

“ACT NOW, YOU, ME COMMUNITY”



One Health Perspective of Rabies: Incidence and Risk Factors in Humans in South Africa.

The Knowledge Hub webinar Review on rabies 14 October 2025

Presented by Veerle Dermaux-Msimang (PhD)

Centre for Emerging Zoonotic & Parasitic Diseases



Outline

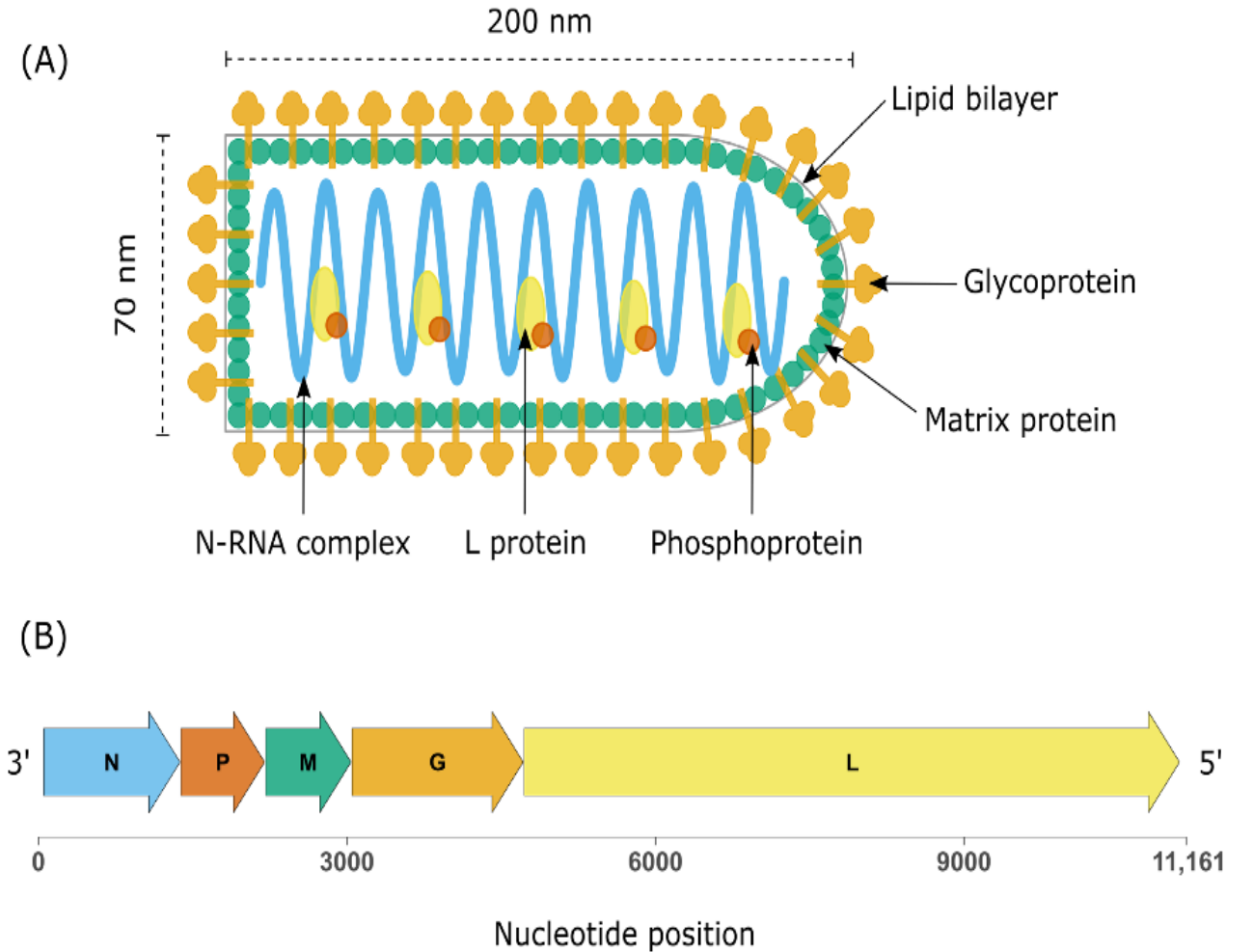
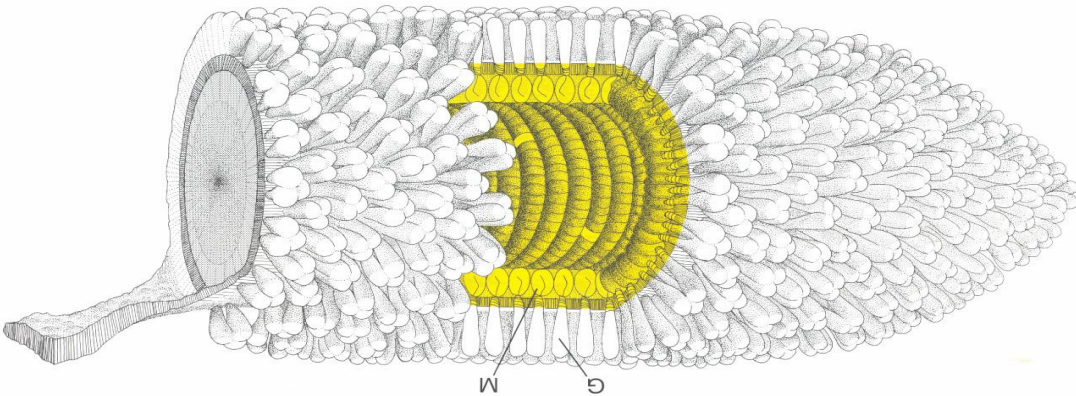
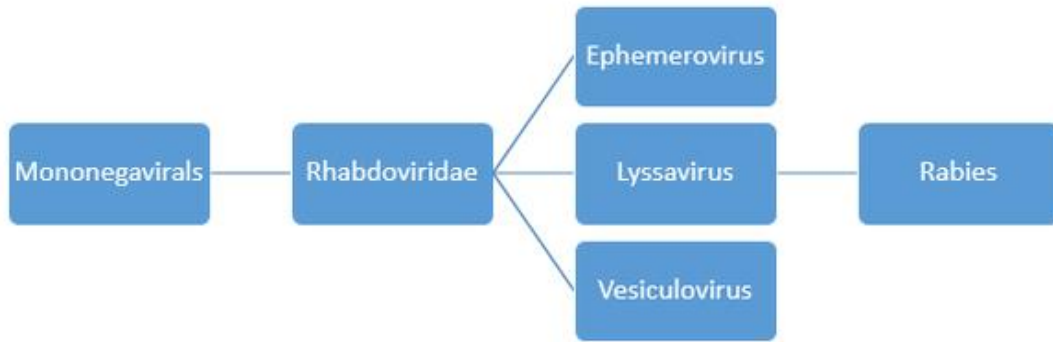


OUTLINE

- RABIES VIRUS STRUCTURE, TAXONOMY AND PHYLOGENETICS
- GLOBAL GEOGRAPHIC DISTRIBUTION OF RABIES CASES
- RABIES DISEASE IMPACT
- AIMS AND OBJECTIVES OF HUMAN RABIES / ONE HEALTH SURVEILLANCE
- SURVEILLANCE KEY CONCEPTS AND SURVEILLANCE IN SOUTH AFRICA
- CASE DEFINITIONS AND NOTIFICATION
- SOURCES AND FLOW OF INFORMATION, REPORTING
- CASE STATISTICS AND EPIDEMIOLOGICAL FINDINGS
 - HUMAN CASES INCIDENCE 1983-2025
 - AGE-GENDER DISTRIBUTION 1983-2024
 - ANIMAL SOURCES FOR HUMAN CASES BY PROVINCES 1983-2024
 - PUBLICATIONS ON HUMAN RABIES EPIDEMIOLOGY 1983-2007; 2008-2018
- TOWARDS OPERATIONALISATION OF ONE HEALTH, RABIES CASE INVESTIGATION, CASE AND BITE REPORTING, DASHBOARD
- KEY PUBLIC HEALTH MESSAGES



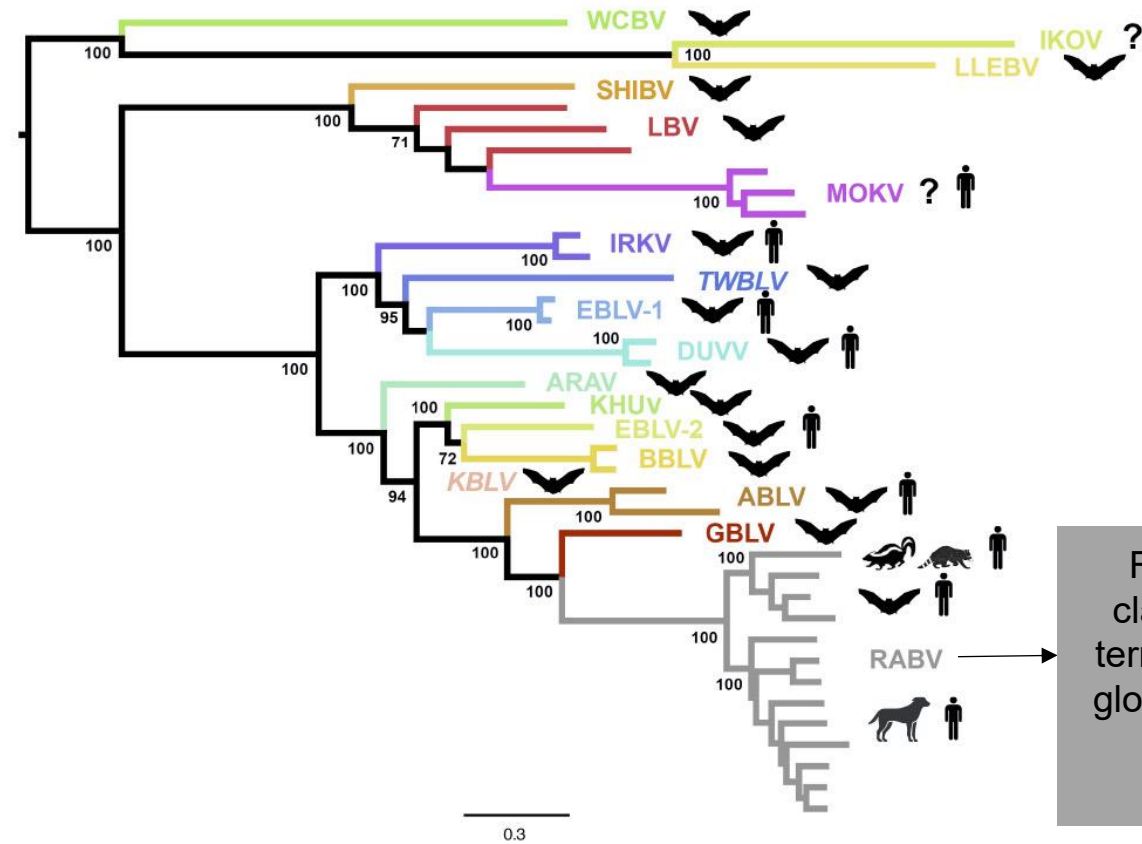
Rabies virus





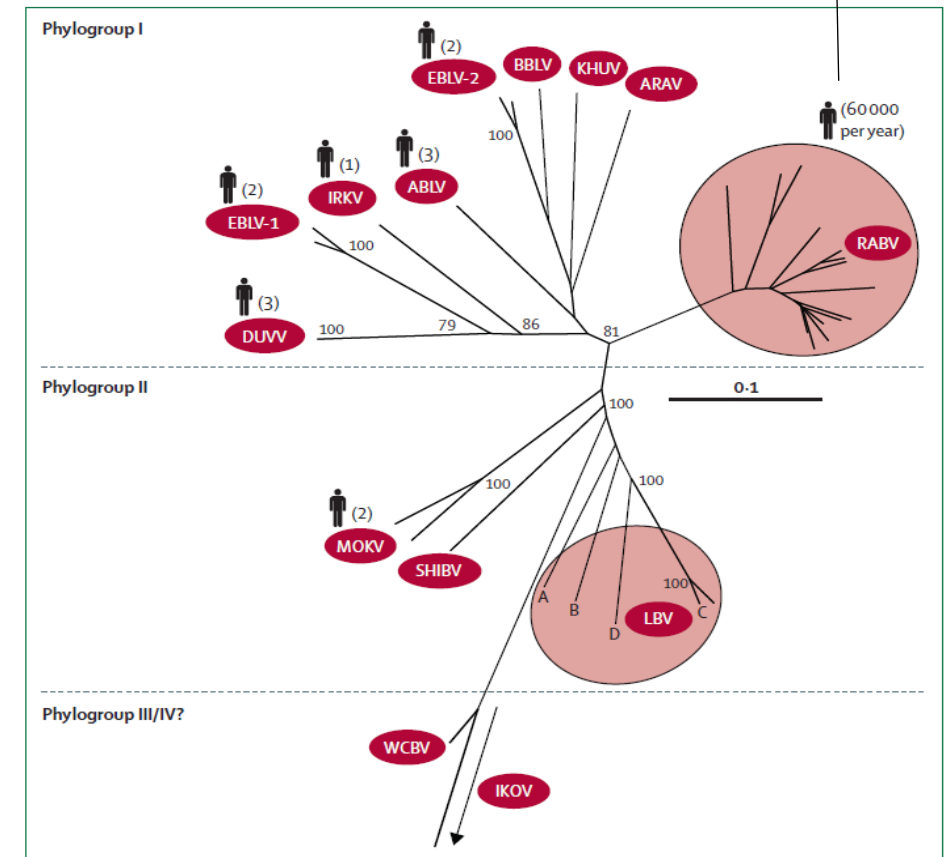
Lyssaviruses

17 species and 1 tentative species



Responsible for
classical rabies in
terrestrial mammals
globally and bats on
the American
continent

Cécile Troupin et al., 2016. PLoS Pathog 12(12): e1006041.



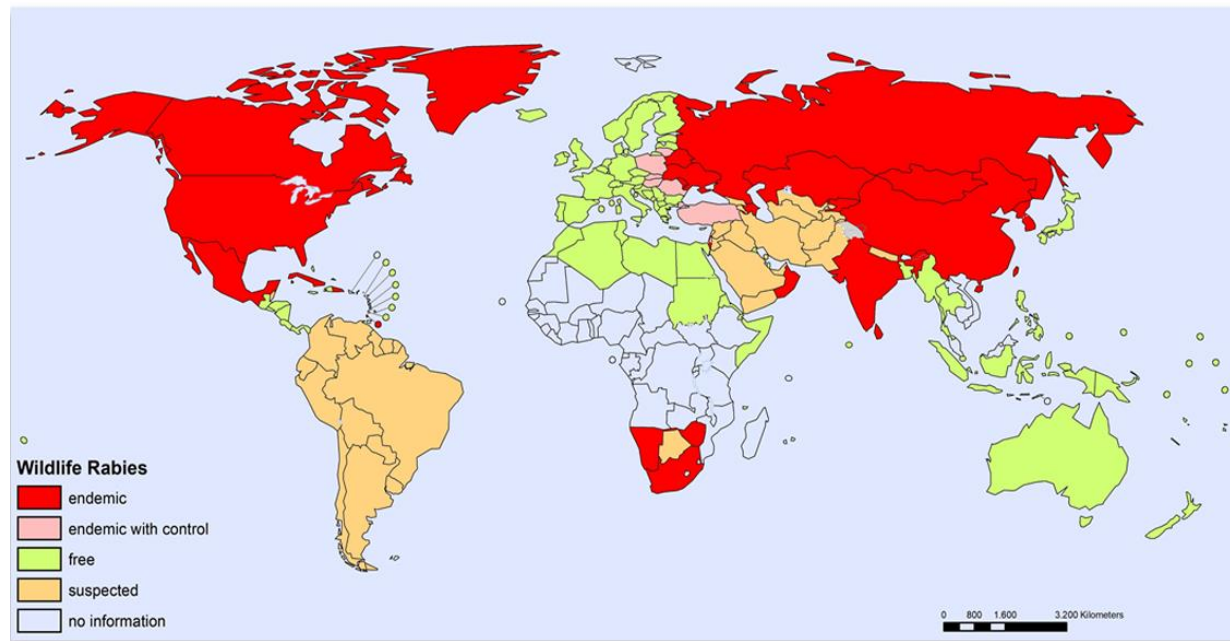
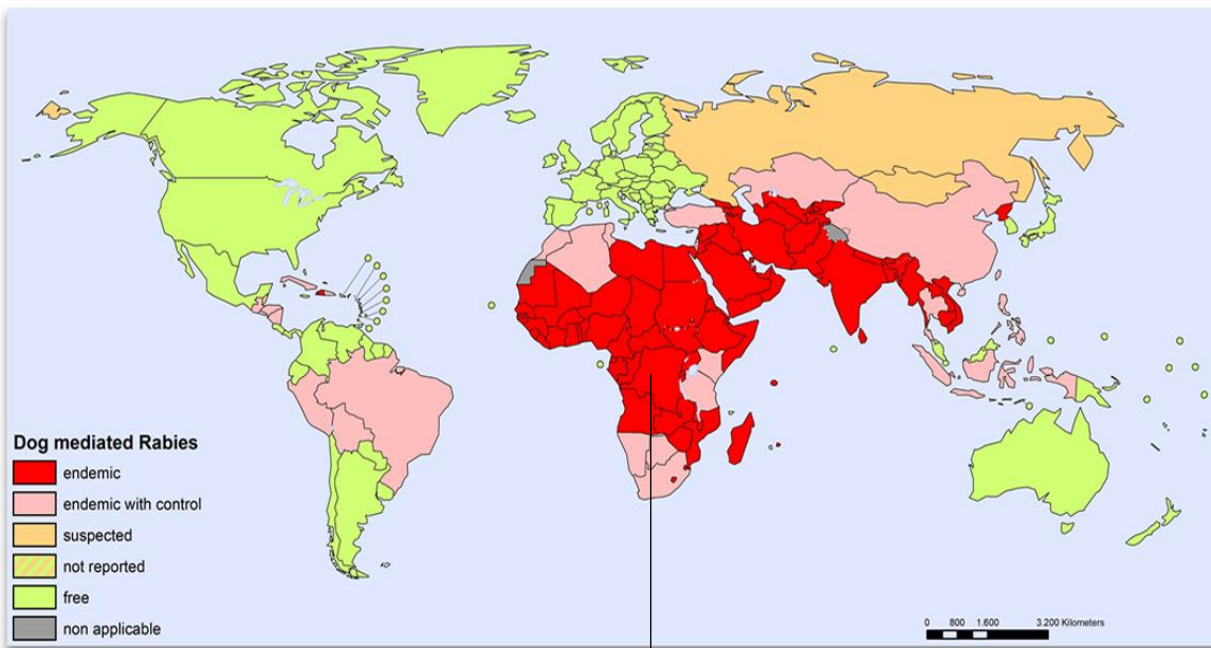
The main cause of
human rabies deaths
worldwide

Anthony R. Fooks, 2014. The Lancet, 384(9951), pp. 1389-1399.

Occurrence of dog-mediated rabies and wildlife rabies



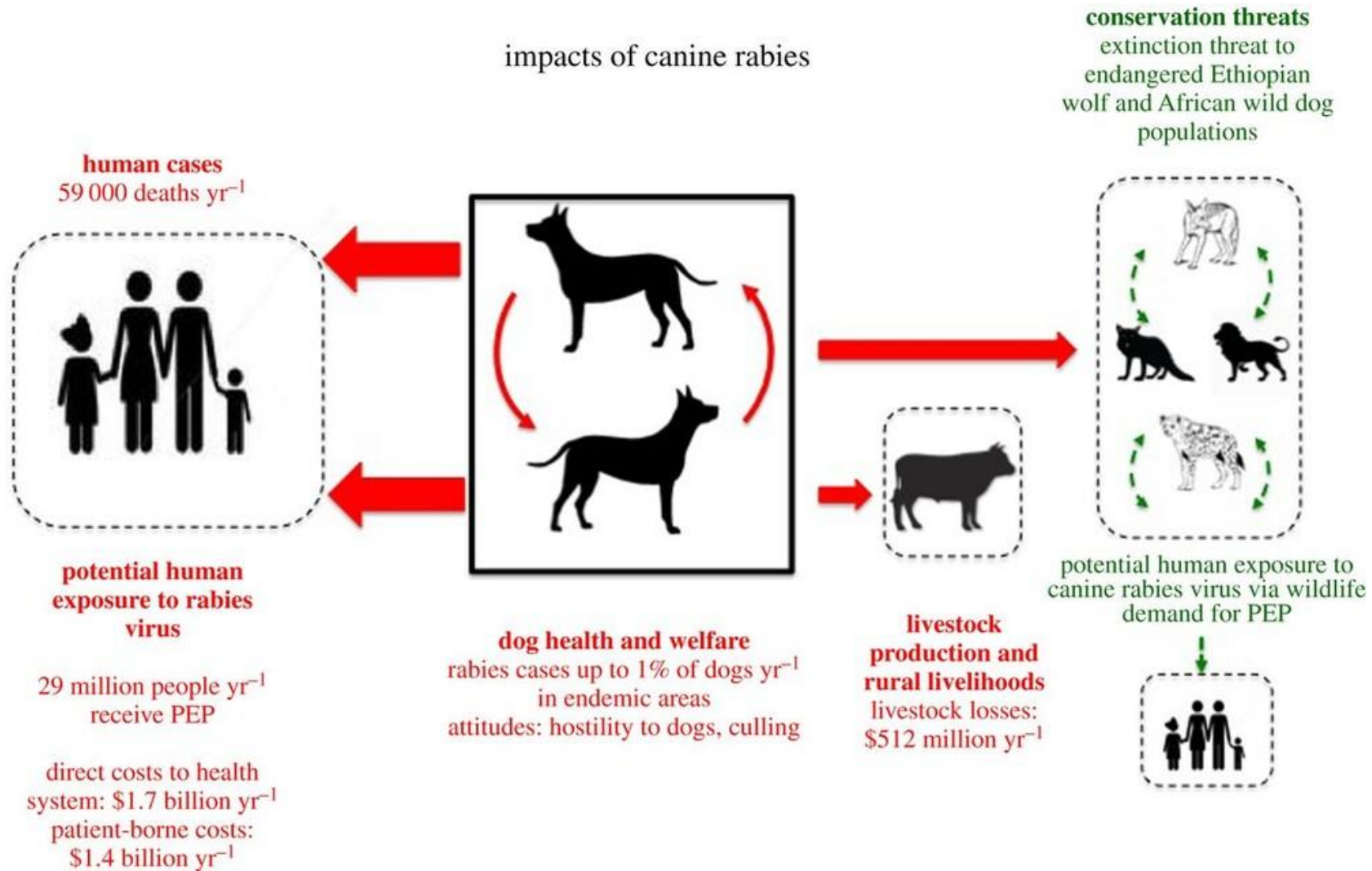
59,000 global human deaths yearly



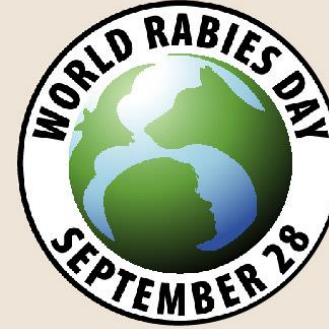
[Occurrence of rabies | Rabies - Bulletin - Europe](#)

21,476 deaths in Africa yearly

Rabies impact on humans, and socio-economic costs

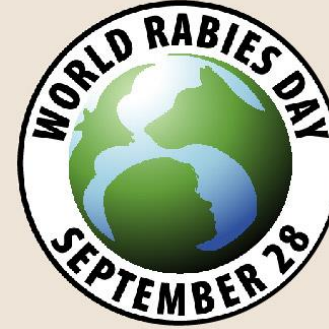


Aims and Objectives Rabies Surveillance



- The transmission of rabies to humans continues to be a formidable public health problem in many developing countries, where unvaccinated dogs continue to be a substantial reservoir of human disease.
- In Latin America, the recognition since 1980 that rabies is a public health problem, rather than an agricultural one, which resulted in sustained national budgets for rabies surveillance and control.
- The global human rabies death estimates are derived from projected dog bite incidence rates and other estimated factors for individual countries. Though they are many times higher than the rabies incidence rates reported by the national authorities of these countries, they likely do not accurately reflect the true burdens of the disease.
- In countries with the highest disease burden, a cycle of neglect is worsened by unreliable surveillance data, a lack of political will to combat rabies, and limited disease awareness among vulnerable groups, particularly in rural and underprivileged areas.

Aims and Objectives Rabies Surveillance

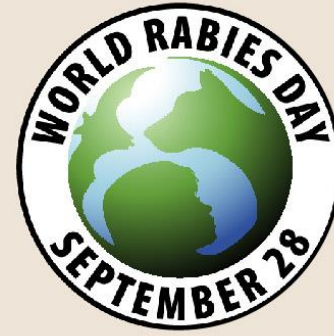


- Rabies control and surveillance are given a low priority against competing public health concerns.
- To break the cycle of neglect, robust surveillance is needed to obtain the accurate data necessary to raise awareness of rabies in the population, to engage the community, and to create the political will and intersectoral collaboration needed to initiate changes in rabies policies.
- Ongoing regional disease incidence estimates also allow control measures to be deployed preferentially in areas at highest risk or in case of outbreaks and provide a baseline against which the impact of subsequent rabies control programs can be measured over time.



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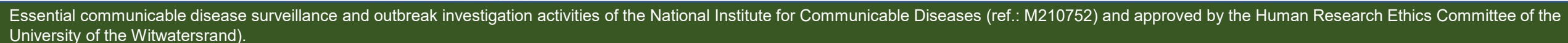


Surveillance & Reporting Methods

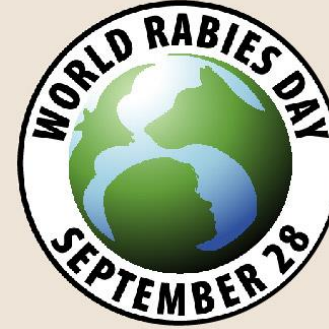


Effective surveillance consists of several key concepts:

- Rabies must first be a legally notifiable disease. Human rabies has been a notifiable medical condition (NMC) in South Africa since 1977- the Health Act of 1977 provided for the control of communicable diseases, including rabies.
- HCPs must be engaged and trained in surveillance methods, disease diagnosis, and case recognition according to internationally recognized definitions. A suspected rabies case is presenting with an acute neurological syndrome (encephalitis) dominated by forms of hyperactivity (furious rabies) or paralytic syndromes (dumb rabies) progressing towards coma and death, usually by respiratory failure, within 7-10 days after the first symptom.
- Community participation is also a key component.
- Laboratory capabilities are also necessary for confirming suspected cases, and if not available locally, quality storage and shipping supplies are needed to transport samples from remote areas to central laboratories. One medical laboratory, the Special Viral Pathogens Laboratory (SVPL) of the NICD, a division of the National Health Laboratory Service (Gauteng province).
- Antemortem testing, including skin biopsies, saliva samples, and cerebrospinal fluid (CSF), is analysed using an **RT-PCR test**. Post-mortem testing: **FAT**
- www.nicd.ac.za



Collecting human case data

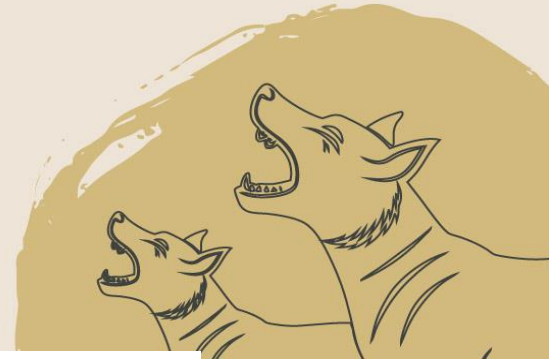
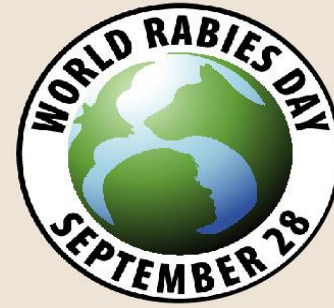


- The data collected on suspected cases, must be analyzed and disseminated effectively. Reporting networks need to be efficient and timely and across various levels.
- Communication and coordination between human health and veterinary systems are also crucial for the follow up of both human and animal cases.
- As we strive to put One Health approaches for managing and preventing rabies into practice, we aim to enhance cross-sectoral evidence-based reporting.
- Finally, stakeholders need to be engaged long term to ensure that the surveillance is sustainable.



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Case statistics and epidemiological findings

Human rabies and One Health aspects





RABV confirmed human case prevalence in South Africa, 1983-2004

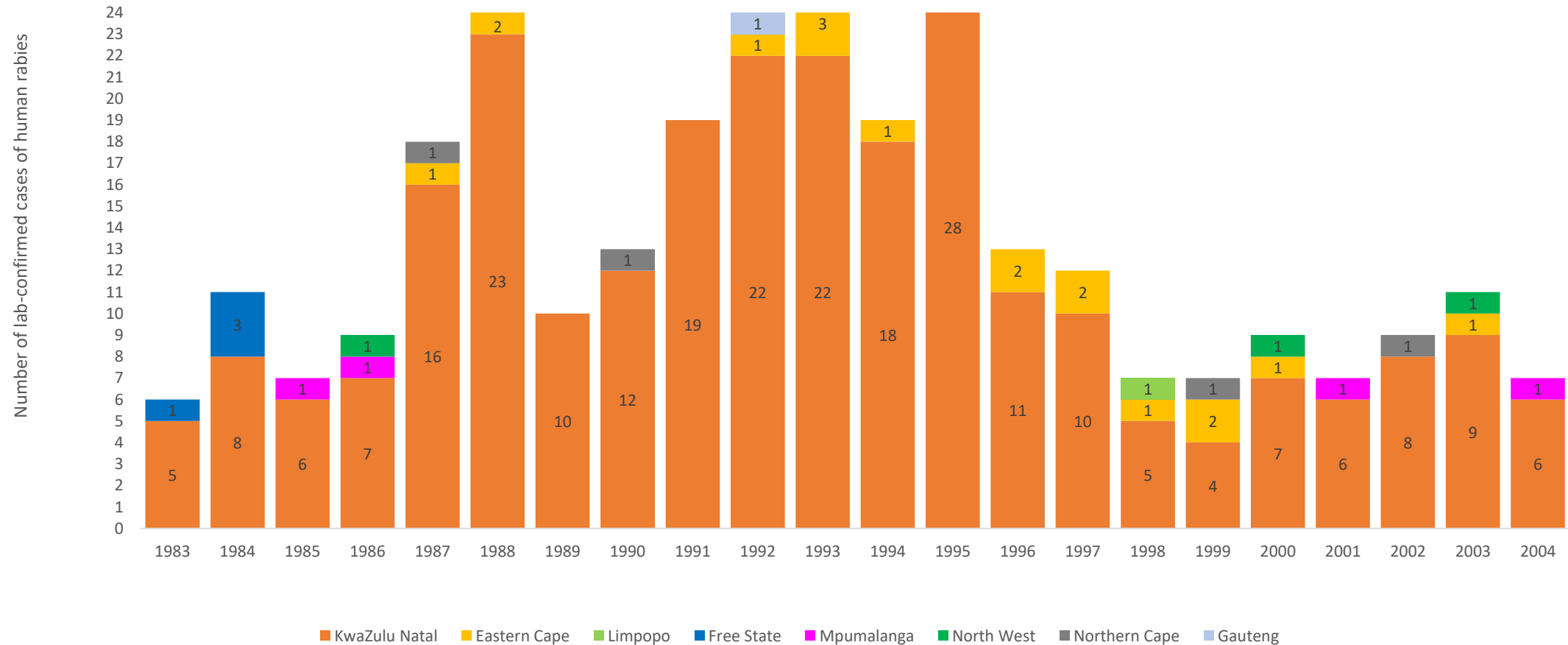


Figure: Human lab-confirmed rabies cases by province, South Africa, 1983-2004 Data source: NICD-NHLS



RABV confirmed human case prevalence in South Africa, 2005-2025

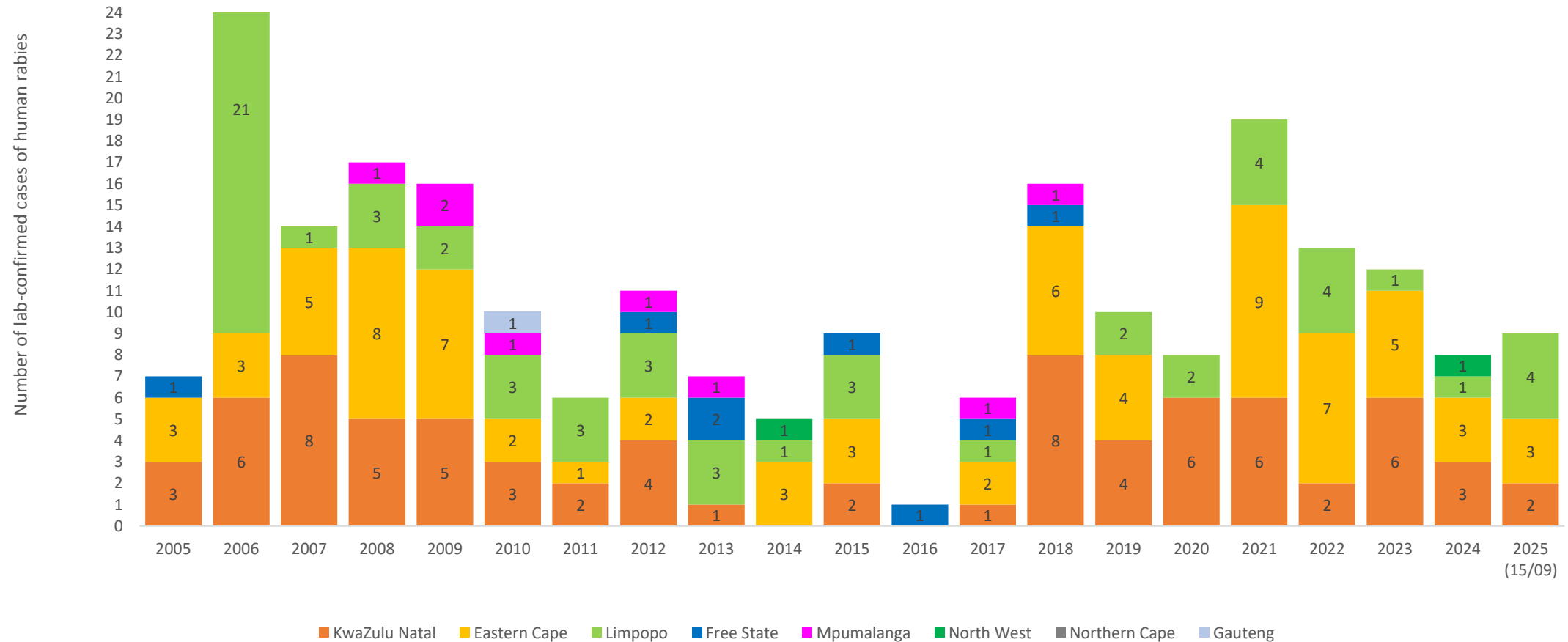


Figure: Human lab-confirmed rabies cases by province, South Africa, 2005-2025 Data source: NICD-NHLS



RABV confirmed and probable human case prevalence in South Africa, 2012-2024

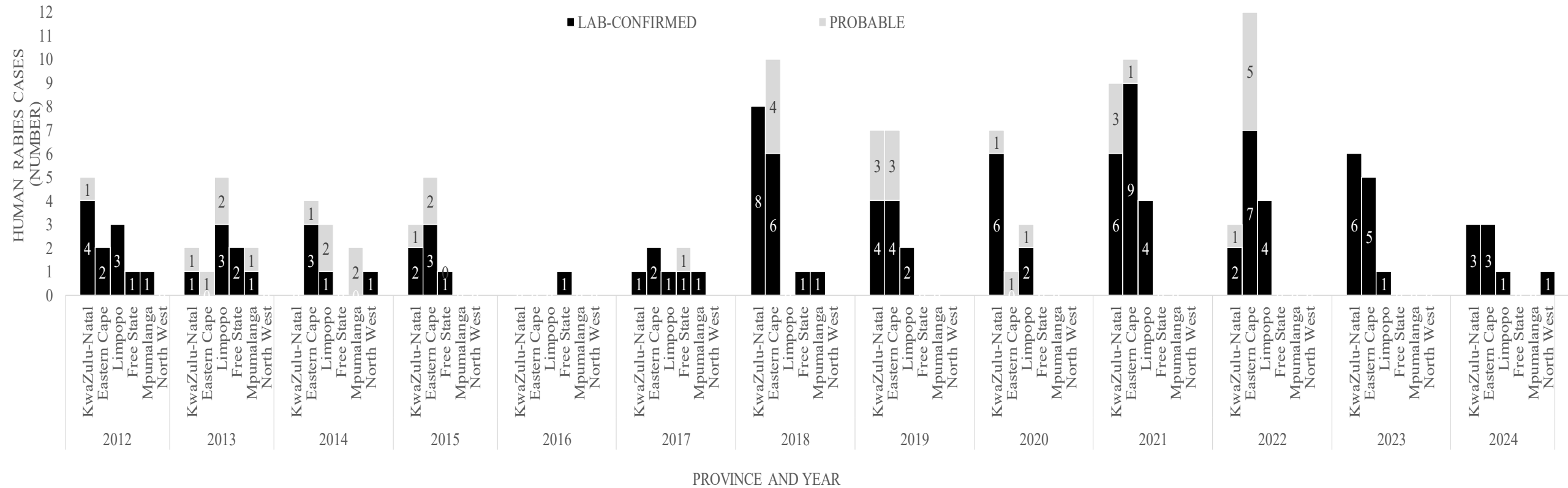
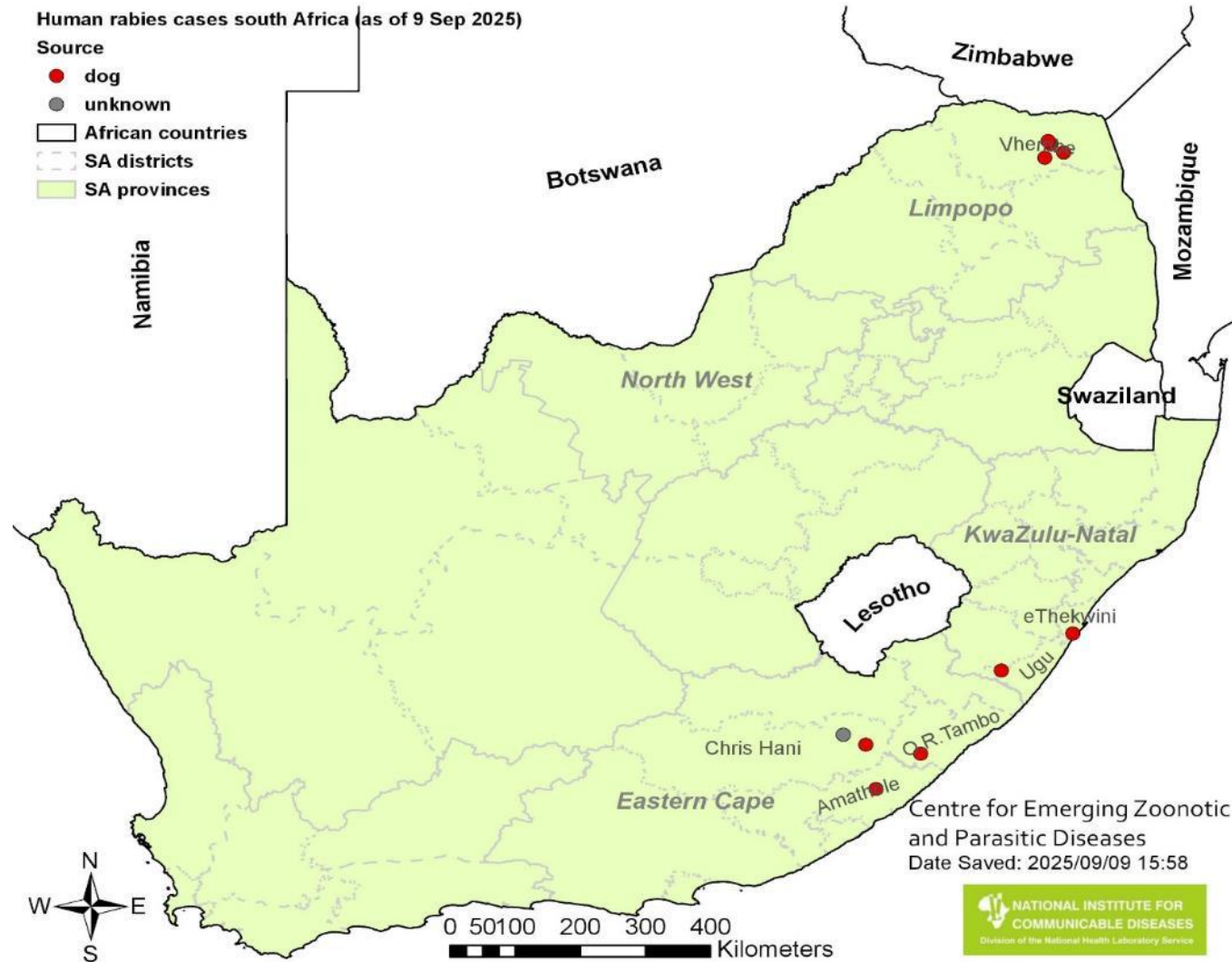


Figure: Human lab-confirmed and probable rabies cases by province, South Africa, 2012-2024 Data source: NICD-NHLS



RABV confirmed (n=9) and probable human case (n=1) prevalence in South Africa, 2025 current



confirmed cases involve four adults and five children, and a probable case is in a child (KZN)* and one in an adult (EC)

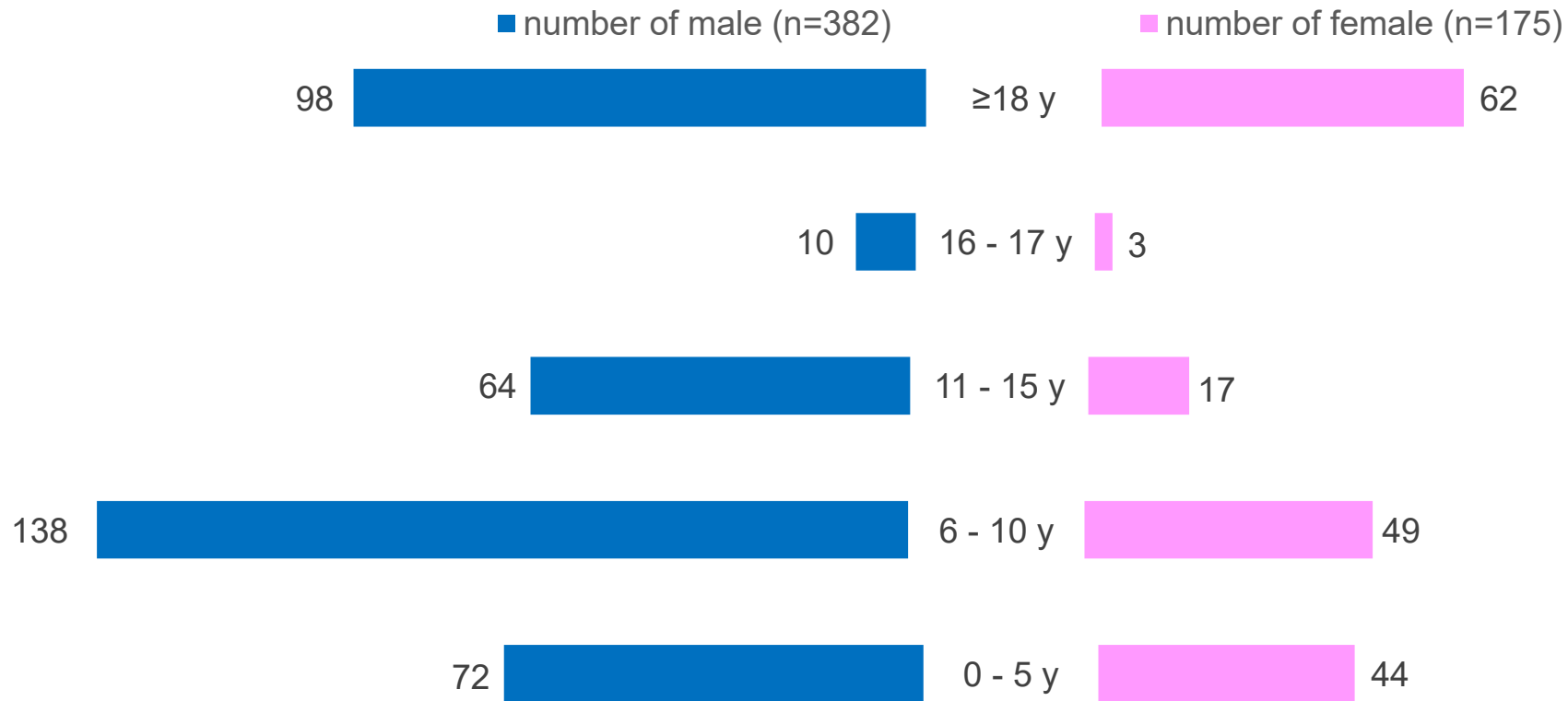
*Not on map

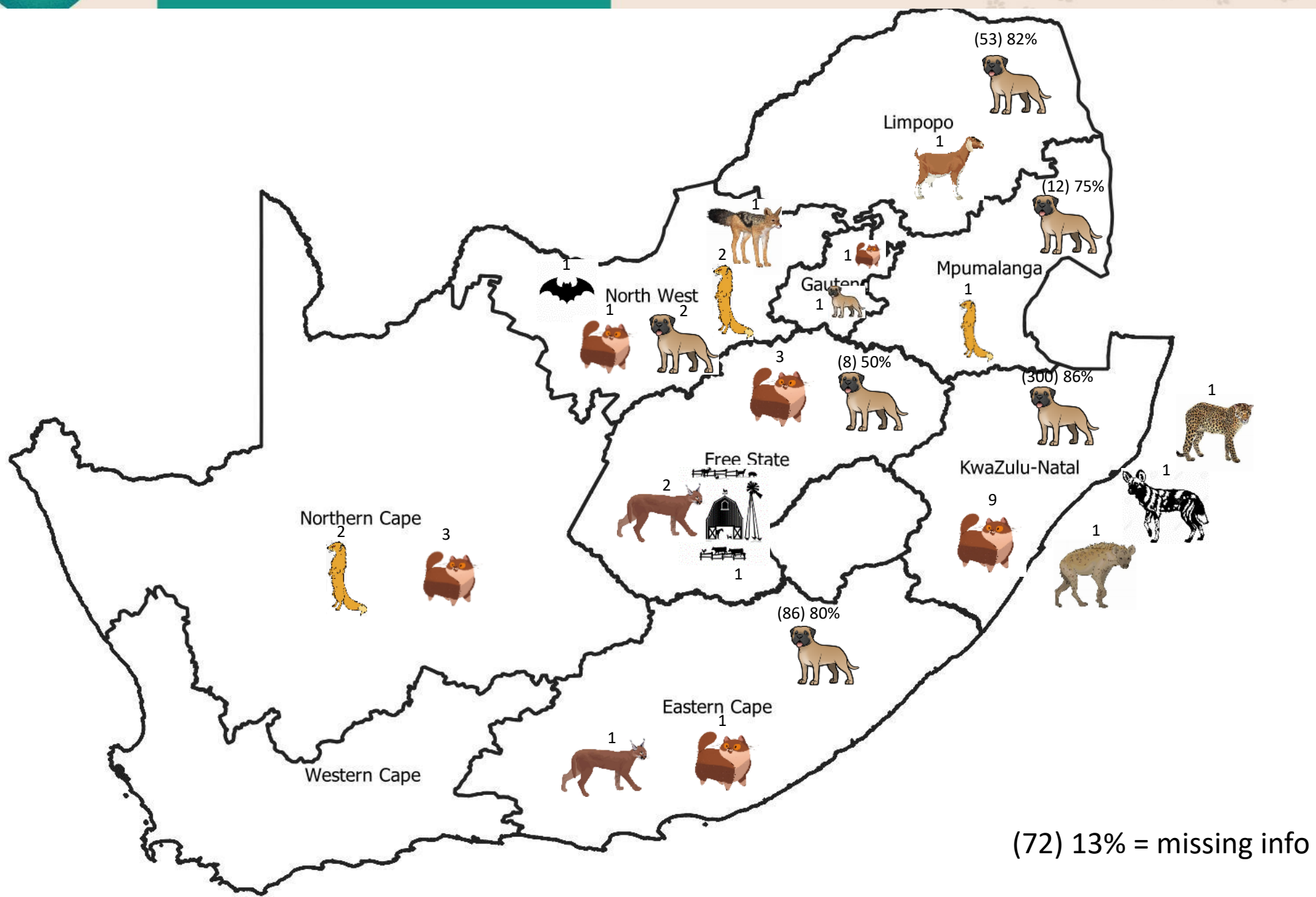


Age-sex distribution pyramid of human rabies cases, South Africa, 1983-2024



69% under sixteen years of age



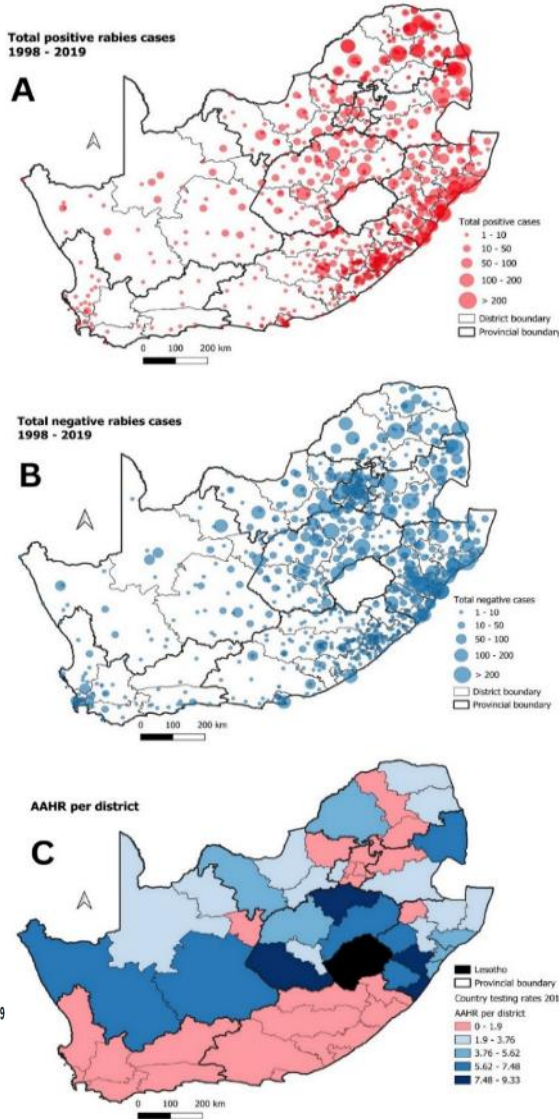




RABV domestic dog, 1998-2019 and human case prevalence in South Africa, 1983-2007 and 2008-2018



Figure (A) The total positive animal rabies cases in South Africa between 1998 and 2019; (B) total negative animal rabies cases in South Africa between 1998 and 2019; and (C) AAHR values per district across South Africa (2010–2019) where districts below the threshold value are indicated in red



Epidemiology of human rabies in South Africa, 2008 - 2018

J Weyer,^{1,2} PhD, MPH; V Dermaux-Msimang,¹ MSc; A Grobbelaar,¹ MSc; C le Roux,¹ MSc; N Moolla,^{1,2} PhD; J Paweska,^{1,2} DVMSc, Dr hab, Prof Vet Sci; L Blumberg,^{1,3} MB BCh, MMed (Micro), DTM&H, DOH, DCH

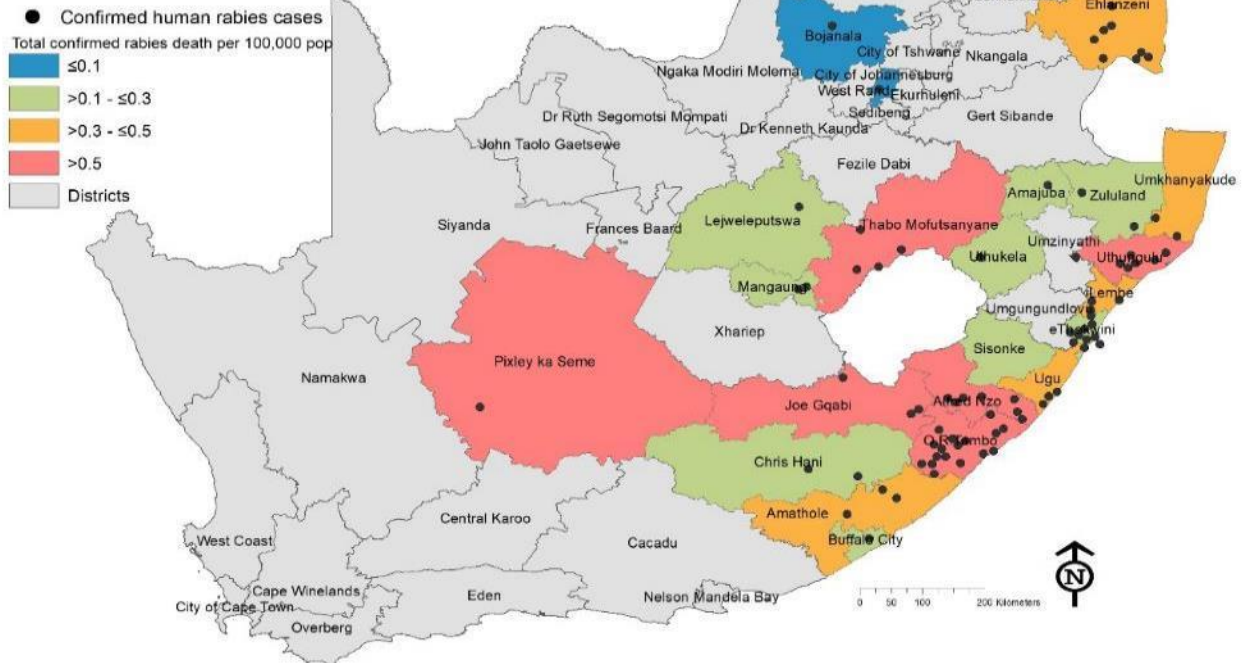


Figure : Human lab-confirmed rabies cases by province, South Africa, 1998-2018 Data source: NICD-NHLS

Weyer J, Dermaux-Msimang V, Grobbelaar AA, le Roux C, Moolla N, Paweska JT, et al. Epidemiology of human rabies in South Africa, **2008 - 2018**. SAMJ. 2020;110(9):877-81-81.

Weyer J, Szymd-Potapczuk AV, Blumberg LH, Leman PA, Markotter W, Swanepoel R, et al. Epidemiology of human rabies in south africa, 1983-2007. Virus Research. 2011; 155(1):283-90. doi:10.1016/j.virusres.2010.10.023





Recent ONE HEALTH Reports for rabies



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**Public Health Bulletin**
South Africa

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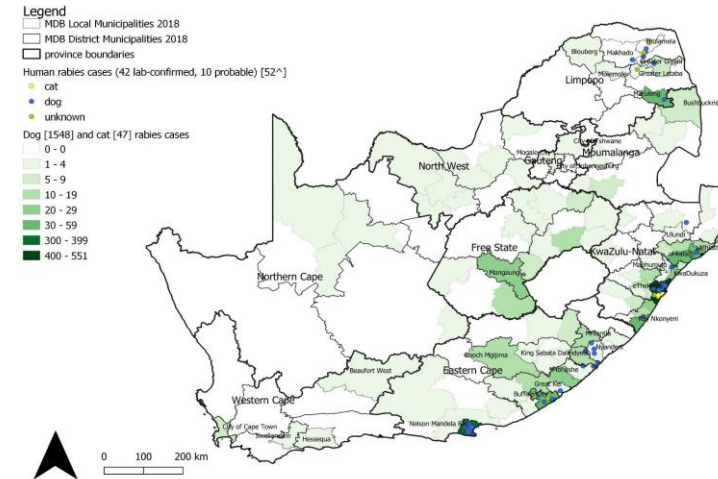
Animal Bites and Human Rabies in Limpopo, South Africa (2011–2023): Epidemiological Trends and Insights

“A total of 98,743 animal bite cases were reported between 2011 and 2023, with an overall incidence of 131 per 100,000 population. Sixty percent of animal bites were reported from Vhembe District, with an average of 4,857 annual incidents. Ongoing surveillance is important to monitor the number of animal bites and human rabies cases and identify high-risk areas for targeted interventions. Adopting a coordinated One Health approach that integrates reporting of both animal bites and human incidents can lead to more effective control measures at the municipality, district, provincial, and national levels.”



One Health Surveillance Report for Rabies, South Africa, 2021-2023

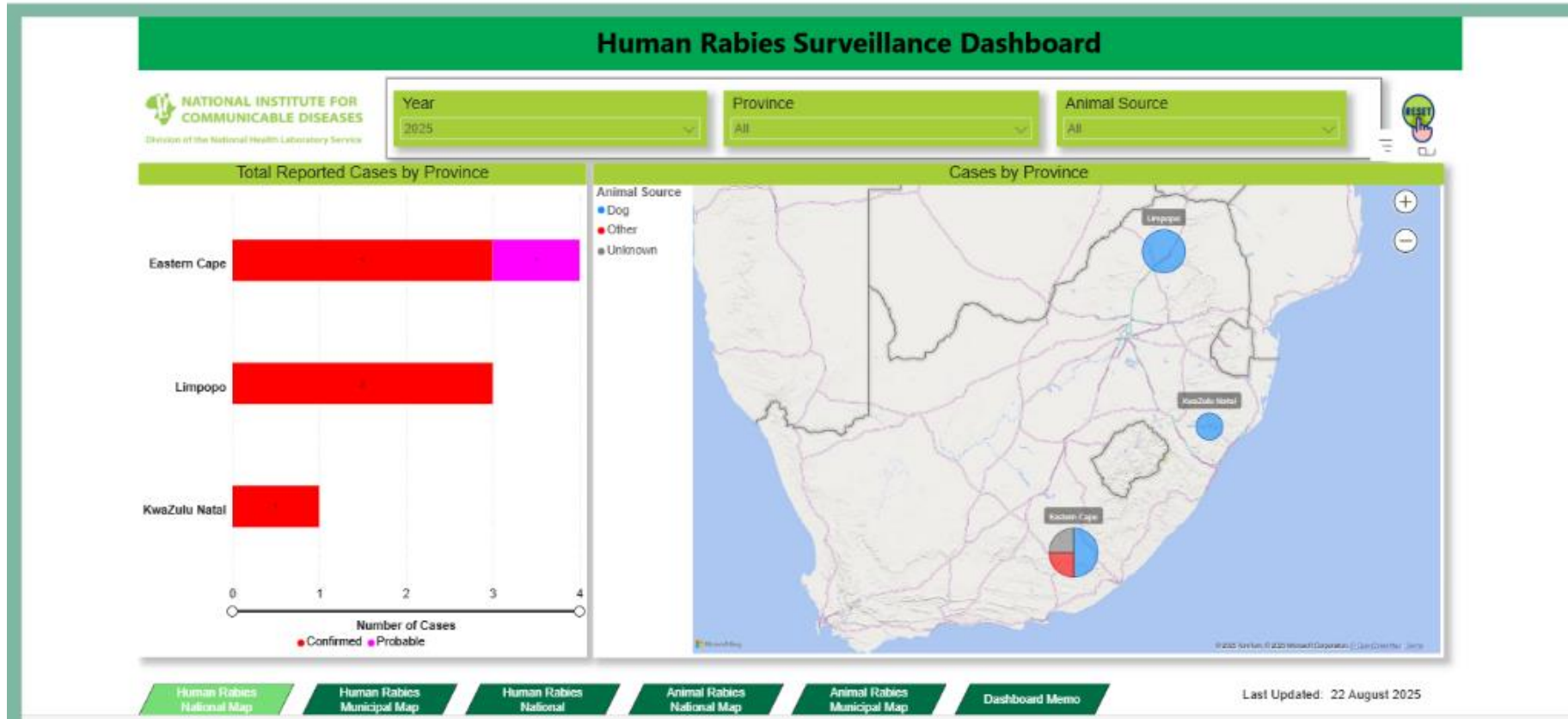
Veerle Dermaux-Msimang¹, Alicia Cloete², Kevin le Roux³, Naazneen Moolla¹, Thomas Dlamini⁴, Antoinette Grobbelaar¹, Babongile Mhlongo⁵, Susan Nzenze⁶, Wayne Ramakrishna⁷, Lucille Blumberg^{1,6}, Ruvimbo Chingonzoh⁶, Drienie (Didi) Claassen⁸, Nosipho Gcabashe⁵, Kamini Govender¹, Chantel le Roux¹, Unarine Makungo⁶, Nosipho Mgobo⁴, Munangatire Mparamoto⁹, Freda Ngobeni¹⁰, Moshibudi Poncho Phafane⁶, Queen Ranoto¹⁰, Jacqueline Weyer¹



Outbreak Investigation Report | Sample Rabies case (human)



Rabies Dashboard



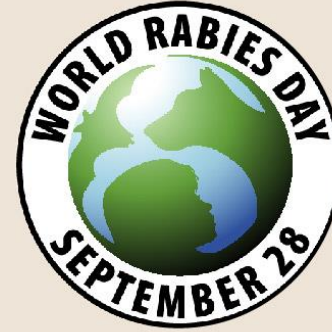


Key Public Health messages



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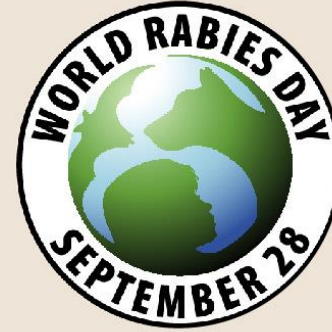
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- As we marked World Rabies Day on Sept 28, 2025, it is crucial to reassess and enhance strategies for effectively combating this preventable disease.
- Surveillance systems are usually passive, based on clinical symptoms, and capture few authentic human cases due to inaccurate diagnosis and the scarcity of laboratory confirmation.
- With surveillance in many areas in South Africa and African countries poorly equipped to detect and confirm human rabies cases, many authentic infections are not recorded, and the data are unavailable to support efforts to control the disease.



Key Public Health messages



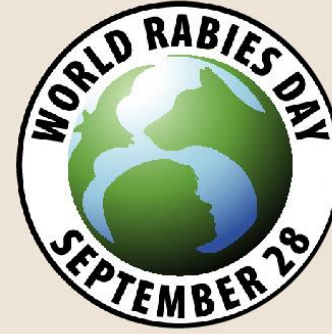
- Enhancing awareness among both the general public and healthcare workers is crucial.
- Digital health platforms and community-based surveillance systems will enhance the effectiveness of the One Health strategy, bridging existing gaps and ensuring sustainable, community-driven rabies control.
- An intersectoral surveillance system for rabies that rely on strong laboratory capacities and efficient cross-sectoral reporting methods.

Key Public Health messages



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- Guidelines and surveillance standards, such as the Rabies Surveillance Blueprint
- Global Rabies Alliance



Surveillance tools



RABIES CASE SURVEILLANCE



BITE CASE TRACKER



BITING ANIMAL QUARANTINE

Supporting tools



EDUCATION INITIATIVE
TRACKER



RABIES TREATMENT TRACKER



Acknowledgments and contacts



CEZPD: jacquelinew@nicd.ac.za; naazneenm@nicd.ac.za; veerlem@nicd.ac.za; DPHSR: outbreak@nicd.ac.za; PET: PETTEAM@nicd.ac.za; LehlohonoloC@nicd.ac.za; Communications: VuyoS@nicd.ac.za;

Thanks for listening!



{Dog listening picture, n.d.}

Any questions?

We acknowledge the contribution to rabies surveillance:

- Laboratory staff NICD, OVR, Allerton
- NICD Division Public Health Surveillance and Response; the DoH CDCC and; NDoA Directorate Animal Health
- Private and public health care and veterinary professionals
- Community workers and members

We acknowledges the grief experiences of family members who have lost close relatives and companion animals due to rabies.

