

# Avian Influenza in the United States Commercial Upland Gamebird Industry: Selected Practices as Exposure Pathways and Analysis of Surveillance Systems

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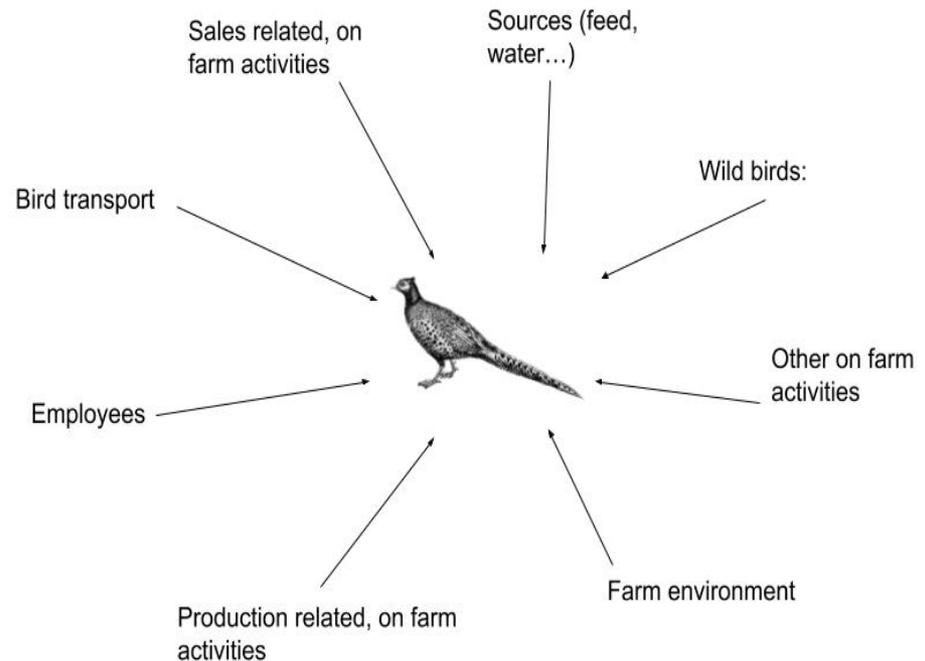
# The Upland Gamebird (UG) Industry

- Markets
  - Production of:
    - Live birds for: Raise-for-release and dog training
    - Meat birds for: Restaurants, other niche buyers
  - Operation of hunting preserves/lodges
- Management production structure
  - Can be partially or fully integrated in production
- Common Species: Pheasant, Chukar, Quail, Wild Turkey



# Avian Influenza (AI) in the UG Industry

- How much do we really know about the epidemiology of AI in UG Industry in the U.S?
  - To what extent does AI actually occur in the industry?
- What are the exposure pathways?
- Multiple markets monitored by different surveillance programs



# Aims

- To explore the involvement of upland gamebird premises in recorded multi-premises epizootics
- To determine frequency of exposure pathways through specific production practices
  - Having connections to live bird markets (LBMs)
  - Raising ducks on-site
- To assess possible impacts of the implementation of AI active surveillance systems on epizootic documentation



# Scope of Study

- Epizootics in United States, beginning in 1980 (the first recorded UG AI detection until present)
- Focusing on commercial UG farms:
  - With the commonly raised species
  - Having 1000+ birds with primary market channel of raise-for-release (hunting clubs) or dog training
- Epizootics involving commercial turkey and chicken farms included for comparison purposes

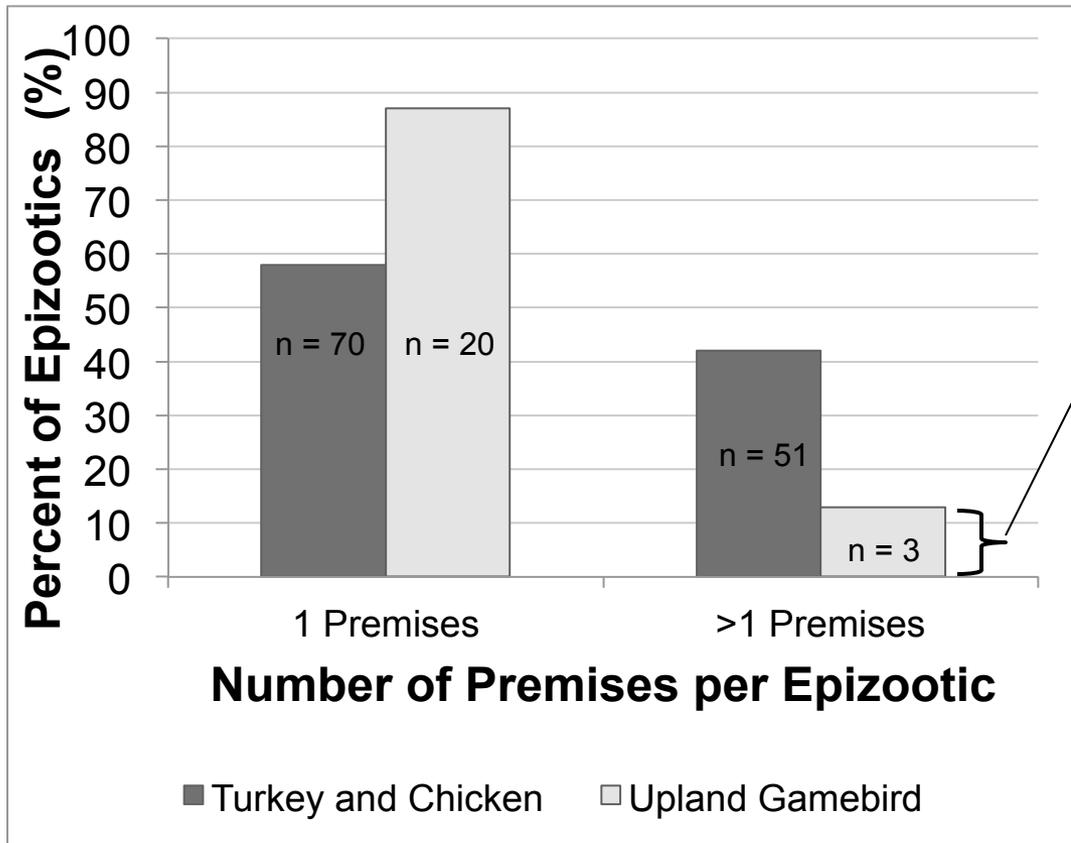


# Analysis of Epizootic Data

- Working definitions for key study components were established
- Accessed data from literature was compiled into a dataset in Microsoft Excel
- Descriptive analysis for each objective were performed via:
  1. Comparison of proportions of single or multi premises epizootics between industries
  2. Assessment of frequency of premises' participation in raising ducks on-site and having connections with LBMs
  3. Comparison of proportions of selected practice before and after surveillance system implementation



# Multi-Premises vs Single-Premises Epizootics



- Three Multi-Premises Outbreaks Involving UGs:**
- 1983 HPAI H5 in Pennsylvania
  - 1986 LPAI H5N2 in Pennsylvania
  - 2002 H7N2 in North Carolina



# Infected UG Premises Possible Involvement in Widespread Epizootics

Epizootic (Year, Location, AIV)	UG species on affected premises	Suspected source for AIV <u>on affect UG premises</u>	Evidence of spread from UG premises
1980 MN LPAI H7N3	Pheasants	Wild Bird	Confirmed to have <b>no epi links to surrounding turkey farms</b>
1983 PA HPAI H5N2	Chukar	LBM Connections	Part of a wide spread outbreak; <b>no documented evidence of spread from UG premises</b>
1986 PA LPAI H5N2	Chukar	LBM Connections	Part of a wide spread outbreak; <b>no documented evidence of spread from UG premises</b>
2002 NC LPAI H7N2	Quail	LBM Connections	Possible cross over into surrounding commercial turkey premises
2009 NJ LPAI H7N3	Pheasants	Wild Bird	<b>Documented spread to another farm</b> (unconfirmed as commercial or hobby, excluded from scope of analysis)
2015 WA HPAI H5N2	Pheasant/ Chukar	Wild Bird	Part of a wide spread outbreak; <b>no evidence of spread from UG premises</b>



# Assessing Specific Practices

- Total epizootics: **23**
- **56.5%** of epizootics involved an UG premises that raised ducks on-site
- **13.1%** of epizootics involved an UG premises that had connections to LBMs
- Large proportion of unknowns

Participation	Raising Ducks On-site	Connections to LBMs
Yes	13 (56.5%)	3 (13.1%)
No	3 (13.1%)	11 (47.8%)
Unknown	7 (30.4%)	9 (39.1%)



# Surveillance System Impact on Documentation of Premises Raising Ducks On-site

Surveillance System	Yes	No	Unknown
<b>Pre-implementation</b> of NPIP H5/H7 AI "Monitored" Surveillance (n = 16)	7 (43.8%)	2 (12.5%)	7 (43.8%)
<b>Post-implementation</b> of NPIP H5/H7 AI "Monitored" Surveillance (n = 7)	6 (85.7%)	1 (14.3%)	0 (0%)

- Increase in proportion of epizootics involving UG farms that raise ducks on-site: **43.8% increased to 85.7%**
- Decrease in proportion of epizootics involving UG farms unknown to have raised ducks on-site: **43.8% decreased to 0%**



# Surveillance System Impact on Documentation of Premises Having Connections to LBMs

- Increase in proportion of epizootics involving UG farms that had no connections to LBMs: **14.3% increased to 100%**
- Decrease in proportion of epizootics involving UG farms unknown to have connections to LBMs: **64.3% decreased to 0%**

Surveillance System	Yes	No	Unknown
<b>Pre-implementation of LBM Uniform Standards AI Surveillance</b> (n = 14)	3 (21.4%)	2 (14.3%)	9 (64.3%)
<b>Post-implementation of LBM Uniform Standards AI Surveillance</b> (n = 9)	0 (0%)	9 (100.0%)	0 (0%)



# Overall Results Summary

- On exploring the involvement of commercial UG farms in multi-premises epizootics
  - Epizootics that involve UG farms are typically limited to just one premises
- On examining selected practices as exposure pathways
  - Both explored practices pose an observable risk
- On the effect of surveillance systems
  - An observable timeframe effect in reporting of both selected practices was evident



# Conclusion

- There is a need to explore why AI epizootics involving UG farms are typically limited to one UG premises: **Are routes of virus spread homogenous among poultry industries?**
- In terms of frequency, raising ducks was more apparent as an AIV exposure pathway than LBM connections in the UG industry, but both were observed. **What other practices may serve as exposure pathways?**
- The existence of epizootics in which none of the selected practices was reported demonstrates **the need for more robust epizootic data collection and accessibility to determine other exposure pathways**
- In this study, inconsistency of records, vague documentation, and limited record accessibility were all encountered



# Acknowledgements

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