

## **New technologies offer new diagnostic and therapeutic tools for disease control**

'New technology' is steamrolling its way towards people and businesses worldwide, and recent advances in the medical sciences are unprecedented. The development of new technologies in the area of animal health offers new avenues for success in the way that diseases are detected, managed, controlled and eradicated. The potential impact of these innovations extends beyond their effects upon animal health and welfare, and could significantly contribute to improved human health and food security. As pathological organisms relentlessly continue to develop new strategies for spread or survival, so must animal science continue to develop new tools as part of an effective pathogen control strategy. To ensure optimal impact, it is important not only to promote the development of new technologies to address current and future health issues, but also to make sure that the full potential of these new technologies is appropriately integrated into current animal health practices and standards. In this respect, the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* provides internationally agreed-upon diagnostic laboratory methods and requirements for the ongoing production and control of vaccines and other biological products.

A greater 'One Health'-oriented interaction between these professional sectors is becoming more and more important for developing and adapting new technologies that address both animal and human disease. Innovative diagnostic methods can play an important role in the detection of new and emerging infectious diseases at the interface between animals, humans and their environment, or indeed may facilitate the discovery of new vaccines that bridge human and animal vaccine development. The development and delivery of new veterinary vaccines and diagnostic tests is of primary importance in developing technological strategies for the future, and will provide both opportunities and challenges for animal health.

New advances in vaccine design using genomics are one part of a host of powerful new methods that have also set the stage to enhance the diagnosis, surveillance and control of infectious diseases. High-throughput sequencing (HTS), for example, uses the latest DNA sequencing platforms in the detection, identification and detailed analysis of both pathogen and host genomes. This new development makes HTS affordable in small diagnostic laboratories, or even in the field. The resulting bioinformatics and computational genomics (BCG) data can now be generated at an unprecedented scale, speed and depth. In the context of animal health, this provides some key opportunities, such as the detection of new microorganisms and improved diagnosis of emerging or re-emerging diseases. However, as HTS-BCG becomes more widely used, the continual detection and rapid identification of

purported new infectious agents will also present challenges. It is important that the OIE ensures that HTS-BCG is fully validated and quality assured if it is to be trusted as a diagnostic tool, and to make certain that the resulting data is appropriately reported and analysed.

Such new technologies signify a new era in disease knowledge, in which discovering new information enabling more accurate predictions can lead to faster responses and greater control of potentially devastating disease crises. However, technical innovation is not only about discoveries; it is also about strategically governing their application to optimise their effects upon global health and safety of international trade of animals and animal products. The OIE recognises its role in identifying the opportunities and challenges presented by new technologies and in setting international standards so that these technologies can be successfully applied to improve animal health and welfare and to enhance food security. It is also committed to ensuring good governance by supporting national Veterinary Services as they incorporate the use of such new technologies in accordance with the highest international standards.

Not all new technologies will be appropriate for all countries, and their introduction and use must also be considered in terms of the individual circumstances of the country or region concerned. The use of new technologies may be limited, due to funding or professional resources, or their implementation may indeed result in a more rational use of limited resources. In this respect, the OIE surveyed its Member Countries to assess their use of new technologies and investigate how this may influence the OIE's role in ensuring that they are incorporated with the best scientific standards. Such feedback from Member Countries is essential in order to determine their Veterinary Services' needs for support in acquiring the new technologies that will be most appropriate to their disease control challenges, easily applicable, and rapidly efficacious. With this information, the OIE can establish what kind of support is needed by the Veterinary Services of its Member Countries as they consider and adopt an appropriate use of new technologies to combat current and future disease challenges.

The animal health sector has the opportunity, not only to be a part of this technological revolution, but also to guide the appropriate application of these rapid advances in genetic engineering and computer science. The reluctance of many to adopt innovations on the basis of philosophical, cultural or economic arguments is often based on ignorance. It is one of the key objectives of the OIE to clarify, explain, communicate and convince all players. Not to do so would be negligent or, in the words of the writer Steward Brand, '*Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road*'.