

【S II-1】

Development of a Risk Factor Surveillance System for Conservation of Endangered Bird Species and Studies on the Risk for their Population Reduction Due to Avian Influenza Virus Infection and a Countermeasure against the Risk

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Endangered birds are threatened by avian influenza epidemics and low-level lead exposure. Therefore, the purpose of this project was to develop a comprehensive risk assessment method for infectious diseases and environmental pollution and to promote conservation measures for endangered birds. The development of such a method would also help facilitate the implementation of avian influenza monitoring in East Asia, including Japan, the promotion of prompt countermeasures, and the strengthening of lead bullet regulations outside of Hokkaido based on lead contamination risk assessments. The project comprises three themes.

Under Theme 1, we summarized the overall research, focusing on highly pathogenic avian influenza. Then, we developed a comprehensive risk assessment methodology considering low-level lead exposure, which causes immunosuppression. We also proposed a socially implementable risk assessment method as an outcome by (i) using a highly effective method developed with reference to practical examples in Japan and overseas and (ii) conducting simulations at a model site. In addition, we performed risk assessment workshops for government veterinarians, and proposed a comprehensive risk assessment method that could be socially implemented in Japan.

Under Theme 2, we developed an effective new rapid diagnostic method, technology for early detection of the virus, and environmental cleanup technology, with the aim of establishing countermeasures against highly pathogenic avian influenza virus (HPAIV) infection in endangered birds. In addition, we elucidated the HPAIV susceptibility of endangered species and common species that share habitats with them and developed a method for evaluating susceptibility in endangered bird species by using cultured cells, thereby establishing a basis for risk assessment and infection prevention in endangered bird species. In addition, we obtained knowledge that will provide a basis for developing treatment methods for endangered birds infected with HPAIV.

Under Theme 3, we aimed to determine the status of lead contamination in raptors outside of Hokkaido via lead bullets and other sources and to clarify the direct (i.e., lead poisoning) and indirect (i.e., changes in susceptibility to HPAIV) risks to raptors from the use of lead bullets. We identified areas where lead poisoning and low-level lead exposure were likely to affect populations and made policy recommendations regarding areas where restrictions on the use of lead bullets and other materials should be prioritized as an outcome. In addition, we were the first in the world to demonstrate immunosuppression caused by lead exposure at the gene expression level.

Comprehensive risk assessment method for infectious diseases and environmental pollution

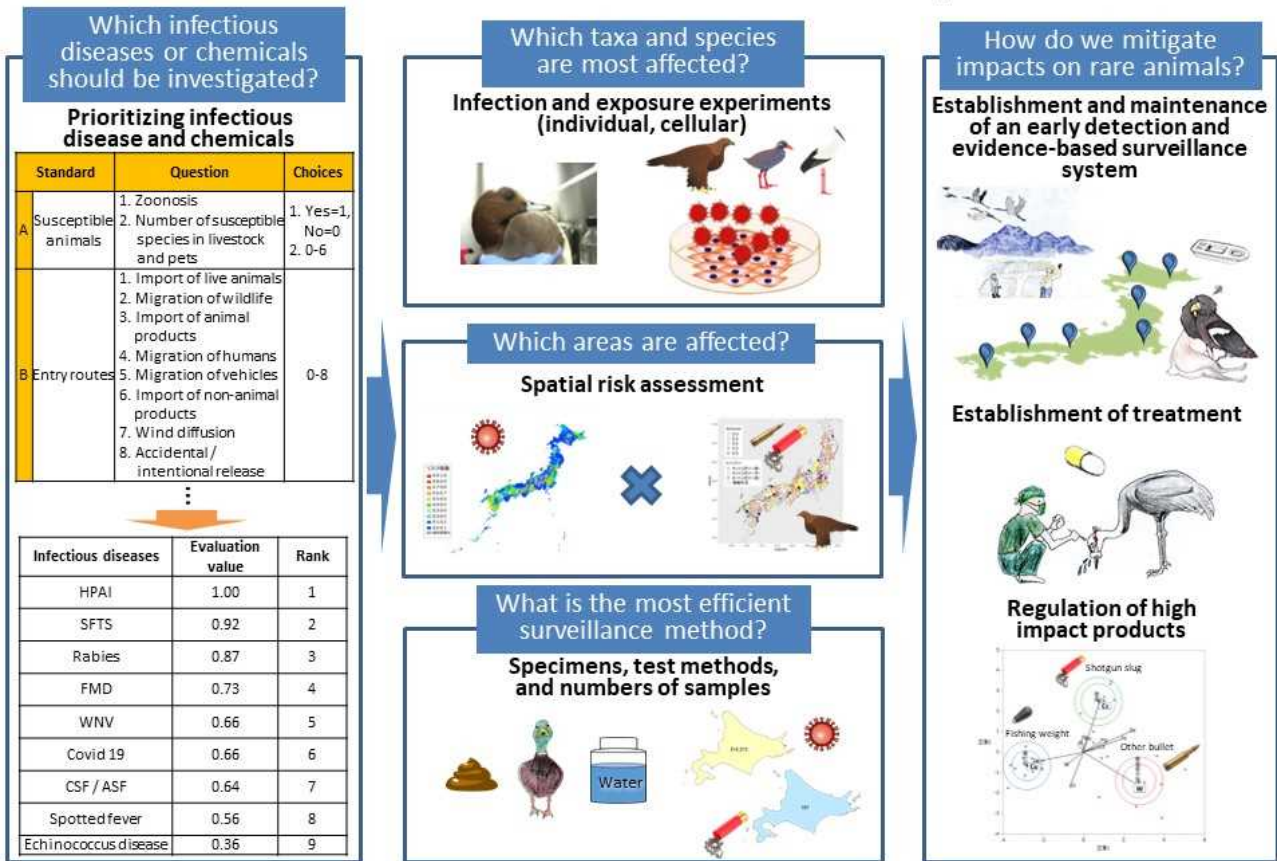


Fig. 1 This study's comprehensive risk assessment method.

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