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Dog Menace in Delhi: A Geographical Review and Epidemiological Analysis of Rabies Burden and Judicial Responses

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Abstract

Free-roaming dogs are a persistent issue in many Indian cities. In Delhi, rising dog-bite incidences and reported rabies cases have prompted intense public debate, policy action by municipal agencies, and a high-profile Supreme Court intervention in August 2025. This review examines the geography of the stray dog–human conflict in Delhi, focusing on dog-bite trends, rabies epidemiology, and governance responses, including the 2025 Supreme Court judgment on dog management. Using published epidemiological studies, municipal surveillance data, and Animal Birth Control (ABC) programme documents, the paper analyses temporal and seasonal dog-bite patterns and identifies neighbourhood-level risk concentrations driven by waste availability, urban density, and uneven ABC coverage. Comparative cases from Bengaluru, Kerala, and Mumbai show similar challenges of fragmented implementation, rapid dog population turnover, and persistent hotspots, while Kerala's expanded anti-rabies initiatives demonstrate measurable reductions in human rabies but heightened community tensions. Findings highlight the need for spatially targeted interventions, improved waste management, and strengthened ward-level sterilisation and vaccination cycles. The study concludes that Delhi's conflict is shaped by ecological and institutional factors, and that durable solutions require aligning public-health priorities with legal and animal-welfare frameworks.

Keywords: stray dogs, rabies, dog-bite epidemiology, Animal Birth Control (ABC) rules, Sterilisation, vaccination, urban governance, public health, Supreme Court

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1. Introduction

Free-roaming domestic dogs (free-ranging dogs; FRDs) occupy complex socio-ecological niches in Indian cities, including waste-based feeding zones, human-created feeding points, informal settlements, transport hubs, and neighbourhood territories shaped by resource availability and uneven urban governance (Home et al., 2018; Belsare & Vanak, 2020; Gompper, 2014). They scavenge on urban edible waste, interact daily with humans, and when unchecked, they pose public-health risks through bite, injuries and the transmission of rabies. Delhi, as one of India's largest metropolitan regions, with uneven municipal services and dense human populations, illustrates how urban geography shapes both the scale and spatial distribution of dog-human conflict (Srinivasan et al., 2025). The August 2025 Supreme Court directives concerning stray dogs in Delhi and the National Capital Region (NCR) have brought additional scrutiny to the options for managing FRDs and their geographic feasibility (Reuters, 2025; AP, 2025).

This paper synthesises existing evidence on drivers and spatial patterns of dog–human conflict in Delhi, compares interventions from other Indian cities, and examines Delhi's rabies and dog-bite epidemiology to inform spatially explicit policy recommendations. To strengthen analytical rigor, a structured review method was followed covering the period **2000–2025**, capturing two and a half decades of urban dog management policy, rabies surveillance data, and demographic change. Searches were conducted across major scholarly databases, national epidemiological repositories, municipal documents, and court records using keyword combinations related to *free-roaming dogs*, *dog bites*, *rabies*, *Animal Birth Control rules*, *vaccination*, and *urban governance*.

All retrieved sources were screened using three criteria:

1. **Relevance to Indian urban contexts** (with a focus on Delhi, Bengaluru, Kerala, and Mumbai).
2. **Data robustness**, including epidemiological counts, temporal trends, or spatial indicators.
3. **Policy or legal significance**, including intervention outcomes and governmental actions.

Eligible studies and documents were analysed using a **thematic–comparative framework** integrating (a) dog-population dynamics, (b) epidemiological patterns and seasonality, and (c) municipal, legal, and socio-ecological drivers. This approach allows triangulation of spatial, public health, and governance perspectives to generate evidence-based, context-specific recommendations for Delhi.

2. Legal and Policy Background

India's national rabies-elimination framework provides the broader policy environment shaping how cities manage free-roaming dogs and dog-mediated public health risks. The National Action Plan for Dog-Mediated Rabies Elimination (NAPRE) 2030, launched under the Ministry of Health and Family Welfare, aims to achieve "zero human deaths from dog-mediated rabies by 2030" through a One Health approach integrating mass dog vaccination, strengthened bite management, improved surveillance, and inter-sectoral coordination between municipal bodies and public-health systems.

Complementing this, the National Rabies Control Programme (NRCP) operationalises these goals through routine surveillance, training of Anti-Rabies Clinics, and technical support for states to expand post-exposure prophylaxis and dog vaccination infrastructure. Peer-reviewed studies show that sustained dog vaccination coverage above 70% is essential to break transmission (Taylor et al., 2017; Radhakrishnan, 2020). Evidence from multi-city analyses also indicates that combining vaccination with long-term population stabilisation improves effectiveness, particularly in dense urban settings (Fielding et al., 2025).

However, evaluations of municipal implementation reveal persistent gaps—uneven vaccine delivery, poor interdepartmental coordination, and chronic underfunding—which hinder progress toward NAPRE targets (Asokan et al., 2024; Grover et al., 2022). Situating Delhi's current challenges within this national framework highlights that local dog-population management is inseparable from national rabies-elimination commitments, and that evidence-based, spatially targeted intervention models are necessary for Delhi to align with NAPRE 2030 and NRCP goals.

The principal national policy instrument is the Animal Birth Control (Dogs) Rules (ABC Rules), issued under the Prevention of Cruelty to Animals Act (originally 2001, with updates and operational guidance since then). The ABC paradigm mandates capture, sterilisation, rabies vaccination, and return to site of capture for healthy free-roaming dogs; it permits euthanasia only for confirmed rabies or severe incurable conditions (Animal Welfare Board of India, 2023).

In August 2025, following a surge in reported bite cases and public pressure, India's Supreme Court initially ordered large-scale removal of dogs to shelters but then modified the directive to emphasise sterilisation, vaccination, and the release of healthy animals back to their localities while isolating or treating rabid/aggressive animals (Reuters, 2025; AP, 2025). The ruling reflects tensions among immediate public-safety demands, legal protections for animals, and practical limits of sheltering at scale.

3. Literature Review: Comparative Cases from Other Indian Cities/States

To understand what might work in Delhi, it is useful to review population management outcomes elsewhere in India, where differing approaches and implementation capacities produced measurable results.

3.1 Bengaluru

Bengaluru has a long-running ABC program with substantial municipal and NGO involvement. Recent urban canine surveys estimate the city's street-dog population at roughly 280,000–300,000; concerted sterilisation and vaccination campaigns have reportedly produced measurable reductions in population estimates and improved neutering coverage compared with earlier years (JSRR/Bengaluru review, 2024). The Bengaluru case underlines two lessons: (1) geographic scale matters—city-wide

reductions require large-scale, sustained effort; (2) monitoring (periodic population surveys) is necessary to evaluate program effectiveness and to target hotspots (JSRR report, 2024).

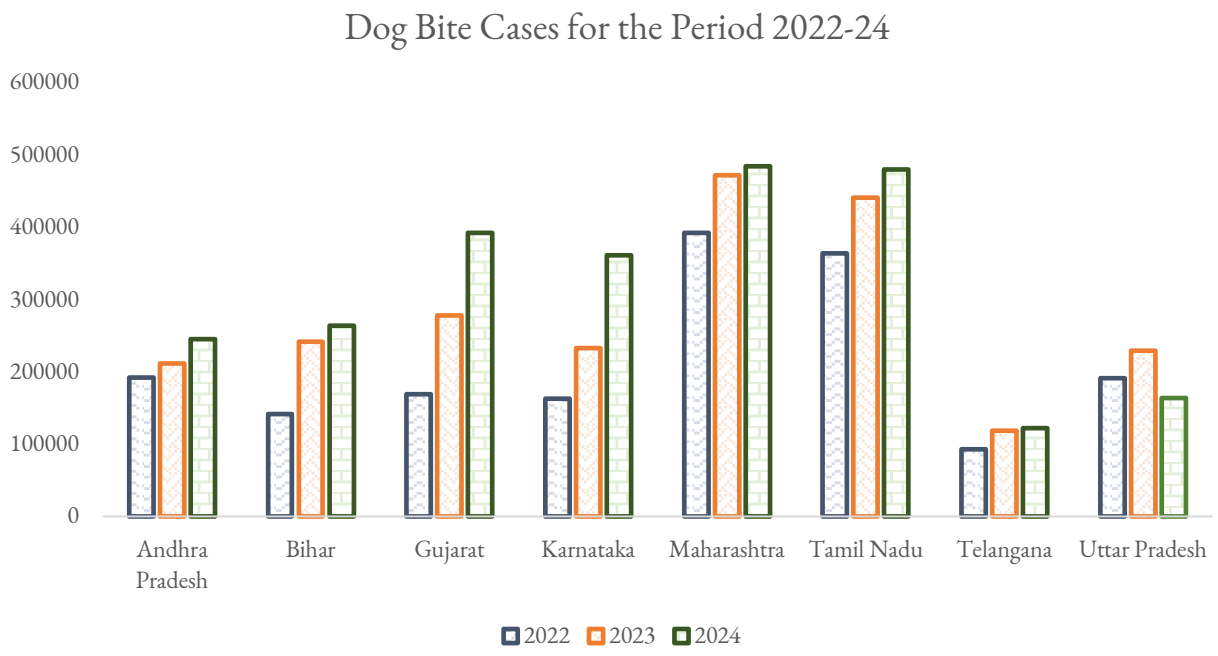
3.2 Kerala

Kerala and several smaller Indian states/districts have been highlighted as demonstrating effective ABC outcomes at a manageable scale due to high administrative capacity and better public-health integration. Evaluations indicate that when sterilisation and vaccination coverage reach high thresholds, rabies incidences and visible stray-dog density decline (Amrutha et al., 2024). The Kerala experience reinforces that context—governance capacity, funding, and community engagement—is decisive.

3.3 Mumbai and Maharashtra

Mumbai (and the larger Maharashtra state) presents a mixed picture: urban density, complex waste flows, and high human mobility make consistent coverage hard. Some districts in Maharashtra reported localised rabies deaths and large numbers of dog-bite cases in episodic outbreaks (local media and public health bulletins). The Mumbai experience emphasises the importance of integrated waste management and health system readiness for timeliness of post-exposure prophylaxis (PEP) (local reporting; IJNRD review). Fig. 1.1 shows the progressive increase in the dog bite cases of all states with over 1lakh cases annually. Among these states, only Uttar Pradesh has reported a decrease in dog bite cases in 2024.

Fig. 1.1 Dog Bite Cases for some Selected States having Dog Bites Greater than 1 Lakh



(Diagram Compiled by Author from Data source Integrated Disease Surveillance Programme as on 27-2-2025)

3.4 Comparative Literature

- **High coverage of vaccination** (≥70% of FRDs) is necessary to interrupt rabies transmission locally (Taylor et al., 2017; Amrutha et al., 2024).
- **Surgical sterilisation** reduces population turnover in some settings, but requires sustained, large-scale capacity. Single, short campaigns rarely yield sustained declines.
- **Waste management and human behaviour** (feeding practices) are co-drivers; DPM (dog population management) must combine ABC with reductions in accessible food sources.
- **Monitoring & geo-targeting** (surveys, hotspot mapping) substantially improve efficiency by prioritising wards/colonies with the highest bite rates and dog densities (Asokan et al., 2024; Fielding et al., 2025).

These findings suggest that for megacities like Delhi, spatial prioritisation (hotspot mapping) plus sustained ABC coupled with improvements in waste services are the most evidence-based pathway.

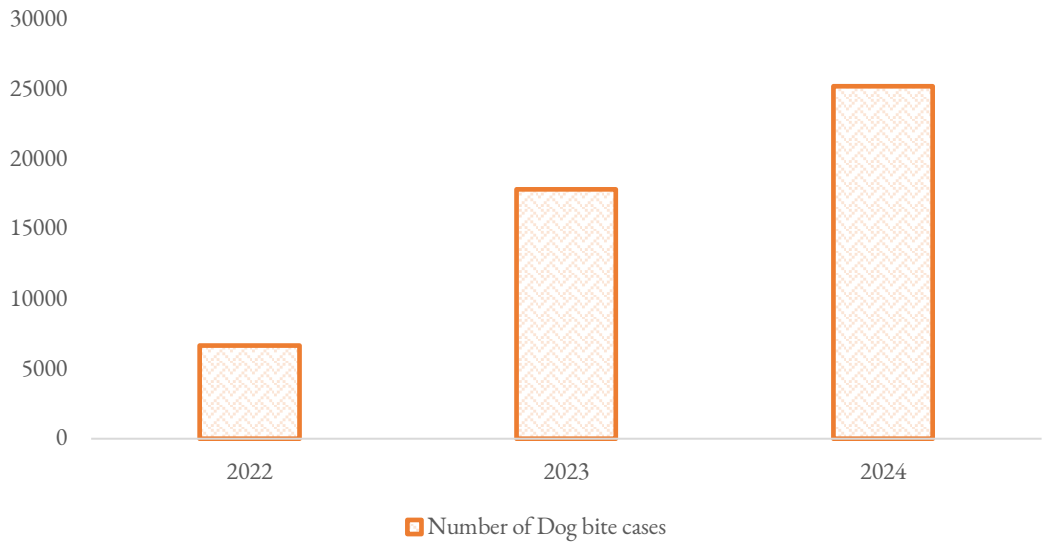
4. Detailed Epidemiological Analysis: Dog Bites and Rabies in Delhi

This section synthesises published and publicly reported epidemiological data on dog-bite incidence, rabies cases, seasonality patterns, demographic burden, and public health system impacts in Delhi.

4.1 Magnitude and Trend in the Recent Years

Multiple sources indicate that Delhi experiences high absolute numbers of dog-bite incidents annually. Municipal data reported by media and PTI show that in 2024 Delhi recorded roughly **68,090** dog-bite cases and that, by mid-2025 (through July/August), tens of thousands of additional cases had been reported, with MCD figures often cited around **26,000+** for the year to date (Hindustan Times, 2025). National reporting highlights India's large dog-bite burden overall, with recent national figures showing millions of dog-bite incidents annually (Economic Times summary, 2025). At the clinical level, specialised anti-rabies clinics in Delhi hospitals saw large caseloads: one multi-centre analysis covering 2007–2019 recorded over **110,000** category II/III animal bite attendances across 13 years in government anti-rabies clinics reviewed in the literature (Grover et al., 2022).

Fig. 1.2 Trend of Dog Bites in Delhi in the Recent Years



(Graph Compiled by Author from Data source IDSP/IHIP as on 27-2-2025).
Note: In January of 2025 alone, the number stood at 3196 cases.

4.2 Case Severity and Demographic Profile

Clinic-based analyses indicate that a substantial share of bites are Category III (severe) injuries requiring rabies PEP; one study of 3,350 cases reported 78% as Category III and that most cases (around 74%) were from stray dogs (Asokan et al., 2024). Age distribution in many urban series tilts toward younger age groups—children are disproportionately affected in many community surveys (Radhakrishnan, 2020). Male predominance is often reported in hospital case series, likely reflecting exposure patterns.

4.3 Seasonality Patterns

Time series analyses from Delhi show seasonality in bite incidence. Several studies using multi-year clinic attendance data find semi-annual or quarterly peaks—often higher counts in spring and autumn months—though precise peaks vary by dataset and study period (Jethani, 2022; Raheja et al., 2021). Seasonal fluctuations likely reflect human outdoor activity patterns (school terms, festivals), breeding cycles of dogs, and changes in waste availability. Time series forecasting studies (2011–2018 data) produced quarterly forecasts that reinforce the need to plan ABC and vaccination campaigns ahead of predictable high-incidence periods (Taneja et al. (2021)).

4.4 Rabies Incidence and Mortality

Accurate counts of human rabies deaths are challenging due to under-reporting. Nationally, WHO-aligned estimates indicate that India carries a high share of global human rabies deaths; more than 95% of human rabies cases have been attributed to dog bites historically (Radhakrishnan, 2020).

Local Delhi reporting to mid-2025 indicated **dozens** of suspected rabies cases/confirmed rabies deaths in the city (press reporting), with MCD reporting 49 cases of rabies till July 31 in one media account—this figure should be treated cautiously as case definitions and confirmation vary across sources (Hindustan Times, 2025). The key operational point is that rabies, although a relatively rare outcome among all bites, has almost invariably fatal consequences if prophylaxis is not timely and proper.

4.5 Public-Health System Burden: PEP and Clinic Load

The high number of bite cases strains anti-rabies clinics and vaccine supply chains. Historical shortages of anti-rabies vaccine in certain years (noted in trend studies) have driven patients to travel longer distances to facilities that have stock (Jethani, 2022). The demand for timely PEP—including rabies immunoglobulin for severe exposures—makes supply reliability critical. Large numbers of Category III bites require more intensive resource use (clinic time, immunoglobulin), increasing costs for municipal health systems and households. The health system burden is thus both operational and financial, and it intensifies during seasonal peaks.

5. Spatial Patterns and Hotspot Evidence

Geospatial analyses of clinic records show spatial clustering of dog-bite cases in Delhi. A 2024 geospatial analysis found distinct urban hotspots within the city (Asokan et al., 2024). Hotspots tend to align with (a) peripheral or informal settlements where waste is openly accessible, (b) market areas with organic waste spillover, and (c) high-pedestrian nodes (schools, bus terminals). These geographies indicate where ward-level prioritisation of ABC, vaccination drives, and waste management upgrades would be most impactful. Geo-tagged incident reporting (via hotlines or health system digitisation) enables near-real-time hotspot mapping that municipal teams can use for triage.

5.1 Spatio-Temporal Patterns and Inter-State Variation in Dog Bite Incidence (2022–2024)

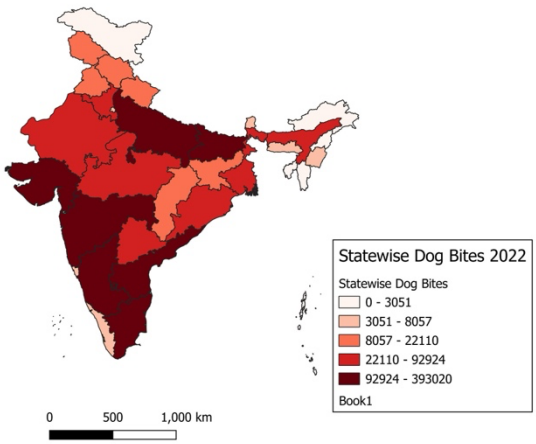
Based on the dog bite data for 2022–2024, choropleth maps (Fig 1.3) have been prepared which clearly illustrate inter-state spatial and temporal intensification variation; an overall rising trend are evident across most States and Union Territories. Large and populous states consistently report the highest burden. Maharashtra, Tamil Nadu, Gujarat, Karnataka, Andhra Pradesh, Bihar, and Uttar Pradesh dominate in absolute numbers, reflecting both population size and urban/peri-urban dog populations. Maharashtra remained the highest contributor throughout the period, increasing from about 3.93 lakh cases in 2022 to 4.85 lakh in 2024, closely followed by Tamil Nadu, which rose from 3.64 lakh to over 4.80 lakh during the same period. Gujarat and Karnataka also showed sharp increases, with Gujarat more than doubling from 1.69 lakh in 2022 to nearly 3.93 lakh in 2024, indicating a rapidly intensifying problem in western and southern India.

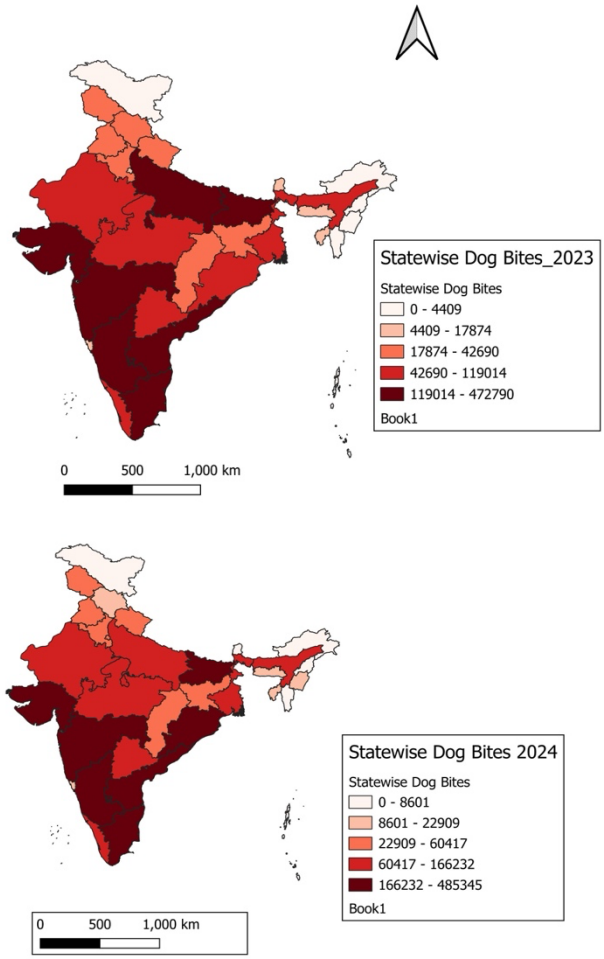
In contrast, smaller states, Himalayan regions, and island territories reported much lower absolute numbers, though many still showed proportional increases. North-eastern states such as Assam, Meghalaya and Tripura and Odisha in Eastern India, recorded notable growth between 2022 and 2024, suggesting expanding dog–human interactions beyond metropolitan regions. Assam, for example, rose dramatically from about 39,900 cases in 2022 to over 1.66 lakh in 2024, while Odisha showed a similar surge.

After normalising dog bite incidence by the geographical area of States and Union Territories, the vulnerability ranking shifts markedly from patterns based on absolute numbers. Chandigarh emerges as the most vulnerable UT, followed by Puducherry, which ranks higher than Delhi despite having far lower absolute case counts. This is primarily due to Puducherry's very small spatial extent, which results in high bite intensity per unit area. Delhi ranks next, reflecting extreme population density and intense human–dog interaction within a compact urban space. Other highly vulnerable regions in the top tier include Goa, Tamil Nadu, Kerala and Bihar. This reordered hierarchy demonstrates that area-normalised analysis reveals concentrated spatial risk, highlighting compact states and UTs as priority zones for targeted intervention—insights that are obscured when relying solely on absolute dog bite figures.

Fig. 1.4 depicts the spatial variation in dog bite incidence across Indian States and Union Territories after normalisation by geographical area, highlighting regions with high bite intensity per unit area. The map reveals a shift in vulnerability towards compact and densely populated States/UTs, underscoring the importance of spatial metrics in assessing dog–human conflict risk.

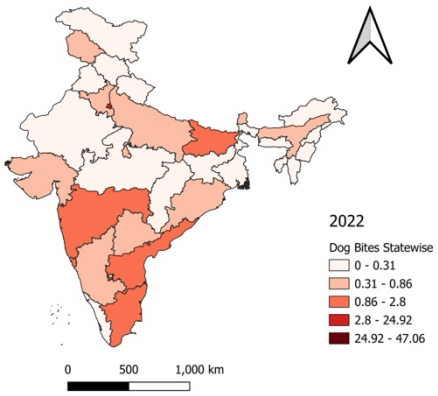
Fig. 1.3 Choropleth Map Representing the Absolute Dog Bite Cases across Different States/ UTs of India

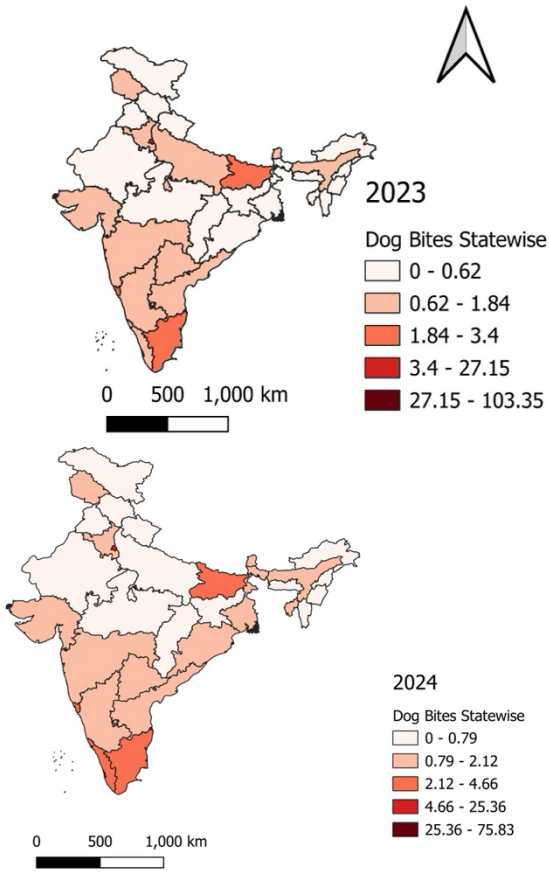




(Map Compiled by Author from Data source IDSP/IHIP as on 27-2-2025)

Fig. 1.4 Choropleth Map Representing the Dog Bite Cases Normalised by Area across Different States/ UTs of India





(Map Compiled by Author from Data source IDSP/IHIP as on 27-2-2025)

6. Evaluating Policy Responses in Delhi

Given Delhi's epidemiology and urban geography, the evidence points toward a multi-pronged, spatially targeted approach:

1. **Scale-up ABC with Hotspot Prioritisation:** Studies and reviews show that sustained high vaccination coverage (around 70%) plus high sterilisation and monitoring can reduce both rabies transmission and visible population density over time (Taylor et al., 2017; Amrutha et al., 2024). For Delhi, targeting hotspot wards first improves cost-effectiveness.
2. **Integrated Waste Management:** This is because food availability is a primary ecological driver, closed-bin systems, frequent market waste collection, and enforcement against open dumping in hotspot wards reduce carrying capacity and dog congregation. Comparative evidence from Indian cities highlights waste control as a high-leverage action.
3. **Rapid Response and Triage:** Maintaining rapid-response veterinary/public-health units (geo-dispatched) for suspected rabid/aggressive animals allows targeted removal or quarantine while protecting non-rabid FRDs and complying with ABC rules. The Supreme Court's

modified order in 2025 effectively endorses such targeted action rather than wholesale removal (Reuters, 2025).

4. **Community Engagement and Designated Feeding Zones:** Where cultural feeding is prevalent, formal feeding zones away from schools and markets, coupled with community education, can spatially contain congregation and reduce random human encounters.
5. **Health System Readiness:** Ensuring continuous PEP vaccine and immunoglobulin supply, plus strengthening peripheral anti-rabies clinics near hotspots, reduces mortality risk from bites and prevents overflow into central hospitals.

7. Discussion: Legal, Social, and Geographic Trade-Offs

The 2025 Supreme Court proceedings revealed the political salience and emotional intensity of the issue—residents ask for immediate public-safety action, while animal-welfare advocates stress humane, evidence-based management. From a geographic perspective, blanket removal or mass sheltering is infeasible in megacities without enormous shelter capacity and ongoing funding. Such actions may also be counterproductive if they displace dogs to neighbouring areas or degrade animal welfare. Conversely, patchy ABC implementation without hotspot targeting will not achieve sufficient coverage to interrupt rabies transmission.

The solution therefore lies at the intersection of juridical clarity (consistent application of ABC rules), municipal capacity building, and spatially targeted interventions that prioritise the highest-risk wards and nodes. The comparative cases (Bengaluru, Kerala, Mumbai) illustrate that governance capacity and monitoring are decisive variables in success or failure.

7.1 Human Rights vs. Animal Rights: The Ethical Dilemma

The debate on Delhi's dog menace is not limited to epidemiology and urban management; it is fundamentally about the balance between human rights and animal rights. On the one hand, citizens argue for their right to safety, health, and freedom from fear of rabid or aggressive dogs. This is framed as a basic human right to security and public health. The Supreme Court has recognised this perspective, emphasising the constitutional duty of the state to protect its citizens from preventable hazards like rabies.

On the other hand, animal rights groups and dog lovers often emphasise that every living being has a right to life and natural behaviors — including reproduction. This raises ethical objections against the state-sponsored Animal Birth Control (ABC) program, which systematically sterilises stray dogs to curb population growth. While vaccination enjoys broad support (as it prevents disease without interfering with natural life processes), sterilisation is contested because it interferes with the biological right to reproduce.

The Paradox of Advocacy

Animal welfare advocates frequently challenge municipal authorities or the Supreme Court when proposals involve culling or relocation of stray dogs, citing the Animal Welfare Board of India (AWBI) guidelines and judicial precedents that protect stray dogs under Article 51A(g) of the Indian Constitution (fundamental duty to show compassion to animals). Yet, many of the same groups support sterilisation as a "humane" alternative, despite it being a direct intervention in animals' natural reproductive rights. This inconsistency reflects a pragmatic compromise rather than a strictly ethical stance — sterilisation is tolerated because it avoids killing, even though it curtails natural life functions.

7.2 Alternative Perspectives: Sanctuaries and Coexistence

Critics of the sterilisation model argue that the state could explore dedicated dog sanctuaries or shelters outside dense urban areas. In principle, this would allow humans to exercise their right to safe streets, while animals retain the right to live and reproduce without disturbing urban life. However, the feasibility of such sanctuaries is challenged by the scale of India's free-roaming dog population (estimated at 15–20 million), the costs of land and upkeep, and concerns that relocation itself is a form of displacement.

Nevertheless, from a human rights perspective, citizens have a claim to protection from preventable injuries and diseases, while from an animal rights perspective, dogs deserve a life free from cruelty and unnatural interventions. The sterilisation debate sits at the uneasy intersection of these two rights-based arguments.

8. Conclusions and Recommendations

Dog–human conflict and dog-mediated rabies in Delhi are governed by socio-ecological drivers embedded in urban geography. This includes food availability from unmanaged waste, refuge spaces within the built environment, feeding practices, and uneven municipal service provision. Area-normalised analysis demonstrates that Delhi's vulnerability is amplified by its compact spatial extent and extreme population density, intensifying human–dog encounters.

From the authors' perspective, effective risk reduction should prioritise mass anti-rabies vaccination of free-roaming dogs, strengthened clinical preparedness, and sustainable feeding practices, rather than interventions that interfere with the natural reproductive processes of animals. Regulated, designated feeding zones—integrated into urban planning—are viewed as essential to reducing spatial conflict while maintaining animal welfare.

This study is subject to important limitations. Reliance on reported dog bite and clinic data may underestimate true incidence due to under-reporting, variations in health-seeking behaviour, and inconsistencies in ward-level documentation. The absence of fine-scale, longitudinal estimates of free-roaming dog populations further limits causal inference between specific urban drivers and observed

spatial patterns. Accordingly, identified hotspots and vulnerability rankings should be interpreted as relative spatial risk indicators, rather than precise epidemiological measures.

Despite these constraints, the findings offer clear directions for future policy and research. Priority should be given to achieving and sustaining high vaccination coverage (≈70%) through repeated campaigns, strengthening anti-rabies clinic supply chains and accessibility in hotspot wards, improving waste management to reduce uncontrolled food sources, and instituting regulated, community-managed feeding spaces to discourage overfeeding near schools, markets, and playgrounds. Enhanced surveillance, geo-tagged reporting, periodic dog population assessments, and GIS-based monitoring dashboards are essential to track risk dynamics over time.

Together, these recommendations align with existing legal frameworks while reinforcing the central argument of this study: dog–human conflict in Delhi is fundamentally a spatial governance challenge, best addressed through data-driven, humane, and geographically targeted urban public health strategies.

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