



स्वास्थ्य एवं  
परिवार कल्याण मंत्रालय  
MINISTRY OF  
HEALTH AND  
FAMILY WELFARE



# GUIDELINE FOR THE ROLE OF METROPOLITAN SURVEILLANCE UNITS (MSUs) IN PREVENTION AND CONTROL OF ZOOZOSES



Jointly developed by  
Centre for One Health & Integrated Disease Surveillance Programme  
National Centre for Disease Control  
Directorate General of Health Services  
Ministry of Health & Family Welfare  
Government of India



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## Abbreviations

AMR	Anti-Microbial Resistance
ANM	Auxillary Nurse Midwife
APHO	Airport Health Authority
ARS	Anti-Rabies Serum
ARV	Anti-Rabies Vaccine
ASHA	Accredited Social Health Activist
ASV	Anti-Snake Venom
CA&ZD	Centre for Arboviral & Zoonotic Disease
CCHF	Crimean-Congo Hemorrhagic Fever
GIS	Geographic information system
HR	Human Resource
IDSP	Integrated Disease Surveillance Programme
IEC	Information, Education & Communication
IHIP	Integrated Health Information Portal
JAS	Jan Arogya Samiti
KFD	Kyasanur Forest Disease
MAS	Mahila Arogya Samiti
MSU	Metropolitan Surveillance Unit
NAPRE	National Action Plan for Dog Mediated Rabies Elimination
NCDC	National Centre for Disease Control
NCVBDC	National Centre for Vector Borne Disease Control
NOHP-PCZ	National One Health Programme for Preventio & Control of Zoonoses
NRCP	National Rabies Control Programme
OIC	Officer-in-charge
PEP	Post Exposure Prophylaxis
PHO	Port Health Authority
PM-ABHIM	Pradhan Mantri Ayushman Bharat Health Infrastructure Mission
RCCE	Risk Communication and Community Engagement
SOP	Standard Operating Procedure
UHC	Urban Community Health Centre
ULB	Urban Local Body
UN	United Nation
UPHC	Urban Primary Health Centre
WHO	World Health Organization
ZD	Zoonotic Disease



## Acknowledgement

We extend our deepest gratitude to Prof. (Dr.) Ranjan Das, Director, National Centre for Disease Control, Ministry of Health and Family Welfare, Government of India, for his visionary leadership and unwavering guidance in shaping these guidelines.

We also wish to acknowledge Dr. Simmi Tiwari, Head of the Centre for One Health at the National Centre for Disease Control (NCDC), for her dedicated oversight and strategic direction throughout the development process. Special recognition is due to Dr. Ajit Shewale and Dr. Jitesh Kuwatada for their valuable contributions. Their expertise, alongside the efforts of public health specialists and consultants within the One Health Division, has been instrumental in finalizing these guidelines.

We also gratefully acknowledge the valuable inputs and collaboration of the Integrated Disease Surveillance Programme (IDSP), Division of Epidemiology, and the Centre for Arboviral and Zoonotic Diseases (CAZD), whose technical expertise and constructive feedback greatly enriched the development of these guidelines. Their collective contributions have strengthened the multisectoral perspective and ensured that the document is both comprehensive and practical for implementation.

Additionally, we express sincere appreciation to PATH for their technical support in drafting and conceptualizing the Guidelines for the Role of Metropolitan Surveillance Units (MSUs) in Prevention and Control of Zoonoses in urban areas.



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### MESSAGE

The Government of India, under the PM Ayushman Bharat Health Infrastructure Mission (PM-ABHIM), has established Metropolitan Surveillance Units (MSUs) in 20 cities to strengthen urban disease surveillance. Each MSU comprises a multidisciplinary team of public health specialists, veterinarians, microbiologists, communication experts, and data analysts, serving as a nodal platform to integrate multi-sectoral expertise. These units are designed to conduct risk mapping, build community awareness, and enable real-time collaboration among municipal authorities, health departments, veterinary services, environmental agencies, and civil society thereby enhancing urban preparedness and resilience against zoonotic threats.

In recent decades, the world has witnessed a dramatic increase in the emergence and re-emergence of infectious diseases, with a significant majority being zoonotic in origin. From SARS and MERS to the most recent global pandemic of COVID-19, these pathogens have demonstrated their capacity to rapidly cross borders and cause widespread public health crises, economic disruption, and social upheaval. A key driver of this trend is the unprecedented pace of urbanization, which is creating dense population centres where human, animal, and environmental interfaces are increasingly blurred. This new reality demands a sophisticated, integrated approach to disease surveillance that can meet the unique challenges of metropolitan areas.

This document, "**Guidelines for the Role of Metropolitan Surveillance Units (MSUs) in Prevention and Control of Zoonoses**," is our strategic response to this challenge. It is a blueprint for building resilient, future-ready defences against diseases that emerge from the human-animal-environment nexus. Recognizing that conventional, siloed health systems are insufficient, this guideline is a call to action for a "One Health" approach. It moves beyond traditional disease surveillance by advocating for the seamless integration of human, animal, and environmental health sectors. These units are not just for reacting to crises, they are designed to anticipate them. They will be equipped to collect and analyse data from diverse sources from human hospitals and veterinary clinics to agricultural farms and wildlife habitats to identify early warning signals before they can escalate into widespread outbreaks.

The document provides detailed guidance on their structure, core functions, and operational procedures. It outlines how these units can facilitate real-time data sharing, conduct swift risk assessments, and coordinate multi-sectoral responses. By empowering our public health workforce with these tools, we can ensure that our metropolitan areas are not only prepared for emerging threats but are also actively working to prevent them. This guideline is an investment in our collective health and security, building a foundation for a safer future for all.

(Sunita Sharma)



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## Message

Zoonotic diseases continue to pose a persistent risk to human and animal health in India, particularly in rural and peri-urban communities where close interactions between people, animals, and the environment are part of daily life. Preventing and controlling zoonotic diseases requires not only strong surveillance and clinical systems but also empowered communities that are aware, vigilant, and engaged in collective action.

Frontline health workers are the cornerstone of this community-level engagement. Their close connect with people and their role in health promotion, disease prevention, and early reporting make them vital agents of change. Recognizing this, the *Guideline for Frontline Health Workers on Leveraging Community Platforms for Enhancing Zoonotic Disease Awareness* has been developed by the National Centre for Disease Control (NCDC). This document provides practical strategies for frontline workers to utilize existing community platforms such as Village Health Sanitation and Nutrition Committees (VHSNCs), Jan Arogya Samitis (JAS), self-help groups for generating awareness, fostering dialogue, and encouraging preventive behaviours.

The guideline highlights simple, culturally sensitive, and participatory approaches that can be integrated into routine community meetings and health promotion activities, thereby strengthening trust between communities and the health system. It also stresses the importance of timely reporting of animal bites and unusual health events as a first step in preventing larger outbreaks.

I am confident that this guideline will be a valuable resource in empowering our frontline health workforce to act as catalysts for change. With their active involvement and the support of community institutions, we can foster a culture of prevention and resilience, thereby reducing the burden of zoonotic diseases in the country.

I extend my gratitude to all experts and partners involved in developing this document and call upon all frontline workers, community leaders, and health authorities to operationalize these strategies to build healthier, safer, and more informed communities.

Prof. (Dr.) Ranjan Das



Antibiotic resistance Containment Stewardship: Our Role, Our Responsibility  
Judicious Use of Antibiotic: Key to Contain Antibiotic Resistance



## Message from Head of Department – IDSP

The rapid urbanization witnessed in recent decades has led to the emergence of metropolitan cities as centers of dynamic growth and opportunity. However, this transformation also presents complex challenges to public health preparedness and response systems. High population density, unplanned urban expansion, environmental hazards, and the constant mobility of large populations make metropolitan areas particularly vulnerable to outbreaks of infectious diseases.

Among the most pressing concerns are zoonotic diseases, with a growing risk of emerging and re-emerging infectious threats in urban settings. Addressing these challenges calls for a One Health approach, integrating human, animal, and environmental health sectors. In this context, the launch of the Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) on October 25, 2021, marked a significant step in strengthening the nation's health infrastructure. A key component of this initiative is the establishment of Metropolitan Surveillance Units (MSUs) in 20 cities, dedicated to enhancing disease surveillance in urban areas.

Through MSUs, a comprehensive, proactive, and innovative system is envisaged to fortify India's preparedness and response capabilities for future health crises. The focus is on building a robust surveillance framework that will improve our ability to detect, prevent, and control zoonotic diseases within complex metropolitan ecosystems.

This Guideline has been developed to highlight the critical role of MSUs in zoonoses prevention and control. It provides a practical framework for implementation and clarifies the roles and responsibilities of MSU staff across human, animal, and environmental health domains. In addition, it outlines priority focus areas, reporting mechanisms, and expected outcomes to ensure effective operationalization.

I sincerely acknowledge and appreciate the collaborative efforts that have gone into preparing this comprehensive document. It will significantly supplement the operational role of MSUs and further advance the One Health approach. I am confident that this endeavor will strengthen the capacity of MSUs and stakeholders in combating zoonotic threats in our metropolitan cities.

**Dr. Himanshu Chauhan**  
Joint Director & Head  
IDSP, NCDC  
MoH&FW, GoI



## From the Desk of Programme Officer

The convergence of global travel, rapid urbanization, and environmental changes has heightened the risk of zoonotic disease outbreaks. Metropolitan areas, with their dense human and animal populations, act as critical hubs for the emergence and transmission of pathogens. The traditional approach to disease control, often siloed within human or animal health sectors, is no longer sufficient. A holistic, integrated strategy is imperative to proactively identify, assess, and mitigate these threats. This guideline provides a foundational framework for the establishment and operation of Metropolitan Surveillance Units (MSUs), which are essential for this new paradigm of public health security.

MSUs are dynamic, multi-disciplinary teams tasked with implementing a "One Health" approach. This means they must foster collaboration among public health officials, veterinarians, environmental scientists, and community leaders. By integrating surveillance data from various sources, including human hospitals, animal clinics, wildlife monitoring programs, and environmental samples, MSUs can generate a comprehensive picture of disease risk. Their role is to transform raw data into actionable intelligence, enabling swift and coordinated responses to potential outbreaks before they can spread beyond local containment.

This document outlines the core functions of MSUs, from routine surveillance to rapid risk assessment and inter-agency communication protocols. It emphasizes the importance of a proactive, rather than reactive, stance, focusing on early detection and prevention. By clearly defining roles, responsibilities, and operational procedures, this guideline equips health authorities with the tools to build a robust defence against zoonotic threats. The successful implementation of these principles will not only protect the health of urban populations but also contribute to global health security by building a resilient and interconnected surveillance network.

I am pleased to present these guidelines as a comprehensive tool to strengthen zoonotic disease preparedness in our cities. By adopting the approaches outlined, states and districts can ensure that metropolitan areas are better equipped to detect, respond to, and contain zoonotic risks in a timely and coordinated manner. I urge all stakeholders to actively collaborate and utilize this roadmap to safeguard public health in urban India.

Let us move forward with collective determination to make our cities resilient against zoonotic threats and build a stronger, safer, and healthier future.



**Dr. Simmi Tiwari**

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## About the document

This document provides comprehensive guidelines on the role of Metropolitan Surveillance Units (MSUs) in implementing initiatives for the prevention and control of zoonotic diseases. It has been developed for the National Programmes on Zoonotic Diseases, implemented by the Centre for One Health, NCDC.

The document underscores the urgent need to address zoonoses in urban India, where rapid urbanization, high population density, increased human–animal interactions, and environmental challenges heighten the risk of disease transmission. Conditions in metropolitan settings often facilitate the spread of infections such as Rabies, Leptospirosis, scrub typhus, Crimean-Congo Hemorrhagic Fever (CCHF), Kyasanur Forest Disease (KFD), brucellosis, food-borne zoonoses e.g., Salmonella: Campylobacter Taeniasis/Cysticercosis, Echinococcosis, and other emerging zoonoses.

A wide range of stakeholders will benefit from this document. MSUs will gain clear guidance on their roles and responsibilities in applying the One Health approach to zoonoses within urban settings. Public health professionals, veterinarians, microbiologists, and allied experts will benefit from structured operational frameworks that strengthen surveillance, improve diagnostic capacity, and ensure effective ou

tbreak response. Municipal authorities and urban local bodies will be able to use the guidelines as a roadmap for integrating human health, animal health, and environmental management into urban governance and service delivery.

By providing a structured framework for coordinated action, this document aims to empower all stakeholders to strengthen urban resilience, reduce the burden of zoonotic diseases, and ensure healthier, safer cities through a One Health approach.



## Overview of Metropolitan Surveillance Unit (MSU)

In recent years, India has witnessed a significant rise in infectious diseases such as Dengue, Chikungunya, and Japanese encephalitis, particularly in urban settings. This surge is driven by factors beyond biological processes, including rapid urbanization and increased human mobility. Approximately 35 percent of India's population resided in urban areas in 2021, with projections indicating that this will increase to 38.6 percent by 2036<sup>1</sup>. Urban areas, especially slums where 49 percent of the urban population lives, are highly susceptible to disease outbreaks due to inadequate access to safe water, sanitation, and other infrastructure<sup>2</sup>. During the COVID-19 pandemic, urban regions in India had a 1.09 times higher risk of disease spread compared to rural areas, highlighting the vulnerability of cities to pandemics<sup>3</sup>.

The COVID-19 pandemic underscored the critical need for robust urban health infrastructure. A recent UN-Habitat report indicated that over 1,430 cities globally were affected, with urban areas accounting for more than 95% of reported cases. Within India, thirty cities contributed to 79% of COVID-19 cases, and the risk of infection was significantly higher in urban and slum-like areas compared to rural regions.<sup>4</sup> The phenomenon of rapid migration for better job opportunities exacerbates the health risks in urban centers. Additionally, the prevalence of zoonotic diseases due to species-crossing in wet markets and small livestock holdings necessitates a coordinated "One Health" approach to mitigate these risks at the city level<sup>5</sup>.

Experts warn that future pandemics are highly likely, with potential threats from influenza viruses and other deadly infectious diseases like Disease X with a probability of zoonotic origin. The continuous risk of emerging infectious diseases emphasizes the importance of establishing Metropolitan Surveillance Units (MSUs). These units will play a crucial role in early detection, monitoring, and response, thereby enhancing urban health resilience.<sup>6</sup>

The Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM ABHIM) was launched on October 25, 2021, to address these challenges. This initiative aims to strengthen India's healthcare infrastructure, specifically focusing on enhancing disease surveillance in urban areas through establishing Metropolitan Surveillance Units (MSUs) in 20 cities. This comprehensive approach aims to strengthen India's preparedness and response capabilities for future health crises, ensuring a robust urban health infrastructure.

### Staff of MSU<sup>7</sup> (Reference: MSU Operational Guideline released by IDSP, NCDC)

Core HR: For the MSU, a core HR team comprising 17 staff which addresses critical HR gaps

identified by the city administration, and depending on the city tier (type of municipalities/corporation) is suggested. These 17 positions could comprise the following:

- 1x Senior Public Health Specialist (Smaller cities may consider public health specialist)
- 1x Public Health Specialist

<sup>1</sup> <https://www.worldbank.org/en/country/india/brief/leveraging-urbanization-india>

<sup>2</sup> <https://unhabitat.org/world-cities-report-2020-the-value-of-sustainable-urbanization>

<sup>3</sup> <https://www.sciencedirect.com/science/article/pii/S0197397520305464#sec1>

<sup>4</sup> <https://www.oecd-ilibrary.org/sites/c734c0fe-en/index.html?itemId=/content/component/c734c0fe-en>

<sup>5</sup> <https://www.who.int/publications/i/item/9789241514934>

<sup>6</sup> <https://www.hindustantimes.com/world-news/us-news/disease-x-scientists-warn-next-pandemic-could-be-triggered-by-virus-of-deadly-infectious-illness-101713678130877.html>

<sup>7</sup> <https://ncdc.mohfw.gov.in/wp-content/uploads/2024/04/80250236601680676956.pdf>



- 1x Microbiologist
- 1x Assistant PH Specialist (2 for larger cities)
- 1x Entomologist (2 for larger cities)
- 1x Veterinary Specialist
- 1x Food safety expert
- 1x Administrative Officer
- 1x Technical Officer (Finance)
- 1x Research Assistant (2 for larger cities)
- 1 x Technical Assistant (2 for larger cities)
- 1 x Multi-Purpose Assistant (2 for larger cities)
- 1x Training manager
- 1x Technical Officer IT (2 for larger cities)
- 1x Communication Specialist
- 1x Data Analyst
- 1x Data Manager

The position of Officer in charge-MSU (OIC-MSU) will be from the government cadre, while The rest of the positions will be contractual. Indicative TORs will be developed in consultation with the state/city corporation.

Any other HR deemed essential by the municipal corporation may also be considered among the following categories.

Full range of HR (core HR + those listed below): In addition to the core categories of HR listed

above, a full-fledged MSU can include additional categories of Human Resources, which have been suggested for consideration by NCDC. These are:

- Biotechnologist
- Pharmacologist/pharmacist
- Laboratory technician

These indicative categories of human resources may be modified in keeping with the existing staffing and surveillance structure or mechanisms in the state, and a vision for the Metropolitan Surveillance.



## Introduction and Problem Statement

India is undergoing rapid urbanization, with urban areas becoming the epicenters of economic growth, technological advancement, and population density<sup>8</sup>. According to the Census of India 2011, urbanization levels stood at 31%, and this figure has since risen, with estimates placing it at over 40% as of 2024<sup>9</sup>. This unprecedented urban growth brings about significant public health challenges, particularly in the realm of infectious disease control and prevention. Urban areas often act as hotspots for disease transmission due to high population density, increased mobility, and diverse socio-economic factors<sup>10</sup>.

Urbanization today in India manages the degradation of natural habitats, large, and transforms them into very populated cities, which certainly leads to human-wildlife confrontation. This scenario is likely to lead to both conflict and coexistence, thus raising several issues with respect to ecology and public health (Srinivasan and Gupta, 2022). There are many studies with varying dimensions exploring these issues, focusing on the management of urban wildlife, creating ways to mitigate zoonotic risks, and another way of looking at such interactions through a socio-zoological perspective, which makes it possible to understand the ecological-cultural-public health nexus (McKinney, 2006).<sup>11</sup>

Several animal species commonly found in cities are known to harbour or transmit important zoonotic pathogens. Stray dogs are the main source of rabies in India's urban areas, accounting for most human exposures. Rodents and bats, often found in congested settlements and open drains, act as reservoirs of leptospirosis, Nipah virus, and other emerging infections. Free-roaming pigs and backyard poultry contribute to food-borne illnesses such as salmonellosis and cysticercosis. Non-human primates, particularly rhesus macaques seen around temples and marketplaces, can transmit rabies and herpes B virus through bites and scratches. Urban birds like pigeons and crows, though seemingly harmless, contaminate food and water sources and are associated with infections such as cryptococcosis, salmonellosis, and avian influenza.

Many wildlife species adapt well to urban habitats and utilize anthropogenic resources. Rhesus macaques, for instance, were found in Delhi city and in metros, pigeons have been found to thrive on food waste and deliberate feeding by humans (Gupta & Prasad, 2020). As expected, such dependence on man does not go without attending misbehaviour, property damage, and human attack, mostly incidental. Like in the case of Mumbai's Sanjay Gandhi National Park, leopards did visit areas where there were residences, causing fear and fascination among the demo (Athreya et al. 2013). It raises part of the complexities of managing wildlife in a very densely populated urban area in India.<sup>12</sup>

<sup>8</sup> <https://www.worldbank.org/en/news/opinion/2024/01/30/gearing-up-for-india-s-rapid-urban-transformation#:~:text=India%20is%20urbanizing%20rapidly..almost%2070%20percent%20to%20GDP.>

<sup>9</sup> <https://www.worldbank.org/en/news/opinion/2024/01/30/gearing-up-for-india-s-rapid-urban-transformation#:~:text=India%20is%20urbanizing%20rapidly..almost%2070%20percent%20to%20GDP.>

<sup>10</sup> <https://www.who.int/news-room/fact-sheets/detail/urban-health#:~:text=Infectious%20diseases%20like%20COVID%2D19,the%20Zika%20and%20Ebola%20viruses.>

<sup>11</sup> <https://mbimph.com/index.php/UPJOZ/article/view/4672/5469>

<sup>12</sup> <https://mbimph.com/index.php/UPJOZ/article/view/4672/5469>



Most wild creatures living in urban spaces act as hosts of zoonotic pathogens and are hence known to be the worst public health threat ever faced. Many rodents, bats, and stray animals transmit leptospirosis, rabies, and the Nipah virus (Verma and Sukla, 2018). Studies show that it is the problem of urban sanitation and waste management that increases the likelihood of wildlife living among humans (Deshpande et al., 2017) because poor informal

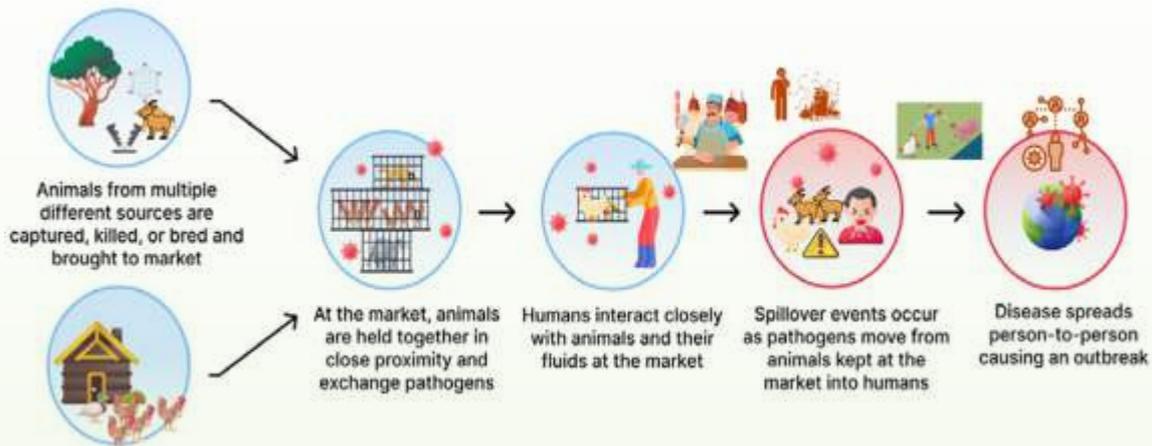


Figure 1: Illustrating the interaction between human, animal, and environmental health in urban animal markets and emphasize the risks posed by poor hygiene, overcrowding, and inadequate protective measures

settlements live near wildlife habitats and are often a potpourri for zoonotic spillovers due to less healthcare access and the nearness to wildlife.

The public health impact of these interactions is significant. Rabies and leptospirosis continue to be major urban zoonoses in India, but other infections such as scrub typhus, salmonellosis, and cysticercosis are emerging as causes of concern. These diseases are often linked with poor urban hygiene, informal meat markets, unregulated slaughterhouses, and inadequate veterinary oversight. The problem is particularly acute among poor urban communities, where limited access to healthcare, overcrowded living conditions, and proximity to animals heighten vulnerability.

In essence, the causal chain is clear: rapid urbanization leads to poor sanitation and waste management, which increases human–animal contact, leading to zoonotic outbreaks. Addressing this complex interplay requires a coordinated, multisectoral approach that integrates human, animal, and environmental health, the very essence of the One Health framework.

Under the PM Ayushman Bharat Health Infrastructure Mission (PM-ABHIM), the Government of India is establishing MSUs in 20 cities to strengthen urban disease surveillance. Each MSU comprises 17 personnel, including public health specialists, veterinary experts, and data analysts, making them well-positioned to support zoonotic disease control efforts in metropolitan cities. Their interdisciplinary structure – public health specialists, veterinarians, microbiologists, communication experts, and data analysts – positions them uniquely to address zoonoses in metropolitan settings.



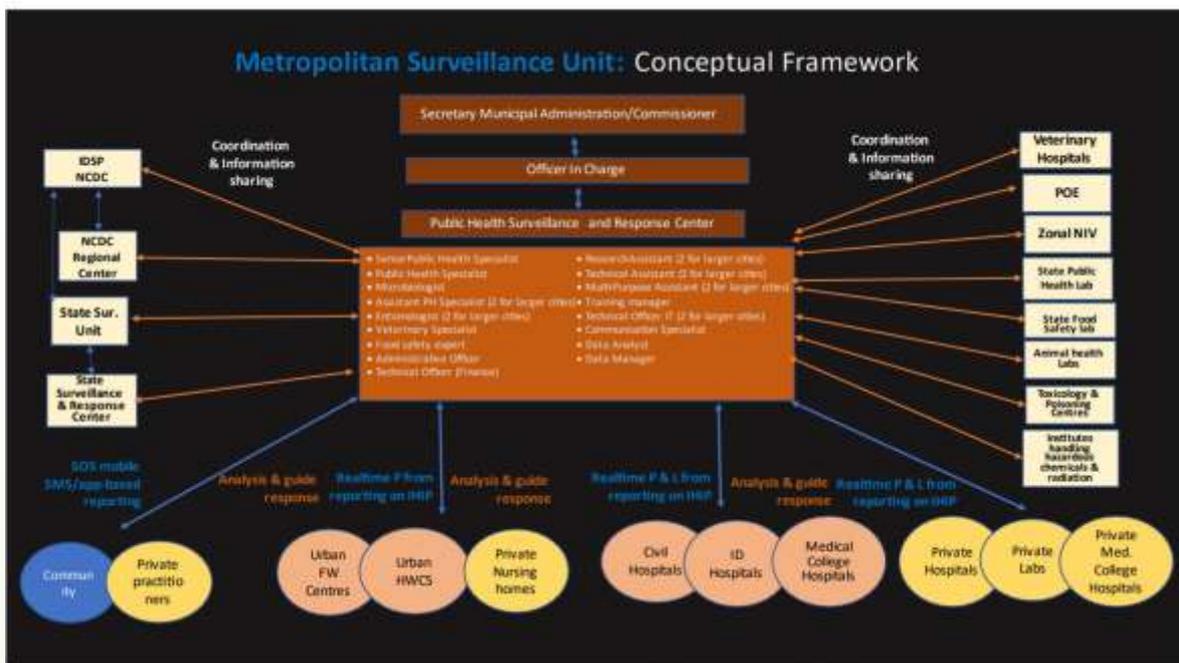


Figure 2- Conceptual Framework of MSU. Source- Operational Guidelines of MSU

MSUs serve as nodal units to conduct risk mapping, support mass vaccination campaigns, and engage in community awareness and capacity-building activities. By enabling cross-sectoral collaboration among municipal authorities, health departments, veterinary colleges, veterinary services, environmental agencies, and civil society, MSUs strengthen urban preparedness and resilience against zoonotic threats.

Through a combination of surveillance, capacity building, policy advocacy, and public engagement, the burden of zoonotic diseases in India's urban centers can be significantly reduced, ensuring safer and healthier living environments for all residents.

### Objectives of the Guidelines

1. Define the role of MSUs in coordinating zoonotic disease surveillance, prevention, and response.
2. Establish responsibilities for MSU staff across human, animal, and environmental health domains.
3. Provide a framework for intersectoral collaboration between health, veterinary, municipal, and environmental agencies.
4. Standardize monitoring, reporting, and accountability mechanisms.
5. Set indicators and targets for prevention, detection, and control of zoonoses.



## Strategic Role of MSU in Prevention & Control of Zoonoses with One Health Approach

While the Integrated Disease Surveillance Programme (IDSP) coordinates district-level surveillance, the Metropolitan Surveillance Unit (MSU) serves as an urban-focused extension designed to address the unique epidemiological, demographic, and environmental complexities of metropolitan areas.

- i. Enhance surveillance of zoonotic diseases prevalent in urban settings, including leptospirosis, food- and water-borne infections, vector-borne diseases, dog bites, and snakebite envenomation. This includes systematic data collection, analysis, and timely reporting.
- ii. Facilitate accurate and timely reporting of zoonotic cases and related deaths through national platforms such as the IDSP-IHIP and NOHP-PCZ-IHIP, ensuring data consistency and visibility.
- iii. Support the development of real-time surveillance systems for zoonotic diseases with outbreak potential, leveraging IHIP and analytics for early warning and rapid response.
- iv. Improve surveillance and reporting of animal bite incidents and rabies cases. MSUs should also monitor and support the implementation of strategies under the Rabies-Free Cities initiative, including mass dog vaccination and dog population management.
- v. Conduct targeted training and capacity-building programs for stakeholders across human health, veterinary services, and municipal governance to improve coordination and response to zoonotic threats.
- vi. Promote collaboration between Municipal Corporations and the animal health sector to implement effective dog population control and vaccination strategies, essential for rabies elimination and broader zoonoses control.

## Roles and Responsibilities of MSU Staff

### Human Health Component

#### I. Public Health Specialist

- Coordinate with the Nodal Officer Epidemic from the corporation/Medical Officer Health and the veterinary department for undertaking activities related to Zoonotic Diseases. Facilitate collaboration for AMR containment where zoonotic pathogens show resistance trends.
- Oversee Zoonotic disease surveillance, ensuring standardized data collection and analysis for effective decision-making. Support integration of AMR data for zoonotic pathogens (e.g., resistant Salmonella, Brucella).
- Monitor and ensure uninterrupted supply of Anti Rabies Vaccine (ARV), Anti Rabies Serum (ARS), Anti Snake Venom (ASV), kits, and consumables for diagnosis of Zoonotic Diseases. Promote rational use of antibiotics in zoonotic disease management, where applicable.
- Coordinate with the Communication Specialist to design and implement public awareness campaigns through MAS and JAS, focusing on prevention & control of Zoonoses, safe practices, responsible pet ownership, rabies prevention, first-aid measures post-animal or snakebite, and basic awareness on avoiding misuse of antibiotics in zoonotic infections.



- Ensure case reporting through IDSP/IHIP and event-based surveillance, including AMR-related zoonotic infections where relevant.
- Supervise outbreak investigation and response in collaboration with veterinary and ULB teams, including zoonotic outbreaks.
- Integrate zoonoses into school health and wellness programs, with emphasis on hygiene, prevention, and responsible use of medicines.
- Coordinate with Airport Health Officer (APHO), Port Health Officer (PHO), for strengthening disease surveillance at the Point of Entry.
- Developing and advising on the SOPs/funding channels

## 2. Data Analyst

- Ensure timely and accurate reporting of Zoonotic Diseases (ZD) on the Integrated Health Information Platform (IHIP), minimizing report delays.
- Track and analyze the incidence of priority Zoonotic diseases (such as Leptospirosis, Rabies, Scrub Typhus, etc.) and geographic distribution of ZD cases across the city.
- Utilize the built-in analytical tool within IHIP, like GIS, to prioritize high-risk zones based on historical case trends and outbreak occurrences.

## 3. Microbiologist

- Enhance the capacity of designated diagnostic laboratories for Zoonotic Disease testing, ensuring compliance with national and WHO standards. Include antimicrobial susceptibility testing for zoonotic pathogens where relevant.
- Analysis of laboratory data
- Monitor and streamline the collection, storage, and transport of samples for laboratory testing of zoonotic diseases. Ensure protocols for AMR testing in zoonotic pathogens are followed.
- Implement quality control protocols for Zoonotic Disease testing, including AMR testing where applicable, ensuring accuracy and reliability.
- Conduct hands-on training sessions for laboratory personnel on advanced diagnostic techniques for Zoonotic Diseases, including AMR detection in zoonotic pathogens.
- Coordination with water and food quality labs for strengthening laboratory surveillance of food-borne (including food-borne zoonosis) and water-borne disease outbreaks.
- Support environmental risk assessments in informal settlements and wet markets in coordination with veterinary specialists and epidemiologists.
- Collaborate with pollution control boards on waste and wastewater management.

## 4. Communication Specialist

- Design a city-wide zoonotic disease awareness strategy along with other epidemic diseases, ensuring targeted messaging for different stakeholders, including schoolchildren and healthcare workers.
- Develop and disseminate IEC materials through digital platforms, radio, television, and community-based initiatives in coordination with the corporation's public relations department.



- Implement community engagement activities focusing on promoting safe food handling, animal contact precautions, disease-specific awareness campaigns, timely vaccination, and vector prevention.
- Coordinate with ULB Media & Communication officer to amplify Zoonotic disease prevention messaging and highlight key achievements of the initiative.

## 5. Training Manager

- Design and execute training modules for healthcare professionals, veterinarians, and frontline workers on management, timely diagnosis, prevention & control of Zoonotic Diseases.
- Develop and distribute standard operating procedures (SOPs) and guidelines for medical practitioners on Zoonotic Diseases.
- Conduct periodic evaluations of training effectiveness through pre-and post-training assessments.

## Animal Health Component

### I. Veterinary Specialist

- Lead surveillance of animal diseases with zoonotic potential, including monitoring for antimicrobial resistance in zoonotic pathogens (e.g., resistant Brucella, Salmonella).
- Implement vaccination programs (dogs, poultry, livestock) in collaboration with ULB and animal husbandry departments. Promote rational use of antibiotics in veterinary care to prevent resistance in zoonotic pathogens.
- Establish rapid response mechanisms for zoonotic outbreaks in animals, including those involving resistant strains.
- Support joint outbreak investigations with human health and ULB teams by conducting field assessments, collecting animal samples, and identifying potential animal sources of infection. Coordinating between veterinary laboratories and medical labs for cross verification.
- Identify high-risk hotspots with dense animal populations, wet markets, and slaughterhouse zones
- Supervise carcass disposal and biosecurity in live animal markets, minimizing environmental contamination and potential AMR spread.
- Collaborate with wildlife authorities for zoonotic spillover monitoring, including AMR surveillance in zoonotic pathogens from wildlife.
- Provide technical assistance in preparation of the microplan for Mass Dog vaccination. Lead and coordinate city-wide canine rabies vaccination drives. Build the capacity of animal handlers on humane dog catching practices.
- Dog Population Management: Implement humane ABC programs in collaboration with municipal veterinary teams.
- Advocate for pre-exposure prophylaxis for high-risk groups and promote awareness of AMR risks in zoonotic disease management among veterinary staff.



## Environmental Health Component

### I. Entomologist

- Lead entomological surveillance of vectors associated with zoonotic diseases (e.g., mosquitoes, ticks, fleas, rodents) in urban settings. Identify vector hotspots using GIS tools and historical data to inform targeted interventions.
- Support outbreak investigations of vector-borne zoonotic diseases (e.g., leptospirosis, scrub typhus, plague) by providing entomological expertise, including vector identification, density estimation, and breeding site mapping.
- Develop and implement *Integrated Vector Management* IVM strategies in collaboration with municipal health and sanitation departments, focusing on urban vector control measures such as larval source reduction, rodent control, and safe waste disposal.
- Monitor environmental factors (water stagnation, waste accumulation, urban animal shelters) that contribute to vector proliferation and zoonotic disease transmission.
- Train municipal staff and frontline workers on vector identification, surveillance techniques, and safe pest control practices.
- Collaborate with APHO/PHO, ULBs, and veterinary teams for integrated entomological surveillance at Points of Entry and high-risk urban zones.
- Ensure timely reporting of entomological findings into IHIP and support integration with human and animal health surveillance data for comprehensive risk profiling.
- Provide technical input for community awareness campaigns on vector control, safe waste management, and personal protection measures against vector-borne zoonoses.



## Disease-Specific Focus Areas

### Rabies

Rabies, a fatal viral disease primarily transmitted through dog bites, remains a significant public health concern. In line with the National Action Plan for Dog-Mediated Rabies Elimination (NAPRE), the Rabies-Free City Initiative has been launched under the National Rabies Control Program (NRCP). This initiative adopts a multi-pronged approach encompassing mass vaccination, surveillance, timely post-exposure prophylaxis (PEP), and public awareness. Given their expertise in surveillance and intersectoral coordination, MSUs can play a pivotal role in the implementation of the initiative.

#### Urban Risk Factors:

- Large populations of stray and unvaccinated dogs.
- High-density slum areas with frequent human-animal interactions.
- Limited access to timely medical care and PEP.

#### MSU Roles:

- Provide technical assistance in the roll-out of the Rabies Free City Initiative in the respective city (please refer to the operational guideline for the Rabies Free City Initiative [https://ncdc.mohfw.gov.in/wp-content/uploads/2024/11/Rabies-Operational-Guidelines\\_25th-Sept\\_24.pdf](https://ncdc.mohfw.gov.in/wp-content/uploads/2024/11/Rabies-Operational-Guidelines_25th-Sept_24.pdf))
- Advocate for the availability of the Anti-Rabies Vaccine (ARV) in all the urban Primary Health Care Centres across the city and both ARV and Anti-Rabies Serum (ARS) in urban community health centres and corporation hospitals.
- Monitor rabies cases, ensuring vaccine and serum availability, coordinating bite case reporting, enhancing PEP administration, and raising public awareness.
- Support for mass dog vaccination, dog population management, and ensuring diagnostic support for rabies.
- Facilitate organizing pre-exposure prophylaxis camps for high-risk groups in coordination with the health department of the respective municipal corporation, including veterinary officers, para vets, sanitation workers, animal handlers, and laboratory staff working in a laboratory for the diagnosis of Rabies
- Facilitate operationalization of Rabies city task force, integrating rabies prevention strategies into municipal planning, and collaborating with animal welfare organizations.
- Training medical officers, veterinarians, and frontline workers on rabies prevention, control, and bite management.
- Supporting mandatory pet registration, city-wide vaccination mandates, and improved waste management practices to reduce stray dog proliferation.



## Leptospirosis

Leptospirosis, caused by *Leptospira* bacteria, is a waterborne zoonotic disease that often follows urban flooding or poor drainage. Symptoms include fever, jaundice, and renal involvement. Urban outbreaks are common in monsoon-affected areas. The Government of India initiated the Programme for Prevention & Control of Leptospirosis with an objective to reduce the morbidity and mortality due to Leptospirosis. MSUs can play a pivotal role in the implementation of the initiative at the urban level

### Urban Risk Factors:

- Stagnant water in low-lying areas and slums.
- Rodent infestation in open drains and garbage piles.
- Occupational exposure among sanitation workers, construction laborers, and municipal staff.

### MSU Roles:

- Organize the sensitization workshops and training programs (webinars) for the health professionals and health workers about diagnosis, case management, and prevention and control of Leptospirosis as per the national guidelines
- Strengthen laboratory diagnostic capacities, including ensuring the availability of kits and reagents in laboratories.
- Advocacy to ensure a regular supply of the drugs for the prevention and treatment of Leptospirosis.
- Ensure inter-sectoral coordination of concerned stakeholders, such as a municipal corporation, PRIs, State public health engineering department, for the prevention of water clogging, effective drainage facilities for the water bodies with cattle and rat urine.
- Key points on awareness and management to be highlighted through mass awareness campaigns/trainings through frontline health workers.
- Provide technical inputs for mapping of water bodies, sewage systems, and rodent populations in coordination with ULB officials.
- Facilitate early diagnosis and reporting through IDSP/IHIP portals.
- Educate high-risk populations cohort including the manpower working in slaughterhouses, on protective measures such as boots, gloves, and safe

## Snakebite and Envenoming

Snakebite envenoming is a potentially life-threatening disease following the bite of a venomous snake. Venomous snake bites can result in medical issues that can be deadly or lead to permanent impairment. However, this can be avoided with prompt availability of safe and effective antivenoms, timely transport, and referral. The Government of India initiated the Snakebite Prevention & Control Programme with an objective to halve the deaths and disability due to Snakebite Envenoming. MSUs can play a pivotal role in the implementation of the initiative at the urban level

### Urban Risk Factors:

- Construction zones and vacant lots are attracting snakes.
- High rodent populations are increasing snake prevalence.
- Delayed access to antivenom in hospitals and primary care centres.



### MSU Roles:

- Undertake capacity building of health care workers such as ASHA, ANM, and medical professionals for the timely and appropriate management of snakebite cases.
- Strengthen recording and reporting of snakebite cases and deaths on IDSP-IHIP from the state and district, and coordinate with all the concerned stakeholders in collating the data on Snake bites cases/deaths.
- Undertake supervisory visits to the UPHC/UCHC on availability of trained manpower, Anti Snake Venom (ASV), infrastructure, and logistics related to snake bite prevention and control
- Identify the high-risk population, especially for snakebite deaths, by mapping factors such as approx. distance of affected community from the nearby hospital having ASV, areas with communities seeking traditional therapy, difficult terrain and transportation issues, essential emergency drug availability and trained staff, referral mechanism, etc.
- Advocacy to arrange for patient transport and map the referral hospitals/linkages for treating the severe envenoming cases due to snake bite
- Establish networking with local snake rescuers' networks and integrate their field data with health surveillance systems to strengthen monitoring, reporting, and timely response to snakebite cases.
- Ensure inter-sectoral coordination with all departments, such as the Animal Husbandry department, the forest department, the tribal department, and the school health education programme on issues related to snake bite prevention and control.
- Organise a session for community awareness with a multi-sectoral approach focusing on occupational risks and simple, cost-effective measures that can prevent a snakebite, early transfer of snakebite patients to the nearest health facility, and first aid skills at the community level, etc.

### Vector-Borne Zoonoses

Vector-borne zoonoses are infections transmitted to humans through vectors such as ticks, mosquitoes, and mites. Diseases like Scrub Typhus, Zika, Crimean-Congo Hemorrhagic Fever (CCHF), and Kyasanur Forest Disease (KFD) pose significant urban and peri-urban health risks.

### Urban Risk Factors:

- Stagnant water in construction sites, potholes, and household containers creates breeding grounds for vectors.
- High human-vector contact in densely populated settlements.
- Poor waste management and open garbage facilitate vector proliferation.
- Encroachment into peri-urban forest areas increases exposure to wildlife-associated vectors.

### MSU Roles:

- Educate high-risk populations on protective measures, including wearing boots and gloves, using repellents, and avoiding vector-prone areas.
- Regularly monitor mosquito larvae, ticks, and rodent populations in urban and peri-urban settings.
- Conduct entomological surveillance in a sustained and planned manner throughout the year, and focus during Outbreaks and build the capacity of state/district entomologists for the same
- Identify high-risk zones using GIS and spatial data to prioritize interventions.



- Coordinate with municipal authorities for fogging, larvicide, and sanitation improvements.
- Facilitate early detection and reporting of vector-borne zoonotic cases to IDSP/IHIP.
- Coordinate with Point of Entry (POE) officials, such as Airport Health Officer (APHO), Port Health Officer (PHO), for entomological surveillance and other disease surveillance activities.
- Advocate for the implementation of Civic bylaws related to mosquito control. (Civic bylaws for mosquito control mandate measures such as building design for water stagnation prevention, proper disposal of debris to eliminate breeding sites, public health surveillance, and the prohibition of interference with mosquito control efforts. Cities advocate for these bylaws to be integrated into building permits, including mandates for mosquito-proofing, and require the proper management of solid waste, which can retain water and harbour mosquito larvae.)

### Emerging Zoonoses

Emerging zoonoses are infections with high epidemic potential, such as **Nipah virus, H5N1 avian influenza, H7N9, and SARS-CoV-2**. Urban areas are particularly vulnerable due to dense populations and frequent human-animal interactions.

#### Urban Risk Factors:

- Live animal and wet markets with poor hygiene.
- Urban expansion into wildlife habitats, increasing human-wildlife contact.
- High mobility and population density facilitate the rapid spread of pathogens.

#### MSU Roles:

- Advocate for mapping of animal markets and butcher shops with Urban Local Bodies (ULBs).
- Design or modify existing IEC/ RCCE materials addressing identified gaps, such as infographics, posters, and brochures on zoonotic disease prevention and early warning signals. Pilot the IEC/ RCCE materials in collaboration with municipal health authorities.
- Educate high-risk populations, such as workers in live animal markets and poultry farms, on protective measures, including gloves, boots, and safe handling practices, and also identification and reporting of early warning signals in IHIP/IDSP.
- Linkage of the high-risk population with the nearest public health facility for regular screening for zoonotic diseases.
- Conduct surveillance in animal markets, poultry farms, and sentinel hospitals in collaboration with Human and Veterinary Sentinel Surveillance Sites under NOHP-PCZ.
- Disseminate accurate public information to prevent panic and promote preventive measures.
- Conduct simulation exercises and preparedness drills for emerging zoonotic disease outbreaks.
- Coordinate with municipal, health, and veterinary authorities for rapid response to emerging threats.
- Advocate for joint outbreak investigations and response activities.



## Food-Borne Zoonoses

Food-borne zoonoses such as Salmonellosis, Campylobacteriosis, Brucellosis, Taeniasis/Cysticercosis, and Listeriosis are major contributors to gastrointestinal illnesses and outbreaks in urban areas. Rapid urbanization, informal food markets, and inadequate hygiene across the food value chain amplify the risk of contamination and disease transmission.

### Urban Risk Factors:

- Inadequate hygiene and sanitation in street food outlets, slaughterhouses, and dairy collection centers.
- Informal and unregulated food supply chains with limited cold-chain maintenance.
- Consumption of raw or undercooked animal products (meat, milk, eggs, seafood).
- Improper waste disposal and drainage leading to contamination of food and water sources.
- High population density and rapid food distribution networks facilitate outbreak spread.

### MSU Roles:

- Mapping of high-risk food establishments such as slaughterhouses, meat and fish markets, street food hubs, and dairy collection centers in collaboration with Urban Local Bodies (ULBs) and Food Safety Departments.
- Strengthen linkages with the Food Safety and Standards Authority of India (FSSAI), municipal food safety officers, and veterinary departments for coordinated surveillance and enforcement of hygiene standards.
- Conduct joint inspections and sampling in collaboration with public health laboratories and veterinary partners to identify contamination sources and monitor pathogen trends in food and water.
- Integrate food-borne disease data from hospitals, private laboratories, and food testing centers into IHIP/IDSP for early detection of outbreaks and trend analysis.
- Develop and pilot IEC/RCCE materials focused on safe food handling, prevention of cross-contamination, and early reporting of food-borne illness clusters.
- Train food handlers, vendors, and processors on hygiene practices, personal protection, and proper waste disposal under One Health awareness programs.
- Coordinate with veterinary and environmental health authorities to monitor zoonotic pathogens in animal-origin food chains and wastewater from slaughterhouses and markets.
- Promote community awareness campaigns in urban slums and low-income neighborhoods on food hygiene, safe water storage, and handwashing practices.
- Support simulation exercises and preparedness drills for urban food-borne outbreak management in coordination with health, food safety, and veterinary authorities.



## Monitoring and Reporting Mechanism

The MSU will ensure **structured monthly reporting and real-time monitoring** through the following mechanisms:

Category	Indicator	Target	Data Source	Responsible Staff
Process Indicators	% of healthcare facilities with adequate ARV & ARS stock	100%	Stock registers, supervision reports	Public Health Specialist
	% of healthcare facilities with adequate ASV stock	100%	Stock registers, supervision reports	Public Health Specialist
	% of wards conducting dog population enumeration	70%	Enumeration reports	Veterinary Specialist, Data Analyst
	% of live animal markets with quarterly inspections	85%	Municipal reports	Veterinary & Environmental Specialists
	% of trained staff on zoonotic disease protocols	100%	Training records	Training Manager
	% of IEC campaigns conducted as per the quarterly plan	100%	IEC activity reports	Communication Officer, Public Health Specialist
Output Indicators	% of stray and pet dogs vaccinated against rabies	>70%	Dog vaccination reports	Veterinary Specialist, Animal Husbandry Dept.
	% of zoonotic cases reported within 24 hours after diagnosis	≥80%	IDSP/IHIP, hospital reports	Public Health Specialist, Data Analyst
	% of priority zoonoses with functional laboratory diagnostics	70%	Laboratory reports	Microbiologist
	% of IEC sessions reaching high-risk groups (slums, wet markets, shelters)	>80%	Field activity reports	Communication Officer, Data Analyst
Outcome Indicators	% of animal bite victims receiving timely PEP (within 24 hours of exposure)	>95%	Facility records,	Public Health Specialist, Data Analyst
	% reduction in reported human rabies cases (annual trend)	≥10% per year	IDSP/IHIP	Public Health Specialist
	% reduction in leptospirosis and other zoonotic outbreaks (annual trend)	≥10% per year	IDSP/IHIP, hospital records	Public Health Specialist, Veterinary Specialist
	% of outbreak investigations with multisectoral participation	100%	Outbreak investigation reports	Public Health Specialist, Veterinary Specialist



## Expected Outcomes

- I. Improved Awareness and Practices among High-Risk Groups: Percentage increase in knowledge of zoonotic disease prevention
- II. Enhanced surveillance and response capacity for zoonotic diseases in urban animal markets: Number of early warning signals and zoonotic cases reported through the IHIP platform.
- III. Improved Access to Healthcare Services for High-Risk Groups: Proportion of high-risk individuals receiving pre-exposure prophylaxis (e.g., rabies vaccination).
- IV. Strengthened Capacity for Zoonotic Disease Management: Number of health inspectors and veterinary officers trained and actively involved in surveillance and response.
- V. Reduction in dog bite incidents through vaccination, sterilization, and waste management activities.

## Intersectoral Coordination Framework

- City-Level Governance: Establish a City One Health Task Force chaired by the Municipal Commissioner, with representation from MSU, animal husbandry, wildlife, environment, and civil society. This task force will lead planning, coordination, and oversight of zoonotic disease control activities.
- Routine Coordination and Surveillance Review: Conduct monthly meetings to assess zoonotic disease trends, dog vaccination coverage, food market hygiene, and urban outbreak preparedness.
- Strengthen Waste Management Linkages: Collaborate closely with urban sanitation and waste management departments to implement waste reduction, segregation, and safe disposal programs, minimizing environmental contamination and reducing breeding grounds for disease vectors and rodents.
- Joint Risk Assessments: Carry out multisectoral risk assessments in high-density urban slums and peri-urban settlements to identify and address zoonotic vulnerabilities.
- Community Engagement: Engage Resident Welfare Associations (RWAs), schools, and local organizations to promote awareness, early reporting, and preventive practices.
- Integration with Existing Governance Mechanisms: Align city-level efforts with established governance mechanisms to ensure synergy and resource optimization:
  - ❖ City Task Force under Rabies-Free Cities Initiative (National Rabies Control Programme)
  - ❖ District Zoonotic Committee under the National One Health Programme for Prevention and Control of Zoonoses (NOHP-PCZ)
  - ❖ Climate and Health Task Force under the National Programme on Climate Change and Human Health (NPCCHH)
  - ❖ Mosquito Abatement Committee under the National Vector Borne Disease Control Programme (NVBDCP)



Table 1- Urban One Health Coordination Matrix

<b>Committee / Platform</b>	<b>Chair</b>	<b>Key Members</b>	<b>Core Functions / Scope</b>	<b>Coordination Link with MSU / City One Health Task Force</b>
<b>City One Health Task Force</b>	Municipal Commissioner	Health, Animal Husbandry, Veterinary, Environment, Sanitation, Civil Society, MSU	City-level planning, coordination, and oversight of zoonotic disease control and One Health activities.	Central coordination platform. Consolidates data and decisions from all committees.
<b>City Task Force (Rabies-Free Cities / NRCP)</b>	Municipal Commissioner	Health, Animal dept-municipal cooperation, SWM, DSO, NUHM, forest, NGOs, etc.	Dog vaccination, population management, rabies case monitoring, and IEC.	MSU shares bite/rabies data and mapping supports planning and monitoring.
<b>District level Zoonotic Committee (NOHP-PCZ)</b>	District Magistrate	Representatives from Health, Veterinary, Environment, Agriculture, Wildlife, MC, etc.	Multisectoral zoonoses control strategy and review.	MSU presents urban data and risk maps to inform district planning.
<b>Climate and Health Task Force (NPCCHH)</b>	District Collector	Health, Animal, Environment, PwD, Dept. of Power, DoME, DDMA, etc.	Climate-health vulnerability assessment, response planning.	MSU provides climate-linked urban disease trend data.
<b>Mosquito Abatement Committee (NVBDPCP)</b>	Municipal Health Officer	Entomologists, Sanitation Dept., MSU, NGOs	Vector surveillance, control operations, and IEC activities.	MSU provides hotspot data, trend analysis, and supports IEC activities.
<b>Community Engagement Platform (RWAs / NGOs)</b>	IEC / RCCE Nodal Officer (MSU)	RWAs, Schools, NGOs, Local Health Workers	Awareness, behavioral change, participatory surveillance.	Works under COHTF; MSU leads risk communication and outreach.



## Annexure I- Definition of Indicators for monitoring & evaluation

Indicator	Type	Definition	Numerator	Denominator
% of healthcare facilities with adequate ARV & ARS stock	Process	Measures the proportion of health facilities maintaining an adequate stock of Anti-Rabies Vaccine (ARV) and Anti-Rabies Serum (ARS) throughout the reporting period.	Number of facilities with adequate ARV & ARS stock at the time of reporting	Total number of reporting health facilities
% of healthcare facilities with adequate ASV stock	Process	Proportion of health facilities maintaining an adequate stock of Anti-Snake Venom (ASV).	Number of facilities with adequate ASV stock	Total number of facilities assessed
% of wards conducting dog population enumeration	Process	Extent of ward-level implementation of dog population surveys as per MSU protocol.	Number of wards where the enumeration was conducted	Total number of wards in the city
% of live animal markets with quarterly inspections	Process	Proportion of registered live animal markets inspected for hygiene and zoonotic risk control measures.	Number of markets inspected during the quarter	Total number of registered live animal markets
% of trained staff on zoonotic protocols	Process	Share of MSU and facility staff trained on standard zoonotic surveillance and response protocols.	Number of trained personnel	Total staff designated for zoonotic activities
% of IEC campaigns conducted as per the quarterly plan	Process	Measures adherence to planned community awareness and IEC activities.	Number of IEC activities conducted	Number of IEC activities planned
% of stray and pet dogs vaccinated against rabies	Output	Proportion of the total dog population (stray and pet) vaccinated during the reporting period.	Number of dogs vaccinated	Estimated total dog population
% of zoonotic cases reported within 24 hours after diagnosis	Output	Proportion of laboratory-confirmed zoonotic cases reported to surveillance platforms within 24 hours.	Number of cases reported within 24 hours	Total number of confirmed zoonotic cases
% of priority zoonoses with functional laboratory diagnostics	Output	Measures the availability and functionality of diagnostic tests for key priority zoonoses in	Number of priorities zoonoses with functional diagnostics	Total number of priorities zoonoses identified



Indicator	Type	Definition	Numerator	Denominator
		urban labs.		
% of IEC sessions reaching high-risk groups	Output	Proportion of IEC sessions specifically targeting high-risk populations (slums, wet markets, shelters).	Number of IEC sessions targeting high-risk groups	Total number of IEC sessions conducted
% of animal bite victims receiving timely PEP (within 24 hours of exposure)	Outcome	Proportion of reported animal bite victims receiving the first dose of post-exposure prophylaxis within 24 hours.	Number of bite victims receiving timely PEP	Total number of reported bite victims
% reduction in reported human rabies cases (annual trend)	Outcome	Annual reduction in confirmed human rabies cases compared to the previous year.	The number of cases has reduced from the previous year	Total rabies cases reported in the previous year
% reduction in leptospirosis and other zoonotic outbreaks (annual trend)	Outcome	Annual percentage reduction in major zoonotic outbreaks compared to the previous year.	The number of outbreaks has reduced from the previous year	Total outbreaks reported in the previous year
% of outbreak investigations with multisectoral participation	Outcome	Proportion of outbreak investigations that included participation from health, veterinary, and environmental sectors.	Number of outbreak investigations with multisectoral participation	Total number of outbreak investigations



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