Investigating the role of pheasants as a bridging host for the introduction of clade 2.3.4.4 H5N6 highly pathogenic avian influenza viruses (HPAIVs) into chickens

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27th Annual Meeting of the National Reference Laboratories for Avian Influenza and Newcastle Disease of European Union Member States

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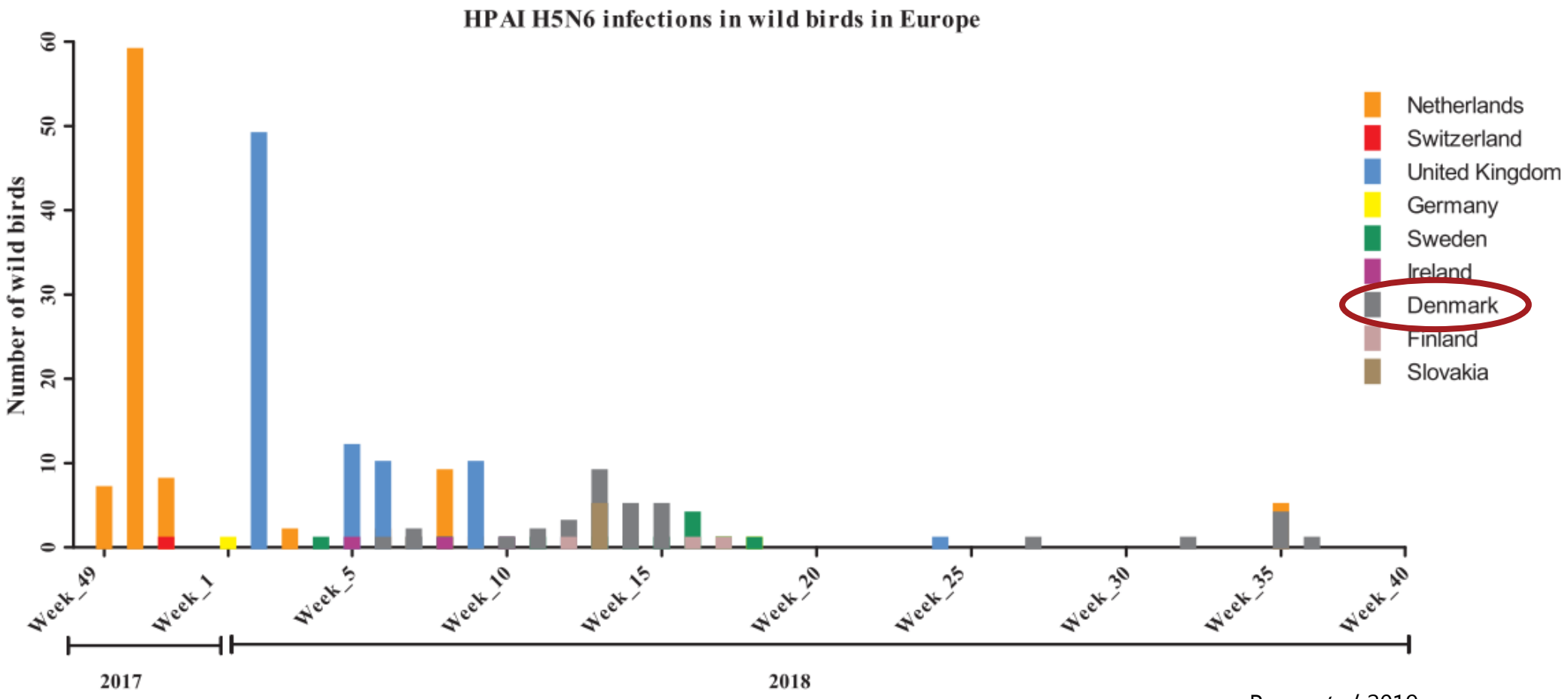
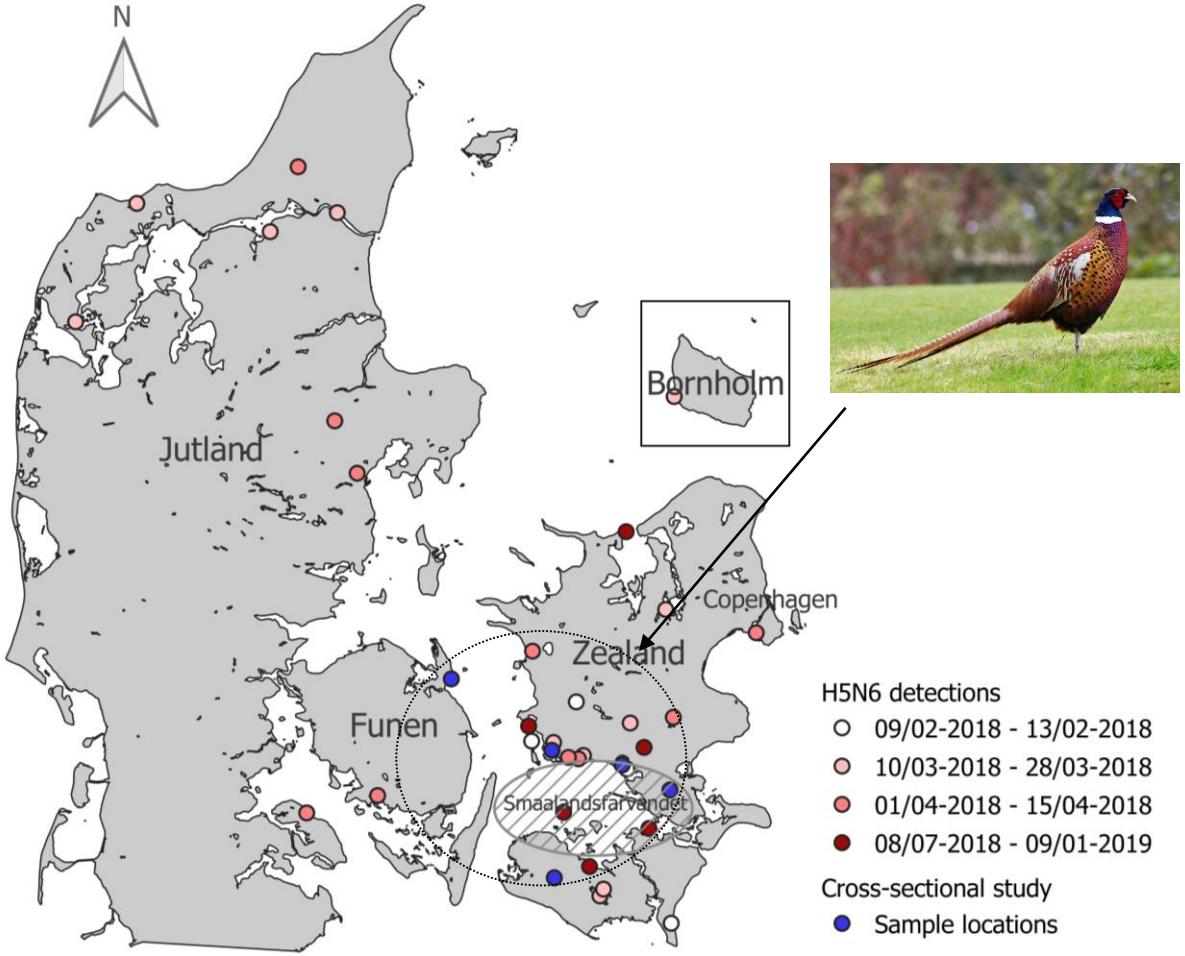
HPAIV H5N6 Clade 2.3.4.4b in Europe



Poen *et al*, 2019

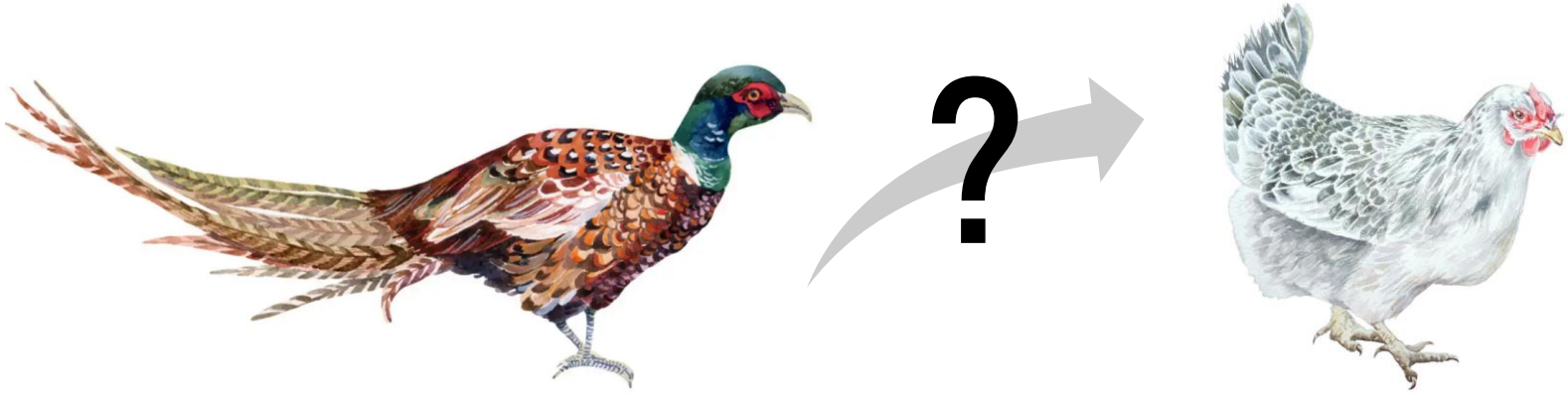
Cross-Sectional Study

- Primo 2019, between 11-15 pheasants were collected for the cross-sectional study at each location
- One wild pheasant tested positive for antibodies against AIV; and by HI-test for clade 2.3.4.4b H5 antigens
- Would pheasants be able to introduce HPAIVs into poultry?



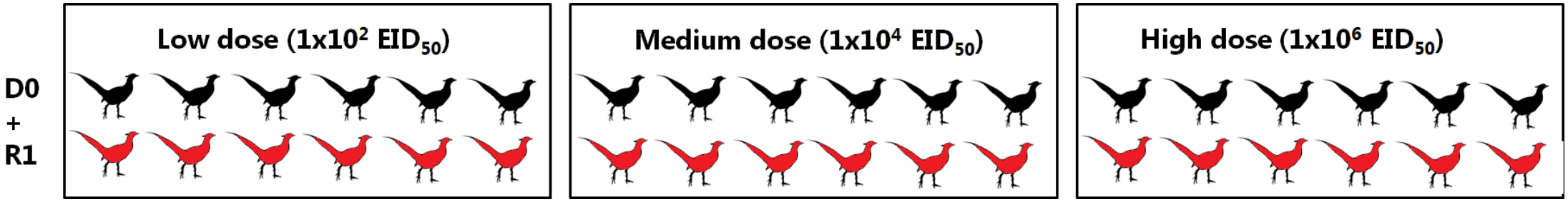
Study Objectives

1. Determine the minimum infectious dose (MID) of HPAIV H5N6 in pheasants
2. Intra- and inter-species transmission of HPAIV H5N6 within pheasants and onward to chickens
3. Pathogenesis of HPAIV H5N6 infection in pheasants

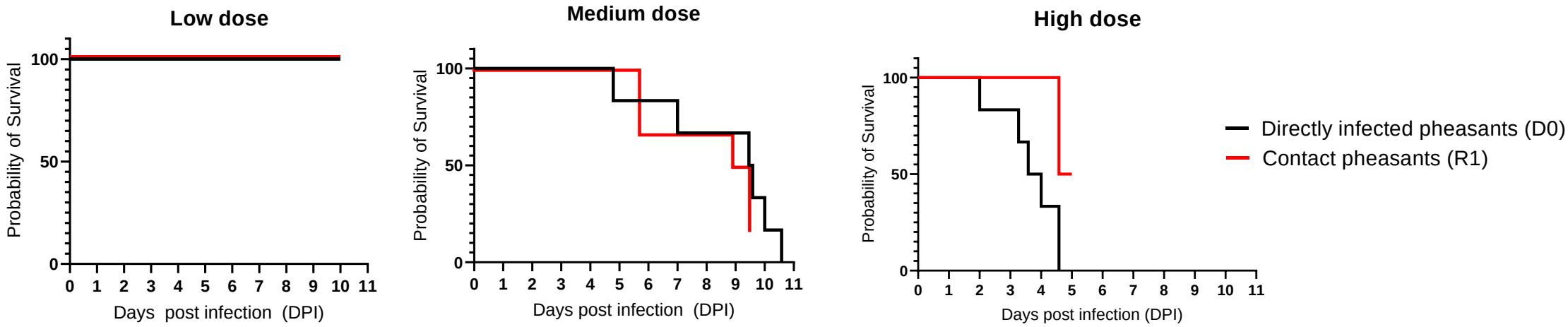


Dose Determination and MID

- Inoculum: HPAIV H5N6 A/pheasant/Denmark/12106-3/2018
- 7-9 week old pheasants (P. colchicus) were directly inoculated intranasally and intraocularly
- Three different doses:



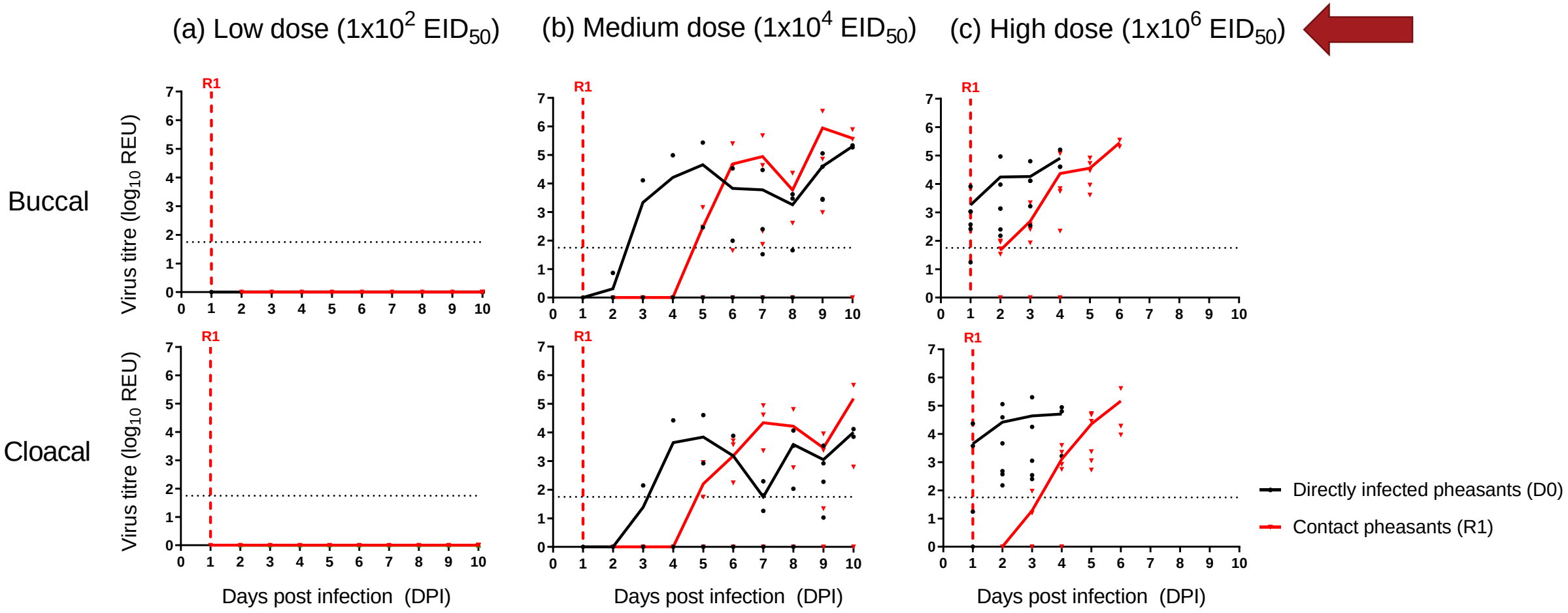
Dose Determination and MID



MDT (D0): 8.57 days

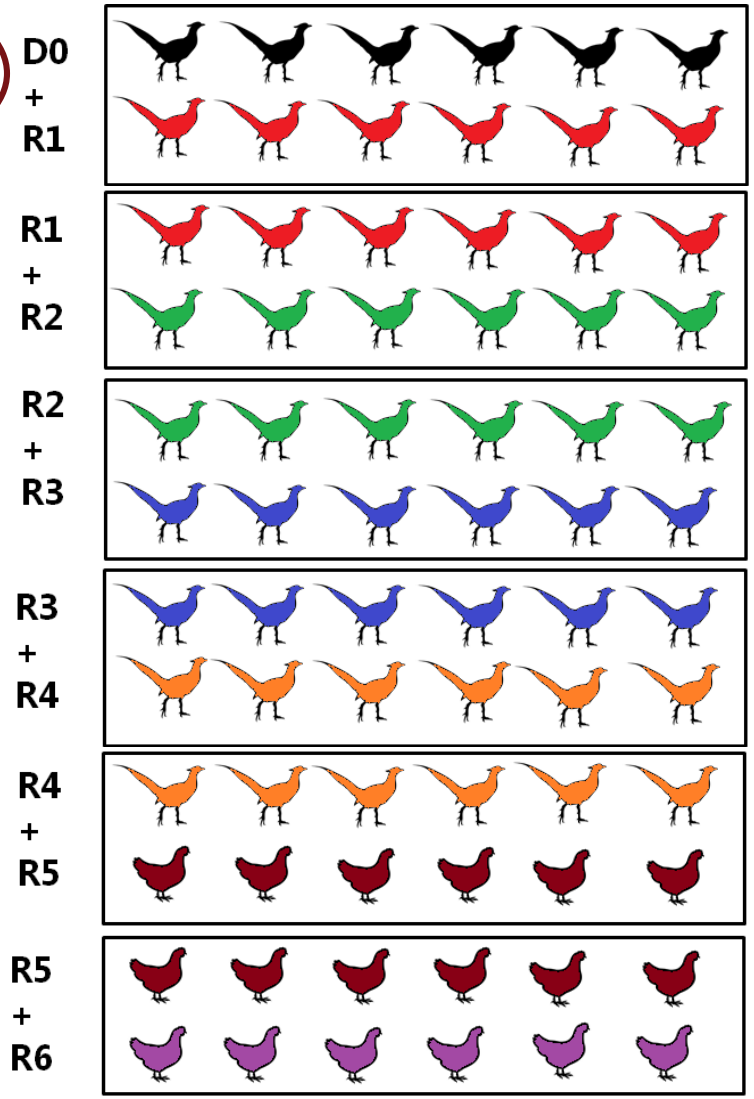
MDT (D0): 3.67 days

Dose Determination and MID

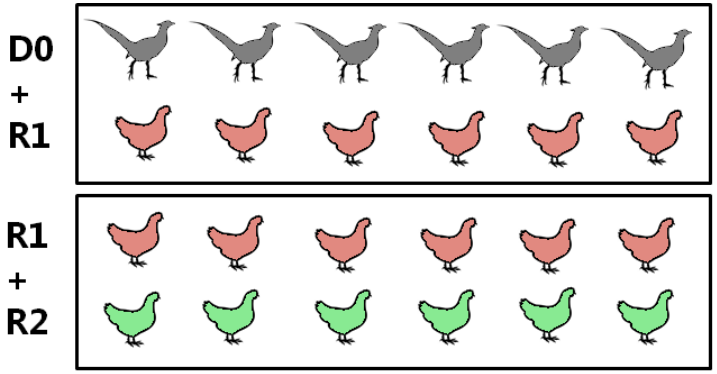


Intra-species and Inter-species Transmission

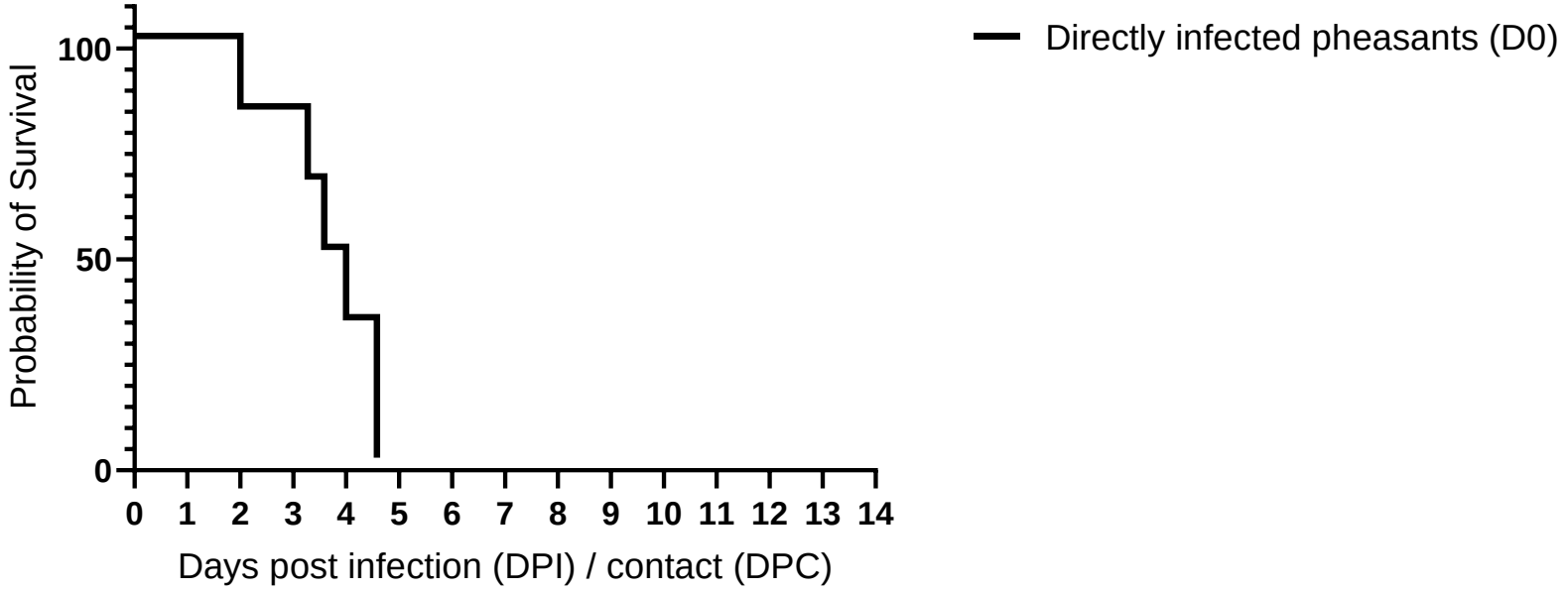
Transmission Chain A:
n=6 in each group



Transmission Chain B:
n=6 in each group



Transmission Chain A – Survival



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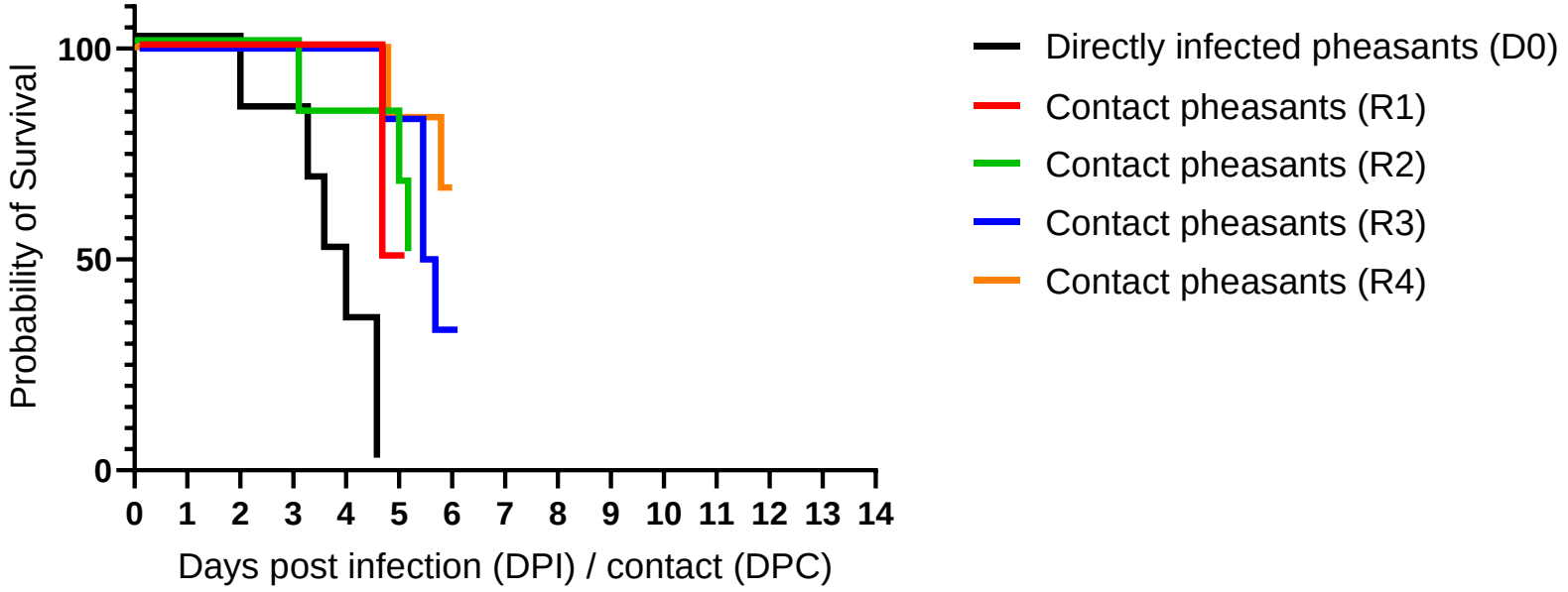

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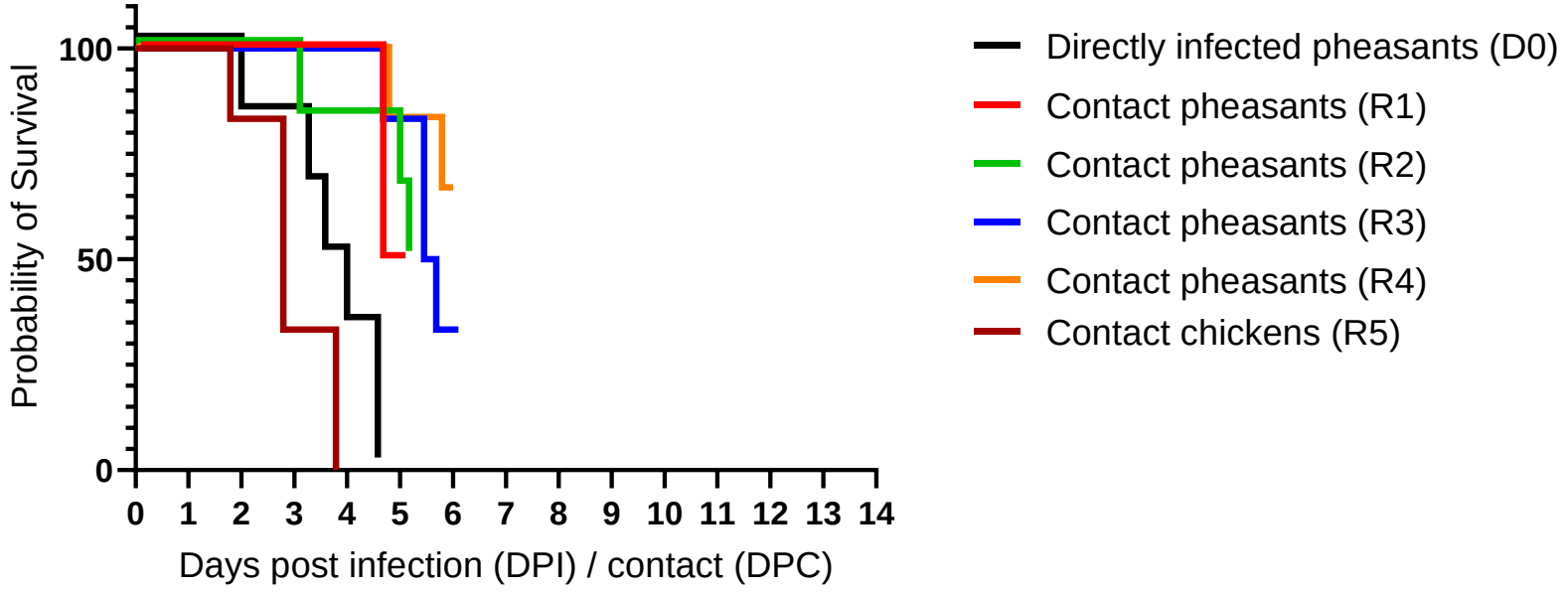

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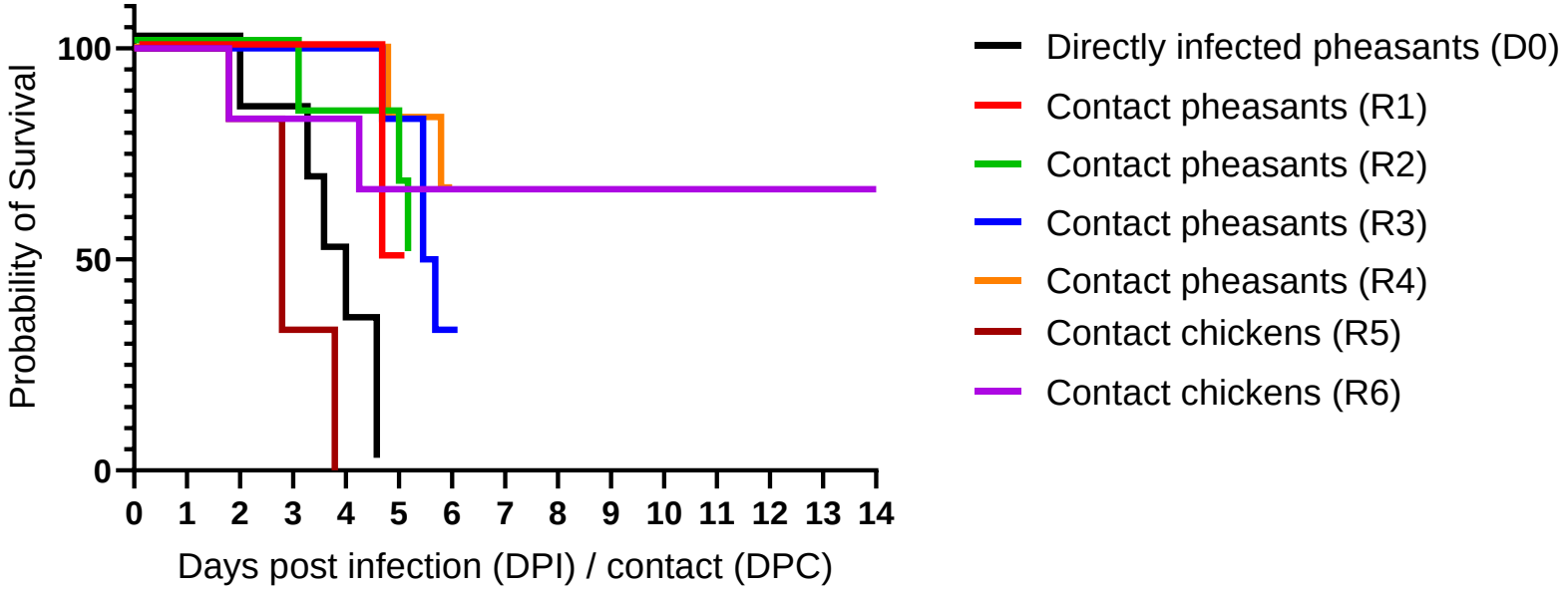
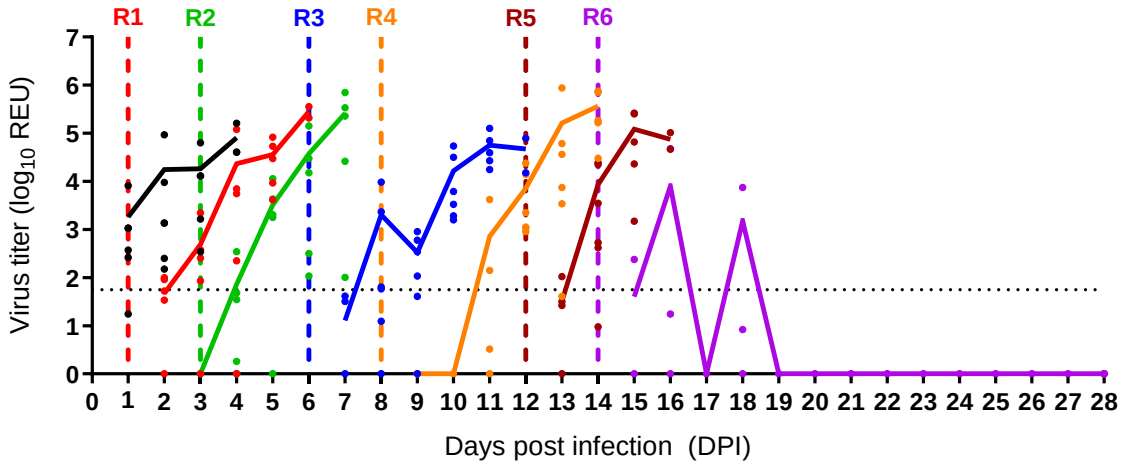
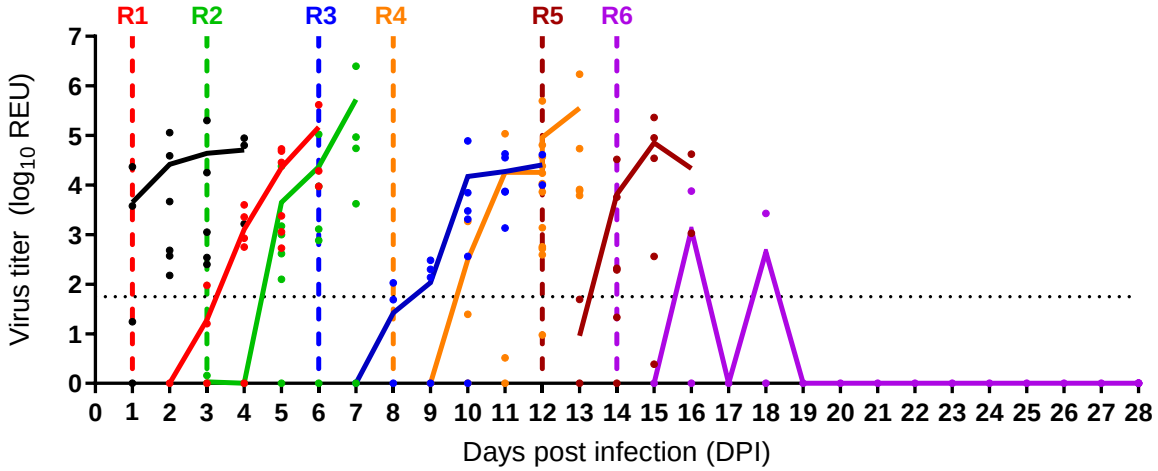


Transmission Chain A – Shedding

Buccal



Cloacal

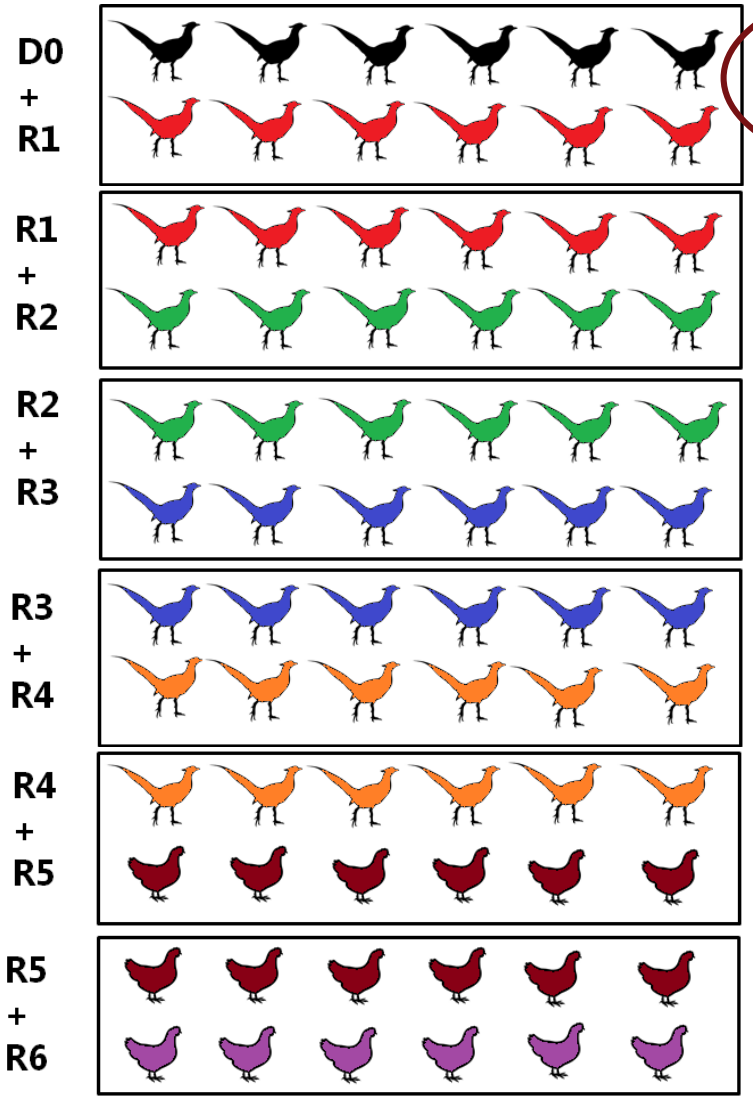


- Directly infected pheasants (D0)
- Contact pheasants (R1)
- Contact pheasants (R2)
- Contact pheasants (R3)
- Contact pheasants (R4)
- Contact chickens (R5)
- Contact chickens (R6)

Intra-species and Inter-species Transmission

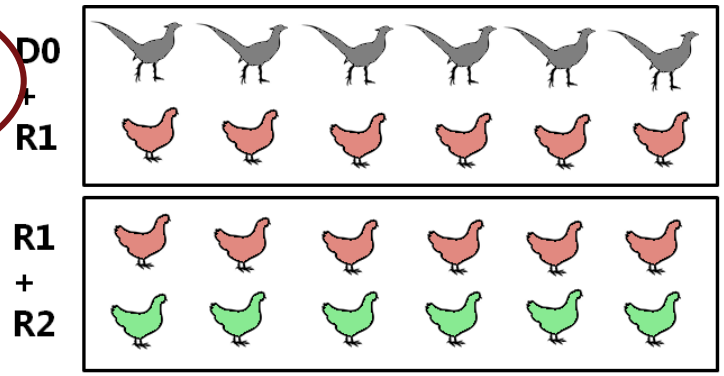
Transmission Chain A:

n=6 in each group

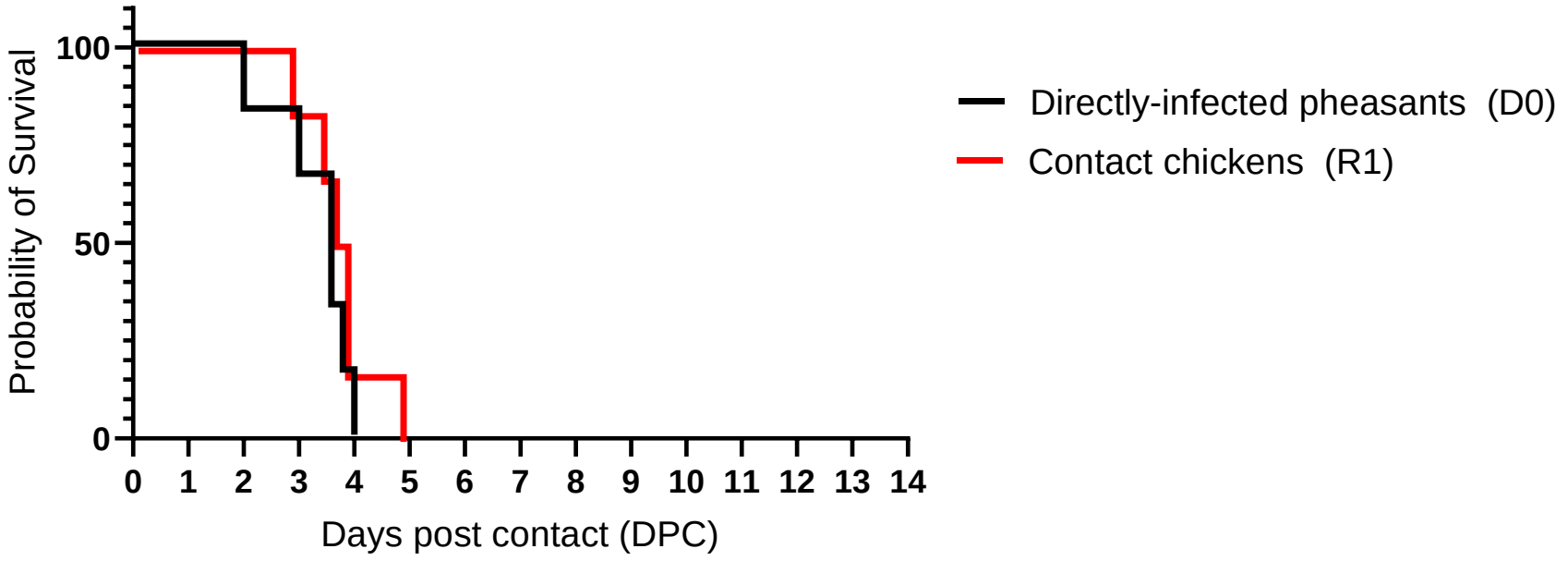


Transmission Chain B:

n=6 in each group



Transmission Chain B - Survival



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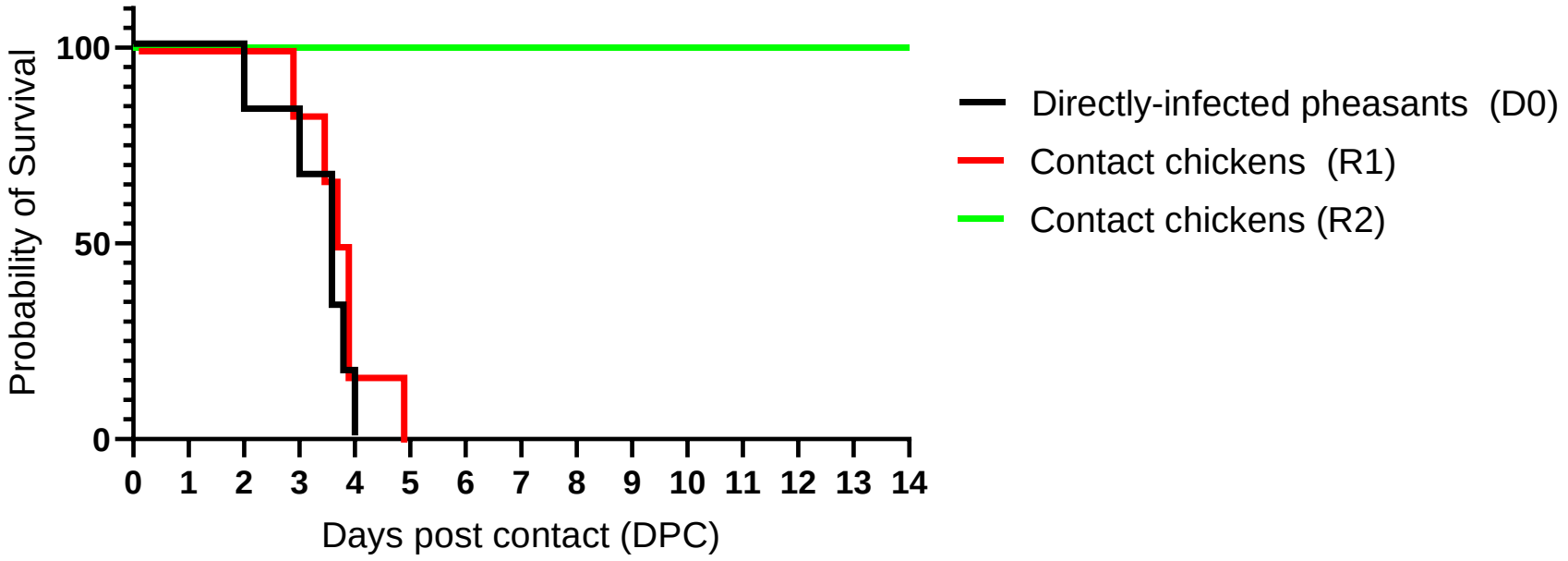

Transmission Chain B - Shedding

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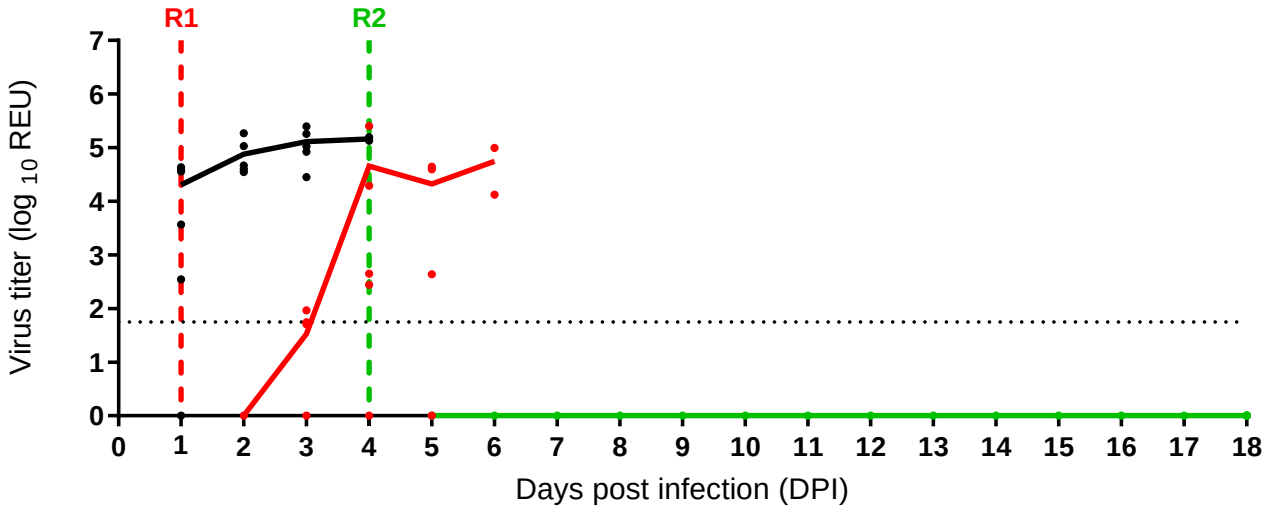

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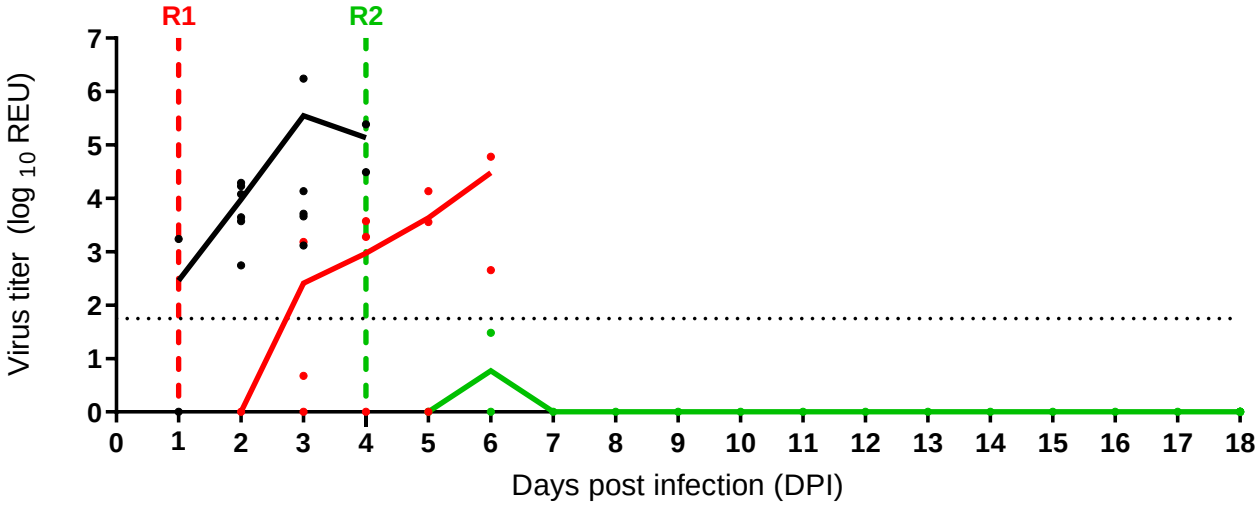

- Directly infected pheasants (D0)
- Contact chickens (R1)
- Contact chickens (R2)

Key Findings

- **Successful intra-species transmission within pheasants was established**

- **Efficient onward transmission from pheasants to chickens also occurred**
  - Lower MDT for chickens

- **Chicken to chicken transmission was not established**
  - Are chickens less efficient at transmitting virus?
  - Insufficient co-housing time?

→ **Pheasants could possibly serve as bridging hosts for the introduction of HPAIVs into commercial poultry**

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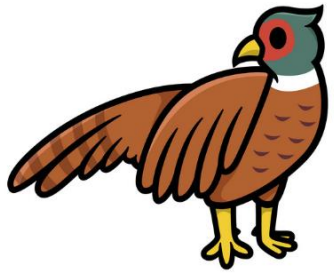
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