

Influenza A Virus Environmental Contamination in Exhibition Swine Settings



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Student Summer Research Projects

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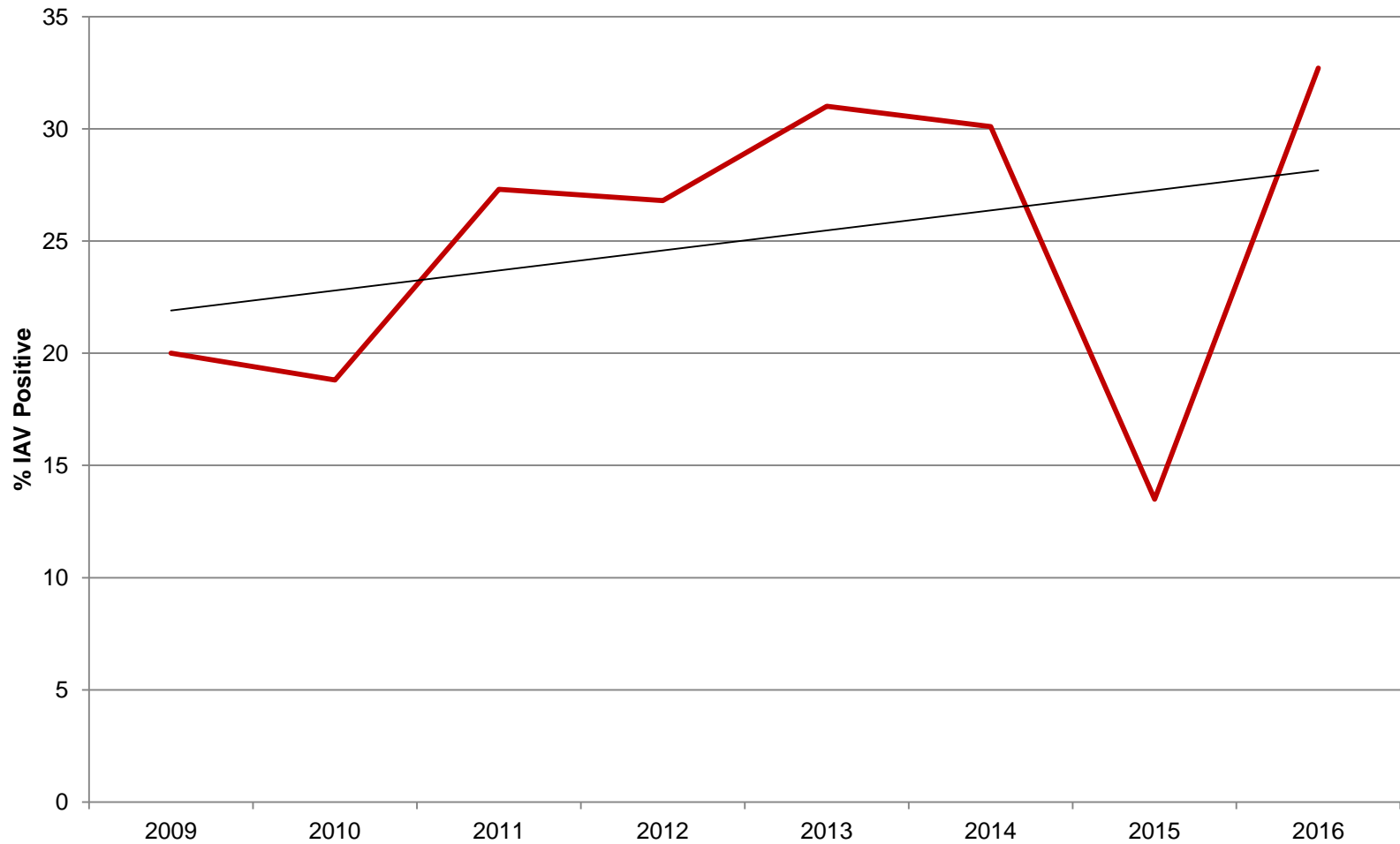
Agricultural Exhibitions



- Non-commercial swine raised in a variety of scenarios
- Pigs may have been shown multiple times
- Only swine contact many individuals have occurs at the fair
- Pigs and people comingled for a prolonged period of time



Exhibitions with Swine Shedding IAV



Study 1:

Detection of swine-lineage influenza A virus on inanimate environmental surfaces during swine corralling at agricultural fairs

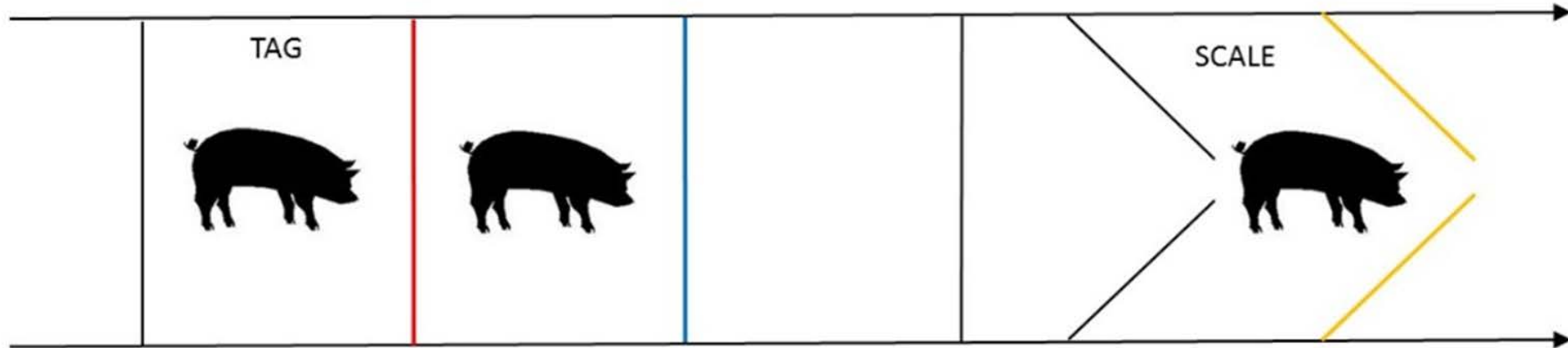


Sarah E. Lauterbach, et al., *Emerging Microbes & Infections* (2017) 5, e9



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Fair 1: Chute Diagram



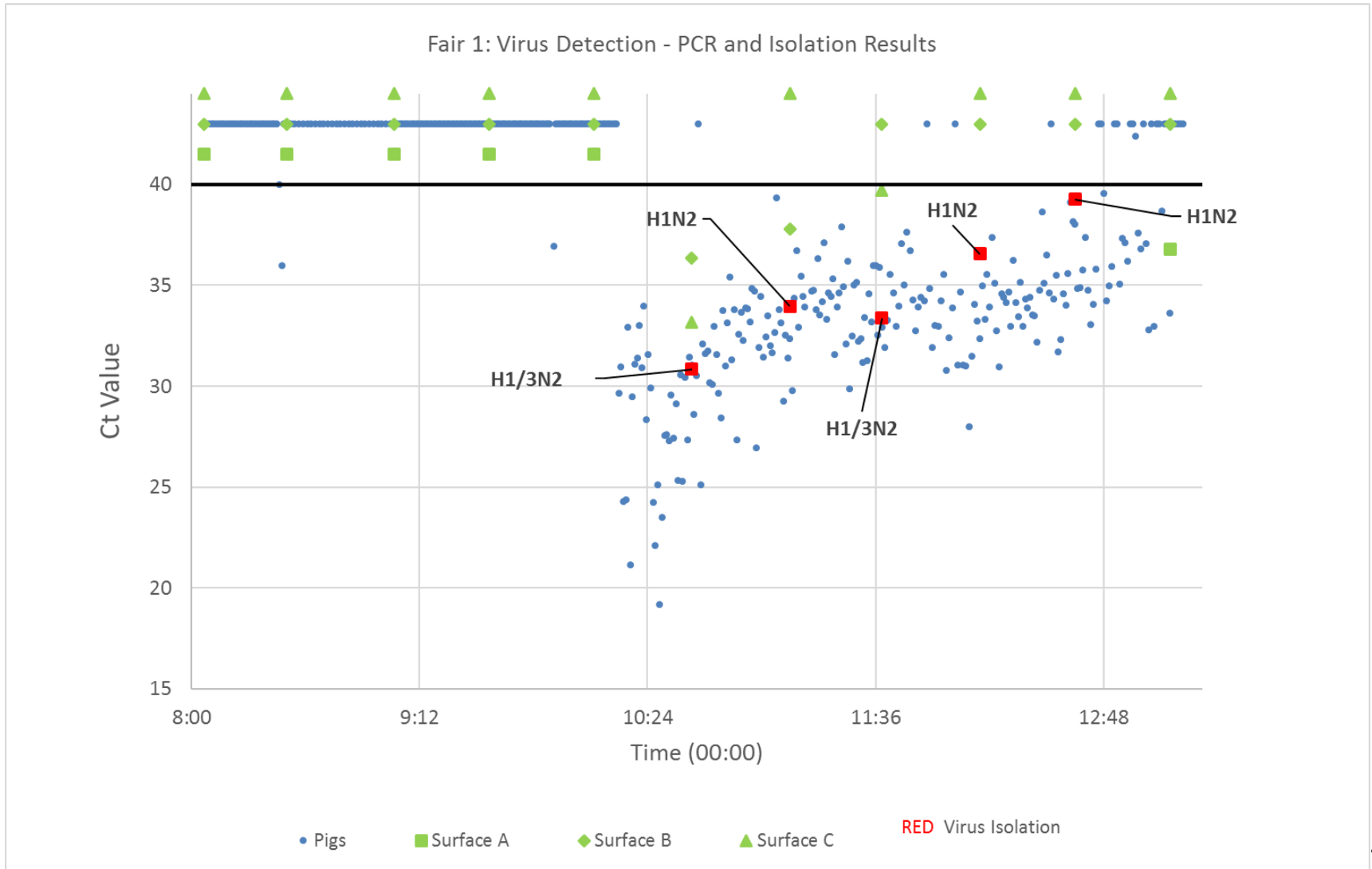
— Surface A: Plastic Board

— Surface B: Plastic Board

— Surface C: Metal Scale Doors



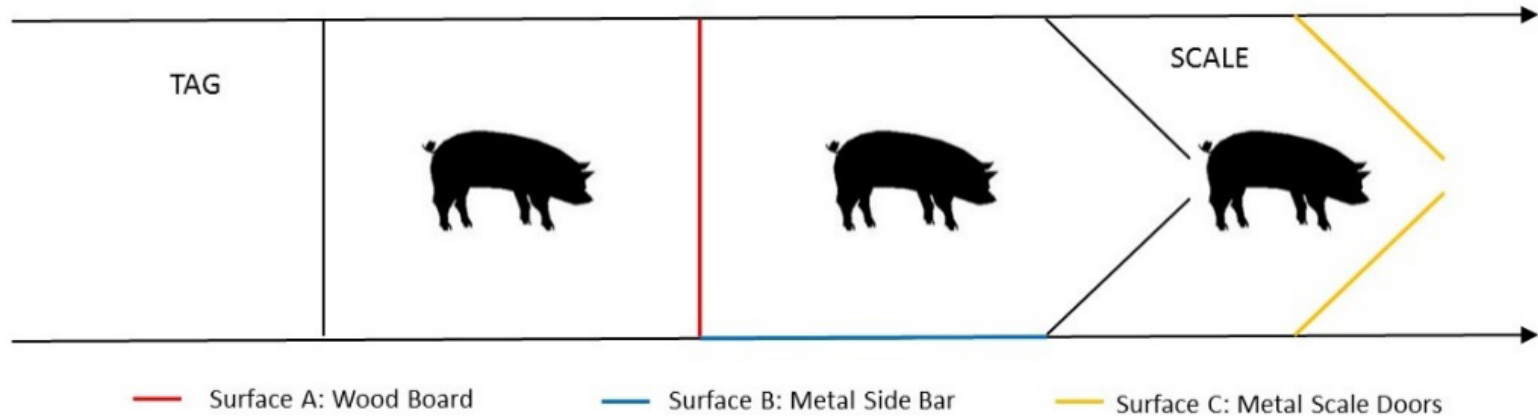
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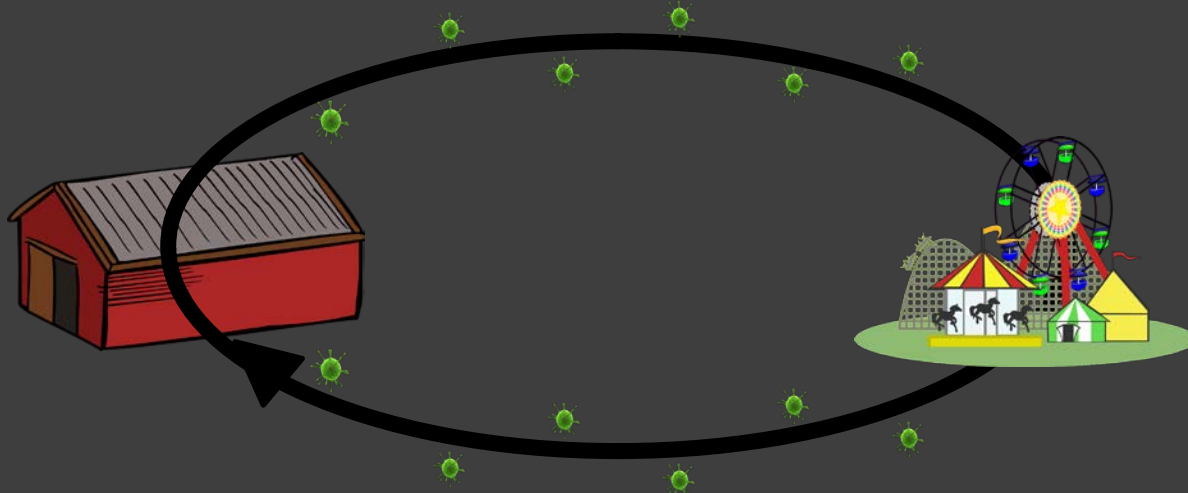


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Fair 2: Chute Diagram



Study 2: Detection of influenza A virus on inanimate fair surfaces



Courtney Wright, AASV Student Poster Competition



Objective:

To document the frequency of IAV contamination of portable fomites at agricultural fairs to identify mitigation strategies for pathogen spread.



Tack Box



Sorting Panel



Waterer



Feeder



Chair



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Surface	Number tested	PCR positives/No. direct contact surfaces sampled	PCR positives/No. indirect contact surfaces	No. of IAV isolates (All from direct contact surfaces)
Tack Box	80	11/55 (20.4%)	5/25 (20%)	1 (H3N2)
Sort Panel	78	10/43 (23.3%)	2/35 (5.7%)	0
Waterer	82	19/82 (23.2%)	0	3 (H3N2)
Feeder	86	20/86 (23.3%)	0	2 (H3N2) 1 (H1N1)
Chair	65	2/18 (11.1%)	4/47 (8.5%)	0
Feed Container	2	1/1 (100%)	0/1 (0%)	0
Broom	1	1/1 (100%)	0	0
Fan	2	0	0/2 (0%)	0
Cooler	1	0/1 (0%)	0	0
Pick	1	0	0/1 (0%)	0
Wheelbarrow	1	0/1 (0%)	0	0
Watering Can	1	0	0/1 (0%)	0
Total	400	64/288 (22.3%)	11/112 (9.8%)	



Key Findings

1. IAV was detected with PCR on 18.75% of inanimate surfaces
 - ≥ 1 surface tested positive at 50% of the fairs (8 Indiana and 2 Ohio fairs).
 - Within positive fairs, frequency of IAV detection ranged from 5% to 90%
2. Viable IAV was recovered from 7 surfaces across 4 fairs
 - 85% of virus isolation positive surfaces were plastic
3. Full length genomic sequencing identified H1N1 pdm09 reassortant, human-like H3N2, and cluster IV-A H3N2
 - Nearly identical viruses found in pigs at multiple fairs during 2016
 - H3N2 isolates were $\geq 99\%$ identical to 2016 H3N2v cases found in Ohio and Michigan

Study 3: Adoption of recommended hand hygiene practices to protect public health at agricultural fairs



Alison Martin, Merial Student Poster Competition



Objective 1:

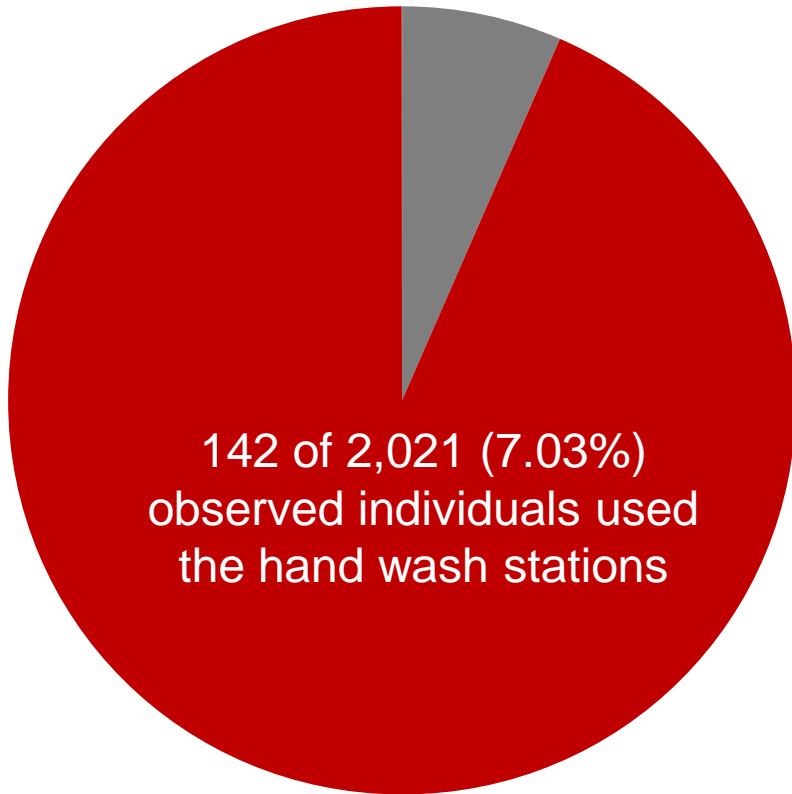
To determine the number of agricultural fairs with working hand hygiene stations

	2013-2015 fairs
Presence	127/162 (78.4%)
Function	94/107 (87.9%)
Risk Signage	119/174 (68.4%)
Wash Procedure	58/134 (43.3%)



Objective 2

To determine the proportion of individuals that utilize hand hygiene stations upon exiting animal barns over a given time





Objective 3

To determine presence of IAV and/or bacteria on hand hygiene stations



- No IAV was detected on hand hygiene stations, even at fairs with IAV positive exhibition swine.
- Antimicrobial resistant bacterial phenotypes found on hand hygiene stations include:
 - Extended spectrum cephalosporin resistant
 - Fluoroquinolone resistant
- 69.2% of tested stations contained antimicrobial resistant bacteria



Overall Conclusions

- Mitigation procedures, such as disinfecting gates and scales during animal corralling, may decrease virus transmission through this route, potentially lessening IAV prevalence in swine.
- Inanimate objects could be perpetuating the spread of IAV and other microorganisms between exhibitions
- Fairs have followed recommendations to provide risk signage and hand hygiene stations, however fairgoers are not using them



Thank you!

