Use of diagnostic laboratory data for event detection in Scotland

Jorge Rivera-Gomis, Suhaib Ahmed, Franz Brulisauer, Jude Eze, John Berezowski

Scotland's Rural College (SRUC), Centre for Epidemiology and Planetary Health (CEPH), Inverness, IV2 5NA, Scotland, UK

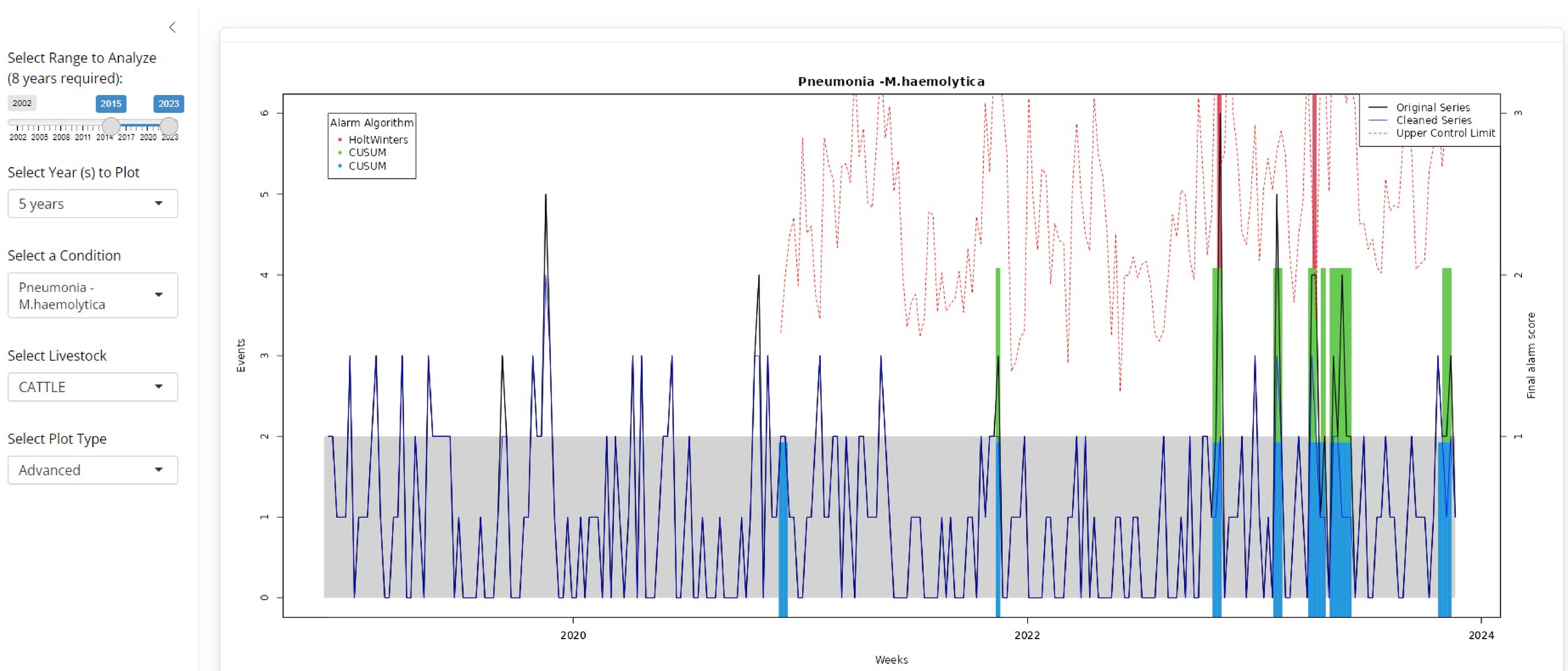
Background:

- **Endemic diseases** of livestock **impact animal welfare** and **cause significant economic losses**.
- Temporal aberration detection algorithms are useful **tools to identify increases in disease indicators from Veterinary Services (VS) diagnostic data**.

Objective:

- To develop an **event detection system** and **information tool** to assist the **Veterinary Services (VS) in disease control** in Scotland.

Figure 1. Tab of the Shiny app showing alarms due to an increase in the number of diagnoses per week.



Methods:

- **Time series analysis of diagnosis count data** with a combination of two Cusum and one Holt-Winters (HW) algorithms (vetsyn and surveillance R packages).
- **Automatic selection** of level, seasonality and trend **parameters for HW**. Optimum value by comparing the Mean Squared Error (MSE).
- Developed according to **feedback from the SRUC VS**.
- Developed in a **Shiny app**.

Results:

- **Data analysis system detects increases in disease and generates alarms**.
- **Shiny app** displays disease trends.

Figure 2. Entries for the most recent alarm and chart with last years cases

Conclusion:

- **Added value** to diagnostic laboratory data to **support VS in disease control**.
- **Future** use for **external users to upload data and analyse it**.