Diagnosis and surveillance of infectious diseases in Wildlife (WildTech): the One Health link to farm livestock and humans. *(Duncan Hannant, University of Nottingham, UK)*

**Abstract:** The WildTech project has provided the unique opportunity for dissemination of new information on diagnosis and epidemiology of wildlife diseases to workers in the fields of human and veterinary health.

It is well known that more than 70% of infectious diseases originate from wildlife and changes in land usage and animal and human population movements all contribute to the risks of exposure to zoonotic diseases. The EU-funded project WildTech (Novel Technologies for Surveillance of Emerging and Re-emerging Infections of Wildlife) addresses the problem of the increasing prevalence of new and emerging diseases arising from wildlife which affect both farm livestock and man. We have applied nucleic acid (NA) microarray technology and high throughput serological screening to detect known and novel infectious agents in wildlife populations. This knowledge has been applied to monitor and model patterns of wildlife disease spread and the risks associated with them. Ultimately this epidemiology framework will be used to reduce the risk of further potential epidemics by application of a generic action plan developed by this project in case of emerging epizootics among wildlife. The work is supported by the development of a wildlife disease data management system with mapping capability for use in Europe and beyond.

Recent research findings will be presented that relate the application of rapid and accurate diagnostic technologies to assess the spread of selected priority diseases (proof of concept) using archive samples and those collected during the project. The presentation summarises the objectives and progress of the WildTech project, with contributions from our 13 international Partners.

NA and serology arrays have been fabricated and tested to detect pathogens in wildlife. Non array-based technologies (e.g. proteomics, luminex arrays, next generation sequencing) have also being investigated. Validation requirements and potential applications of these new methods for wildlife disease surveillance have been analysed. We have developed the new technologies in our Partner laboratories and delivered the Standard Operating Procedure for processing and transportation of tissue and serum samples. Large numbers of samples have been processed either for evaluating / validating the developed arrays, or for surveillance.

The epidemiology aspect of the project has delivering the mathematical, statistical and epidemiological tools necessary for a pan-European wildlife disease surveillance design, testing and support. Tasks undertaken and in progress include qualitative risk assessment for developing wildlife sampling strategies, epidemiological analysis of historic and new field data to quantify spatial and temporal patterns of disease incidence (prevalence and geographic distribution) and assessing the consequence of changing pathogen distributions using statistical and dynamic modelling. Finally, the evidence derived from these risk assessments now forms the basis of recommendations for appropriate and proportionate management and policy actions.

The WildTech database has been developed. The goal is to have sample data and array results stored and accessed for epidemiological analysis that can be further developed to form part of a pan-European surveillance system. Wildpro® (the open-access electronic encyclopaedia on the health and management of free-ranging and captive wild animals, and (re)-emerging infectious diseases), continues to be updated with new pathogens as part of the WildTech project.

Two technology transfer workshops have taken place to introduce the basic principles underlying the new technologies being developed by the WildTech project: the first was a theory-based workshop held at the joint EWDA/WDA conference in Lyon in July 2012. The second was a hands-on wet-lab workshop held at the AHVLA in October 2012, attended by our Associate and Collaborative Partners.

Our pool of Associate and Collaborative Partners continues to grow and they, along with our Project Partners, continue to provide us with samples for surveillance and technology validation.

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**Summary:** In addition to bringing together diagnostic and surveillance approaches within the EU, the WildTech project is providing a valuable resource for information transfer between the western countries (USA and Canada particularly) and the non-EU countries elsewhere including Russia. Importantly, there are USA, Canadian and Russian groups who are fully integrated into the project. Technology transfer is a key component of the project's dissemination strategy and this is a strong component of current interactions with USA Department of Homeland Security and the USDA.