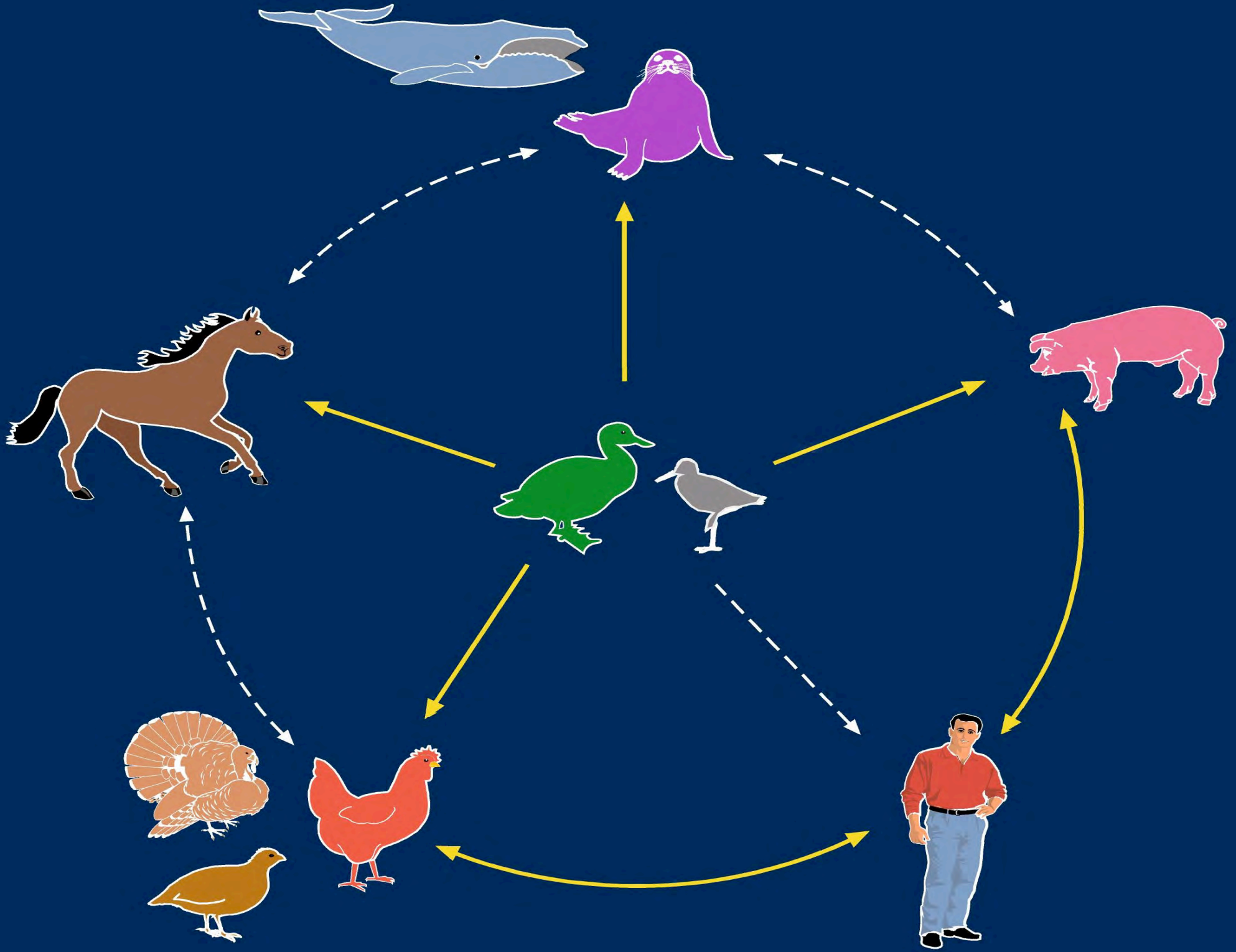
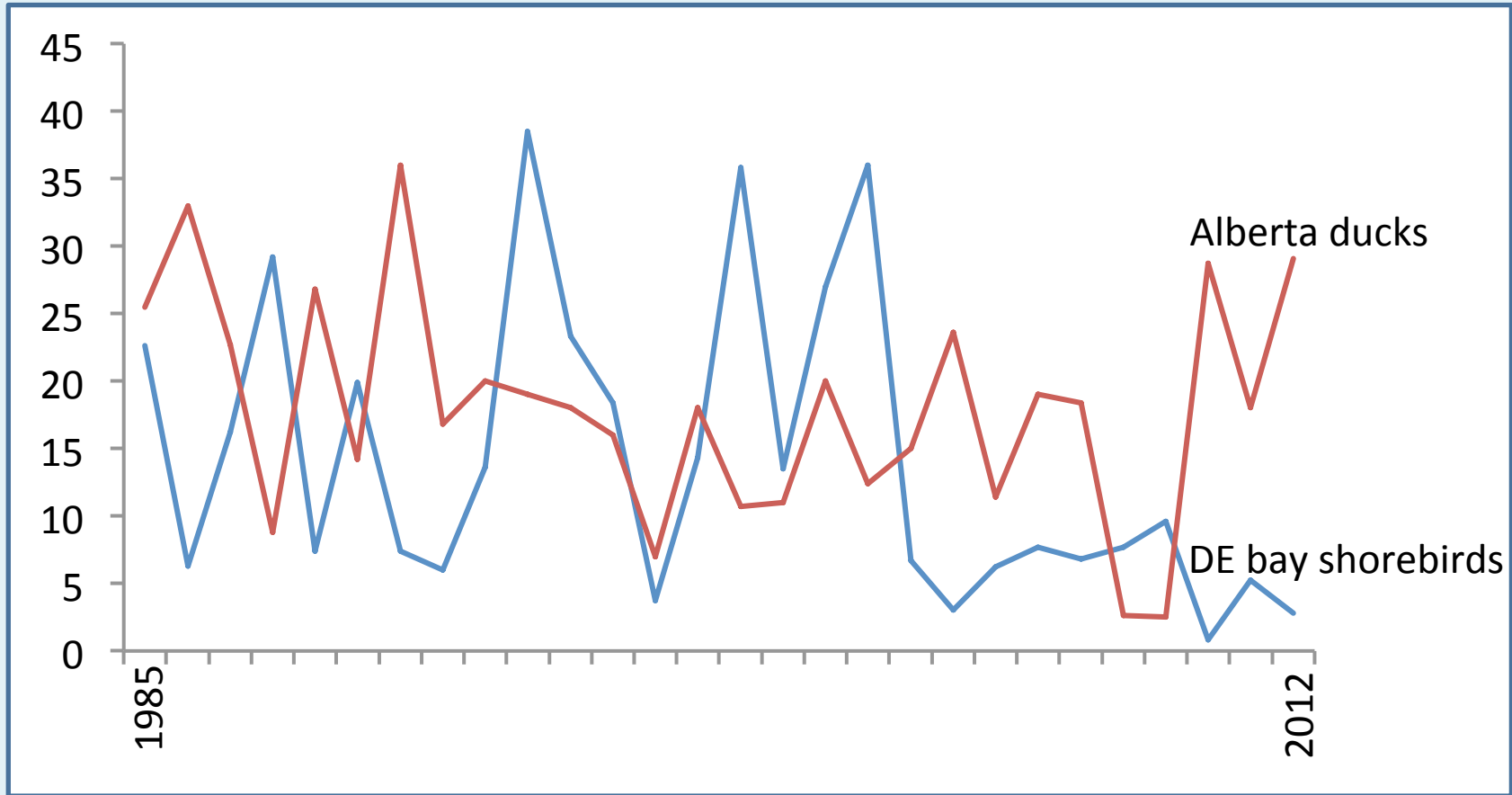


Influenza at the human-animal interface

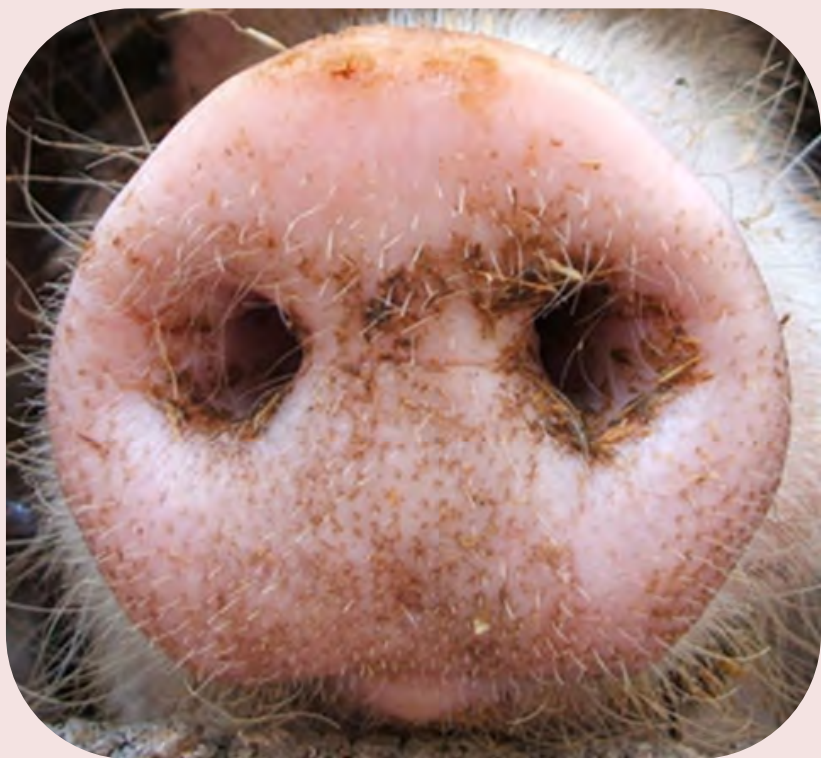
Richard Webby
ISG 2018





Why aren't we all dead?

- Exposure to infected host
- Population immunity
- Population susceptibility
- pH of fusion
- Receptor preference
- Likely many things we don't understand



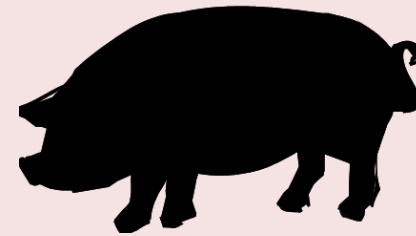
The same but very different



A(H3N2)

A(H1N1)

Influenza B

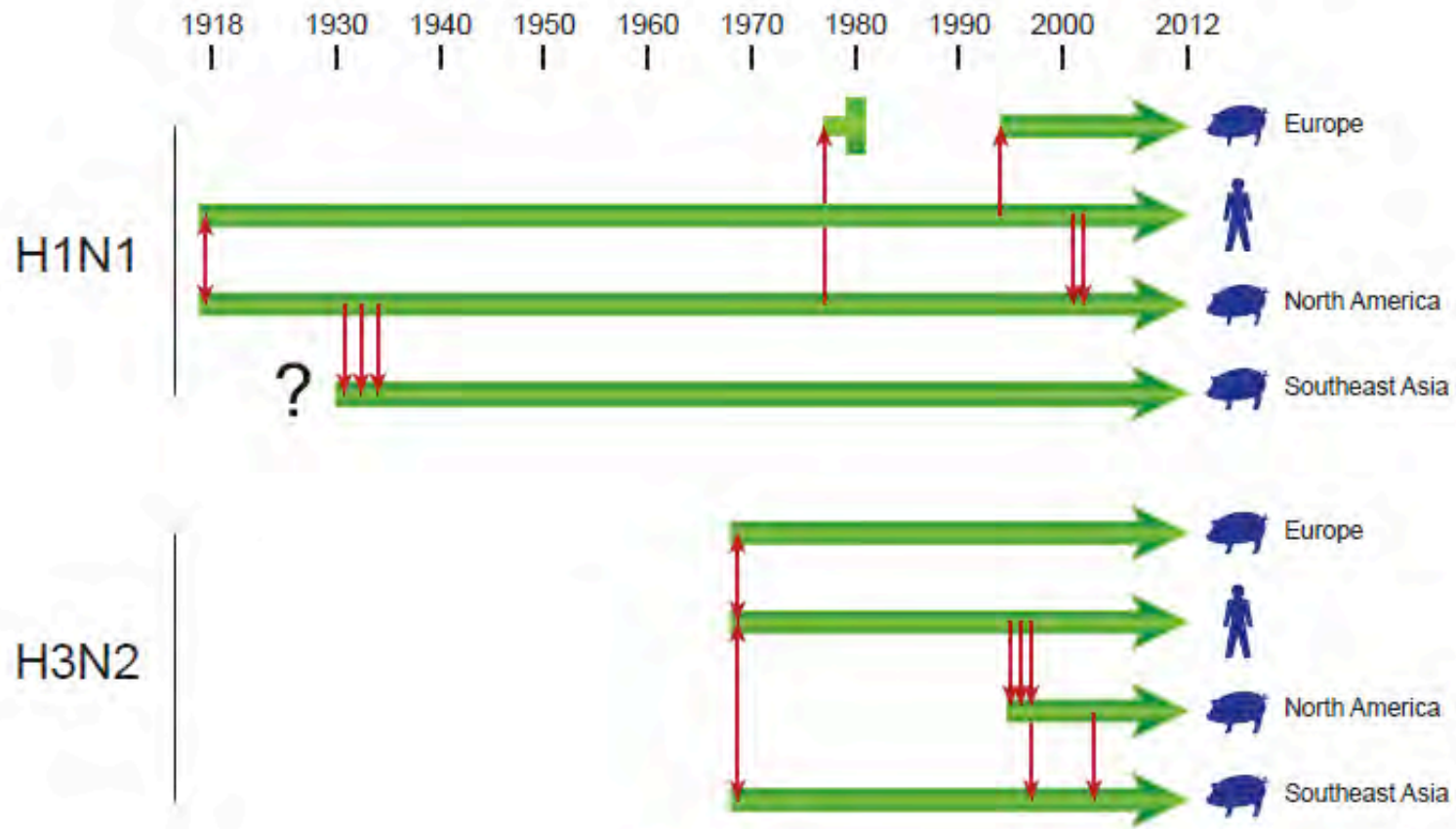


A(H3N2)

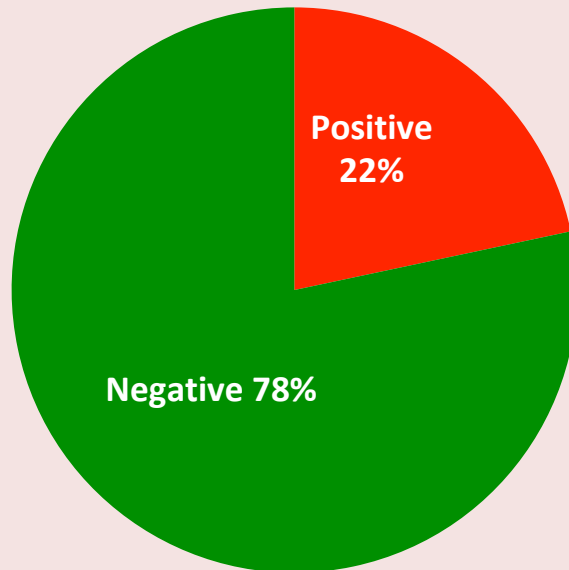
A(H1N1)

A(H1N2)

Humans are the source for most viral diversity in swine

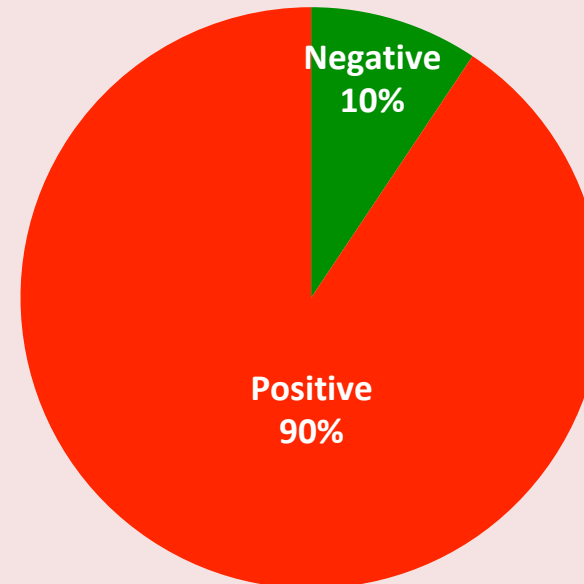


Group level



n = 540

Farm level



4.6% overall prevalence

468 human infections since 2005



Mini outbreaks

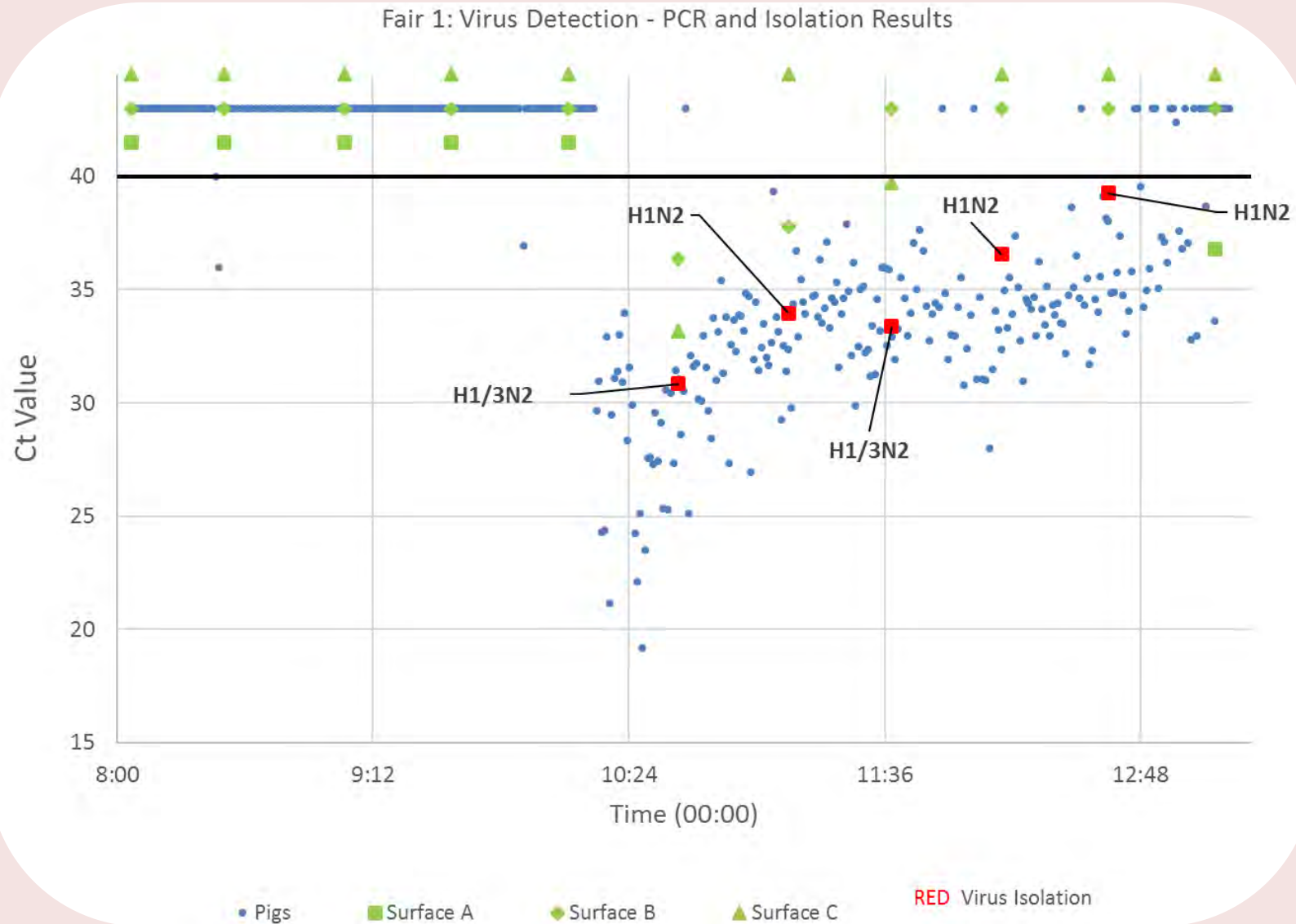




Table. Bangladesh LPM surveillance

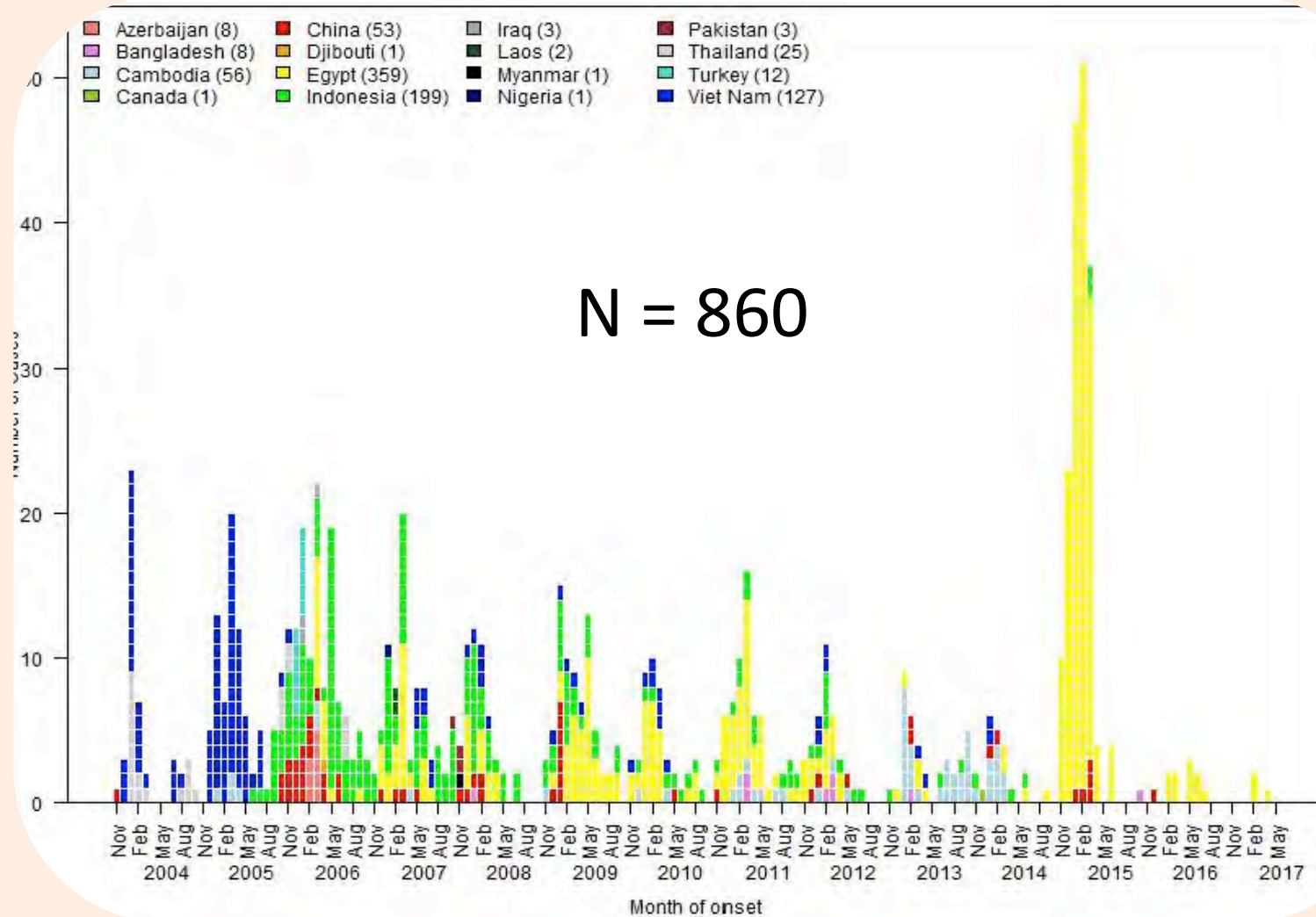
Month	No. Collected	No. rt-RTPCR positive (M gene)	H5 rt-RTPCR positive
Jan-17	255	113 (44.3%)	31
Feb-17	255	75 (29.4%)	14
Mar-17	255	41 (16.1%)	4
Apr-17	205	56 (27.3%)	6
May-17	205	105 (51.2%)	75
Jun-17	215	146 (67.9%)	75

Table 5. Egypt market and farm surveillance

Month	No. Collected	No. Positive	H5N1	H5N8
January-17	325	14(4.30%)	0	7
February-17	329	51(15.50%)	19	31
March-17	391	24(6.13%)	5	15
April-17	389	7(1.79%)	0	6
May-17	361	3(0.83%)	0	3
June-17	204	13(6.37%)	0	8
July-17	277	1(0.36%)	0	0



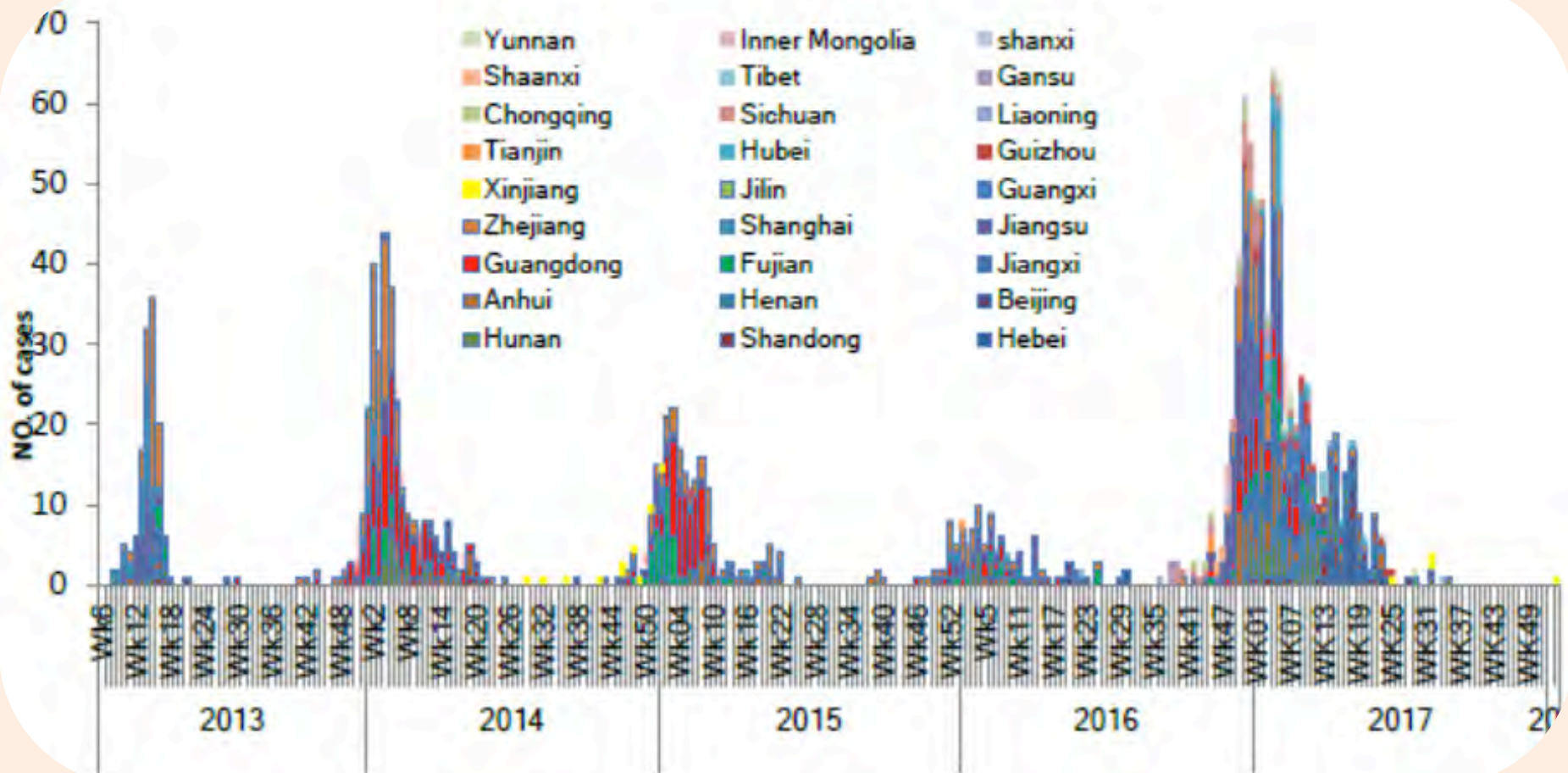
H5N1/6/8





H7N9

N = 1535



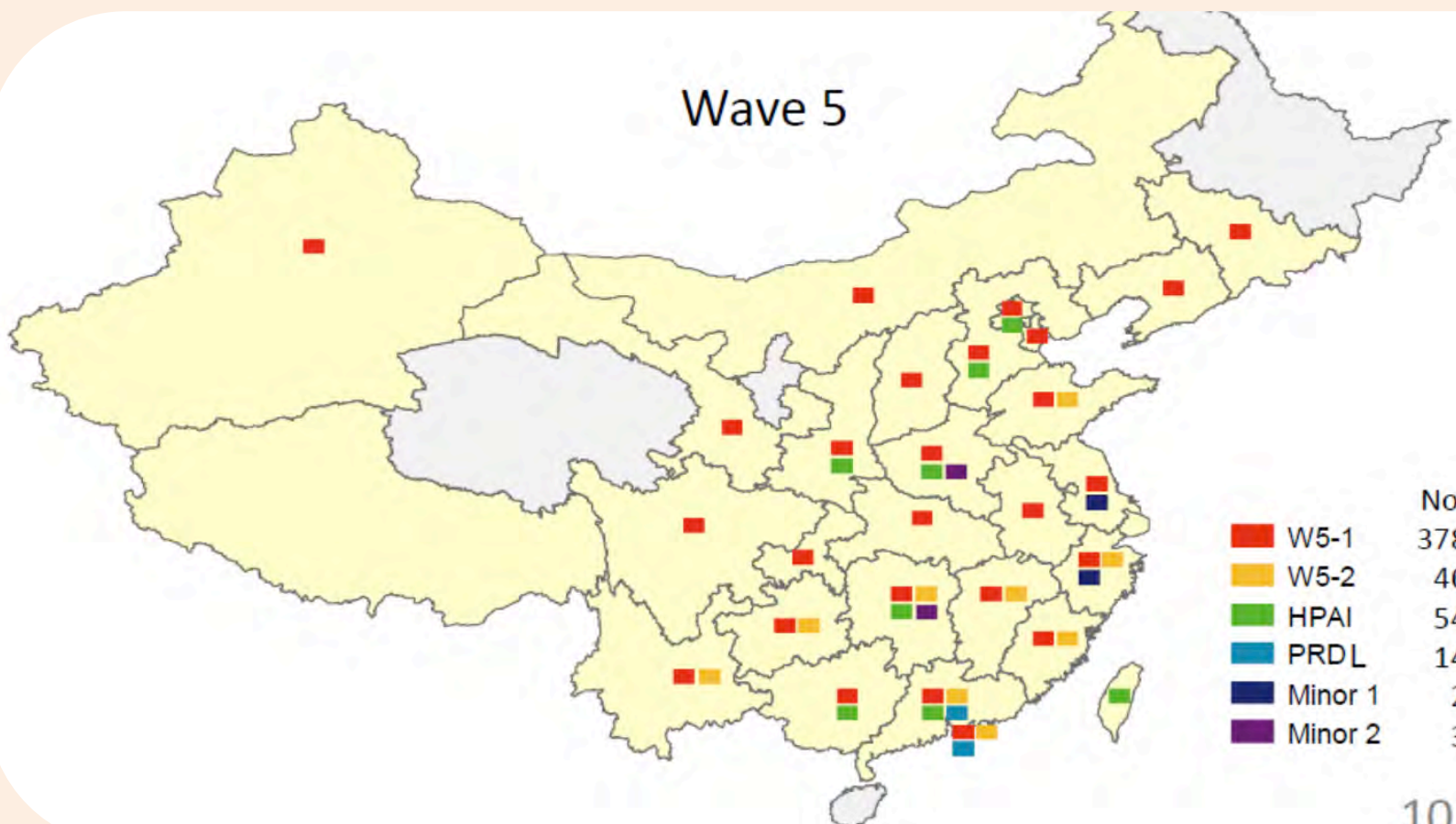
The 5th wave (2016-17)

- began earlier
- spread to more districts and counties
- had increased impact in middle aged
- saw more cases in semi-urban and rural areas
- was not more clinically severe (despite HPAI cases)

The 6th wave (2017-18)

- few human cases
- dramatic drop in detections in poultry
- related temporally with introduction of poultry vaccination

Wave 5



Don't forget H9N2

Don't forget H2

Where is the next pandemic coming from?



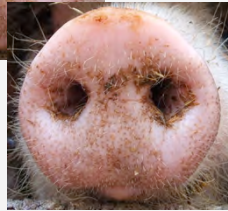
Its like looking for a needle in a haystack when there are countless haystacks and you don't know what the needle looks like.

David Morens

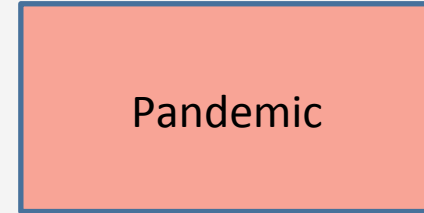
Transmissibility in humans



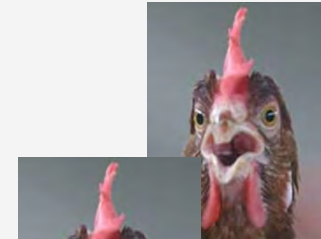
H3/H1



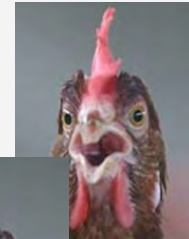
Classical swine H1



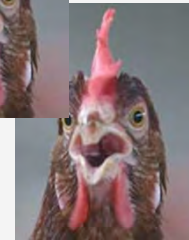
Pandemic



H9



H7



H5

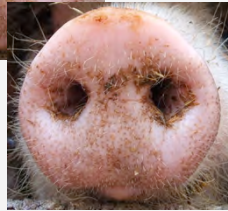
Preexisting immunity in humans



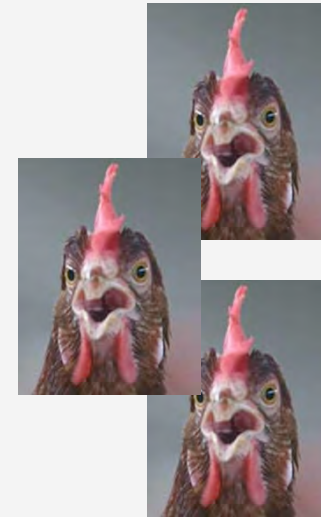
Transmissibility in humans



H3/H1



Classical swine H1



H7

H9

H5

Preexisting immunity in humans

Acknowledgments

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