



Highly pathogenic avian influenza international modelling challenge

Kick-off meeting
29 January 2026



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The organizing committee



Clara Delecroix



Brandon Hayes



Sébastien Lambert

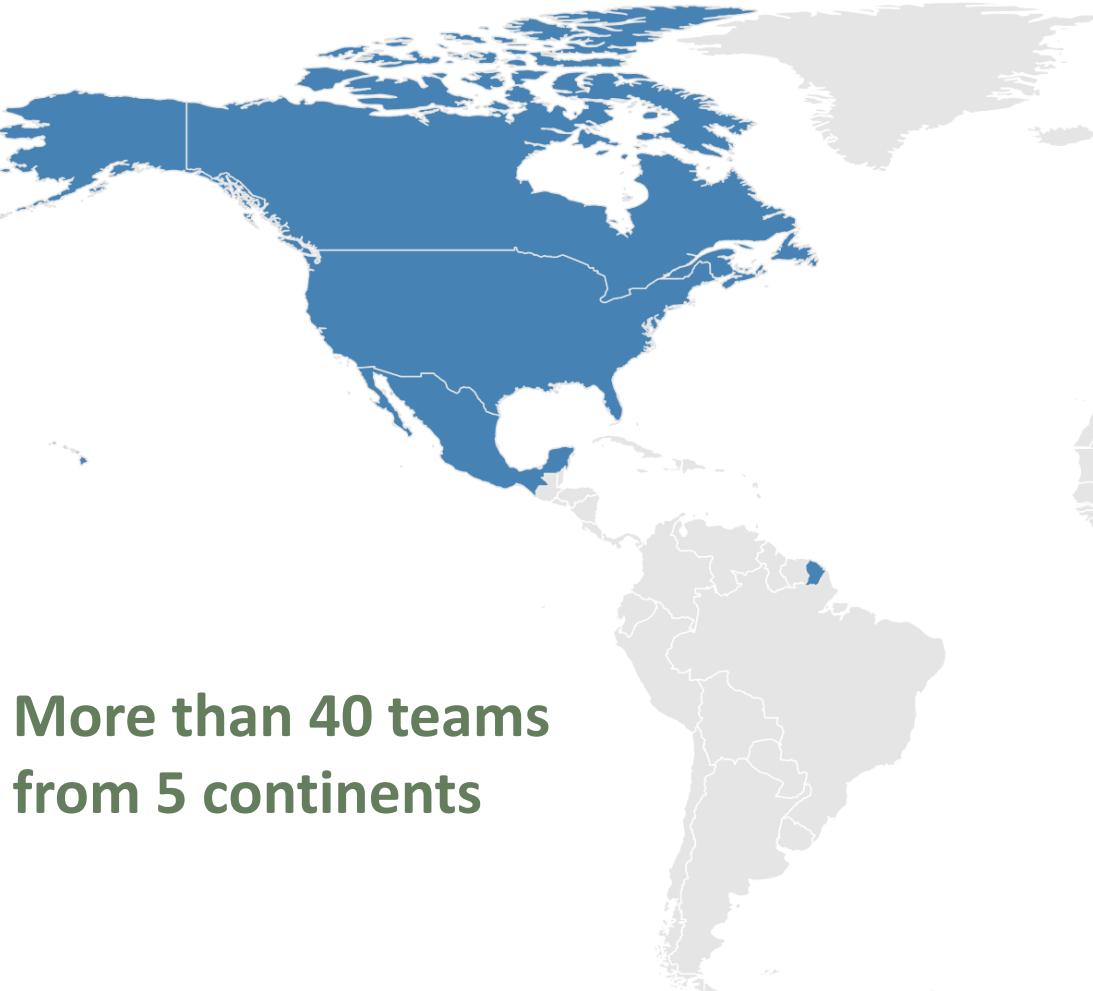


Gaël Beaunée

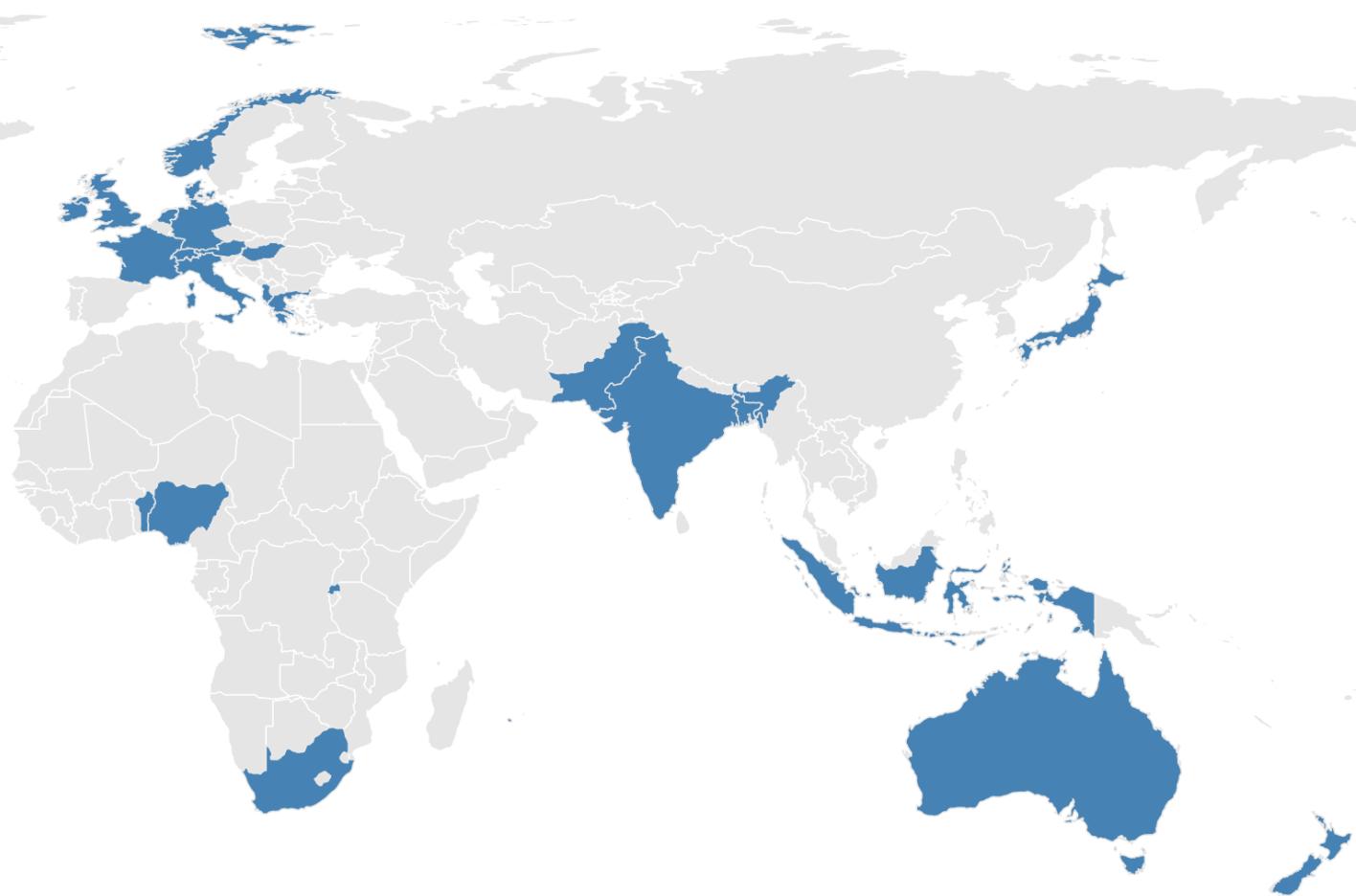


Timothée Vergne

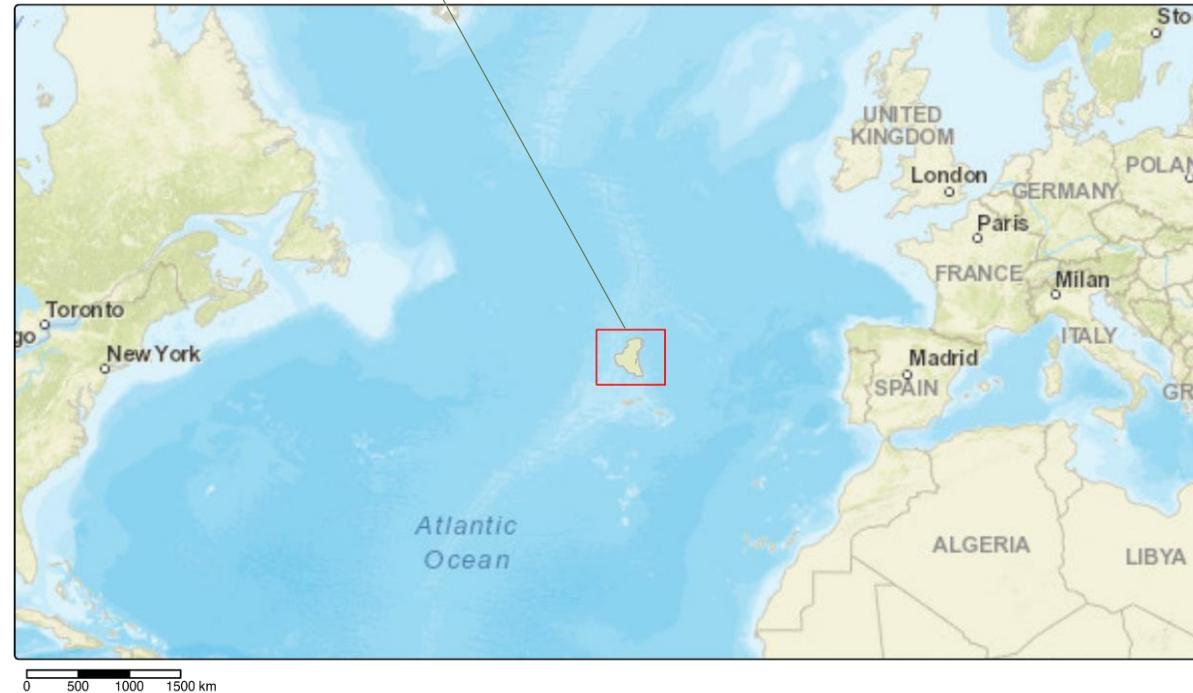
The modelling teams



**More than 40 teams
from 5 continents**



Jolly Island



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- Suspicion reported on 20/12/2025
 - Neurological disorders
 - Fast incidence increase
 - High mortality
- HPAI confirmed on 22/12/2025
- By 31/12/2025: 8 outbreaks confirmed and 3 under investigation



We need you

- Help us make evidence-based decisions
 - *Predict the development of the epidemic*
 - What?
 - Where?
 - How many?
 - *Assess the effectiveness of control strategies already implemented*
 - *Assess the effectiveness of alternative control strategies*

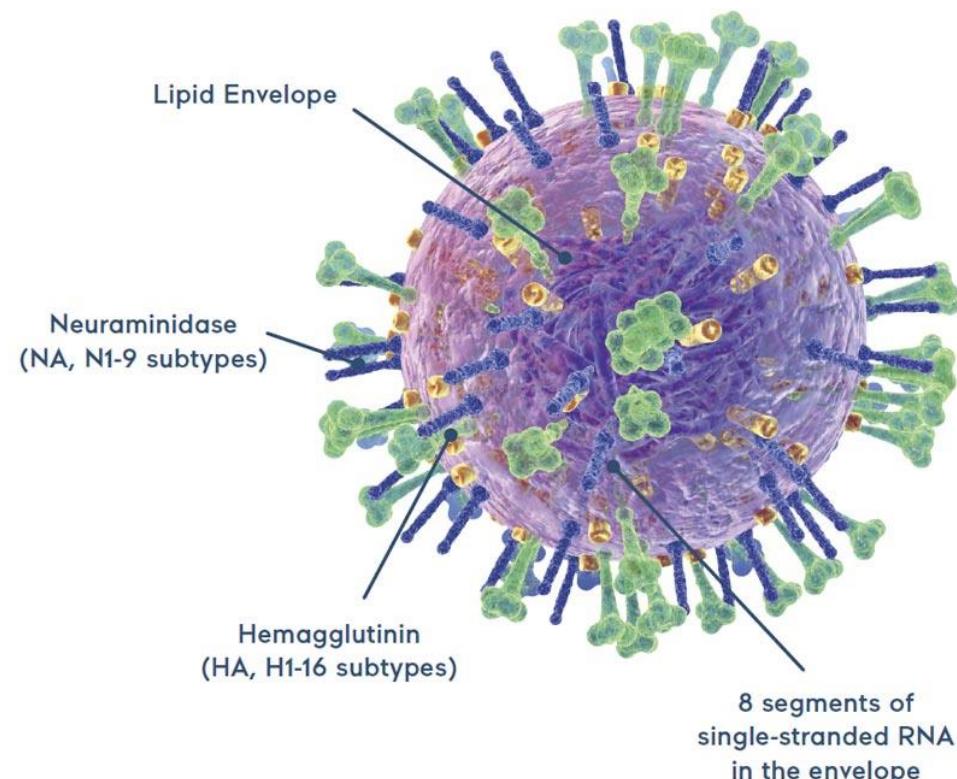
What you need to know about HPAI Jolly Island the epidemiological situation the modelling challenge

What you need to know about HPAI

Jolly Island
the epidemiological situation
the modelling challenge

The virus

- Avian influenza is an RNA virus
 - Viral envelope composed of Hemagglutinin (subtypes H1 to H16) and Neuraminidase (subtypes N1 to N9)
 - Its highly contagious form, HPAI, is caused by several subtypes such as H5N1, or the newly detected subtype H5N0.



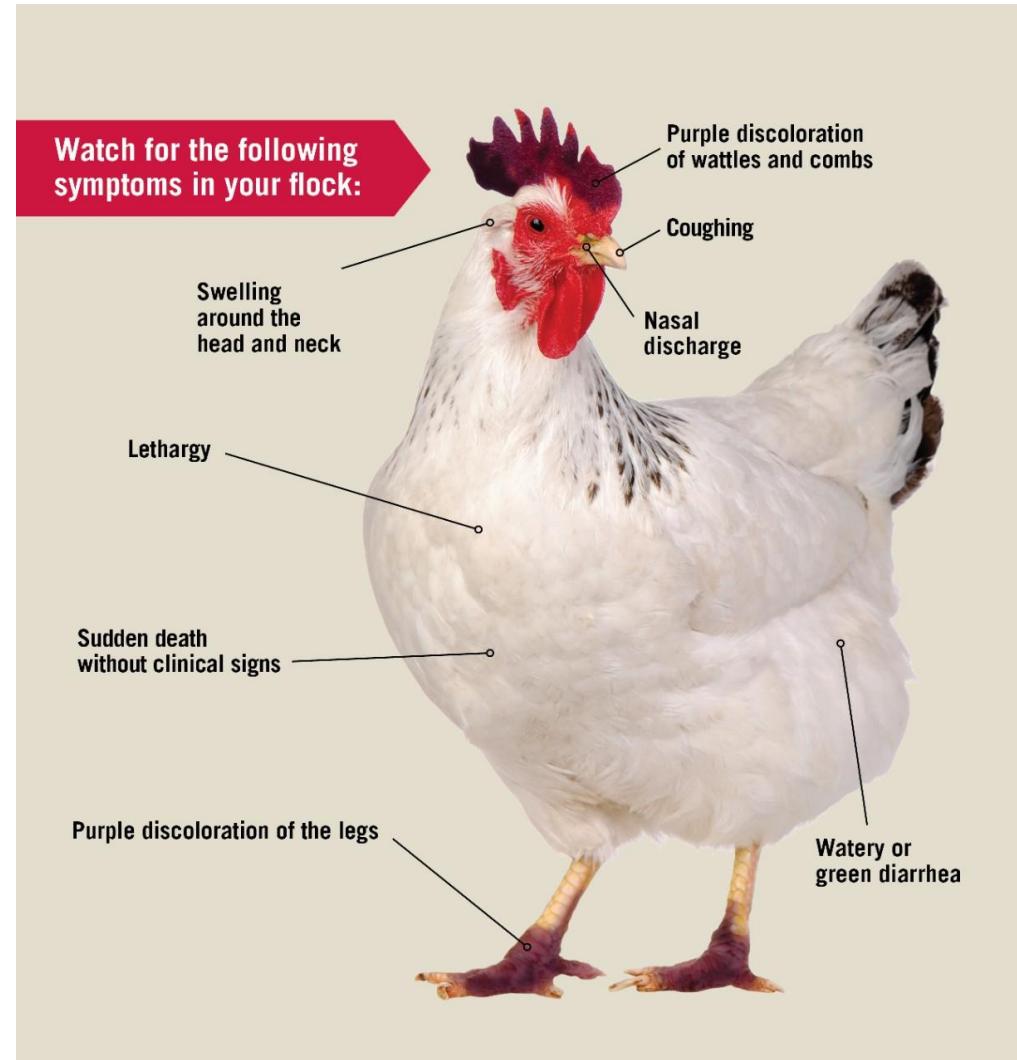
The hosts

- Poultry (chicken, ducks, turkey)
- Wild birds, especially water birds
- Occasional spillover to other mammals



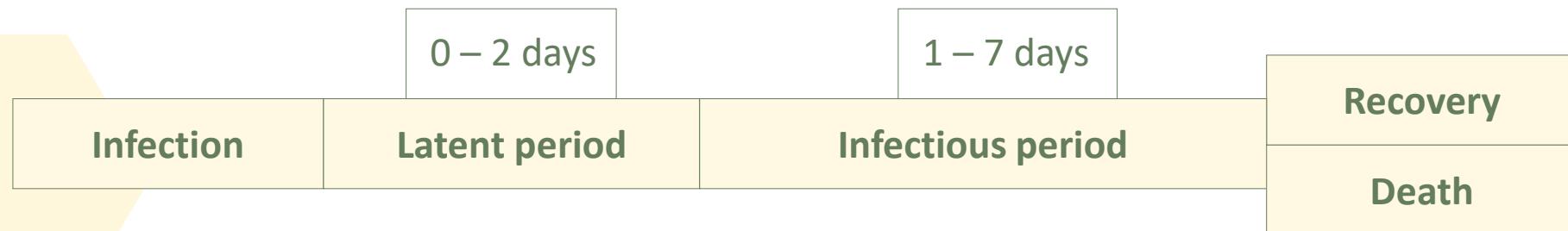
Symptoms

- Varying symptoms in wild birds, depending on the species
- In poultry, HPAI causes neurological and respiratory disorders, and high mortality
- The clinical manifestation of the infection can vary depending on the poultry species



Timeline of infection

Variable depending on the species, production type, viral strain, etc.



Kirkeby et al., 2022 - *A review of estimated transmission parameters for the spread of avian influenza viruses*

Lambert et al., 2023 - *A systematic review of mechanistic models used to study avian influenza virus transmission and control*

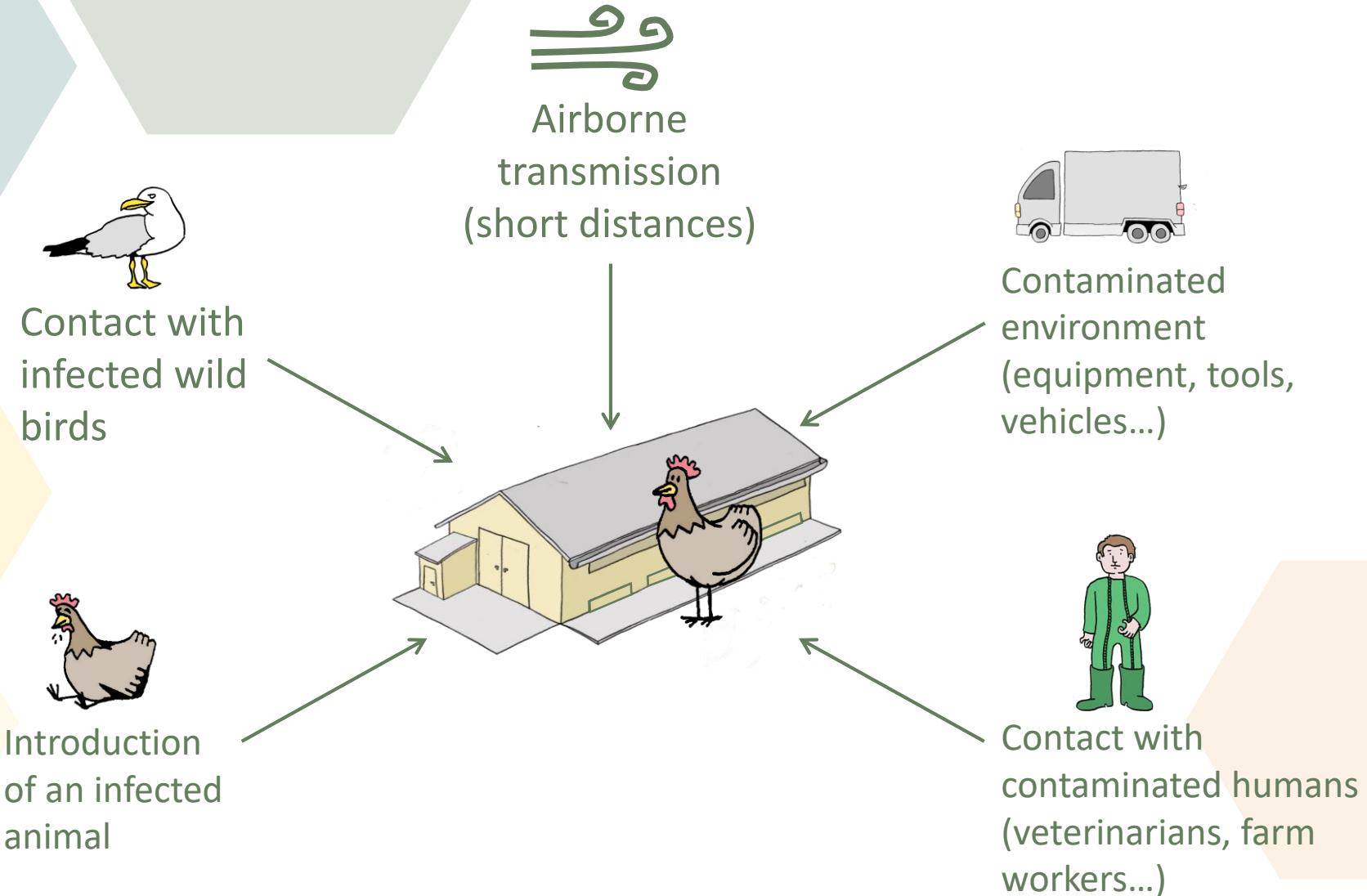
Transmission routes – between individuals

- **Excretion:** via oral secretions, feces and feathers
- **Inoculation:** oral



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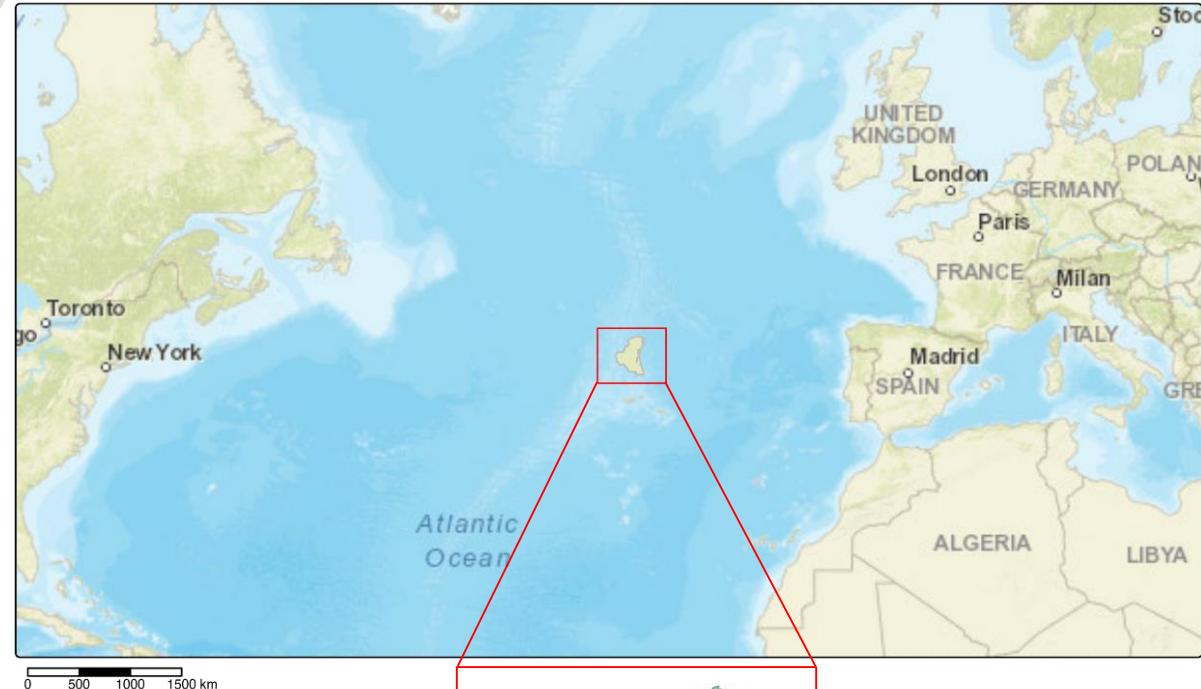
Transmission routes – between farms



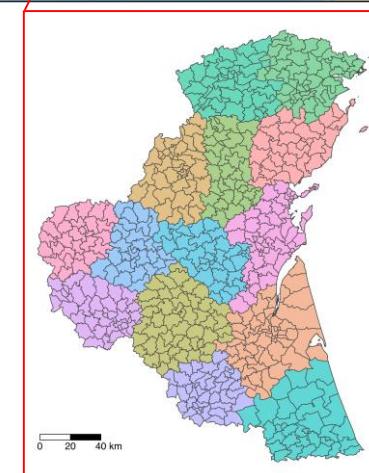
What you need to know about HPAI Jolly Island the epidemiological situation the modelling challenge

Jolly Island

- Latitude 41.5°N,
longitude -28.0°E
- Area: 3,667 km²



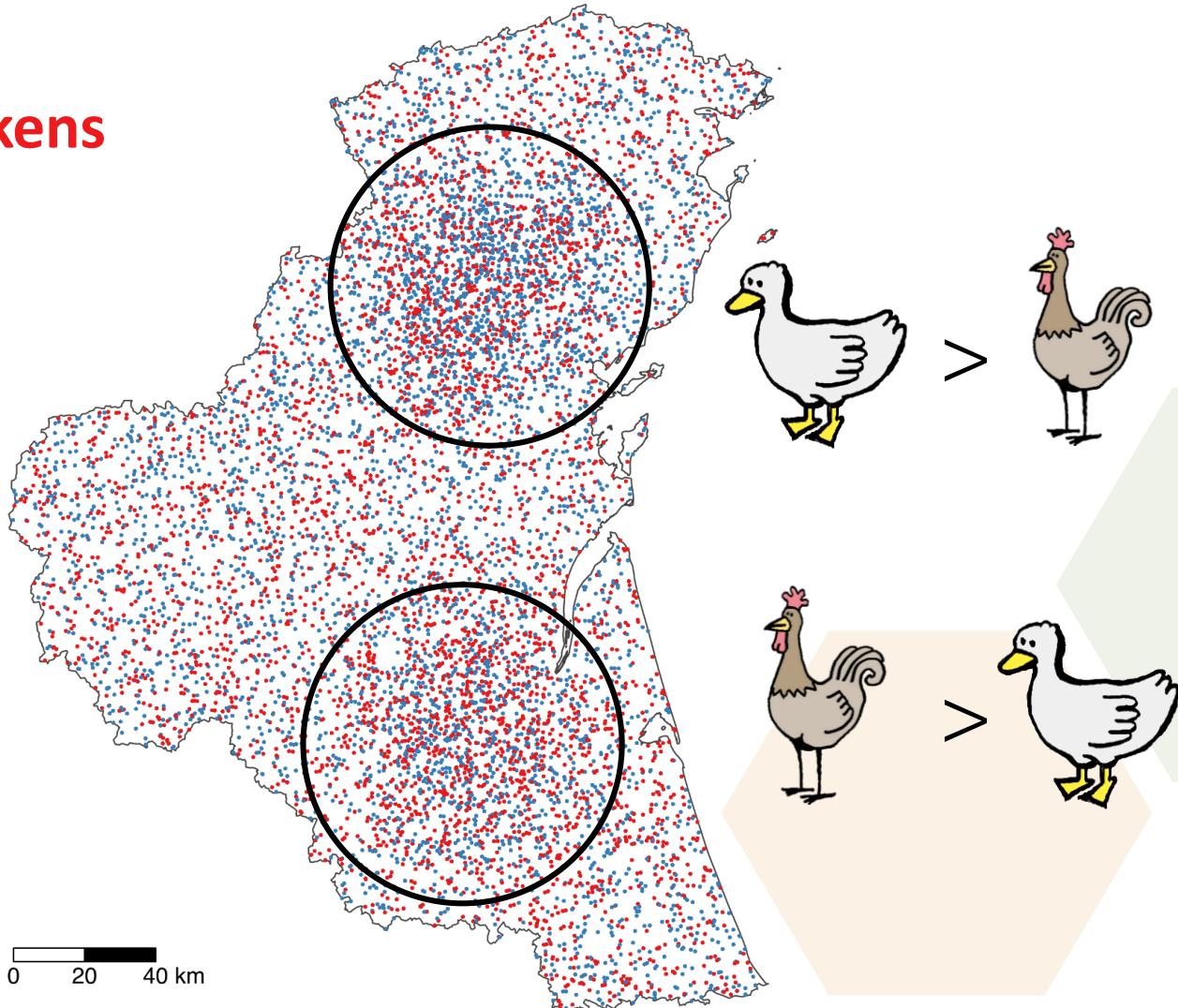
- Administrative divisions:
14 counties, 556 districts



Jolly Island: poultry population

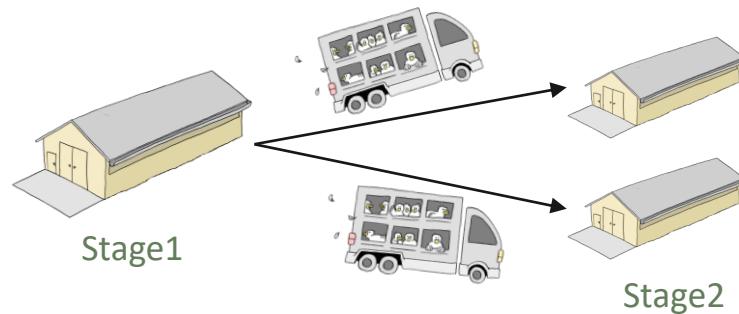
Total number of poultry farms: 9160

- Two species : **ducks** and **chickens**
- Two densely populated poultry areas
- Four production types:
 - Chickens: broilers (“Jolian” breed) and layers
 - Meat ducks: organic and conventional
- No breeders: imports from another island



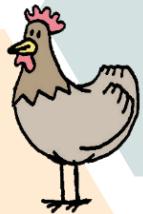
Jolly Island: the “Jolian” breed

- Endemic breed traditionally raised in two stages:
 - First stage (days 1 to 21): indoor
 - Second stage (days 22 to 49): outdoor
- Different farms for stage 1 and stage 2:
 - Birds are moved between farms at the end of stage 1
 - Stage 2 farms are smaller than stage 1 farms: birds from stage 1 can be sent to more than one stage 2 farm



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Jolly Island: production types characteristics



Chicken broilers (Jolian) : ~50%

Medium size

Stage 1: indoor (avg 5,300 birds)

Stage 2: outdoor (avg 2,250 birds)

All-in/All-out

Stage 1: imports only

Stage 2: from stage 1

Stage 1: 21 days / downtime: 21 days

Stage 2: 28 days / downtime: 21 days



Chicken layers : ~5%

Large size (avg 18,500 birds)

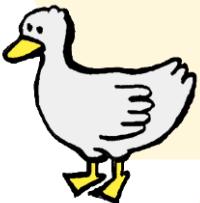
Indoor

All-in/All-out

Imports only

Production time: 400 days

Downtime: 21 days



Conventional ducks : ~35%

Large size (avg 15,500 birds)

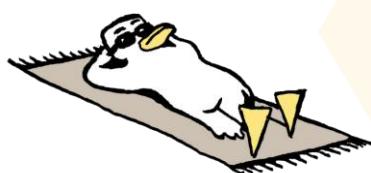
Indoor

All-in/All-out

Imports only

Production time: 7 to 8 weeks

Downtime: 21 days



Organic ducks : ~10%

Small size (avg 800 birds)

Outdoor

All-in/All-out

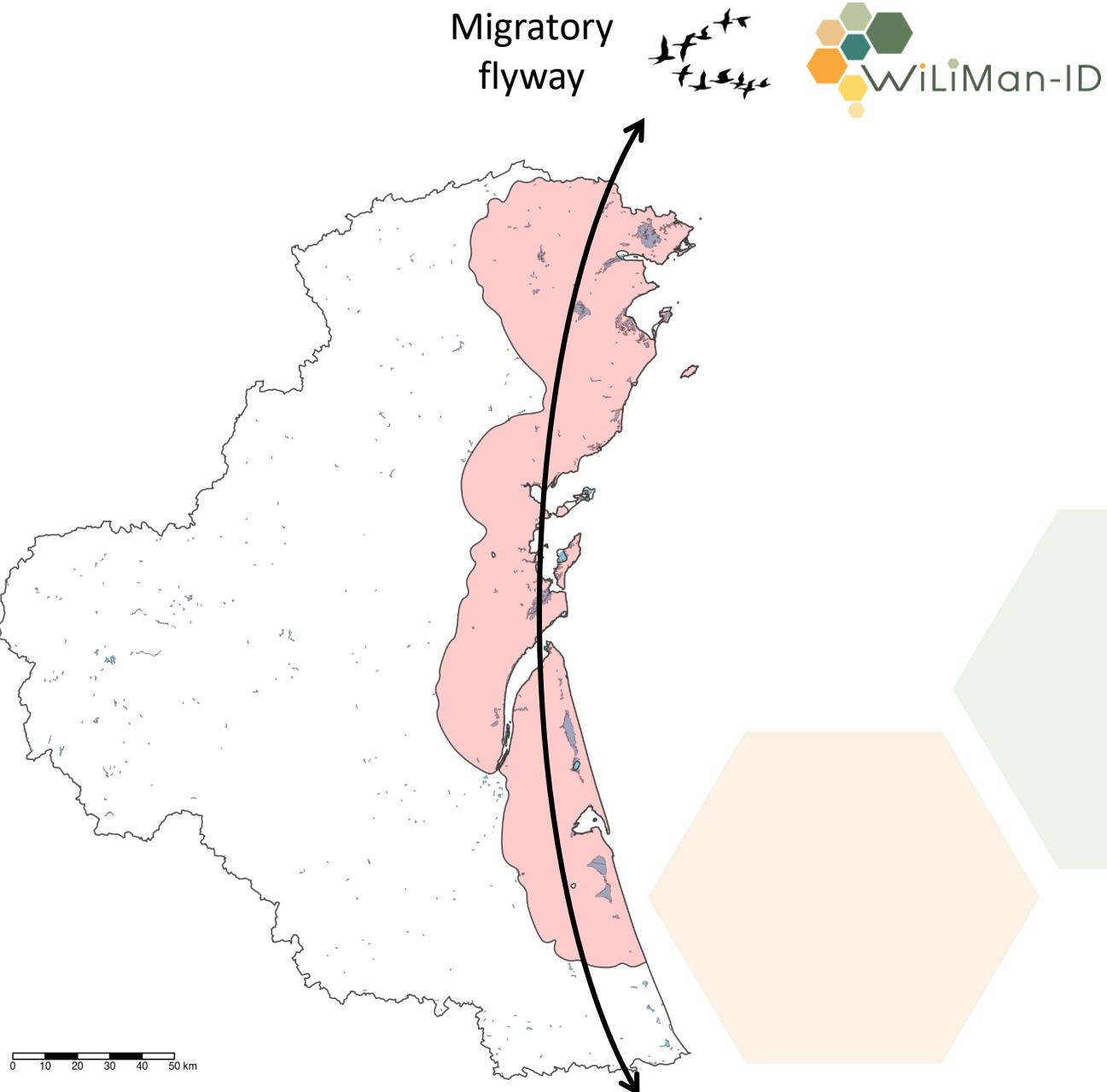
Imports only

Production: 10 to 12 weeks

Downtime: 21 days

Jolly Island: risk from wild birds

- The east coast is a known stop-over site for migratory birds
- Previous studies have identified a **high-risk zone** where spillover from wild birds is more likely than in the rest of the island



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Jolly Island: more information

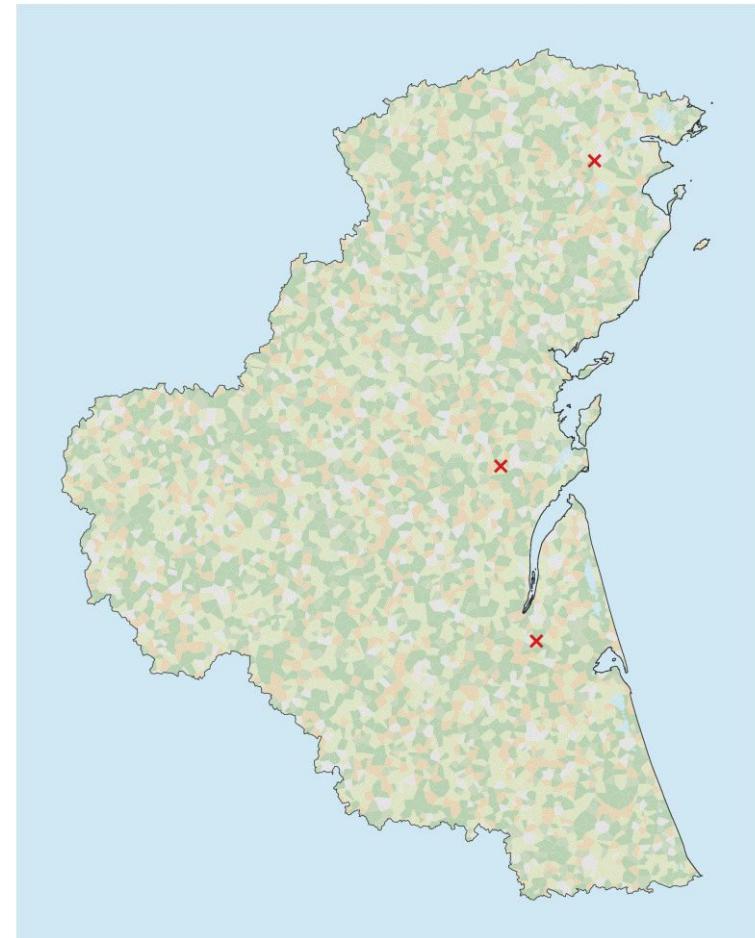
- Narrative on poultry population (.pdf)
- population.csv
- movements.csv
- activity.csv
- counties_32626.geojson
- districts_32626.geojson
- clc_32626.geojson
- hrz_32626.geojson

What you need to know about HPAI Jolly Island the epidemiological situation the modelling challenge

(Don't worry about taking notes, you will be provided the following information in detail via a written narrative)

Epi narrative – The first 3 weeks

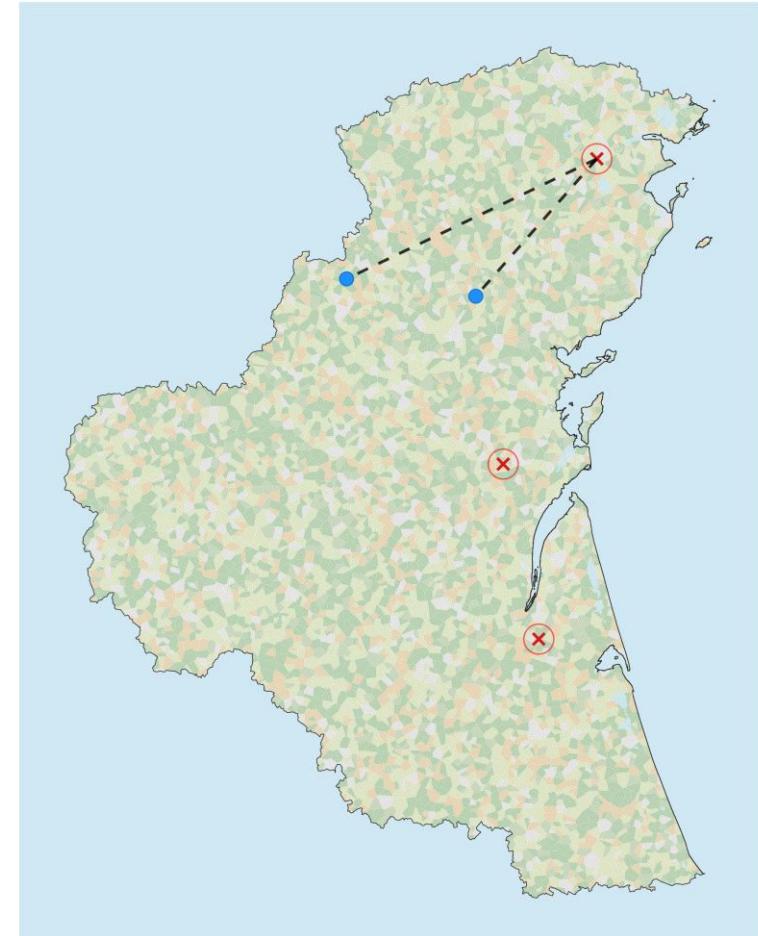
- First case: 1st-stage broiler in Susquehanna county
 - Suspicious on 20 December, confirmed 22 December
- Second case: 2nd-stage broiler farm in Berks county
 - Peripheral to the Ednorig estuary
 - Suspicious on 21 December, confirmed 25 December
- Third case: 1st-stage broiler in Indiana county
 - Suspicious on 24 December, confirmed 25 December
- Wild bird cases reported since early December
 - But scattered and confined to HRZ
 - Typically only detected in early winter
 - Migration finishes by March



Epi narrative – The first 3 weeks

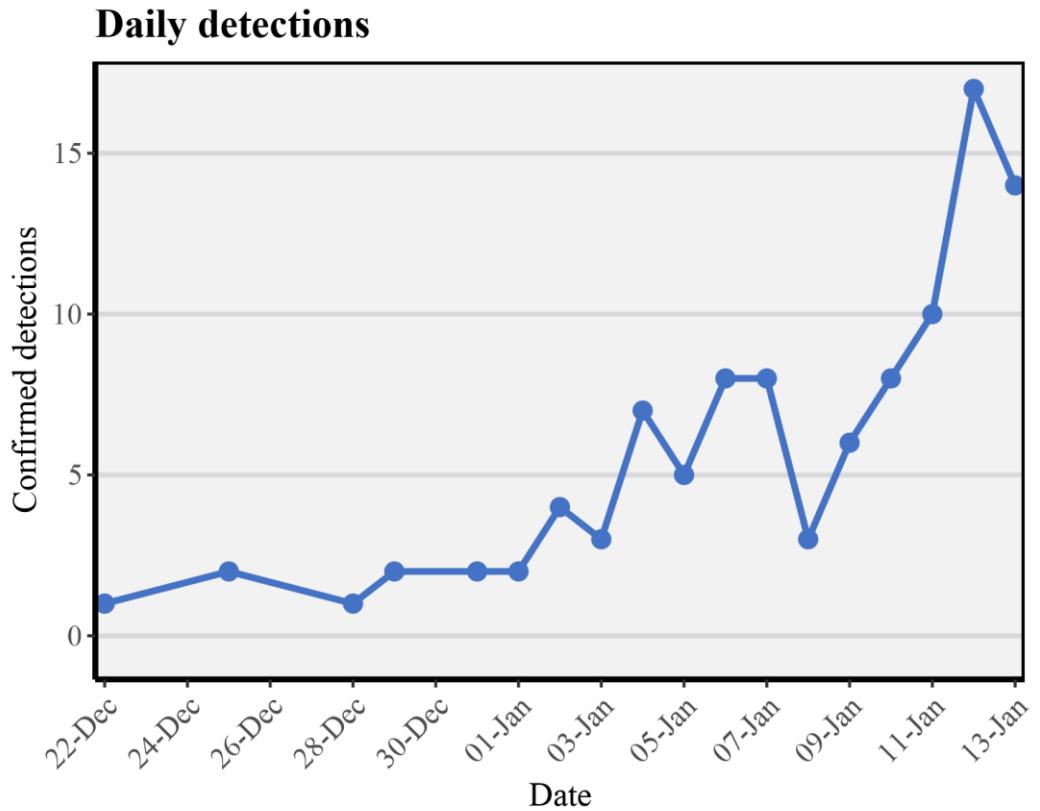
Control measures rapidly enacted

- Case quarantine & cull
- 3-day national standstill implemented on 22 December
- 10 km surveillance zones around confirmed farms
 - Increased vigilance
 - Movement restrictions
 - Lifted after 28 days if no new cases
- Restocking ban on all culled farms
- Preshipment testing started in HRZ
 - First preshipment detection on 25 December
 - Shipments prevented, potential crisis averted 😊💨



Epi narrative – The first 3 weeks

- But things still got out-of-hand
- 10th case detected on 1 January
- Preventive culling initiated 1 January
 - 1 km zone around detections
 - All poultry (chicken or duck) farms
- Capability to cull 5-10 farms per day
- But saturation point hit by 6 January
 - Planned culls wind-up in a queue
 - Prioritize reactive over preventive culls
- Field teams working as fast as possible, but cases and scheduled culls are piling up...



Epi narrative – The first 3 weeks

- We can provide you with the data we have
 - Outbreak list
 - Preventive culls
 - Movements
 - Farm activity
- Thanks to our field veterinarians, we were also able to get copies of a few mortality ledgers from earlier-affected farms
- They're not in great shape, but maybe you can get some insights from them
- Also, though most of our computers broke shortly after we plotted the initial cases, our GIS team created an outbreak map

BROILER (STAGE 2) PRODUCTION RECORD					
Farm ID:	3013	Capacity:	2,147	Printed:	2026-01-22
				<i>Call Bob & Fred Sept</i>	
DATE	DEAD	NOTES			
2025-12-22	7				
2025-12-23	2				
2025-12-24	2				
2025-12-25	3				
2025-12-26	1				
2025-12-27	0				
2025-12-28	1				
2025-12-29	1				
2025-12-30	0				
2025-12-31	1				
2026-01-01	0				
2026-01-02	1				
2026-01-03	0				
2026-01-04	1				
2026-01-05	1				
2026-01-06	0				
2026-01-07	1				
2026-01-08	3				
2026-01-09	9				
2026-01-10	50				
2026-01-11	110				
2026-01-12	200				
2026-01-13	200				
2026-01-14	300				

Epi narrative – The first 3 weeks

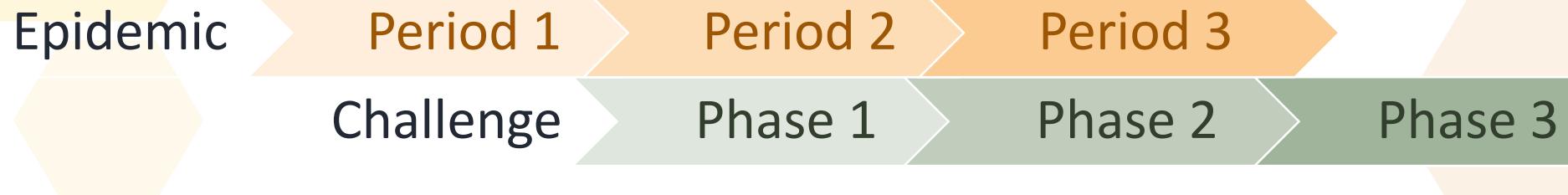
- Most cases appear to be in the south
- Few scattered in north and center
- Major concern is cases are encroaching on (or are already inside) the higher-density production area in the south
- What should be expected next?



What you need to know about HPAI Jolly Island the epidemiological situation the modelling challenge

How the challenge works

- 3 phases, each lasting one month
- At the start of each phase: full set of available data and information
- At the end of each phase: submission of an archive with all requested outputs
 - Deadlines will be strictly enforced for fairness
- Updated data and information provided a few days later for the next phase



- Communication: dedicated Slack workspace

What you will receive



- The narrative
 - Context and description of epidemic control interventions
- Datasets
 - Geographical information (once)
 - Outbreak data
 - Preventive cull data
 - Movement data
 - Activity data
 - Mortality ledgers
 - DataDoc
- Output template
 - To be completed at the end of each phase

What is expected from you

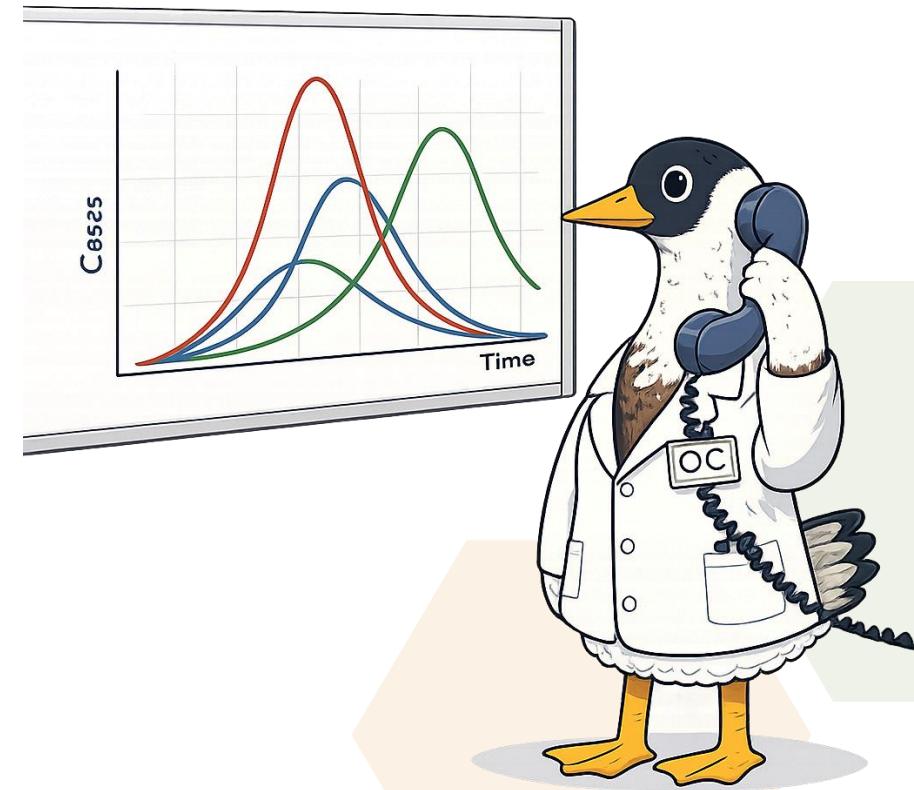
- Completed output template
 - Model description
 - Answers to the narrative questions
- Data files, as specified in the narrative
 - Simulated trajectories
 - Spatial predictions
- Recommendation brief
 - Maximum one page
 - Key findings and implications
- Priority questions will be clearly identified in the narrative



Submit to : hpai-modelling-challenge@wiliman-id.eu

What will happen after the end of the challenge

- Synthesis phase (May–Dec)
 - Results from the different modelling approaches will be analysed and compared
 - Modelling teams may be contacted for additional information or clarifications
 - Insights from these analyses will form the basis for collective reporting and future publication



What will happen after the end of the challenge



A special issue of *Epidemics* is planned:

- One paper describing the preparation of the challenge (by the OC)
- One paper per modelling team willing to contribute
- One collective synthesis paper (including all who complete the challenge)
- One collective methodological paper : “X tips for successfully participating in a modelling challenge”
- “Ten simple rules for designing and running an effective modeling challenge” (by OC of HPAI & ASF challenge)

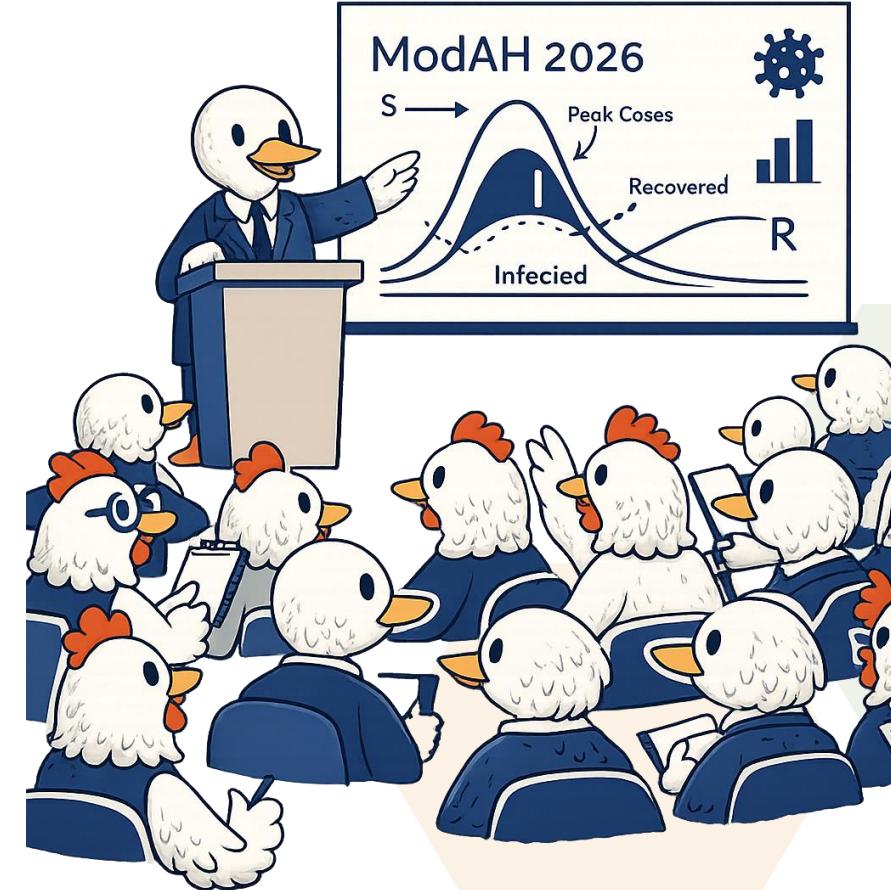


02 December 2025
International modelling challenge on highly pathogenic avian influenza
Submission deadline: 30 June 2027



What will happen after the end of the challenge

- Dedicated workshop following ModAH Conference (27 Aug PM – 28 Aug AM)
 - Overview of the challenge and key lessons learned
 - Roundtable discussions on selected topics (feedback, discussion on the X tips paper, ...)
 - You will soon receive a survey to indicate your interest in attending



Now, questions, and then...

Let's have fun!