

# Investigating the evolutionary dynamics of the Highly Pathogenic Avian Influenza Virus A(H5N1) outbreaks in Italy, October 2021 - July 2023

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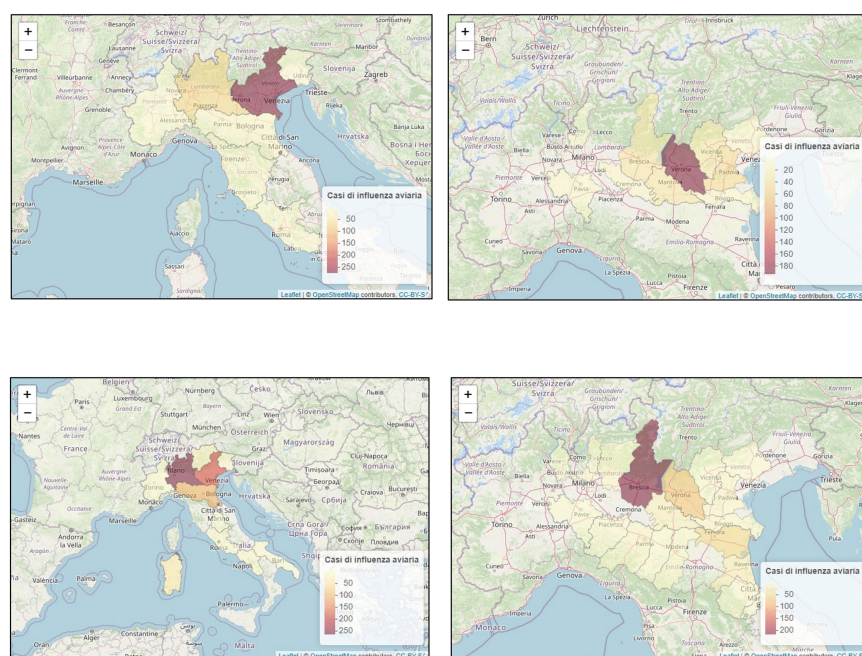
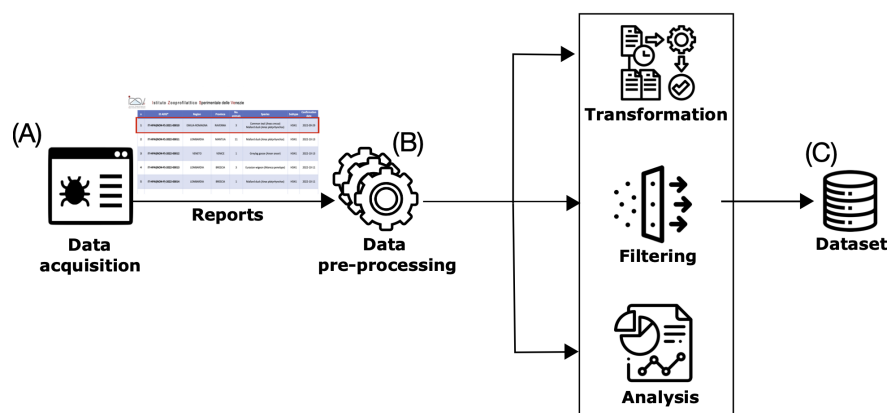
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## Abstract

In recent years, the epidemiological situation of avian influenza has been undergoing rapid changes, leading to severe consequences for the poultry industry, farmers' livelihoods, international trade, and the health of wild birds. However, planning effective control measures should this outbreak grow further requires real-time and open data, which are scarce to date. We extracted the epidemiological data of Highly Pathogenic Avian Influenza (HPAI) A(H5N1) outbreaks reported between 2021 and 2023 from the Istituto Zooprofilattico Sperimentale delle Venezie and performed a comprehensive analysis. From October 2021 to July 20, 2023, 620 HPAI outbreaks detections were reported, of which 358 in domestic poultry and 257 in wild birds. Lombardy, Emilia-Romagna, and Veneto have experienced the highest impact and are among the most affected regions. Moreover, we applied economic indices (such as Homogeneity, Location and Specialization Index) to wild birds dataset to show their possible usage in epidemiology. Black-headed gull is the most homogeneous species (HI: 0.44); Emilia-Romagna and Veneto are the less homogenous regions (HI: 0.03, 0.10); less specialized regions are Veneto, Lombardia and Emilia-Romagna (SI: 15.72, 24.53, 28.62). The spread of the virus to five continents speaks to the need for global cooperation and alertness to protect animals, people and economies.

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