Popular Article

Laboratory Diagnosis in Veterinary Healthcare: A Lifeline for Animal Health in India

Dr. Yogendrasinh H. Gadhvi¹, Dr. Jitendra M. Bhutediya², Dr. Ravindrasinh B. Thakor³,]Dr. Naresh B. Bhati⁴

¹ Veterinary Officer (Outsourced), Malpur, Aravalli, Gujarat, India
² Veterinary Officer, Bhiloda, Aravalli, Gujarat, India
³ Veterinary Officer, Ahmedabad Panjrapol, Dabhla, Ahmedabad, Gujarat, India
⁴ Assistant Professor, Kamdhenu University, Rajpurnava, Himmatnagar, Gujarat, India

India is home to the world's largest livestock population, forming the backbone of rural livelihoods and the agricultural economy. Millions of farmers depend on animals for milk, meat, draught power, manure, and steady income. However, livestock—like humans—are highly vulnerable to diseases, particularly infectious and contagious ones such as Foot and Mouth Disease (FMD), Brucellosis, Lumpy Skin Disease (LSD), and Peste des Petits Ruminants (PPR). When such diseases strike, the consequences are severe: loss of animals, reduced productivity, and economic distress for farmers, and in some cases, transmission of diseases to humans.

In veterinary practice, relying only on visible symptoms to identify diseases can be misleading. Many animal diseases present with similar signs such as fever, weakness, or skin lesions. Without proper confirmation, treatment often becomes a matter of guesswork. This is where **laboratory diagnosis plays a crucial role**, much like blood tests or imaging investigations in human medicine. Laboratory testing helps identify the exact cause of disease, enabling accurate treatment and effective disease control.

Current Scenario of Veterinary Diagnosis in India

Veterinary disease diagnosis in India today relies on a combination of traditional clinical methods and laboratory-based scientific techniques.

In rural areas, **traditional diagnostic approaches** are still widely practiced. Veterinarians assess animals based on clinical signs, past experience, and herd history, often followed by empirical treatment. While this approach is practical in remote settings, it has a major limitation—different diseases can look alike, leading to misdiagnosis and inappropriate treatment.

On the other hand, **laboratory-based diagnosis** provides scientific certainty. Microscopy helps detect parasites and bacteria, while culture and antibiotic sensitivity testing identify effective

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www.thescienceworld.net
thescienceworldmagazine@gmail.com

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drugs. Serological tests such as ELISA and RBPT detect antibodies against diseases like Brucellosis. Advanced molecular tools such as PCR directly identify the genetic material of viruses and bacteria, offering high accuracy. Institutions like the Indian Veterinary Research Institute (IVRI), NIHSAD, and state diagnostic laboratories play a key role in providing these services.

Laboratory diagnosis also supports national disease surveillance systems such as **NADRES (National Animal Disease Referral Expert System)** and the **Integrated Disease Surveillance Programme (IDSP)**, enabling early detection and informed policymaking.

Why Laboratory Diagnosis Is a Game-Changer

The most important benefit of laboratory diagnosis is **accuracy**. An animal showing fever with skin lesions could be suffering from LSD, cowpox, insect allergy, or another condition—only a PCR test can confirm the exact disease. Accurate diagnosis ensures the right treatment and prevents unnecessary use of medicines.

Laboratory testing also promotes **rational use of antibiotics**. Culture and sensitivity tests identify the most effective drug, reducing misuse and overuse. This is critical in combating **antimicrobial resistance**, a growing threat to both animal and human health.

Another major advantage is **early detection of disease outbreaks**. During the 2022 LSD outbreak in India, timely PCR confirmation helped authorities initiate vaccination and containment measures, preventing large-scale losses. Confirmed laboratory data also allows authorities to track disease spread through digital platforms, helping predict future outbreaks.

Importantly, laboratory diagnosis protects against **zoonotic diseases** such as Brucellosis and Anthrax. By detecting and controlling infections in animals, the risk of transmission to humans is minimized—an approach aligned with the **One Health concept**, which links animal, human, and environmental health.

Consequences of Skipping Laboratory Diagnosis

When laboratory diagnosis is not performed, the risks multiply. Diseases like Babesiosis may be mistaken for leptospirosis or post-parturient hemoglobinuria, leading to incorrect treatment and animal deaths. Farmers incur financial losses due to wrong medications, infertility, reduced milk yield, and mortality.

Unconfirmed cases often go unreported, allowing diseases to spread silently across villages and districts. In such situations, veterinarians may resort to broad-spectrum antibiotics as a precaution, accelerating antimicrobial resistance and leaving harmful drug residues in milk and meat. Additionally, lack of accurate data weakens government planning for vaccination programs and disease control strategies.

Lessons from the Field

Real-life examples from India clearly demonstrate the value of laboratory diagnosis. In Brucellosis, confirmation through RBPT or ELISA allows timely isolation of animals, preventing spread to humans. In LSD outbreaks, PCR confirmation enables early vaccination, whereas

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misdiagnosis as a skin allergy can result in rapid village-to-village spread. Similarly, in goats, rapid test kits for PPR help initiate vaccination quickly, reducing mortality that would otherwise occur if the disease were mistaken for pneumonia.

Challenges in Strengthening Diagnostic Services

Despite its importance, India still faces several challenges in veterinary diagnostics. Many rural veterinary centers lack basic laboratory facilities, forcing samples to be transported over long distances. There is a shortage of trained laboratory personnel, and sample handling is often compromised due to lack of cold-chain facilities. Advanced molecular tests like PCR remain expensive and are largely confined to urban laboratories. Moreover, farmer awareness about point-of-care diagnostic kits is limited.

The Way Forward

To safeguard animal health and rural livelihoods, India must invest in strengthening veterinary diagnostic infrastructure. Rural laboratories should be upgraded with basic and molecular testing capabilities. Field veterinarians and para-veterinary staff need training in proper sample collection and use of point-of-care diagnostic kits. Development of affordable, field-friendly diagnostic tools is essential.

Integrating mobile applications, artificial intelligence, and real-time data systems can enhance disease tracking and outbreak prediction. Strong collaboration between animal and human health sectors will promote the One Health approach. Public-private partnerships can further help scale diagnostic services affordably and efficiently.

Conclusion

Laboratory diagnosis is not a luxury—it is a **lifesaving necessity** for veterinary healthcare in India. It brings precision to treatment, prevents economic losses, enables early outbreak control, and protects public health from zoonotic diseases. While challenges remain, empowering veterinarians with reliable diagnostic tools has the potential to transform rural veterinary care and protect India's vast livestock wealth.

No more guesswork—diagnosis must lead the way.