

## **Preparedness through interactive story maps kept up to date by living systematic literature reviews on animal and zoonotic diseases**

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### **INTRODUCTION**

Pathogens with pandemic potential often have an animal component in the transmission cycle. Changes in ecosystems and human-animal interactions can lead to the emergence of strains with altered virulence or species affinity.

Supporting decision-makers with up-to-date evidence is a key component of preparedness. For this evidence to be actionable, it needs to be delivered in formats that can be understood and browsed and filtered to answer varied questions. The extensive and rapidly growing body of research literature on animal and zoonotic diseases presents challenges both for gathering knowledge in a timely manner, as well as for condensing all knowledge into user-friendly outputs.

With the aim of keeping disease agent-related knowledge at the decision-makers' fingertips, we have developed story maps that are a combination of two main components: a (i) living systematic literature review (LSR) workflow, which feeds automatically into (ii) an interactive, user-friendly interface used to browse the compilation of available knowledge.

### **METHODOLOGY**

Disease selection focused on preparedness: 36 vector-borne diseases, for which globalisation and climate change represent potential pressures to emergence or re-emergence in the European Union; and the 14 diseases that affect terrestrial animals and which are listed as category A in the Animal Health Law (Regulation (EU) 2016/429). Three diseases are included in both groups, resulting in a total of 47 diseases.

LSRs offer an approach to keeping high-quality evidence collection and analysis processes continuously up to date so that the most recent, relevant and reliable evidence can be used to inform policy. The COVETLAB consortium, together with EFSA, has developed an efficient and reproducible LSR protocol that complies data with the rigour of systematic literature reviews and feeds databases for the 47 selected diseases in seven areas of knowledge:

experimental infections, pathogen survival, diagnostic tests, vaccines, treatments, vector control and geographical distribution.

A pipeline was set up to analyse the data using the statistical programming language R and to automatically update interactive story maps created using JavaScript programming. The entire process is built using open-source tools.

## RESULTS

The LSRs and analysis pipelines were used to produce 47 interactive story maps for animal and zoonotic diseases. For each disease, different sections of the story map display the evidence gathered through the LSRs in the seven knowledge areas covered. LSRs are updated annually or bi-annually. For reportable diseases, the section that displays geographical distribution is updated every three months with disease notifications being submitted to the World Organisation for Animal Health (OIE). Additional sections list available risk assessments, legislation information, as well as a list of references.

All story maps are publicly available through EFSA (<https://www.efsa.europa.eu/en>).

Important disease parameters, such as infectious period, incubation period, clinical signs, case fatality, diagnostic performance, efficacy of existing vaccines and treatments, vector distribution and recent risk assessments, are updated annually. For full transparency, the review protocols, R-scripts for meta-analysis and databases can be downloaded directly from the story maps.

## DISCUSSION

The LSR story maps compilation resulted in a continuous summary and visualisation of evidence that can support decision-making by, and preparedness of, risk assessors and risk managers in connection with animal and zoonotic diseases. The LSRs focus on primary research evidence. Secondary outputs of the review are the identification of evidence gaps or, on the contrary, areas with repeated research efforts. Despite the fact that most parts of the review process are automated, the workload remains challenging due to the data extraction part that remains manual. The potential use of machine learning to highlight review priorities or the incorporation of crowd reviews in the data extraction process offer food for thought.