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FOREWORD

Dr Parvinder Maini

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The interconnectedness of human, animal, and environmental health has never been more evident than it is today. Emerging infectious diseases, antimicrobial resistance, ecosystem degradation, food insecurity, and climate-linked health risks continue to challenge traditional sectoral approaches to public health and governance. These realities reinforce the need for a collaborative, interdisciplinary, and systems-based framework — one that recognises that the health of people is intrinsically linked with the health of animals and the environment they inhabit. It is within this context that the National One Health Mission (NOHM) emerges as a transformative national initiative for strengthening India's preparedness, resilience, and response capabilities. The Mission marks an important transition from concept to coordinated national implementation.

The Office of the Principal Scientific Adviser (OPSA) to the Government of India has consistently advocated for integrated and evidence-based approaches to address complex societal challenges through science, technology, and innovation. The NOHM embodies this vision by fostering convergence across ministries, scientific institutions, research ecosystems, and state governments to create a coordinated national framework for surveillance, diagnostics, data integration, capacity building, and medical countermeasures. The Mission reflects India's commitment to building a future-ready public health ecosystem grounded in scientific collaboration and cooperative federalism.

This special edition of Vigyan Dhara captures the evolving landscape of One Health implementation in India. It presents the foundational efforts being undertaken through the Mission's implementation phase, while also showcasing the contributions of

the Advisory & Review Committees that are guiding critical thematic areas such as surveillance, biosafety networks, data sharing and integration, and medical countermeasures. These efforts underline the importance of strengthening institutional linkages and enabling scientific coordination across sectors. The experiences featured in this edition also demonstrate the importance of contextual implementation and the role of local leadership in enabling intersectoral coordination.

As the Mission progresses into its implementation phase, there is a growing need to strengthen knowledge exchange, build technical capacities, and foster interdisciplinary partnerships. Through articles, insights, and creative formats such as The One Health Comic, this edition seeks to make the concept of One Health more accessible and relatable to diverse audiences, particularly young readers and emerging practitioners. Building awareness and encouraging cross-sectoral thinking will be crucial for nurturing the next generation of scientists, policymakers, and implementers committed to this vision.

As India advances the implementation of the NOHM, it is imperative that we continue to strengthen collaborative scientific ecosystems, institutional capacities, and policy coherence. The challenges before us are complex, but they also present an opportunity to reimagine health security through integrated action and shared responsibility.

I extend my appreciation to all experts, institutions, state representatives, and partner organisations who have contributed to this special edition and to the larger vision of the NOHM. The success of One Health will not only depend on scientific advancement, but also on our ability to collaborate across disciplines, institutions, and sectors.

THE IMPLEMENTATION PHASE OF
THE NATIONAL



MISSION



HUMAN HEALTH

ANIMAL HEALTH

ENVIRONMENT HEALTH

FROM BLUEPRINT TO BREAKTHROUGH

India's National One Health Mission Comes Alive



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A decade ago, the prospect of uniting doctors, veterinarians, wildlife experts, environmental scientists, epidemiologists, laboratories, and policymakers within a single coordinated health framework may have seemed difficult to imagine. Today, that idea is steadily becoming a national movement.

India's National One Health Mission (NOHM), steered by the Office of the Principal Scientific Adviser (OPSA) to the

Government of India, has now moved decisively from planning to implementation, transforming the way the country prepares for and responds to emerging health threats. At a time when the world is witnessing the growing impact of zoonotic diseases, antimicrobial resistance, climate-linked outbreaks, and ecosystem disruption, the Mission represents India's effort to build a health system that recognizes one simple truth: human, animal, and environmental health cannot be separated.



Group photograph from the "First State & Union Territory Engagement Workshop" bringing together Central and State partners for strengthening the One Health approach



The foundations of this approach, however, go back well before the launch of the Mission itself. Globally, the One Health concept has steadily gained prominence over the last two decades as countries and international organizations recognized that nearly 75 percent of emerging infectious diseases originate in animals. The increasing frequency of outbreaks such as Ebola, Avian Influenza, SARS, Nipah, and COVID-19 reinforced the need for integrated surveillance, shared scientific infrastructure, and coordinated policy action across sectors. International bodies including the World Health Organization (WHO), Food and Agriculture Organization (FAO), World Organisation for Animal Health (WOAH), and the United Nations Environment Programme (UNEP) have all advocated for stronger One Health framework worldwide.

India's own journey toward a formalized One Health architecture accelerated during and after the COVID-19 pandemic. The pandemic demonstrated how quickly diseases can spread across borders and species, while also highlighting the importance of stronger coordination across sectors during health challenges. It became increasingly clear that future preparedness would require closer integration between public health systems, veterinary sciences, wildlife surveillance, environmental monitoring, and research ecosystems. The NOHM was conceived to precisely address this challenge by creating a coordinated national framework that brings together multiple ministries, scientific institutions, and states under a shared vision of “Sarvasya Aarogyam” - Connecting health, nature, and people.

Recognizing this need, the 21st Prime Minister's Science, Technology and Innovation Advisory Council (PM-STIAC) identified One Health as a national priority area and recommended the development of

an integrated institutional framework capable of addressing emerging health threats in a coordinated manner. The OPSA subsequently led extensive inter-ministerial consultations to shape the contours of what would eventually become the mission.

This momentum also aligned strongly with India's growing global engagement on health security. During India's G20 Presidency, One Health emerged as a major area of international discussion, particularly through the G20 Chief Scientific Advisers' Roundtable (CSAR), where experts and policymakers emphasized the importance of collaborative scientific preparedness, pandemic resilience, and integrated surveillance systems. India consistently highlighted the need for equitable, science-driven, and globally connected health systems that recognize the interdependence between humans, animals, and ecosystems.

The Mission received Union Cabinet approval in 2024, marking a major milestone in institutionalizing the One Health approach at the national level. With this approval, India formally adopted one of the world's most ambitious whole-of-government health security frameworks, bringing together more than a dozen ministries and departments under a shared implementation architecture. Ministries dealing with health, animal husbandry, environment, biotechnology, agriculture, science and technology, and ayush are now working alongside institutions such as the Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR), National Centre for Disease Control (NCDC), Council of Scientific and Industrial Research (CSIR) laboratories, and wildlife and environmental agencies to create integrated surveillance, diagnostics, preparedness, and response systems (Figure 1).



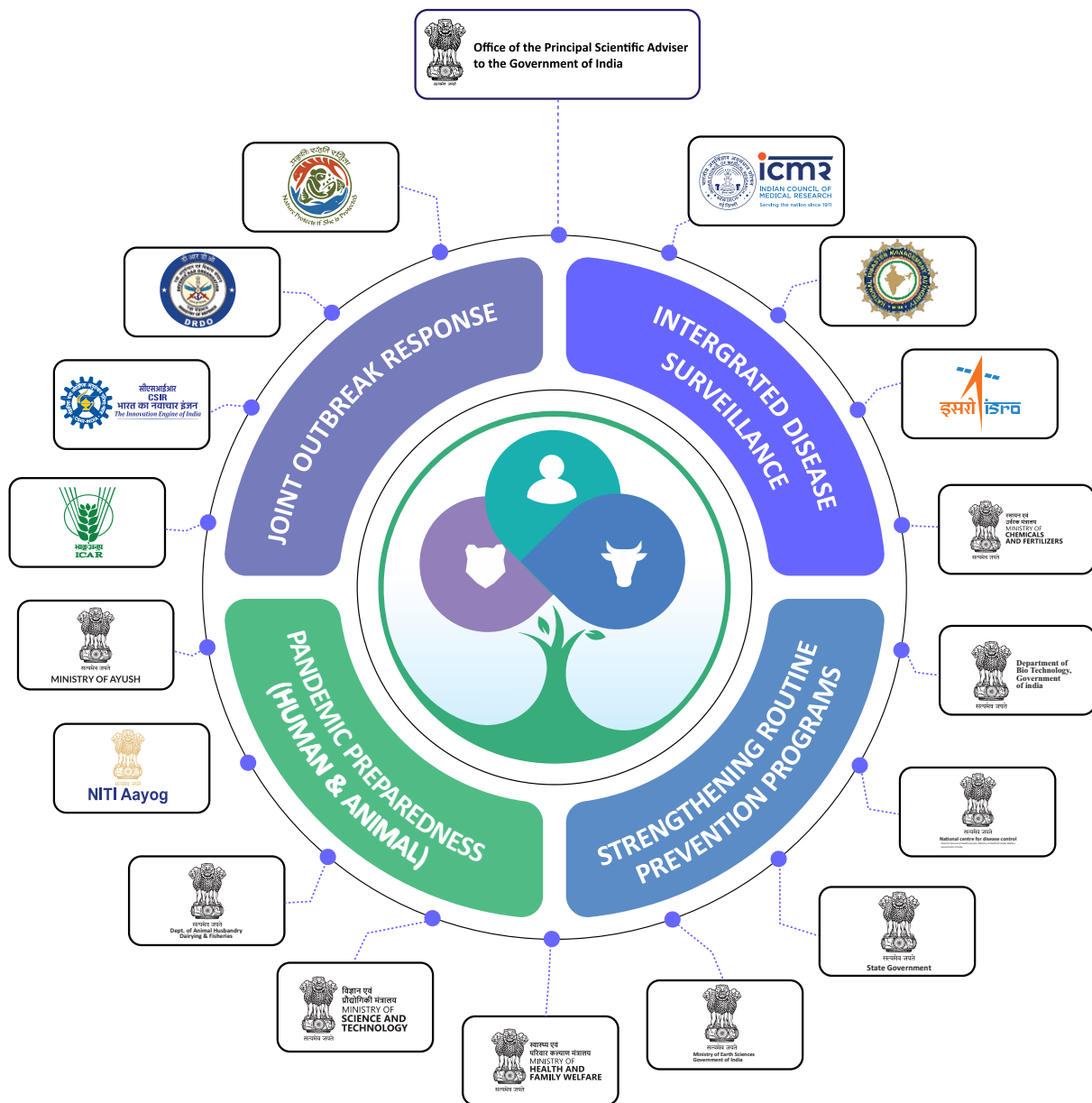


Figure 1: Government stakeholders in the mission

What makes the Mission remarkable is not only its scale, but also the way it is reshaping collaboration across sectors that traditionally functioned in isolation. Instead of functioning in silos, institutions are increasingly working through shared platforms, joint outbreak investigations, coordinated surveillance exercises, and integrated scientific planning. The Mission is steadily creating a culture where human health experts, veterinary scientists, ecologists, laboratory researchers, and administrators operate as part of a connected preparedness ecosystem (Figure 2).



Operational Mechanism Of National One Health Mission

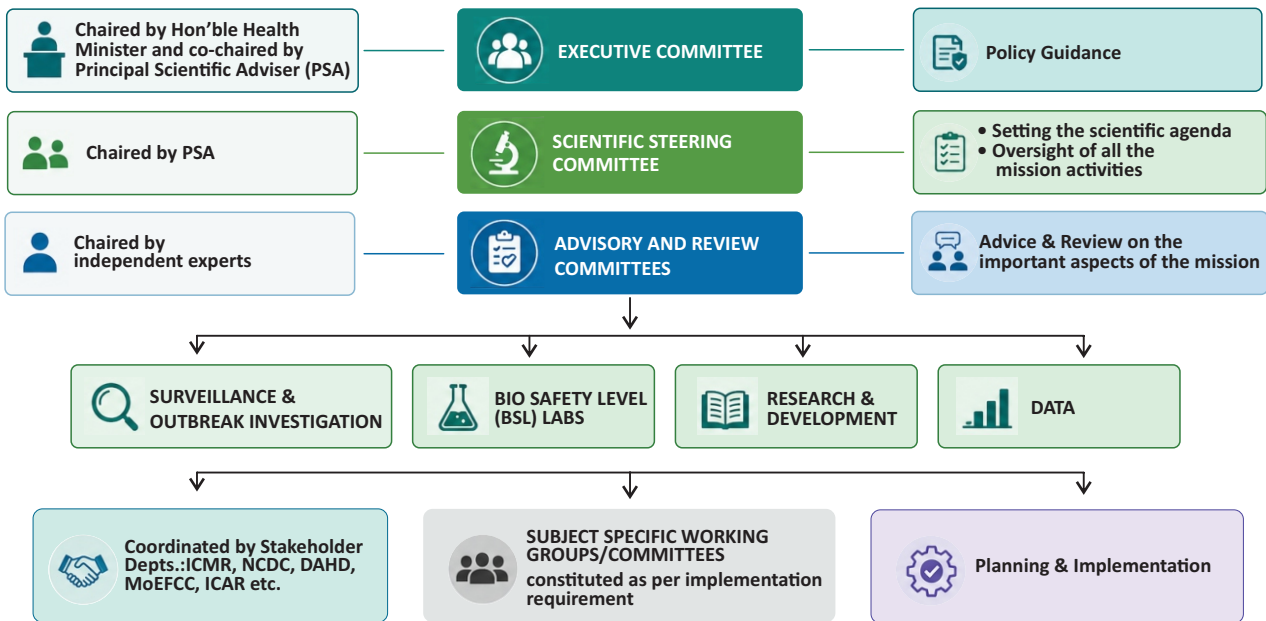


Figure 2: Governance of the mission

Over the past year, this shift from policy to implementation has become increasingly visible across states and institutions. One Health is now visible in laboratories, field surveillance systems, training programmes, state consultations, and emergency preparedness exercises across the country.

One of the strongest signals of this transition came with the inaugural “State and Union Territory Engagement Workshop” held on June 2025, where more than 27 States and UTs participated alongside representatives from multiple departments.

The workshop was designed not merely as a consultation, but as a working platform to help states/UTs operationalize One Health within their own governance structures and disease priorities. Discussions focused on surveillance integration, outbreak coordination, institutional convergence, and data-sharing mechanisms.

A key outcome of the workshop was the

development and dissemination of a suggestive model framework for governance structures to strengthen One Health implementation across States and UTs (Figure 3). The framework is envisioned as a flexible guide that could help them establish institutional mechanisms suited to their own administrative contexts, disease burdens, and local priorities, while still aligning with the broader national vision of integrated health security.

This push toward decentralised implementation reflects an important shift in the Mission's philosophy. Health threats rarely emerge uniformly across the country. A zoonotic disease challenge in the Himalayan region differs greatly from coastal disease risks to urban Antimicrobial Resistance (AMR) patterns, or vector-borne outbreaks in forested landscapes. By enabling States and UTs to contextualize One Health strategies within a broader national framework, the Mission is building an approach that is both nationally coordinated and locally responsive.



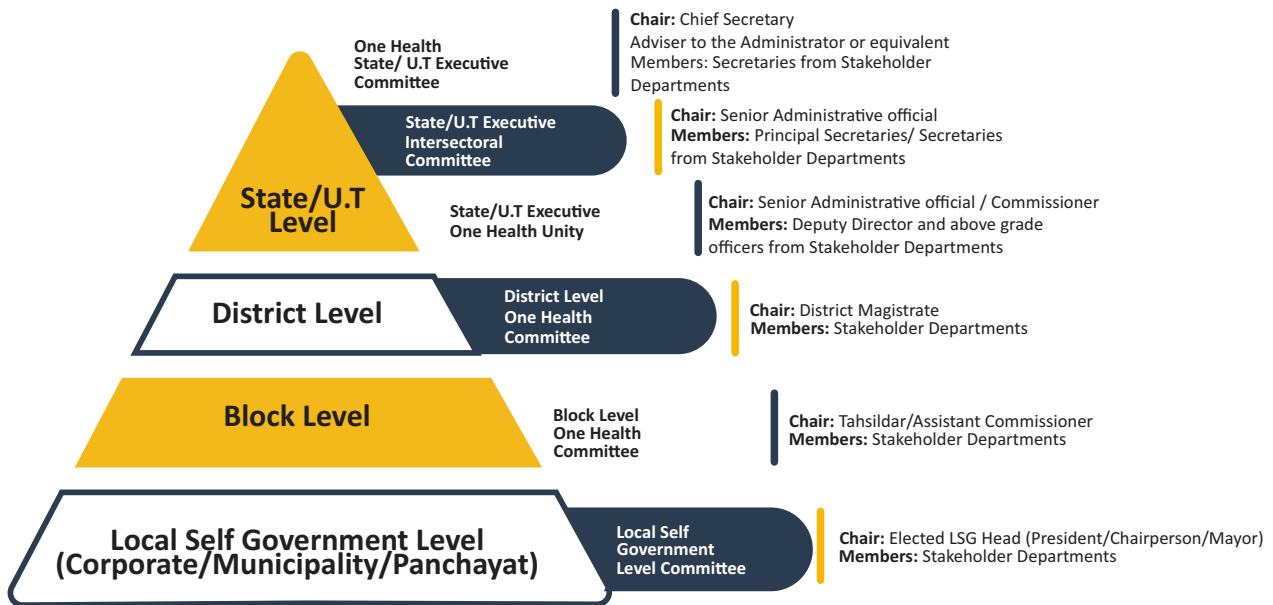


Figure 3: Visual representation of the model governance framework



Alongside governance reforms, India is also building the scientific backbone required for long-term health security. One of the Mission's major milestones has been the formal notification of a national network of BSL-3 laboratories. These high-containment facilities form a critical part of India's preparedness architecture, allowing researchers and public health agencies to safely study and diagnose dangerous pathogens while supporting outbreak response, genomic surveillance, training, and research collaboration.

But preparedness under the Mission is not limited to laboratory infrastructure alone. Equal emphasis is being placed on ensuring that institutions and response systems can function together effectively during real-world emergencies. The national mock drills “Vishanu Yuddh Abhyas” and “Vishanu Sankraman Pratirodh Abhyas” demonstrated how the One Health framework can operate during simulated outbreak situations. These exercises brought together experts from

public health, veterinary sciences, wildlife sectors, laboratories, disaster response agencies, and administration to test coordination systems under field conditions. In doing so, they validated the National Joint Outbreak Response Team (NJORT) model and highlighted how rapid communication, integrated action, and cross-sectoral coordination can significantly strengthen outbreak preparedness and response capacity.

This spirit of integration is also reshaping India's surveillance ecosystem. Rather than viewing surveillance solely through a medical lens, the One Health approach expands the focus to include animals, wildlife, ecosystems, wastewater, vectors, and environmental indicators. Across the country, targeted surveillance programmes are being supported in slaughterhouses, bird sanctuaries, wetlands, and healthcare settings to better understand the movement of pathogens and antimicrobial resistance across interfaces where humans, animals, and the environment interact most closely.



Home > Dashboard For National One Health Mission

Dashboard for National One Health Mission



EXPLORE ONE HEALTH INITIATIVES ACROSS INDIA

Discover State/UT wise initiatives on One Health through this information portal. The platform offers a comprehensive view of ongoing efforts focused on strengthening collaboration between human, animal, and environmental health systems across India. Users can explore initiatives related to governance frameworks, capacity building, research and innovation.

Select A State : Click On Any State To View Its Initiatives



Selected State: Uttar Pradesh

Map Keys

- Selected State
- States with available data



This Map is not upto scale

Scan to access

State Initiative

Central Initiative

Multilateral Initiative

Central ministries



Department of Animal Husbandry & Dairying (DAHD)

National Animal Disease Control Programme (NADCP)

... (FMD) and Brucellosis through 100% vaccination of cattle, buffalo, sheep, goats, and pigs.

Livestock Health and Disease Control (LHDC)

Strengthens disease surveillance systems, expands veterinary diagnostic infrastructure, and boosts state veterinary

Anim

Introdu India's animal

Collaborations

- Part of the National One Health Inter-Ministerial Steering Committee.
- Collaborates closely with ICMR, ICAR, and NCDC for field surveillance, laboratory integration, and outbreak response.
- Joint exercises and capacity-building programs with veterinary colleges and medical institutions under One Health umbrella.

Figure 4: A snapshot of the One Health information portal created and visible on OPSA website



This broader surveillance approach is particularly important in addressing AMR, which has emerged as one of the world's most pressing public health challenges. Projects monitoring AMR in hospital wastewater and environmental systems are helping generate evidence that can guide infection control strategies, antibiotic stewardship, and future policy interventions. Digital integration is another area where the Mission is beginning to create long-term impact.

The launch of the first phase of the One Health information portal (Figure 4) represents an important step towards creating a centralized platform for tracking activities, sharing information, monitoring implementation, and strengthening coordination between states and institutions. As data systems mature, the second phase of the dashboard is expected to evolve into a more predictive and analytical platform capable of supporting early warning systems and evidence-based decision-making.

Alongside digital integration, the Mission is also investing heavily in people and institutional capacity. E-learning modules for officials and professionals are being developed to strengthen awareness and standardize understanding of One Health approaches across sectors. Youth engagement initiatives are similarly being launched to bring students and young professionals into the movement, recognizing that future health security will depend not only on institutions, but also on scientific awareness and public participation.

Research and innovation remain central to the Mission's long-term vision. India is increasingly investing in diagnostics, vaccines, genomic surveillance, artificial intelligence-enabled disease prediction

systems, and interdisciplinary research that examines how climate change, biodiversity loss, food systems, urbanisation, and ecosystem disruption influences disease emergence. Many of these efforts are aimed not only at improving outbreak response, but also at building a deeper understanding of how changing ecological and environmental conditions shape future health risks. The upcoming National Institute for One Health (NIOH) in Nagpur, is expected to serve as a major hub for research, training, and policy convergence, further strengthening India's scientific preparedness ecosystem.

More than a response to future pandemics, the NOHM is gradually emerging as a long-term framework for resilience; one that recognizes that public health cannot be protected without protecting ecosystems, animal health, food systems, and environmental stability. In many ways, it reflects a broader shift in India's scientific and governance landscape: from reactive response to preventive preparedness, from fragmented systems to integrated networks, and from isolated expertise to collaborative problem-solving.

The journey is still unfolding, and many challenges remain, from harmonising data systems and strengthening local capacities to sustaining long-term institutional coordination. Yet the momentum is unmistakable. What began as a strategic blueprint is now becoming an operational reality across states, laboratories, institutions, and field systems. As India strengthens this interconnected health architecture, the NOHM is gradually redefining what health security means in the twenty-first century: not the protection of one sector alone, but the collective protection of people, animals, and the ecosystems they share.





**PERSPECTIVES
FROM THE
CHAIRS OF
ADVISORY
& REVIEW
COMMITTEE**

Disclaimer: This article reflects perspectives of the individuals who have helped in shaping the Mission. This is not an official reflection of the National One Health Mission.

ADVISORY & REVIEW COMMITTEE ON MEDICAL COUNTERMEASURES

One Health Approach For A Healthy Planet The Imperatives of a Technology Push



Dr Renu Swarup

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“The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug, make them resistant”

*– Sir Alexander Fleming,
Nobel Lecture, 1945.*

Sir Alexander Fleming's words from nearly eight decades ago resonate powerfully today. We have arrived at a point where the emergence of Antimicrobial Resistance (AMR) poses a significant and escalating threat to

global health. Often referred to as a "silent pandemic," AMR is just one critical symptom of a larger systemic issue that demands a holistic approach. The COVID-19 pandemic served as a definitive wake-up call, a stark reminder that human, animal, and environmental health are not isolated domains but are deeply and inextricably interconnected. One Health is no longer a theoretical concept; it is a lived reality.

The One Health approach is a collaborative, trans-disciplinary strategy that unites policymakers, researchers, healthcare professionals, veterinarians, environmentalists, and other stakeholders. By fostering this cooperation, we can develop holistic solutions for a wide range of complex health challenges. These include zoonotic diseases, AMR, food safety and security, environmental pollution, and the wide-ranging impacts of climate change on health. One Health serves as our best strategic defence against emerging threats from novel pandemics to climate-driven shifts in vector populations.

While One Health emphasizes the direct impact of animal and environmental factors on human well-being, the time has come to expand this perspective to Planetary Health.



Planetary Health takes a broader view, focusing on the health of human civilization and the integrity of the natural systems upon which it depends. This expanded framework integrates One Health principles with a focus on systemic issues like climate change and the social determinants of health. The constitutional right to health can only be fully realized by integrating frameworks that address both human and planetary well-being.

India has already taken decisive steps to champion One Health on both the national and global stages. The launch of the NOHM and the emphasis on this agenda during its G20 presidency have established a strong foundation for integrated and sustained action. The need of the hour is to shift from this foundation of plans and commitments to a period of concrete action—transforming a vital concept into an unstoppable movement.



G20 Chief Science Advisers' Roundtable (G20-CSAR) discussion on "Leveraging Opportunities in One Health for Pandemic Preparedness"

National One Health Mission (NOHM)

The Government of India, recognizing the need for a coordinated effort, approved the establishment of NOHM as a cross-ministerial initiative based on the recommendations of the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC). Led by the OPISA and with ICMR as the implementing agency, the mission's vision is to coordinate, support, and integrate all existing One Health activities nationwide. The aim is to achieve overall pandemic preparedness and integrated disease control against priority diseases by focusing on key pillars such as integrated surveillance systems for early warning,

targeted R&D for medical tools, and strengthening state coordination. To streamline these activities and foster collaboration, a National Institute of One Health is being established in Nagpur, and dedicated groups are working on surveillance, research, and data integration. The mission also emphasizes community engagement, capacity building, and ensuring readiness through real-time information linkages and access across sectors.

Critical Enablers for NOHM

A. Technology Push for New Innovative Solutions

Technology and innovation are critical enablers in dismantling sectoral silos and



driving an integrated, preventive, and data driven One Health approach. The strategic deployment of cutting-edge technologies – from advanced surveillance and predictive modelling to the rapid development of medical countermeasures – is our most powerful tool. By ensuring that technologies are being continuously refined for higher sensitivity, specificity, and efficiency, we can effectively manage outbreaks, epidemics, and pandemics and stay ahead of emerging threats.

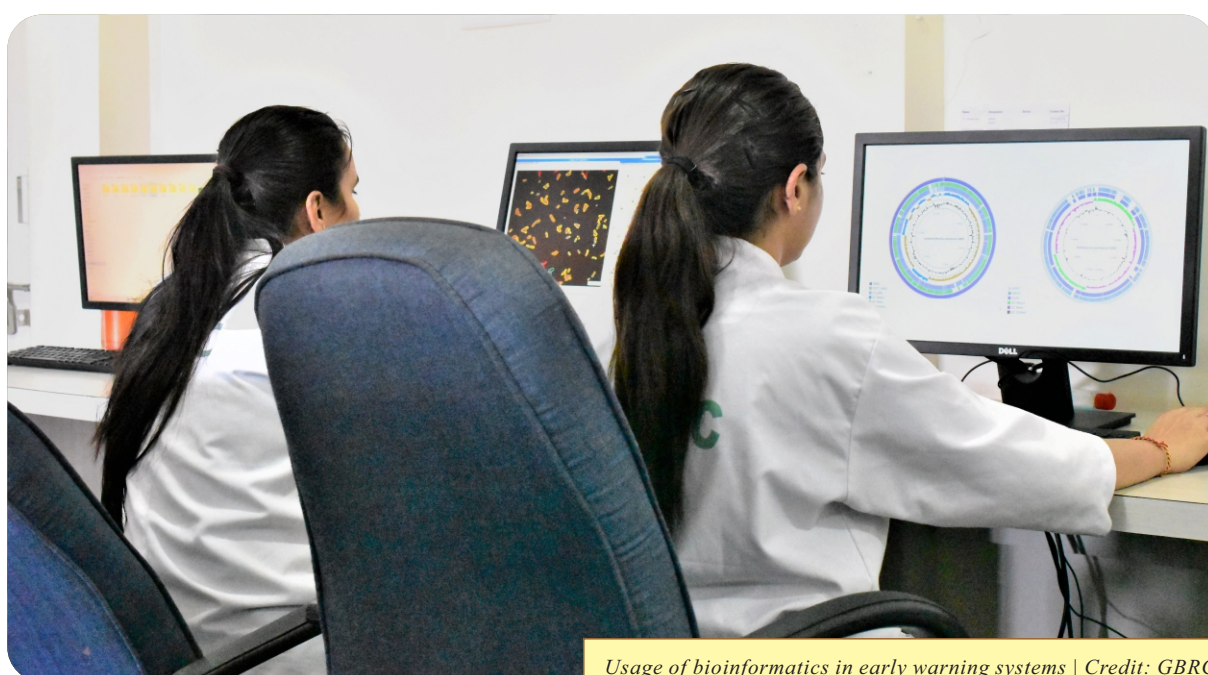
B. Surveillance and Predictive Modelling

Robust surveillance and early warning systems are critical for timely disease detection and response. A well-coordinated system, backed by a strong technology framework, is essential for every stage – from data collection and analysis to decision-making. Epidemiological surveillance must be integrated with genomic surveillance at one end and hospital data on the other. Technologies such as Next-Generation Sequencing (NGS) and wastewater surveillance networks are crucial for rapid and comprehensive pathogen identification. Establish-

ing well-defined sentinel sites will further strengthen these efforts.

The COVID-19 pandemic highlighted the power of technology in surveillance, with the widespread use of AI and predictive analytics for early warning. The development of data analytics dashboards, which captured key indicators to guide evidence-based decisions on infrastructure augmentation, served as a powerful model. These dashboards and predictive models can be contextualized and adapted to the broader One Health framework.

NCDC is working with all the stakeholders to create a standardized response strategy. The Integrated Disease Surveillance Program (IDSP) dashboard is now equipped to integrate data from diverse sources, with a focused effort on priority pathogens and sites. Furthermore, the Integrated Health Information Platform (IHIP) represents a significant step forward, successfully integrating surveillance at the primary care level and enabling the identification of outbreaks at a local level. To truly realize the potential of One Health, we must move beyond this to



Usage of bioinformatics in early warning systems | Credit: GBRC



achieve seamless cross-sectoral and cross-border data integration, making surveillance truly real-time and actionable. Data must be able to "talk to each other" to enable more coordinated and integrated action.

C. Building the Ecosystem for Research, Translation, and Product Development

The COVID-19 pandemic demonstrated the vital role of research and innovation in our fight against health emergencies. India's ability to indigenously develop new platform technologies for vaccines and diagnostics was a direct result of promoting a culture of risk-taking and high-risk funding, that had been critical in building research competence across both public and private sectors. This pre-existing robust research ecosystem provided the foundational strength to scale up countermeasure development.

Despite this success, challenges were identified that need to be addressed. Key gaps are present in diagnostics, lack of established protocols and centres, and dependency on imported products.

It is essential to establish a continuous mechanism for supporting high-risk, innovation-driven R&D. We must allocate a dedicated fund for the development of diagnostics, therapeutics, and vaccines, while also investing in human resources and infrastructure. We need to support basic, applied, and translational research to continuously develop new prototype vaccines and therapeutic libraries for priority pathogens, along with innovative drug molecules for infectious diseases and new antibiotics to combat AMR. Encouraging industry and the startup ecosystem to participate in this high-risk research is crucial. A compelling model for this would be to establish a network of Centres of Excellence (CoE) for research on

priority pathogens, where new and emerging pathogens can be studied, characterized, and maintained in designated repositories.

Development of Medical Countermeasures

A. Diagnostics

The onset of the COVID-19 pandemic revealed a critical challenge in rapidly scaling up diagnostic testing capacity. The unprecedented global demand for sensitive and specific diagnostic kits placed immense pressure on existing supply chains and global manufacturers. In response, India's robust medical diagnostics startup ecosystem and industry, supported by academic laboratories, mobilized a mission-mode approach to develop indigenous kits. While this effort succeeded in creating a domestic manufacturing base, it exposed a significant dependency on imported reagents and enzymes. Other key challenges were the lack of notified validation centres and the limited availability of necessary assay panels, which required access to clinical samples, virus cultures, and biorepositories.

To overcome this dependency on imported products, collaborative mechanisms like the DBT-led National Bio-pharma Mission and centres such as Centre for Cellular and Molecular Platforms (CCAMP) and Andhra Pradesh MedTech Zone (AMTZ) successfully brought together industries and startups to secure indigenous sourcing, thereby, enabling the rapid large-scale manufacture of diagnostic kits. These capacities and tools must be institutionalized to ensure a day-one response readiness for any future emergency. Other challenges were also swiftly addressed, enabling India to build competencies and achieve large-scale manufacturing within three months.



To further strengthen this ecosystem, the focus must now shift on the development of novel molecular diagnostics for identifying emerging pathogens. The immediate development and deployment of such kits during an outbreak is crucial for preventing rapid disease spread. While many raw materials like chemicals, reagents, and enzymes are locally available, we must build resilient supply chains for specialized items such as nanoparticles, radioisotopes, antigens, and antibodies. The goal should be to eliminate import dependency by fostering indigenous manufacturing.

Furthermore, a well-developed laboratory infrastructure for testing and reference samples is essential. The final stage of diagnostic kit development – validation – requires a robust system with approved protocols and processes to ensure accuracy and reliability. It is recommended that a dedicated mission be established to develop diagnostic kits for all identified priority pathogens.

B. Drugs and Therapeutics

A national mission on therapeutics and novel drug development is a strategic imperative, built on a Public-Private Partnership (PPP) model that includes academia, industry, and startups. The COVID-19 pandemic highlighted a critical gap: while numerous drugs were available, the capacity for rapid, targeted drug development and repurposing for specific pathogens was nascent. To address this, a coordinated national effort is needed to streamline the entire value chain, from initial discovery research and product development to manufacturing and regulatory approval. This mission can provide the necessary momentum to bring together public and private sectors to meet the targeted goal of developing drugs for priority pathogens.

Drug discovery efforts against priority pathogens can be advanced through two key approaches: the repurposing of approved drugs and the identification of novel compounds. It is essential to characterize these compounds and advance them through Phase 1 clinical trials to establish safety. This creates a portfolio of "trial-ready" compounds that can swiftly proceed to Phase 2 efficacy studies in the event of an outbreak. A PPP model is vital for this, encouraging participation from companies with expertise in drug discovery and manufacturers of repurposed drugs. Proactively addressing issues related to Intellectual Property (IP) is also necessary to facilitate the rapid development and deployment of these countermeasures.

C. Vaccines

India's response to COVID-19 yielded a significant success story: the development of a diverse portfolio of vaccines by leveraging multiple platform technologies. This was made possible through strong PPPs and the establishment of a robust shared infrastructure for discovery and development. Key components included immunoassay laboratories that met global standards and were recognized by the Coalition for Epidemic Preparedness Innovations (CEPI) network, along with animal challenge facilities, and a nationwide clinical trial network. This comprehensive ecosystem facilitated the rapid development of novel vaccines, including the first DNA, mRNA, and a nasal vaccine.

This rapid progress was fuelled by high-risk innovation funding & the strategic creation of an ecosystem for vaccine development, validation, and manufacturing.



Leveraging these facilities and competencies, it is now crucial to institutionalize platform technologies (e.g., Messenger RNA (mRNA), viral vectors, protein expression systems) to ensure they can be rapidly adapted to new pathogens. Future efforts must prioritize innovation in vaccine science, from basic and translational research to the development of new candidate libraries and technology platforms. This focus should extend to both human and animal health, addressing

One Health related disease threats. Research should also emphasize scientific approaches to adjuvant development and all integral components necessary for vaccine scale-up and manufacturing.

Finally, there is a need to establish a well-coordinated network that not only provides the ecosystem for translational research but also ensures a continuous pipeline of funding for high-risk innovations.



Messenger RNA (mRNA): From transcription to translation | Credits: OZ Biosciences

Conclusion

Effective One Health implementation is fundamentally dependent on both strong political commitment and robust, cross-sectoral governance frameworks. This requires institutionalized mechanisms—such as inter-ministerial task forces or national One Health platforms – that brings together health, agriculture, environment, and wildlife sectors. However, the responsibility for One Health extends beyond governments and experts. It requires active engagement of a broad range of stakeholders, including farmers, veterinarians, health workers, educators, and communities.

Empowering citizens, particularly youth, as agents of change is crucial. A participatory, citizen-centric model for disease surveillance, where communities can actively report health events, shifts the paradigm from a top-down approach to a collaborative one.

One Health impacts life and society, and there are many complexities and challenges which need the attention of researchers, clinicians, policy makers, and public health specialists. Management of One Health also requires responsible citizen engagement.



ADVISORY & REVIEW COMMITTEE ON SURVEILLANCE

One Health Surveillance: The Imperatives and Opportunities



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Disruptive epidemics and pandemics have caused significant human and economic losses in the recent decades. India is a hot spot with nearly 75% of these originating from animals and driven by the country's rich biodiversity, large livestock populations, rapid urbanization, globalization, high population density, behavioural factors, and rapid environmental and socio-economic changes. Addressing these challenges requires coordinated, multi-sectoral actions across the human, animal, and environmental health domains. This should be integrated through technology-enabled One Health (Human-Animal-Environment) Surveillance (OHS) strategies and complemented by behaviourally informed community engagement initiatives that promote culturally appropriate risk mitigation for pandemic and epidemic prevention and control in India.

The recent COVID-19 Pandemic exposed the

vulnerabilities in India's surveillance systems and pandemic preparedness. OHS is consequently a critical priority for our country. Strengthening surveillance to rapidly detect and prepare for future pandemic or epidemic, including potential 'Disease X' events, demands transitioning the existing silo-based surveillance system into a multidisciplinary OHS that seamlessly integrates its three components along with climate change and social sciences.

Successful implementation of OHS requires a comprehensive understanding of infections, dynamics of their transmission in different contexts, associated risk factors, methods for its detection, and predictive monitoring. This entails incorporating principles of complexity science (nonlinear-feedback loop-adaptive systems) to model the interdependent relationship among all systems (Figure 5) and integrating remote



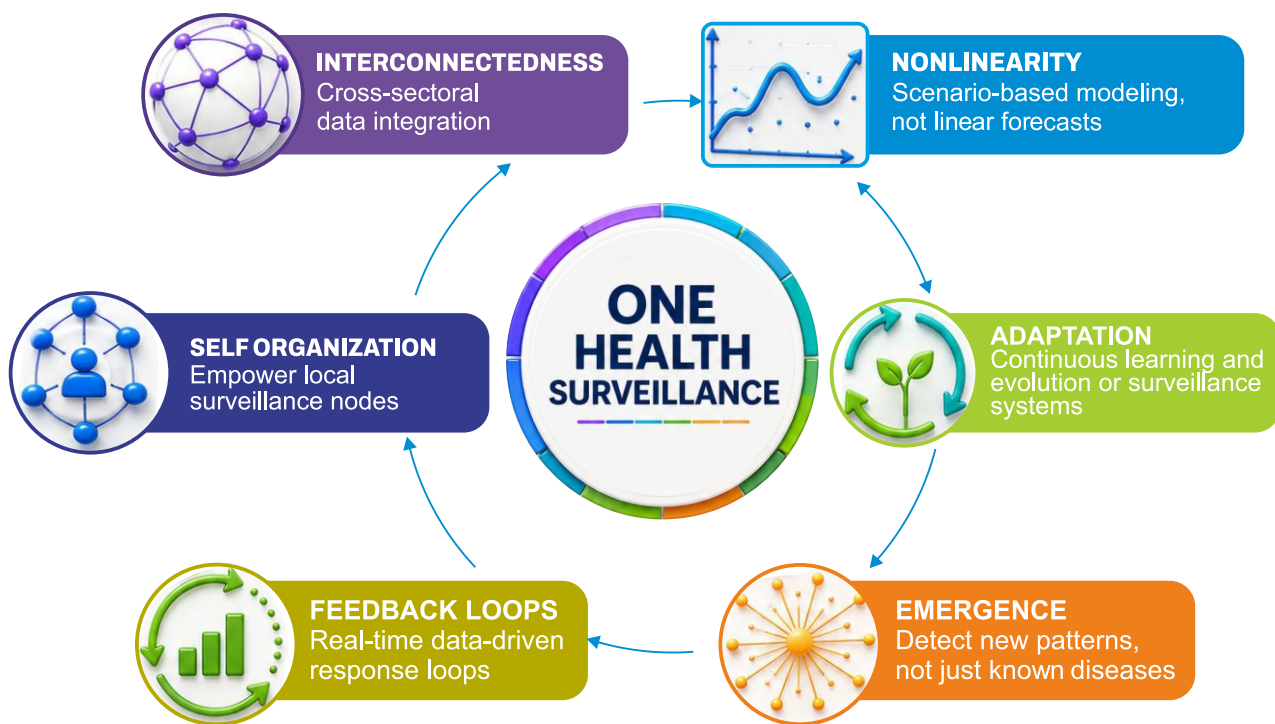


Figure 5: One Health and Complexity Science Principles

sensing data to capture real time environmental and spatial indicators of emergence and evolution of infections. These approaches shall enable building of data driven intelligence within surveillance systems. Functional OHS must be supported by a trained multidisciplinary workforce, resilient human & animal health infrastructure, coordinated community- and policy-driven responses, robust regulatory frameworks, strong leadership and safety culture, and unremitting mechanisms for feedback, evaluation, and resilience for improvement.

In India, ~8-10% disease outbreaks, reported through the IDSP are zoonotic in nature.

However, animal disease surveillance managed through both central and state programs, remains fragmented with wide interstate variation. Coverage, data quality, field implementation, and integration of information are additional challenges. Information is collected through multiple, uncoordinated platforms such as National Animal Disease Reporting System (NADRS), the National Surveillance Programme for Aquatic Animal Diseases (NSPAAD), and ICAR–National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI) network. Disease surveillance in wild animals is also yet to mature. Notwithstanding the challenges, there are ample opportunities (Table 1).



CHALLENGES	OPPORTUNITIES
<ul style="list-style-type: none"> • Fragmented data systems with challenges of quality, coverage, and integration • Inadequate inter-ministerial and even intra-ministerial coordination • Health, agriculture, dairy & animal husbandry, forest, and environment ministries/departments operate in silos • Lack of trained personnel and only a few professionals are trained in cross-sectoral outbreak response • Lack of One Health relevant training curricula and laboratory facilities: jointly applicable protocols for manpower functionality • Data sharing constraints due to legal, departmental, data quality, and heterogeneity and logistic hurdles 	<ul style="list-style-type: none"> • Creation of One Health Mission • Creation of One Health governance councils • Availability of national funding • Multi-sectoral capacity building programs • Heartening experiences with 'whole of society' and 'whole of governance' during COVID-19 pandemic • Research: National Institute of One Health • International funding and technical assistance • Technological advancement - application of complexity science, remote sensing, and artificial intelligence for data integration, interpretation, and prediction

Table 1: Establishing One Health Surveillance Architecture

An adaptive, technology-integrated surveillance system—incorporating principles from complexity sciences—is essential for dynamically capturing India's vast territory and rapidly changing climate. There is now a growing realization to include geospatial techniques and geo-reconnaissance tools in OHS platforms. Geo-reconnaissance can significantly enhance early detection and risk assessment of potential health threats. India possesses advanced satellite capabilities, but robust operational frameworks and systematic approaches are needed for effective integration of satellite data into routine One Health Surveillance.

In conclusion, India's expanding health infrastructure and laboratory network, against a backdrop of existing human,

animal, and environmental surveillance coupled with its technological advancements provide unique opportunities for establishing district level OHS System. Developing actionable protocols to leverage advanced data systems and readiness of the sectors to share data and build a multidisciplinary workforce will be the keys to successful implementation. One Health Mission at the OPSA has established a technical expert group to advance the establishment of technology enabled OHS. The country has strong policy commitment and therefore, well positioned to emerge as a global leader in successfully implementing the proposed surveillance system at grassroots levels. This will also accelerate progress towards the Sustainable Development Goals.



ADVISORY & REVIEW COMMITTEE ON DATA SHARING & INTEGRATION

A Time to Share: Post CoVID-19 in India



Prof. Vijay Chandru
Visiting Faculty, Department of Bioengineering, Indian Institute of Science (IISc) and ARTPark



Dr Praphul Chandra
Professor and Director AI Centre of Excellence, Atria University



Mr Jigar Doshi
Director of ML, ARTPark



Mr Ajay Nair
Chief Executive Officer, Swasth Alliance & Independent Strategic Advisor



Dr Ravi Nanjundiah
Professor, Centre for Atmospheric & Oceanic Science; Associate Faculty, Divecha Centre for Climate Change, IISc



Dr Vybhav GR
Lead Computational Science, Climate & Weather forecast, ARTPark

As India deepens its commitment to a NOHM, the critical challenge is no longer about whether we can generate data, but whether we can share, integrate, and act on it responsibly. Fragmented silos of health, agriculture, environment, and veterinary records still dominate our institutional landscape. Yet, outbreaks do not respect bureaucratic boundaries. Beyond zoonotic diseases, one health viewpoints should move to include other topics (climate change, nutrition and food safety, policy and planning, welfare and well-being, AMR, vector-borne diseases, toxicosis and pesticides issues) and thematic fields (social sciences, geography, and economics). These

challenges demand a connected intelligence system.

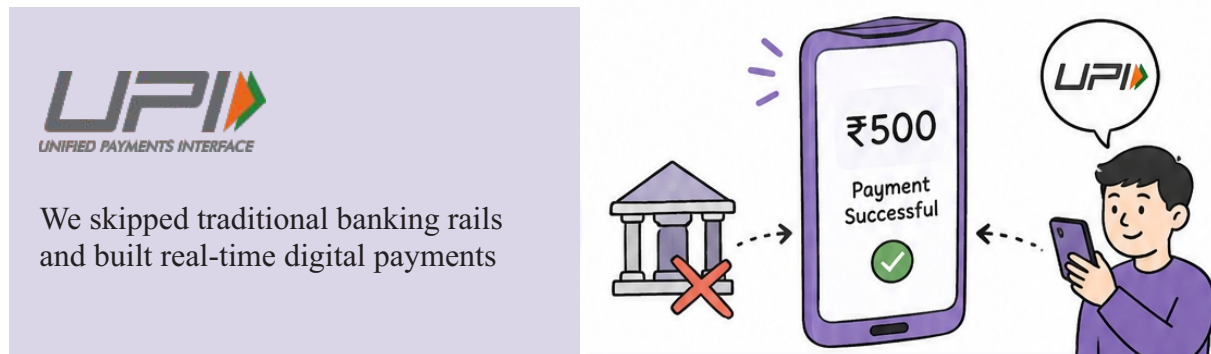
Desiderata: An Integrated Intelligence Ecosystem

The ambition for India's NOHM is to build a connected intelligence system where data flows seamlessly yet securely across human, animal, and environmental health sectors. The ultimate desired state is a system that can not only “collect the dots” of surveillance data but also “connect these dots” to create actionable intelligence for national preparedness.



The Technology Imperative: India's Next Digital Infrastructure Leap

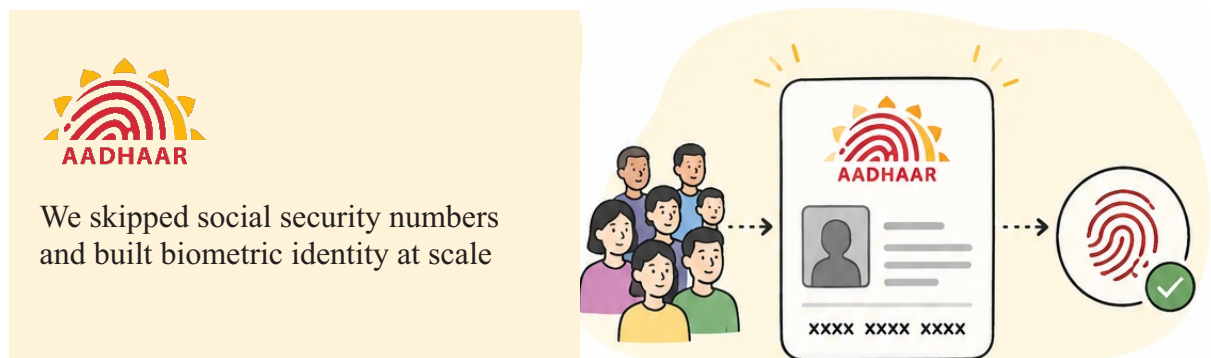
India did not build landline infrastructure and then add mobile; we leapfrogged to mobile-first.



UPI
UNIFIED PAYMENTS INTERFACE

We skipped traditional banking rails and built real-time digital payments

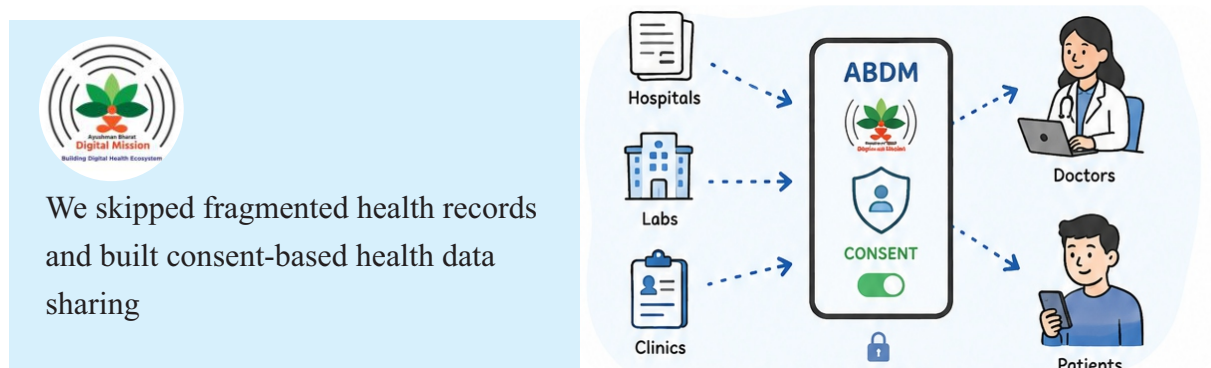
The illustration shows a smartphone displaying '₹500 Payment Successful' with a green checkmark. A speech bubble above the phone says 'UPI'. To the left, a traditional bank building is crossed out with a red 'X'. A person is shown holding the phone, and a dashed arrow points from the bank building to the phone.



AADHAAR

We skipped social security numbers and built biometric identity at scale

The illustration shows a smartphone displaying the Aadhaar logo and a person's profile with masked text 'XXXX XXXX XXXX'. A fingerprint is being scanned on the phone, with a green checkmark indicating success. A group of people is shown to the left, with a dashed arrow pointing to the phone.



ABDM
Ayushman Bharat
Digital Mission
Building Digital Health Ecosystem

We skipped fragmented health records and built consent-based health data sharing

The illustration shows a smartphone displaying the ABDM logo and a 'CONSENT' toggle switch that is turned on. A padlock icon is at the bottom. Dashed arrows connect 'Hospitals', 'Labs', and 'Clinics' to the phone, and from the phone to 'Doctors' and 'Patients'.

The question isn't whether we need better data sharing for one health. The question is whether we build it the old way, or leapfrog to something fundamentally better.

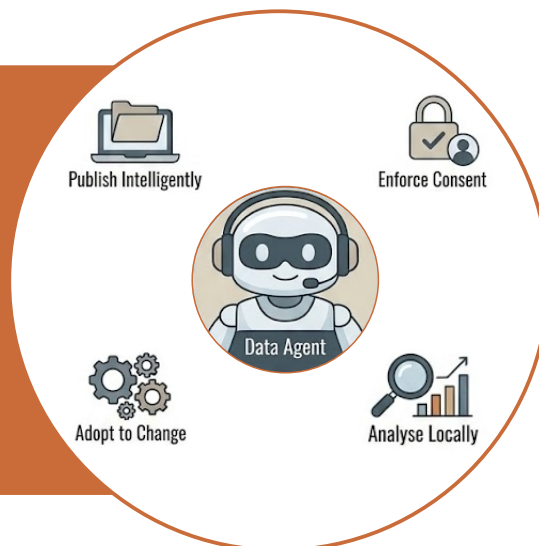
Now, as we architect the data infrastructure related to One Health, we face a similar choice: build brittle application programming interface (API) integrations, or leapfrog to agentified APIs that make data sharing intelligent, adaptive, and trustworthy. We can skip to the latter and build an agentified data infrastructure.



What does Agentification Mean?

An agent is an intelligent intermediary deployed by each institution to manage its data. They act as autonomous “data ambassadors” with four key capabilities:

- Publish intelligently through standards-compatible streams
- Enforce consent dynamically: translate privacy and access rules into executable code, ensuring that permissions expire automatically
- Adapt to system changes internally
- Analyse data and support policy-bound decisions locally



Challenges Agentification will Address: The “Integration Hell”

When multiple institutions across human, animal, environmental, and related sectors attempt to connect their data through static APIs, the result is:

- ▶ **Exponential integration complexity:** every new system requires multiple custom connectors.
- ▶ **Brittle contracts:** if one schema changes, dozens of links can fail.
- ▶ **Rigid permissions:** static access rules cannot adapt to dynamic consent or evolving regulations.
- ▶ **Trust gaps:** there is no built-in way to verify provenance, enforce expiry, or log usage.

This creates an “integration hell” that slows innovation and weakens preparedness.

Real-world scenario

A state health department may consider surveillance dataset “complete” at lower population coverage threshold, while national epidemiological models may require significantly higher completeness for reliable projections. An agentified system could automatically detect such specification mismatches, flag data gaps, propose augmentation strategies from complementary sources, or recommend alternative datasets that satisfy the required analytical criteria. The agent bridges local operational realities with national analytical requirements (Figure 6).



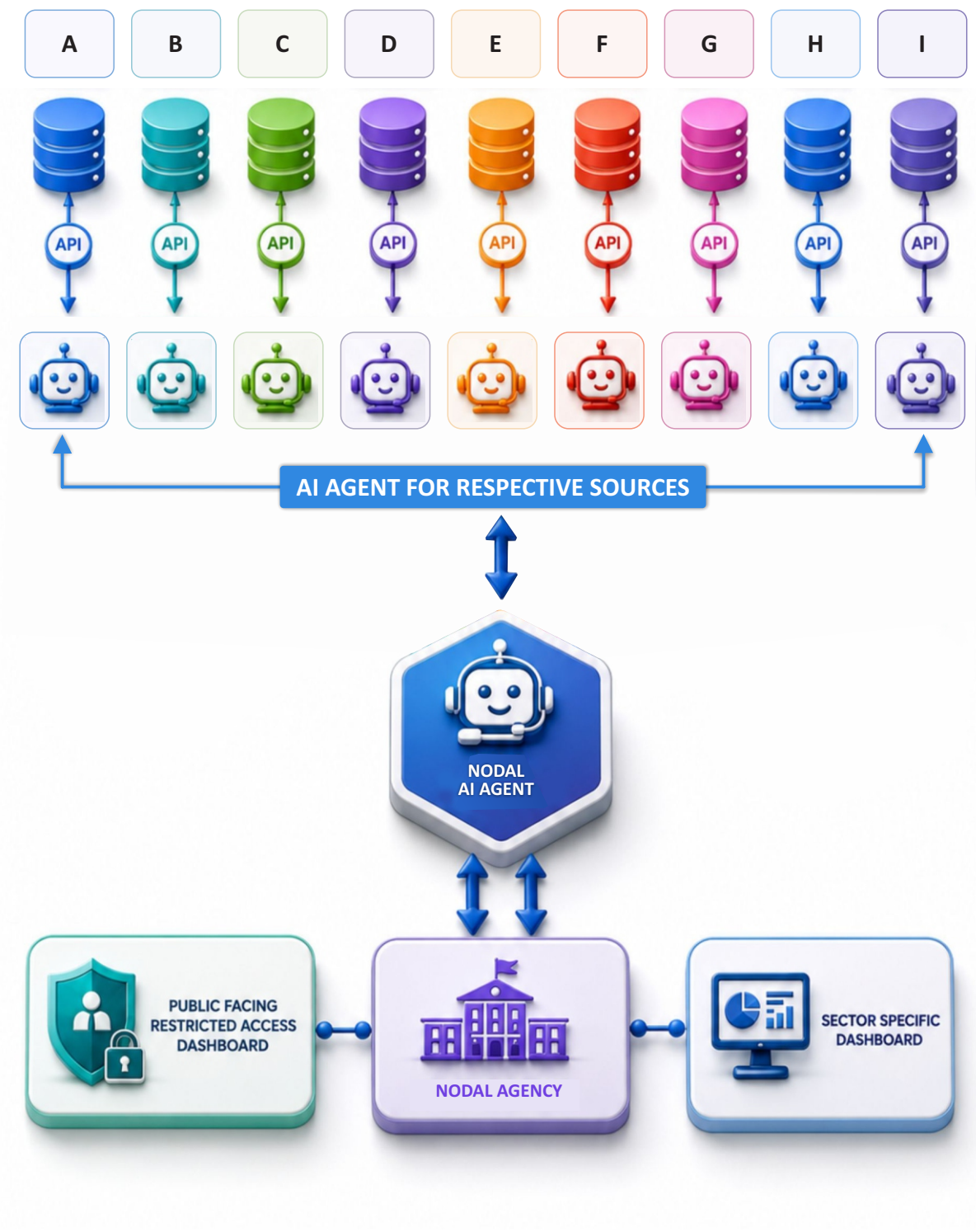
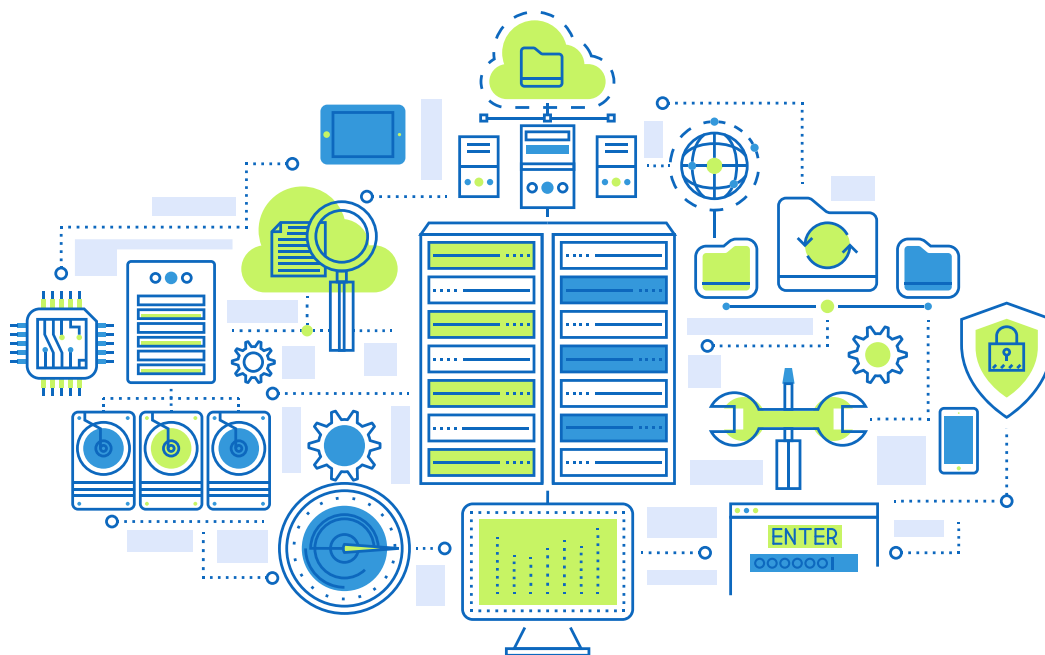


Figure 6. Illustration of agentic AI workflow for decision support





Advanced data center infrastructure for secure digital operations | Credits: Stock images

Now, consider how agentification could revolutionize India's pandemic preparedness infrastructure. Currently, when national health intelligence is required, fragmented datasets across ministries, states, and departments operate with distinct data quality standards and limitations understood only by their custodians.

Agentified systems would deploy intelligent agents within departments, each possessing knowledge of local data characteristics, noise patterns, and constraints. When high-quality datasets are required for policy analysis, these agents would not simply return raw data; they would evaluate holdings against defined quality and completeness

requirements.

This capability is not possible with traditional APIs. Static APIs can only return pre-programmed responses—they cannot assess data quality relative to requester-specific needs or external benchmarks. Agentified systems transform data sharing from mechanical retrieval into intelligent curation.

For India, the opportunity is to deploy agents that don't just bridge silos but transform them into a dynamic, adaptive, and context-aware ecosystem — one capable of powering pandemic preparedness and beyond.

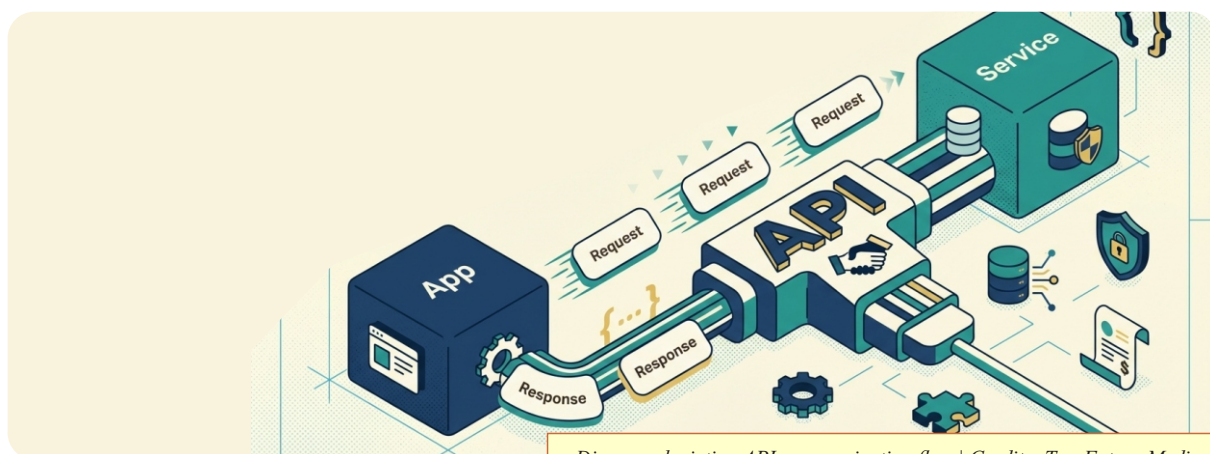


Diagram depicting API communication flow | Credits: TrueFuture Media



Principles of Integrated Health Vision: Marrying Organisation with Technology

To achieve this vision, the interoperable architecture must be built on a foundation of hybrid principles that address both governance structure and technical architecture. These elements must work in tandem, as one cannot succeed without the other. The architectural diagram in Figure 6 above suggests how such a federated approach empowered by state-of-the-art AI wrappers around APIs can be set up.

► Federated by Design, Focused on Action

The core should be a federated data architecture (FA) enabling collaboration to tackle challenges.

► Decentralized Implementation, Centralized Standards

Operational models must empower sub-national actors, particularly the office of the District Collector while being guided by nationally mandated data standards and interoperability protocols.

► Trust Through Privacy and Security

Data integration must incorporate robust legal frameworks and privacy-enhancing technologies from the outset.

Protocols: The Rules for Secure Collaboration

To translate these principles into practice, a set of clear and enforceable protocols are required to govern how data is shared and integrated between different agencies and focused units. Key protocols include:

- Standardized Formats and Interoperability
- Secure access through Agentic APIs
- Legally binding Data Sharing Agreements (DSAs) between participating agencies



Foundational Technologies: The Enabling Toolkit

The implementation of this federated ecosystem depends on a suite of foundational technologies that can support secure, scalable, and privacy-preserving data integration. The "Health Stack" approach, with its focus on open, interoperable digital building blocks, provides a useful conceptual model.



Privacy-Enhancing Technologies (PETs)

PETs such as differential privacy and secured multi-party computation, can enable data analysis without exposing sensitive information.



A National Health Data Exchange

A secure digital backbone, built on Data Empowerment and Protection Architecture (DEPA) principles, is needed to manage consent-driven data flow across the network.



Cloud Computing and AI/ML

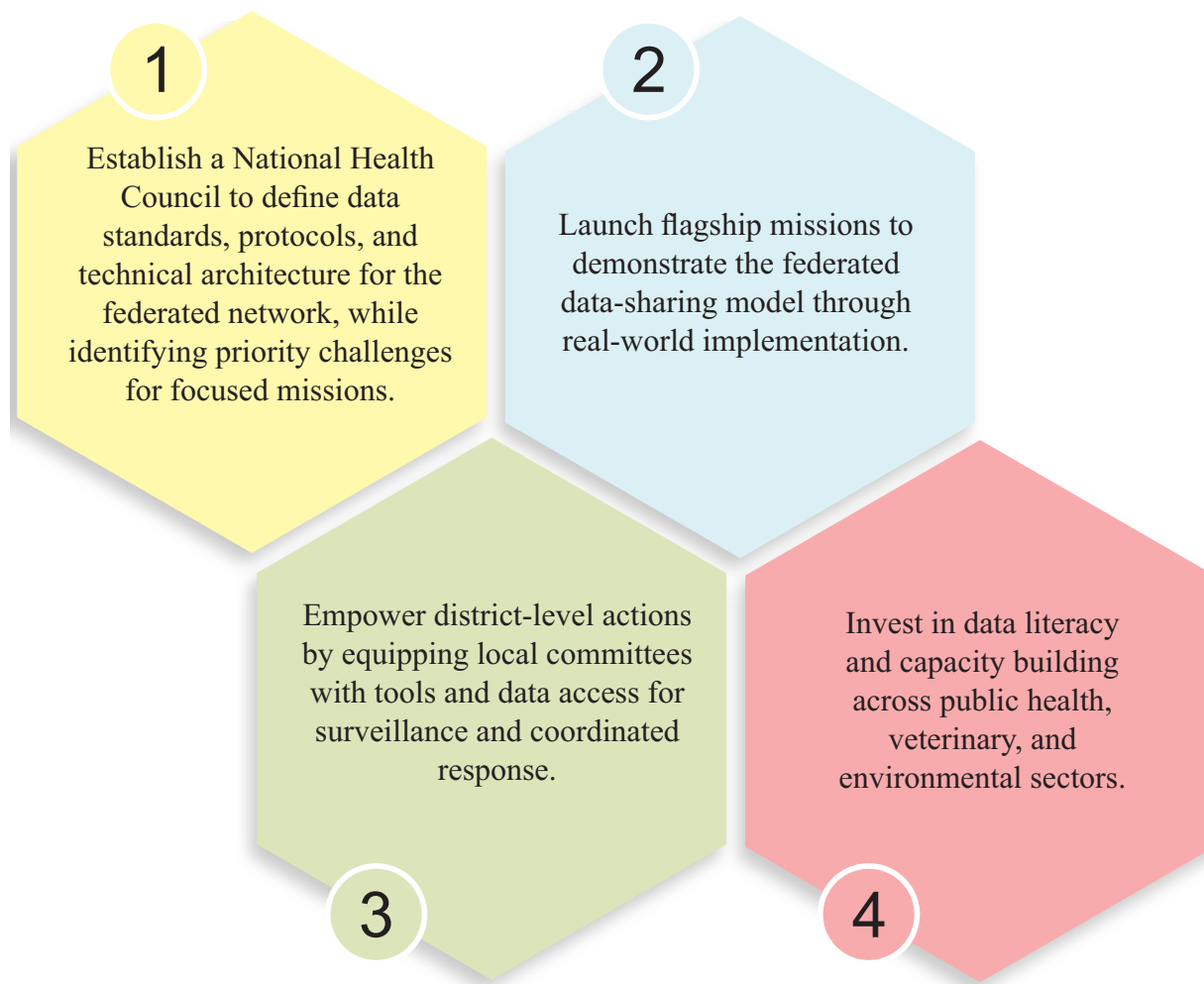
Scalable cloud and high-performance infrastructure combined with AI and ML models can power early warning systems and predictive analytics.

With these technologies in place, India can move from vision to action through concrete institutional and programmatic steps.



Recommendations: A Concrete Path Forward

To accelerate the development of this integrated ecosystem, the following balanced recommendations are proposed:



By integrating pragmatic organizational design with a robust technological framework, India can build an ecosystem that strengthens public health preparedness while setting a benchmark for effective and responsible governance.

The essence of One Health is foresight. As the world faces accelerating climate disruption, novel pathogens, and AMR, India cannot afford a fragmented approach to data. Federated, privacy-preserving data integration must therefore become a foundational principle; supporting a future that is resilient, coordinated, and respectful of privacy, dignity, and diversity.



ADVISORY & REVIEW COMMITTEE ON BIO SAFETY LEVEL NETWORK

India's National BSL – 3 Laboratory Network



Lt. Gen. Madhuri Kanitkar (Retd.)

Former Vice-chancellor,
Maharashtra University of Health Sciences;
and Member, PM-STIAC

The global health landscape, characterized by the persistent threat of emerging and re-emerging infectious diseases, necessitates a proactive, coordinated, and scientifically advanced defence mechanism. Under the mandate of the NOHM, robust National Biosafety Level (BSL) 3 and 4 have been established — strategic assets designed to safeguard human, animal, and environmental health across the nation. This is an important step towards pandemic preparedness.

BSL-3 and BSL-4 laboratories are the specialized bedrock of our national health security. They are equipped with stringent engineering controls, specialized equipment, and operational protocols that are required to safely handle highly pathogenic or exotic agents, such as those causing COVID-19, Crimean-Congo Hemorrhagic Fever (CCHF), Nipah, and Ebola. Without this infrastructure, the critical work of timely and accurate diagnosis, vaccine development, and therapeutic research on dangerous pathogens would be impossible and unsafe.



*BSL-III & BSL-IV Laboratories equipped for advanced infectious disease research and biosafety operations
Credits: KAVS Spectronova Technologies Private Limited*



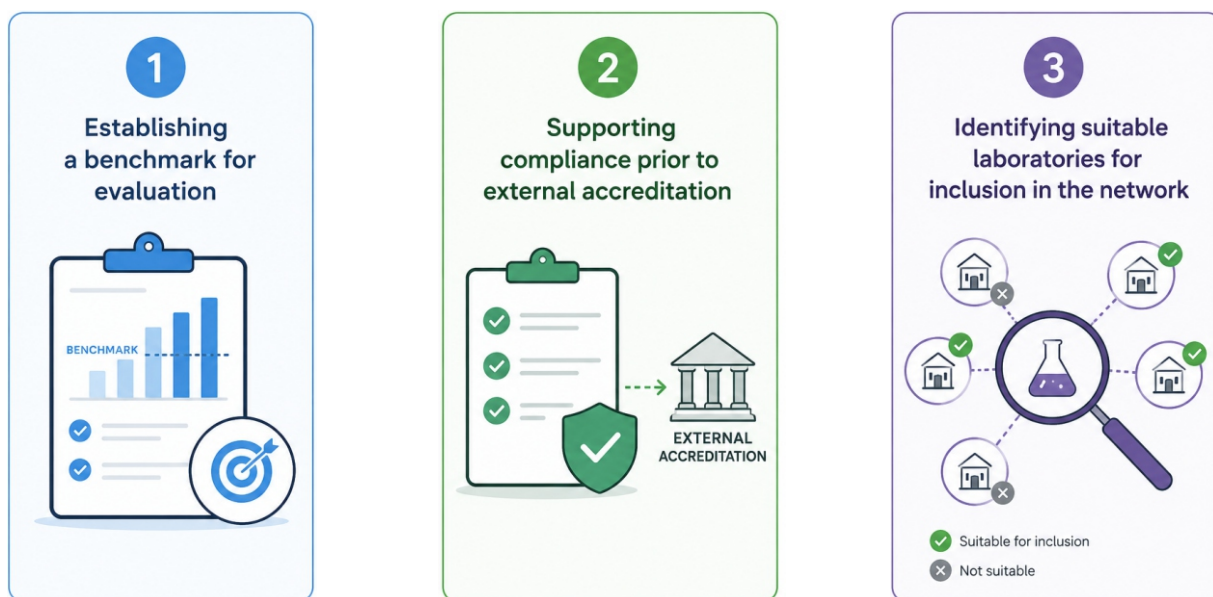
While individual high-containment labs are essential, the creation of a resilient national network is paramount. A decentralized, interconnected network is vital because health threats do not adhere to state borders, and responses must be rapid and geographically dispersed. This network minimizes reliance on a single central facility, distributing specialized diagnostic and research capabilities closer to the source of potential outbreaks. This lab network ensures adequate geographical distribution, utilizing “hub and spoke” models for better coordination.

Under the NOHM, this national network was formalized by integrating 23 existing high-

level laboratories. This achievement ensures distributed expertise and rapid scalability during a national health crisis, dramatically reducing diagnostic turnaround times and enabling swift epidemiological surveillance.

A key achievement of this initiative has been the development of Minimum Standard Requirements (MSRs) for any laboratory to be a designated part of the national network. The expert committee for this network has identified the need to create a comprehensive MSR checklist covering personnel, processes, infrastructure, equipment, and documentation aspects.

The goal is to use the MSRs for:



This rigorous standardization ensures data comparability, reliability, and interoperability across the country. The idea of a common accreditation procedure has also been investigated across laboratories under separate departments and ministries.

The BSL network is designed to fill crucial gaps in India's health system. When a local

lab encounters an unknown or high-risk pathogen beyond its capacity, the national BSL network provides rapid and specialized confirmation needed for early containment. The network thus connects the frontline clinical response in local hospitals to the highest level of scientific expertise.



The BSL Network Expert Committee meetings have established clear deliverables and mechanisms for operationalizing the network:

- **Mapping Capabilities:** Labs were surveyed to map their infrastructure, current utilization, mandate, and pathogens handled; ensuring the network is a national resource equally accessible to humans, livestock, and wildlife sectors.
- **Harmonization of SOPs:** A working group was constituted to collate, review, and harmonize SOPs for sample handling, equipment, decontamination, and biosafety/biosecurity, supporting standardized and integrated response mechanisms across the network.
- **Pathogen Prioritization:** Priority pathogens and disease categories were identified to guide preparedness and diagnostic strengthening across laboratories, ensuring readiness for coordinated response across sectors.
- **Testing Operational Issues:** It was stressed that all operational issues, including collection and handling of samples, processing, and data record, must be tested in mock drill exercises like the *Vishanu Yuddh Abhiyas*.
- **Data Sharing:** A working group was established to recommend an interdepartmental data sharing platform, with clear input/output data systems and defined access control, recognizing the sensitivity of the data.
- **Inter-Sectoral Engagement:** The committee emphasized that inter-sectoral engagement should be constantly addressed, requiring continued collaboration among relevant stakeholders across human, animal, and environmental health sectors for effective One Health implementation. A simple scoring system has also been prepared for laboratories to have self-assessment tool to evaluate their level of preparedness towards One Health Investigation Capability.



The network plays a powerful role in capacity building across all sectors:

► **Training:** The network facilitates advanced training and capacity-building initiatives for BSL personnel across sectors, including human, animal, and environmental health. Led initially by institutions like National Institute of Virology (NIV) and National Institute of High Security Animal Diseases (NISHAD), these efforts are intended to strengthen technical competencies, promote harmonized biosafety and biosecurity practices, and support preparedness for integrated outbreak investigation and response under the One Health framework. This promotes the trans-

disciplinary spirit of One Health. The participants from these trainings function as trainers in their respective BSL labs to build institutional capacity.

► **Interconnectedness:** The focus on harmonized SOPs and a dedicated outbreak database, integrated with platforms like the IHIP and the National Digital Livestock Mission (NDLM), ensures seamless data exchange and collaboration between medical labs and hospitals, allowing for a swift, comprehensive response that transcends traditional sectoral boundaries. The BSL network fills the critical void of high-containment and standardized diagnostic capability at the apex level.



Looking ahead, the future of the BSL network involves continued strategic expansion into underserved regions and further strengthening its animal and environmental arms. This integrated, multi-sectoral platform will not only enhance India's pandemic preparedness but will also serve as a permanent scientific pillar supporting the enduring resilience and strategic success of the NOHM. The BSL network is not just a collection of labs; it is an integrated national ecosystem designed for collective security.



STATE HIGHLIGHTS

3



JAMMU & KASHMIR



KARNATAKA



KERALA



MEGHALAYA



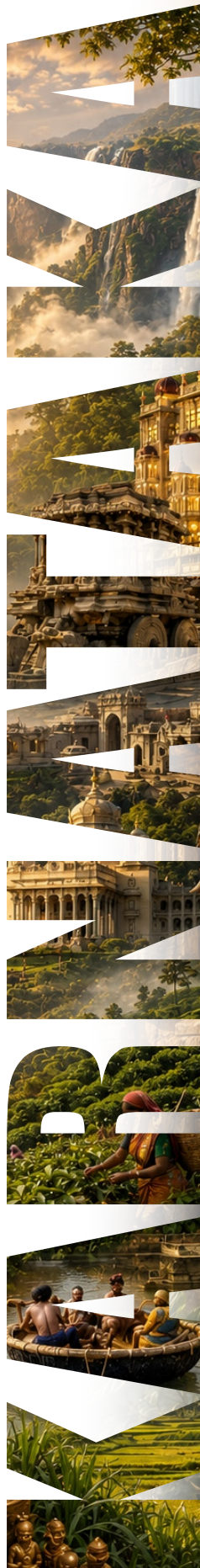
TELANGANA

Enhancing Outbreak Prevention and Control Through Effective Data Sharing: Karnataka's One Health Approach



Dr Padma M.R.
Deputy Director,
State Surveillance Unit &
Communicable Diseases,
Department of Health and Family
Welfare Services, Government of
Karnataka

Karnataka has made significant strides in implementing the One Health initiative, focusing on integrating human, animal, and environmental health to prevent and respond to zoonotic diseases. The state is home to the Kysanur Forest Disease, exemplifying a classical One Health approach through its proactive cross-sectoral collaborations and data sharing. These efforts have established a benchmark for strengthening outbreak prevention, early detection, and control measures. Karnataka further distinguishes itself as the first Indian state to enhance its public health response capacity through the Sector Connect, Field Epidemiology Programme – One Health (FEP OH), an initiative spearheaded by the NCDC. This 3-month, on-the-job training program targets professionals from diverse sectors including public health, animal husbandry, wildlife, food safety, and airport operations, across state, district, and field levels. The program actively promotes inter-sectoral coordination, facilitates cross-learning, and enhances epidemiological skills for joint risk assessments, outbreak investigations, and early warning identification. By equipping officers with competencies in evidence-based decision-making, effective communication,





Chintan Shivir for Metropolitan Surveillance Units – IDSP

Integrated Disease Surveillance Programme (IDSP) successfully organised a one-day Chintan Shivir to review the functioning and progress of Metropolitan Surveillance Units across India.



Scan to explore the IHIP Portal



National Stakeholder Roundtable on Waste Water Surveillance

The IDSP-NCDC hosted a national stakeholder roundtable discussion on "Wastewater Surveillance Transformation: From Signals to Public Health Action" on 8th April 2026 at the NCDC campus in Delhi.

[Read more](#)



20 Years of IDSP – 04th Nov 2024

The Integrated Disease Surveillance Programme (IDSP) marked its 20th anniversary on November 4, 2024, with a special commemorative event held at the Dr. Ambedkar International Centre, New Delhi.

[Read more](#)



Influenza Chintan Shivir

The Influenza Chintan Shivir (22–23 December 2025, New Delhi) brought together representatives from multiple ministries, State Governments, premier research institutions, and international partners

[Read more](#)

Snapshot of the Integrated Health Information Platform (IHIP) Portal Dashboard

and transformational leadership, the training has successfully built a sustainable network of skilled professionals committed to continuous collaboration on critical public health priorities.

One Health State Initiatives

1. Surveillance

Karnataka currently reports an average of 250 outbreaks annually. In the year 2024, 223 outbreaks were reported through the Integrated Health Information Platform (IHIP), which includes 160 waterborne, 39 vector-borne, 11 vaccine-preventable, 10 dog bite & human rabies, 3 influenza-like illness, and 1 other outbreak. Joint investigations of zoonotic disease outbreaks, such as Avian Influenza, Anthrax, Brucellosis, and Glanders disease, are conducted by Rapid Response Teams comprising personnel from the Health & Family Welfare Department, (DoHFW) Department of Animal Husbandry & Veterinary Services, and/or the Forest Department, as necessitated by the nature of the outbreak. Prevention and control of waterborne and vector-borne disease outbreaks are carried out in coordination with the Department of Rural Development and Panchayat Raj

(RDPR).

The Education Department and the Department of Women and Child Development support Information, Education, and Communication (IEC) initiatives to raise awareness about communicable disease prevention.

To enhance public engagement in surveillance, dedicated public helplines are active: a toll-free number (1926) for general communicable disease concerns across Karnataka, and a specific number (1533) for Bangalore, managed by the Forest Department, to report snake-related incidents.

2. Data Sharing for Waterborne and Zoonotic Diseases and Outbreak Prevention

Karnataka has taken significant steps in improving outbreak management through collaboration between DoHFW and DoRDPR under Jal Shakti. The DoHFW shares user IDs of IHIP with Jal Nigam, which thereby enables the DoRDPR to effectively monitor waterborne diseases such as cholera, typhoid, and diarrhoea.





*An illustration of anti-rabies vaccination drive for community dogs
Credits: United Against Rabies*

This collaborative data sharing facilitates rapid water quality checks and swift investigations into contamination sources, crucial for preventing further spread of infections. Furthermore, formal communications between departments such as dispatching letters between Health & Family Welfare, Animal Husbandry & Veterinary Services, and Karnataka Veterinary Animal and Fisheries Sciences University, strengthens collaboration for surveillance, joint outbreak investigations, prompt action on early warning signals, and regular data exchange.

3. Notifiable Diseases

Karnataka has taken proactive steps to enhance disease surveillance and control by expanding its list of notifiable diseases. For instance, the following were declared as notifiable diseases:

- ▶ Human Rabies was notified on 5 December 2022, under the Karnataka Epidemic Disease Act 2020. This was complemented by the notification of Animal Rabies on 3 August 2024, under the Prevention and Control of Infectious and Contagious Diseases in Animal Act, 2009, ensuring a comprehensive One Health approach.

Demonstrating a commitment to public safety, the Government also revised compensation policies on 30 October 2023, offering ₹5,000 for stray dog bites and ₹5 Lakh for fatalities resulting from dog bites.

- ▶ Karnataka also became the first State to make Snakebite cases notifiable on 12 February 2024, under the Karnataka Epidemic Disease Act 2020. This pioneering initiative has significantly improved case reporting and led to increased utilization of Antivenom Serum, also known as Anti-Snake Venom (ASV) or anti-venom. Additionally, the Agricultural Department of the state has revised the death compensation for farmers from ₹ 1 Lakh to ₹ 2 Lakh, who suffer unnatural deaths while working in the field.

4. State Action Plan for Snakebite Envenoming and Dog Mediated Rabies Elimination

Karnataka has actively implemented State Action Plans for Snakebite Envenoming (SAPSE) and Dog-Mediated Rabies Elimination (SAPRE). These plans were developed through dedicated workshops, focusing on the comprehensive management of snake bites and dog bites, including



enhanced surveillance and treatment protocols. The workshops highlighted the critical necessity of cross-sectoral coordination to achieve targeted One Health Outcomes.

5. Formation of One Health/Zoonosis Committees

Inter-sectoral committees with representation from health, veterinary, and environmental sectors has been proactively established to holistically address zoonotic disease challenges. These committees foster collaborative decision-making, thereby aligning with the One Health strategy of integrated disease management. To further strengthen this framework, District Surveillance Committees in all districts were constitutionally mandated in March 2024. These committees are designed to ensure close collaboration among various stakeholders for effective disease surveillance and outbreak response activities.

Despite these achievements, several operational and systemic challenges remain:

a. Inadequate Disease Reporting – Gaps in Reporting from Medical and Private Institutions

A significant challenge is the gap in disease reporting. While government health facilities account for 91% of reported cases, there is a notable gap in data from private hospitals. This is particularly evident in the

reporting of snake bite cases, where better engagement and surveillance with private hospitals are crucial for a comprehensive understanding of the burden.

b. Lack of Data Sharing Infrastructure

Effective disease surveillance is hampered by the absence of a robust, cross-sectoral data-sharing mechanism. Investing in technology and training is necessary to build a seamless information exchange system.

c. Gaps in Kyasanur Forest Disease (KFD) Management

Karnataka faces a critical challenge in controlling KFD, a tick-borne viral haemorrhagic fever. With no available human vaccine, control efforts rely heavily on vector management. The Government of India has discouraged the use of 5% Malathion spraying for tick control and a suitable alternative insecticide is yet to be identified. With KFD now endemic in neighbouring states, it is crucial to elevate its status to a national priority under the Vector-Borne Disease Control program.

d. Low Public Awareness

Despite existing initiatives, public awareness of zoonotic diseases and preventive measures remains low. Educational campaigns are essential to empower communities with the knowledge needed for early symptom recognition and prevention.

Conclusion

Karnataka's One Health initiative stands as a model for effective public health collaboration. The state has demonstrated that integrating health, animal, and environmental data allows for timely and coordinated responses to outbreaks. By making human rabies and snake bites notifiable diseases, the initiative has enhanced disease management practices. To sustain these gains, it is essential to address challenges in data integration and capacity building, ensuring comprehensive public health protection for the future.



Telangana Advance One Health Programme to Tackle Zoonotic Disease



Dr V.K. Sumithra Nair
One Health Nodal Officer,
Government of Telangana

Telangana has taken a major step in public health by adopting the National One Health Programme for Prevention and Control of Zoonoses (NOHPPCZ), becoming the fifth Indian state to do so. The programme promotes collaboration between human, animal, and environmental health sectors to prevent and control diseases that spread between animals and humans.

Why It Matters?

Zoonotic diseases account for about 60% of emerging infectious diseases globally. In Telangana, rabies and leptospirosis are among the most pressing threats. In 2024 alone, the state reported around 121,000 dog bite cases - about 300-350 every day - making rabies a critical public health challenge. Seasonal floods also increase the risk of leptospirosis, while avian influenza and Japanese encephalitis remain additional concerns.

To address these concerns, the government developed a One Health Framework around several key pillars, including:

Governance

Nodal officers are appointed at state and district levels, and committees set up to improve coordination between departments such as Health, Animal Husbandry, Forests, Urban Development, and Agriculture.



Training

Over 30 officers were trained through the Field Epidemiology Training Programme in One Health. Further workshops brought together officials from multiple departments to strengthen preparedness.

AMR

A state-level AMR committee has been established, with plans to integrate strategies against drug resistance.

These efforts have significantly strengthened Telangana's One Health framework; however, several challenges still need to be addressed to ensure long-term sustainability and effectiveness such as:

- ▶ Absence of a dedicated budget for programme activities.
- ▶ Delays in interdepartmental coordination
- ▶ Limited integration with national digital disease reporting systems such as the IHIP
- ▶ Shortage of a dedicated workforce trained specifically for One Health

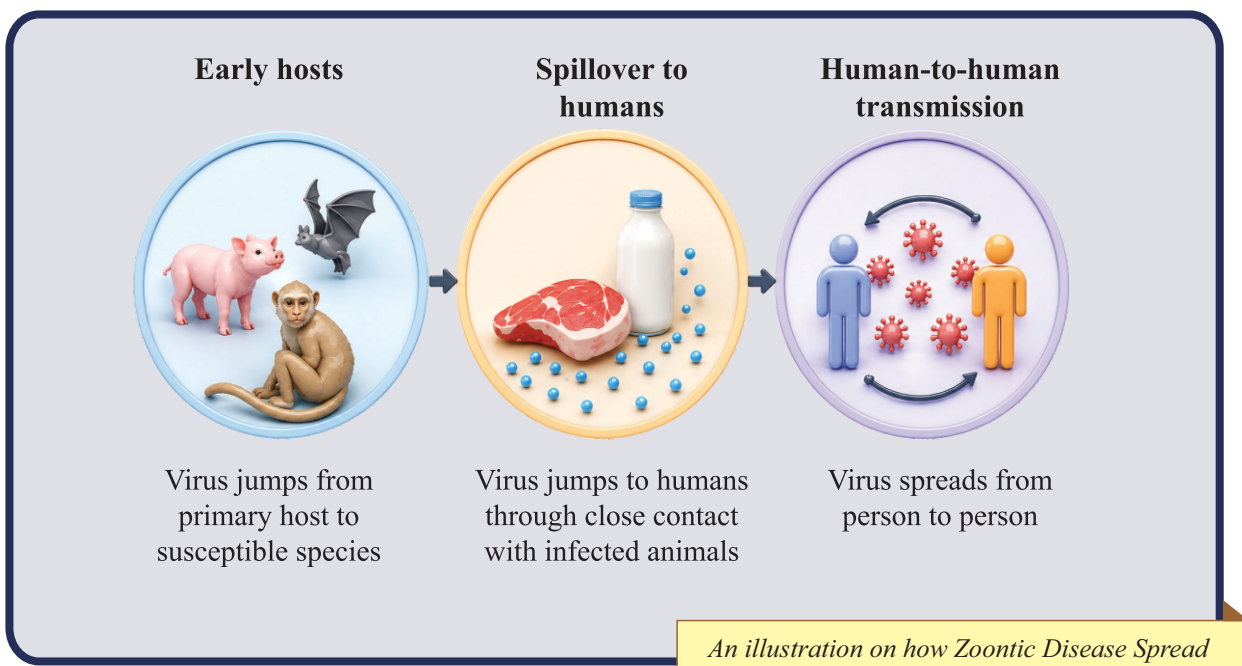
Looking Forward

Telangana's efforts align with India's NOHM and international strategies led by World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (WOAH), and United Nations Environment Programme (UNEP). To further strengthen its impact, experts have recommended:

- ▶ Dedicated funding support to sustain activities
- ▶ Full operationalization of state and district committees
- ▶ Stronger community engagement, particularly around rabies prevention and safe water practices

Integration with digital platforms for faster data sharing and outbreak response

Taken together, these measures can help strengthen the long-term sustainability and effectiveness of Telangana's One Health framework.



One Health Governance Structure in the Union Territory of Jammu and Kashmir



Dr Harjeet Rai

State Surveillance Officer (IDSP)/
Epidemiologist, Jammu Division,
Jammu & Kashmir

The Union Territory of Jammu and Kashmir has adopted a comprehensive One Health approach to address the interconnectedness of human, animal, and environmental health. This integrated strategy focuses on strengthening surveillance, prevention, and response mechanisms for zoonotic and climate-sensitive diseases through effective governance, interdepartmental coordination, and capacity building.

Governance and Policy Framework

A robust governance structure has been established to operationalize the One Health framework in the UT.

- ▶ UT and District Level Zoonosis Committees have been constituted under the One Health Mission
- ▶ Environmental Health Cells have been notified under the National Programme for Climate Change and Human Health (NPCCHH) and the UT Action Plan for Climate Change and Human Health (UTAPCCHH)
- ▶ Committees for formalizing and monitoring the UT Action Plan for Rabies Elimination have been constituted
- ▶ Human rabies has been declared a notifiable disease across J&K

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- MoUs have been signed for establishing the ICMR–National Institute of Virology (North Zone) under the Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM), an NCDC branch in Jammu and a sentinel influenza laboratory under the IDSP laboratory network in collaboration with Directorate of Health Services Jammu and NCDC. The signing of the MoU for establishing an NCDC Branch in Srinagar is currently underway.



Campus of Government Medical College (GMC) at Doda, Jammu, Kathua, Udhampur

Laboratory Strengthening

Under the National One Health Programme for Prevention and Control of Zoonosis, five sentinel laboratories have been nominated - one each at Government Medical College (GMC) at Doda, Jammu, Kathua, Udhampur, and Sher-e-Kashmir University of Agricultural Sciences and Technology (SKUAST)-Jammu — to facilitate integrated surveillance and laboratory based confirmation of zoonotic diseases.

Capacity Building and Awareness

The Sector Connect: Field Epidemiology Training in One Health (2024–25) trained 55 officers from various departments including Health, Animal Husbandry, Food Safety, and Wildlife.

Innovation and Digital Tools

Digital platform like IHIP–IDSP is being utilized for reporting and monitoring human health cases across Jammu and Kashmir.



Campus of Sher-e-Kashmir, University of Agricultural Sciences and Technology (SKUAST)-Jammu



Consultative Workshop on One Health in Meghalaya



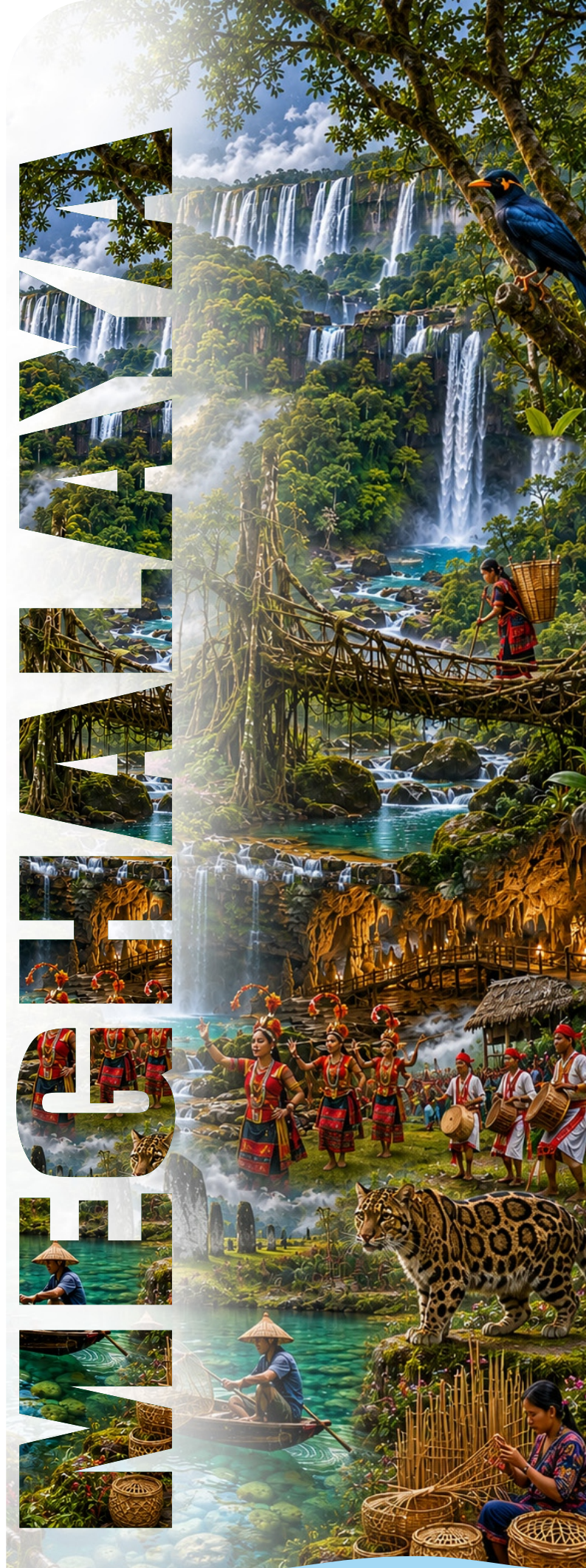
Dr Valerie J Laloo
State Nodal Officer, One Health Centre, Meghalaya



Ms Grace Shylla
Public Health Consultant, One Health Centre

The One Health initiative in Meghalaya highlights the state's growing commitment to integrating human, animal, and environmental health. A Consultative Workshop on One Health was held in Shillong on 23 and 24 of October 2025, bringing together departments to strengthen collaboration, surveillance, and joint planning under the One Health Mission.

The Workshop was inaugurated by Dr Valerie J. Laloo, State Surveillance Officer and Nodal Officer, One Health Meghalaya. The event included key officials from Health, Animal Husbandry & Veterinary, and other departments, and discussions centred on interdepartmental coordination, data-sharing, zoonotic disease control, AMR, and climate-health linkages.



Department Highlights

▶ Meghalaya Basin Development Authority (MBDA)

MBDA emphasized its convergence-driven, community-focused approach, addressing livelihood vulnerabilities, AMR risks, climate impacts, and capacity building across sectors.

▶ Animal Husbandry & Veterinary Department

The department highlighted work on priority zoonoses (rabies, JE, Nipah, anthrax, scrub typhus), ongoing surveillance of Foot-and-Mouth Disease (FMD), Peste des Petits Ruminants (PPR) and African Swine Fever (ASF), as well as proposed a One Health Support Centre and state-level gap assessment.

▶ India Meteorological Department (IMD)

IMD showcased its weather monitoring systems, early warning services, and noted a warming trend in Meghalaya—critical for predicting climate-sensitive diseases.

▶ North-Eastern Space Application Centre (NeSAC)

NeSAC presented its geospatial tools,

including disaster alerts, AI-based mosquito habitat mapping, and GIS support for environmental and health monitoring.

▶ Indian Institute of Public Health (IIPH), Shillong

The institute shared ongoing research on Soil Transmitted Helminths and scrub typhus, and plans for a regional centre on zoonotic and vector-borne diseases, alongside efforts in capacity building and syndromic surveillance.

▶ Department of Health & Family Welfare

The department linked National Centre for Vector Borne Diseases Control (NCVBDC), IDSP, and National Programme on Climate Change and Human Health (NPCCHH) activities to One Health, with priorities in climate resilience, early warning systems, joint surveillance, community awareness, and laboratory strengthening.

Overall, the workshop reinforced shared understanding across sectors and underscored the importance of coordinated efforts at the grassroots to drive the One Health agenda forward, with an interdepartmental data-sharing framework exercised by December 2025.



PYAAR- Pathanamthitta Youth Against Antimicrobial Resistance (One Health Initiative)- Kerala



Dr Ajan M J
Assistant Director, SNO
One Health, DHS



Dr Anithakumari L
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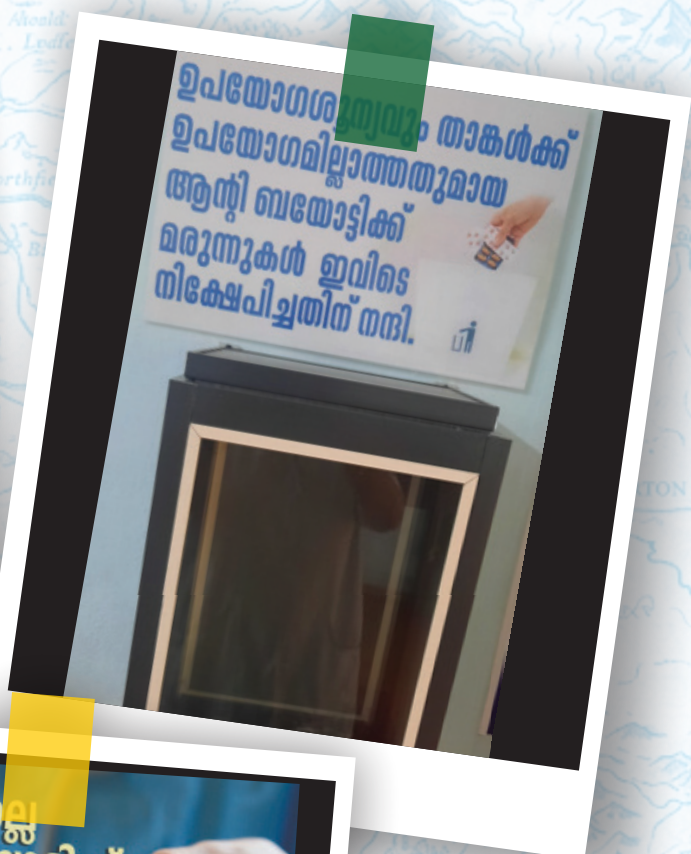


Dr Amjith Rajeevan
One Health Nodal Officer,
Pathanamthitta

The PYAAR (Pathanamthitta Youth Against Antimicrobial Resistance) initiative was launched under the One Health Program during 2022–23 to promote awareness on AMR among youth. A total of 168 college students were trained, and 100 were selected to form the PYAAR Brigade. Of these, 20 acted as 'Champions of One Health' conducting awareness sessions across institutions, while others supported event organization, and the rest were "vocals on one health". A social media campaign was launched through Instagram, Twitter, and Facebook to enhance



outreach. The innovative 'ANTI-BOX' was introduced in institutions for safe disposal of leftover antibiotics, managed via KEIL or IMAGE (Biomedical waste management agencies). In 2023–24, activities included volunteer-based antibiotic stewardship programs at different colleges in Pathanamthitta, district IEC initiatives, and distribution of branded T-shirts to volunteers. PYAAR stands out as a model for engaging youth in AMR awareness and intersectoral collaboration under the One Health framework, combining innovation, community participation, and sustainable health education efforts across Pathanamthitta district.





STAKEHOLDERS' PERSPECTIVES

4



AI generated visuals

Mock Drills for One Health Preparedness

Vishanu Yuddh Abhyas and Viral Sankraman Abhyas



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Scientist E, ICMR



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Scientist-D,
BSL-4 Facility; NIV



Dr Deepak Patil
Scientist-D, NIOH

As the NOHM is metamorphosing into its original shape and form, many exciting initiatives and opportunities are also unfolding. The National Joint Outbreak Response Team (NJORT), under the aegis of the National Centre for Disease Control (NCDC) has become operational on ground. Chandipura outbreak in Gujarat in 2024 and Nipah outbreaks in Kerala in May & July 2025 were investigated by various stakeholders as part of the NJORT. In addition, the National BSL-3 laboratory network of 23 laboratories has become operational, with laboratories trained and prepared to handle human, animal, and environmental patho-

gens, including high-risk pathogens.

While our preparedness to handle outbreaks from a One Health perspective is being strengthened, it is also critical to objectively assess the readiness at various levels in a fair and transparent way. To evaluate outbreak preparedness, coordination mechanisms and response capacities, two national-scale mock drills were conducted under the One Health framework. The execution of mock drills was meticulously planned by the Secretary, Department of Health Research



(DHR) and Director General, ICMR; Director General, Health Services (DGHS); Director, NCDC; and Chief Secretaries of Rajasthan and Madhya Pradesh, months before their actual enactment. Two separate teams, including a front-end and back-end team, were constituted and entrusted with the responsibility of eliciting on-the-ground responses, writing the script, and planning field-level activities for Vishanu Yuddh Abhyas (VYA).



NJORT investigation of Nipah | Credits- Nipah

Vishanu Yuddh Abhyas (VYA)

VYA was conducted in Makarwali village of Ajmer, Rajasthan, from 27 to 31 August 2024. The exercise simulated an outbreak of Avian Influenza at a poultry farm with suspected spillovers to 5 human contacts. The exercise aimed to assess the readiness of NJORT to mount an efficient response in the event of human spillover of avian influenza (H5N1); assess intersectoral coordination among public health, veterinary and wildlife sectors at the National, State, District and Sub-district levels; and identify administrative challenges, resource constraints, and communication gaps that could affect the outbreak response.

The Action Plan for VYA

The plot unfolded when the Urban Community Health Center (UCHC), Ajmer, admitted five new patients over three consecutive days from 16 to 18 August 2024. The cases included two healthcare workers and three

patients from a nearby village. All of them were presented with high-grade fever and cough, followed by breathlessness. The healthcare workers had previously attended two cases in the emergency department who had succumbed to the infection five days earlier, presenting similar symptoms and Acute Respiratory Distress Syndrome (ARDS). Among the five admitted patients, one healthcare worker and one village resident developed bilateral pneumonia and were put on ventilatory support due to low oxygen saturation of 60% on room air. Relatives of the patients reported several deaths in their neighbourhood (Makadwali village-3 km from UCHC) during the third week of August.

This event triggered a series of responses by the attending healthcare workers, including officials from ICMR-DHR and NCDC, as well as independent observers from the Ministry of Home Affairs (MHA). This included patient triaging and isolation;



included patient triaging and isolation; donning and doffing of PPE; capturing demographic details, chronology of cases and contacts; detailed patient histories to establish epidemiological linkages; and collection of clinical samples and their timely transport to suitably equipped laboratories. In addition, the availability of appropriate equipment and materials to care for such patients was assessed. The laboratory response was reviewed through local biochemistry & clinical haematology laboratories, Virus Research & Diagnostic Laboratory (VRDL) at AIIMS Jodhpur, ICMR-National Institute of Virology (NIV), and ICAR-National Institute of High Security Animal Diseases (NIHSAD). Poultry and cattle samples from affected farms were collected by State Department of Animal Husbandry teams. VRDL, Jodhpur, identified an untypable influenza virus strain, raising suspicion of Avian Influenza which was subsequently confirmed in human and poultry samples by ICMR-NIV and ICAR-NIHSAD, respectively. The NJORT was informed on 28 August 2024, following which the IDSP nodal officer from NCDC convened an immediate meeting of all stakeholders at the national and state levels. Necessary instructions were given to the state and field teams to ensure an

appropriate and timely response while the NJORT reached Ajmer on 30 August 2024, further intensifying investigations

VYA brought out the strengths of the state health system in mounting a response to an unprecedented outbreak. These included immediate deployment of rapid response teams, strong intersectoral coordination, high commitment of healthcare workers and laboratory teams, prompt sample collection and referral, real-time information sharing with NJORT, and robust sample transportation systems.

However, VYA also brought out areas where strengthening is required, including intersectoral coordination of biosafety practices among healthcare workers, specific gaps in the healthcare facility, and involved laboratories and awareness among poultry farm owners & workers. Similarly, the strengths and gaps in the NJORT response were also highlighted. The main observed strength was the rapid convening of all stakeholders and agreement on the proposed plan of action. A gap identified was the lack of uniform sensitization and understanding of roles and responsibilities among stakeholders.



"Vishanu Yuddh Abhyas": A mock drill on pandemic preparedness in Ajmer, Rajasthan. | Credits - ANI



JAIPUR



DELHI



JODHPUR



AJMER



PUNE



Viral Sankraman Abhyas (Virus Infection Exercise)

Building on the lessons from VYA, a second national mock drill Viral Sankraman Abhyas (VSA) was conducted to further assess outbreak preparedness and intersectoral coordination under the One Health framework. The exercise simulated a Crimean-Congo Haemorrhagic Fever (CCHF) outbreak affecting humans and animals and brought together stakeholders from public health, animal health, wildlife, laboratory and administrative sectors at national, state, and district levels. The mock drill was conducted in Khandwa district, Madhya Pradesh, from 2 to 5 November 2025. VSA

aimed to assess the readiness of the NJORT to respond to a suspected zoonotic viral haemorrhagic fever outbreak; evaluate intersectoral coordination among public health, veterinary, wildlife, laboratory and administrative stakeholders across national, state, district and sub-district levels; assess field capacities for outbreak detection, case investigation, contact tracing, laboratory confirmation, animal and vector investigations, containment and risk communication; and identify operational challenges related to communication, logistics, biosafety, information sharing and adherence to established protocols.



The Action Plan of VSA

A central expert back-end team comprising of representatives from ICMR-NIV, NIOH, NCDC, and NIHSAD visited Shivpuri village, PHC Chinchgohan, and CHC Chhegaon Makhan on 15-16 October 2025. The team provided technical guidance, conducted field inspections, facilitated site selection, and trained healthcare staff in infection prevention and surveillance preparedness.

year-old male farmer from Shivpuri village, who developed high-grade fever and myalgia, followed by bleeding from stool and gums. He presented to PHC Chinchgohan on 21 October 2025 and was referred to CHC Chhegaon Makhan, where his condition deteriorated and he succumbed despite resuscitation. During intubation and care, the attending doctor and nurse were exposed to blood and secretions and later became part of the simulated healthcare-associated cluster.

The plot unfolded with an index case, a 40-



On Day 0, the wife and brother of the index case were admitted to CHC Chhegaon Makhan with fever and gum bleeding. On Day 1, the doctor, nurse and a neighbour who attended the funeral were admitted, leading to recognition of a cluster of viral haemorrhagic fever cases. The Block Medical Officer notified the District Epidemiologist and the CMHO, Khandwa while the State Surveillance Officer alerted the Mission Director, National Health Mission, Madhya Pradesh and Chief, IDSP, NCDC. Following correction of an initial delay in notification, sample collection, triple packaging and dispatch were initiated.

Clinical samples were first processed at AIIMS Bhopal. Subsequently, ICMR-NIV Pune confirmed CCHF in three cases, while one case was reported as Dengue positive and one was negative for both CCHF and Dengue. Animal and tick investigations were conducted by the Animal Husbandry and Entomology teams. Real-time RT-PCR supported the zoonotic transmission linkage. The NJORT and State teams visited the epicentre, cattle sheds, forest fringes, PHC, CHC, and District Hospital. A house-to-house fever survey was completed in the Shivpuri cluster, covering 65 households and 391 community members. Contact tracing, line listing, medical observation, IPC orientation, PPE use, biomedical waste segregation, surface disinfection, vector investigation, livestock sampling, and public communication formed the core of the response.

VSA brought out several strengths, including prompt mobilization, rapid patient admissions, state and national team activation, use of PPE by medical staff, triple packaging of samples, field investigation by human, animal, and environmental health teams, establishment of isolation and control room facilities, and a functional

multi-laboratory diagnostic pipeline involving AIIMS Bhopal, ICMR-NIV, and NIHSAD.

However, the exercise also brought out areas where strengthening is required namely standardized communication protocol enforcement, laboratory staffing for timely aliquoting, sample logistics and cold chain management, biosafety and biosecurity adherence, real-time data accuracy, reconciliation of discordant laboratory results, role clarity of deployed members, full sectoral deployment, reporting compliance in IHIP, timely animal sample referral, prompt briefing of deployed NJORT members, and timely availability of Ribavirin tablet. Overall, VSA reinforced that One Health preparedness depends on rapid field deployment, clear communication, trained multisectoral teams, and a robust laboratory network.

The mock drills effectively evaluated district-level readiness for public health emergencies and the efficiency of multisectoral coordination. The exercises identified critical gaps and informed corrective actions to strengthen communication protocols, laboratory surge capacity, sample logistics and cold chain management, biosafety and biosecurity practices, data quality, role clarity, sectoral deployment, IHIP reporting, animal sample referral, NJORT briefing, and timely availability of Ribavirin. These drills demonstrated that effective One Health preparedness relies on rapid field deployment, clear communication, trained multisectoral teams, and a robust laboratory network. Regular multisectoral simulation exercises are essential for identifying vulnerabilities, strengthening health security, and building resilient systems capable of responding effectively to future epidemics and pandemics in India.



Together, these exercises demonstrate that outbreak preparedness is increasingly becoming field-oriented and systems-based. They also necessitate continued strengthening of role clarity, biosafety practices, laboratory coordination, animal health linkages, field documentation, and community engagement. The central lesson is simple yet important: preparedness must be practiced. Only repeated, realistic, and well-documented mock drills can make the country more resilient to future outbreaks.



"Viral Sankraman Abhyas" conducted in Khandwa, Madhya Pradesh



The Role of Central Zoo Authority in Advancing One Health in India



Dr V. Clement Ben
Member Secretary,
Central Zoo Authority



Dr Neehar Oak
Former Veterinary Consultant,
Central Zoo Authority

Within the context of One Health, CZA occupies a unique position in India by integrating zoos into the country's broader health and conservation frameworks. Through its regulatory oversight, technical guidance and institutional innovations, CZA has emerged as a vital player in operationalizing One Health principles at both national and regional levels.

One of our most visible contributions has been through its Conservation Breeding Programs (CBPs) for endangered and threatened species. By safeguarding and restoring genetic diversity, these programs contribute not only to species survival but also to the maintenance of balanced ecosystems, which form the foundation of resilient environments. Biodiversity is a natural buffer against disease emergence and spillover, as diverse ecological systems are less vulnerable to the proliferation of pathogens. CZA's management of conservation breeding ensures that ex-situ populations are maintained under stringent veterinary protocols, reducing the risk of disease transmission and reinforcing the long-term health of both captive and wild populations. In this way, conservation breeding becomes an instrument of One Health by addressing ecological integrity and disease risk simultaneously.

Equally important is CZA's role in outbreak investigation and response. Zoos are often the first places where signs of emerging diseases are noticed, as they house a diverse range of species under close observation. Over the years, coordinated investigations

have been done for diseases such as Avian Influenza, Canine Distemper, Tuberculosis, and Foot-and-Mouth Disease in zoo settings, with CZA acting as a central coordinating authority, bringing together scientific institutions such as ICAR institutes viz. NIHSAD, the Indian Veterinary Research Institute (IVRI), and the state animal husbandry departments. Measures include forming expert fact-finding committees, issuing technical directives on containment and biosecurity, and ensuring confirmatory testing through accredited laboratories. For example, during the Avian Influenza outbreaks in Delhi and Uttar Pradesh, CZA oversaw epidemiological investigations, directed temporary closure of zoos, strengthened biosafety practices, and facilitated communication between veterinary and public health authorities. This extends the mandate of CZA beyond conservation and into safeguarding public health through an integrated One Health approach.

One of the forward-looking initiatives that embodies the One Health mandate is the National Referral Centre for Wildlife (NRC-W) designed to function as a national hub for wildlife health surveillance and capacity building. It aims to develop a network of regional centres in key zoos and scientific institutions across India. The NRC-W is mandated to consolidate information on wildlife mortalities and outbreaks, support advanced diagnostics and molecular epidemiology, and provide training for zoo veterinarians and field staff on biosafety, surveillance, and outbreak response. By linking wildlife health



monitoring with the national human and livestock health systems, NRC-W aims to strengthen India's preparedness for emerging infectious diseases and pandemics. Its role is both technical and strategic, as it provides evidence-based support to ministries such as MoEF&CC, DAHD, and the MoHFW, thereby embedding wildlife health into national public health planning.

In conclusion, CZA plays an indispensable role in advancing the One Health approach in India. Its conservation breeding programs help secure biodiversity which forms the foundation for ecological stability and human health. At the same time, its outbreak

investigations and directives on zoo biosecurity and disease management enable rapid disease containment and strengthen inter-sectoral coordination. The upcoming NRC-W will further provide a strong institutional backbone for wildlife disease surveillance and pandemic preparedness. By bridging conservation, veterinary science, and public health, CZA ensures that zoos are not only centres of species protection but also integral components of India's preparedness and resilience against zoonotic threats. In an era of increasing global health challenges, CZA's role is both timely and transformative, reinforcing the principle that protecting animals and ecosystems is inseparable from protecting human health.



Conservation breeding efforts for endangered vultures showcased through Asia's First Gyps Vulture Reintroduction Programme at Pinjore, Haryana in 2016. | Credits: PIB News



Indian Animal Health Scenario and the One Health Approach



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India's animal health scenario is closely intertwined with the scale, diversity, and economic importance of its livestock sector. As per the 20th Livestock Census (2019), India has a total livestock population of about 536.76 million, comprising approximately 193.46 million cattle, 109.85 million buffalo, 74.26 million sheep, 148.9 million goats, and around 9.1 million pigs, along with a poultry population exceeding 850 million birds. This vast resource base forms the backbone of rural livelihoods, nutritional security, and agrarian resilience. Economically, the livestock sector contributes about 30.1% to agricultural Gross Value Added (GVA) and nearly 5.5% of the national economy at current prices in 2023-24, making it one of the fastest-growing sub-sectors in agriculture. This highlights the

critical importance of robust animal health systems to sustain productivity, ensure food security, and support rural incomes. India is the world's largest producer of milk and a leading producer of meat and eggs, highlighting the crucial role of livestock in agri-food systems. The sector supports over 20 million rural households and has maintained an annual growth rate of nearly 7–8%, surpassing the crop sector and contributing significantly to agricultural resilience and rural economic development.

Despite its importance, the sector faces persistent challenges from a wide spectrum of infectious and non-infectious diseases. Endemic diseases such as Foot-and-Mouth Disease (FMD), brucellosis, Peste des Petits



Ruminants (PPR), Classical Swine Fever (CSF), and haemorrhagic septicaemia continue to cause significant economic losses. Among these, brucellosis is particularly important due to its zoonotic nature, affecting both livestock productivity and human health through occupational exposure and contaminated animal products. Emerging and re-emerging diseases such as Lumpy Skin Disease (LSD), Avian Influenza, and other transboundary infections, along with zoonoses like rabies and leptospirosis, further threaten animal health, trade, and public health security. These challenges have necessitated a shift toward a preventive, surveillance-driven, and digitally enabled animal health system supported by vaccination, diagnostics, and integrated disease intelligence. FMD and brucellosis cause major economic losses in India, exceeding ₹20,000 crore and ₹3,500 crore annually, respectively, while PPR and CSF produce high morbidity and mortality in small ruminants and pigs. The 2022 LSD outbreak affected over 2 million cattle and resulted in significant mortality and economic losses, while avian influenza outbreaks have also resulted in mass poultry

culling and economic losses. In addition, rabies and leptospirosis remain major zoonotic threats and public health concerns in several parts of the country.

Role of DAHD in Assuring Animal Health

The Department of Animal Husbandry and Dairying (DAHD) is the nodal agency for implementation of national livestock development and animal health programmes. Under the Livestock Health and Disease Control Program (LHDCP) and National Animal Disease Control Programme (NADCP), key initiatives are being implemented to strengthen disease prevention and control through mass vaccination, animal identification, and systematic surveillance. The brucellosis control programme targets vaccination of female calves in endemic areas, strengthening surveillance systems, and improving awareness to reduce both economic losses and zoonotic transmission risk. Under the LHDCP, vaccination coverage has been extended for PPR in small ruminants and



Cattle affected by Lumpy Skin Disease (LSD), a viral infection that contributed to major livestock losses during the 2022 outbreak affecting over 2 million cattle | Credits: Down to Earth News



classical swine fever in pigs with an aim at progressive control and eventual eradication. The Assistance to States for Control of Animal Diseases (ASCAD) component under LHDCP supports state-specific disease control efforts, while veterinary infrastructure is being strengthened through deployment of mobile veterinary units, expansion of diagnostic laboratories, and enhancement of field-level service delivery.

Complementing animal health interventions, broader livestock development initiatives are being implemented through other initiatives like the Rashtriya Gokul Mission (RGM) and National Livestock Mission (NLM). To digitalize the livestock sector in the country, the National Digital Livestock Mission (NDLM) or Bharat Pashudhan has been initiated. The Bharat Pashudhan initiative aims to create a comprehensive digital livestock ecosystem by ensuring individual animal identification, traceability, health records, vaccination history, and service delivery integration. At the core of the mission is the Bharat Pashudhan application launched during

March 2024, which assigns a unique Pashu Aadhaar to each animal, capturing comprehensive information on vaccinations, artificial insemination, ownership changes, and disease occurrences. As of May 2026, over 97 million livestock owners and 375.2 million animals have been registered with Pashu Aadhar, enabling real-time traceability, monitoring, and intervention. NDLM is a robust platform which can be utilised for sharing of information related to zoonotic diseases. It can facilitate early detection of zoonotic diseases, support rapid outbreak response, and hence can enhance inter-sectoral coordination between veterinary, public health, and environmental authorities. The platform can also support regular monitoring of livestock health trends and product traceability, ensure safer food supply chains and improve public health outcomes. Furthermore, by empowering farmers with digital tools and prompt information, the mission strengthens preventive care and biosecurity measures at the grassroots level, making India's livestock sector more resilient, safer, and aligned with global One Health priorities.

NADRES **ICAR NIVEDI** **National Animal Disease Referral Expert System (NADRES v2)**
Transforming Animal Health *AI-Enabled Redefining Livestock Disease Risk Forewarning*

6/12/2026 11:33:57 AM

Home About Us Risk Factors Analytics Livestock Diseases Post Prediction Validation Contact

NADRES Centre Login
Admin Login

Forewarning of Livestock Diseases June-2026
 Arunachal Pradesh, Meghalaya, Bihar, Mizoram, Nagaland, Goa and Jharkhand.
 • **Black Quarter** (June-2026): Nagaland, West Bengal, Himachal Pradesh, Karnataka, Tamil Nadu, Odisha, Gujarat, Rajasthan, Assam, Tripura, Jharkhand, Maharashtra, Telangana, Andhra Pradesh, Madhya Pradesh, Uttarakhand, Arunachal Pradesh, Puducherry, Bihar, Manipur, Sikkim, Chhattisgarh and Uttar Pradesh.
 • **Classical Swine Fever** (June-2026): Arunachal Pradesh, Himachal Pradesh, Andhra

Risk Factors
 Data is available at block level for 15 years on cost basis
 Environmental data units available at Block level from 2001 (...In Progress)
 191776 Outbreak data available since 1987 in the database

Select Parameter:
 Select Parameter
 Submit

Environmental Data Parameters

Sl.No	Parameter	Resolution	Time Interval	Units	Source
1	Relative humidity	2.5	1 Month	Percentage (%)	Source
2	Sea Level Pressure	2.5	1 Month	Pascals	Source
3	Cloud Cover	0.5	1 Month	Percentage (%)	Source
4	Temperature	0.5	1 Month	Degree Celsius	Source
5	Diurnal Temperature	0.5	1 Month	Degree Celsius	Source
6	Maximum Temperature	0.5	1 Month	Degree Celsius	Source
7	Minimum Temperature	0.5	1 Month	Degree Celsius	Source
8	Precipitation	0.5	1 Month	Milli Meters	Source
9	Soil Moisture	0.5	1 Month	Kg m-2	Source
10	Vapour Pressure	0.5	1 Month	Hectopascals (hPa)	Source
11	Wetness	0.5	1 Month	Days	Source

Livestock Disease Risk Forewarning
 State-Wise Single Disease
 State-wise All Disease
 District-Wise Single Disease
 Control Programme
 Sampling Plans
 LH-DCP Web Portal
 Epi Calculator
 Dashboard
 Analytical Dashboard
 Risk-Maps
 Online GIS Maps
 R Shiny Dashboards
 Disease Out Break Analysis
 Monthly Bulletin(Archives)
 Monthly Prediction Bulletin
 Outbreak Report Status
 2026
 2025

Scan to access

DAHD-ICAR Collaboration for Advancing Animal Health System

A major advancement in animal health management has been the strengthening of surveillance and early warning systems. The analytical systems such as the National Animal Disease Epidemiology Network (NADEN) and National Animal Disease Referral Expert System (NADRES) support risk mapping, forecasting, and epidemiological analysis. NADEN, implemented by ICAR-NIVEDI, Bengaluru, has evolved from the AICRP on ADMAS (1987) and now operates through 33 collaborating centres across states, involving State Animal Husbandry Departments, diagnostic laboratories, and ICAR institutes. It supports data collection on 15 major livestock diseases, contributes to the NADRES database, identifies sentinel surveillance sites, and strengthens capacity building in epidemiology and informatics. NADEN also supports key DAHD programmes including FMD Control Programme (FMDCP), Brucellosis Control Programme (BCP), Peste des Petits Ruminants Eradication Programme (PPR-EP), and Classical Swine Fever Control Program (CSF-CP), thereby integrating surveillance with national disease control strategies.

A major innovation in this direction is the National Animal Disease Referral Expert

System Version 2 (NADRES V2) developed by ICAR-NIVEDI. NADRES V2 is an AI- and machine learning-based, weather-driven early warning system that forecasts risks of 15 livestock diseases with a two-month lead time. It integrates outbreak data from NADEN, livestock density from census data, and multiple environmental predictors from meteorological and satellite sources. Using ensemble machine learning models and rigorous validation metrics, it generates district-level risk forecasts categorized into six levels, supporting evidence-based decision-making. The system disseminates forecasts through DAHD, state departments, KVKs, and digital platforms, while also delivering real-time alerts to farmers and veterinarians via Farmer Registration and Unified beneficiary Information System (FRUITS) and Distributed Ledger Technology (DLT)-based SMS systems. NADEN supports systematic epidemiological analysis, strengthens disease intelligence, sentinel surveillance, and capacity building in veterinary epidemiology and disease informatics through collaboration among veterinary universities, diagnostic laboratories, State Animal Husbandry Departments, and ICAR institutes across India. Together, NADEN and NADRES strengthen predictive surveillance, outbreak preparedness, and data-driven animal health governance within a One Health framework.



Vaccination in livestock | Credits: Livestock Data for Decisions

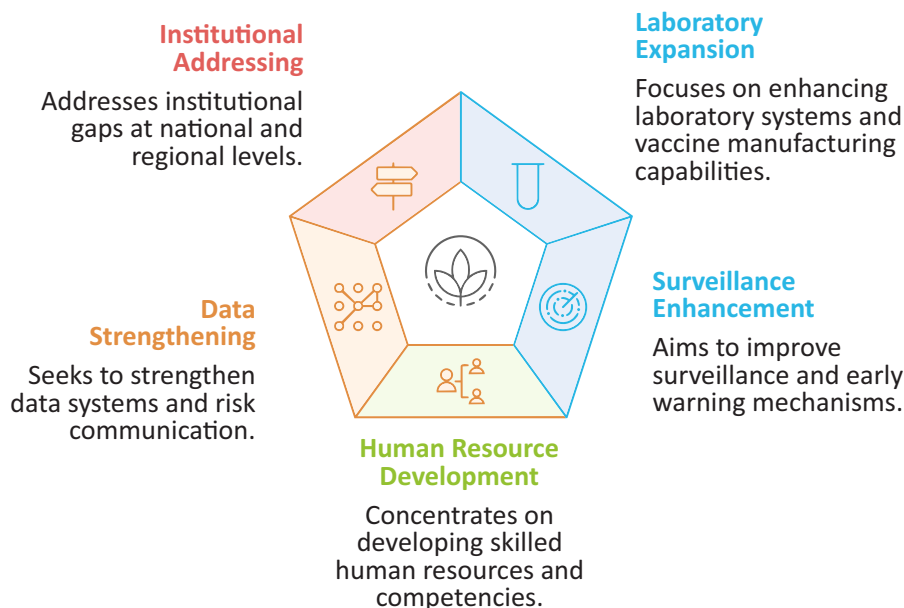


One Health and Sustainability of Livestock Sector

The DAHD plays a critical role in early detection, surveillance, and control of zoonotic diseases by linking animal health systems with human and environmental health networks. A key operational component of NOHM is the National Joint Outbreak Response Team (NJORT), comprising experts from human, animal, and wildlife sectors, which investigate outbreaks like Avian Influenza, Nipah and coordinate multi-sectoral response measures. Supporting these efforts is the NIOH, established in Nagpur, which will serve as a central hub for research, training, surveillance, and coordination across all sectors, further strengthening India's resilience against emerging health threats.

A pivotal initiative led by the DAHD under the Ministry of Fisheries, Animal Husbandry, and Dairying is the Pandemic Fund Project, titled "Animal Health Security Strengthening in India for Pandemic Preparedness and Response". Launched in October 2024 with a grant of \$25 million from the G20 Pandemic Fund, the project aims to fortify India's animal

health systems through a One Health approach. Implemented in partnership with the Asian Development Bank (ADB), the World Bank, and the FAO, the project emphasizes a coordinated approach to health security. The project focuses on strengthening disease surveillance, upgrading laboratory infrastructure, improving data systems, and building human resource capacity in veterinary and public health sectors. These initiatives aim to reduce the risk of zoonotic diseases, thereby protecting public health and supporting the livelihoods of livestock farmers. Through this project, India is taking proactive steps to strengthen its animal health systems, ensuring a more robust and integrated response to future health threats. The project focuses on strengthening disease surveillance, upgrading laboratory infrastructure, improving data systems, and building human resource capacity in veterinary and public health sectors. These initiatives aim to reduce the risk of zoonotic diseases, thereby protecting public health and supporting the livelihoods of livestock farmers. Through this project, India is taking proactive steps to strengthen its animal health systems, ensuring a more robust and integrated response to future health threats.



Envisaged outcomes for "Animal Health Security Strengthening in India for Pandemic Preparedness and Response"

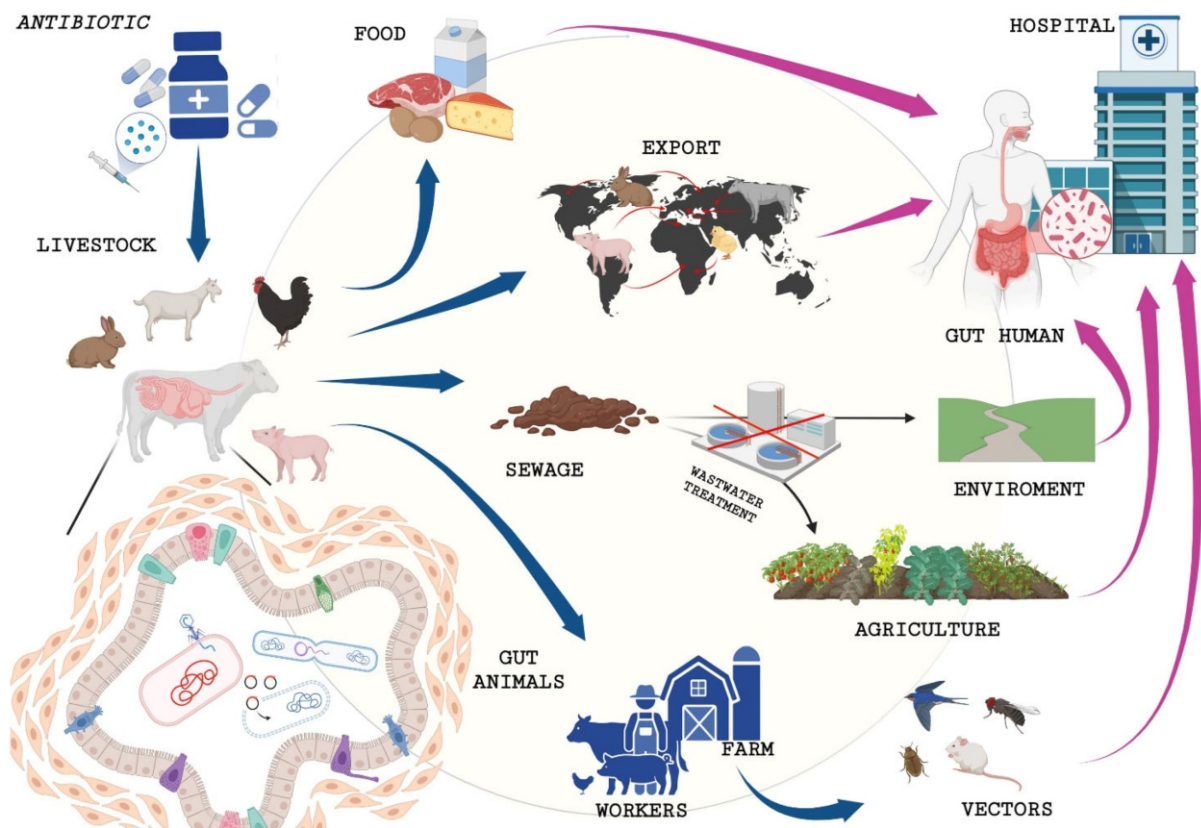


Integrated approach

Another notable initiative is the "Sector Connect" program, led by the NCDC with the DAHD serving as a key partner, focusing on strengthening One Health capacity building in India. Through this initiative, multidisciplinary training programs in epidemiology, surveillance, and outbreak response are conducted for personnel across human, animal, and environmental health sectors at district and block levels. These trainings aim to enhance field-level skills in early detection of zoonotic and emerging infectious diseases, promote inter-sectoral coordination, and foster a shared understanding of One Health principles.

AMR is a major global and national concern, addressed through India's National Action antimicrobial stewardship, and awareness across sectors. ICMR leads AMR surveillance in humans, while DAHD promotes rational antimicrobial use in livestock

through guidelines, vaccination strategies, and improved biosecurity. The Department is also a key stakeholder in the recently launched National Action Plan on AMR 2.0 (2025-2029) playing a major role in infection prevention and control through vaccination and good animal husbandry practices, supporting surveillance through the ICAR-All India Network Project on Antimicrobial Resistance (INFAAR), creating awareness and strengthening laboratory capacity etc. Capacity building remains a key focus area, with continuous training of veterinarians and field personnel in disease surveillance, epidemiology, diagnostics, and digital reporting systems. Public awareness programmes also play a vital role in promoting vaccination, zoonotic disease prevention, and safe livestock management practices. The Standard Veterinary Treatment Guidelines (SVTGs) represent a pioneering step toward standardizing veterinary care across India.



Conjugation, transduction and transformation of antibiotic-resistant bacteria through livestock

It covers more than 270 diseases across 12 livestock and poultry species—including cattle, buffalo, goat, sheep, pigs, poultry, equine, and yaks—providing detailed protocols on clinical signs, diagnosis, treatment regimens, drug dosage, withdrawal periods, and side effects. A key innovation lies in the integration of rational drug use principles to combat AMR, in alignment with India's National Action Plan on AMR and the One Health approach. In addition, validated ethnoveterinary and Ayurvedic practices have been incorporated to ensure cost-effective, culturally relevant, and sustainable treatment options, particularly for smallholder farmers. Despite significant progress, challenges remain in the form of uneven infrastructure, manpower shortages, and evolving disease

dynamics driven by climate change, intensified livestock production, and increased animal movement. Addressing these requires sustained investment, improved inter-sectoral coordination, and stronger integration of digital technologies and field services. The future of animal health in India will increasingly depend on advanced tools such as artificial intelligence, big data analytics, geospatial modelling, and predictive surveillance systems to improve preparedness and response. To address the infrastructure gaps, the Department has come up with the Minimum Standards for Veterinary Infrastructure in India that provides uniform standards and services across the country. Its large-scale outreach significantly strengthens preparedness and timely intervention.



Conclusion

Through coordinated initiatives of DAHD the country is steadily strengthening disease surveillance, vaccination, livestock traceability, outbreak forecasting, and biosecurity systems in alignment with global One Health frameworks. These transformative efforts are enhancing pandemic preparedness, safeguarding food safety and public health, and improving livestock productivity and rural livelihoods. As the livestock sector contributes significantly to agricultural and national GDP, sustained political commitment, scientific innovation, cross-sectoral collaboration, and active community participation will be critical in translating the One Health vision into a practical and sustainable model for health security, economic resilience, and biodiversity conservation in India and beyond.



FEATURED INTERVIEWS

In an interview for Vigyan Dhara, **Dr Rajan Khobragade**, Additional Chief Secretary, Health and Family Welfare (H&FW), Government of Kerala; and **Dr Sampath Kumar**, Development Commissioner & Additional Chief Secretary, Government of Meghalaya shared their insights into the One Health system and its genesis in the respective States. The section covers the experience of the two States in navigating cross-sectoral coordination challenges, experience of Kerala in dealing with Nipah virus outbreak, and pertinent role of community and traditional institutions in disease surveillance. The section also covers how Meghalaya has dealt with the surveillance challenges posed by difficult terrains and ecological diversity. Furthermore, key priorities and strategic lessons to assist other states, who are in the early stage of One Health initiatives, are also mentioned.



Kerala



Dr Rajan Khobragade

Addl Chief Secretary,
Health and Family Welfare (H&FW),
Government of Kerala



1

From Kerala's perspective, how would you define One Health and how has it shaped the state's health system over time?

The successive outbreaks and coordinated actions during the 2nd Nipah outbreak in 2019 led to the initiation of streamlined response that eventually got strengthened over time. Due to this experience, since the beginning of COVID pandemic, Kerala's health system was ahead of the curve. The government was implementing 'Rebuild Kerala Initiative' with the assistance of World Bank. Upon discussions, the Department of H&FW undertook an initiative of implementing One Health project in four Pamba basin districts: Idukki, Kottayam, Alappuzha, and Pathanamthitta in 2021. At the same time, the Government passed the Public Health Act, and subsequently, decision was taken to implement the One Health project in the remaining 10 districts. The legal mandate, the policy framework, and specific intervention plans facilitated the building capacities of grassroot level functionaries across the governance structures.

The unique feature of this intervention was the involvement of people and having grassroot level governance structures. There are now volunteers at every ward and community mentor in Panchayat. Orientations have been conducted for the health standing committee chairperson, panchayat president, and block and district panchayat regarding early identification of red flag signs, mitigation, and control of the situation based on its severity. The District Collector headed a multi-sector committee of all the relevant departments and organizations and were further trained in effectively supervising the community activities.

Simultaneously, inter-departmental coordination was established across departments such as Animal Husbandry, Water resources, Agriculture, Fisheries, Pollution Control Board, Forest Department, etc. at both the State and District level. This resulted in successfully implementing the framework.



2**What was the genesis of the One Health governance structure in your state? What were the key objectives, challenges, and milestones along the way?**

At the time of second Nipah outbreak on 3 June 2019, it was realized that a good framework was needed. It was important to have a specific structure for the reporting mechanism and to subsequently transfer that data to all the relevant stakeholders involved viz. Animal Husbandry, Forest, Revenue Department, etc. Besides that, transparency while communicating and in the daily activities undertaken by the authorities also played a key role in the entire process. This eventually resulted in boosting people's confidence leading to completely following the state advisory. Consequently, not only did the patients survive but there were zero spillover cases during the outbreak. These structures strengthened over time and when news regarding Corona virus came in December 2019/January 2020, detailed guidelines were immediately issued in January 2020. 26 committees were created at the State level, that were also mirrored at the District level. Detection of the first case of COVID led to an immediate launch of the response against the pandemic based on which control and mitigation was achieved.

The key objective has been to ensure that all the departments and organisations are accountable for the management of the outbreak of diseases/epidemic/pandemic. People's involvement, coordinated inter-departmental efforts, and accurate scientific communication are of paramount importance during such times. Multi-directional communication can create more confusion than assistance. Therefore, the chain of command is equally important. With respect to this, an important milestone was the daily pandemic management meeting conducted by the Chief Minister. It involved all the Secretaries and key organizations' heads. Decisions taken post discussions were informed to people every day in the press conference.

It is of paramount importance to ensure that data analysis and the subsequent actions should be entirely based on science to enable people to follow the advisories and

3**How has the state addressed cross-sectoral coordination challenges to bring together multiple disciplines and departments? Kindly share specific examples that illustrate this collaboration.**

One Health, as a matter of principle, is already enshrined in the Kerala Public Health Act. This legal mandate has made all the line departments and organizations accountable. At the State level, there are policy and executive committee structures involving Secretaries and Departments. Whereas at the district level, the Collectors head the One Health Committees involving all the stakeholders. This has enabled proactive actions on the field, even in ordinary circumstances.

For instance, the H5N1 outbreak in Alappuzha and Kottayam in 2024-25 depicts this cross-sectoral coordination. When people started reporting death of poultry, the Animal



Husbandry Department was alerted. They followed up on the situation and managed it as per the protocols by involving Health Departments. This resulted in containing the spread of the outbreak in the affected districts without any spill over to the other districts.

4

Drawing on Kerala's experience with zoonotic disease outbreaks such as Nipah virus, how did collaboration between central and state institutions strengthen the One Health response, particularly in diagnostics, medical logistics, and risk communication?

In Kerala, health care protocols are strictly followed during zoonotic disease outbreaks. Detailed investigation and differential diagnoses are done into the etiology of the disease/death such as in the case of Nipah, Mpox outbreaks, etc.

During the Nipah outbreak in 2018, samples had to be sent to National Institute of Virology for diagnosis. Despite minimum time taken by the institute for processing, the duration required to send samples and figure out a patient's status was longer and posed significant challenges for both the patients and the system. This bottleneck issue was resolved because of the consistent efforts of Dr Gangakhedkar, Dr Pragya and the NIV teams. A 'point of care' test was deployed in Ernakulam Medical College Hospital (MCH), during the second outbreak in June 2019. After the index case diagnosis, primary high-risk / low-risk and secondary contact carriers were identified. During symptomatic phase, they were isolated and the 'point of care' test made it easier to get results in a day.

The samples were further sent to NIV-Pune for confirmation and accordingly protocols were followed. In Kerala, the mobile van of NIV and the Institute of Advance Virology (IAV) were established to reduce the time taken to send samples and expedite the process. Coordinated efforts of NIV and IAV played a pivotal role in prompt diagnosis. The field actions, contact tracing, home quarantine, and surveillance of symptomatic cases prevented the infection from spreading further.

5

Could you describe the structure and functioning of Kerala's community-based disease surveillance model, with particular reference to volunteer training and measurable outcomes?

Volunteers in the State have been trained in basic things regarding One Health and they are present in every ward. Based on disease burden studies, area specific priorities have been identified and early warning signs have been notified for select diseases. This has been further linked to the threshold levels to get the outbreak response activated when the situation arrives. Information is promptly shared between relevant departments for field actions in adverse events, leading to further investigations.

As a first step towards achieving the target, a Community-Based Surveillance (CBS) toolkit was developed. It comprised of guidelines for setting up the CBS system in



Local Self Governments (LSGs), with the roles and responsibilities of various stakeholders, the technical aspects of carrying out CBS, and the roles of institutions, district, and state units enlisted in facilitating the process.

The toolkit was piloted along with the Standard Operation Protocol for Joint Outbreak Investigation in One Health Districts. After subsequent workshops, detailed investigations, and thereby incorporating the necessary feedback, the toolkit was finally approved by the Government. CBS System has been successfully set up in 264 LSGs of the Pamba Basin districts. More than 175 events have been conducted, and community engagement has resulted in control, mitigation, and investigation of more than 40 outbreaks. Presently, a management system is being developed by the State with the help of Digital University of Kerala to further assist the Health System in analytics and forecasting.

6

Based on Kerala's experience, what key priorities would you recommend for states that are in the early stages of adopting the One Health approach?

The following are the key priorities:

- ▶ The principle of One Health should be a part of respective Public Health Acts.
- ▶ State level discussion with all the line departments and organizations should be held to ensure that they are a part of planning process.
- ▶ There should be formal State and District level structures, with defined roles and responsibilities, and meetings held periodically.
- ▶ Capacity building of State, District, and Field level functionaries is required.
- ▶ There should be a well-defined reporting mechanism and structured review at Secretary level regarding disease outbreaks, control, and mitigation activities.

In Kerala, One Health is internalized in field workers and line department functionaries due to the dedicated efforts of State and District level officers. Moving ahead, this will only get strengthened and will assist in taking timely measures for control and mitigation.

Meghalaya



Dr Sampath Kumar
Development Commissioner &
Additional Chief Secretary,
Government of Meghalaya



1

How would you define the One Health approach from Meghalaya's perspective, and how has it shaped the state's strategy given its biodiversity and shared borders?

In simple terms, One Health is a concept indicating that the health of people, animals, and the environment are deeply connected, and that to protect any one of them, we must look at all the three together. For Meghalaya, this is not just a theory; it is a daily reality.

Meghalaya is a state with one of the highest forest coverage and highest rainfall in the world with diverse climate conditions due to varied altitude. This biodiversity is a gift, but it also creates conditions where diseases that originate in animals, such as scrub typhus, Japanese Encephalitis, rabies, and leptospirosis can find their way to human population. The state also shares international border with Bangladesh which means diseases can cross into our territory without warning, carried by migrating animals, people, or even monsoon floodwaters.

Meghalaya's approach to One Health, therefore, goes beyond the usual focus on animal-to-human disease transmission. It explicitly includes climate change, land use patterns, and how changes in forests and water bodies affect disease risk. For example, we know that as forests are cleared and grasslands expand, the tiny mites that spread scrub typhus find a larger habitat, putting rural farming communities at greater risk.

2

Could you describe the establishment and evolution of the One Health governance structure in Meghalaya?

Meghalaya's One Health governance structure has evolved from scattered conversations between departments into a formal, multi-tiered system; though, we are still building it out fully.

For a long time, we have had the state Surveillance Committee chaired by the Health



Secretary to steer the surveillance activities. This year we are changing our strategy and have notified the One Health Steering Committee. This high-level Steering Committee will be led by the Chief Secretary and co-chaired by Secretaries of both Health & Family Welfare and Animal Husbandry & Veterinary; with secretaries from Environment, Agriculture, Water & Sanitation, Disaster Management, and Finance. This committee sets the overall vision, approves budgets, and removes obstacles between departments that would otherwise work in silos.

Below this, a dedicated One Health Cell; housed within the Health Department, serves as the day-to-day hub. It coordinates data, tracks progress, and prepares briefs for the Steering Committee. The Cell gets its support and inputs from various disciplines and specialities within and out of the system such as surveillance and early warning, laboratories and diagnostics, antimicrobial resistance, and wildlife ecosystem.

At the district level, One Health Committees bring together health and veterinary officials, agriculture, forest and wildlife officials, and civil society representatives to translate state-level policy into ground-level action.

A key influence on this structure was the recognition, particularly during COVID-19, that decentralised leadership and cross-departmental collaboration are not optional; they are essential for an effective health response.

3 How is the state addressing cross-sectoral coordination challenges? Please share specific examples.

When we talk of cross sectoral coordination, it is not without challenges. Therefore, to address these, the state has adopted both institutional and operational mechanisms to improve collaboration among departments and stakeholders.

One of the major steps taken has been the establishment of the State One Health Steering Committee. This high-level governance mechanism is helping to facilitate policy-level coordination, joint planning, and shared accountability across sectors.

At the operational level, the state is promoting regular coordination between departments such as Health, Animal Husbandry & Veterinary, PHE department, Food safety, Forest & Environment, Agriculture, Disaster Management, Urban Affairs, and district administrations. Joint meetings, information sharing, and collaborative outbreak response activities are increasingly being institutionalized.

Specific examples include:

- ▶ Whenever there are cases of food poisoning reported, the district and state rapid response teams are activated which comprise of the officials from the health



department, food inspectors from the food safety department, officials from the PHE department and lab teams. Investigation and sample collection is undertaken and sent to designated labs for testing.

- In case of rabies deaths and animal related outbreaks (zoonotic), coordination happens between department of animal husbandry and veterinary, environment and wildlife departments, etc.

Overall, Meghalaya's approach to cross-sectoral coordination reflects an evolving transition toward integrated governance, shared surveillance, and collaborative emergency preparedness under the One Health framework.

4

What strategies were adopted to sensitize government stakeholders to One Health, and how did these translate into a functional system?

The first step was bringing all the departments into the same room. In April 2024, the National Health Mission Meghalaya organised a two-day One Health Surveillance Conclave in Shillong, bringing together officials from Health, Animal Husbandry, Forest, Meteorology, Space Applications (NESAC), research institutions like IIPH Shillong, and international partners including Asian Development bank (ADB), United States Agency for International Development (USAID), and Jhpiego. This was a turning point: departments that rarely met began to understand each other's data, constraints, and priorities.

The second strategy was demonstrating value through data. We used our scrub typhus predictive model as a proof of concept, showing officials that when we combine weather data, land use satellite imagery, and past case data, we can predict outbreaks 2 to 4 weeks in advance with 80% accuracy. When officials see that this kind of intelligence can help them decide where to deploy testing kits or field teams before an outbreak peaks, the case for collaboration becomes very practical and compelling.

A third approach has been designing a formal two-day design workshop where all departments not only present their data but also openly share what they need and how they can contribute. This shifts the conversation from "what One Health means in theory" to "what each of us needs to do next week."

5

How has Meghalaya addressed surveillance challenges posed by its difficult terrain and ecological diversity? Any innovative approaches?

Our terrain is among the most challenging in India. Many villages become completely cut off during the monsoon. Network connectivity is poor in large parts of the state. Laboratory capacity is concentrated in Shillong, while diseases often emerge in remote blocks. These are not small obstacles.



Several innovations are helping us work around them:

The first is our predictive disease model. Rather than waiting for cases to be reported from remote areas, which is slow and often incomplete, we use satellite data on land cover, temperature, rainfall, and humidity to predict where disease risk is rising, even before cases appear. For scrub typhus, this model detected 80% of actual cases during its testing period.

We are also experimenting with new technologies. Pasteur Institute, Shillong is conducting wastewater surveillance for antimicrobial resistance and COVID-19 at sewage treatment plants, an approach that can detect disease trends in populations without requiring every person to come to a health facility.

The key ongoing challenge is that real-time digital reporting from remote areas is hampered by poor internet connectivity. Solutions being explored include offline data entry with later synchronisation, and stronger investment in block-level laboratory infrastructure. We hope that the MoU signed with Starlink will resolve those challenges.

6

During COVID-19, how did collaboration between the Government of Meghalaya and central agencies strengthen the One Health response?

The whole concept of One Health in Meghalaya began gaining prominence during the COVID-19 pandemic in 2020, when the state witnessed the importance of coordinated, multisectoral action in responding to a large-scale public health emergency. During this period, various government departments, development partners, private institutions, civil society organizations, and communities came together to support outbreak response activities. Importantly, traditional community leaders and local governance institutions also played a crucial role in promoting public health measures, reducing viral transmission, and supporting community-level surveillance and awareness, particularly in rural and hard-to-reach areas. These experiences reinforced the need for a formal One Health framework in the state.

The state has also come up with first-of-its kind systemic reform by bringing elected local bodies exclusively for promoting preventive health. The Village Health Councils (VHCs) are constituted in every village and locality by involving traditional headmen for ensuring effective mobilisation of communities from the demand side.

When it comes to collaboration with the central government, the type of areas of focus has been logistics like oxygen plants, vaccines, finance, technical support etc. which has further strengthened the one health approach in the state. The Emergency COVID-19 Response Package (ECRP) helped the state to build and strengthen its infrastructure and assemble much needed manpower for emergency response in the field, labs, and even borders.



7

How have community bodies and traditional institutions contributed to One Health in Meghalaya, and what lessons can other states draw?

In Meghalaya's tribal communities, traditional governance structures: village headmen, Village Health Councils (VHCs), and Self-Help Groups (SHGs) are often more trusted and more accessible than government officials, particularly in remote areas. Recognising this has shaped how the state thinks about community engagement in health.

VHCs have been identified as a primary vehicle for community-based surveillance, reporting early warning signs of illness in people or animals before they escalate. Training sessions, awareness campaigns, and health camps are being used to equip VHCs and SHGs with the skills to do this.

Faith leaders, village headmen, and even local influencers are being engaged as advocates for One Health principles, because communities often respond better to trusted local voices than to government communications.

Accredited Social Health Activist (ASHA) workers are also being trained to conduct Rapid Diagnostic Tests (RDTs) for fever illnesses at the village level, reducing the lag between a person falling sick and a disease being detected and reported.

The key lesson for other states is this: community structures that already exist and are already trusted should be the first building block of any surveillance system, not an afterthought. In a state like Meghalaya, where geography makes formal healthcare access difficult, community members who know their own villages are often the earliest and most reliable early warning signal we have.



IMPORTANT UPDATES ON THE NATIONAL ONE HEALTH MISSION



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Second meeting of the Scientific Steering Committee for the National One Health Mission held on 15th April 2025
16 April 2025

The Office of Principal Scientific Adviser to Government of India organised the first State/UTs engagement workshop under the National One Health Mission

09 June 2025



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Third meeting of the Scientific Steering Committee for the National One Health Mission held on 26th August 2025
26 August 2025

Union Health and Family Welfare Minister Shri J P Nadda reviews the progress of National One Health Mission at Second Meeting of the Executive Steering Committee

26 September 2025



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National One Health Mission Assembly Concludes Successfully, Reinforcing Collaborative Action for Preparedness and Viksit Bharat
21 November 2025

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Fourth meeting of the Scientific Steering Committee for the National One Health Mission held on 18th December 2025

18 December 2025



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National Workshop on One Health organised in Nagpur on “Operational Frameworks for One Health: National Vision and State Action”
18 March 2026

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Strengthening One Health Preparedness: DAHD Hosts National Workshop to Address Gaps Identified in Mock Drills

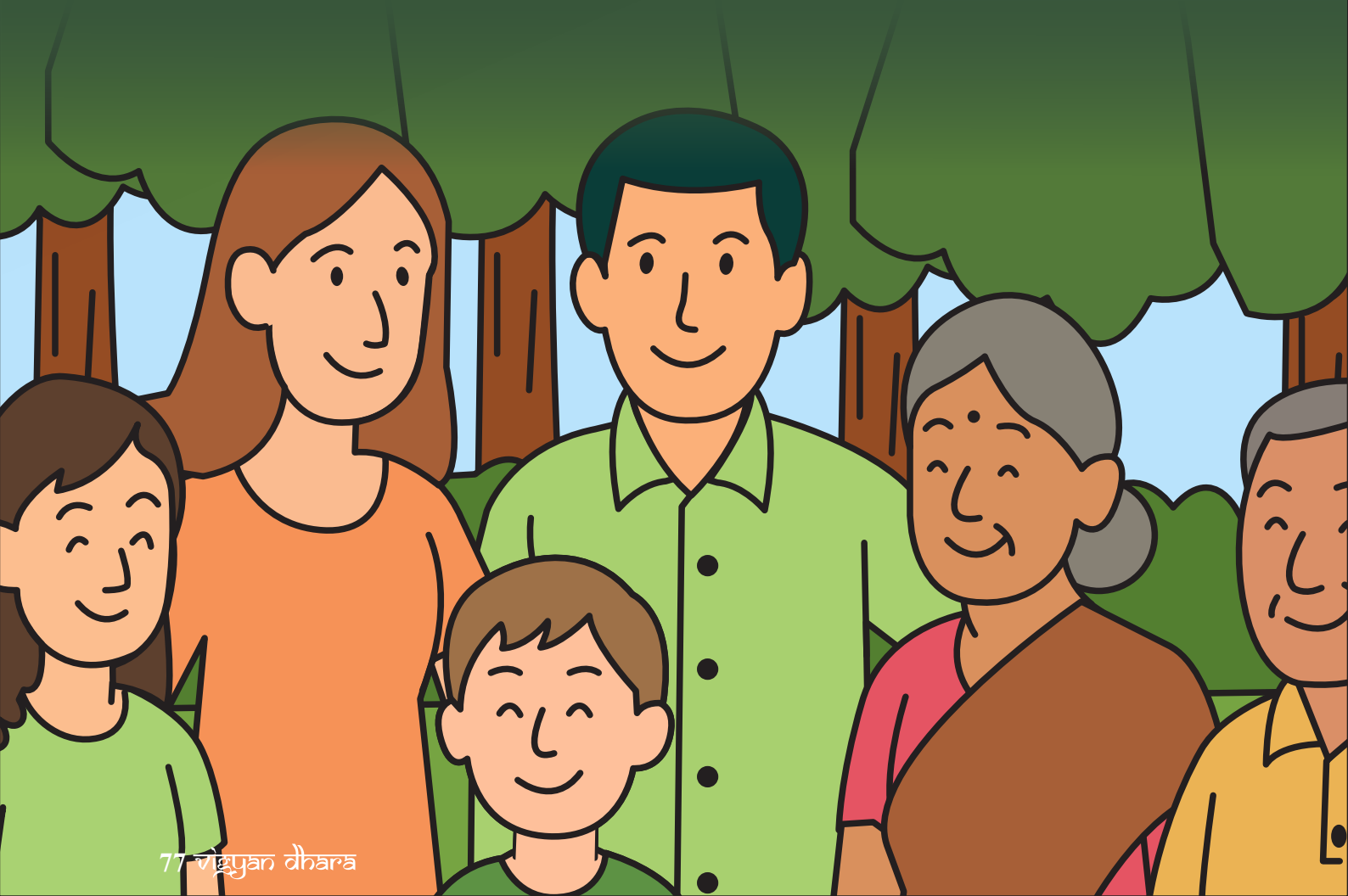
21 March 2026



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ONE HEALTH COMIC



Our Home at the Forest Edge

Our beautiful forest home... full of life and nature's gifts.

Monkey Down!

Look! A sick monkey. That's a sign...
...of KFD. Kyasanuru Forest Disease

The Hidden Danger

But sometimes, hidden dangers lurk... like tiny ticks, especially near forest and plantation.

The Tick Bite

KFD spreads when infected ticks bite humans. These ticks often carry the KFD virus.

Tick Control: Your First Line of Defence

Regular tick control measures on livestock, such as applying acaricides and frequent inspections, are crucial. This breaks the disease cycle, reducing the number of infected ticks in the environment.

Protection Measures

Wear protective clothing & use DEPA repellents in the forest!

Protection Measures

Check for ticks every day, especially after being outside!

Early Symptoms

Oh no, a fever, headache, body aches... these are early signs of KFD!

CLINIC

By staying aware and taking precautions, we can protect our families and community from KFD

KFD Awareness

Concept and Art: Dr Darshan N



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