OFFLU Swine Influenza Virus technical meeting
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Flu Surveillance and Research Update

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Flu Surveillance
Data Sources = UMN, ISU, IRD/USDA

Top 5 IAV in North American (primarily US) Swine
APRIL 1, 2021 to OCTOBER 1, 2021

1. H1N1 with 1A.3.3.3,gamma H1 with Classic Sw N1
2. H1N2 with 1B.2.1,delta2 H1 with 1998B N2
3. H3N2 3.1990.4.1,Cl_IVA H3 with 2002B N2
4. H3N2 3.2010.1,HuLike H3 with 2002B N2
5. *H1N1 1A.3.3.2, pdm09 H1 with pdm09 N1*

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Top 5 IAV in North American (primarily US) Swine
OCTOBER 1, 2021 to MARCH 31, 2022

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3. H3N2 3.1990.4.1,Cl_IVA H3 with 2002B N2
4. H3N2 3.2010.1,HuLike H3 with 2002B N2
5. *H1N1 1A.1.1, alpha with 2002B N2*

Flu Research

- TOPIC: **Role of farmworkers and management practices in influenza A virus transmission within breeding herds**
- GOAL: elucidate the relevance of farmworkers and farm management practices in IAV transmission within breeding herds in order to help guide swine producers towards control strategies to reduce the burden of influenza in pigs
  - **Gustavo Lopez-Moreno**…. Montse Torremorell "Evidence of influenza A infection and risk of transmission between pigs and farmworkers" Zoonoses and Public Health. 2022 https://onlinelibrary.wiley.com/share/5IUKK4MXGCX3ISASYRNN?target=10.1111/zph.12948. First published: 20 April 2022 https://doi.org/10.1111/zph.12948
    - Take home: swine farms can be a setting on which bidirectional IAV transmission can occur and biosecurity programs are warranted.
  - Gustavo Lopez-Moreno…Montse Torremorell "Evaluation of dam parity and internal biosecurity practices in influenza infections on piglets prior to weaning." Publication pending.
    - Take home: a combination of sow vaccination and strict farm management/pig handling practices can result in a reduction on IAV prevalence and weaning of IAV negative piglets from breeding herds.

Flu Research

- TOPIC: **Influenza prime-boost vaccination, diversity, and evolution in individual pigs**
- GOAL**:** explore the application of multiple prime-boost vaccination protocols to control influenza in pigs and characterize the immune response, the within-host evolution of IAV, and the emergence of novel reassortant influenza viruses in vaccinated pigs
  - **Chong Li** …..Montserrat Torremorell. “Vaccination decreases the risk of influenza A virus reassortment with a concomitant increase in subgenomic genetic variation in pigs.” Submitted for publication 29 March 2022
    - Take Home: IAV vaccination of swine herds reduces the IAV genetic diversity through restricting the generation of reassortants
  - Chong Li … Montserrat Torremorell. "Quantification of influenza within-host diversity and transmission in naïve and vaccinated pigs using a co-infection model" Submitted for publication 2 May 2022
    - Take Home: vaccination is more likely to affect the IAV within-host genetic selection on specific sites than at the whole genome or gene segment, and the shared variants between pigs were more likely due to random mutations.