Experimental Study of Avian Influenza Virus (H9N2) Transmission

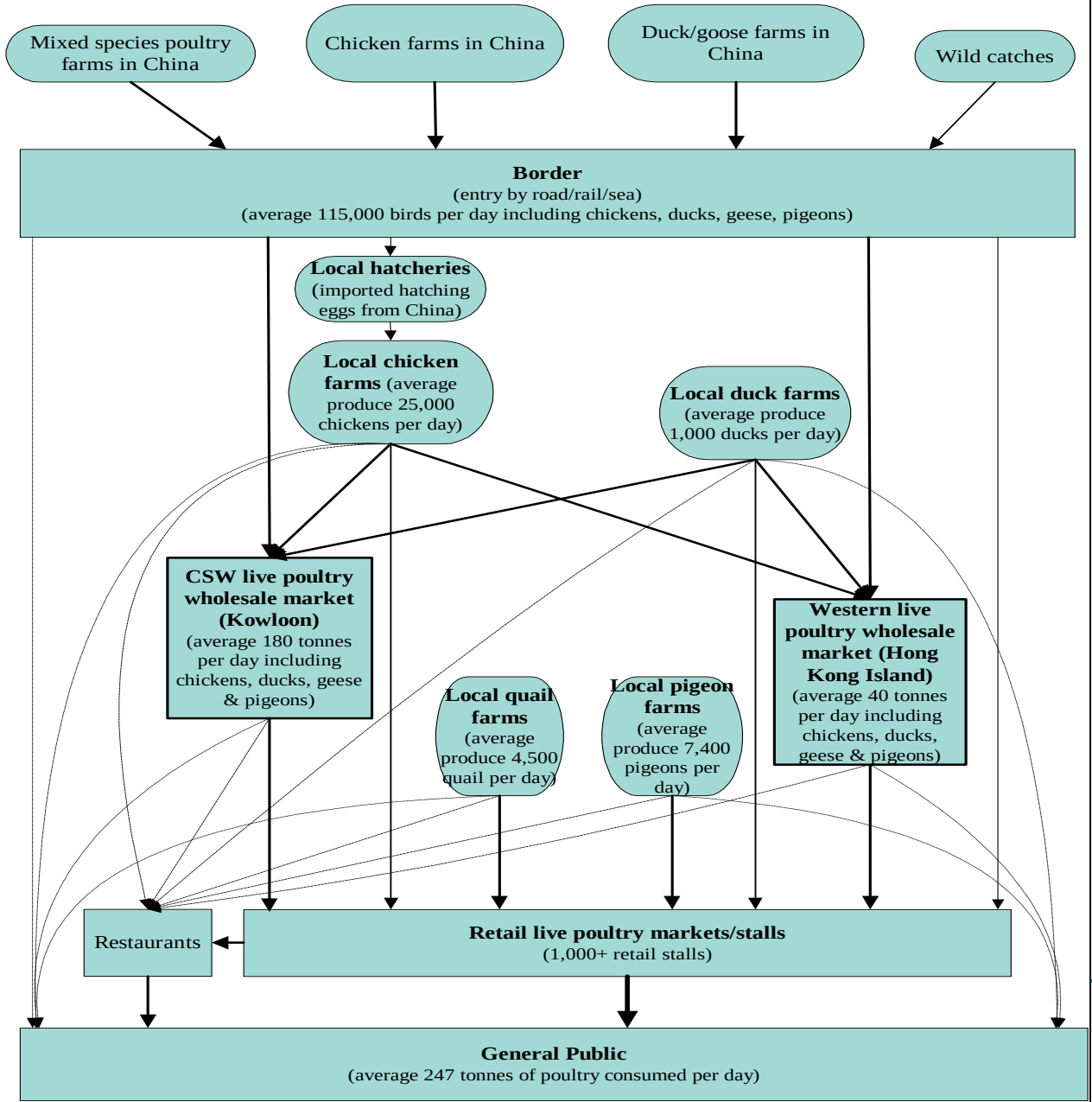
- in a replica of the live poultry market stall environment

Nina Yu-Hsin Kung

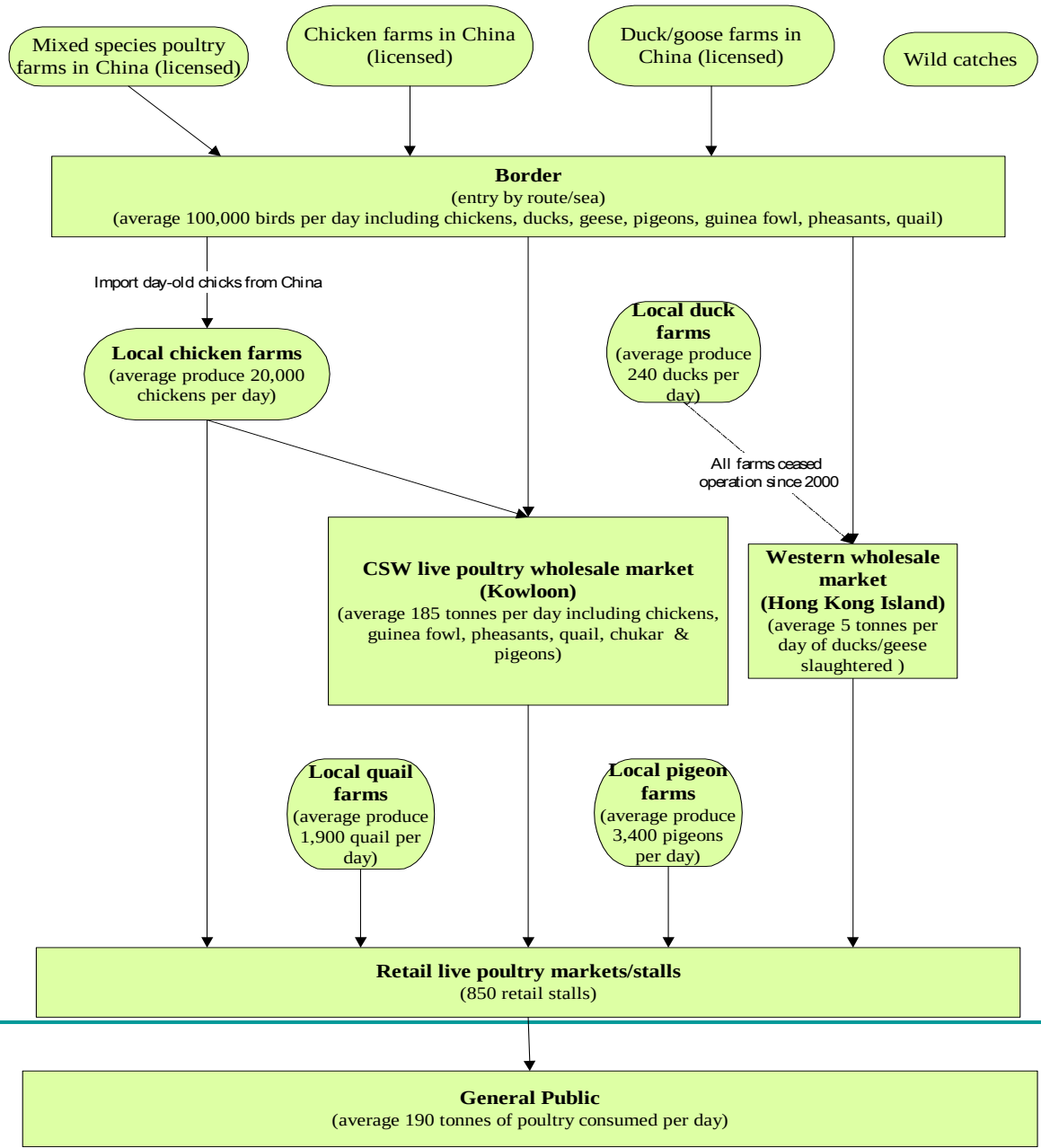
Live Poultry Markets in Hong Kong

- Risk factor associated with 1997 human H5N1 infection
- Spordically cases of H5N1 in poultry and human
- Continuing circulation of low pathogenic avian influenza viruses (H9N2, H6N1) in live poultry markets

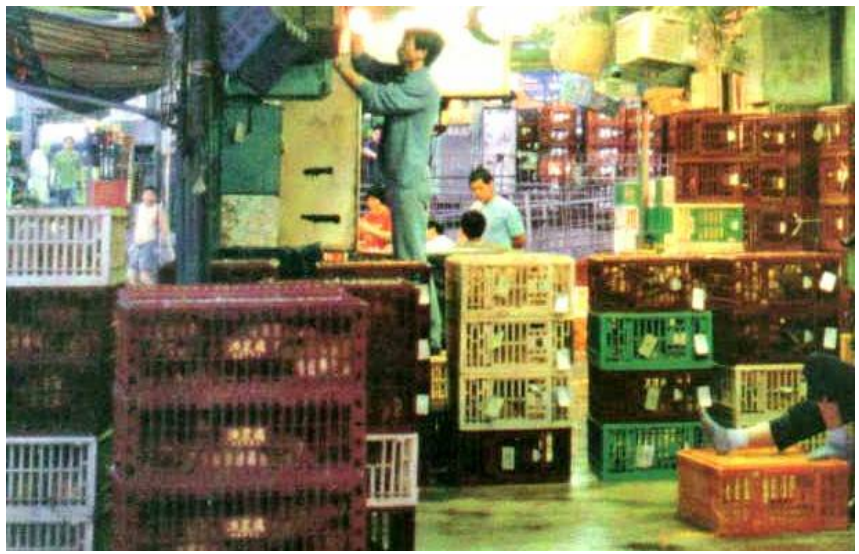
Live Poultry Market System in Hong Kong SAR (1997)



Live Poultry Marketing System in Hong Kong SAR (Post 1997)



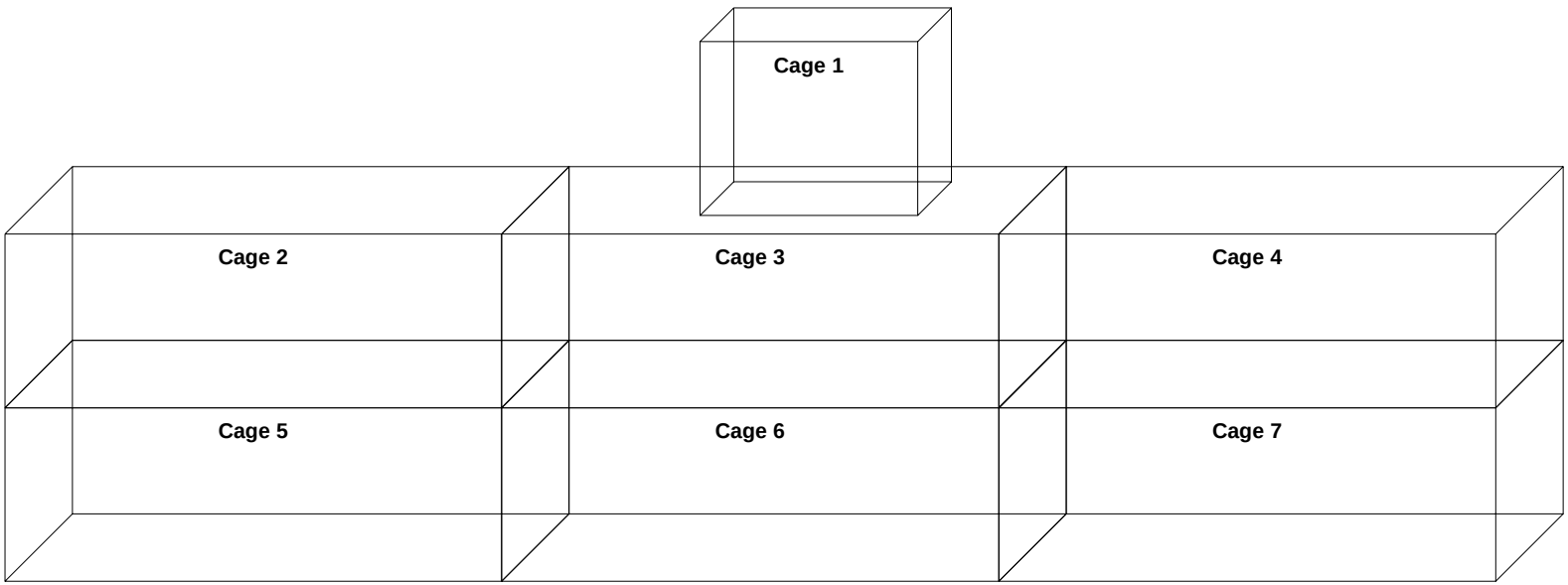
Wholesale Live Poultry Market



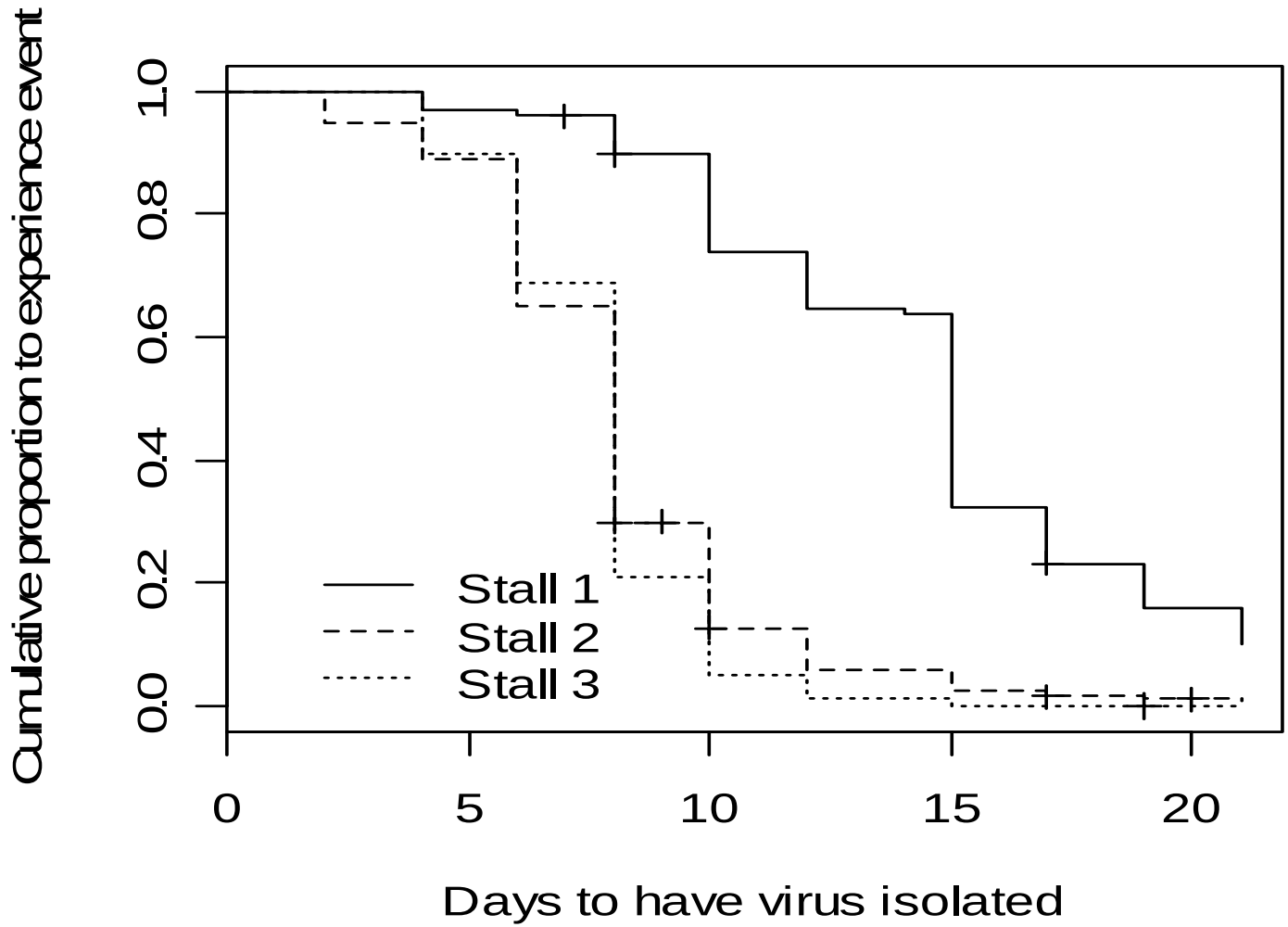
Retail Live Poultry Markets

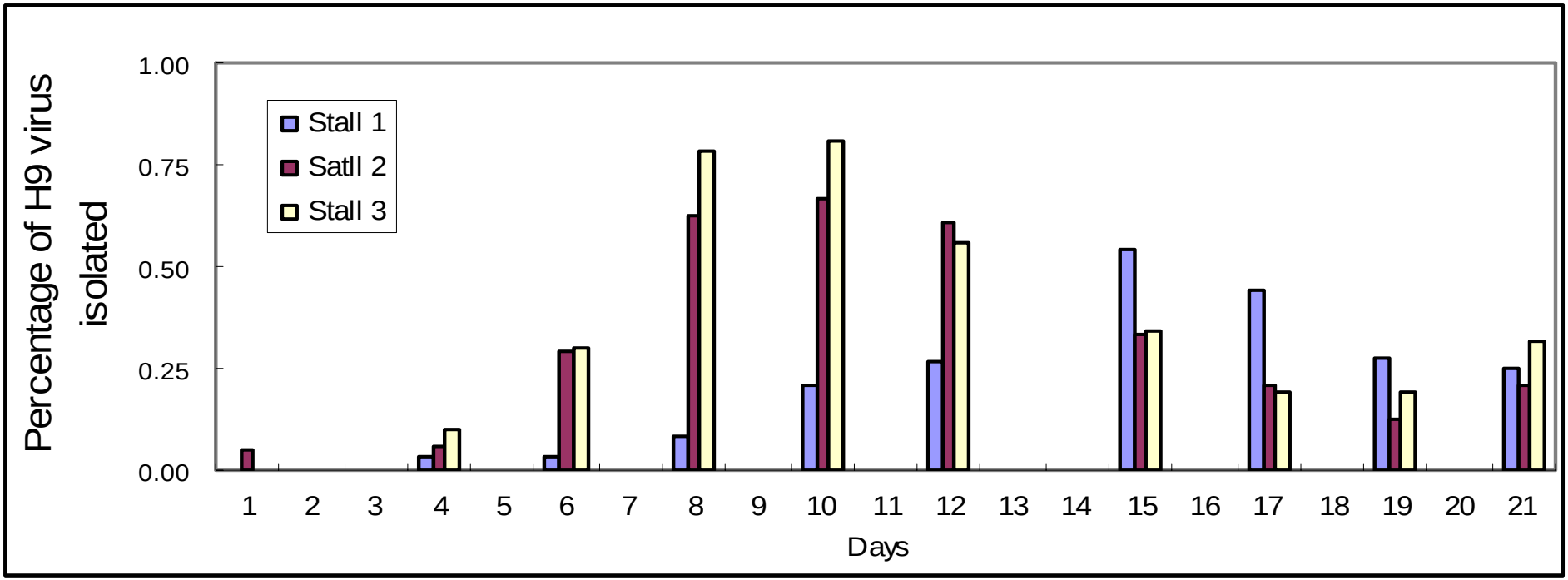
Market replica study

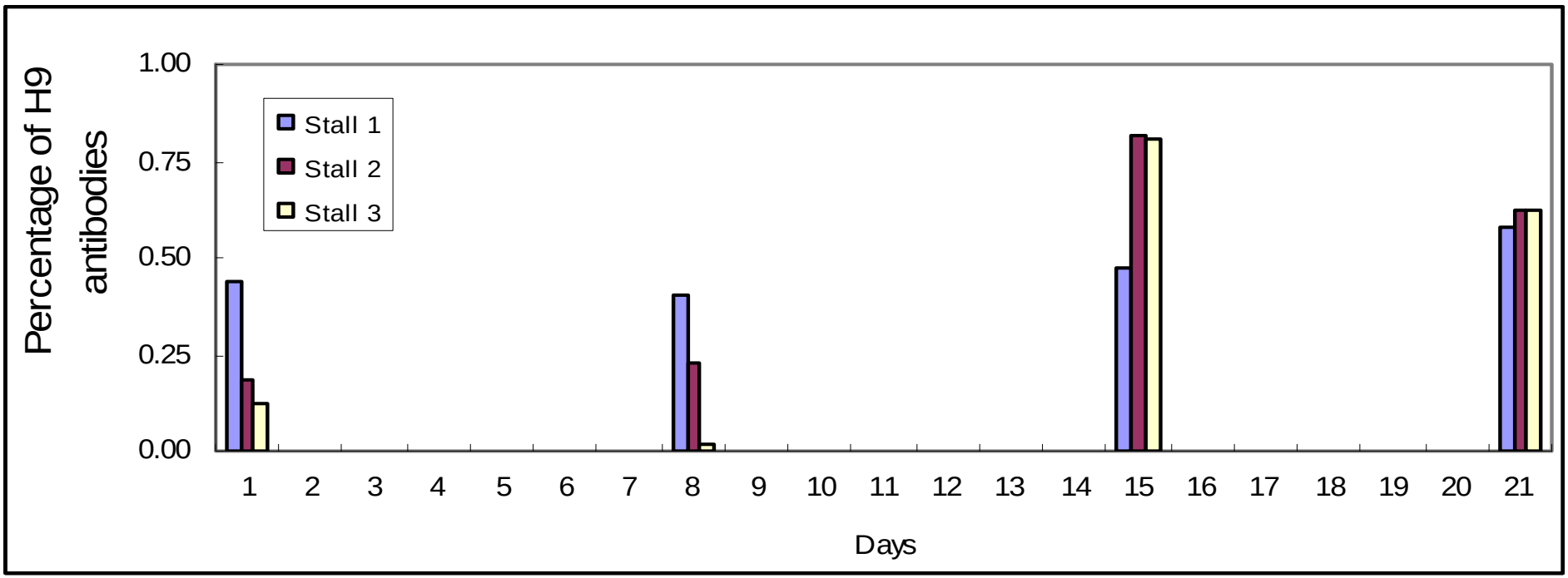
- 3 groups (100 chickens each group)
- Artificially infected chickens (H9N2)
- Chicken turnover rate
  - Week 1: 0
  - Week 2: 25%
  - Week 3: 50%
- Data analysis
  - Prior immunity
  - Virus transmission dynamic


Cage 1
Cage 2
Cage 3
Cage 4
Cage 5
Cage 6
Cage 7

Stall No.	Immune status of chickens	Week 1 (no turnover)	Week 2 (25% turnover)	Week 3 (50% turnover)
1	All 100 chickens H5 seronegative. 50 of 100 chickens H9 seropositive	Virus isolation on Day 1,4,6 Serology on Day 1 No turnover of chickens	Virus isolation on Day 8, 10, 12 Serology on Day 8 Replace 5 chickens on Day 8,9,10,11 and 12	Virus isolation on Day 15,17,19,21 Serology on Day 21 Replace 10 chickens on Day 15,16,17,18 and 19
2	All 100 chickens H5 and H9 seronegative			
3	All 100 chickens H5 seropositive (post vaccine) and H9 seronegative			


Cumulative proportion to experience event
0.0
0.2
0.4
0.6
0.8
1.0
0
5
10
15
20
Days to have virus isolated
Stall 1
Stall 2
Stall 3


Percentage of H9 virus isolated
1.00
0.75
0.50
0.25
0.00
Stall 1
Satll 2
Stall 3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Days


Percentage of H9 antibodies
1.00
0.75
0.50
0.25
0.00
Stall 1
Stall 2
Stall 3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Days

Conclusions

- Slow virus transmission rate in stall with half population carried H9 antibody
- No difference in the susceptibility to H9 virus between vaccinated (H5) and non-vaccinated chickens
- Multiple cycles of infection occurring, with individual stalls oscillating in a similar pattern but over different time frames

Conclusions (cont')

- Chickens can be re-infected with virus of the same subtype if their initial antibody titres were low
- H9 virus is mainly shed through the respiratory route
- Other transmission routes include drinking water, feed and handling
- Basis for similar studies with H5N1 virus transmission

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