

New Flubird Database - Platform for Data Exchange and Knowledge Building in Avian Influenza Surveillance

Mathey A¹, Staubach C¹, Kowalczyk S¹, Wilking H¹, Richter S¹, Kranz P¹, Harder T², Conraths FJ¹ and the NFB consortium³

¹ Institute of Epidemiology, Friedrich-Loeffler-Institute, Wusterhausen, Germany

² German and OIE NRL for Avian Influenza, Friedrich-Loeffler-Institute, Greifswald-Insel Riems, Germany

³ Coordinated by Osterhaus A, Erasmus University Medical Center, Rotterdam, The Netherlands

³ Co-ordinated by Hagemeijer W, Wetlands International Headquarters, Ede, The Netherlands

³ Funded by the EU – Sixth Framework Programme for Research and Technological Development (FP6)

To tackle shortcomings in the current understanding of the epidemiology of avian influenza viruses in migratory wild birds, a network of virologists, ornithologists and epidemiologists was established, built on related initiatives and cooperations. Apart from enhancing possibilities of method standardization and sharing of data and expert knowledge, this large-scale cooperation forms the backbone of a targeted surveillance system, with tasks distributed among the partners according to their respective expertise.

As a central instrument for this purpose, a database system was developed to store, manage and analyse data from the different disciplines, as well as additional environmental data. A flexible user management system was implemented, allowing data access rights to be configured independently for different users, and different data types, respectively. Interaction by project participants is possible via a secured internet connection and a web interface, which provides the different tools and modules for data processing.

Emphasis is placed on the integrative process of combining the interdisciplinary data for analysis, which is realized on different levels. Interactive software modules allow for the creation of database queries, targeting parameters shared by the different types of data. The resulting subsets of interest can be ordered, stratified and visualized in form of tables and diagrams. To the end of visual integration, search results can be displayed by means of a mapping engine, and be placed into different thematic contexts in form of prepared environmental, ecological and administrative background layers. For example, geo-referenced diagnostic results from sampling can be visualized in combination with species based migration flyways, as well as count data from the IWC (International Waterbird Census), that were compiled by the ornithological partners under the lead of Wetlands International. The considerable amount of developing effort for this map server resulted in a flexible system, which can be transferred to other online databases. Currently, the system is being adapted for an “European online database on epizootic diseases as an early warning system” in the framework of the EPIZONE Network.

Established data mining algorithms will be deployed to search the data pool continuously for hidden patterns and trends that could allow for a better comprehension of the disease's ecology. In close cooperation with partner institutes, insights from other work-packages and expert opinions will be used to parameterize epidemiological models, suited to enhance the predictability of the occurrence of defined sub- and patho-types on the basis of the continuously updated datasets. Examples for candidates are results from experimental infection studies, performed to elucidate the role of selected waterbird species as long-distance carriers, as well as observational and ecological information with reference to the potential ability of different bird species to spread avian influenza viruses, gathered by ornithological and ecological partners.

To prepare the exchange of data and information with related initiatives, as for example the wild-bird monitoring in the European Union or the Global Avian Influenza Network for Surveillance (GAINS) of the World Conservation Society (WCS), data structures and coding systems were implemented and designed to preserve compatibility. All results and insights derived from epidemiological analysis will be communicated with stakeholders, using the framework of the envisaged “early warning and assessment system” coordinated by the project management.