High risk areas/time periods/individuals?

Method: MCDF (weighted overlay)
Disease: WN (zoonosis)
Study region: Castilla y León

Given the re-emergence of West Nile in Europe…
Which are areas at high risk for West Nile in Castilla y León?

Potential impact in the equine industry

WN risk map +
Network of equine movements
Given the re-emergence of West Nile in Europe…
Which are areas at high risk for West Nile in Castilla y León?

WN risk map
+ Surveillance areas in wild birds

High risk areas/time periods/individuals?

Method: MCDF (weighted overlay)
Disease: WN (zoonosis)
Study region: Castilla y León

Surveillance in wild birds

Risk
High
Low

Surveillance in wild birds

2008
2009
2008-2009
Given the re-emergence of West Nile in Europe… Which are areas at high risk for West Nile in Castilla y León?

Risk-based surveillance

Setting priorities for public health

WN risk map + Most populated areas

Human population by municipality:
- 101 – 232
- 233 – 377
- 378 – 870
- 871 - 3959

Risk:
- High
- Low

Study region: Castilla y León

Method: MCDF (weighted overlay)
Disease: WN (zoonosis)
Methods:
- Network analysis
- Phylodynamics
- Biosecurity and risk assessment
- Data Mining and Machine Learning
- Prediction models

High risk areas/time periods/individuals?

MaxEnt

Avian Influenza

US, California, South Korea, Globally
Once a disease has been introduced into a region…

How disease will spread?
Which will be the most cost-effective control measures to control it?

**“BeFAST” spread model**

“Between -Farm -Animal spatial transmission” model was developed to simulate disease spread within and between herds (H)

- Susceptible
- Subclinically infected
- Clinically infected
- Detected
- Depopulated

**SPATIAL AND STOCHASTIC DISEASE SPREAD MODEL**
CSF model for Segovia (Spain)

Time to detection = 1 week
2,3 millions €

Time to detection = 2 weeks
21 millions €

9.18 TIMES HIGHER COSTS (EXPONENTIAL GROWTH)
EDUCATION AND TRAINING IS ESSENTIAL

Suspicious symptoms

Alert !!!

TEACHING
Increase risk awareness and perception
Reduce the time to detection in the field
Rapid and effective response
Training the next generation of vet-data-scientists

At UC Davis

Master of Preventive Veterinary Medicine (MPVM), Graduate Group of Epidemiology (GGE)
Training the next generation of vet-data-scientists

At UC Davis

Master of Preventive Veterinary Medicine (MPVM), Graduate Group of Epidemiology (GGE)

- Dealing with dirty data
- Develop analytical skills
- Real-world experimentation
Ref. Lab. Prevention Risk-based Surveillance Control

Teaching

Early detection in field

Rapid control

Increase risk awareness and perception

Reduce the time to detection in the field

Rapid and effective response

Courses and Seminars on epidemiology of Infectious diseases

ASF EPI TRAINING COURSE

8 countries
28 participants
Courses and Seminars on Epidemiology of Infectious Diseases

Ref. Lab.

Prevention
Risk-based Surveillance
Control

Teaching
Early detection in field
Rapid control

Increase risk awareness and perception
Reduce the time to detection in the field
Rapid and effective response

29 participants (all provinces of China)
Courses and Seminars on Epidemiology of Infectious Diseases

- Prevention
- Risk-based Surveillance
- Teaching
- Early detection in field
- Rapid control

Control

- Increase risk awareness and perception
- Reduce the time to detection on the field
- Rapid and effective response

11 participants (5 countries)
Digital simulations (CSF, FMD, BT, AI, WN)
La situación más grave se observa en la zona de transición.

A continuación intenta identificar las áreas y los objetos que podrían ser significativos.

¿Qué muestras deberá tomar durante la visita?

- Toma de muestras: vejiga, riñón, pulmón, corazón, médula ósea, hígado, cuello.

- Señalar: vejiga, riñón, hígado, cuello.
Graphic adventure
Simulation exercise (field)

FOOT-AND-MOUTH DISEASE
TENERIFE, JUNE 2008
Simulation exercise (field)
Simulation exercise (field)

**OBJECTIVES**

- **Assessment of the response** by the Veterinary Services (at different levels) in case of a suspicion of an infectious disease.
- **Identification of the strengths and weaknesses** of the contingency plan in Spain
- **Recommendations** to improve the rapid response
“CADMS overarching goal is to develop methods, tools and systems that can be used to prevent, control, or eradicate animal diseases and their adverse associated health and economic impacts in animals and human populations”
Spatial epidemiology, risk assessment and modeling Laboratory

FAO Reference Center for Epidemiology and Animal Disease surveillance

- Cross-disciplinary
- Research-extension
- Multi-cultural diverse center: 7 languages, 9 different countries, 53% woman
National and International Collaborators

More than 20 countries

- Iowa State University, University of Minnesota, Kansas State University
- University College of Dublin, Marine Institute, Ireland
- Animal & Plant Health Agency (AHVLA) and Royal Veterinary College (RVC), UK
- Universidad Complutense de Madrid and IREC-CSIC-UCLM, Spain
- Massey University, New Zealand
- Istituto Zooprofilattico Sperimentale dell’Abruzzo e del Molise “Giuseppe Caporale”, Italy
- Universidad de la República, Uruguay
- Universidad de Valdivia, Chile
- Nanjing University Shanghai, China
- Makerere University, Uganda
- Universidad Complutense de Madrid and IREC-CSIC-UCLM, Spain
- University of Pretoria, South Africa
- Centro de Investigación en Alimentación y Desarrollo (CIAD) y Universidad Autonoma, Mexico
- Universidad de Valdivia, Chile
- Universidad de la República, Uruguay
Development, integration and implementation of new methods in epidemiology

POWER TO THE PEOPLE
Make those tools/methods available for the people to use

https://bioportal.ucdavis.edu
Collaborative program

Welcome new partners!

Labs, industry, livestock producers, private practitioners, official vets, epidemiologists
Thanks for your attention!

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