, including sterilization programs and controlled breeding.
- **Field investigations:** Conduct comprehensive epidemiological field investigations when human rabies cases occur, applying advanced epidemiological techniques to trace the source and transmission routes.
- **Virus characterization:** Collaborate with NCDC and ICMR laboratories to conduct advanced studies on the rabies virus, including genetic sequencing for strain characterization. Also carry out yearly sero-surveillance for rabies in dogs.

- **Freedom verification:** Maintain continuous monitoring and reporting of rabies cases beyond 2030 to ensure the long-term absence of the disease, aligning with scientific protocols for disease freedom verification.

This comprehensive plan emphasizes a scientific approach at every stage, encompassing awareness, training, surveillance, and vaccination efforts as key components of a successful rabies-elimination strategy for Rajasthan.

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