

17.005

Economics of One Health: Evidence of substantial benefits of integrated West Nile virus surveillance



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Purpose: Enhanced cross-sectorial collaboration and sharing of surveillance information between the animal and the public health sectors are key to improve the management of zoonotic threats. However, there is little evidence on the costs and benefits of One Health (OH) surveillance for zoonoses. An integrated and multi-disciplinary West Nile virus (WNV) surveillance system (SS) has been implemented in Emilia-Romagna since 2009. The SS includes surveillance activities in the public health and in the animal health sectors. From 2013, surveillance information generated in the two sectors is shared, guiding targeted public health interventions to mitigate the risk of WNV transmission via blood transfusion. The objective of this work was to estimate the cross-sectorial costs and benefits associated with the OH approach to surveillance information of this SS.

Methods & Materials: We applied a conceptual framework to identify the cross-sectorial links between WNV surveillance and triggered interventions, and the associated costs and benefits. Cost items included costs of human, animal, and entomological surveillance, linking of information, and triggered interventions. Benefits were quantified as the averted costs of potential human cases of West Nile neuroinvasive disease associated to infected blood transfusions. Evaluation of costs and benefits of surveillance designs was conducted considering two scenarios: OH and a uni-sectorial approach that does not integrate animal health information.

Results: The OH scenario was estimated to represent a reduction of 184'619 EUR in the overall costs of surveillance in the 2009-2015 period. The main cost components were blood donation screening activities in both the OH and uni-sectorial scenario. The OH approach allowed savings of 1.24 million EUR in blood donations screening activities. These savings compensated the cost of animal health surveillance and linking of information. Benefits of the OH approach due to avoided short term cost-of-illness and avoided compensation for transfusion-transmitted infections were estimated to be 3.0 million EUR.

Conclusion: Overall, the OH approach to WNV surveillance in Emilia-Romagna region is estimated to be economically beneficial. These results can further contribute to bring evidence on the economic aspects of OH surveillance for zoonoses and contribute for the prioritization of resource allocated to zoonoses mitigation.

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17.006

Developing a transdisciplinary database for operationalization of One Health surveillance for Japanese Encephalitis in India



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Purpose: Vector borne diseases like Japanese Encephalitis (JE) result from the convergence of multiple factors, including, but not limited to, human, animal, environmental, economic and social determinants. To combat these problems, it is essential to have a systematic understanding of drivers and determinants based on a surveillance system that systematically gathers and analyzes data emanating from across multiple disciplines. We developed and deployed a database for collection of transdisciplinary data, obtained both through cross-sectional and longitudinal approaches, across various biotopes, which can function as an affordable surveillance database.

Methods & Materials: A multidisciplinary group of experts, representing epidemiology, human health, veterinary public health, microbiology, GIS, social sciences, and entomology, was assembled to develop a conceptual framework through collaborative iterations. A unique identifier was developed to construct a relational database to organize data from multiple sources, collected in multiple rounds: animal testing, human testing, questionnaire-based surveys, demographic data, GPS data, environmental and meteorological data, vector collection and entomological data. The database was developed using Microsoft Access.

Results: The unique ID based system spanned multiple strata; data points could be identified from a macro (state or district) level to a micro (individual) level. The relational database allowed comparisons across and within strata, allowing us to tease out the determinants that had interactions at various levels. Recognition of factors like changing feeding/biting preference of JE vector mosquitoes could be identified only due to the transdisciplinary nature of the relational database. Presence of JEV in both pig-owning and non-pig-owning villages indicated local factors playing at a higher strata. This database allowed us to connect drivers which were previously studied only within their sectoral enquiries.

Conclusion: Developing an affordable, simple, and efficient database that could collate transdisciplinary data, allowed us to not only identify unique insights in JE epidemiology, but also provided us with a template to develop One Health surveillance database for vector borne diseases.

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17.007

Analyzing a hepatitis A outbreak by integrating space-time distances and network approach as evidences-based assessment of vaccination policy



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Purpose: Acute hepatitis A (AHA) is one of notifiable diseases in Taiwan, and a significant decrease in incidence was documented