OFFLU swine influenza virus meeting
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USA Herd-based Research Update

- Montse Torremorell leads a team of researchers at the University of Minnesota Swine Disease Eradication Center dedicated to understanding transmission of and developing control measures for IAV-S in swine breeding herds.
- In swine breeding herds
  - Piglets maintain, diversify and transmit influenza to other farms.
  - Influenza prevalence at weaning varies significantly between weaned groups.
  - Control of influenza in breeding herds is critical to reduce transmission to other farms.

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Swine Disease Eradication Center

The identification of high risk periods for influenza circulation and influenza seasonality could guide sow vaccination control strategies

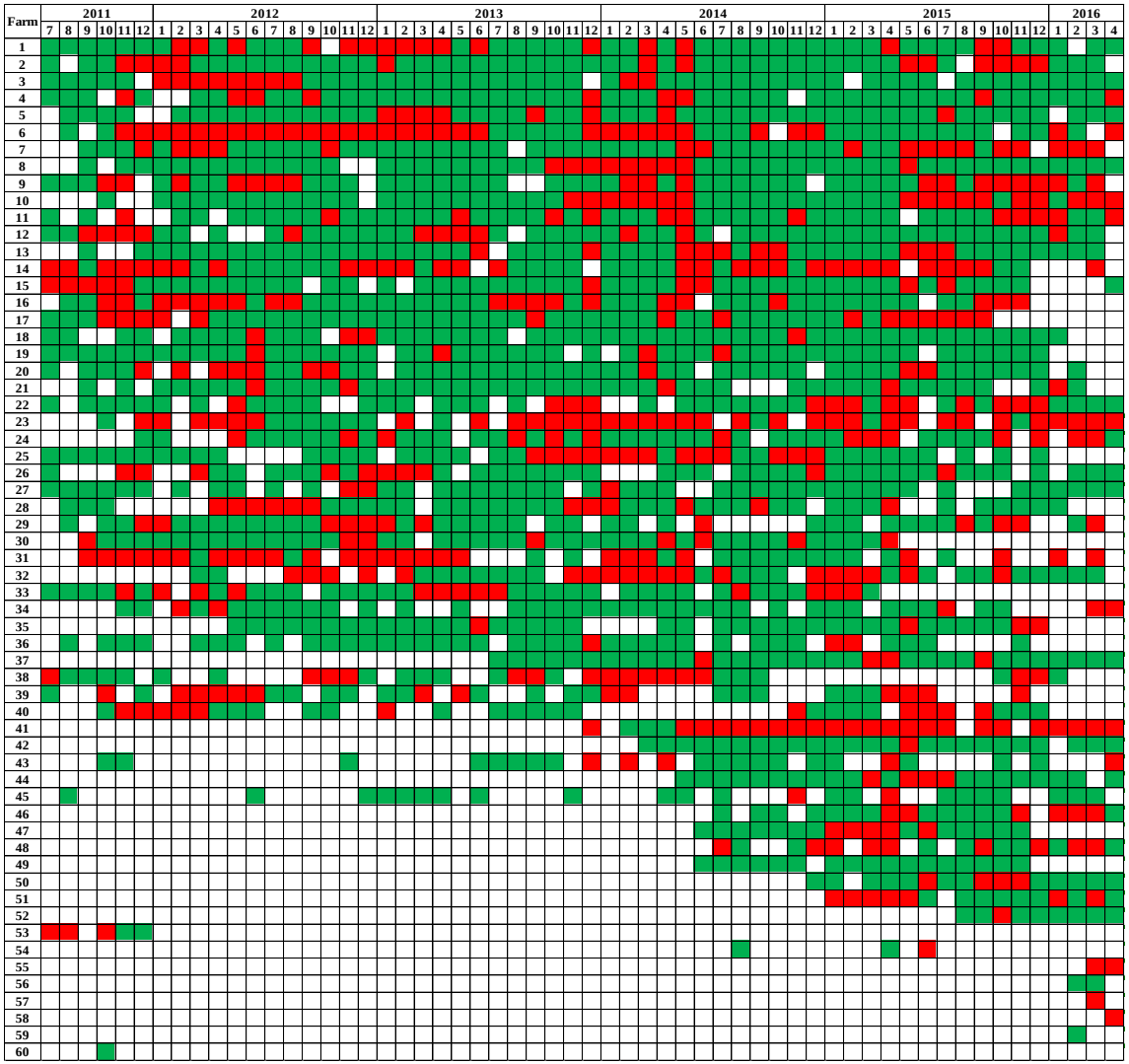
Objectives:

- Assess herd-level prevalence and seasonality of influenza in a pig production system.
- Associate influenza prevalence with meteorological conditions.
- Characterize influenza genetic diversity at the system level.

Materials and methods:

- Influenza system-based **active surveillance program** from 2011-2016.
- 60 breed-to-wean farms located in US Midwest – one production "system."
- Mean farm size was 3249 sows.
- Piglets prior to weaning were sampled.
- 4 Oral fluids/farm/month (10% prev, 93% confidence).

Active surveillance program results



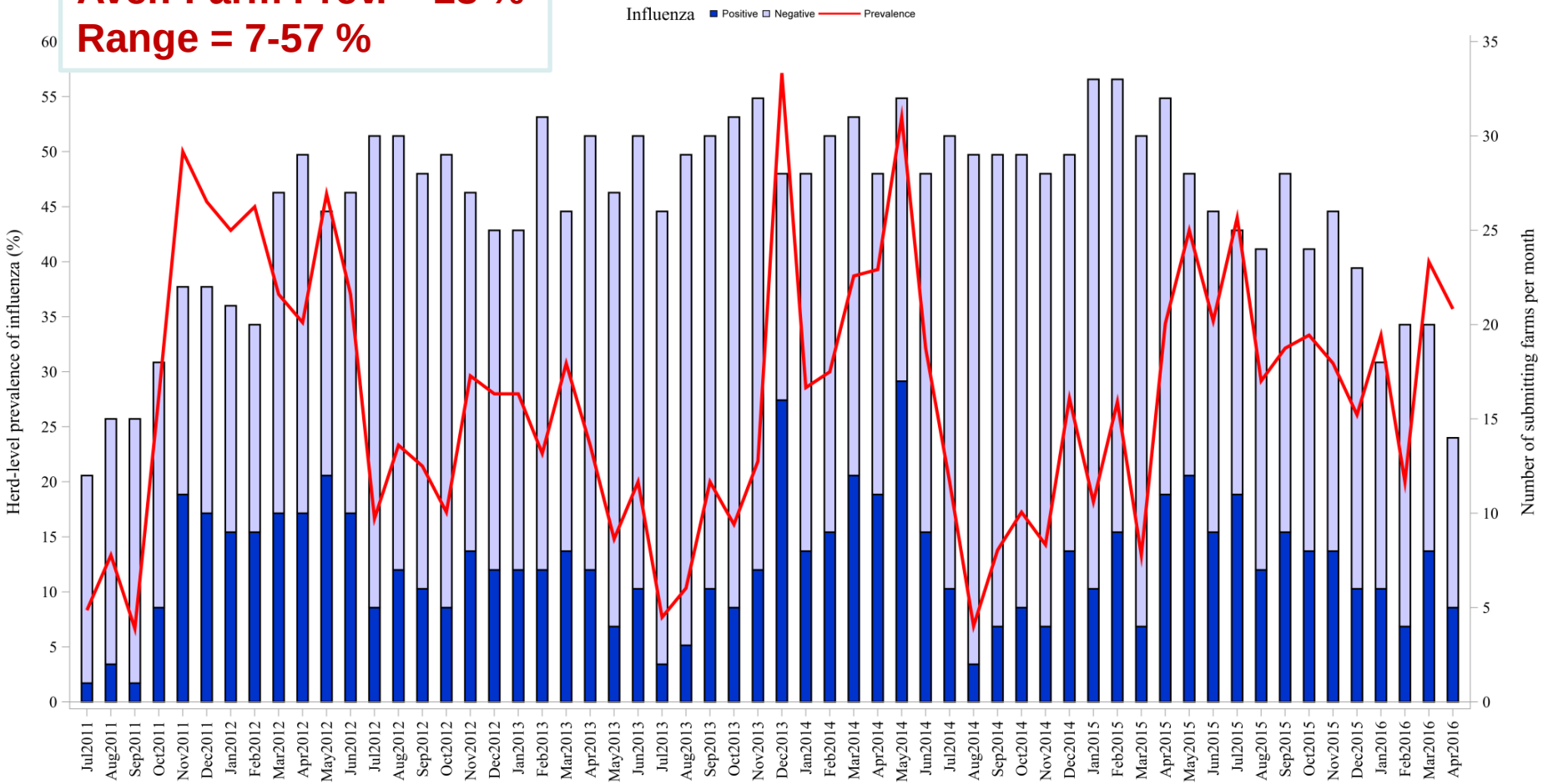
60 Farms (58 months)
2105 submissions
7775 oral fluids

Average:
35 submissions/farm
4 oral fluids/submission
Se = 0.89

Selected for further analysis (≥30 subs, Se≥ 0.87):
34 farms
1523 submissions (28% pos)
6066 oral fluids
45 submissions/farm
13 pos. subm/farm
4 oral fluids/submission
Se = 0.92

Influenza herd-level prevalence varied over time

n years= ~5
n months = 58
Aver. Farm Prev. = 28 %
Range = 7-57 %



Conclusions:

- Influenza is widespread in BTW pig farms.
- Influenza prevalence was seasonal across the years evaluated.
- Influenza prevalence increased during fall, peaked in winter and spring, and decreased in summer months.
- Influenza detection dynamics may be partially associated with air absolute humidity.
- Co-circulation of genetically distinct viruses was common over time.

- **Implications:**
  - Year round surveillance is very valuable.
  - Identification of high risk periods
  - Guidance for control strategies.
- **Limitations:**
  - Limited extrapolation given that this study was based on one production system.
  - Other unmeasured farm factors (e.g. vaccination) could impact influenza detection dynamics over time.

Related Research Results:

- During infections of influenza in swine, the air and surfaces in swine housing facilities contain detectable levels of viable influenza virus representing an exposure hazard to swine and people
  - Potential routes for influenza indirect transmission include:
    - Air/droplets inside animal holding areas
    - Contaminated surfaces

Live Animal Markets in Minnesota: A Potential Source for Emergence of Novel Influenza A Viruses and Interspecies Transmission

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Characterization of Viral Load, Viability and Persistence of Influenza A Virus in Air and on Surfaces of Swine Production Facilities

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Airborne Detection and Quantification of Swine Influenza A Virus in Air Samples Collected Inside, Outside and Downwind from Swine Barns

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