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Towards
the veterinary
diagnostics
of the
future

Main topic :

Veterinary Diagnostic Laboratories: Emerging leaders in One Health

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Many of today's greatest challenges are interconnected and driven by human activities: emerging and reemerging diseases, climate change, antimicrobial resistance, environmental contamination, food safety and security, clean water availability, and loss of biodiversity. Such "wicked problems" require a response equally complex in approach and that brings in expertise and perspectives from across disciplines. One Health at its simplest is exactly that - a collaborative, interdisciplinary approach to improve health for humans, animals, plants, and the environment at a local, national, and global level.

The emergence of SARS-CoV-2 and the extended global pandemic placed renewed emphasis on the role of diagnostics in emergency response. Throughout the global pandemic, veterinary diagnostic laboratories leveraged their training, equipment, and personnel to provide surge capacity testing for both animals and humans, highlighting the strength of a One Health approach. As we look to the future, it's clear that we, as veterinary diagnosticians, are uniquely poised to lead efforts to improve animal, human, and environmental health.

Veterinary diagnostic laboratories share extensive expertise in bacteriology, virology, parasitology, immunology, anatomic and clinical pathology, toxicology, and nutrition. Individual laboratories receive tens or hundreds of thousands of samples a year from domestic and wild animals around the world. As veterinary diagnostic laboratories, we stand in a pivotal place with potential to develop and implement novel diagnostic and surveillance approaches to facilitate early detection of emerging infectious diseases, track antimicrobial resistance, promote food safety and security, and ensure environmental health.

A united approach is required to successfully enhance and share diagnostic capacity and capabilities across laboratories, leveraging the unique expertise of individual laboratories. In the U.S., the USDA National Animal Health Laboratory Network (NAHLN), a network of more than sixty federal, state, and academic laboratories, provides a successful example of a coordinated approach to animal disease outbreak response. To enhance the network's capabilities to detect new and emerging pathogens, USDA is launching a new process to tackle cases of unusual morbidity/mortality events (UME) in animals; that is, to provide an efficient approach for laboratories to receive additional funding and support to continue diagnostic investigations after routine diagnostic testing fails to identify a cause of disease. This program will enhance the early warning systems, strengthen our ability to identify new emerging threats, and potentially minimize future impacts to human and animal health, by facilitating a more rapid response to emerging diseases.

In addition, the rapid enhancements in both diagnostic capabilities (e.g., next-generation sequencing) and analytics (artificial intelligence, machine learning) presents new opportunities to build cutting-edge diagnostic platforms that are truly disease-agnostic, allowing us to cast the widest net for detection of emerging pathogens. Through collaborations with experts across disciplines including computer science and bioinformatics, we leverage the existing strength of veterinary diagnostic laboratories to lead a One Health approach to disease surveillance and detection to promote animal, human, and environmental health.