

# Risk factor analysis on routinely collected data from the Dutch HPAI epidemic



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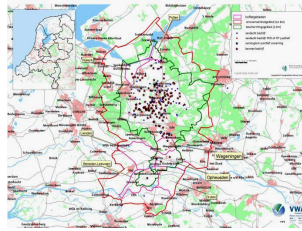
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## INTRODUCTION

Although many routes of high pathogenicity avian influenza (HPAI) virus introduction into poultry farms have been identified qualitatively, the relative risk of various routes remains unknown. Routinely collected data from the 2004 epidemic from all poultry farms in a geographically defined Dutch region (figure) were used in a census survey to identify and quantify risk factors for introduction of HPAI.

## RESULTS

The only significant association found was between layer finisher type poultry and the presence of HPAI virus. We hypothesised that these farm types have more contacts with each other than other farm types, specifically by egg collectors. The other RF were not significantly associated with the presence of HPAI virus (table).



Risk factor	Cases (n)	Controls (n)	cOR (95% CI)	OR <sub>MH</sub> (95% CI)
Layer finisher chickens (1) vs. all other chicken types (0)	141 (173)	292 (401)	1.65 (1.06-2.56)	2.05 <sup>a</sup> (1.29- 3.27)
All layer type chickens (1) vs. all meat type chickens (0)	149 (172)	337 (401)	1.23 (0.74- 2.06)	1.59 <sup>a</sup> (0.93-2.71)
Free-range housing (1) vs. all other housing types (0)	24 (170)	49 (398)	1.17 (0.69-1.98)	1.34 <sup>a</sup> (0.78-2.29)
Cattle (1) vs. no cattle (0)	52 (143)	116 (346)	1.13 (0.75-1.70)	1.28 <sup>a</sup> (0.84-1.95)
on farms without free-range housing for chickens				1.14 <sup>b</sup> (0.76-1.72)
Mixed farms with pigs (1) vs. farms without pigs (0)	40 (168)	110 (396)	0.81 (0.54-1.23)	0.90 <sup>a</sup> (0.59-1.39)
regardless the absence/ presence of other farm animals				0.79 <sup>b</sup> (0.51-1.20)

<sup>a</sup> = stratified on farm size

<sup>b</sup> = stratified on housing type

## MATERIALS & METHODS

We hypothesised that introduction of HPAI virus into a flock could be caused by people dealing with poultry professionally, by infected wild birds or wild birds acting as a vector and by pigs on mixed farms with poultry. Because the introduction routes we wanted to study had not been gathered in the data set, we had to use plausible derivatives thereof, hereafter called risk factors (RF). The following five RF were defined; farms with layer type chickens (RF 1&2), free range farms (RF 3), mixed farms with cattle without free-range housing for poultry (RF 4), mixed farms with pigs (RF 5). These RF were evaluated by calculating the crude odds ratios (cOR) and the Mantel-Haenszel OR (OR<sub>MH</sub>) and 95% confidence intervals (95% CI).

## CONCLUSIONS

-Routine collected epidemic data could be used to identify risk factors for introduction of HPAI or other list A diseases.

-Of the five risk factors under study, the presence or absence of layer finisher type chickens was found to be significantly associated with the risk of HPAI virus introduction.

-For future outbreaks of HPAI, our finding would suggest that indirect contacts between poultry farms should be limited as much as possible.

-The advice to the Dutch government is 1) prioritise pre-emptive depopulation of high risk layer farms and or 2) temporarily prohibit the collection of eggs to decrease mechanical transmission of HPAI virus.

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