Analysis of the geographic distribution of H5N1 events

By

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Outline

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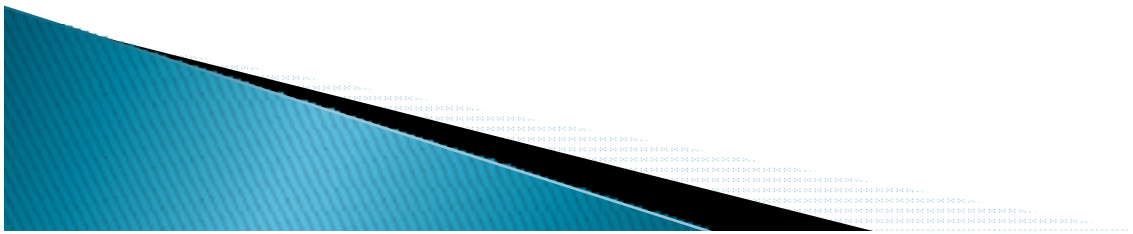
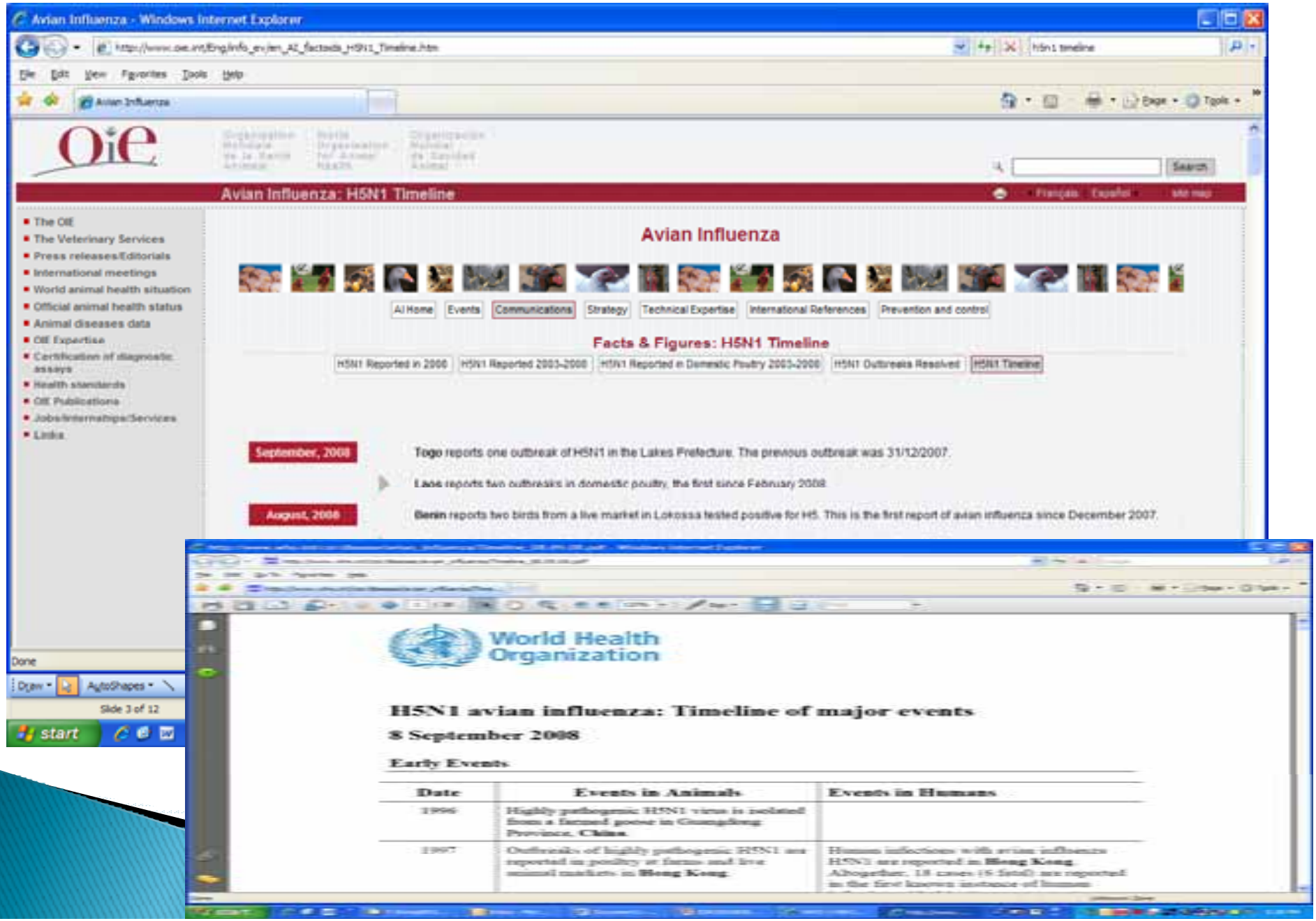
- Summary

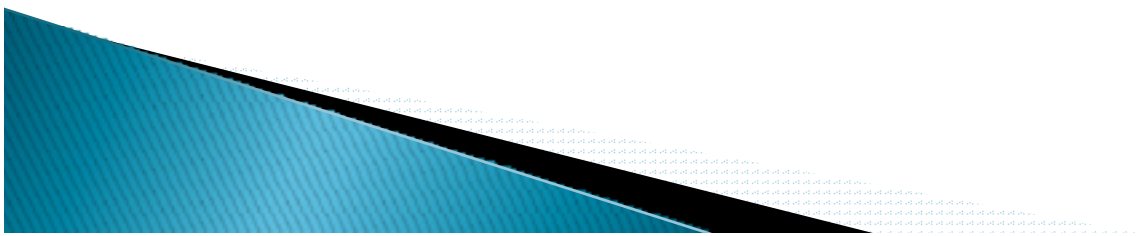


Materials: websites of OIE, WHO…



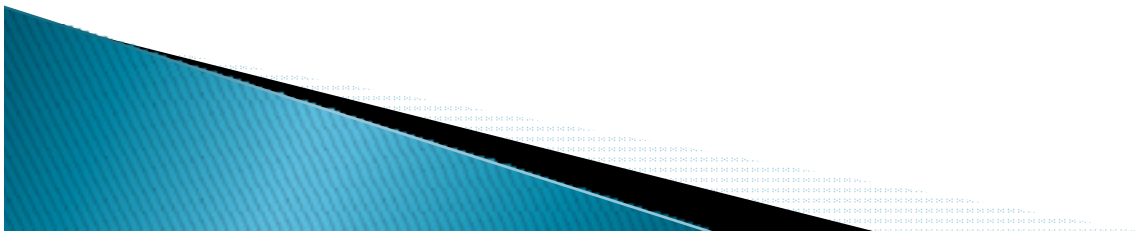
Analysis of Global H5N1 Events at Country Level

(Three years: 12/2004—11/2007)



Wildlife vs. Poultry

- 16 countries have wildlife H5N1 occurrences (*United States, Switzerland, Spain, Slovenia, Slovakia, Poland, Mongolia, Italy, Iran, Greece, Georgia, Croatia, Bulgaria, Bosnia & Herzegovina, Austria*).
- 20 countries have poultry H5N1 occurrences (Albania, Bangladesh, Burkina Faso, Cambodia, Cameroon, Djibouti, Ghana, India, Indonesia, Israel, Jordan, Laos, Malaysia, Myanmar, Niger, South Korea, Sudan, Thailand, Togo, West Bank.).
- 24 countries have wildlife & poultry H5N1 occurrences.

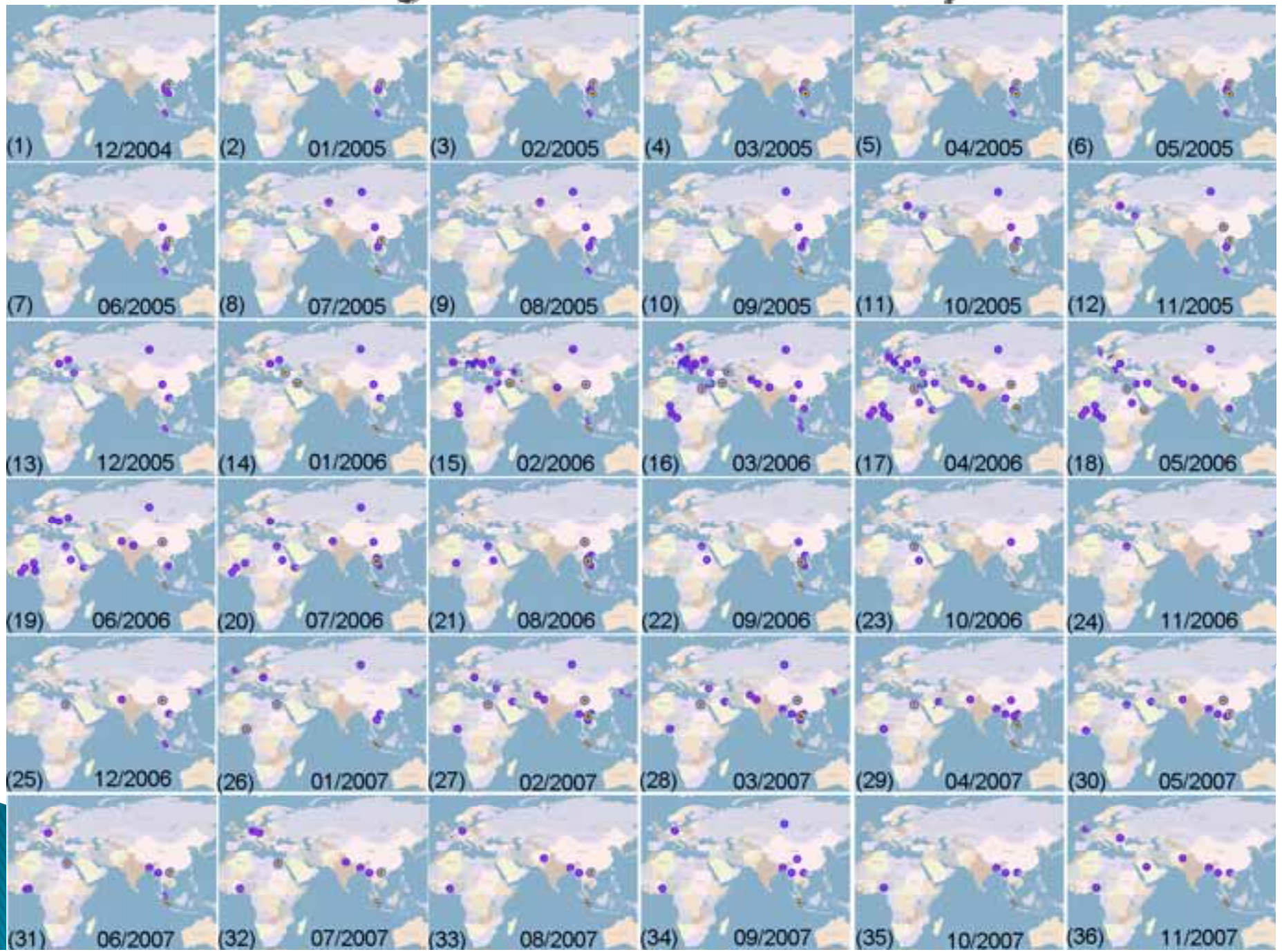


Odds ratio

Country poultry density	#Country w/H5N1 Reported	#Country w/o H5N1 Reported	Sum	Odds Ratio	Reject H0?
Greater than average*	45	58	103		
Less than average*	14	76	90		
Total	59	134	193	4.21	Yes

Average is the global poultry average. Source credit: www.fao.org

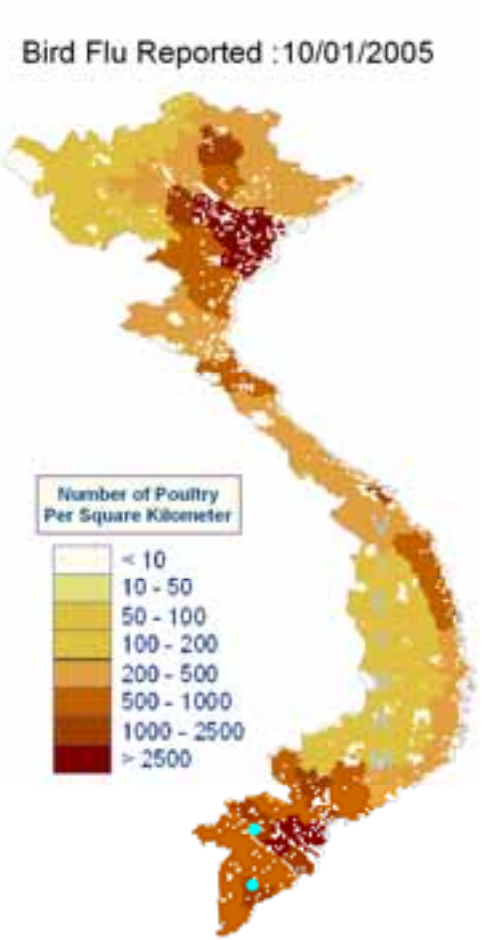
Distribution of global H5N1 events analysis



Analysis of H5N1 events in Vietnam

(Oct., 2005 – Jan., 2006)

Source of Data and Geo-visualization



HIGHLY PATHOGENIC AVIAN INFLUENZA IN VIETNAM
Follow-up report No. 15 (covering the period from 1 October to 23 November 2005)

Details of new outbreaks:

First administrative division	*Lower administrative division*	*Type of epidemiological unit*	*Name of the location*	*Date of start of the outbreak*	*Species*	*Number of animals in the outbreaks*				
						susceptible	*cases*	*deaths*	*destroyed*	*slaughtered*
Bac Giang	Hiep Hoa	village	...	15 Nov. 05	avi	...	...	15	89	...
Bac Giang	Lang Giang	village	Dinh Tri	8 Nov. 05	avi	...	...	15	118	...
Bac Giang	Lang Giang	village	Tan Thinh	9 Nov. 05	avi	...	...	50	723	...
Bac Giang	Luc Ngan	village	Phuong Son	9 Nov. 05	avi	...	...	140	525	...
Bac Giang	Son Dong	village	Giao Lien	13 Nov. 05	avi	...	...	50	575	...
Bac Giang	Son Dong	village	...	16 Nov. 05	avi	...	...	50	575	...

8.28 x 11.69 in

1 of 7

HIGHLY PATHOGENIC AVIAN INFLUENZA IN VIETNAM
Follow-up report No. 16 (covering the period from 24 November 2005 to 23 January 2006)

New outbreaks:

First administrative division	*Lower administrative division*	*Type of epidemiological unit*	*Name of the location*	*Date of start of the outbreak*	*Species*	*Number of animals in the outbreaks*				
						susceptible	*cases*	*deaths*	*destroyed*	*slaughtered*
Bac Can	Bach Thong	village	Vi Huong	1 Dec. 2005	avi	...	...	3	1,142	...
Cao Bang	Cao Bang	village	Hoa Chung	24 Nov. 2005	avi	...	...	14	0	...
Cao Bang	Ha Lang	village	Kim Loan	26 Nov. 2005	avi	...	...	185	1,696	...
Cao Bang	Ha Lang	village	Thanh Nhat	28 Nov. 2005	avi	...	...	10	25	...
Cao Bang	Phuc Hoa	village	Hong Dai	15 Dec. 2005	avi	...	...	74	323	...
Cao Bang	Phuc Hoa	village	My Hung	1 Dec. 2005	avi	...	...	1,320	1,377	...
Cao Bang	Phuc Hoa	village	Trieu Au	1 Dec. 2005	avi	...	...	0	1,003	...

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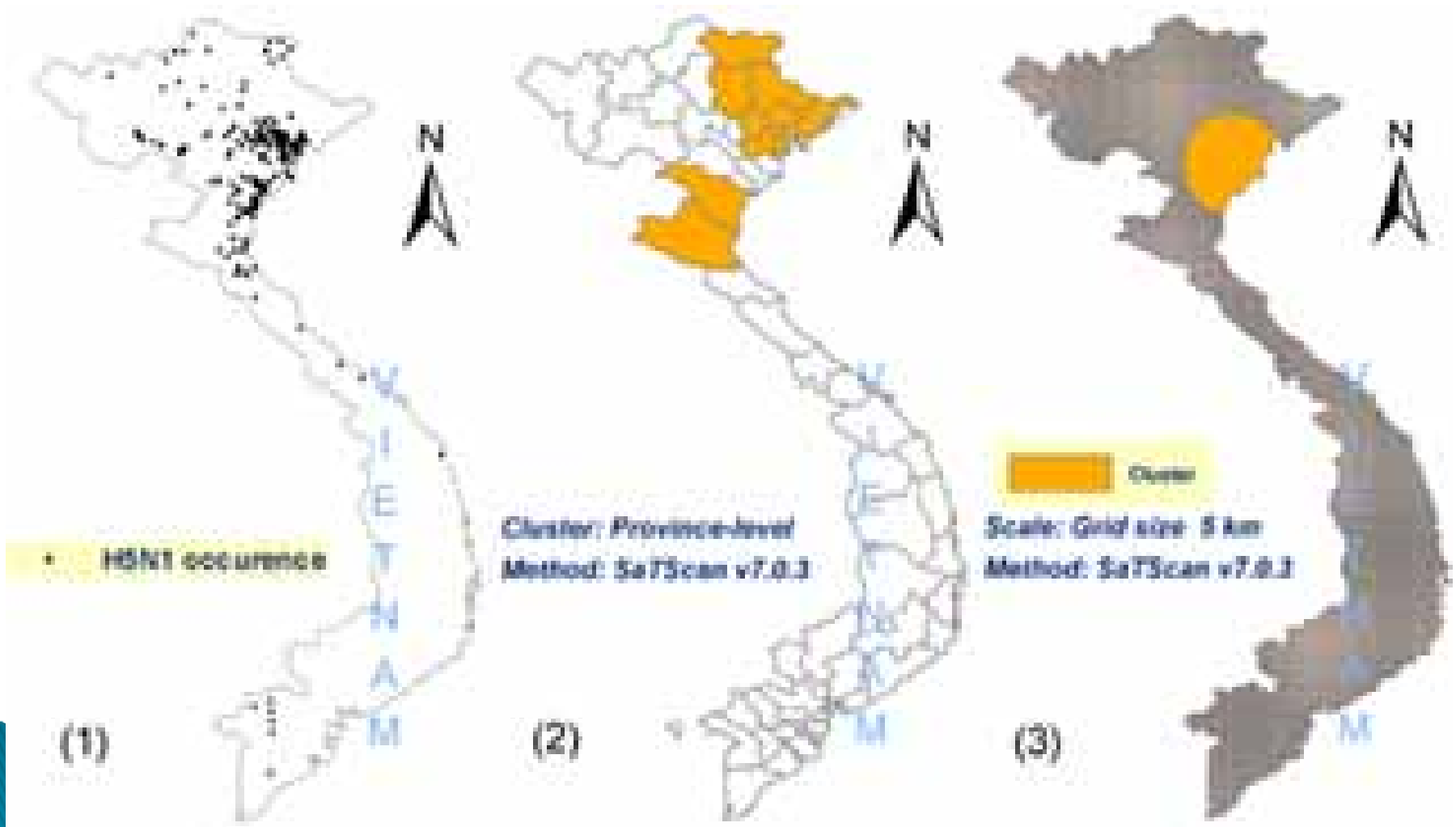
Spatial scale vs. Clusters

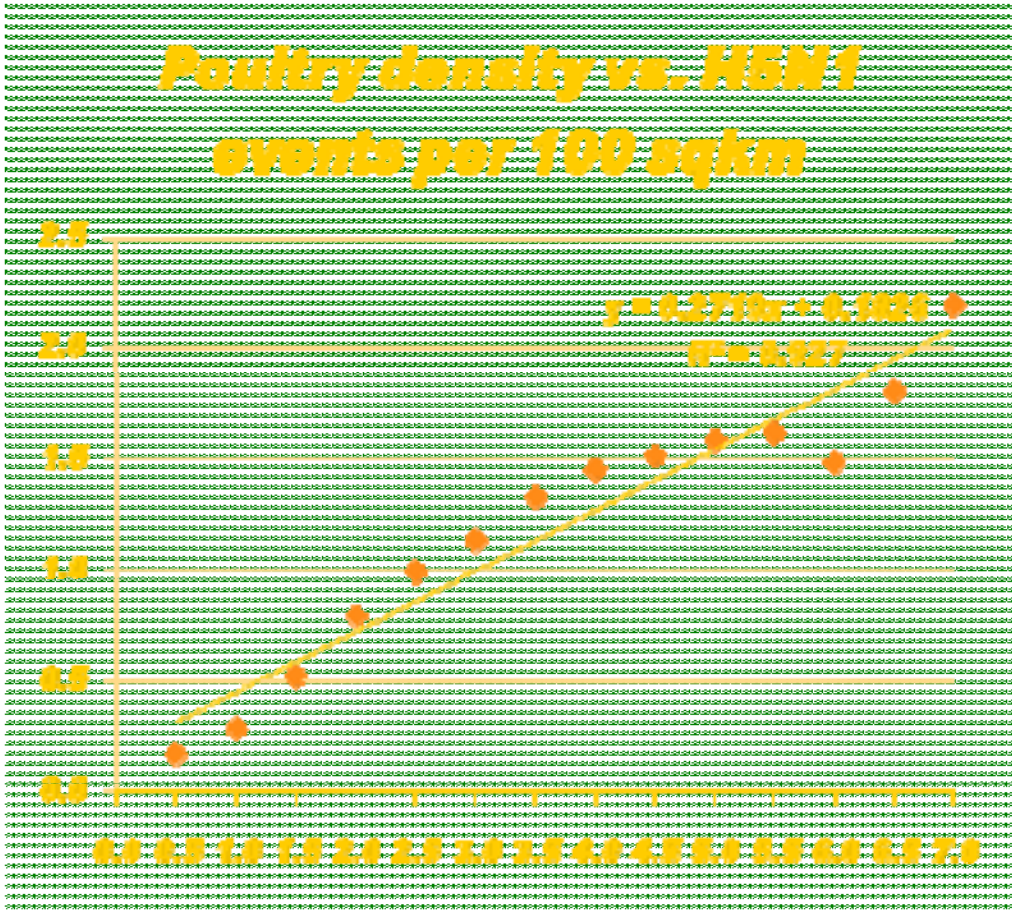


Poisson-based model

Poultry Density vs. Rate of H5N1

Poultry density	Times	H5N1per100sqkm
greater than 0.5*594	0.5	0.16
greater than 1*594	1	0.28
greater than 1.5*594	1.5	0.52
greater than 2*594	2	0.79
greater than 2.5*594	2.5	0.99
greater than 3*594	3	1.13
greater than 3.5*594	3.5	1.33
greater than 4*594	4	1.45
greater than 4.5*594	4.5	1.51
greater than 5*594	5	1.58
greater than 5.5*594	5.5	1.61
greater than 6*594	6	1.48
greater than 6.5*594	6.5	1.81
greater than 7*594	7	2.19

Gridded poultry density source: http://www.fao.org



Average poultry density in Vietnam is 594

Summary

- H5N1 events are strongly associated with spatial and temporal factors, GIS improves the effectiveness in understanding and responding to disease outbreaks.

- With GIS-Grid-based spatial statistics analyse, we can explore the relationship between the gridded poultry density and the rate of H5N1 events. This could have implications for weighing/quantifying risk factor.

- GIS gives us the ability to delineate spatial clusters of H5N1 in a more effective way than political-boundary-based spatial statistics analyse. This could have implications for public health efforts, potentially enabling health workers to direct scarce resources in a more-focused fashion.

Questions?

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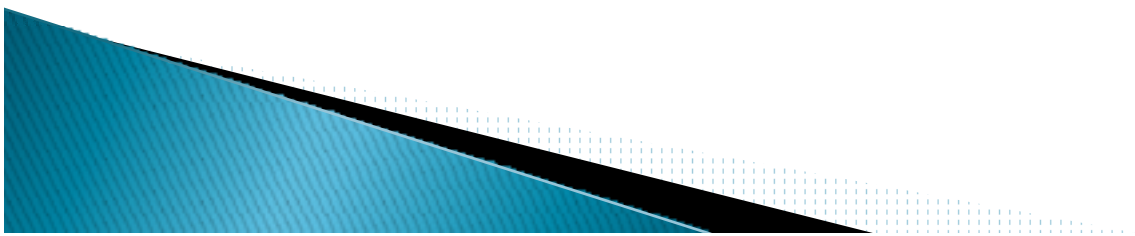


Thank You!