Annex 8

Factors Associated with the presence of Avian Influenza H5N1 Virus in Poultry Collecting Facilities in Indonesia

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Background

- December 2003 → Avian Influenza H5N1 virus in Indonesia

- Poultry collector houses (PCF) → important role in AI transmission

- Risk factors of PCFs → Improvement of control measures

Objective

- **Objective:** to determine and quantify risk factors for the introduction or persistence of HPAI virus in PCFs in Jakarta

- **Research Question:**
  What are risk factors of AI virus presence in poultry collecting facilities (PCFs) in Jakarta?

- **Occurrence relation:**
  AI virus in PCFs= f (Risk factors)

Study design

- **Study design:**
  Prospective cohort study
- **Study Domain:**
  Poultry Collecting Facilities (PCFs) in Jakarta, Indonesia
- **Outcome:**
  Presence AI virus in PCFs

Study population

- **Inclusion criteria:**
    1. PCFs registered to the Provincial Livestock, Fisheries, and Marine Services Office of Jakarta province.
    2. PCFs had the ability to collect more than 100 chickens per day and had more than three suppliers
- **Measuring AI virus presence:**
    - Using sentinel birds (biosensor)
    - 7-8 per PCF

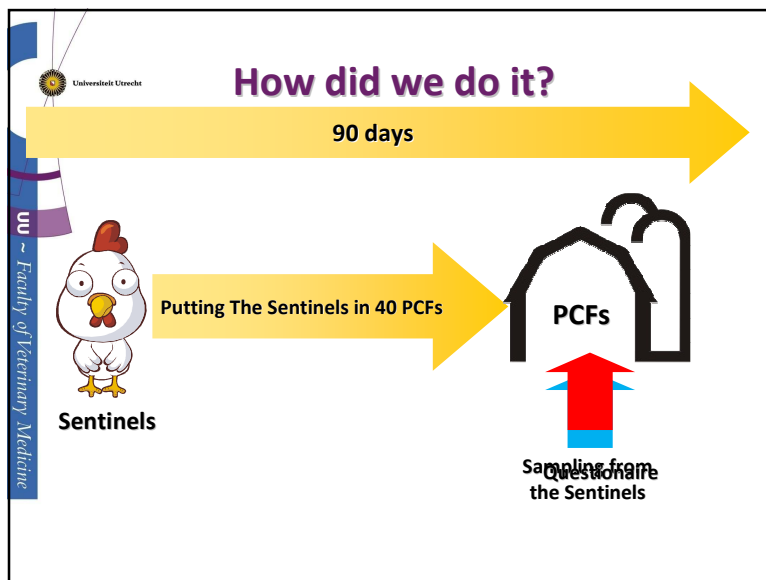
Determinants

- Questionnaires → 4 trained interviewers from CIVAS, accompanied by officers from each municipality in Jakarta
- Potential risk factors were identified based on the existing conditions of the PCFs related to the AI virus transmission in poultry
    1. Rearing management
    2. Biosecurity measurement
    3. Characteristics of poultry

How did we do it?

90 days

Putting The Sentinels in 40 PCFs

PCFs

Sentinels

Sampling from the Sentinels

Questionnaire

Data analysis

- AI detection in dead/sick sentinels with PCR
- If AI is detected, the PCF is declared positive
- Survival analysis → Survival Regression → time to AI infection of sentinels
- Accelerate Failure Time Model with 7 distribution
- Risk factors with p-value less than 0.25 in the univariate analysis → multivariate analysis
- SPSS15 and R

Results

Descriptive statistics

Statistic	PCFs Size (m²)	Total Poultry to the PCFs/day	Bird Density (bird/m²)	Percentage dead Sentinels (%)	Percentage AI Positive Sentinels (%)
Mean	376.1	2090	8.3	81.4	67.6
Median	300	1500	7.5	100	83.3
Percentile 25	150	800	2	85.7	37.5
50	300	1500	7.5	100	83.3
75	500	3000	13.3	100	100.0
Minimum	9	200	0.33	0	0
Maximum	1500	8000	26.7	100	100
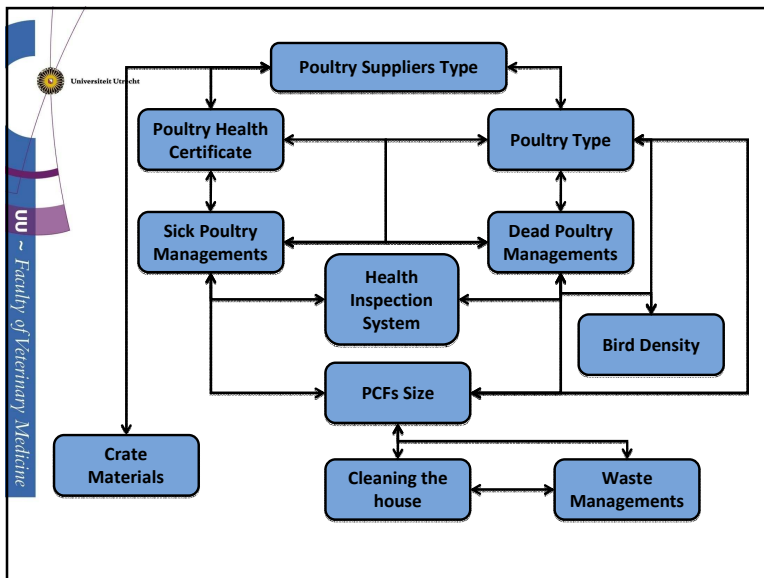
Risk factors

Risk Factors	Acceleration Factor (AF)	95% CI	
	Exp(-γ)	lower	upper
Intercept	0.02	0.01	0.026
Cleaning House			
Appropriate Cleaning the house vs **Inappropriate cleaning the house**[*)].	**1.86**	1.19	2.90
Crate Materials			
Non plastic crate vs **Plastic Crate**[*)]	**1.78**	1.14	2.78
Sick Poultry Managements			
Sick Poultry leave it in the PCFs area vs. **Sick Poultry taken out from the PCF**[*)]	**2.59**	1.79	3.76

Risk factors

Risk Factors	Acceleration Factor (AF)	95% CI	
Poultry Type			
Layer vs **Broiler**[*)]	**0.27**	0.15	0.50
Mix vs **Broiler**[*)]	0.68	0.44	1.05
Bird Density			
Medium density (5-10 bird m^2) vs **Low density (0-5 bird m^2)**[*)]	1.04	0.66	1.64
High density (>10 bird m^2) vs **Low density (0-5 bird m^2)** [*)]	**2.44**	1.69	3.54
Log (scale)	0.84	0.76	0.94
AIC	**1615.143**		

Implications

✓ **Current presence of AI in the provinces or breed most at risk**

✓ **Tools for improvement of control measures**

✓ **Change the management of PCFs**

Suggestions for control

✓ **Separation of sick poultry**

✓ **Density of PCFs**

✓ **Use of plastic crates**

✓ **Application of the GMP in PCFs**

✓ **Further research on for example origin of AI, role of PCF in spread of AI to poultry farms, …**

Thank you